Facility: **Browns Ferry NPP** Scenario No.: **A** Op-Test No.: **ILT 1102**

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

Initial Conditions: IC190 / Unit 3 Reactor Power 83% / RHRSW Pump B2 is tagged out of service / APRM 3 is bypassed for Surveillance Testing

Turnover: Alternate Bus Duct Cooling Fans per 3-OI-47 Section 6.11.1[2]. Raise Reactor Power to 90% with Reactor Recirculation.

Event No.	Malf. No.	Event Type*	Event Description
1		N-BOP N-SRO	Bus Duct Cooling Fan rotation 3-OI-47 Section 6.11.1[2]
2		R-ATC R-SRO	Raise Reactor Power with Recirc
3	rd01a	C-ATC C-SRO	CRD Pump 3A Trip
4	og05a	I-BOP TS-SRO	HWC Malfunction
5	th12a	C-ATC C-SRO	Recirc Pump 3A High Vibration
6	hp01	C-BOP TS-SRO	HPCI Inadvertent Initiation
7	hp08 hp09 th23	M-ALL	HPCI Steam Leak Fail to isolate / Loss of 480 V RMOV Bd 3A/ ED on Temps
8	fw12	C	Startup Level Control Valve Failure
9	ad03b	C	1 ADS Valve fails to operate

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

Console Operator Instructions

A. Scenario File Summary

1. File: batch and trigger files for scenario 3-A

Batch nrc2011aR1
#rhrsw pump B2 clearance
ior ypobkrrhrswpb2 fail_tcoil
ior zlohs2319a[1] off

#aprm 3 bypassed for 3-sr-3.3.1.1.16

#crd a pump trip
imf rd01a (e1 0)

#hpci Initiation
imf hp01 (e5 0)

#recirc pump a vibration high
imf th12a (e10 0)

#hwc malfunction
imf og05a (e15 60) 99
ior xa5553a[10] (e15 0) alarm_on
trg 16 nrc20110440
trg 16 = mmf og05a 100 360 99

Trigger nrc20110440
zdihs0440a[1].eq.1

#HPCI Steam Leak/major (have to manually modify fp02 to close)
mrf fp02 (e20 0) close
imf hp09
imf hp08 (e20 0) 8 600 4
trg 21 nrc2011732
trg 21 = imf ed12a
ior ypovfcv733 (e20 0) fail_now
imf fw12
imf ad03b

#if crew anticipates ED, may have to raise severity

Trigger nrc2011732
zdihs732[1].eq.1

Console Operator Instructions

Scenario 3-A

		DESCRIPTION/ACTION
Simulator Setup	manual	Reset to IC 190
Simulator Setup	**Load Batch**	Bat nrc2011aR1
Simulator Setup	manual	Place APRM 3 in Bypass
Simulator Setup	manual	Clearance out RHRSW Pump B2 and CRD Pump A
Simulator Setup		Verify Batch file loaded

RCP required (83% - 90% w/Recirc flow) – Provide marked up copy of 3-GOI-100-12 and RCP for Urgent Load Reduction.

Scenario Summary:

With the unit at 83% power, the BOP operator will rotate Bus Duct Cooling Fans IAW 3-OI-47 section 6.11.1[2]. Upon completion the ATC will commence power increase with flow.

When the NRC is satisfied with the reactivity manipulation, CRD Pump 3A will trip. ATC will perform 3-AOI-85-3 actions to start the Standby CRD Pump.

Once the Standby CRD Pump is started and CRD parameters are restored, the Hydrogen Water Injection system will malfunction resulting in high hydrogen concentration in Off Gas. The crew will respond IAW with ARPs and 3-AOI-66-1 and shutdown the Hydrogen Water Chemistry System. The SRO will address TRM 3.7.2 and Enter Condition A.

After shutdown of the HWC System, high vibration alarms on Reactor Recirculation Pump 3A will have the crew respond IAW the ARPs. The ARPs will direct the operators to adjust RR Pump 3A speed, in an attempt to lower vibrations on RR Pump 3A. Once speed is adjusted, high vibration alarm will clear and vibrations will lower.

After the RR Pump 3A vibrations is addressed, HPCI will inadvertently initiate. The crew will verify the initiation is inadvertent and trip and lockout HPCI. The SRO will address Technical Specification 3.5.1 and Enter Condition C.

Shortly 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 RMOV Board will be lost due to an electrical fault.

The crew will enter 3-EOI-3 and scram the Reactor. All rods will insert on the scram and level and pressure will be controlled IAW 3-EOI-1. The crew should lower reactor pressure. As the second MAX safe temperature is approached, the crew should anticipate Emergency Depressurization and when the second MAX safe temperature is reached the crew will Emergency Depressurize.

During ED, one ADS valve will fail and the operator will open an additional SRV. After ED, the startup level controller will fail. The crew will control level with Core Spray Loop 2 and place RHR Loop 2 in Suppression Pool Cooling.

The Emergency classification is 3.1-S.

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

All Control Rods are inserted.

Emergency Depressurization complete.

Reactor Level is restored and maintained.

Simulator Event Guide:

Event 1 Normal: Bus Duct Cooling Fan rotation, 3-OI-47, Section 6.11.1[2]

	SRO	Directs BOP to rotate Bus Duct Cooling Fans.
	BOP	Rotate Bus Duct Cooling Fans, IAW 3-OI-47, Section 6.11.1[2]
		[2] **PERFORM** the following to **SWAP** from Bus Duct Cooling Fan A to Fan B: [2.1] **VERIFY** U-3 GEN BUS DUCT HTX B INLET VANE DMPR, 3-DMP-262-0057, is fully OPEN. [2.2] **DRAIN** water from 3B bus duct fan housing as follows: [2.2.1] Simultaneously **OPEN** GEN MAIN BUS COOLING FAN B DRAIN VALVE, 3-DRV-262-0002, and **OBSERVE** GEN MAIN BUS COOLING FAN B DRAIN SIGHT GLASS, 3-LG-262-0002, for water. [2.2.2] **WHEN** GEN MAIN BUS COOLING FAN B DRAIN SIGHT GLASS, 3-LG-262-0002, no longer indicates water flow, **THEN CLOSE** GEN MAIN BUS COOLING FAN B DRAINVALVE, 3-DRV-262-0002.
Driver	**Driver**	Pre start walk down complete Inlet Damper is Fully Open, Water has been drained from fan housing, B Fan is not rotating.
	BOP	[2.3] On Panel 9-7, **MOMENTARILY PLACE** GEN BUS DUCT HX FAN A, 3-HS-262-0001A, in STOP. [2.4] On Panel 9-7, **MOMENTARILY PLACE** GEN BUS DUCT HX FAN B, 3-HS-262-0002A, in START.

Simulator Event Guide:

Event 2 Reactivity: Raise Power with 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	NRC	When satisfied with Reactivity Manipulation, CRD Pump Trip
	DRIVER	When directed by lead examiner, Trigger 1 CRD Pump Trip

Simulator Event Guide:

Event 3 Component: CRD Pump 3A Trip

	ATC	Reports Trip of CRD Pump 3A.
	SRO	Announces entry into 3-AOI-85-3, "CRD System Failure".
		4.1 Immediate Actions [1] **IF** operating CRD PUMP has failed **AND** the standby CRD Pump is available, **THEN PERFORM** the following at Panel 3-9-5: [1.1] **PLACE** CRD SYSTEM FLOW CONTROL, 3-FIC-85-11, in MAN at minimum setting. [1.2] **START** associated standby CRD Pump using one of the following: • CRD PUMP 3B, using 3-HS-85-2A [1.3] **ADJUST** CRD SYSTEM FLOW CONTROL, 3-FIC-85-11, to establish the following conditions: • CRD CLG WTR HDR DP, 3-PDI-85-18A, approximately 20 psid. • CRD SYSTEM FLOW CONTROL, 3-FIC-85-11, between 40 and 65 gpm. [1.4] **BALANCE** CRD SYSTEM FLOW CONTROL, 3-FIC-85-11, and **PLACE** in AUTO or BALANCE.
	Driver	If Dispatched to CRD Pump 3A, pump is extremely hot to touch. CRD Pump 3B - oil levels in band, pump ready for start, conditions normal after the start. CRD 3A - report breaker tripped on over current, Electrical Maint called.
	NRC	When ready, HWC Malfunction.
Driver	Driver	Upon Lead examiner direction, initiate Trigger 15 for HWC Malfunction.

Simulator Event Guide:

Event 4 Instrument: HWC Malfunction

<table>
<tr><td></td><td>BOP</td><td>Respond to Off Gas Panel Alarms 9-53-10, 3, and 13</td></tr>
<tr><td></td><td></td><td>53-10, H2 Water Chemistry Abnormal
A. Checks H2 concentration on H2 analyzer on 3-9-53.
B. Dispatches personnel.</td></tr>
<tr><td></td><td></td><td>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.</td></tr>
<tr><td></td><td>SRO</td><td>Announces entry into 3-AOI-66-1, “Off Gas H2 High”.</td></tr>
<tr><td></td><td>Driver</td><td>When dispatched to Panel report, “H2 injection rates above (high) setpoint cannot adjust”</td></tr>
<tr><td></td><td>BOP</td><td>3-AOI-66-1, “Off Gas H2 High”

[2] IF HWC System injection is in service, THEN PERFORM the following

[2.1] At HYDROGEN WATER CHEMISTRY CONTROL PANEL, 3-LPNL-925-0589, VERIFY that H2 and O2 injection rates are normal at Operator Interface Unit (OIU). (H2 injection rate should match the setpoint on the OIU. 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 shut down 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].</td></tr>
<tr><td>Driver</td><td>Driver</td><td>If directed to perform HWC Shutdown locally, inform Control Room that scaffold is in the way cannot access switch.</td></tr>
<tr><td></td><td>BOP</td><td>Shutdown HWC System using either 3-HS-4-40A at panel 9-53 or 3-HS-4-40B at panel 9-5</td></tr>
<tr><td></td><td>SRO</td><td>[4] IF hydrogen concentration is ≥ 4%, THEN REFER TO TRM 3.7.2</td></tr>
<tr><td>NRC</td><td>NRC</td><td>Once HWC is Shutdown, H2 Concentration will begin to lower slowly</td></tr>
</table>

Simulator Event Guide:

Event 4 Instrument: HWC 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.
	SRO	[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.
	SRO	**REFER TO** TRM 3.7.2
		Condition A: With the concentration of hydrogen > 4% by volume Required Action A.1: Restore the concentration to within the limit Completion Time: 48 hours
	NRC	When ready, Recirc Pump 3A High Vibration.
Driver	Driver	Upon Lead examiner direction, initiate Trigger 10 for Recirc Pump 3A High Vibration.

Simulator Event Guide:

Event 5 Component: Recirc Pump 3A High Vibration

	ATC	Responds to alarm, RECIRC PUMP MTR A VIBRATION HIGH.
	BOP/ATC	A. **CHECKS** temperatures for RECIRC PMP MTR 3A/3B WINDING **AND** BRG TEMP recorder, 3-TR-68-71 on Panel 3-9-21 are below: • Pump motor bearing temperatures (< 190°F) • Pump motor winding temperatures (< 255°F) • Pump Seal Cavity temperatures (< 180°F) • Pump cooling water from Seal Cooling temperature (< 140°F) • Pump motor cooling water from bearing temperature (< 140°F) B. **CHECKS** for a rise in Drywell equip sump pumpout rate, due to seal leakage. C. **DISPATCHES** personnel to 3-LPNL-925-0712, (Vibration Mon. System) on EL 565' (S-R17), to **REPORT** the Vibration Data for Pump A and any other alarm indications, to the Unit Operator. The person shall advise the Unit Operator of any changes in the vibration values. D. **IF** alarm seals in, **THEN ADJUST** pump speed slightly to try reset the alarm. E. **IF** unable to reset alarm, **THEN CONSULT** with Unit Supervisor, and with his concurrence, SHUTDOWN the Recirc pump and **REFER TO** 3-AOI-68-1A or 3-AOI-68-1B. F. **IF** pump operation continues, **THEN RECORD** pump 3A seal parameters hourly on Attachment 1, Page 22 of this ARP.
Driver	Driver	When dispatched, report all vibration points are elevated and point 3-XI-068-0059D is at 12.5 mils. After speed is lowered, vibration reading lowered slightly, point 59D is 12 mils.
	ATC	Lowers Pump Speed in an attempt to reset high vibration alarm.
Driver	Driver	**IF** Speed is lowered a second time, vibration readings lowered again and point 59D is10 mils. **THEN** Delete th12 a
	SRO	Determine whether to remove RR Pump 3A.
	ATC	Records seal parameters hourly for RR Pump 3A.
	NRC	When ready, HPCI Inadvertent Initiation.
Driver	Driver	Upon Lead examiner direction, initiate Trigger 5 for HPCI Initiation.

Simulator Event Guide:

Event 5 Component: Contingent if SRO removes RR Pump 3A

	SRO	Directs RR Pump 3A Shutdown, IAW 3-OI-68, Section 7.2.
	ATC	**7.2 Stopping a Recirc Pump (Mode 1) & Single Loop Operation** **CAUTIONS** 1) Prior to stopping a Recirc Pump, all attempts should be made to evaluate where the plant conditions will end up, when a Recirc Pump is removed from service. If practical, the control rod line should always be below 95.2% before stopping a Recirc Pump. At BFN, deliberate entry into Regions 1, 2, or 3 is **NOT** permitted. 2) Per Technical Specifications, the reactor CAN BE operated indefinitely with one Recirc loop out of service, provided the requirements of T.S. 3.4.1 are implemented within 24 hours of entering single loop operations.
	ATC	[1] **IF** stopping of the 3A Recirc Pump is immediately required, **THEN PERFORM** the following: (Otherwise N/A)
	ATC	[4] **REDUCE** reactor power by a combination of control rod insertions and core flow changes, as recommended by the Reactor Engineer/Unit Supervisor, to maintain operating recirc pump flow less than 46,600 gpm. REFER TO 3-GOI-100-12, 3-GOI-100-12A, and 3-SR-3.1.3.5(A).
	ATC	[5] **WHEN** desired to control Recirc Pumps 3A and/or 3B speed in preparation for shutting down a recirc drive, **THEN ADJUST** Recirc Pump speed 3A and/or 3B using the following push buttons as required: **Recirc Drive** **3A** **RAISE** SLOW, 3-HS-96-15A **RAISE** MEDIUM, 3-HS-96-15B **LOWER** SLOW, 3-HS-96-17A **LOWER** MEDIUM, 3-HS-96-17B **LOWER** FAST, 3-HS-96-17C
Driver	Driver	If Reactor Engineer is contacted, inform crew to follow Urgent Load Reduction RCP.
	NRC	When ready, HPCI Inadvertent Initiation.
Driver	Driver	Upon Lead examiner direction, initiate Trigger 5 for HPCI Initiation.

Simulator Event Guide:

Event 5 Component: Contingent if SRO removes RR Pump 3A

	SRO	Directs RR Pump 3A Shutdown, IAW 3-OI-68, Section 7.2.
	ATC	[6] To shutdown Recirc Drive 3A: **PERFORM** the following: (Otherwise N/A) [6.1] **FIRMLY DEPRESS** RECIRC PUMP 3A SHUTDOWN, 3-HS-96-19. [6.2] **VERIFY** Recirc Drive shuts down. [6.3] **VERIFY** DRIVE RUNNING, 3-IL-96-41 is extinguished.
	ATC	[8] **WHEN** RECIRC LOOP A DIFF PRESS LOW 3-PDA-68-65 "ALARMS", **CLOSE**, RECIRC PUMP 3A DISCHARGE VALVE, 3-HS-68-3A.
		[10] **WHEN** conditions allow, **THEN MAINTAIN** operating jet pump loop flow greater than 41 x 106 lbm/hr (3-FI-68-46 or 3-FI-68-48).
	NRC	When ready, HPCI Inadvertent Initiation.
Driver	Driver	Upon Lead examiner direction, initiate Trigger 5 for HPCI Initiation.

Simulator Event Guide:

Event 6 Component: HPCI Inadvertent Initiation

	BOP	Recognizes and responds to an inadvertent HPCI initiation and reports it to the SRO.
		Verifies by multiple indications that the initiation signal is not valid and reports it to the SRO.
	SRO	Directs BOP to trip HPCI and place the Aux Oil Pump in Pull-to-Lock.
	BOP	Trips HPCI and places the Aux Oil Pump in Pull-to-Lock (after turbine stops).
	ATC	Reports power / level/ pressure stable after HPCI secured.
		Reports FWLC system transferred from 3-element control to single-element control.
	SRO	Refer to Technical Specification 3.5.1 Condition C: HPCI System Inoperable Required Action C.1: Verify by administrative means RCIC System is Operable C.2: Restore HPCI System to Operable status Completion Time C.1: Immediately C.2: 14 Days
		Directs Instrument Mechanics to investigate the HPCI initiation logic.
iver	Driver	Acknowledge Notifications and directions.
	ATC	Places FWLC system back in 3-element control per 3-OI-3.
		[1] **IF** desired to transfer level control from Single Element to Three Element, **THEN** PERFORM the following: (Otherwise N/A) [1.1] **VERIFY** conditions in Note 2 are met for placing level control in Three Element. [1.2] **OBSERVE** stable steam flow and Feedwater flow. [1.3] **DEPRESS** THREE ELEMENT push-button, 3-HS-46-6/3. • **VERIFY** green backlight for push-button illuminates. [1.4] **VERIFY** extinguished green backlight for SINGLE ELEMENT push-button, 3-HS-46-6/1. [1.5] **CHECK** Reactor water level stable.
		Reports to US that FWLC placed back in 3-element control.
NRC	NRC	When Ready, Major HPCI Steam Leak.
Driver	Driver	Upon Lead examiner direction, initiate Trigger 20 for HPCI Steam Leak.

Simulator Event Guide:

Event 6 Component: HPCI Inadvertent Initiation

	BOP	Reports Suppression Chamber Water Level Abnormal, greater than (-) 1".
	SRO	Enters EOI-2.
		Monitor and Control Suppression Pool Level between -1 inch and -6inch, (Appendix 18).
	BOP	Checks ECCS systems for sources of water.
		Reports HPCI minimum flow 73-30 open, attempts close valve. (Valve will **NOT** remain closed with initiation signal in.)
	Crew	Directs AUO to valve locally to isolate.
Driver	Driver	When dispatched, wait 3 minutes and report ready to isolate at breaker. When directed by operator, **GO TO** Component Override, **THEN** System 73, **THEN** FCV-73-30 Fail_Now.
	SRO	Directs pump down of Torus per App 18.
	SRO	Can Suppression Pool Level Be Maintained Above -6 inches? - YES Can Suppression Pool Level Be Maintained Below -1 inches? - YES
	BOP/ATC	Appendix 18
	BOP/ATC	**IF** Directed by SRO, **THEN REMOVE** water from Suppression Pool as follows: **DISPATCH** personnel to perform the following (Unit 3 RB, El 519 ft, Torus Area):
Driver	Driver	When dispatched, wait 8 minutes and report lined up locally to pump torus.
	BOP	Aligns to pump down torus in Control Room, per Appendix 18. b. **IF** Main Condenser is desired drain path, **THEN OPEN** 3-FCV-74-62, RHR MAIN CNDR FLUSH VALVE. c. **IF** Radwaste is desired drain path, **THEN PERFORM** the following: 1) ESTABLISH communications with Radwaste. 2) OPEN 3-FCV-74-63, RHR RADWASTE SYS FLUSH VALVE.
	BOP	Directs AUO to Start RHR Drain Pump.
Driver	Driver	When directed to start RHR Drain Pump, IRF RH09 **or** RH10 **and** RH11A **or** B
NRC	NRC	When Ready, Major HPCI Steam Leak.
Driver	Driver	Upon Lead examiner direction, initiate Trigger 20 for HPCI Steam Leak.

Simulator Event Guide:

Event 7 Major: HPCI Steam Leak

	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	Driver	When requested, wait 4 minutes and place RPS A on alternate IRF RP04 **and** RP03.

Simulator Event Guide:

Event 7 Major: HPCI Steam Leak

	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.
	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
Driver	Driver	If requested, wait 3 minutes and report Appendix 8E complete, **enter** bat app08e

Simulator Event Guide:

Event 7 Major: HPCI Steam Leak

	SRO	EOI-3 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
		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:
CS#1	**CS#1**	**Enters** EOI-1 RPV Control **and** directs Reactor Scram **before** any temperature exceeds MAX Safe.
CS#2	**CS#2**	Stops at Stop sign When temperatures in two or more areas are above Max Safe, Then Emergency Depressurization is required.
CS#2	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

	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

CS#1	SRO	Enters EOI-1, "RPV Control" and directs Reactor Scram.
CS#1	ATC	Scrams the Reactor and places the Mode Switch in Shutdown.
	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. Should Answer YES; during Scenario and direct Bypass Valves opened.
CS#2	**CS#2**	**IF** Emergency Depressurization is required, **THEN** exit RC/P and enter C2 Emergency Depressurization. Answers YES; when two area temperatures 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. Should begin to lower Reactor Pressure with bypass valves, not to exceed 100° cooldown; until SRO decides that ED is anticipated.
	ATC/BOP	Controls Reactor Pressure as directed with Bypass Valves.
		When directed to Anticipate ED, Opens all bypass valves.

Simulator Event Guide:

Event 7 Major: HPCI Steam Leak

	SRO	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? - 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 Feedwater, Appendix 5A.
	ATC	Maintains the prescribed level band, per Appendix 5A.

Simulator Event Guide:

Event 7 Major: HPCI Steam Leak

	ATC	Maintains the prescribed level band, IAW Appendix 5A.
		1. **IF** It is desired to use a reactor feed pump that is in operation, **THEN CONTINUE** at step 12 to control the operating pump. 2. **VERIFY** Condensate system in service, supplying suction to RFPs. 3. **VERIFY OPEN** 3-FCV-1-125(133)(141), RFPT 3A(3B)(3C) HP STEAM SUPPLY VALVE. 4. **DEPRESS** 3-HS-46-8A(9A)(10A), RFPT 3A(3B)(3C) SPEED CONT RAISE/LOWER, and **VERIFY** amber light is illuminated. 5. **VERIFY** a Main Oil Pump is running for RFPT to be started. 6. **VERIFY** that the green light is illuminated and the red light is extinguished above the following on Panel 3-9-5 3-HS-3-208A, RX WTR LVL CH A HI RFPT/MT TRIP RESET 3-HS-3-208B, RX WTR LVL CH B HI RFPT/MT TRIP RESET.
		7. **VERIFY OPEN** the following valves: 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 8. **DEPRESS** 3-HS-3-124A(150A)(175A), RFPT 3A(3B)(3C) TRIP RESET, and Verify that the turbine trip is RESET.

Simulator Event Guide:

Event 7 Major: HPCI Steam Leak

	ATC	Maintains the prescribed level band, IAW Appendix 5A.
		9. **VERIFY OPEN** 3-FSV-3-20(13)(6), RFP 3A(3B)(3C) MIN FLOW VALVE.
		10. **PLACE** 3-HS-46-112A(138A)(163A), RFPT 3A(3B)(3C) START/LOCAL ENABLE, in START, **AND VERIFY** RFPT speed increases to approximately 600 rpm.
		11. **VERIFY OPEN** 3-FCV-3-19(12)(5), RFP 3A(3B)(3C) DISCHARGE VALVE.
		12. **SLOWLY ADJUST** RFPT speed **UNTIL** feedwater flow to the RPV is indicated, using **ANY** of the following methods on Panel 3-9-5: • Individual 3-HS-46-8A(9A)(10A), RFPT 3A(3B)(3C) SPEED CONT RAISE/LOWER switch in MANUAL GOVERNOR, **OR** • Individual 3-SIC-46-8(9)(10), RFPT 3A(3B)(3C) SPEED CONTROL in MANUAL, **OR** • 3-LIC-46-5, REACTOR WATER LEVEL CONTROL, in MANUAL with individual 3-SIC-46-8(9)(10), RFPT 3A(3B)(3C) SPEED CONTROL in AUTO.
		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** 3-LIC-46-5, REACTOR WATER LEVEL CONTROL, in AUTO with individual 3-SIC-46-8(9)(10), RFPT 3A(3B)(3C) SPEED CONTROL in AUTO.

Simulator Event Guide:

Event 7 Major: HPCI Steam Leak

CS#2	SRO	Enters 3-C-2, “Emergency Depressurization”.
		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.
CS#2	ATC/BOP	Opens 6 ADS Valves.
		Reports 1 ADS Valve failed to Open.
	SRO	Can 6 ADS Valves Be Opened? - NO
		Directs Opening of Additional MSRVs, as necessary, to establish 6 MSRVs Open.
	ATC/BOP	Opens 1 additional MSRV.
	SRO	Are At Least 4 MSRVs Open? - YES
	SRO	Directs Reactor Level Restored to (+) 2 to (+) 51 inches with Condensate (Appendix 6A) **or** Core Spray (Appendix 6D, 6E) **or** LPCI (Appendix 6B, 6C)
	ATC/BOP	Restores Reactor Level to prescribed level band, reports Startup Level Controller failure and restores level with Core Spray Loop 2 **or** RHR Loop 2.
	SRO	Emergency Plan Classification is 3.1-S.

Simulator Event Guide:

Event 7 Major: HPCI Steam Leak

	ATC	Appendix 6A Injection with Condensate
		1. **VERIFY CLOSED** the following Feedwater heater return valves: • 3-FCV-3-71, HP HTR 3A1 LONG CYCLE TO CNDR • 3-FCV-3-72, HP HTR 3B1 LONG CYCLE TO CNDR • 3-FCV-3-73, HP HTR 3C1 LONG CYCLE TO CNDR
		2. **VERIFY CLOSED** the following RFP discharge valves: • 3-FCV-3-19, RFP 3A DISCHARGE VALVE • 3-FCV-3-12, RFP 3B DISCHARGE VALVE • 3-FCV-3-5, RFP 3C DISCHARGE VALVE
		3. **VERIFY OPEN** the following drain cooler inlet valves: • 3-FCV-2-72, DRAIN COOLER 3A5 CNDS INLET ISOL VLV • 3-FCV-2-84, DRAIN COOLER 3B5 CNDS INLET ISOL VLV • 3-FCV-2-96, DRAIN COOLER 3C5 CNDS INLET ISOL VLV
		4. **VERIFY OPEN** the following heater outlet valves: • 3-FCV-2-124, LP HEATER 3A3 CNDS OUTL ISOL VLV • 3-FCV-2-125, LP HEATER 3B3 CNDS OUTL ISOL VLV • 3-FCV-2-126, LP HEATER 3C3 CNDS OUTL ISOL VLV
		5. **VERIFY OPEN** the following heater isolation valves: • 3-FCV-3-38, HP HTR 3A2 FW INLET ISOL VLV • 3-FCV-3-31, HP HTR 3B2 FW INLET ISOL VLV • 3-FCV-3-24, HP HTR 3C2 FW INLET ISOL VLV • 3-FCV-3-75, HP HTR 3A1 FW OUTLET ISOL VLV • 3-FCV-3-76, HP HTR 3B1 FW OUTLET ISOL VLV • 3-FCV-3-77, HP HTR 3C1 FW OUTLET ISOL VLV
		6. **VERIFY OPEN** the following RFP suction valves: • 3-FCV-2-83, RFP 3A SUCTION VALVE • 3-FCV-2-95, RFP 3B SUCTION VALVE • 3-FCV-2-108, RFP 3C SUCTION VALVE
		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.
	ATC	Reports failure of Start Up Level controller.

Simulator Event Guide:

Event 7 Major: HPCI Steam Leak

	ATC/BOP	Appendix 6E Injection with Core Spray Loop 2
		1. **VERIFY OPEN** the following valves: • 3-FCV-75-30, CORE SPRAY PUMP 3B SUPPR POOL SUCT VLV • 3-FCV-75-39, CORE SPRAY PUMP 3D SUPPR POOL SUCT VLV • 3-FCV-75-51, CORE SPRAY SYS II OUTBD INJECT VALVE.
		2. **VERIFY CLOSED** 3-FCV-75-50, CORE SPRAY SYS II TEST VALVE.
		3. **VERIFY** CS Pump 3B **and/or** 3D **RUNNING**.
		4. **WHEN** RPV pressure is below 450 psig, **THEN THROTTLE** 3-FCV-75-53, CORE SPRAY SYS II INBD INJECT VALVE, as necessary to control injection at or below 4000 gpm per pump.
		5. **MONITOR** Core Spray Pump NPSH using Attachment 1.
		Restores Level (+) 2 to (+) 51 inches.

Simulator Event Guide:

Event 7 Major: HPCI Steam Leak

	ATC/BOP	Appendix 6C Injection with RHR Loop 2 LPCI Mode
		1. **IF** Adequate core cooling is assured, **AND** it becomes necessary to bypass the LPCI injection valve auto open signal to control injection, **THEN PLACE** 3-HS-74-155B, LPCI SYS II OUTBD INJ VLV BYPASS SEL in **BYPASS.**
		2. **VERIFY OPEN** 3-FCV-74-24, RHR PUMP 3B SUPPR POOL SUCT VLV.
		3. **VERIFY OPEN** 3-FCV-74-35, RHR PUMP 3D SUPPR POOL SUCT VLV.
		4. **VERIFY CLOSED** the following valves: • 3-FCV-74-75, RHR SYS II DW SPRAY INBD VLV • 3-FCV-74-74, RHR SYS II DW SPRAY OUTBD VLV • 3-FCV-74-71, RHR SYS II SUPPR CHBR/POOL ISOL VLV • 3-FCV-74-72, RHR SYS II SUPPR CHBR SPRAY VALVE • 3-FCV-74-73, RHR SYS II SUPPR POOL CLG/TEST VLV
		5. **VERIFY** RHR Pump 3B **and/or** 3D running.
		6. **WHEN** RPV pressure is below 450 psig, **THEN VERIFY OPEN** 3-FCV-74-67, RHR SYS II LPCI INBD INJECT VALVE.
		7. **IF** RPV pressure is below 230 psig, **THEN VERIFY CLOSED** 3-FCV-68-3, RECIRC PUMP 3A DISCHARGE VALVE.
		8. **THROTTLE** 3-FCV-74-66, RHR SYS II LPCI OUTBD INJECT VALVE, as necessary to control injection.
		9. **MONITOR** RHR Pump NPSH using Attachment 1.
		10. **PLACE** RHRSW pumps in service, as soon as possible, on **ANY** RHR Heat Exchangers discharging to the RPV.
		11. **THROTTLE** the following in-service RHRSW outlet valves to maintain flow between 1350 and 4500 gpm: • 3-FCV-23-46, RHR HX 3B RHRSW OUTLET VLV • 3-FCV-23-52, RHR HX 3D RHRSW OUTLET VLV.
		Restores Level (+) 2 to (+) 51 inches.

Simulator Event Guide:

Event 7 Major: HPCI Steam Leak

	SRO	Continues to evaluate Suppression Pool Level and other legs of EOI-2.
		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	Start RHR Loop 2 in Suppression Pool Cooling, if not being used for level control, IAW Appendix 17A

Simulator Event Guide:

Event 7 Major: HPCI Steam Leak

	ATC/BOP	Initiates Suppression Pool Cooling per 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: HPCI Steam Leak

	BOP	Places H2O2 analyzers in service, IAW Appendix 19.
		5. **IF** H2/O2 Analyzer is in STANDBY at 3-MON-76-110 (Panel 3-9-55), **THEN PLACE** H2/O2 Analyzer in service at as follows: (Touch screen actions unavailable in the simulator)
		6. **VERIFY** H2/O2 ANALYZER SAMPLE PUMP running using 3-XI-76-110 (Panel 3-9-55). 7. **VERIFY** red LOW FLOW indicating light extinguished at 3-MON-76-110, H2/O2 ANALYZER (Panel 3-9-55).
		8. **WHEN** H2/O2 Analyzer has been aligned and sampling for 10 minutes or greater, **THEN OBTAIN** H2 and O2 readings from 3-XR-76-110 H2/O2 CONCENTRATION recorder (Panel 3-9-54).

Critical Tasks - Two

CS#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

CS#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 indications
   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

Scenario Tasks

EVENT	TASK NUMBER	K/A	RO	SRO
1	Rotate Bus Duct Cooling Fans			
	RO U-047-NO-27	400000A4.01	3.1	3.0
2	Raise Power with Recirc Flow			
	RO U-068-NO-17 SRO S-000-NO-138	2.1.23	4.3	4.4
3	CRD Pump Trip			
	RO U-085-AL-07 SRO S-085-AB-03	201001A2.01	3.2	3.3
4	Hydrogen Water Chemistry Malfunction			
	RO U-066-AL-10 SRO S-066-AB-01	271000A1.13	3.2	3.7
5	Reactor Recirculation Pump High Vibrations			
	RO U-068-AL-11	202001A4.05	3.3	3.3
6	HPCI Inadvertent Start			
	RO U-073-NO-05	206000A2.17	3.9	4.3
7	HPCI Steam Leak			
	RO U-073-AL-06 SRO S-000-AB-03 SRO S-000-EM-12 SRO T-000-EM-16	295032EA2.03	3.8	4.0

SCENARIO REVIEW CHECKLIST

SCENARIO NUMBER: 3-A

7 Total Malfunctions Inserted: List (4-8)

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

4 Abnormal Events: List (1-3)

1 Major Transients: List (1-2)

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

1 EOI Contingencies used: List (0-3)

60 Run Time (minutes)

2 Crew Critical Tasks: (2-5)

YES Technical Specifications Exercised (Yes/No)

SHIFT TURNOVER SHEET

Equipment Out of Service/LCO's:

RHRSW Pump B2 is out of service and tagged out.

APRM 3 is bypassed for IMD Surveillance testing.

Operations/Maintenance for the Shift:

Rotate Bus Duct Cooling Fans IAW 3-OI-47 Section 6.11.1[2].

Once completed raise power with flow to 90% IAW 3-GOI-100-12 section 5.0 step 21 and the Reactivity Control Plan.

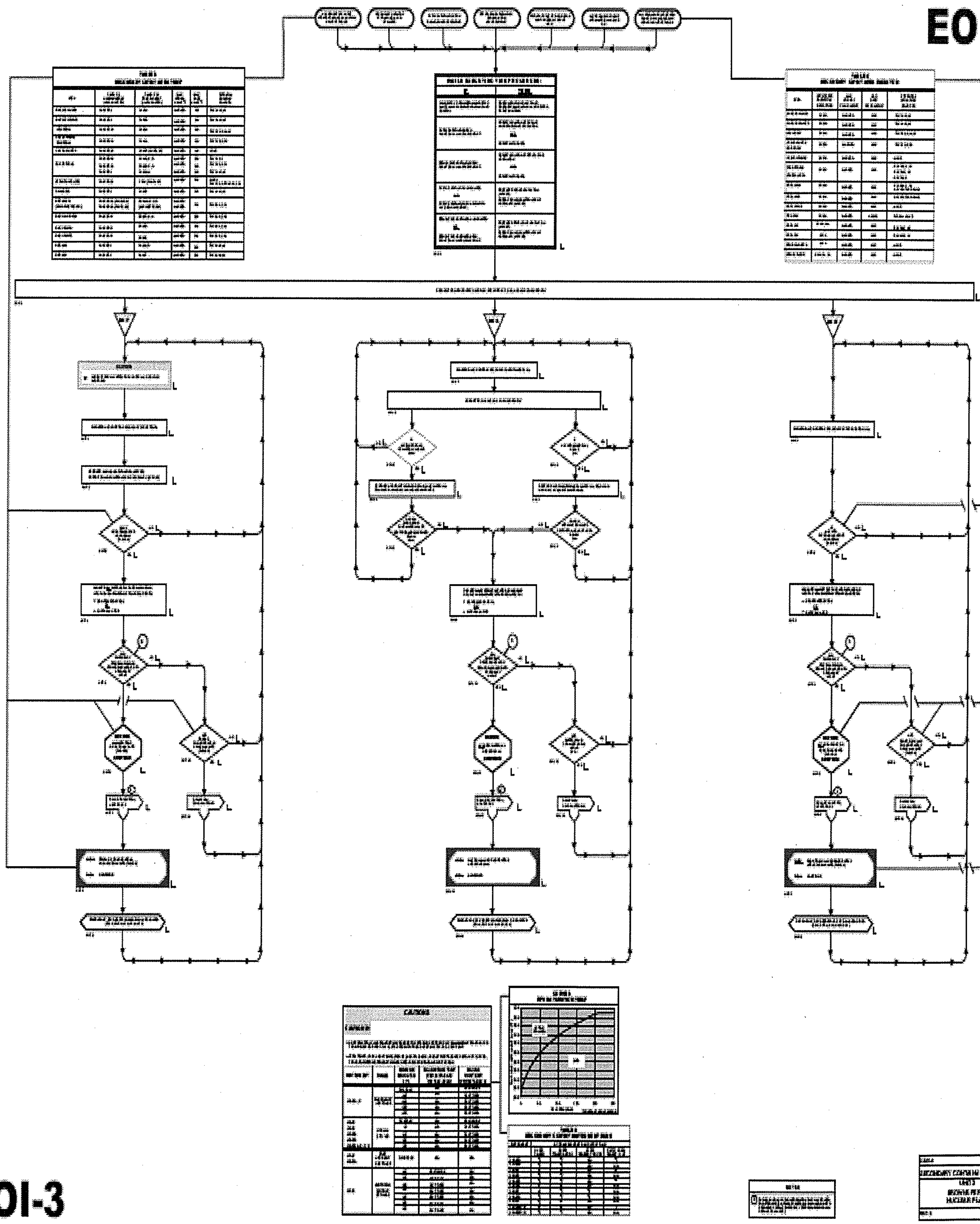
Units 1 and 2 are at 90% power.

Unusual Conditions/Problem Areas:

None

EOI-3

UNIT 3



SECONDARY CONTAINMENT CONT[illegible]

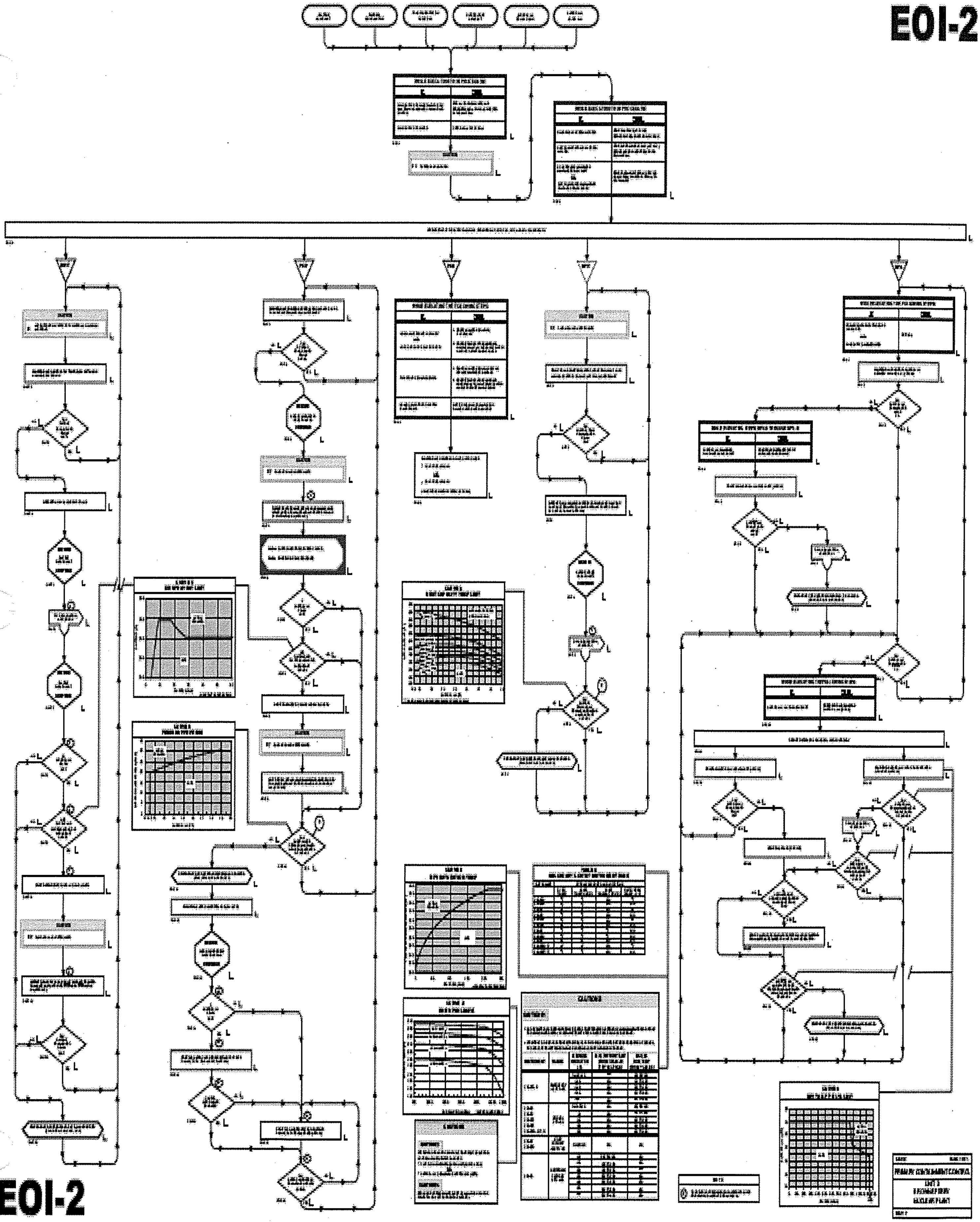
UNIT 3

BROWNS FERRY NUCLEAR PLANT

EOI-3

EOI-3

EOI-2

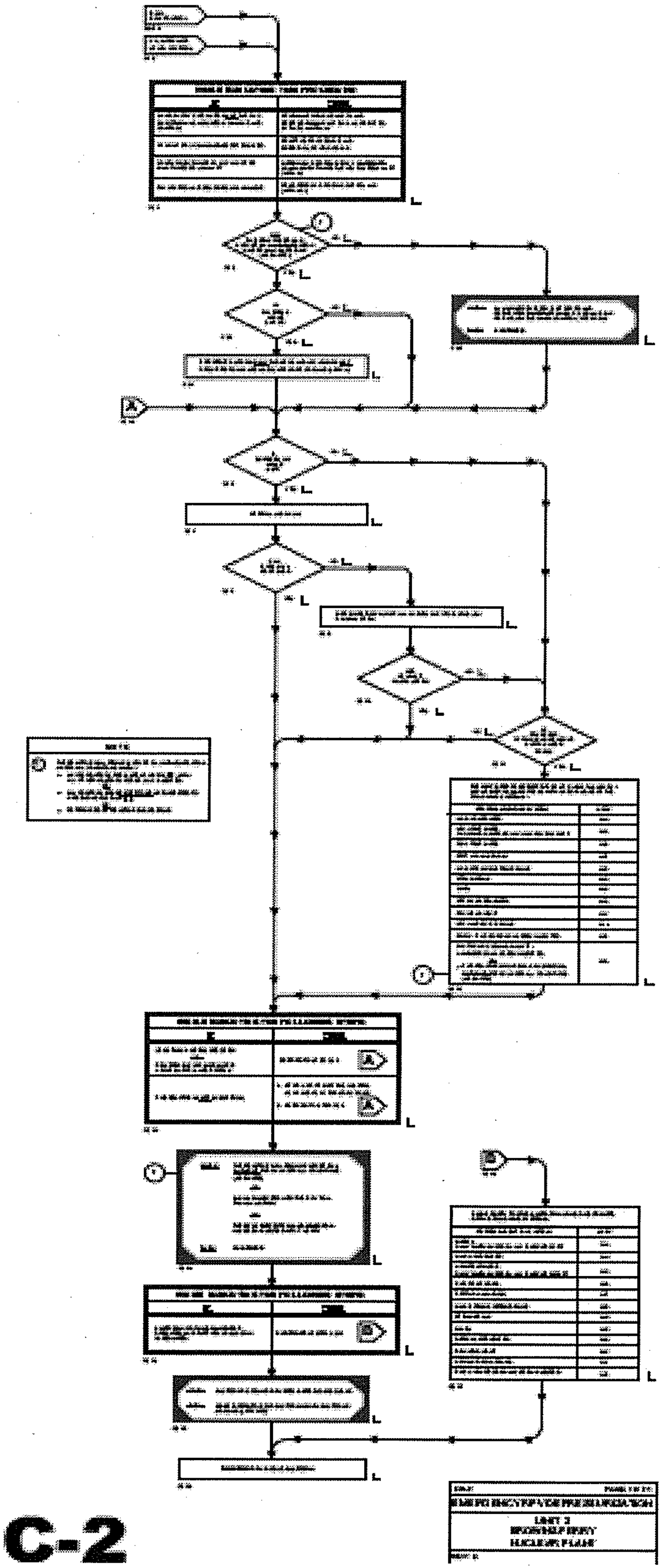


PRIMARY CONTAINMENT CONTROL

UNIT 3
BROWNS FERRY
NUCLEAR PLANT

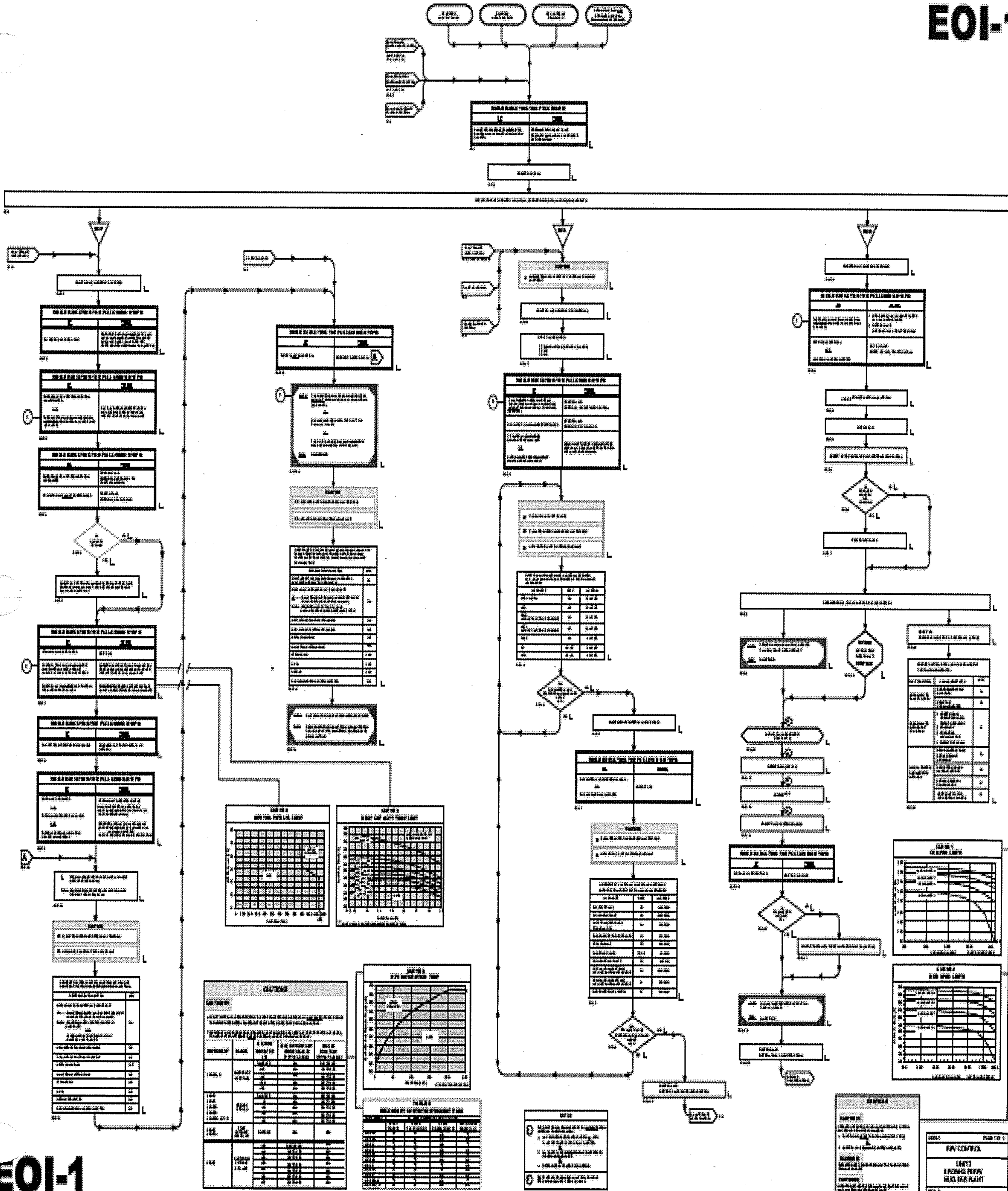
EOI-2

3-C-2 EMERGENCY RPV DEPRESSURIZATION



C-2

EOI-1



EOI-1

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. With the concentration of hydrogen >4% by volume.	A.1 Restore the concentration to within the limit.	48 hours

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. <u>OR</u> 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

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 4.	12 hours 36 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. HPCI System inoperable.	C.1	Verify by administrative means RCIC System is OPERABLE.	Immediately
	AND		
	C.2	Restore HPCI System to OPERABLE status.	14 days
D. HPCI System inoperable. AND Condition A entered.	D.1	Restore HPCI System to OPERABLE status.	72 hours
	OR		
	D.2	Restore low pressure ECCS injection/spray subsystem to OPERABLE status.	72 hours
E. One ADS valve inoperable.	E.1	Restore ADS valve to OPERABLE status.	14 days
F. One ADS valve inoperable. AND Condition A entered.	F.1	Restore ADS valve to OPERABLE status.	72 hours
	OR		
	F.2	Restore low pressure ECCS injection/spray subsystem to OPERABLE status.	72 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
G. Two or more ADS valves inoperable. <u>OR</u> Required Action and associated Completion Time of Condition C, D, E, or F not met.	G.1 Be in MODE 3. <u>AND</u> G.2 Reduce reactor steam dome pressure to ≤ 150 psig.	12 hours 36 hours
H. Two or more low pressure ECCS injection/spray subsystems inoperable for reasons other than Condition A. <u>OR</u> HPCI System and one or more ADS valves inoperable.	H.1 Enter LCO 3.0.3.	Immediately

SECONDARY CONTAINMENT TEMPERATURE

Description

UNUSUAL EVENT

ALERT

SITE EMERGENCY

3.1-S			TABLE	US

An unisolable Primary System leak is discharging into Secondary Containment

AND

Any area temperature exceeds the Maximum Safe Operating Temperature limit listed in Table 3.1.

OPERATING CONDITION:
Mode 1 or 2 or 3

GENERAL EMERGENCY

3.1-G			TABLE	US

An unisolable Primary System leak is discharging into Secondary Containment

AND

Any area temperature exceeds the Maximum Safe Operating Temperature limit listed in Table 3.1

AND

Any indication of potential or significant fuel cladding failure exists. Refer to Table 3.1-G/3.2-G with RCS Barrier intact inside Primary Containment.

OPERATING CONDITION
Mode 1 or 2 or 3

Facility: **Browns Ferry NPP** Scenario No.: **B** Op-Test No.: **ILT 1102**

Examiners:	

Operators:	**SRO:**
	ATC:
	BOP:

Initial Conditions: IC191/ Unit 3 Reactor Power 90%. RCW Pump 3A tagged. 3-PI-3-207 Bypassed for surveillance.

Turnover: Perform Stroke Time Test on 3-FCV-43-13 and 3-FCV-43-14 per 3-SR-3.6.1.3.5 Section 7.3. Raise Reactor Power to 95%.

Event No.	Malf. No.	Event Type*	Event Description
1		N-BOP TS-SRO	Stroke time 2 PCIVs. The second valve will fail open.
2		R-ATC R-SRO	Raise Reactor Power with Recirc
3	th18d	C-ATC C-SRO	VFD Cooling Water Pump failure
4	trg11	C-BOP C-SRO	Steam Packing Exhauster Trip / STBY Exhauster Starts but discharge damper fails to open.
5	pc14	TS-SRO C-BOP	Leak on RHR Loop 1 Minimum Flow Line
6	sw02a	C-ATC C-SRO	Loss of RBCCW – Pump trip with Sectionalizing Valve 3-70-48 failure to close
7	th33a	M-ALL	Drywell Leak with Emergency Depressurization on Drywell Temps
8	tc02	C	Bypass Valves Fail Closed
9	trg25	C	RHR Loop I and II Drywell Sprays Fail

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

Console Operator Instructions

A. Scenario File Summary

1. File: batch and trigger files for scenario 3-B

Batch nrc2011b
#raw cooling water pump a clearance
ior zlohs247a[1] off

#surveillance 3.6.1.5 section 7.3
ior zlohs4314a[1] (e3 5) off
ior zlohs4314a[2] (e3 5) on
ior zlofcv4314[1] (e3 5) off
ior zlofcv4314[2] (e3 5) on
ior zloil641b6[1] (e3 5) off
trg 3 nrc20114314

Trigger nrc20114314
zdihs4314a(3).eq. 1

#wide range pressure bypassed 3-207

#vfd cooling pump failure
ior zlohs682b2a[1] on
ior zlohs682b2a[2] off
mrf th18d trip
ior zdihs682b1a[1] (e1 0) off
trg 2 nrc2011bvfd
trg 2 = bat nrc2011b1

Trigger nrc2011bvfd
zdihs682b2a(3) .eq. 1

Batch nrc2011b1
mrf th18d close
dor zlohs682b2a[1]
dor zlohs682b2a[2]

#RBCCW pump trip
imf sw02a (e5 0)
ior zlohs7048a[1] off
ior zlohs7048a[2] on
ior xa554c19 alarm_off
trg 6 nrc20117048
trg 6 = bat nrc2011b2

Trigger nrc20117048
zdihs7048a[1].eq.1

Batch nrc2011b2
dor zlohs7048a[1]
dor zlohs7048a[2]

#Steam packing blower trip
ior ypomtrspea (e11 0) fail_control_power
ior ypovfcv6635 (e11 0) fail_power_now
ior zlohs6635a[1] on
trg 10 nrc2011spe
trg 10 = bat nrc2011spe

Trigger nrc2011spe
zdihs6635a[3].eq.1

Batch nrc2011spe
dor ypovfcv6635
dor zlohs6635a[1]

#RHR A leak
imf pc14 (e15 0) 10
ior xa554c[17] (e15 30) alarm_on
ior xa554c[24] alarm_off
ior xa554c[30] alarm_off
ior xa554c[31] alarm_off

#Major
imf th33a (e20 0) .8 15
imf tc02 (e20 0) 0
trg 25 nrc2011dwspray2
ior zdihs7475a[2] auto
imf rp07
imf th33b (e25 0) .5 180

Trigger nrc2011dwspray2
zdihs7474a(3).eq. 1

Console Operator Instructions

Scenario 3-B

		DESCRIPTION/ACTION
Simulator Setup	manual	Reset to IC 191
Simulator Setup	**Load Batch**	Bat nrc2011b
Simulator Setup	manual	Place Green covers on Reactor Pressure indications two places. Verify 3-PI-3-207 bypassed
Simulator Setup	manual	Clearance out RCW Pump 3A
Simulator Setup		Verify Batch file loaded, clear VFD alarms

RCP required (90% - 95% w/Recirc flow) – Provide marked up copy of 3-GOI-100-12 and RCP for Urgent Load Reduction.

Marked up Copy of 3-SR-3.6.1.3.5, for section 7.3 performance.

Scenario Summary:

BOP will perform Stroke Time Test on 3-FCV-43-13 and 3-FCV-43-14 with 3-FCV-43-14 failing open. SRO will determine Technical Specification 3.6.1.3 Condition A required.

Then the ATC will raise power with Reactor Recirculation flow to 95%.

Once evaluators satisfied with Reactivity Manipulations, 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.

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.

A leak will develop on RHR Loop 1 common minimum flow line, field reports will indicate the leak can be isolated by closing RHR A and C Pump suction valves. Once suction valves are closed, SRO will determine Technical Specification 3.5.1 Condition A is required, TS 3.6.2.3 Condition B, 3.6.2.4 Condition B, and 3.6.2.5 Condition B all 7 Days.

After RHR Loop 1 is isolated, a RBCCW Pump will trip and the sectionalizing valve will fail to close automatically. Operators will take actions, IAW 3-AOI-70-1, and trip RWCU Pumps; and close the sectionalizing valve for RBCCW.

A LOCA will occur, RPS will fail to de-energize, the crew will scram the Reactor by arming and depressing ARI, and enter EOI-1 and EOI-2. All rods will insert on ARI, level control will be on feedwater; and pressure control will be on SRVs. The bypass valves fail closed during the scram. The LOCA will cause increasing DW Pressure and Temperature; the crew will take action IAW EOI-2. When the crew attempts to spray the Drywell, the Drywell Spray valves will fail to open. Unable to spray the drywell; the crew will need establish limits for DW pressure and temperature for anticipating ED and ED.

The Emergency classification is 2.1-A.

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.

Simulator Event Guide:

Event 1 Normal: Perform Stroke Time Test on 3-FCV-43-13 and 3-FCV-43-14 IAW 3-SR-3.6.1.3.5 Section 7.3

	SRO	Directs BOP to perform 3-SR-3.6.1.3.5, Section 7.3.
	BOP	Performs 3-SR-3.6.1.3.5, Section 7.3.
		7.3 Sampling and Water Quality System Valve Closure Timing [1] **RECORD** the initial position of RX RECIRC SAMPLE INBD ISOLATION VLV, 3-FCV-43-13. OPEN / CLOSED (Circle one)
		[2] On 3-LPNL-925-0009B (RB 621', near steps to Precoat Tank), **PLACE** the following switches to the OPEN position: • REACTOR RECIRC SAMPLE INBD ISOL VLV, 3-HS-043-0013B • REACTOR RECIRC OUTBD ISOLATION VLV, 3-HS-043-0014B
		[3] **VERIFY OPEN** 3-FCV-43-13 using RX RECIRC SAMPLE INBD ISOLATION VLV, 3-HS-43-13A.
		[4] **CLOSE** and **TIME** 3-FCV-43-13, using RX RECIRC SAMPLE INBD ISOLATION VLV, 3-HS-43-13A, and **RECORD** the closure time below. **3-FCV-43-13 Closure Time (Seconds)** **Normal** **Measured** **Maximum** 0.6 - 1.6 5.0
		[4.1] **VERIFY** 3-FCV-43-13 closure time is less than or equal to the maximum closure time.
	NA	[5] **IF** the stroke time measured in Step 7.3[4] is less than or equal to the maximum stroke time value but outside the normal range, **THEN PERFORM** the following: (Otherwise **N/A** this section.)
		[5.1] **OPEN** the 3-FCV-43-13 using RX RECIRC SAMPLE INBD ISOLATION VLV, 3-HS-43-13A. [5.2] **CLOSE** and **TIME** 3-FCV-43-13 using RX RECIRC SAMPLE INBD ISOLATION VLV, 3-HS-43-13A and **RECORD** the stroke time on Attachment 3. [5.3] **VERIFY** the restroke time is less than or equal to the maximum closure time.

Simulator Event Guide:

Event 1 Normal: Perform Stroke Time Test on 3-FCV-43-13 and 3-FCV-43-14 IAW 3-SR-3.6.1.3.5 Section 7.3

	BOP	[6] **RETURN** 3-FCV-43-13, to the initial position recorded in Step 7.3[1], using RX RECIRC SAMPLE INBD ISOLATION VLV, 3-HS-43-13A.
		[7] **RECORD** the initial position of RX RECIRC SAMPLE OUTBD ISOLATION VLV, 3-FCV-43-14. OPEN / CLOSED (Circle one)
		[8] **OPEN** or **VERIFY OPEN** 3-FCV-43-14, using 3-HS-43-14A.
		[9] **CLOSE** and **TIME** 3-FCV-43-14, using RX RECIRC SAMPLE OUTBD ISOLATION VLV, 3-HS-43-14A and **RECORD** the closure time below. **3-FCV-43-14 Closure Time (Seconds)** **Normal** **Measured** **Maximum** 0.4 - 1.4 5.0
		Report Failure of 3-FCV-43-14 to stroke close.
	SRO	Dispatches personnel to investigate.
		Refer to Technical Specification 3.6.1.3.
		Condition A: NOTE Only applicable to penetration flow paths with two PCIVs. One or more penetration flow paths with one PCIV inoperable except due to MSIV leakage not within limits. Required Action A.1: Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured. Required Action A.2 : Verify the affected penetration flow path is isolated. Completion Time : 4 hours except for main steam line and Once per 31 days for isolation devices outside primary containment

Simulator Event Guide:

Event 2 Reactivity: Raise Power with Flow

	SRO	Notifies ODS of power increase.
		Direct 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	NRC	When satisfied with Reactivity Manipulation, VFD Cooling Water Pump Failure.
	DRIVER	When directed by lead examiner, Trigger 1 VFD Cooling Water Pump Failure.

Simulator Event Guide:

Event 3 Component: VFD Cooling Water Pump Failure

	ATC	Reports the following annunciators 4B-12, 28 and 32 RECIRC DRIVE 3B COOLANT FLOW LOW, RECIRC DRIVE 3B DRIVE ALARM and RECIRC DRIVE 3B PROCESS ALARM.
	ATC	Reports the 3-B-1 VFD Cooling Water Pump for the B Recirc Pump, has tripped.
	ATC	Reports Standby Recirc Drive Cooling Water Pump3-B-2, failed to auto start.
	ATC	RECIRC DRVIE 3B 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 3B 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 3A-5D).
Driver		Upon Lead examiner direction, initiate Trigger 11 for Steam Packing Exhauster trip

Simulator Event Guide:

Event 4 Component: SPE Packing Exhauster Trip

	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 3B, 3-HS-66-50A started. 2. 3B DISCHARGE VLV, 3-HS-66-34A opens.
	BOP	Determines that Alternate Blower started, but discharge damper fails to open.
		Opens 3B DISCHARGE VLV, 3-HS-66-34A to restore SPE Vacuum.
Driver	Driver	When dispatched, wait 5 minutes and report no obvious problems at SPE or Breaker.
	NRC	When ready, RHR A Leak.
Driver		Upon Lead examiner direction, initiate Trigger 15 for RHR A Leak.

Simulator Event Guide:

Event 5 Component: RHR A Leak

	BOP/ATC	Respond to Alarm 4C-17 RHR LOOP I PUMP ROOM FLOOD LEVEL HIGH, A. **DISPATCH** personnel to visually check the RHR pump room. B. **IF** alarm is valid, **THEN PERFORM** the following • **VERIFY** the floor drain sump pumps running. • **VERIFY** the floor drains for proper drainage. • **IF** possible, **THEN DETERMINE** the source of the leak and the leak rate. • **ENTER** 3-EOI-3 FLOWCHART.
	BOP/ATC	Respond to Alarm 3B-26, DRYWELL TO SUPPR CHAMBER DIFF PRESS ABNORMAL A. **CHECK** alarm by checking Drywell to Suppression Chamber DP. B. **REFER TO** 1-AOI-64-1. C. **REFER TO** Tech Spec Section 3.6.2.6.
	BOP/ATC	Dispatches personnel to RHR Loop 1 area.
	SRO	Evaluates Tech Spec 3.6.2.6 and Enters EOI-3.
.iver	Driver	3 minutes after dispatched, report leak is on the common minimum flow line for RHR Pumps A and C; appears leak was caused by maintenance work in the area. When the crew closes 74-1 and 74-12 report leak has stopped. Cannot access any manual valves due to amount of water spray. If only one of the RHR Suppression Pool Suction Valves is closed, report that leak has not slowed. In addition, report water level is about 8 inches in this quad and there is water flowing over the weir; into the suppression chamber area.
	BOP/ATC	Respond to Alarm 4C-3, SUPPR CHMB RM FLOOD LEVEL HIGH A. **DISPATCH** personnel to **VISUALLY CHECK** the suppression chamber room. B. **IF** alarm is valid, **THEN PERFORM** the following: • **CHECK** the floor drain sump pumps running. • **CHECK** the floor drains for proper drainage. • **IF** possible, **THEN DETERMINE** the source of the leak and the leak rate. • **ENTER** 3-EOI-3 FLOWCHART.
	SRO	When leak source is reported, **directs** BOP to close 74-1 and 74-12, RHR Pump 3A and 3B Suppression Pool Suction Valves.
	BOP	Closes 74-1 and 74-12, RHR Pump 3A and 3B Suppression Pool Suction Valves.

Simulator Event Guide:

Event 5 Component: RHR A Leak

	SRO	EOI-3 (Secondary Containment Water Level)
		Monitor and Control Secondary CNTMT Water Levels.
		Answers Yes to: Is Any Area Water Level Above 2 inches? Answers Yes to: Is Any Floor Drain Sump Water Level Above 66 inches?
		Restores and Maintains floor drain sump levels and area water levels, using all available sump pumps.
		When source of leak is determined and isolated, Answers Yes to: Can all floor drain and area water levels be restored and maintained?
	BOP/ATC	Contacts Radwaste to determine status of sump Pumps.
Driver	Driver	After 74-1 and 74-12 are isolated, **REPORT** sump pumps are operating normally, in area of alarm. **DELETE** overrides on alarms, xa554c[3] alarm_on **and** ior xa554c[17] alarm_on
	SRO	EOI-3 (Temperature)
		Monitor and Control Secondary Containment Temperatures.
		Operate all available ventilation. (Appendix 8F) Defeat isolation interlocks, as necessary. (Appendix 8E)
		Answers NO to: Is Any Area Temperature Above Max Normal?
	SRO	EOI-3 (Radiation)
		Monitor and Control Secondary CNTMT Radiation Levels.
		Answers NO to: Is Any Area Radiation Level Above Max Normal?
Driver		Upon Lead examiner direction, initiate Trigger 5 for Loss of RBCCW.

Simulator Event Guide:

Event 5 Component: RHR A Leak

	SRO	Refer to Technical Specification 3.5.1, 3.6.2.3, 3.6.2.4, 3.6.2.5, and 3.6.2.6
		TS 3.5.1 Condition A: One low pressure ECCS injection/spray subsystem inoperable. Required Action A.1: Restore low pressure ECCS injection/spray subsystem to Operable status. Completion Time: 7 Days
		TS 3.6.2.3 Condition B: Two RHR suppression pool cooling subsystems inoperable. Required Action B.1: Restore one RHR suppression pool cooling subsystem to Operable status. Completion Time: 7 Days
		TS 3.6.2.4 Condition B: Two RHR suppression pool spray subsystems inoperable. Required Action B.1: Restore one RHR suppression pool spray subsystem to Operable status. Completion Time: 7 Days
		TS 3.6.2.5 Condition B: Two RHR drywell spray subsystems inoperable. Required Action B.1: Restore one RHR drywell spray subsystem to Operable status. Completion Time: 7 Days
		TS 3.6.2.6: No Entry required
Driver		Upon Lead examiner direction, initiate Trigger 5 for Loss of RBCCW.

Simulator Event Guide:

Event 6 Component: Loss of RBCCW

	BOP/ATC	Responds to alarm 4C-12, RBCCW PUMP DISCH. HDR PRESS LOW Report Trip of RBCCW Pump 3A.
	BOP/ATC	Automatic Action: Closes 3-FCV-70-48, non-essential loop, closed cooling water sectionalizing MOV. A. **VERIFY** 3-FCV-70-48 CLOSING/CLOSED. B. **VERIFY** RBCCW pumps A and B in service. C. **VERIFY** RBCCW surge tank low level alarm is reset. D. **DISPATCH** personnel to check the following: • RBCCW surge tank level locally. • RBCCW pumps for proper operation. E. **REFER TO** 3-AOI-70-1, for RBCCW System failure and 3-OI-70, for starting spare pump.
	SRO	Enters 3-AOI-70-1.
	ATC	Closes 3-FCV-70-48 and report the sectionalizing valve failed to close automatically
	BOP	Dispatch Personnel to investigate RBCCW Pump 3A trip
Driver	Driver	When dispatched, report RBCCW Pump 3A breaker is tripped free. There is also a smell of burnt wiring and charring on the breaker.
	ATC	3-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, 3-FCV-70-48 **CLOSED**.
	ATC	Secures RWCU Pumps and Closes 3-FCV-70-48.

Simulator Event Guide:

Event 6 Component: Loss of RBCCW

		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).
		Step 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	Driver	When dispatched, report RBCCW Pump 3A breaker is tripped free. 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 3-OI-70. Direct Unit 1 to place Spare RBCCW Pump in service
Driver	Driver	When called to place spare RBCCW Pump in service, wait 10 minutes (IRF SW02). **THEN** inform Unit 3 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, 3-HS-70-48A. [5.2] **RESTORE** the RWCU system to operation. (REFER TO 3-OI-69) Directs ATC or BOP to Open Sectionalizing Valve and Restore RWCU.
	ATC	Opens Sectionalizing Valve, 3-FCV-70-48.
NRC		When Ready, Major Main Steam Line Leak inside Containment.
Driver		Upon Lead examiner direction, initiate Trigger 20 for Main Steam Line Leak inside Containment.

Simulator Event Guide:

Event 7 Major: Main Steam Line Leak inside Containment

	Crew	Recognize rising Drywell Pressure and Temperature.
	SRO	Directs a Reactor Scram, prior to 2.4 psig in the Drywell.
	ATC	Manually scrams the reactor.
CS#2	ATC	Reports RPS failed to de-energize and initiates one channel of ARI.
CS#2	ATC	Verifies all Rods In, on ARI Initiation.
	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
	ATC/BOP	Report failure of Bypass Valves to control Reactor Pressure
		Is any MSRV Cycling? – YES - Direct 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
		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° cooldown.
		Control Reactor Pressure in assigned band, IAW Appendix 11A.

Simulator Event Guide:

Event 7 Major: Main Steam Line Leak inside Containment

	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
		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

Simulator Event Guide:

Event 7 Major: Main Steam Line Leak inside Containment

	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. (Condensate and Feedwater, Appendix 5A)
	ATC	Maintains the prescribed level band, IAW Appendix 5A.

Simulator Event Guide:

Event 7 Major: Main Steam Line Leak inside Containment

	ATC	Maintains the prescribed level band IAW Appendix 5A
		1. **IF** It is desired to use a reactor feed pump that is in operation, **THEN CONTINUE** at step 12 to control the operating pump. 2. **VERIFY** Condensate system in service, supplying suction to RFPs. 3. **VERIFY OPEN** 3-FCV-1-125(133)(141), RFPT 3A(3B)(3C) HP STEAM SUPPLY VALVE. 4. **DEPRESS** 3-HS-46-8A(9A)(10A), RFPT 3A(3B)(3C) SPEED CONT RAISE/LOWER, and **VERIFY** amber light is illuminated. 5. **VERIFY** a Main Oil Pump is running for RFPT to be started. 6. **VERIFY** that the green light is illuminated and the red light is extinguished above the following on Panel 3-9-5 • 3-HS-3-208A, RX WTR LVL CH A HI RFPT/MT TRIP RESET • 3-HS-3-208B, RX WTR LVL CH B HI RFPT/MT TRIP RESET.
		7. **VERIFY OPEN** the following valves: • 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 8. **DEPRESS** 3-HS-3-124A(150A)(175A), RFPT 3A(3B)(3C) TRIP RESET, and **VERIFY** that the turbine trip is RESET.

Simulator Event Guide:

Event 7 Major: Main Steam Line Leak inside Containment

	ATC	Maintains the prescribed level band, IAW Appendix 5A.
		9. **VERIFY OPEN** 3-FSV-3-20(13)(6), RFP 3A(3B)(3C) MIN FLOW VALVE.
		10. **PLACE** 3-HS-46-112A(138A)(163A), RFPT 3A(3B)(3C) START/LOCAL ENABLE, in START, AND **VERIFY** RFPT speed increases to approximately 600 rpm.
		11. **VERIFY OPEN** 3-FCV-3-19(12)(5), RFP 3A(3B)(3C) DISCHARGE VALVE.
		12. **SLOWLY ADJUST** RFPT speed **UNTIL** feedwater flow to the RPV is indicated, using **ANY** of the following methods on Panel 3-9-5: • Individual 3-HS-46-8A(9A)(10A), RFPT 3A(3B)(3C) SPEED CONT RAISE/LOWER switch in MANUAL GOVERNOR, **OR** • Individual 3-SIC-46-8(9)(10), RFPT 3A(3B)(3C) SPEED CONTROL in MANUAL, **OR** • 3-LIC-46-5, REACTOR WATER LEVEL CONTROL, in MANUAL with individual 3-SIC-46-8(9)(10), RFPT 3A(3B)(3C) SPEED CONTROL in AUTO.
		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** 3-LIC-46-5, REACTOR WATER LEVEL CONTROL, in AUTO with individual 3-SIC-46-8(9)(10), RFPT 3A(3B)(3C) SPEED CONTROL in AUTO.

Simulator Event Guide:

Event 7 Major: Main Steam Line Leak inside Containment

	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.
		Can PC Pressure Be Maintained Below 2.4 psig? - NO
		Vents Primary Containment, IAW Appendix 12.
		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.

Simulator Event Guide:

Event 7 Major: Main Steam Line Leak inside Containment

	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** 3-HS-76-69, H2/O2 ANALYZER ISOLATION BYPASS switch in BYPASS (Panel 3-9-54). 2. **DEPRESS** 3-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 3-9-54): a. **PLACE** 3-HS-76-110, H2/O2 ANALYZER DW/SUPPR CHBR SELECT in SUPPR CHBR position. b. **VERIFY** SUPPR CHBR SMPL VLVS 3-FSV-76-55/56 OPEN using 3-IL-76-49-1. c. **VERIFY** OPEN SMPL RTN VLVS 3-FSV-76-57/58 using 3-IL-76-49-3. 4. **IF** H2/O2 Analyzer is to sample the Drywell, **THEN ALIGN** Analyzer as follows (Panel 3-9-54): a. **PLACE** 3-HS-76-110, H2/O2 ANALYZER DW/SUPPR CHBR SELECT in DRYWELL position. b. **VERIFY OPEN** DRYWELL SMPL VLVS 3-FSV-76-49/50 using 3-IL-76-49-2. c. **VERIFY OPEN** SMPL RTN VLVS 3-FSV-76-57/58 using 3-IL-76-49-3.

Simulator Event Guide:

Event 7 Major: Main Steam Line Leak inside Containment

	BOP	Places H2O2 analyzers in service, IAW Appendix 19.
		(The following step is not modeled in the simulator) 5. **IF** H2/O2 Analyzer is in STANDBY at 3-MON-76-110 (Panel 3-9-55), **THEN PLACE** H2/O2 Analyzer in service at as follows: a. **TOUCH** 3-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 3-XI-76-110 (Panel 3-9-55). 7. **VERIFY** red LOW FLOW indicating light extinguished at 3-MON-76-110, H2/O2 ANALYZER (Panel 3-9-55).
		8. **WHEN** H2/O2 Analyzer has been aligned and sampling for 10 minutes or greater, **THEN OBTAIN** H2 and O2 readings from 3-XR-76-110 H2/O2 CONCENTRATION recorder (Panel 3-9-54).

Simulator Event Guide:

Event 7 Major: Main Steam Line Leak inside Containment

	BOP	Vents Primary Containment IAW Appendix 12
		1. **VERIFY** at least one SGTS train in service. 2. **VERIFY CLOSED** the following valves (Panel 3-9-3 or Panel 3-9-54): • 3-FCV-64-31, DRYWELL INBOARD ISOLATION VLV, • 3-FCV-64-29, DRYWELL VENT INBD ISOL VALVE, • 3-FCV-64-34, SUPPR CHBR INBOARD ISOLATION VLV, • 3-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 3-FCV-84-19, **OR** Step 9 to vent the Suppression Chamber through 3-FCV-84-20.
		8. VENT the Suppression Chamber using 3-FIC-84-19, PATH B VENT FLOW CONT, as follows: a. **PLACE** keylock switch 3-HS-84-35, DW/SUPPR CHBR VENT ISOL BYP SELECT, to SUPPR-CHBR position (Panel 3-9-54). b. **VERIFY OPEN** 3-FCV-64-32, SUPPR CHBR VENT INBD ISOL VALVE (Panel 3-9-54). c. **PLACE** 3-FIC-84-19, PATH B VENT FLOW CONT, in AUTO with setpoint at 100 scfm (Panel 3-9-55). d. **PLACE** keylock switch 3-HS-84-19, 3-FCV-84-19 CONTROL, in OPEN (Panel 3-9-55). e. **VERIFY** 3-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: Main Steam Line Leak inside Containment

	BOP	Vents Primary Containment IAW Appendix 12
		9. VENT the Suppression Chamber using 3-FIC-84-20, PATH A VENT FLOW CONT, as follows: a. **VERIFY OPEN** 3-FCV-64-141, DRYWELL DP COMP BYPASS VALVE (Panel 3-9-3). b. **PLACE** keylock switch 3-HS-84-36, SUPPR CHBR/DW VENT ISOL BYP SELECT, to SUPPR-CHBR position (Panel 3-9-54). c. **VERIFY OPEN** 3-FCV-64-34, SUPPR CHBR INBOARD ISOLATION VLV (Panel 3-9-54). d. **VERIFY** 3-FIC-84-20, PATH A VENT FLOW CONT, in AUTO with setpoint at 100 scfm (Panel 3-9-55). e. **PLACE** keylock switch 3-HS-84-20, 3-FCV-84-20 ISOLATION BYPASS, in BYPASS (Panel 3-9-55). f. **VERIFY** 3-FIC-84-20, PATH A VENT FLOW CONT, is indicating approximately 100 scfm. g. **CONTINUE** in this procedure at step 12.
		12. **ADJUST** 3-FIC-84-19, PATH B VENT FLOW CONT, or 3-FIC-84-20, PATH A VENT FLOW CONT, as applicable, to maintain **ALL** of the following: Stable flow as indicated on controller, **AND** 3-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		Acknowledges Notification.

Simulator Event Guide:

Event 7 Major: Main Steam Line Leak inside Containment

	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 auto open signal as necessary; by **PLACING** 3-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: • 3-FCV-23-46, RHR HX 3B RHRSW OUTLET VLV • 3-FCV-23-52, RHR HX 3D RHRSW OUTLET VLV d. **IF** Directed by SRO, **THEN PLACE** 3-XS-74-130, RHR SYS II LPCI 2/3 CORE HEIGHT OVRD in MANUAL OVERRIDE. e. **IF** LPCI INITIATION Signal exists, **THEN** MOMENTARILY PLACE 3-XS-74-129, RHR SYS II CTMT SPRAY/CLG VLV SELECT in SELECT.
		f. **IF** 3-FCV-74-67, RHR SYS II LPCI INBD INJECT VALVE, is OPEN, **THEN VERIFY CLOSED** 3-FCV-74-66, RHR SYS II LPCI OUTBD INJECT VALVE. g. **OPEN** 3-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** 3-FCV-74-73, RHR SYS II SUPPR POOL CLG/TEST VLV, to maintain **EITHER** of the following as indicated on 3-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** 3-FCV-74-30, RHR SYSTEM II MIN FLOW VALVE. k. **MONITOR** RHR Pump NPSH using Attachment 1.

Simulator Event Guide:

Event 7 Major: Main Steam Line Leak inside Containment

	SRO	Can Drywell Temp Be Maintained Below 160°F? - NO
		Operate all available Drywell Cooling.
		Before DW Temperature rises to 200°F, Continue
		EOI-1 RPV Control and SCRAM the Reactor
		Before DW Temperature rises to 280°F, Continue Stops at STOP sign.
	SRO	EOI-2 Primary Containment Pressure
		Before Suppression Chamber Pressure rises to 12 psig, Continue
		Initiate Suppression Chamber Sprays, Using only pumps not required to assure adequate core cooling by continuous injection. (Appendix 17C)
	SRO	Directs Operator to initiate Suppression Chamber Sprays, IAW Appendix 17C.
	ATC/BOP	Initiates Suppression Chamber Sprays, IAW Appendix 17C.

Simulator Event Guide:

Event 7 Major: Main Steam Line Leak inside Containment

	ATC/BOP	1. **BEFORE** Suppression Chamber pressure drops below 0 psig, **CONTINUE** in this procedure at Step 6. 2. **IF** Adequate core cooling is assured, **OR** Directed to spray the Suppression Chamber irrespective of adequate core cooling, **THEN BYPASS** LPCI injection valve auto open signal as necessary by **PLACING** 3-HS-74-155A(B), LPCI SYS I(II) OUTBD INJ VLV BYPASS SEL in **BYPASS**.
		Step 3 and 4 are NA.
		5. **INITIATE** Suppression Chamber Sprays as follows: a. **VERIFY** at least one RHRSW pump supplying each EECW header. b. **IF EITHER** of the following exists: • LPCI Initiation signal is **NOT** present, **OR** • Directed by SRO, **THEN PLACE** keylock switch 3-XS-74-122(130), RHR SYS II LPCI 2/3 CORE HEIGHT OVRD, in MANUAL OVERRIDE. c. **MOMENTARILY PLACE** 3-XS-74-129, RHR SYS II CTMT SPRAY/CLG VLV SELECT, switch in SELECT. d. **IF** 3-FCV-74-67, RHR SYS II INBD INJECT VALVE, is OPEN, **THEN VERIFY CLOSED** 3-FCV-74-66, RHR SYS II OUTBD INJECT VALVE. e. **VERIFY OPERATING** the desired RHR System II pump(s) for Suppression Chamber Spray. f. **VERIFY OPEN** 3-FCV-74-71, RHR SYS II SUPPR CHBR/POOL ISOL VLV.

Simulator Event Guide:

Event 7: Main Steam Line Leak inside Containment

	ATC/BOP	g. **OPEN** 3-FCV-74-72, RHR SYS II SUPPR CHBR SPRAY VALVE. h. **IF** RHR System II is operating **ONLY** in Suppression Chamber Spray mode, **THEN CONTINUE** in this procedure at Step 5.k. i. **VERIFY CLOSED** 3-FCV-74-30, RHR SYSTEM II MIN FLOW VALVE. j. **RAISE** system flow by placing the second RHR System II pump in service as necessary. k. **MONITOR** RHR Pump NPSH using Attachment 2.
		l. **VERIFY** RHRSW pump supplying desired RHR Heat Exchanger(s). m. **THROTTLE** the following in-service RHRSW outlet valves to obtain between 1350 and 4500 gpm flow: • 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: Main Steam Line Leak inside Containment

	SRO	EOI-2 (Drywell Temperature)
		Before DW Temperature rises to 280°F, **Continue**
		Is Suppression Pool level below 18 feet? - YES
		Are DW Temperature and Pressure within the safe area of curve 5? - YES
		Direct Operators to shutdown Recirc Pumps and Drywell Blowers.
	ATC	Trips Reactor Recirculation Pumps.
	BOP	Places all Drywell Blowers in Off.
	SRO	Initiate DW Sprays, using only pumps not required to assure adequate core cooling; by continuous injection. (Appendix 17B)
	ATC/BOP	Initiate DW Sprays, IAW Appendix 17B.
	SRO	EOI-2 (Primary Containment Pressure)
		When Suppression Chamber Pressure exceeds 12 psig, **THEN Continue**
		Is Suppression Pool level below 18 feet - YES
		Are DW Temperature and Pressure within the safe area of curve 5 - YES
		Directs Operators to shutdown Recirc Pumps and Drywell Blowers.
	ATC	Trips Reactor Recirculation Pumps.
	BOP	Places all Drywell Blowers in Off.
	SRO	Initiate DW Sprays; using only pumps not required to assure adequate core cooling; by continuous injection. (Appendix 17B)
	ATC/BOP	Initiate DW Sprays, IAW Appendix 17B.

Simulator Event Guide:

Event 7 Major: Main Steam Line Leak inside Containment

	ATC/BOP	Initiate DW Sprays, IAW 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 II, **THEN CONTINUE** in this procedure at Step 6 using RHR Loop 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-74-130, RHR SYS II LPCI 2/3 CORE HEIGHT OVRD, in MANUAL OVERRIDE. d. **MOMENTARILY PLACE** 1-XS-74-29, RHR SYS II CTMT SPRAY/CLG VLV SELECT, switch in SELECT. e. **IF** 1-FCV-74-67, RHR SYS II LPCI INBD INJECT VALVE, is OPEN, **THEN VERIFY CLOSED** 1-FCV-74-66, RHR SYS 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-74-74, RHR SYS II DW SPRAY OUTBD VLV. • 1-FCV-74-75, RHR SYS II DW SPRAY INBD VLV.
	ATC/BOP	Reports Failure of Drywell Spray Valve on RHR Loop II.

Simulator Event Guide:

Event 7 Major: Main Steam Line Leak inside Containment

	SRO	EOI-2 (Drywell Temperature)
CS#1		Can Drywell Temperature be Maintained below 280°F? - NO
		Emergency RPV Depressurization is required.
CS#1	SRO	Enters EOI-C2.
		Will the Reactor remain subcritical without Boron under all conditions? - YES
		Is Drywell Pressure Above 2.4 psig? – YES
		Prevent Injection from only those CS and LPCI Pumps; not required to assure adequate core cooling. (Appendix 4)
		Is Suppression Pool level above 5.5 feet? - YES
		Direct ATC/BOP to Open all ADS Valves.
CS#1	ATC/BOP	Open 6 ADS Valves
	SRO	Can 6 ADS Valves be opened - YES
	SRO	EOI-1 Level
	SRO	Restore and Maintain RPV Water Level between +2 to 51 inches with one or more of the following injection sources. Condensate Appendix 6A, Core Spray Appendix 6D or 6E, LPCI Appendix 6C
	ATC/BOP	Restore and maintain level +2 to +51 inches IAW Appendix 6A, 6D, 6E, or 6C
	SRO	Emergency Plan Classification 2.1-A

Simulator Event Guide:

Event 7 Major: Main Steam Line Leak inside Containment

	ATC/BOP	Restore and maintain level +2 to +51 inches IAW Appendix 6A, 6D, 6E, or 6C
		Condensate Appendix 6A
		1. **VERIFY CLOSED** the following feedwater heater return valves: • 1-FCV-3-71, HP HTR 1A1 LONG CYCLE TO CNDR • 1-FCV-3-72, HP HTR 1B1 LONG CYCLE TO CNDR • 1-FCV-3-73, HP HTR 1C1 LONG CYCLE TO CNDR
		2. **VERIFY CLOSED** the following RFP discharge valves: • 1-FCV-3-19, RFP 1A DISCHARGE VALVE • 1-FCV-3-12, RFP 1B DISCHARGE VALVE • 1-FCV-3-5, RFP 1C DISCHARGE VALVE.
		3. **VERIFY OPEN** the following drain cooler inlet valves: • 1-FCV-2-72, DRAIN COOLER 1A5 CNDS INLET ISOL VLV • 1-FCV-2-84, DRAIN COOLER 1B5 CNDS INLET ISOL VLV • 1-FCV-2-96, DRAIN COOLER 1C5 CNDS INLET ISOL VLV
		4. **VERIFY OPEN** the following heater outlet valves: • 1-FCV-2-124, LP HEATER 1A3 CNDS OUTL ISOL VLV • 1-FCV-2-125, LP HEATER 1B3 CNDS OUTL ISOL VLV • 1-FCV-2-126, LP HEATER 1C3 CNDS OUTL ISOL VLV.
		5. **VERIFY OPEN** the following heater isolation valves: • 1-FCV-3-38, HP HTR 1A2 FW INLET ISOL VALVE • 1-FCV-3-31, HP HTR 1B2 FW INLET ISOL VALVE • 1-FCV-3-24, HP HTR 1C2 FW INLET ISOL VALVE • 1-FCV-3-75, HP HTR 1A1 FW OUTLET ISOL VALVE • 1-FCV-3-76, HP HTR 1B1 FW OUTLET ISOL VALVE • 1-FCV-3-77, HP HTR 1C1 FW OUTLET ISOL VALVE
		6. **VERIFY OPEN** the following RFP suction valves: • 1-FCV-2-83, RFP 1A SUCTION VALVE • 1-FCV-2-95, RFP 1B SUCTION VALVE • 1-FCV-2-108, RFP 1C SUCTION VALVE.
		7. **VERIFY** at least one condensate pump running.
		8. **VERIFY** at least one condensate booster pump running.
		9. **ADJUST** 1-LIC-3-53, RFW START-UP LEVEL CONTROL, to control injection (Panel 1-9-5).
		10. **VERIFY** RFW flow to RPV.

Simulator Event Guide:

Event 7 Major: Main Steam Line Leak inside Containment

	ATC/BOP	Restore and maintain level +2 to +51 inches IAW Appendix 6A, 6D, 6E, or 6C
		Core Spray System I Appendix 6D
		1. **VERIFY OPEN** the following valves: • 1-FCV-75-2, CORE SPRAY PUMP 1A SUPPR POOL SUCT VLV • 1-FCV-75-11, CORE SPRAY PUMP 1C SUPPR POOL SUCT VLV • 1-FCV-75-23, CORE SPRAY SYS I OUTBD INJECT VALVE.
		2. **VERIFY CLOSED** 1-FCV-75-22, CORE SPRAY SYS I TEST VALVE.
		3. **VERIFY** CS Pump 1A and/or 1C running.
		4. WHEN RPV pressure is below 450 psig, THEN **THROTTLE** 1-FCV-75-25, CORE SPRAY SYS I INBD INJECT VALVE, as necessary to control injection at or below 4000 gpm per pump.
		5. **MONITOR** Core Spray Pump NPSH using Attachment 1.
		Core Spray System II Appendix 6E
		1. **VERIFY OPEN** the following valves: • 1-FCV-75-30, CORE SPRAY PUMP 1B SUPPR POOL SUCT VLV • 1-FCV-75-39, CORE SPRAY PUMP 1D SUPPR POOL SUCT VLV • 1-FCV-75-51, CORE SPRAY SYS II OUTBD INJECT VALVE.
		2. **VERIFY CLOSED** 1-FCV-75-50, CORE SPRAY SYS II TEST VALVE
		3. **VERIFY** CS Pump 1B and/or 1D running.
		4. WHEN RPV pressure is below 450 psig, THEN **THROTTLE** 1-FCV-75-53, CORE SPRAY SYS II INBD INJECT VALVE, as necessary to control injection at or below 4000 gpm per pump.
		5. **MONITOR** Core Spray Pump NPSH using Attachment 1.

Simulator Event Guide:

Event 7 Major: Main Steam Line Leak inside Containment

	ATC/BOP	Restore and maintain level +2 to +51 inches IAW Appendix 6A, 6D, 6E, or 6C
		LPCI Appendix 6C
		1. IF Adequate core cooling is assured **AND** It becomes necessary to bypass LPCI Injection Valve auto open signal to control injection, THEN **PLACE** 1-HS-74-155B, LPCI SYS II OUTBD INJ VLV BYPASS SEL in **BYPASS.**
		2. **VERIFY OPEN** the following valves: • 1-FCV-74-24, RHR PUMP 1B SUPPR POOL SUCT VLV. • 1-FCV-74-35, RHR PUMP 1D SUPPR POOL SUCT VLV.
		3. **VERIFY CLOSED** the following valves: • 1-FCV-74-75, RHR SYS II DW SPRAY INBD VLV • 1-FCV-74-74, RHR SYS II DW SPRAY OUTBD VLV • 1-FCV-74-71, RHR SYS II SUPPR CHBR/POOL ISOL VLV • 1-FCV-74-72, RHR SYS II SUPPR CHBR SPRAY VALVE • 1-FCV-74-73, RHR SYS II SUPPR POOL CLG/TEST VLV.
		4. VERIFY RHR Pump 1B and/or 1D running.
		5. WHEN RPV pressure is below 450 psig, THEN **VERIFY OPEN** 1-FCV-74-67, RHR SYS II LPCI INBD INJECT VALVE.
		6. IF RPV pressure is below 230 psig, THEN **VERIFY CLOSED** 1-FCV-68-3, RECIRC PUMP 1A DISCHARGE VALVE.
		7. **THROTTLE** 1-FCV-74-66, RHR SYS II LPCI OUTBD INJECT VALVE, as necessary to control injection.
		8. **MONITOR** RHR Pump NPSH using Attachment 1.
		9. **PLACE** RHRSW pumps in service as soon as possible on ANY RHR Heat Exchangers discharging to the RPV.
		10. **THROTTLE** the following in-service RHRSW outlet valves to maintain flow between 1350 and 4500 gpm: • 1-FCV-23-46, RHR HX 1B RHRSW OUTLET VLV • 1-FCV-23-52, RHR HX 1D RHRSW OUTLET VLV.

Critical Tasks - Two

CS#1-When Drywell Pressure cannot be maintained below the PSP limit, US determines that Emergency Depressurization is required and RO initiates Emergency Depressurization as directed by US.

1. Safety Significance:
   Precludes failure of containment

2. Cues:
   Procedural compliance
   High Drywell Pressure

3. Measured by:
   Observation - US determines (indicated by announcement or observable transition to C-2) that Emergency Depressurization is required before Drywell pressure exceeds the PSP limit.
   <u>AND</u>
   Observation - RO opens at least 6 SRV's during performance of Emergency Depressurization actions.

4. Feedback:
   RPV pressure decreasing
   SRV open status indications

OR

CS#1-When Drywell Temperature cannot be maintained below the Drywell Temperature limit of 280°F, US determines that Emergency Depressurization is required and RO initiates Emergency Depressurization as directed by US.

1. Safety Significance:
   Precludes failure of containment

2. Cues:
   Procedural compliance
   High Drywell Temperature

3. Measured by:
   Observation - US determines (indicated by announcement or observable transition to C-2) that Emergency Depressurization is required before Drywell Temperature exceeds the limit of 280°F.
   <u>AND</u>
   Observation - RO opens at least 6 SRV's during performance of Emergency Depressurization actions.

4. Feedback:
   RPV pressure decreasing
   SRV open status indications

Critical Tasks - Two

CS#2- 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.

Scenario Tasks

EVENT	TASK NUMBER	K/A	RO	SRO
1	Stroke Time Containment Isolation Valves			
	RO U-064-SU-08 SRO S-000-AD-81	223002A2.08	2.7	3.1
2	Raise Power with Recirc Flow			
	RO U-068-NO-17 SRO S-000-NO-138	2.1.23	4.3	4.4
3	VFD Cooling Water Pump Failure			
	RO U-068-AL-33 SRO S-068-AB-01	202001A2.22	3.1	3.2
4	Steam Packing Exhauster Trip			
	RO U-47C-AL-02 SRO S-047-AB-03	271000A1.01	3.3	3.2
5	RHR Loop 1 Leak			
	RO U-77A-AL-06 SRO S-000-EM-09	203000A4.02	4.1	4.1
6	Loss of RBCCW			
	RO U-070-AL-03 SRO S-070-AB-01	206000A2.17	3.9	4.3
7	Drywell LOCA			
	RO U-000-EM-05 SRO S-000-EM-04 SRO S-000-EM-05 SRO T-000-EM-15	295028EA2.01	4.0	4.1

SCENARIO REVIEW CHECKLIST

SCENARIO NUMBER: 3-B

8 Total Malfunctions Inserted: List (4-8)

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

4 Abnormal Events: List (1-3)

1 Major Transients: List (1-2)

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

1 EOI Contingencies used: List (0-3)

60 Run Time (minutes)

2 Crew Critical Tasks: (2-5)

YES Technical Specifications Exercised (Yes/No)

SHIFT TURNOVER SHEET

Equipment Out of Service/LCO's:

RCW Pump 3A is out of service and tagged out.

3-PI-3-207 Bypassed for surveillance.

Operations/Maintenance for the Shift:

Perform Stroke Time Test on 3-FCV-43-13 and 3-FCV-43-14 per 3-SR-3.6.1.3.5 Section 7.3.

Once completed raise power with flow to 95% IAW 3-GOI-100-12 section 5.0 step 21

and the Reactivity Control Plan.

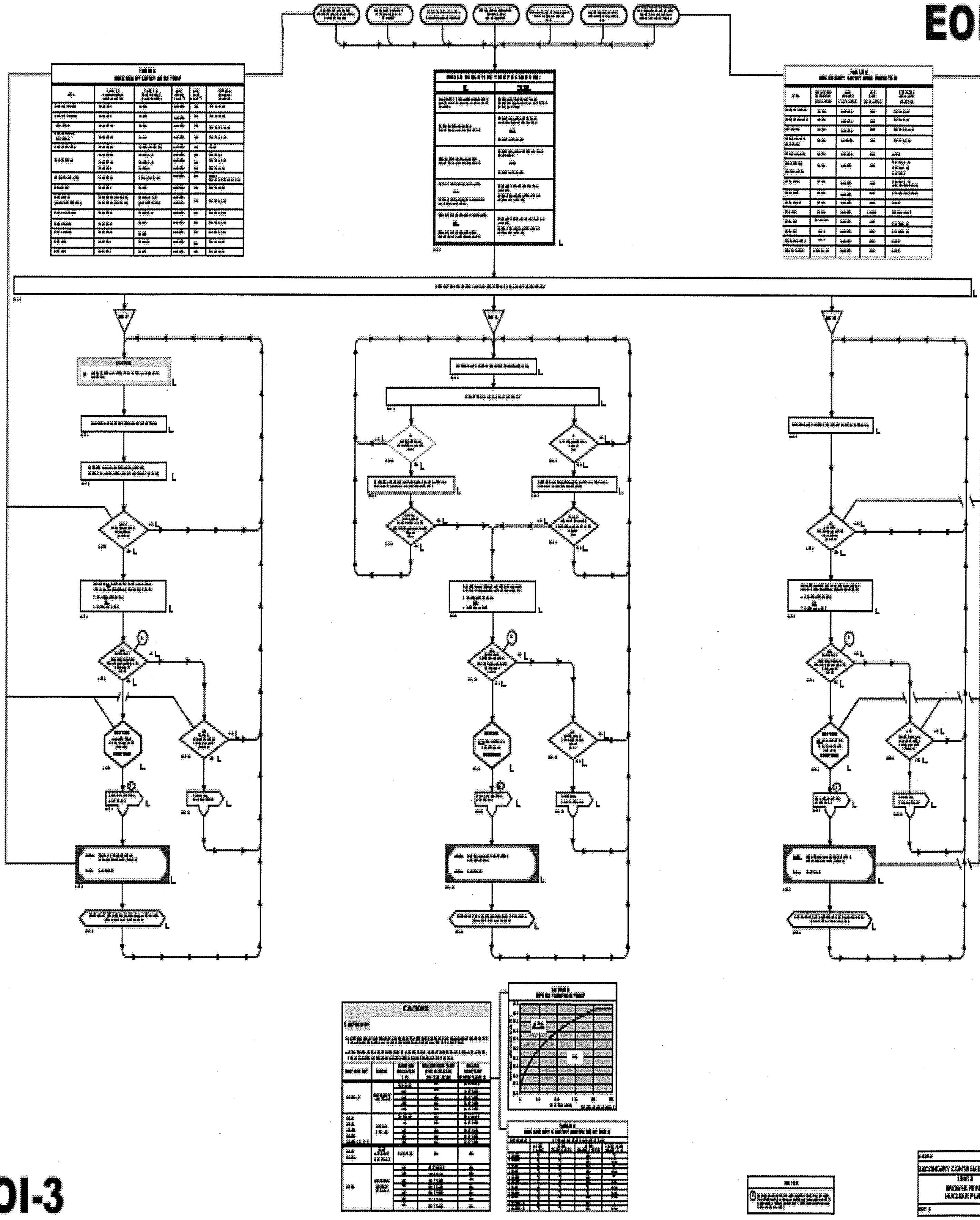
Units 1 is in a forced outage and Unit 2 is at 100% power.

Unusual Conditions/Problem Areas:

None

EOI-3
UNIT 3

EOI-3

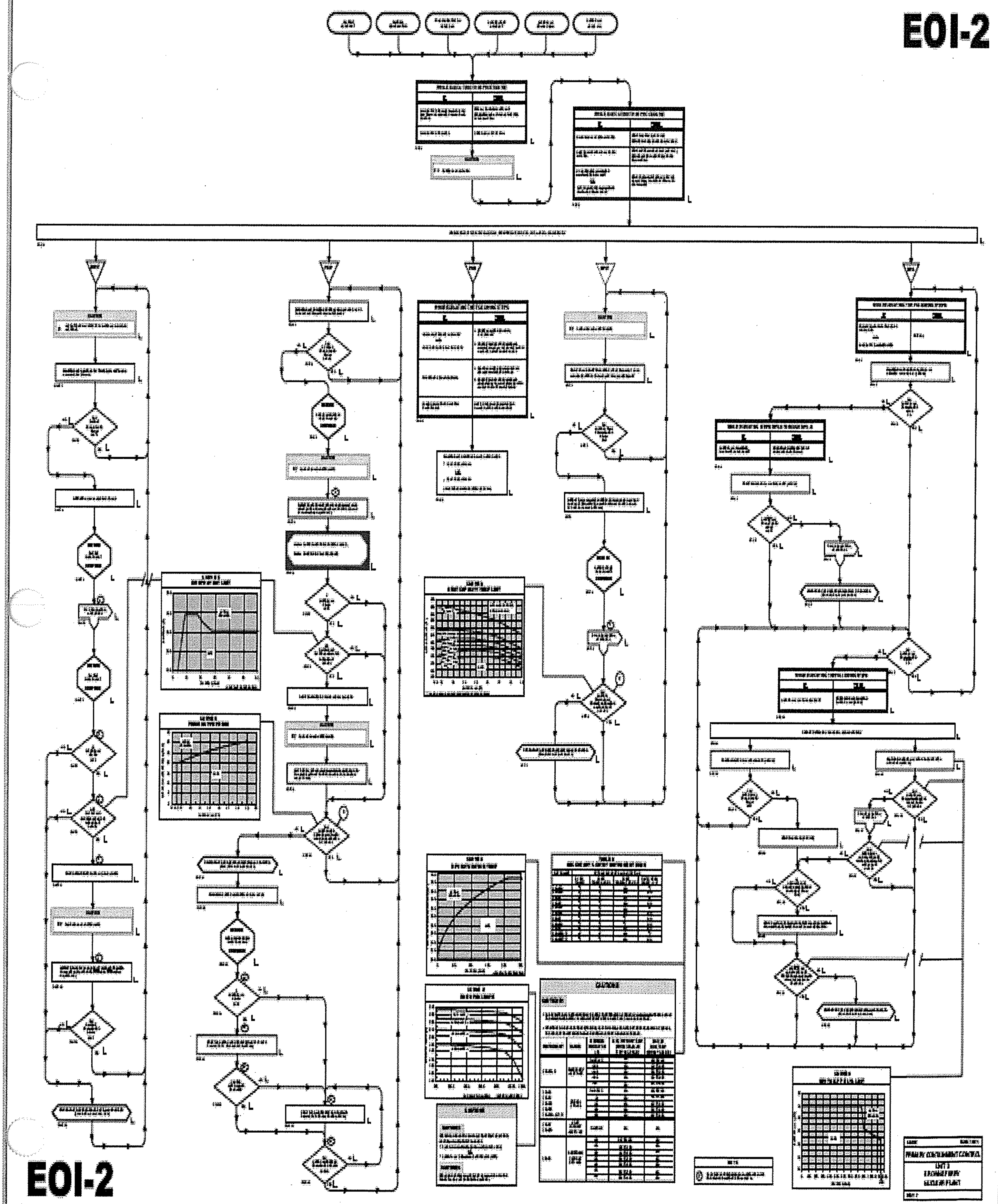


EOI-3

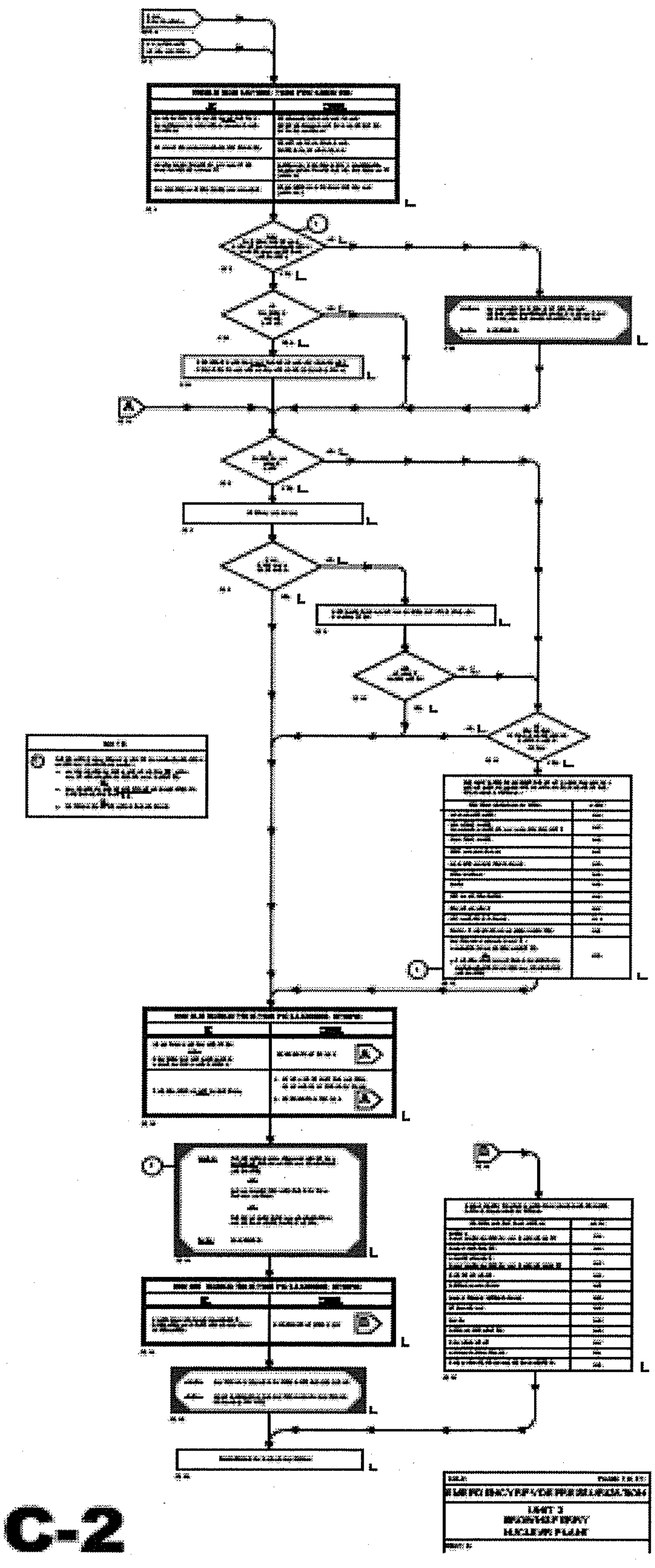
SECONDARY CONTAINMENT CON

UNIT 3

BROWNS FERRY NUCLEAR PLANT

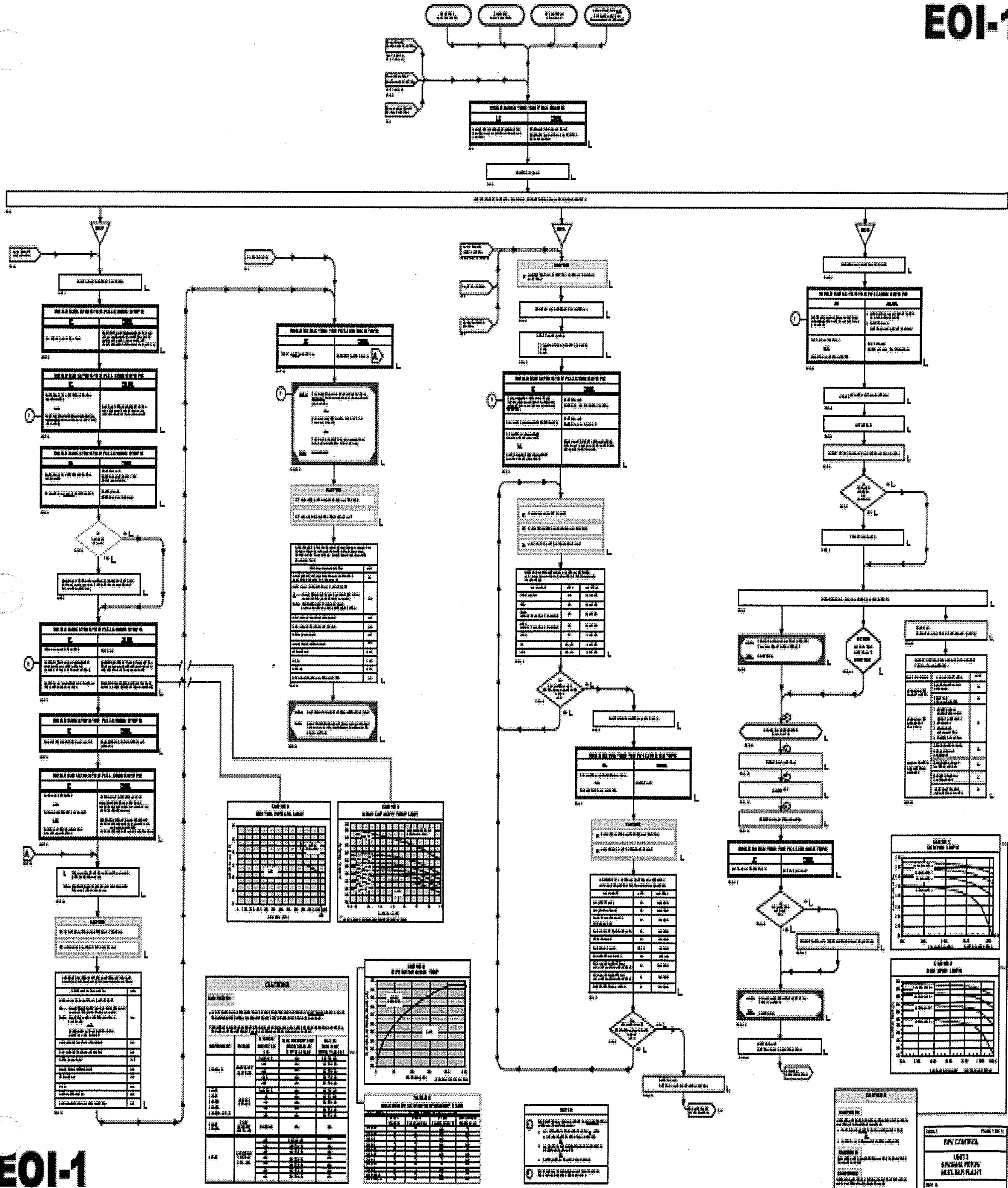

EOI-2
EOI-2

3-C-2 EMERGENCY RPV DEPRESSURIZATION



C-2

EOI-1



EOI-1

3.6 CONTAINMENT SYSTEMS

3.6.1.3 Primary Containment Isolation Valves (PCIVs)

LCO 3.6.1.3 Each PCIV, except reactor building-to-suppression chamber vacuum breakers, shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
When associated instrumentation is required to be OPERABLE per LCO 3.3.6.1, "Primary Containment Isolation Instrumentation."

ACTIONS

------------------------------------NOTES------------------------------------

1. Penetration flow paths except for 18 and 20 inch purge valve penetration flow paths may be unisolated intermittently under administrative controls.

2. Separate Condition entry is allowed for each penetration flow path.

3. Enter applicable Conditions and Required Actions for systems made inoperable by PCIVs.

4. Enter applicable Conditions and Required Actions of LCO 3.6.1.1, "Primary Containment," when PCIV leakage results in exceeding overall containment leakage rate acceptance criteria in MODES 1, 2, and 3.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. --------------NOTE------------ Only applicable to penetration flow paths with two PCIVs. -------------------------------- One or more penetration flow paths with one PCIV inoperable except due to MSIV leakage not within limits.	A.1	Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured.	4 hours except for main steam line <u>AND</u> 8 hours for main steam line
	<u>AND</u>		

(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. (continued)	A.2	--------------NOTE------------ Isolation devices in high radiation areas may be verified by use of administrative means. ----------------------------------	
		Verify the affected penetration flow path is isolated.	Once per 31 days for isolation devices outside primary containment <u>AND</u> Prior to entering MODE 2 or 3 from MODE 4, if primary containment was de-inerted while in MODE 4, if not performed within the previous 92 days, for isolation devices inside primary containment

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. ---------------NOTE------------ Only applicable to penetration flow paths with two PCIVs. ----------------------------------- One or more penetration flow paths with two PCIVs inoperable except due to MSIV leakage not within limits.	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.	1 hour
C. ---------------NOTE------------ Only applicable to penetration flow paths with only one PCIV. ----------------------------------- One or more penetration flow paths with one PCIV inoperable.	C.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.	4 hours except for excess flow check valves (EFCVs) <u>AND</u> 12 hours for EFCVs
	<u>AND</u>		
	C.2	---------------NOTE------------ Isolation devices in high radiation areas may be verified by use of administrative means. ----------------------------------- Verify the affected penetration flow path is isolated.	Once per 31 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. One or more penetration flow paths with MSIV leakage not within limits.	D.1	Restore leakage rate to within limit.	4 hours
E. Required Action and associated Completion Time of Condition A, B, C, or D not met in MODE 1, 2, or 3.	E.1	Be in MODE 3.	12 hours
	<u>AND</u>		
	E.2	Be in MODE 4.	36 hours
F. Required Action and associated Completion Time of Condition A, B, C, or D not met for PCIV(s) required to be OPERABLE during MODE 4 or 5.	F.1	Initiate action to suspend operations with a potential for draining the reactor vessel (OPDRVs).	Immediately
	<u>OR</u>		
	F.2	-------------NOTE------------ Only applicable for inoperable RHR Shutdown Cooling Valves. -------------------------------- Initiate action to restore valve(s) to OPERABLE status.	Immediately

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 $\leq$ 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. <u>OR</u> 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

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 4.	12 hours 36 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. HPCI System inoperable.	C.1	Verify by administrative means RCIC System is OPERABLE.	Immediately
	<u>AND</u>		
	C.2	Restore HPCI System to OPERABLE status.	14 days
D. HPCI System inoperable. <u>AND</u> Condition A entered.	D.1	Restore HPCI System to OPERABLE status.	72 hours
	<u>OR</u>		
	D.2	Restore low pressure ECCS injection/spray subsystem to OPERABLE status.	72 hours
E. One ADS valve inoperable.	E.1	Restore ADS valve to OPERABLE status.	14 days
F. One ADS valve inoperable. <u>AND</u> Condition A entered.	F.1	Restore ADS valve to OPERABLE status.	72 hours
	<u>OR</u>		
	F.2	Restore low pressure ECCS injection/spray subsystem to OPERABLE status.	72 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
G. Two or more ADS valves inoperable. OR Required Action and associated Completion Time of Condition C, D, E, or F not met.	G.1 AND G.2	Be in MODE 3. Reduce reactor steam dome pressure to ≤ 150 psig.	12 hours 36 hours
H. Two or more low pressure ECCS injection/spray subsystems inoperable for reasons other than Condition A. OR HPCI System and one or more ADS valves inoperable.	H.1	Enter LCO 3.0.3.	Immediately

3.6 CONTAINMENT SYSTEMS

3.6.2.3 Residual Heat Removal (RHR) Suppression Pool Cooling

LCO 3.6.2.3 Four RHR suppression pool cooling subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One RHR suppression pool cooling subsystem inoperable.	A.1 Restore the RHR suppression pool cooling subsystem to OPERABLE status.	30 days
B. Two RHR suppression pool cooling subsystems inoperable.	B.1 Restore one RHR suppression pool cooling subsystem to OPERABLE status.	7 days
C. Three or more RHR suppression pool cooling subsystems inoperable.	C.1 Restore required RHR suppression pool cooling subsystems to OPERABLE status.	8 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time not met.	D.1 Be in MODE 3. AND D.2 Be in MODE 4.	12 hours 36 hours

3.6 CONTAINMENT SYSTEMS

3.6.2.4 Residual Heat Removal (RHR) Suppression Pool Spray

LCO 3.6.2.4 Four RHR suppression pool spray subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One RHR suppression pool spray subsystem inoperable.	A.1	Restore the RHR suppression pool spray subsystem to OPERABLE status.	30 days
B. Two RHR suppression pool spray subsystems inoperable.	B.1	Restore one RHR suppression pool spray subsystem to OPERABLE status.	7 days
C. Three or more RHR suppression pool spray subsystems inoperable.	C.1	Restore required RHR suppression pool spray subsystems to OPERABLE status.	8 hours
D. Required Action and associated Completion Time not met.	D.1	Be in MODE 3.	12 hours
	AND		

3.6 CONTAINMENT SYSTEMS

3.6.2.5 Residual Heat Removal (RHR) Drywell Spray

LCO 3.6.2.5 Four RHR drywell spray subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One RHR drywell spray subsystem inoperable.	A.1	Restore the RHR drywell spray subsystem to OPERABLE status.	30 days
B. Two RHR drywell spray subsystems inoperable.	B.1	Restore one RHR drywell spray subsystem to OPERABLE status.	7 days
C. Three or more RHR drywell spray subsystems inoperable.	C.1	Restore required RHR drywell spray subsystems to OPERABLE status.	8 hours
D. Required Action and associated Completion Time not met.	D.1	Be in MODE 3.	12 hours
	<u>AND</u>		
	D.2	Be in MODE 4.	36 hours

3.6 CONTAINMENT SYSTEMS

3.6.2.6 Drywell-to-Suppression Chamber Differential Pressure

LCO 3.6.2.6 The drywell pressure shall be maintained ≥ 1.1 psid above the pressure of the suppression chamber.

-----NOTE-----
This differential may be decreased to < 1.1 psid for a maximum of 4 hours during required operability testing of the HPCI system, the RCIC system or the suppression chamber-to-drywell vacuum breakers.

APPLICABILITY: MODE 1 during the time period:

a. From 24 hours after THERMAL POWER is > 15% RTP following startup, to

b. 24 hours prior to reducing THERMAL POWER to < 15% RTP prior to the next scheduled reactor shutdown.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Drywell-to-suppression chamber differential pressure not within limit.	A.1 Restore differential pressure to within limit.	8 hours
B. Required Action and associated Completion Time not met.	B.1 Reduce THERMAL POWER to ≤ 15% RTP.	12 hours

	PRIMARY CONTAINMENT PRESSURE	PRIMARY CONTAINMENT HYDROGEN
	Description	Description
UNUSUAL EVENT		
ALERT	2.1-A TABLE Drywell pressure at or above 2.45 psig AND Indication of Primary System leakage into Primary Containment. Refer to Table 2.1-A. OPERATING CONDITION: Mode 1 or 2 or 3	
SITE EMERGENCY	2.1-S CURVE Suppression Chamber pressure can NOT be maintained in the safe area of Curve 2.1-S. OPERATING CONDITION: Mode 1 or 2 or 3	2.2-S Drywell or Suppression Chamber hydrogen concentration at or above 4% AND Drywell or Suppression Chamber oxygen concentration at or above 5%. OPERATING CONDITION: Mode 1 or 2 or 3
GENERAL EMERGENCY	2.1-G Suppression Chamber pressure can NOT be maintained below 55 psig. OPERATING CONDITION: Mode 1 or 2 or 3	2.2-G Drywell or Suppression Chamber hydrogen concentration at or above 6% AND Drywell or Suppression Chamber oxygen concentration at or above 5%. OPERATING CONDITION: Mode 1 or 2 or 3

Facility: **Browns Ferry NPP** Scenario No.: **C** Op-Test No.: **ILT 1102**

Examiners:	

Operators:	
	SRO:
	ATC:
	BOP:

Initial Conditions: IC192/ Unit 3 Reactor Power 86% / HPCI tagged out for PMs. Stator Water Cooling Pump 3B tagged out.

Turnover: BOP Operator - Perform 3-OI-3 Section 8.13 Automatic Start Test of RFPT 3A EBOP 3A3 Oil Pump. Perform Control Rod Pattern adjust IAW RCP.

Event No.	Malf. No.	Event Type*	Event Description
1		N-BOP N-SRO	8.13 Automatic Start Test of RFPT 3A Oil Pumps, 3-OI-3
2		R-ATC R-SRO	Perform Control Rod Pattern adjust IAW RCP
3	rd04r3823	C-ATC TS-SRO	Final(4th) Control Rod manipulated continues to move 3 notches beyond intended position
4	rc09	C-BOP TS-SRO	RCIC Room high temp / Fail to Isolate
5	fw05b	C-ALL	Loss of FW Heating 3-FCV-5-21, HP HEATER 3B2 EXTR ISOL VLV Fail to isolate
6	fw18	M-ALL	Feedwater Line Break in Turbine Bldg / Drywell leak Div 1 ECCS fails to initiate
7	cs04a	I	Core Spray Logic Power Failure
8	ed12b	C	480V RMOV Board 3B Supply Breaker Trip

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

Console Operator Instructions

Scenario File Summary

File: batch and trigger files for scenario 3-C

Batch nrc2011c

#hpci tagout
bat nrc2011hpcito

Batch nrc2011hpcito
ior zdihs732 close
ior zdihs733a close
ior zdihs7381a close
ior zlohs7347a[1] off
ior ypovfcv732 (none 30) fail_now
ior ypovfcv733 (none 30) fail_now
ior ypovfcv7381 (none 30) fail_now

#stator water pump b tagout
ior zlohs3536a[1] off
ior zlohs3536a[2] off

#CR Drift
imf rd04r3823 (e1 0)

#RCIC leak fail to isolate
imf rc09 (e5 0) 100 120
imf rc10

#Loss of Feedwater Heating
imf fw05b (e10 0) 100 300 75
ior ypovfcv0521 fail_power_now
ior zlohs0521a[2] on
trg 11 nrc20110521
trg 11 = bat nrc2011c1

Trigger nrc20110521
zdihs0521a[1].eq.1

Batch nrc2011c1
dor ypovfcv0521
dor zlohs0521a[2]

```
#Major
imf fw18 (e20 0) 50 300
imf th21 (e25 30) .1 360
imf cs04a
imf ed12b (e20 300)
ior xa553c[27] alarm_off
ior xa553c[14] alarm_off
ior zloil7561a[1] off
ior zloil7561b[1] off
trg 21 nrc20117525
trg 21 = bat nrc2011c2
```

Trigger nrc20117525
zdihs7525a[3] .eq. 1

Batch nrc2011c2
dmf cs04a

Console Operator Instructions

Scenario 3-C

		DESCRIPTION/ACTION
Simulator Setup	manual	Reset to IC193
Simulator Setup	**Load Batch**	Bat nrc2011c
Simulator Setup	manual	Clearance out HPCI
Simulator Setup	manual	Clearance out Stator Water Cooling Pump 3B
Simulator Setup		Verify batch file loaded

RCP required (86% Power with Control Rod Pattern Adjust) – Provide marked up copy of 3-GOI-100-12 and RCP for Urgent Load Reduction.

Scenario Summary:

The Plant is operating at 86% Reactor Power.

The BOP Operator will perform Automatic Start Test of RFPT 3A EBOP 3A3 Oil Pump, 3-OI-3 Section 8.13

The ATC will adjust the Control Rod Pattern IAW RCP. When the 4th control rod is withdrawn, it will continue to move 3 notches beyond its intended position. The ATC will completely insert the Control Rod IAW 3-AOI-85-6 or 3-AOI-85-7. Accumulator must be declared Inop if charging water is isolated. The SRO may declare the Control Rod Inoperable, Technical Specification 3.1.3 condition C.

A RCIC Steam Line Break 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 and RCIC System inoperable. With HPCI already Inoperable, plant shutdown is required. Technical Specification 3.5.3 Condition B and 3.6.1.3 Condition A.

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 3-AOI-6-1A or 1C. The ATC will lower reactor power by 5%. The Operators refer to 3-AOI-6-1A or 1C and determine that all automatic actions failed to occur and the Operators isolate the Heater B2.

A Feedwater line break will occur in the Turbine Building. The Loss of Feedwater Flow 3-AOI-3-1 should be entered and a manual Scram inserted. EOI-1 will be entered on Reactor Level.

EOI-2 will be entered on High Drywell Pressure / Temperature. Actions of EOI-2 will be directed.

SRO will enter C-1 on lowering Reactor Level. CRD should be maximized and SLC should be initiated as Reactor Level continues to lower.

Reactor level will decrease to TAF and an Emergency Depressurization will be initiated per C-2.

Div 1 ECCS will fail to auto initiate and will have to be manually initiated.

Level will be restored with Low Pressure ECCS.

The Emergency Classification is 1.1-S1

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

All Control Rods are inserted

Emergency Depressurization complete

Reactor Level is restored and maintained

Simulator Event Guide:

Event 1 Normal: Automatic Start Test of RFPT 3A EBOP 3A3 Oil Pump per 3-OI-3 Section 8.13

	SRO	Direct BOP to perform Automatic Start Test of RFPT 3A EBOP 3A3 Oil Pump per 3-OI-3 Section 8.13
	BOP	**8.13 Automatic Start Test of RFPT 3A Oil Pumps** [1] **OBTAIN** Unit Supervisor approval to perform this test. [2] **VERIFY** the following switches in Normal after START or STOP: • RFPT 3A 3A1 MAIN OIL PUMP, 3-HS-3-103A • RFPT 3A 3A2 MAIN OIL PUMP, 3-HS-3-250A [3] **VERIFY** RFPT 3A EBOP 3A3, 3-HS-3-102A, in AUTO. [4] **TEST** EBOP 3A3 as follows: [4.1] **DEPRESS** and **HOLD** 3A3 EBOP TEST push-button, 3-HS-3-105A. [4.2] **VERIFY** the following: • Red (running) light and amber (auto start) light at push-button illuminated. • RFPT OIL PUMP AUTO START annunciation, 3-XA-55-6B Window 29, in alarm. [4.3] **RELEASE** 3A3 EBOP TEST push-button, 3-HS-3-105A. [4.4] **PLACE** RFPT 3A EBOP 3A3 switch, 3-HS-3-102A, in START (return to AUTO). [4.4.1] **VERIFY** the following: • Amber (auto start) light extinguished at 3A3 EBOP TEST push-button, 3-HS-3-105A. • RFPT OIL PUMP AUTO START annunciation, 3-XA-55-6B Window 29, will reset. [4.5] **PLACE** RFPT 3A EBOP 3A3, 3-HS-3-102A, in STOP (return to AUTO). • **CHECK** Red light extinguished at 3A3 EBOP TEST push-button.
	BOP	Perform 3-OI-3 section 8.13 steps 1-4 to Test Automatic Start of RFPT 3A EBOP 3A3 Oil Pump

Simulator Event Guide:

Event 2 Reactivity: Raise Reactor Power after Completion of Control Rod Pattern Adjustment per 3-GOI-100-12 and in accordance with the RCP

	SRO	Notify ODS of Power Increase
		Direct Power Increase after Control Rod Pattern Adjustment per 3-GOI-100-12 section 5.0 step 21 **5.0 INSTRUCTION STEPS** [21] **WHEN** desired to restore Reactor power to 100%, **THEN** **PERFORM** the following as directed by Unit Supervisor and recommended by the Reactor Engineer: • **RAISE** power using control rods or core flow changes. **REFER TO** 3-SR-3.3.5(A) and 3-OI-68. • **MONITOR** Core thermal limits using Illustration 1, ICS, and/or 0-TI-248
	ATC	Raise Power with Control Rods per 3-OI-85, section 6.6
	ATC	**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].

Simulator Event Guide:

Event 2 Reactivity: Raise Reactor Power after Completion of Control Rod Pattern Adjustment per 3-GOI-100-12 and in accordance with the RCP

	ATC	**6.6.2 Actions Required During and Following Control Rod Withdrawal (contd)** [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. **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**.

Simulator Event Guide:

Event 2 Reactivity: Raise Reactor Power after Completion of Control Rod Pattern Adjustment per 3-GOI-100-12 and in accordance with the RCP

	ATC	**6.6.3 Control Rod Notch Withdrawal (continued)** [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. **6.6.4 Continuous Rod Withdrawal** [1] **SELECT** desired Control Rod by depressing appropriate CRD ROD SELECT, 3-XS-85-40. [2] **OBSERVE** the following for the selected control rod: • CRD ROD SELECT pushbutton is brightly ILLUMINATED • White light on the Full Core Display ILLUMINATED • Rod Out Permit light ILLUMINATED [3] **VERIFY** Rod Worth Minimizer operable and LATCHED into correct ROD GROUP when the Rod Worth Minimizer is enforcing. [4] **VERIFY** Control Rod is being withdrawn to a position greater than three notches. [5] **IF** withdrawing the control rod to a position other than "48", **THEN** **PERFORM** the following: (Otherwise N/A) [5.1] **PLACE AND HOLD** CRD NOTCH OVERRIDE, 3-HS-85-47, in NOTCH OVERRRIDE. [5.2] **PLACE AND HOLD** CRD CONTROL SWITCH, 3-HS-85-48, in ROD OUT NOTCH.

Simulator Event Guide:

Event 2 Reactivity: Raise Reactor Power after Completion of Control Rod Pattern Adjustment per 3-GOI-100-12 and in accordance with the RCP

	ATC	**6.6.4 Continuous Rod Withdrawal (continued)** [5.3] **WHEN** control rod reaches two notches prior to the intended notch, **THEN** **RELEASE** CRD NOTCH OVERRIDE, 3-HS-85-47 and CRD CONTROL SWITCH, 3-HS-85-48. [5.4] **IF** control rod settles at notch before intended notch, **THEN** **PLACE** CRD CONTROL SWITCH, 3-HS-85-48, in ROD OUT NOTCH and **RELEASE**. [5.5] **WHEN** control rod settles into the intended notch, **THEN CHECK** the following. • Four rod display digital readout and the full core display digital readout and background light remain illuminated. • CONTROL ROD OVERTRAVEL annunciator, 3-XA-55-5A, Window 14, does **NOT** alarm. [5.6] **CHECK** the control rod settles at intended position and ROD SETTLE light extinguishes. [6] **IF** continuously withdrawing the control rod to position 48 and performing the control rod coupling integrity check in conjunction with withdrawal, **THEN** **PERFORM** the following: (Otherwise N/A) [6.1] **PLACE** and **HOLD** CRD NOTCH OVERRIDE, 3-HS-85-47, in NOTCH OVERRRIDE. [6.2] **PLACE** and **HOLD** CRD CONTROL SWITCH, 3-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.

Simulator Event Guide:

Event 2 Reactivity: Raise Reactor Power after Completion of Control Rod Pattern Adjustment per 3-GOI-100-12 and in accordance with the RCP

	ATC	**6.6.4 Continuous Rod Withdrawal (continued)** [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, 3-XA-55-5A, Window 14, does not alarm. [6.5] **RELEASE** both CRD NOTCH OVERRIDE, 3-HS-85-47, and CRD CONTROL SWITCH, 3-HS-85-48. [6.6] **CHECK** control rod settles into position 48 and ROD SETTLE light extinguishes. [6.7] **IF** control rod coupling integrity check fails, **THEN REFER TO** 3-AOI-85-2 [7] **IF** continuously withdrawing the control rod to position 48 and the control rod coupling integrity check will be performed after the CRD NOTCH OVERRIDE, 3-HS-85-47, and CRD CONTROL SWITCH, 3-HS-85-48 are to be released, **THEN** **PERFORM** control rod coupling integrity check as follows (otherwise N/A): [7.1] **PLACE AND HOLD** CRD NOTCH OVERRIDE, 3-HS-85-47, in NOTCH OVERRRIDE. [7.2] **PLACE AND HOLD** CRD CONTROL SWITCH, 3-HS-85-48, in ROD OUT NOTCH. [7.3] **WHEN** position 48 is reached, **THEN** **RELEASE** CRD NOTCH OVERRIDE, 3-HS-85-47, and CRD CONTROL SWITCH, 3-HS-85-48. [7.4] **VERIFY** control rod settles into position 48. [7.5] **PLACE** CRD CONTROL SWITCH, 3-HS-85-48, in ROD OUT NOTCH and **RELEASE**.

Simulator Event Guide:

Event 2 Reactivity: Raise Reactor Power after Completion of Control Rod Pattern Adjustment per 3-GOI-100-12 and in accordance with the RCP

	ATC	**6.6.4 Continuous Rod Withdrawal (continued)** [7.6] **CHECK** control rod coupled by observing the following: • Four rod display digital readout **AND** full core display digital readout **AND** background light will remain illuminated. • CONTROL ROD OVERTRAVEL annunciator (3-XA-55-5A, Window 14) does NOT alarm. [7.7] **CHECK** control rod settles into position 48 and ROD SETTLE light extinguishes. [7.8] **IF** control rod coupling integrity check fails, **THEN** **REFER TO** 3-AOI-85-2. **6.6.5 Return to Normal After Completion of Control Rod Withdrawal** [1] **WHEN** control rod movement is no longer desired **AND** deselecting control rods is desired, **THEN**: [1.1] **PLACE** CRD POWER, 3-HS-85-46, in OFF. [1.2] **PLACE** CRD POWER, 3-HS-85-46, in ON.
Driver	Driver	When ATC withdraws the Final (4th) rod (38-23) Insert trigger 1, Rod will continue to move 3 Notches beyond intended position. When Control Rod 38-23 reaches position 14 delete malfunction **rd04r3823** from the malfunction menu.

Simulator Event Guide:

Event 3 Component: Final(4th) Control Rod manipulated continues to move 3 notches beyond intended position

Driver	Driver	When ATC withdraws the Final (4th) rod (38-23) Rod will continue to move 3 Notches beyond intended position. When Control Rod 38-23 reaches position 14 delete malfunction **rd04r3823** from the malfunction menu.
	ATC	Reports CONTROL ROD DRIFT alarm and Control Rod 38-23 has drifted out 3 notches from intended position
	SRO	Directs ATC to respond per ARP and 3-AOI-85-6 and/or 3-AOI-85-7
	ATC	**3-ARP-9-5A window 28 CONTROL ROD DRIFT** A. **DETERMINE** which rod is drifting from Full Core Display. B. **IF** no control rod motion is observed, **THEN** **RESET** 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, 3.10.8.
	ATC	Resets the CONTROL ROD DRIFT alarm when rod motion has stopped by placing the ROD DRIFT ALARM TEST switch, 3-HS-85-3A-S7, in RESET and **RELEASE**. Then resets the annunciator Responds per 3-AOI-85-6 and/or 3-AOI-85-7 Monitors Full Core Display for a second Control Rod Drift as 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: Final(4th) Control Rod manipulated continues to move 3 notches beyond intended position

	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 (00) 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.

Simulator Event Guide:

Event 3 Component: Final(4th) Control Rod manipulated continues to move 3 notches beyond intended position

	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. [11] **IF** a manual scram was not inserted and Reactor Startup or Shutdown is not in progress, **THEN** [12] **WHEN** control rod fault has been corrected, **THEN** [13] **NOTIFY** Reactor Engineer to **EVALUATE** impact on preconditioning envelope, prior to returning to normal power operation.
	ATC	Selects Control Rod 38-23 and inserts to position 00 Notifies the Reactor Engineer to Evaluate Core Thermal Limits and Preconditioning Limits for the current Control Rod pattern. Removes the associated HCU from service per 3-OI-85

Simulator Event Guide:

Event 3 Component: Final(4th) Control Rod manipulated continues to move 3 notches beyond intended position

Driver	Driver	As Reactor Engineer inform that Core Thermal Limits and Preconditioning Limits for the current Control Rod pattern will be evaluated.
	SRO	Evaluates Tech Spec 3.1.3 Condition C Initiates Work Order/Service Request 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 per 3-OI-85
Driver	Driver	If contacted, as Reactor Engineer inform that all conditions listed above will be evaluated. If contacted, as Work Control inform that you will get working on a Work Order/SR. If contacted, as System Engineering inform that you will perform 0-TI-20.
	SRO	The SRO may direct entry into 3-AOI-85-7, Mispositioned Control Rod, if so the following procedure will be used.
	ATC	**3-AOI-85-7 Mispositioned Control Rod** **4.1 Immediate Actions** None **4.2 Subsequent Actions** [1] **STOP** all intentional control rod movement. [2] **IF** Control Rod is determined to be mispositioned, **THEN** **NOTIFY** the following: • Reactor Engineer (RE), • Shift Technical Advisor (STA), • Unit Supervisor • Shift Manager (SM) • Operations Superintendent. [INPO SOER 84-002]

Simulator Event Guide:

Event 3 Component: Final(4th) Control Rod manipulated continues to move 3 notches beyond intended position

	ATC	**4.2 Subsequent Actions (continued)** [3] **IF** the Control Rod is > 2 notches from the intended position, **THEN** **PERFORM** the following: (Otherwise N/A) [3.1] **INSERT** the mispositioned rod to "00". [3.2] **IF** a Reactor Startup or Shutdown is not in progress, **THEN** (Otherwise N/A) [4] **IF** the Control Rod is less than or equal to 2 notches from the intended position, **THEN** (Otherwise N/A) [5] **CHECK** the following radiation recorders for a rise in activity to determine if any fuel damage occurred: • MAIN STEAM LINE RADIATION, 3-RR-90-135 (Panel 3-9-2) • OFFGAS RADIATION, 3-RR-90-266, on Panel 3-9-2. • OFFGAS RADIATION, 3-RR-90-160 (Panel 3-9-2) • OFFGAS PRETREATMENT RADIATION, 3-RR-90-157 (Panel 3-9-2) [6] **IF** there is any evidence of fuel damage, **THEN** [7] **INTIATE** a Service Request/PER for Control Rod error or mispositioned Control Rod. [8] **IF** possible, **THEN DETERMINE** how long the rod has been mispositioned [9] **NOTIFY** Reactor Engineer to perform the following when time permits: • **EVALUATE** the possible consequences • **DOCUMENT** in Reactor Engineer log.

Simulator Event Guide:

Event 3 Component: Final(4th) Control Rod manipulated continues to move 3 notches beyond intended position

	SRO	Directs ATC to stop all intentional Control Rod Movement Informs all positions listed in step 2 of Subsequent Actions of Mispositioned Control Rod Directs ATC to Insert Mispositioned Control Rod to 00 Enters 3-GOI-100-12, Power Maneuvering Initiates Service Request and Notifies Reactor Engineer to evaluate the possible consequences and document in the Reactor Engineering Log
Driver	Driver	The SRO will direct the associated HCU removed from service if 3-AOI-85-6 is entered. 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
Driver	Driver	When directed by NRC insert Trigger 5 for RCIC steam leak with failure to auto isolate.

Simulator Event Guide:

Event 3 Component: Final(4^{th}) Control Rod manipulated continues to move 3 notches beyond intended position

	ATC	Stops all intentional control rod movement When directed inserts Control Rod to Position 00 Evaluates Radiation Recorders to determine if Fuel Damage Exists and determines how long rod has been mispositioned.
Driver	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.
Driver	Driver	When directed by NRC insert Trigger 5 for RCIC steam leak with failure to auto isolate.

Simulator Event Guide:

Event 4 Component: RCIC Room high temp / Fail to Isolate

Driver	Driver	When directed by NRC insert Trigger 5 for RCIC steam leak with failure to 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 4 Component: RCIC Room high temp / Fail to Isolate

	BOP	Reports rising temperature in RCIC, reports RCIC failed to isolate and isolates RCIC Steam Line
	SRO	Enter EOI-3 on Secondary Containment Area Radiation
Diver	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
CS#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 <u>OR</u> • Suppress a Fire
CS#3	BOP	Isolates RCIC Steam Lines and reports Temperatures and Radiation Levels lowering

Simulator Event Guide:

Event 4 Component: RCIC Room high temp / Fail to 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
	SRO	Ensures no systems are still discharging to Secondary Containment, remains in EOI-3 until entry conditions are cleared.
		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**
	SRO	Evaluates Technical Specification 3.5.3 Condition B and 3.6.1.3 Condition B. The SRO will determine RCIC Isolation Valves inoperable and RCIC System inoperable. With HPCI already Inoperable, plant shutdown is required to Mode 3 within 12 hours and less than 150 psig Steam Dome Pressure within 36 hours.
	SRO	Notifies Operations management that Plant Shutdown is required
	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.

Simulator Event Guide:

Event 4 Component: RCIC Room high temp / Fail to Isolate

	ATC/BOP	d. **VERIFY OPEN** the following dampers: • 3-FCO-64-5, REFUEL ZONE SPLY OUTBD ISOL DMPR • 3-FCO-64-6, REFUEL ZONE SPLY INBD ISOL DMPR • 3-FCO-64-9, REFUEL ZONE EXH OUTBD ISOL DMPR • 3-FCO-64-10, REFUEL ZONE EXH INBD ISOL DMPR. 3. **PLACE** Reactor Zone Ventilation in service as follows (Panel 3-9-25): a. **VERIFY** 3-HS-64-11A, REACTOR ZONE FANS AND DAMPERS, control switch is in OFF. b. **PLACE** 3-HS-64-11A, REACTOR ZONE FANS AND DAMPERS, control switch in SLOW A (SLOW B). c. **CHECK** two SPLY/EXH A(B) green lights above 3-HS-64-11A, REACTOR ZONE FANS AND DAMPERS, control switch extinguish and two SPLY/EXH A(B) red lights illuminate. d. **VERIFY OPEN** the following dampers: • 3-FCO-64-13, REACTOR ZONE SPLY OUTBD ISOL DMPR • 3-FCO-64-14, REACTOR ZONE SPLY INBD ISOL DMPR • 3-FCO-64-42, REACTOR ZONE EXH INBD ISOL DMPR • 3-FCO-64-43, REACTOR ZONE EXH OUTBD ISOL DMPR.
Driver	Driver	When directed by NRC insert Trigger 10 for Loss of Feedwater Heating and 3-FCV-5-21, HP HEATER 3B2 EXTR ISOL VLV Fail to isolate

Simulator Event Guide:

Event 5 Component: Loss of Feedwater Heating and 3-FCV-5-21, HP HEATER 3B2 EXTR ISOL VLV Fail to isolate

Driver	Driver	When directed by NRC insert Trigger 10 for Loss of Feedwater Heating and 3-FCV-5-21, HP HEATER 3B2 EXTR ISOL VLV Fail to isolate.
	ATC/BOP	Announces "BYPASS VALVE TO CONDENSER NOT CLOSED" and refers to 3-ARP-9-6A, window 18. A. **CHECK** heater high or low level or moisture separator high or low level alarm window illuminated on Panel 3-9-6 or 3-9-7 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 34-21, Col T-13 J-LINE, elevation 565'.
Driver	Driver	Acknowledge dispatch, wait 1-2 minutes and report 3-LCV-6-22B light is out on junction box 34-21.
	ATC/BOP	Announces "HEATER B2 LEVEL HIGH" and refers to 3-ARP-9-6A window 9. A. **CHECK** the following indications: • Condensate flow recorder 2-29, Panel 3-9-6. Rising flow is a possible indication of a tube leak. • Heater B2 shell pressure, 3-PI-5-22 and drain cooler B5 flow, 3-FI-6-34, Panel 3-9-6. High or rising shell pressure or drain cooler flow is possible indication of a tube leak. B. **CHECK** drain valve 3-FCV-6-95 open. C. **CHECK** level on ICS screen, FEEDWATER HEATER LEVEL (FWHL). • **IF** the 3B2 heater indicates HIGH (Yellow), **THEN** **VERIFY** proper operation of the Drain and Dump Valves. • **DISPATCH** personnel to local Panel 3-LPNL-925-562C to VERIFY and MANUALLY control the level. D. **IF** a valid HIGH HIGH level is received, **THEN** **GO TO** 3-AOI-6-1A or 3-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 3-FCV-6-95 open Checks 3B2 Heater level on ICS and dispatches personnel to verify and manually control level
Driver	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 3-FCV-5-21, HP HEATER 3B2 EXTR ISOL VLV Fail to isolate

	ATC/BOP	Announces B1 and B2 High Pressure Heater Extraction Isolation
	SRO	Directs crew to enter 3-AOI-6-1A or 3-AOI-6-1C
	ATC/BOP	**3-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 3-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** 3-GOI-100-12 or 3-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 A-2(B-2) or (C-2) DRAIN TO HTR A-3(B-3) or (C- 3), 3-FCV-6-94(95) or (96). [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, 3-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 3-FCV-5-21, HP HEATER 3B2 EXTR ISOL VLV Fail to isolate

	ATC/BOP	**3-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** 3-OI-6.
	ATC BOP	Lower Reactor Power greater than 5% below initial power level using Recirc Pump flow adjustments Refers to 3-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 3-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 **3-AOI-6-1A Attachment 1** B1 or B2 — The following valves must be manually closed: 3-FCV-3-31, HP HTR 3B2 FW INLET ISOL VALVE 3-FCV-3-76, HP HTR 3B1 FW OUTLET ISOL VALVE The following valves AUTO Isolate 3-FCV-5-9, HP HEATER 3B1 EXTR ISOL VLV 3-FCV-5-21, HP HEATER 3B2 EXTR ISOL VLV 3-FCV-6-74, MOISTURE SEP LC RES B1 ISOL VLV 3-FCV-6-172, MOISTURE SEP LC RES B2 ISOL VLV Directs power reduction to < 79% power (Mid-power runback) per 3-OI-6, Illustration 1 **3-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 3-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 3-FCV-5-21, HP HEATER 3B2 EXTR ISOL VLV Fail to isolate

	BOP	Closes the following Feedwater Valves Manually 3-FCV-3-31, HP HTR 3B2 FW INLET ISOL VALVE 3-FCV-3-76, HP HTR 3B1 FW OUTLET ISOL VALVE Verifies the following valves close automatically 3-FCV-5-9, HP HEATER 3B1 EXTR ISOL VLV 3-FCV-5-21, HP HEATER 3B2 EXTR ISOL VLV 3-FCV-6-74, MOISTURE SEP LC RES B1 ISOL VLV 3-FCV-6-172, MOISTURE SEP LC RES B2 ISOL VLV Takes action to manually shut 3-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 3B HP HTR string (i.e. tube leak) and reports to crew
Driver	Driver	After HS for 3-FCV-5-21 taken to closed, verify Trigger 11 goes active. As Reactor Engineer , when contacted to evaluate and adjust thermal limits, acknowledge order and when crew is at ≈ 79% power recommend inserting the first group of Emergency Insert Control Rods
	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
Driver	Driver	When directed by NRC Insert Trigger 20 Feedwater Line Break in Turbine Bldg When Reactor Water Level reaches -110 to -120 inches insert Trigger 25 Drywell leak

Simulator Event Guide:

Event 6 Major: Feedwater Line Break in Turbine Bldg / Drywell leak/
Div 1 ECCS fails to initiate

Driver	Driver	When directed by NRC Insert Trigger 20 Feedwater Line Break in Turbine Bldg When Reactor Water Level reaches -110 to -120 inches insert Trigger 25 Drywell leak
	ATC	Responds to alarms "RECTOR FEED PUMPS A, B, AND C ABNORMAL", "RFWCS ABNORMAL" and "REACTOR WATER LEVEL ABNORMAL"
	ATC	**3-ARP-9-5A Reactor Water Level Abnormal** A. **VERIFY** Reactor water level hi/low using multiple indications including Average Narrow Range Level on 3-XR-3-53 recorder, 3-LI-3-53, 3-LI-3-60, 3-LI-3-206, and 3-LI-3-253 on Panel 3-9-5. B. **IF** alarm is valid, **THEN** **REFER TO** 3-AOI-3-1 or 3-OI-3. C. **IF** 3-LI-3-53, 3-LI-3-60, 3-LI-3-206, and 3-LI-3-253 has failed or is invalid, **THEN** with SRO permission, **BYPASS** the affected level instrument. **REFER TO** 3-OI-3, Section 8.2.
	ATC	Monitors Reactor Water Level and Reports trend, recommends Manual Reactor Scram Determines Feedwater Leak in the Turbine Building due to both Feedwater Line Flows lowering to 0 and Reactor Feed Pump Flows Increasing with a Lowering Reactor Water Level
	SRO	Directs a Manual Reactor Scram inserted 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)
	ATC	Inserts Manual Reactor Scram Trips Reactor Feed Pumps and shuts Reactor Feed Pump Discharge Valves Secures Condensate Booster Pumps then Condensate Pumps

Simulator Event Guide:

Event 6 Major: Feedwater Line Break in Turbine Bldg / Drywell leak/
Div 1 ECCS fails to initiate

Driver	Driver	When Reactor Water Level reaches -110 to -120 inches insert Trigger 25 Drywell leak
	SRO	**Enters EOI-1 on Low Reactor Water Level** **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 800-1000 psig using Bypass Valves **RC/L** Monitor and Control RPV Water Level Verify as Required • PCIS Isolations (Groups 1, 2 and 3) • ECCS • RCIC Recognizes loss of all High Pressure Injection sources with exception of CRD and SLC. Directs maximizing CRD flow to the Vessel per Appendix 5B Answers **No** to can water level be Restored and Maintained above +2 inches Maintain RPV Water Level above -162 inches

Simulator Event Guide:

Event 6 Major: Feedwater Line Break in Turbine Bldg / Drywell leak/
Div 1 ECCS fails to initiate

Driver	Driver	When Reactor Water Level reaches -110 to -120 inches insert Trigger 25 Drywell leak
CS#4		**Enters EOI-1 on Low Reactor Water Level (cont)** 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
	ATC	**Appendix 5B** 1. IF Maximum injection flow is NOT required, THEN **VERIFY** CRD aligned as follows: a. **VERIFY** at least one CRD pump in service and aligned to Unit 3 CRD system. b. **ADJUST** 3-FIC-85-11, CRD SYSTEM FLOW CONTROL, as necessary to obtain flow rate of 65 to 85 gpm. c. **THROTTLE** 3-PCV-85-23, CRD DRIVE WATER PRESS CONTROL VLV, to maintain 250 to 350 psid drive water header pressure differential. d. **EXIT** this procedure. 2. IF BOTH of the following exist: CRD is NOT required for rod insertion, **AND** Maximum injection flow is required, THEN **LINE UP** ALL available CRD pumps to the RPV as follows: a. IF CRD Pump 3A is available, THEN **VERIFY** RUNNING CRD Pump 3A or 3B. b. IF CRD Pump 3B is available, THEN **VERIFY** RUNNING CRD Pump 3A or 3B.

Simulator Event Guide:

Event 6 Major: Feedwater Line Break in Turbine Bldg / Drywell leak/
Div 1 ECCS fails to initiate

Driver	Driver	When Reactor Water Level reaches -110 to -120 inches insert Trigger 25 Drywell leak
	ATC	**Appendix 5B (cont)** c. OPEN the following valves to increase CRD flow to the RPV: • 3-PCV-85-23, CRD DRIVE WATER PRESS CONTROL VLV • 3-PCV-85-27, CRD CLG WATER PRESS CONTROL VLV • 3-FCV-85-50, CRD EXH RTN LINE SHUTOFF VALVE. d. ADJUST 3-FIC-85-11, CRD SYSTEM FLOW CONTROL, on Panel 9-5 to control injection WHILE maintaining 3-PI-85-13A, CRD ACCUM CHG WTR HDR PRESS, above 1450 psig, if possible.
	ATC	**Appendix 7B** 2. IF RPV injection is needed immediately ONLY to prevent or mitigate fuel damage, THEN **CONTINUE** at Step 10 to inject SLC Boron Tank to RPV. 10. **UNLOCK** and **PLACE** 3-HS-63-6A, SLC PUMP 3A/3B, control switch in START PUMP 3A or START PUMP 3B (Panel 3-9-5). 11. **CHECK** SLC injection by observing the following: Selected pump starts, as indicated by red light illuminated above pump control switch. • Squib valves fire, as indicated by SQUIB VALVE A and B CONTINUITY blue lights extinguished, • SLC SQUIB VALVE CONTINUITY LOST Annunciator in alarm (3-XA-55-5B, Window 20). • 3-PI-63-7A, SLC PUMP DISCH PRESS, indicates above RPV pressure. • System flow, as indicated by 3-IL-63-11, SLC FLOW, red light illuminated, • SLC INJECTION FLOW TO REACTOR Annunciator in alarm (3-XA-55-5B, Window 14). 12. IF Proper system operation CANNOT be verified, THEN **RETURN TO** Step 10 and **START** other SLC pump. 13. IF SLC tank level drops to 0%, THEN **STOP** SLC pumps. 15. **MONITOR** and **CONTROL** SLC System as necessary to maintain injection.

Simulator Event Guide:

Event 6 Major: Feedwater Line Break in Turbine Bldg / Drywell leak/
Div 1 ECCS fails to initiate

		When Trigger 25, Drywell Leak, is inserted Drywell Pressure will begin to rise and Reactor Water Level will begin to lower at a faster rate.
	BOP	Approximately 5 minutes after Feedwater Leak inserted recognizes loss of 480v RMOV Board B. Announces loss of Division II ECCS systems
NRC	NRC	Loop II LPCI will still inject due to outboard injection valve open (with no power) and inboard injection valve still having power. Will be unable to throttle flow; when Loop II LPCI is no longer required, pumps must be secured. Loop II Core Spray is not functional.
	SRO	**Enters C-1, Alternate Level Control**
CS#4		Verifies ADS Inhibited
		Directs lineup of Injection Systems Irrespective of Pump NPSH and Vortex limits (LPCI and CS) per Appendix 6B and 6D
		Answers **Yes** to can 2 or more CNDS, LPCI or CS Injection Subsystems be aligned with pumps running
CS#1		When RPV Water Level drops to -162 inches, Then continues
		Answers **Yes** 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 **Yes** to are pumps running that can restore and maintain RPV Water Level above -180 inches after Emergency Depressurization
		Emergency RPV Depressurization is Required
		Enters C-2
CS#2		Directs maximizing RPV Injection from all available sources irrespective of pump NPSH and Vortex Limits
		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

Simulator Event Guide:

Event 6 Major: Feedwater Line Break in Turbine Bldg / Drywell leak/
Div 1 ECCS fails to initiate

<table>
<tr><td>CS#4

CS#2</td><td>BOP/ATC</td><td>Inhibits ADS

Lines up LPCI and CS Loop I pumps for Injection per Appendix 6B and 6D

After Emergency Depressurization commenced, verifies RPV Injection is maximized from all available sources irrespective of pump NPSH and Vortex Limits</td></tr>
<tr><td></td><td>BOP/ATC</td><td>Appendix 6B, Loop I LPCI
1. IF Adequate core cooling is assured,
AND
It becomes necessary to bypass the LPCI injection valve auto open signal to control injection,

THEN PLACE 3-HS-74-155A, LPCI SYS I OUTBD INJ VLV BYPASS SEL in BYPASS.

2. VERIFY OPEN 3-FCV-74-1, RHR PUMP 3A SUPPR POOL SUCT VLV.

3. VERIFY OPEN 3-FCV-74-12, RHR PUMP 3C SUPPR POOL SUCT VLV.

4. VERIFY CLOSED the following valves:
• 3-FCV-74-61, RHR SYS I DW SPRAY INBD VLV
• 3-FCV-74-60, RHR SYS I DW SPRAY OUTBD VLV
• 3-FCV-74-57, RHR SYS I SUPPR CHBR/POOL ISOL VLV
• 3-FCV-74-58, RHR SYS I SUPPR CHBR SPRAY VALVE
• 3-FCV-74-59, RHR SYS I SUPPR POOL CLG/TEST VLV</td></tr>
</table>

Simulator Event Guide:

Event 6 Major: Feedwater Line Break in Turbine Bldg / Drywell leak/
Div 1 ECCS fails to initiate

	BOP/ATC	**Appendix 6B, Loop I LPCI (cont)** 5. **VERIFY** RHR Pump 3A and/or 3C running. 6. WHEN RPV pressure is below 450 psig, THEN **VERIFY OPEN** 3-FCV-74-53, RHR SYS I LPCI INBD INJECT VALVE. 7. IF RPV pressure is below 230 psig, THEN **VERIFY CLOSED** 3-FCV-68-79, RECIRC PUMP 3B DISCHARGE VALVE. 8. **THROTTLE** 3-FCV-74-52, RHR SYS I LPCI OUTBD INJECT VALVE, as necessary to control injection. 10. **PLACE** RHRSW pumps in service as soon as possible on ANY RHR Heat Exchangers discharging to the RPV. 11. **THROTTLE** the following in-service RHRSW outlet valves to maintain flow between 1350 and 4500 gpm: • 3-FCV-23-34, RHR HX 3A RHRSW OUTLET VLV • 3-FCV-23-40, RHR HX 3C RHRSW OUTLET VLV
	BOP/ATC	**Appendix 6D, Loop I Core Spray** 1. **VERIFY OPEN** the following valves: • 3-FCV-75-2, CORE SPRAY PUMP 3A SUPPR POOL SUCT VLV • 3-FCV-75-11, CORE SPRAY PUMP 3C SUPPR POOL SUCT VLV • 3-FCV-75-23, CORE SPRAY SYS I OUTBD INJECT VALVE.

Simulator Event Guide:

Event 6 Major: Feedwater Line Break in Turbine Bldg / Drywell leak/
Div 1 ECCS fails to initiate

	BOP/ATC	**Appendix 6D, Loop I Core Spray (cont)** 2. **VERIFY CLOSED** 3-FCV-75-22, CORE SPRAY SYS I TEST VALVE. 3. **VERIFY** CS Pump 3A and/or 3C **RUNNING**. 4. WHEN RPV pressure is below 450 psig, THEN **THROTTLE** 3- FCV-75-25, CORE SPRAY SYS I INBD INJECT VALVE, as necessary to control injection at or below 4000 gpm per pump.
CS#1	SRO	**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 **Yes** to can 6 ADS Valves be opened Maintains 6 ADS Valves open until RPV cold shutdown Interlocks are clear
  CS#1 CS#2 CS#2	BOP/ATC	Reports Suppression Pool Level in Feet when directed by SRO Opens 6 ADS valves and verifies open when directed **When RPV Pressure is low enough for Injection of LPCI and Core Spray, operator should verify available systems are injecting. At this time operator should notice Core Spray Loop I Injection Valve not open and take action to manually open the valve.** When adequate core cooling is assured begins to throttle flow to prevent overfilling RPV. Must secure pumps on Loop II LPCI to stop injection.
NRC	NRC	Loop II LPCI will still inject due to outboard injection valve open (with no power) and inboard injection valve still having power. Will be unable to throttle flow, when Loop II LPCI is no longer required pumps must be secured. Loop II Core Spray is not functional.

Simulator Event Guide:

Event 6 Major: Feedwater Line Break in Turbine Bldg / Drywell leak/
Div 1 ECCS fails to initiate

	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) Does not initiate Drywell Sprays Because Adequate Core Cooling is not assured at this time

Simulator Event Guide:

Event 6 Major: Feedwater Line Break in Turbine Bldg / Drywell leak/
Div 1 ECCS fails to initiate

	SRO	**Enters EOI-2 on High Drywell Pressure (cont)** **PC/P** Monitor and control Primary Containment pressure below 2.4 psig 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 (Does not initiate Suppression Chamber Sprays because Adequate Core Cooling is not assured at this time) **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 **SP/T** Monitor and Control Suppression Pool Temperature below 95F using available Suppression Pool Cooling Answers **Yes** to can Suppression Pool Temperature be maintained below 95F (Once Emergency Depressurization has commenced Suppression Pool Temperature will exceed 95F, this step should be re-addressed once Adequate Core Cooling is assured)

Simulator Event Guide:

Event 6 Major: Feedwater Line Break in Turbine Bldg / Drywell leak/
Div 1 ECCS fails to initiate

	SRO	**SP/L** Monitor and Control Suppression Pool Level between -1 and -6 inches Answers **Yes** to can Suppression Pool Level be maintained above -6 inches Answers **Yes** to can Suppression Pool Level be maintained below -1 inches
	SRO	**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 except systems required to: • Be operated by EOIs OR • Suppress a Fire **Secondary Containment Radiation** Monitor and Control Secondary Containment Radiation Levels Answers **No** to Is Any Area Radiation Level 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
		Secondary Water Level Conditions may change if the leak is not isolated in a timely manner.
	SRO	The Emergency Classification is 1.1-S1

Critical Tasks - Three

CS#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.

CS#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 T.A.F. (-162 inches).

1. Safety Significance:
   Maintaining adequate core cooling.

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

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

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

Critical Tasks - Three

CS#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

Scenario Tasks

EVENT	TASK NUMBER	K/A	RO	SRO
1	Automatic Start Test of RFPT 3A Oil Pumps			
	RO U-003-NO-30	259001K4.06	2.5	2.6
2	Control Rod Pattern Adjustment			
	RO U-085-NO-07 SRO S-000-AD-31	2.2.2	4.6	4.1
3	Control Rod Mispositioned or Drift			
	RO U-085-AB-07 SRO S-085-AB-07	295014AA1.03	3.5	3.5
4	RCIC Steam Leak			
	RO U-071-AL-19 SRO S-000-EM-12	295032EA1.05	3.7	3.9
5	Loss of Feedwater Heating			
	RO U-006-AB-01 SRO S-006-AB-01	2.1.43	4.1	4.3
6	Feedwater Line Break			
	RO U-000-EM-18 SRO S-000-EM-19 SRO T-000-EM-15	295031EA2.04	4.6	4.8

SCENARIO REVIEW CHECKLIST

SCENARIO NUMBER: 3-C

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

SHIFT TURNOVER SHEET

Equipment Out of Service/LCO's:

RHRSW is tagged out for Preventive Maintenance.

Stator Water Cooling Pump 3B is tagged out.

Operations/Maintenance for the Shift:

BOP Operator perform 3-OI-3 Section 8.13 Automatic Start Test of RFPT 3A EBOP 3A3 Oil Pump

Once completed perform Control Rod Pattern adjustment in accordance with the Reactivity Control Plan

Units 1 and 2 are at 100% power.

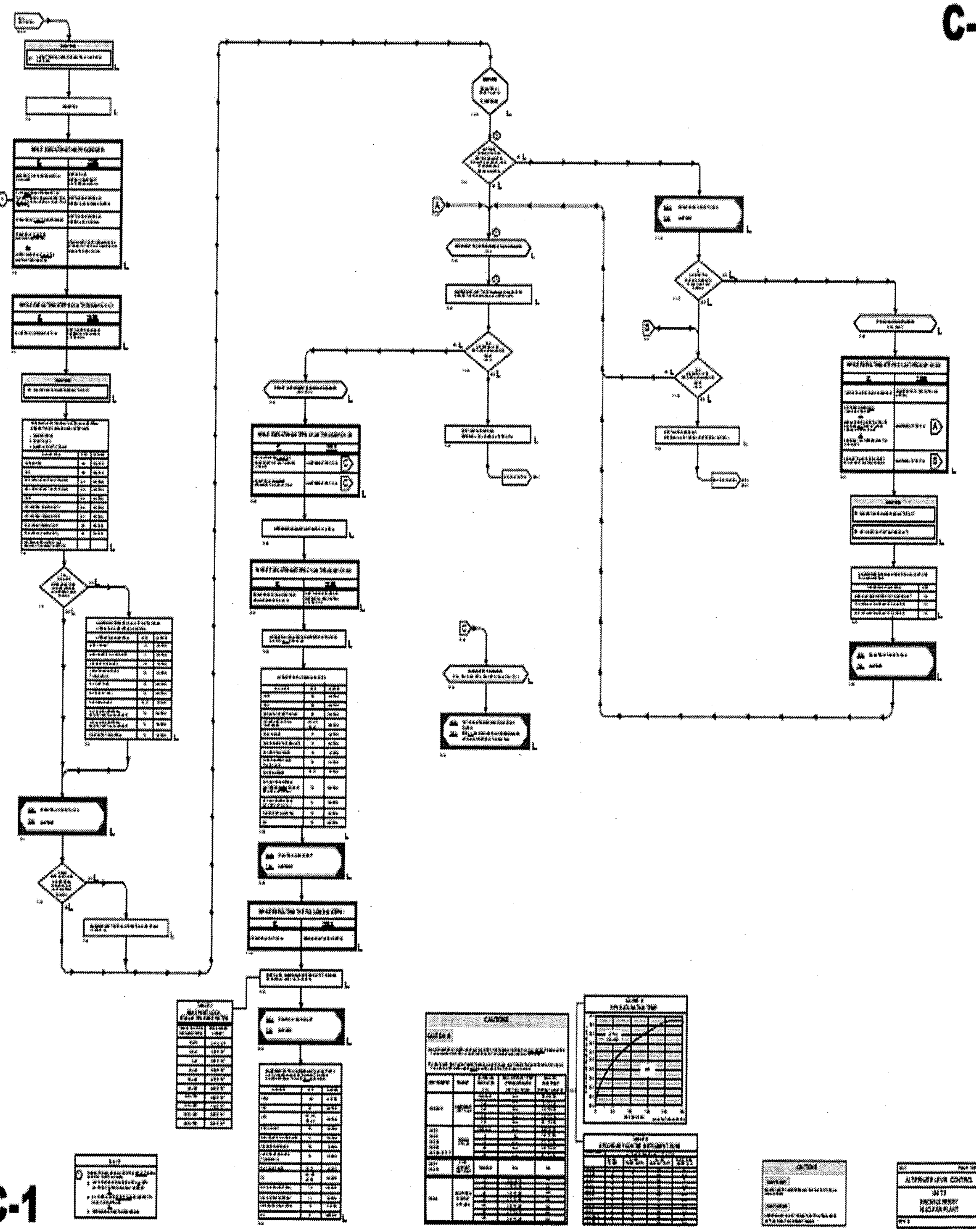
Unusual Conditions/Problem Areas:

None

C-1

UNIT 3

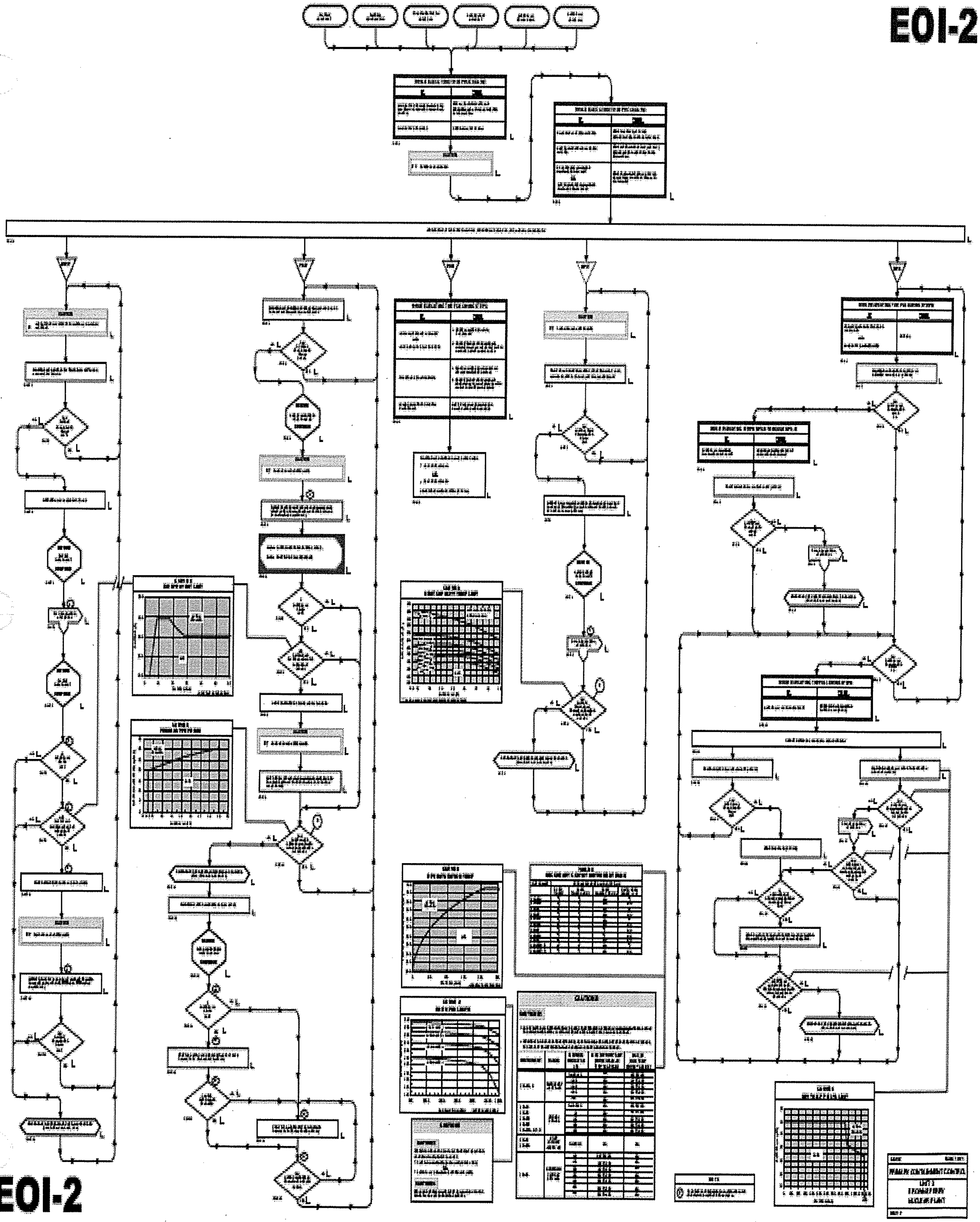
C-1



C-1

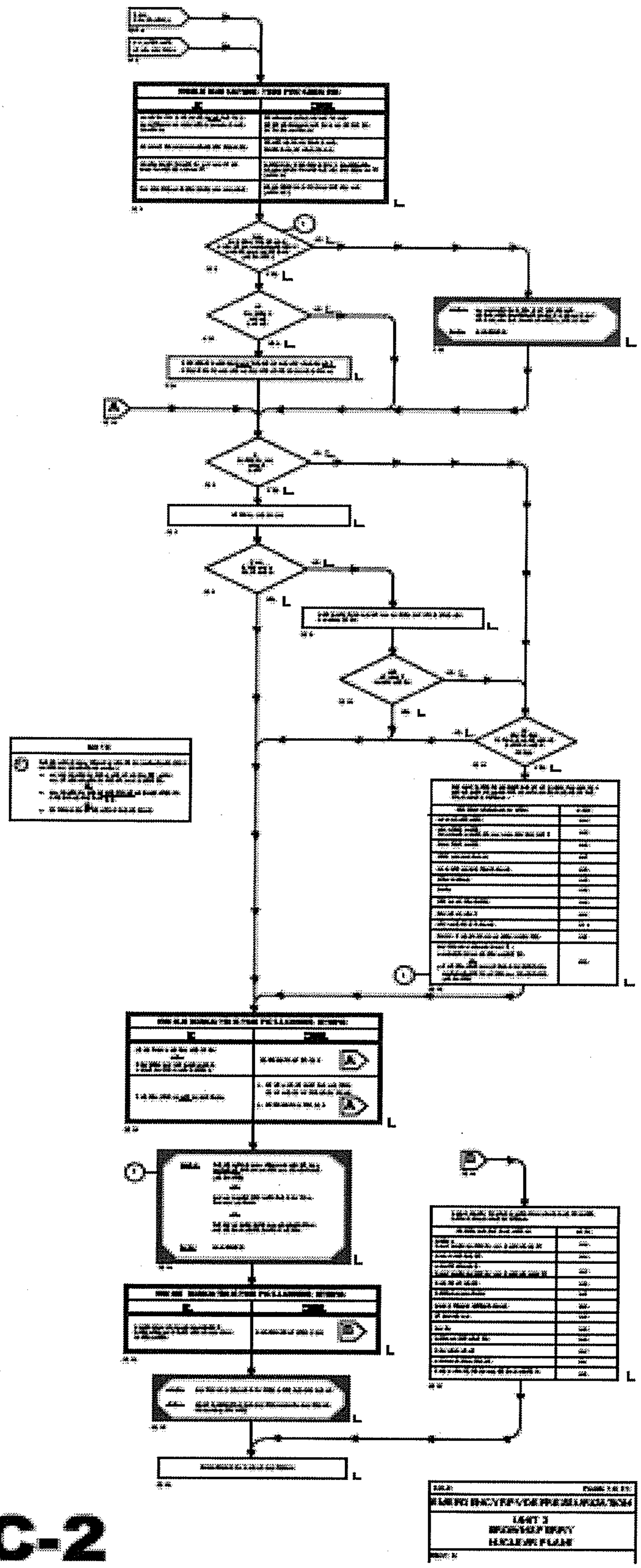
EOI-2
UNIT 3

EOI-2

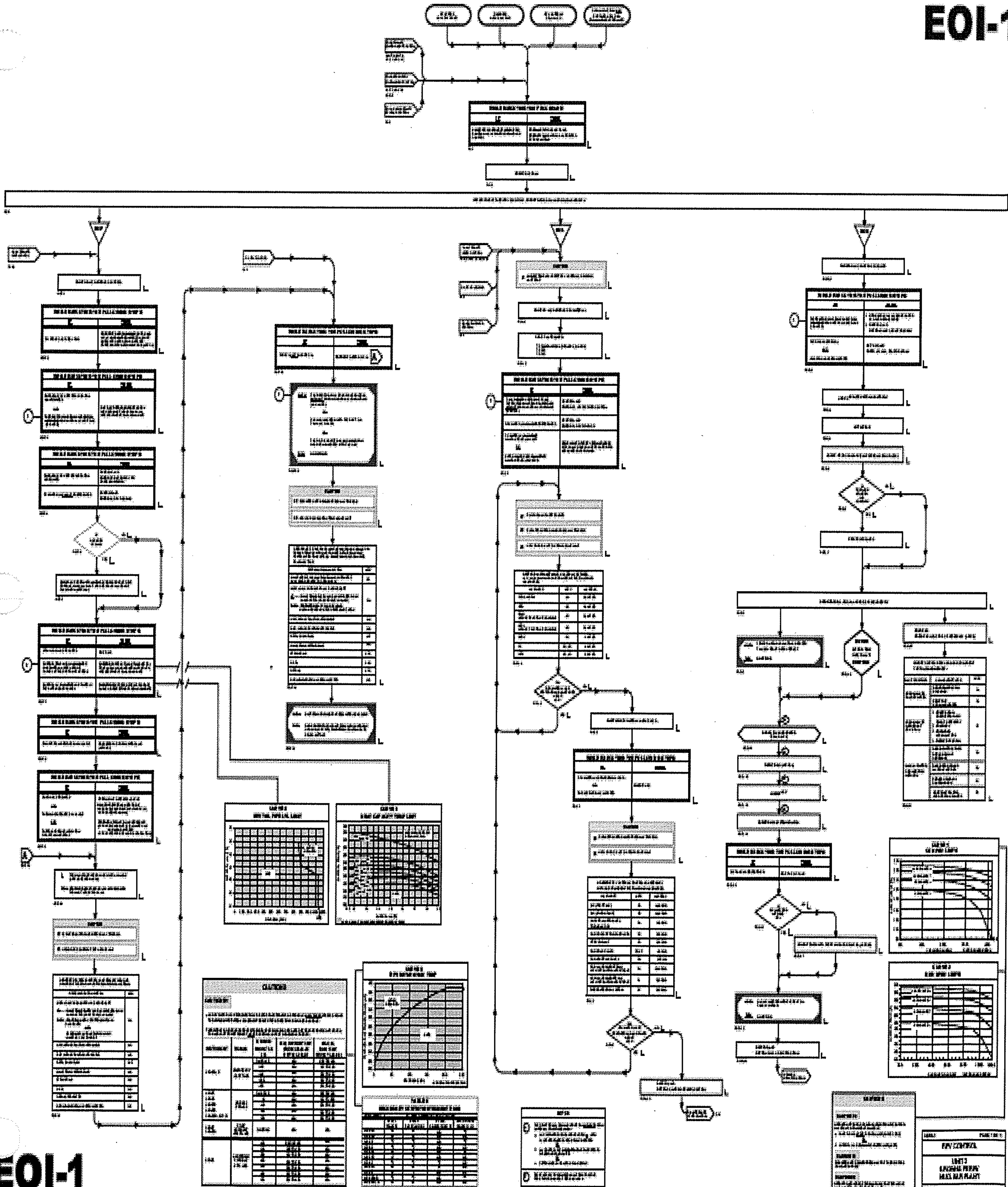


EOI-2

3-C-2 EMERGENCY RPV DEPRESSURIZATION

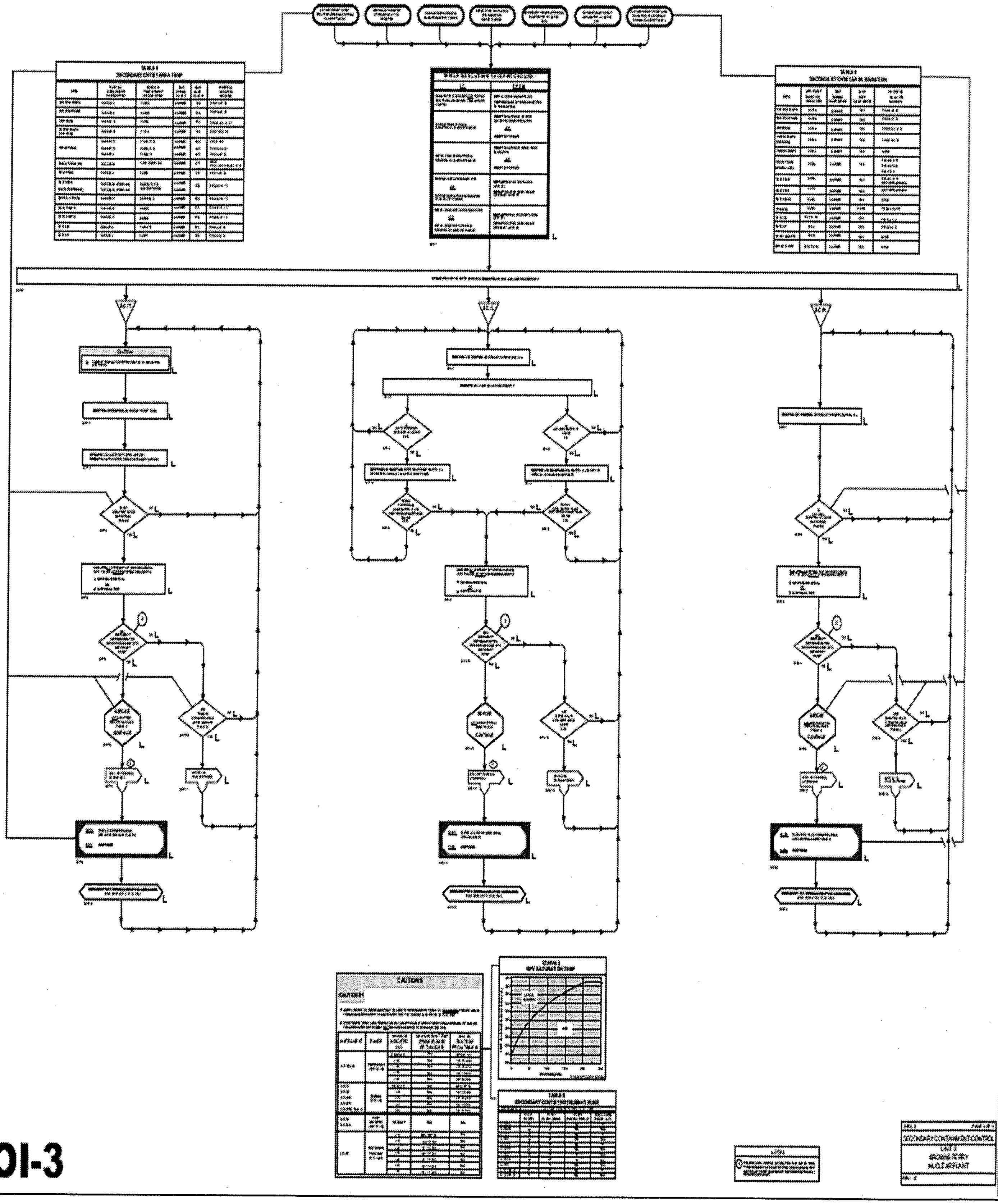


EOI-1



EOI-1

3-EOI-3 SECONDARY CONTAINMENT CONTROL 3-EOI-3



3.6 CONTAINMENT SYSTEMS

3.6.1.3 Primary Containment Isolation Valves (PCIVs)

LCO 3.6.1.3 Each PCIV, except reactor building-to-suppression chamber vacuum breakers, shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
When associated instrumentation is required to be OPERABLE per LCO 3.3.6.1, "Primary Containment Isolation Instrumentation."

ACTIONS

-----NOTES-----

1. Penetration flow paths except for 18 and 20 inch purge valve penetration flow paths may be unisolated intermittently under administrative controls.
2. Separate Condition entry is allowed for each penetration flow path.
3. Enter applicable Conditions and Required Actions for systems made inoperable by PCIVs.
4. Enter applicable Conditions and Required Actions of LCO 3.6.1.1, "Primary Containment," when PCIV leakage results in exceeding overall containment leakage rate acceptance criteria in MODES 1, 2, and 3.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. --------------NOTE------------ Only applicable to penetration flow paths with two PCIVs. ----------------------------------- One or more penetration flow paths with one PCIV inoperable except due to MSIV leakage not within limits.	A.1	Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured.	4 hours except for main steam line <u>AND</u> 8 hours for main steam line
	<u>AND</u>		
			(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2 --------------NOTE------------ Isolation devices in high radiation areas may be verified by use of administrative means. ---------------------------------- Verify the affected penetration flow path is isolated.	Once per 31 days for isolation devices outside primary containment AND Prior to entering MODE 2 or 3 from MODE 4, if primary containment was de-inerted while in MODE 4, if not performed within the previous 92 days, for isolation devices inside primary containment

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. --------------NOTE------------ Only applicable to penetration flow paths with two PCIVs. ---------------------------------- One or more penetration flow paths with two PCIVs inoperable except due to MSIV leakage not within limits.	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.	1 hour
C. --------------NOTE------------ Only applicable to penetration flow paths with only one PCIV. ---------------------------------- One or more penetration flow paths with one PCIV inoperable.	C.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.	4 hours except for excess flow check valves (EFCVs) AND 12 hours for EFCVs
	AND		
	C.2	--------------NOTE------------ Isolation devices in high radiation areas may be verified by use of administrative means. ---------------------------------- Verify the affected penetration flow path is isolated.	Once per 31 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. One or more penetration flow paths with MSIV leakage not within limits.	D.1	Restore leakage rate to within limit.	4 hours
E. Required Action and associated Completion Time of Condition A, B, C, or D not met in MODE 1, 2, or 3.	E.1	Be in MODE 3.	12 hours
	<u>AND</u>		
	E.2	Be in MODE 4.	36 hours
F. Required Action and associated Completion Time of Condition A, B, C, or D not met for PCIV(s) required to be OPERABLE during MODE 4 or 5.	F.1	Initiate action to suspend operations with a potential for draining the reactor vessel (OPDRVs).	Immediately
	<u>OR</u>		
	F.2	-------------NOTE------------ Only applicable for inoperable RHR Shutdown Cooling Valves. -------------------------------- Initiate action to restore valve(s) to OPERABLE status.	Immediately

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

3.5.3 RCIC System

LCO 3.5.3 The RCIC System shall be OPERABLE.

APPLICABILITY: MODE 1,
MODES 2 and 3 with reactor steam dome pressure > 150 psig.

ACTIONS

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. RCIC System inoperable.	A.1 Verify by administrative means High Pressure Coolant Injection System is OPERABLE.	Immediately
	<u>AND</u>	
	A.2 Restore RCIC System to OPERABLE status.	14 days
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	12 hours
	<u>AND</u>	
	B.2 Reduce reactor steam dome pressure to ≤ 150 psig.	36 hours

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.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One withdrawn control rod stuck.	----------------NOTE---------------- Rod worth minimizer (RWM) may be bypassed as allowed by LCO 3.3.2.1, "Control Rod Block Instrumentation," if required, to allow continued operation. --	
	A.1 Verify stuck control rod separation criteria are met.	Immediately
	AND	
	A.2 Disarm the associated control rod drive (CRD).	2 hours
	AND	
		(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. (continued)	A.3	Perform SR 3.1.3.2 and SR 3.1.3.3 for each withdrawn OPERABLE control rod.	24 hours from discovery of Condition A concurrent with THERMAL POWER greater than the low power setpoint (LPSP) of the RWM
	<u>AND</u>		
	A.4	Perform SR 3.1.1.1.	72 hours
B. Two or more withdrawn control rods stuck.	B.1	Be in MODE 3.	12 hours
C. One or more control rods inoperable for reasons other than Condition A or B.	C.1	-------------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.	3 hours
	<u>AND</u>		
	C.2	Disarm the associated CRD.	4 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. ------------NOTE------------ Not applicable when THERMAL POWER > 10% RTP. ------------------------------ Two or more inoperable control rods not in compliance with banked position withdrawal sequence (BPWS) and not separated by two or more OPERABLE control rods.	D.1	Restore compliance with BPWS.	4 hours
	<u>OR</u>		
	D.2	Restore control rod to OPERABLE status.	4 hours
E. Required Action and associated Completion Time of Condition A, C, or D not met. <u>OR</u> Nine or more control rods inoperable.	E.1	Be in MODE 3.	12 hours

WATER LEVEL

Description	Description	
1.1-U1 NOTE Uncontrolled water level decrease in Reactor Cavity with irradiated fuel assemblies expected to remain covered by water. OPERATING CONDITION: Mode 5	**1.1-U2** Uncontrolled water level decrease in Spent Fuel Pool with irradiated fuel assemblies expected to remain covered by water. OPERATING CONDITION ALL	UNUSUAL EVENT
1.1-A1 NOTE Uncontrolled water level decrease in Reactor Cavity expected to result in irradiated fuel assemblies being uncovered. OPERATING CONDITION: Mode 5	**1.1-A2** Uncontrolled water level decrease in Spent Fuel Storage Pool expected to result in irradiated fuel assemblies being uncovered. OPERATING CONDITION: ALL	ALERT
1.1-S1 NOTE Reactor water level can NOT be maintained above -162 inches. (TAF) OPERATING CONDITION: ALL	**1.1-S2** Reactor water level can NOT be determined. OPERATING CONDITION: Mode 1 or 2 or 3	SITE EMERGENCY
1.1-G1 Reactor water level can NOT be restored and maintained above -180 inches. OPERATING CONDITION: Mode 1 or 2 or 3	**1.1-G2** NOTE TABLE US Reactor water level can NOT be determined **AND** Either of the following exists: • The reactor will remain subcritical without boron under all conditions, and ➢ Less than 4 MSRVs can be opened, or ➢ Reactor pressure can NOT be restored and maintained above Suppression Chamber pressure by at least ❖ UNIT 1 – 90 psi ❖ UNIT 2 – 80 psi ❖ UNIT 3 – 70 psi • It has NOT been determined that the reactor will remain subcritical without boron under all conditions and unable to restore and maintain MARFP in Table 1.1-G2. OPERATING CONDITION: Mode 1 or 2 or 3	GENERAL EMERGENCY

Facility: **Browns Ferry NPP** Scenario No.: **D** Op-Test No.: **ILT 1102**

Examiners:	

Operators:	**SRO:**
	ATC:
	BOP:

Initial Conditions: IC193 / Unit 3 Reactor Power 4% / Condensate Pump 3A tagged

Turnover: Aligning Charcoal Filters for Parallel Flow IAW 3-OI-66 Section 5.11. Raise Power with Control Rods for Mode Change

Event No.	Malf. No.	Event Type*	Event Description
1		N-BOP N-SRO	Aligning Charcoal Filters for Parallel Flow 5.11
2		R-ATC R-SRO	Raise Power with Control Rods for Mode Change
3	th03b	C-ATC TS-SRO	Reactor Recirc Pump B Trip
4	trg 5	TS-SRO C-BOP	CS inadvertent initiation
5	ms01	C-BOP C-SRO	Steam Seal Regulator failure
6	fw30c	C-ATC C-SRO	Feedwater Pump Governor drifts up
7	pc14	M-ALL	Torus Leak / ATWS
8		C	3-FCV-74-57 fails to open (If repair team called for, open valve after ED started)
9	trg 20	C	3-FCV-73-30 Fails to Open

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

Console Operator Instructions

Scenario File Summary

File: batch and trigger files for scenario 3-D

Batch nrc2011dR1
#cp pump 3a clearance
ior ypobkrcndpa fail_power

#Recirc Pump B trip
imf th03b (e1 0)

#cs Initiation
ior zdihs755a[4] (e5 0) start
ior ypobkrcspmpa (e6 0) fail_power

#steam seal failure
imf ms01 (e10 0)
imf mc04 (e10 0) 100

#FWLC fail
imf fw30c (e15 0) 100 3000 54
trg 7 nrc2011fptc
trg 7 = dmf fw30c

Trigger nrc2011fptc
zdihs4610a[4] .ne. 1

#SP LEAK ATWS/major
bat atws75
imf pc14 (e20 0) 100 300 75
ior ypovfcv7330 (e20 0) fail_now
trg 21 = bat atws-1
trg 22 = bat app01f
trg 23 = bat app02
ior zdihs7457a[2] auto
bat nrcstick20
trg 24 = bat nrcunstick14
trg 25 = bat sdv

Batch nrcstick20

imf rd06r3015
imf rd06r3023
imf rd06r3031
imf rd06r1851
imf rd06r1439
imf rd06r1431
imf rd06r3415
imf rd06r3815
imf rd06r4215
imf rd06r4631
imf rd06r5439
imf rd06r3027
imf rd06r2631
imf rd06r2615
imf rd06r2239
imf rd06r3839
imf rd06r1415
imf rd06r3015
imf rd06r4615
imf rd06r2223

Batch nrcunstick14

dmf rd06r3435
dmf rd06r3423
dmf rd06r2631
dmf rd06r3431
dmf rd06r2639
dmf rd06r3439
dmf rd06r3027
dmf rd06r3427
dmf rd06r2243
dmf rd06r2643
dmf rd06r3043
dmf rd06r3443
dmf rd06r1843
dmf rd06r1819

Console Operator Instructions

Scenario 3-D

		DESCRIPTION/ACTION
Simulator Setup	manual	Reset to IC 193
Simulator Setup	Load Batch	Bat nrc2011dR1
Simulator Setup	manual	Clearance out Condensate pump 3A
Simulator Setup		Verify Batch file loaded

RCP required (Raise Power from 4% to 8% with Control Rods for Mode Change) – Provide marked up copy of 3-GOI-100-1A and RCP

Scenario Summary:

The Plant is operating at 4% Reactor Power.

The BOP Operator will Align Charcoal Filters for Parallel Flow IAW 3-OI-66 section 5.11.

The ATC will withdraw control rods in order to raise power to 8% for a mode change from 2 to 1.

Once the NRC is satisfied with the reactivity manipulation, Reactor Recirculation Pump B will trip. The SRO will direct entry to 3-AOI-68-1A; the ATC will close RR Pump B discharge valve.
The SRO will evaluate Technical Specification 3.4.1, Condition A is required.

Core Spray Pump 3A inadvertently initiates, BOP Operator verifies initiation is inadvertent and with SRO concurrence stops Core Spray Pump 3A IAW with ARPs. The SRO will evaluate Technical Specification 3.5.1, Condition A is required.

The Steam Seal regulator will fail; the BOP Operator will take action IAW with the ARPs and restore steam seal pressure with the bypass valve.

The operating feedwater pump controller will fail and level will slowly rise until the ATC or Crew notices the Reactor Level change. The controller will fail to respond until the ATC takes manual control with handswitch. The Operator will be able to maintain Reactor Level control in manual. SRO should direct entry into 3-AOI-3-1.

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 SRO will determine that Suppression Pool level cannot be maintained above 11.5 feet and enter EOI-1 to scram the reactor and then to Emergency Depressurize.

An ATWS will exist on the scram, the crew will work through EOI-1 and C-5 to insert control rods, maintain reactor level and pressure. The SRO will transition to C-2 to Emergency Depressurize.

Attempts to add water to the suppression pool will be unsuccessful with the failure of 3-FCV-73-30 and 3-FCV-74-57.

The Emergency Classification is 1.2-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

Simulator Event Guide:

Event 1 Normal: Aligning Charcoal Filters for Parallel Flow IAW 3-OI-66 Section 5.11

	SRO	Direct BOP to align Charcoal Filters for parallel flow.
	BOP	Align Charcoal Filters for Parallel Flow IAW 3-OI-66 section 5.11.
		5.11 Aligning Charcoal Filters for Parallel Flow: [1] **PLACE** the OFFGAS TREATMENT SELECT handswitch, 3-XS-66-113, in TREAT. [2] **OPEN** the CHARCOAL ADSORBER TRAIN 2 INLET VALVE, using 3-HS-66-117. [3] **OPEN** the CHARCOAL ADSORBER TRAIN 1 DISCH VALVE, using 3-HS-66-118. [4] **CLOSE** the CHARCOAL ADSORBER TRAINS SERIES VLV, using 3-ES-66-116. [5] **CHECK** dewpoint temperature on OFFGAS MOIST SEP REHEATER TEMPERATURE recorder, 3-TRS-66-108, indicates 45°F or less (Red Pen). [6] **IF** the Off-Gas System is intended to be operated with charcoal beds in parallel with the charcoal beds on another (shut down) unit, **THEN**

Simulator Event Guide:

Event 2 Reactivity: Raise Power with Control Rods

	SRO	Notify ODS of power increase
		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
		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

	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

	ATC	**6.6.4 Continuous Rod Withdrawal** [1] **SELECT** desired Control Rod by depressing appropriate CRD ROD SELECT, 3-XS-85-40. [2] **OBSERVE** the following for the selected control rod: • CRD ROD SELECT pushbutton is brightly ILLUMINATED • White light on the Full Core Display ILLUMINATED • Rod Out Permit light ILLUMINATED [3] **VERIFY** Rod Worth Minimizer operable and LATCHED into correct ROD GROUP when the Rod Worth Minimizer is enforcing. [4] **VERIFY** Control Rod is being withdrawn to a position greater than three notches. [5] **IF** withdrawing the control rod to a position other than "48", **THEN** **PERFORM** the following: (Otherwise N/A) [5.1] **PLACE AND HOLD** CRD NOTCH OVERRIDE, 3-HS-85-47, in NOTCH OVERRRIDE. [5.2] **PLACE AND HOLD** CRD CONTROL SWITCH, 3-HS-85-48, in ROD OUT NOTCH. [5.3] **WHEN** control rod reaches two notches prior to the intended notch, **THEN** **RELEASE** CRD NOTCH OVERRIDE, 3-HS-85-47 and CRD CONTROL SWITCH, 3-HS-85-48. [5.4] **IF** control rod settles at notch before intended notch, **THEN** **PLACE** CRD CONTROL SWITCH, 3-HS-85-48, in ROD OUT NOTCH and **RELEASE**.

Simulator Event Guide:

Event 2 Reactivity: Raise Power with Control Rods

	ATC	**6.6.4 Continuous Rod Withdrawal (Continued)** [5.5] **WHEN** control rod settles into the intended notch, **THEN** **CHECK** the following. • Four rod display digital readout and the full core display digital readout and background light remain illuminated. • CONTROL ROD OVERTRAVEL annunciator, 3-XA-55-5A, Window 14, does **NOT** alarm. [5.6] **CHECK** the control rod settles at intended position and ROD SETTLE light extinguishes. [6] **IF** continuously withdrawing the control rod to position 48 and performing the control rod coupling integrity check in conjunction with withdrawal, **THEN** **PERFORM** the following: (Otherwise N/A) [6.1] **PLACE** and **HOLD** CRD NOTCH OVERRIDE, 3-HS-85-47, in NOTCH OVERRRIDE. [6.2] **PLACE** and **HOLD** CRD CONTROL SWITCH, 3-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, 3-XA-55-5A, Window 14, does not alarm. [6.5] **RELEASE** both CRD NOTCH OVERRIDE, 3-HS-85-47, and CRD CONTROL SWITCH, 3-HS-85-48.

Simulator Event Guide:

Event 2 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** 3-AOI-85-2 [7] **IF** continuously withdrawing the control rod to position 48 and the control rod coupling integrity check will be performed after the CRD NOTCH OVERRIDE, 3-HS-85-47, and CRD CONTROL SWITCH, 3-HS-85-48 are to be released, **THEN** **PERFORM** control rod coupling integrity check as follows (otherwise N/A): [7.1] **PLACE AND HOLD** CRD NOTCH OVERRIDE, 3-HS-85-47, in NOTCH OVERRRIDE. [7.2] **PLACE AND HOLD** CRD CONTROL SWITCH, 3-HS-85-48, in ROD OUT NOTCH. [7.3] **WHEN** position 48 is reached, **THEN** **RELEASE** CRD NOTCH OVERRIDE, 3-HS-85-47, and CRD CONTROL SWITCH, 3-HS-85-48. [7.4] **VERIFY** control rod settles into position 48. [7.5] **PLACE** CRD CONTROL SWITCH, 3-HS-85-48, in ROD OUT NOTCH and **RELEASE**. [7.6] **CHECK** control rod coupled by observing the following: • Four rod display digital readout **AND** full core display digital readout **AND** background light will remain illuminated. • CONTROL ROD OVERTRAVEL annunciator (3-XA-55-5A, Window 14) does NOT alarm.

Simulator Event Guide:

Event 2 Reactivity: Raise Power with Control Rods

	ATC	[7.7] **CHECK** control rod settles into position 48 and ROD SETTLE light extinguishes. [7.8] **IF** control rod coupling integrity check fails, **THEN** **REFER TO** 3-AOI-85-2. **6.6.5 Return to Normal After Completion of Control Rod Withdrawal** [1] **WHEN** control rod movement is no longer desired **AND** deselecting control rods is desired, **THEN**: [1.1] **PLACE** CRD POWER, 3-HS-85-46, in OFF. [1.2] **PLACE** CRD POWER, 3-HS-85-46, in ON.
Driver	Driver	When NRC directs, insert Trigger 1 for Reactor Recirc Pump 3B trip.

Simulator Event Guide:

Event 3: Reactor Recirc Pump 3B Trip

Driver	Driver	When NRC directs, insert Trigger 1 for Reactor Recirc Pump 3B trip.
	ATC	Respond to numerous alarms and Report Trip of Reactor Recirc Pump 3B
	SRO	Enter 3-AOI-68-1A Recirc Pump Trip/Core Flow Decrease OPRMs Operable
	ATC	**4.2 Subsequent Actions** [1] **IF** both Recirc Pumps are tripped in modes 1 or 2, **THEN** (Otherwise N/A), [1.1] **SCRAM** the Reactor. [2] **IF** a single Recirc Pump tripped, **THEN CLOSE** tripped Recirc Pump discharge valve.
		Closes 3B Recirc Pump Discharge Valve
	ATC	[3] **IF** Region I or II of the Power to Flow Map is entered, **THEN**
		Steps 3 through 8 are N/A
	SRO	[9] **NOTIFY** Reactor Engineer to **PERFORM** the following: • Tech Specs 3.4.1 • 3-SR-3.4.1(SLO), Reactor Recirculation System Single Loop Operation • 0-TI-248, Core Flow Determination in Single Loop Operation

Simulator Event Guide:

Event 3: Reactor Recirc Pump 3B Trip

	SRO	Evaluate Tech Spec for Single Loop Operation TS 3.4.1 Condition A
		Condition A — Requirements of the LCO not met. Required Action A.1 — Satisfy the requirements of the LCO Completion Time — 24 hours MODE Change not permitted until setpoint changes complete.
	ATC	[10] [NER/C] **WHEN** the Recirc Pump discharge valve has been closed for at least five minutes (to prevent reverse rotation of the pump) [GE SIL-517], **THEN** (N/A if Recirc Pump was isolated in Step 4.2[8]) **OPEN** Recirc Pump discharge valve as necessary to maintain Recirc Loop in thermal equilibrium.
		Opens Recirc Pump 3B discharge valve
	BOP	[11] **REFER TO** the following ICS screens to help determine the cause of recirc pump trip/core flow lowering. VFDPMPB and VFDBAL [12] **CHECK** parameters associated with Recirc Drive and Recirc Pump/Motor 3B on ICS and 3-TR-68-71 to determine cause of trip. Dispatch personnel [13] **PERFORM** visual inspection of tripped Reactor Recirc Drive. Dispatch personnel [14] **PERFORM** visual inspection of Reactor Recirc Pump Drive relay boards for relay targets.
Driver	Driver	As Reactor Engineer acknowledge request, any field investigation for pump trip report no obvious causes. Pump Breaker 4KV Recirc BD 3B
Driver	Driver	When NRC directs, insert Trigger 5 for Core Spray Pump 3A inadvertent start.

Simulator Event Guide:

Event 4: Core Spray Pump 3A Inadvertent Initiation

Driver	Driver	When NRC directs, insert Trigger 5 for Core Spray Pump 3A inadvertent start. Delete Trigger override immediately after pump starts to allow operator to secure pump. When operator places Core Spray 3A to off insert trigger 6.
	BOP	Report inadvertent start of Core Spray Pump 3A and alarm CORE SPRAY SYS I PUMP A START
	BOP	A. **VERIFY** auto start signals by multiple indications. B. **VERIFY** Pump 3A operation by motor amps, discharge pressure, and flow on Panel 3-9-3. B. **IF** pump is **NOT** needed, **THEN** **STOP** Pump before 5 min time limit at minimum flow expires. D. **WHEN** the auto start signal is reset and Core Spray is **NOT** required for Core Cooling, THEN E. **RETURN** system to standby readiness.
	BOP	Report drywell pressure and reactor level normal and stops Core Spray Pump 3A
Driver	Driver	When operator secures pump insert Trigger 6.
	BOP	When pump is stopped reports loss of indication on pump (no lights)
	BOP	Dispatches personnel to breakers
Driver	Driver	When dispatched report breaker is tripped, blown control power fuses on breaker.
	SRO	Evaluate Technical Specification 3.5.1
		Condition A — One low pressure ECCS injection/spray subsystem inoperable. Required Action A.1 — Restore low pressure ECCS injection/spray subsystem(s) to Operable status. Completion Time — 7 Days
Driver	Driver	When NRC directs, insert Trigger 10 for Steam Seal Regulator Failure.

Simulator Event Guide:

Event 5: Steam Seal Regulator Failure

Driver	Driver	When NRC directs, insert Trigger 10 for Steam Seal Regulator Failure.
	BOP	Respond to Annunciator STEAM TO STEAM SEAL REG PRESS LOW A. **CHECK** steam seal header pressure, 3-PI-1-148, Panel 3-9-7. B. **VERIFY** proper valve alignment on Panel 3-9-7. C. **IF** pressure is low, **THEN OPEN** steam seal bypass valve 3-FCV-1-145. D. **DISPATCH** personnel to check 3-PIC-1-147 (El 617' Turb Bldg). E. **CHECK** condenser vacuum on 3-P/TR-2-2 (Panel 3-9-6) and turbine vibration on 3-XR-47-15 (Panel 3-9-7) normal.
	BOP	Responds to Annunciators STEAM PACKING EXHAUSTER VACUUM LOW OG HOLDUP LINE INLET FLOW HIGH
	BOP	Recommends opening steam seal bypass valve 3-FCV-1-145 to restore steam pressure
	SRO	Concurs with actions to restore steam seal pressure
	BOP	Dispatches personnel and checks condenser vacuum
Driver	Driver	Reports Condenser Vacuum stable or slowly degrading.
Driver	Driver	If personnel dispatched report 3-PIC-1-147 has failed low, no air pressure indication, once steam seal pressure is restored delete malfunction **mc04** condenser air in leakage
	SRO	Evaluate entry to 3-AOI-47-3 Loss of Condenser Vacuum
	BOP	Once steam seal pressure is restored resets annunciators and verifies condenser vacuum is improving.
Driver	Driver	If I&C is dispatched acknowledge communication
Driver	Driver	When NRC directs, insert Trigger 15 for Feedwater Pump Governor Failure.

Simulator Event Guide:

Event 6: Feedwater Pump Governor Drifts Up

Driver	Driver	When NRC directs, insert Trigger 15 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 3-AOI-3-1.
		4.2 Subsequent Actions [1] **VERIFY** applicable automatic actions. [16] **IF** Feedwater Control System has failed, **THEN PERFORM** the following: [16.1] **PLACE** individual RFPT Speed Control Raise/Lower switches in MANUAL GOVERNOR (depressed position with amber light illuminated). [16.2] **ADJUST** RFP Discharge flows with RFPT Speed Control Raise/Lower switches as necessary to maintain level. [20] **IF** level continues to rise, **THEN TRIP** a RFP, as necessary. [22] **IF** RFPs are in manual control, **THEN LOWER** speed of operating RFPs. [23] **EXPECT** a possible Reactor power rise due to a rise in moderation. [24] **IF** unit remains on-line, **THEN PERFORM** the following: • **RETURN** Reactor water level to normal operating level of 33" (normal range). • **REQUEST** Nuclear Engineer check core limits.
	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	Driver	If a scram is inserted or at NRC direction initiate trigger 20 for the Suppression Pool Leak

Simulator Event Guide:

Event 7 Major: Torus Leak/ATWS

Driver	Driver	If a scram is inserted or at NRC direction initiate trigger 20 for the Suppression Pool Leak
	ATC/BOP	Respond to alarm multiple Pump Room Flood Level alarms and **SUPPR CHAMBER WATER LEVEL ABNORMAL**
	ATC/BOP	Report lowering suppression pool water level
		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** 3-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", **THEN ENTER** 3-EOI-2 Flowchart.
Driver	Driver	When dispatched wait 6 minutes and report water level is 4 inches and rising in the Southeast Quad. Water is flowing in from the Torus Area. Cannot determine source of the leak.
	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 inches
CS#5	SRO	Sets a Value for HPCI to place in Pull to Lock prior to 12.75 feet
CS#5	ATC/BOP	Places HPCI in Pull to Lock before Suppression Level lowers to 12.75 feet

Simulator Event Guide:

Event 7 Major: Torus Leak/ATWS

	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** 3-FCV-73-40, HPCI CST SUCTION VALVE. b. **OPEN** 3-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** 3-FCV-71-19, RCIC CST SUCTION VALVE. 2) **OPEN** 3-FCV-71-34, RCIC PUMP MIN FLOW VALVE.
	BOP	Attempts to makeup water to the Suppression Pool using HPCI; 3-FCV-73-30 has lost power. Utilizes RCIC to makeup water to the Suppression Pool and dispatches personnel to investigate 3-FCV-73-30.
Driver	Driver	3-FCV-73-30 power fails when the Torus leak is inserted, crew will dispatch personnel to investigate. Acknowledge investigation and provide no further information.
CS#2	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.

Simulator Event Guide:

Event 7 Major: Torus Leak/ATWS

	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: • 3-FCV-74-61, RHR SYS I DW SPRAY INBD VALVE • 3-FCV-74-60, RHR SYS I DW SPRAY OUTBD VALVE • 3-FCV-74-58, RHR SYS I SUPPR CHBR SPRAY VALVE • 3-FCV-74-59, RHR SYS I SUPPR POOL CLG/TEST VALVE • 3-FCV-23-46, RHR HX 3B RHRSW OUTLET VALVE b. **VERIFY** RHR Pumps 3A and 3C are NOT running. c. **PLACE** 3-BKR-074-0100, RHR HTX A-C DISCH XTIE (TO U-2) VLV FCV-74-100 (M010-171) to ON (480V RMOV Board 3B, Compartment 19A). d. **START** RHRSW Pumps B1 and B2. e. **NOTIFY** Unit 1 Operator to **VERIFY CLOSED** 1-FCV-23-46, RHR HEAT EXCHANGER B COOL WATER OUTLET VLV

Simulator Event Guide:

Event 7 Major: Torus Leak/ATWS

Driver	Driver	When personnel dispatched to close 3-BKR-074-0100, wait 1 minutes then close breaker and report, delete override for breaker control power. When requested 1-FCV-23-46 is closed. When requested to open 2-FCV-23-57 insert remote function **sw09 open**
	BOP	f. **NOTIFY** Unit 2 Operator to perform the following 1) **VERIFY CLOSED** 2-FCV-23-46, RHR HX 2B RHRSW OUTLET VLV 2) **OPEN** 2-FCV-23-57, STANDBY COOLANT VLV FROM RHRSW. g. **INJECT** Standby Coolant into the Suppression Pool as follows: 1) **CLOSE** 3-FCV-74-52, RHR SYS I LPCI OUTBD INJECT VLV. 2) **OPEN** 3-FCV-74-100, RHR SYS I U-2 DISCH XTIE. 3) **OPEN** 3-FCV-74-57, RHR SYS I SUPPR CHMBR/POOL ISOL VLV. 4) **THROTTLE OPEN** 3-FCV-74-59, RHR SYS I SUPPR POOL CLG/TEST VLV to control injection.
	BOP	Determines 3-FCV-74-57 will not open and is unable to Emergency Makeup to the Suppression Pool, dispatches personnel to determine cause of valve failure.
Driver	Driver	Acknowledges dispatch and provides no further information until crew has opened all ADS valves. Once all ADS valves are opened delete override **zdihs7457a[2] auto** and inform crew that the valve would not open due to dirty contacts and the problem has been fixed.
	SRO	Enters EOI-3 on Flood Alarms

Simulator Event Guide:

Event 7 Major: Torus Leak/ATWS

	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 **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-1 at pre-determined trigger value and directs Reactor Scram based on EOI-2 step SP/L-7.
	ATC	Inserts Reactor Scram, Initiates One Channel of ARI and reports "rods out"

Simulator Event Guide:

Event 7 Major: Torus Leak/ATWS

	SRO	**Enters EOI-1 from EOI-2 step SP/L-7** 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: Torus Leak/ATWS

	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)
CS#4	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).

Simulator Event Guide:

Event 7 Major: Torus Leak/ATWS

	BOP/ATC	**Appendix 3A (continued)** 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.
	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	Driver	When requested for appendix 8A and 8E wait 6 minutes and insert bat app08ae and report complete

Simulator Event Guide:

Event 7 Major: Torus Leak/ATWS

CS#1/2	SRO	**Enters C-5 from EOI-1 step RC/L-3 (continued)** 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-2 step SP/L-6 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
CS#1	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 7 Major: Torus Leak/ATWS

CS#1	BOP/ATC	**Appendix 4 (continued)** 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 7 Major: Torus Leak/ATWS

CS#1	BOP/ATC	**Appendix 4 (continued)** 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.
CS#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

Simulator Event Guide:

Event 7 Major: Torus Leak/ATWS

	SRO	**Determines Emergency Depressurization is required and enters C-2 (continued)** **Stops** execution of execution of C-2 until Shutdown Cooling RPV Pressure Interlocks are clear **Maintain** RPV in Cold Shutdown per Appendix 17D
CS#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
CS#3	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 6B, 6C
CS#3	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

Simulator Event Guide:

Event 7 Major: Torus Leak/ATWS

CS#3	BOP/ATC	**Appendix 6A (continued)** 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.
CS#3	BOP/ATC	**Appendix 6B** 1. IF Adequate core cooling is assured, **AND** It becomes necessary to bypass the LPCI injection valve auto open signal to control injection, THEN **PLACE** 3-HS-74-155A, LPCI SYS I OUTBD INJ VLV BYPASS SEL in **BYPASS.** 2. **VERIFY OPEN** 3-FCV-74-1, RHR PUMP 3A SUPPR POOL SUCT VLV 3. **VERIFY OPEN** 3-FCV-74-12, RHR PUMP 3C SUPPR POOL SUCT VLV

Simulator Event Guide:

Event 7 Major: Torus Leak/ATWS

CS#3	BOP/ATC	**Appendix 6B (continued)** 4. **VERIFY CLOSED** the following valves: • 3-FCV-74-61, RHR SYS I DW SPRAY INBD VLV • 3-FCV-74-60, RHR SYS I DW SPRAY OUTBD VLV • 3-FCV-74-57, RHR SYS I SUPPR CHBR/POOL ISOL VLV • 3-FCV-74-58, RHR SYS I SUPPR CHBR SPRAY VALVE • 3-FCV-74-59, RHR SYS I SUPPR POOL CLG/TEST VLV 5. **VERIFY** RHR Pump 3A and/or 3C running. 6. WHEN RPV pressure is below 450 psig, THEN **VERIFY OPEN** 3-FCV-74-53, RHR SYS I LPCI INBD INJECT VALVE. 7. IF RPV pressure is below 230 psig, THEN **VERIFY CLOSED** 3-FCV-68-79, RECIRC PUMP 3B DISCHARGE VALVE. 8. **THROTTLE** 3-FCV-74-52, RHR SYS I LPCI OUTBD INJECT VALVE, as necessary to control injection. 10. **PLACE** RHRSW pumps in service as soon as possible on ANY RHR Heat Exchangers discharging to the RPV. 11. **THROTTLE** the following in-service RHRSW outlet valves to maintain flow between 1350 and 4500 gpm: • 3-FCV-23-34, RHR HX 3A RHRSW OUTLET VLV • 3-FCV-23-40, RHR HX 3C RHRSW OUTLET VLV
	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

Simulator Event Guide:

Event 7 Major: Torus Leak/ATWS

	BOP/ATC	**Appendix 6C (continued)** 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
	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 6B, 6C

Simulator Event Guide:

Event 7 Major: Torus Leak/ATWS

CS#4	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: Torus Leak/ATWS

CS#4	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	Driver	When directed to perform Appendix 2 and outside portions of Appendix 1F wait 3 minutes. Insert Triggers 22 and 23 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: Torus Leak/ATWS

CS#4	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: Torus Leak/ATWS

	SRO	**Executes all legs of EOI-2 concurrently (SP/L leg has been previously addressed)** **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: Torus Leak/ATWS

	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: Torus Leak/ATWS

	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.

Critical Tasks - Five

CS#1-During an ATWS, when conditions with Emergency Depressurization required, Terminate and Prevent RPV injection from ECCS and Feedwater until reactor pressure is below the MARFP as directed by US.

1. Safety Significance:
   Prevention of fuel damage due to uncontrolled feeding.

2. Cues:
   Procedural compliance.

3. Measured by:
   Observation - No ECCS injection prior to being less than the MARFP.
   AND
   Observation - Feedwater terminated and prevented until less than the MARFP.

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

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

1. Safety Significance:
   Precludes failure of Containment.

2. Cues:
   Procedural compliance.
   Suppression Pool level trend.

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

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

Critical Tasks - Five

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

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

2. Cues:
   Procedural compliance.
   RPV pressure indication.

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

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

CS#4-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.
   <u>AND</u>
   RO places SLC A / B Pump control switch in ON, when directed by US.
   <u>AND</u>
   Control Rod insertion commenced in accordance EOI Appendixes.

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

Critical Tasks - Five

CS#5-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

Scenario Tasks

EVENT	TASK NUMBER	K/A	RO	SRO
1	Align Charcoal Filters			
	RO U-066-NO-22	271000A4.09	3.3	3.2
2	Raise Power with Control Rods			
	RO U-085-NO-06 SRO S-000-AD-31	2.2.2	4.6	4.1
3	Reactor Recirc Pump Trip			
	RO U-068-AB-01 SRO S-068-AB-01	202001A2.03	3.6	3.7
4	Core Spray Inadvertent Initiation			
	RO U-075-NO-01	209001A3.02	3.8	3.7
5	Steam Seal Regulator Failure			
	RO U-001-AL-01 SRO S-047-AB-03	245000K6.01	2.8	2.9
6	Reactor Feed Pump Turbine Governor Failure			
	RO U-003-AL-09 SRO S-003-AB-01	259002A4.01	3.8	3.6
7	Torus Leak/ATWS			
	RO U-000-EM-14 RO U-000-EM-17 RO U-000-EM-83 SRO S-000-EM-07 SRO S-000-EM-15 SRO S-000-EM-18	295030EA2.01	4.1	4.2

SCENARIO REVIEW CHECKLIST

SCENARIO NUMBER: 3-D

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)

2 EOI Contingencies used: List (0-3)

90 Run Time (minutes)

5 Crew Critical Tasks: (2-5)

YES Technical Specifications Exercised (Yes/No)

SHIFT TURNOVER SHEET

Equipment Out of Service/LCO's:

Condensate Pump 3A tagged Out of Service.

Operations/Maintenance for the Shift:

Align Charcoal Filters for Parallel Flow IAW 3-OI-66 Section 5.11.

Once completed Raise Power with Control Rods for Mode Change IAW 3-GOI-100-1A, section 5.4 step [67] and the Reactivity Control Plan

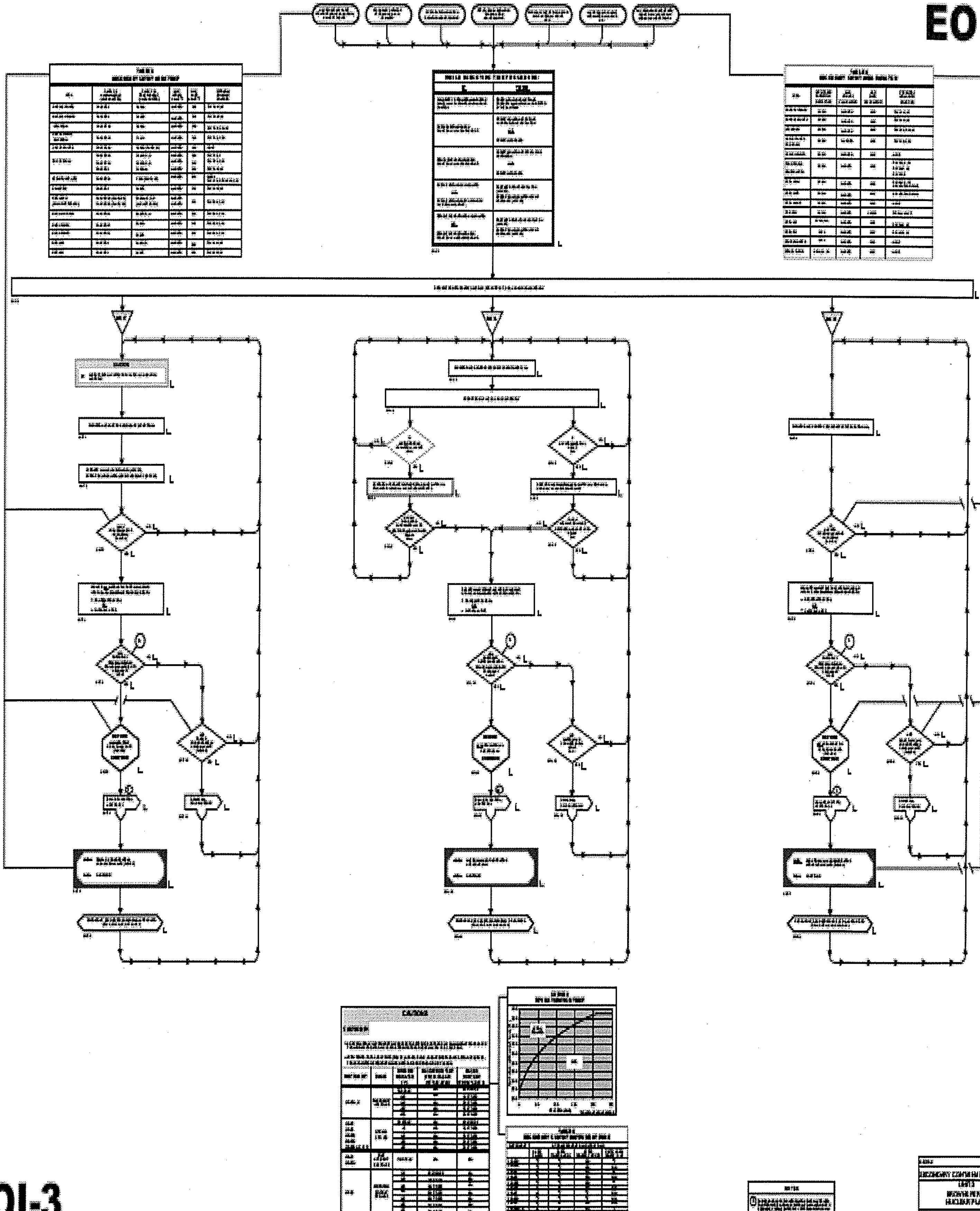
Units 1 and 2 are at 100% power.

Unusual Conditions/Problem Areas:

None

EOI-3

UNIT 3



SECONDARY CONTAINMENT CONTROL

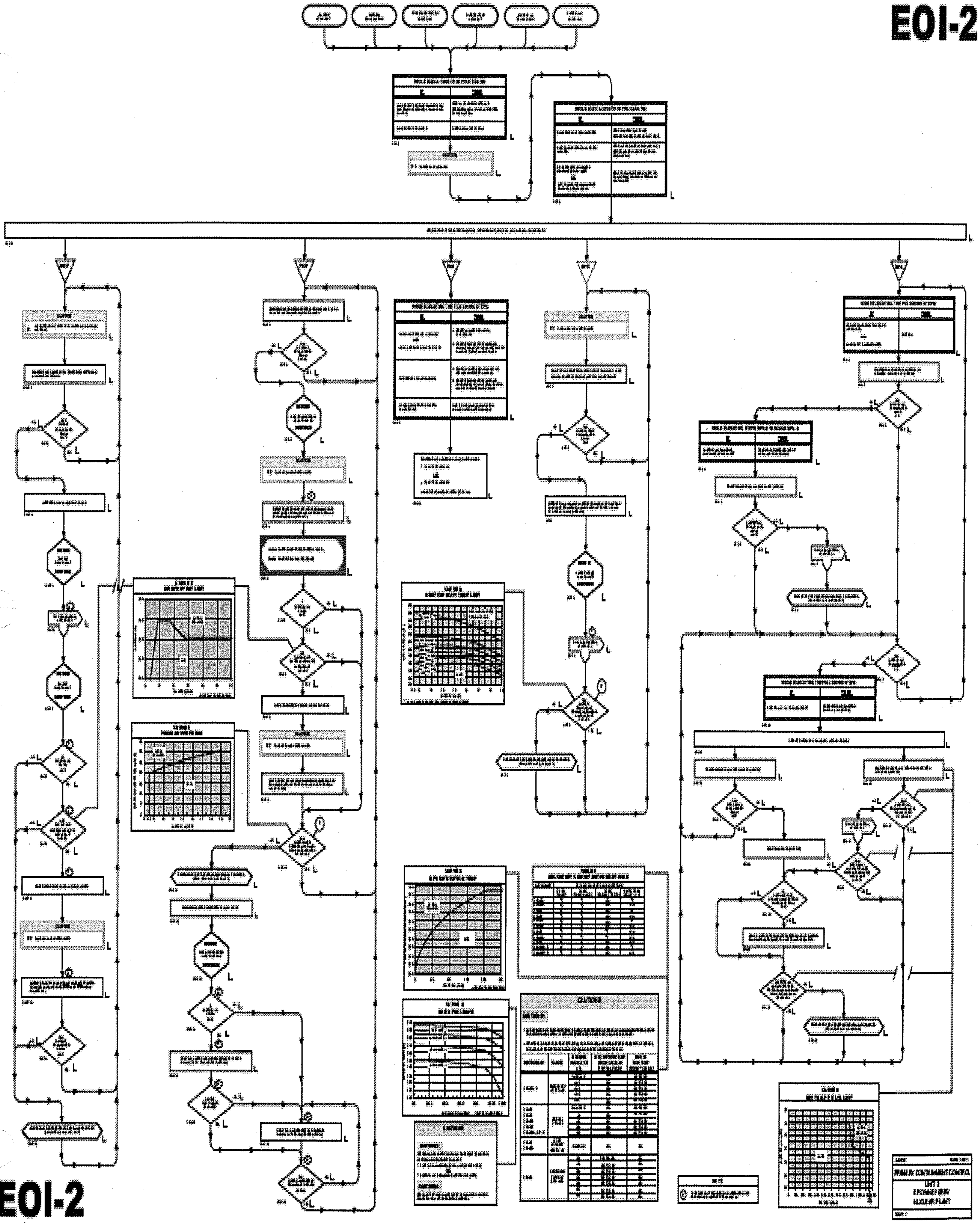
UNIT 3

BROWNS FERRY NUCLEAR PLANT

EOI-3

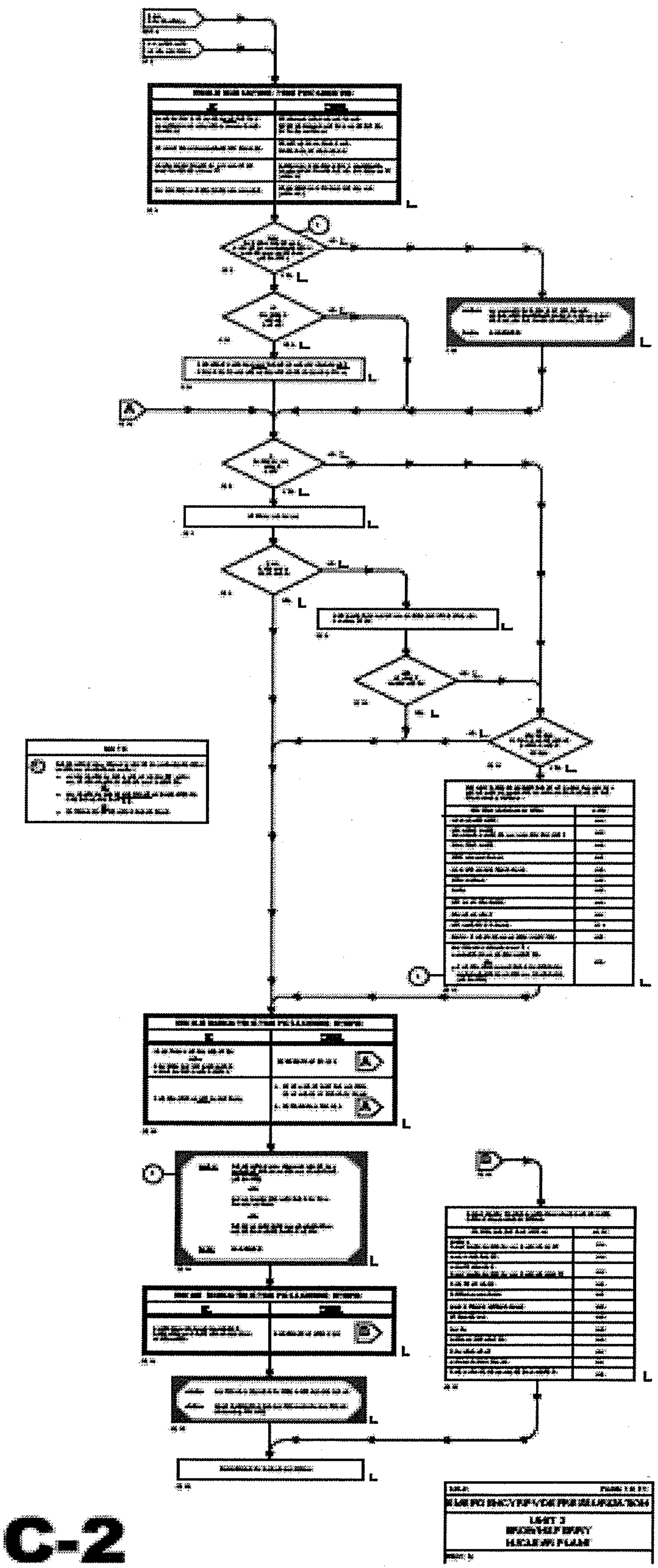
EOI-2
UNIT 3

EOI-2



EOI-2

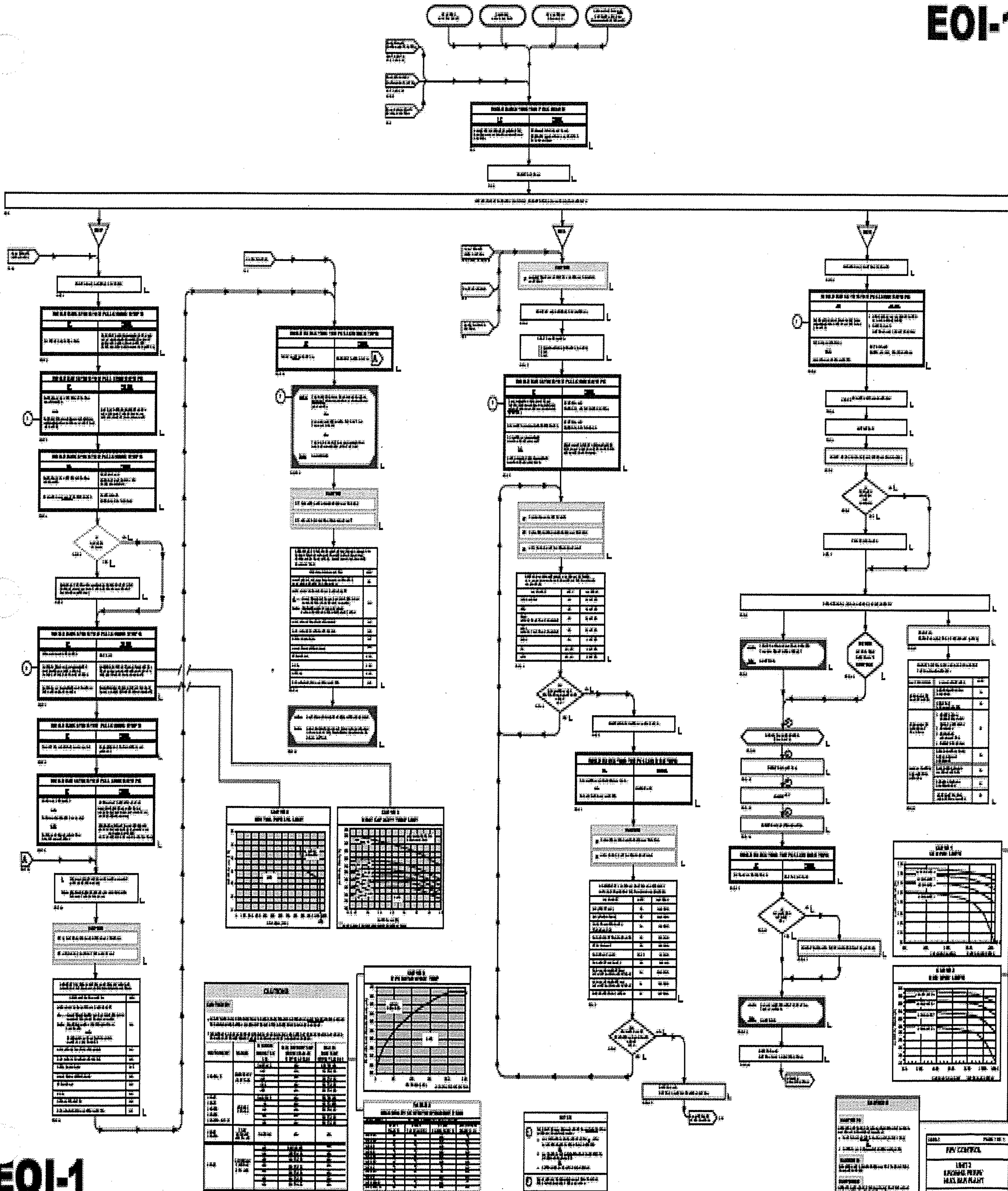
3-C-2 EMERGENCY RPV DEPRESSURIZATION



C-2

EOI-1
UNIT 3

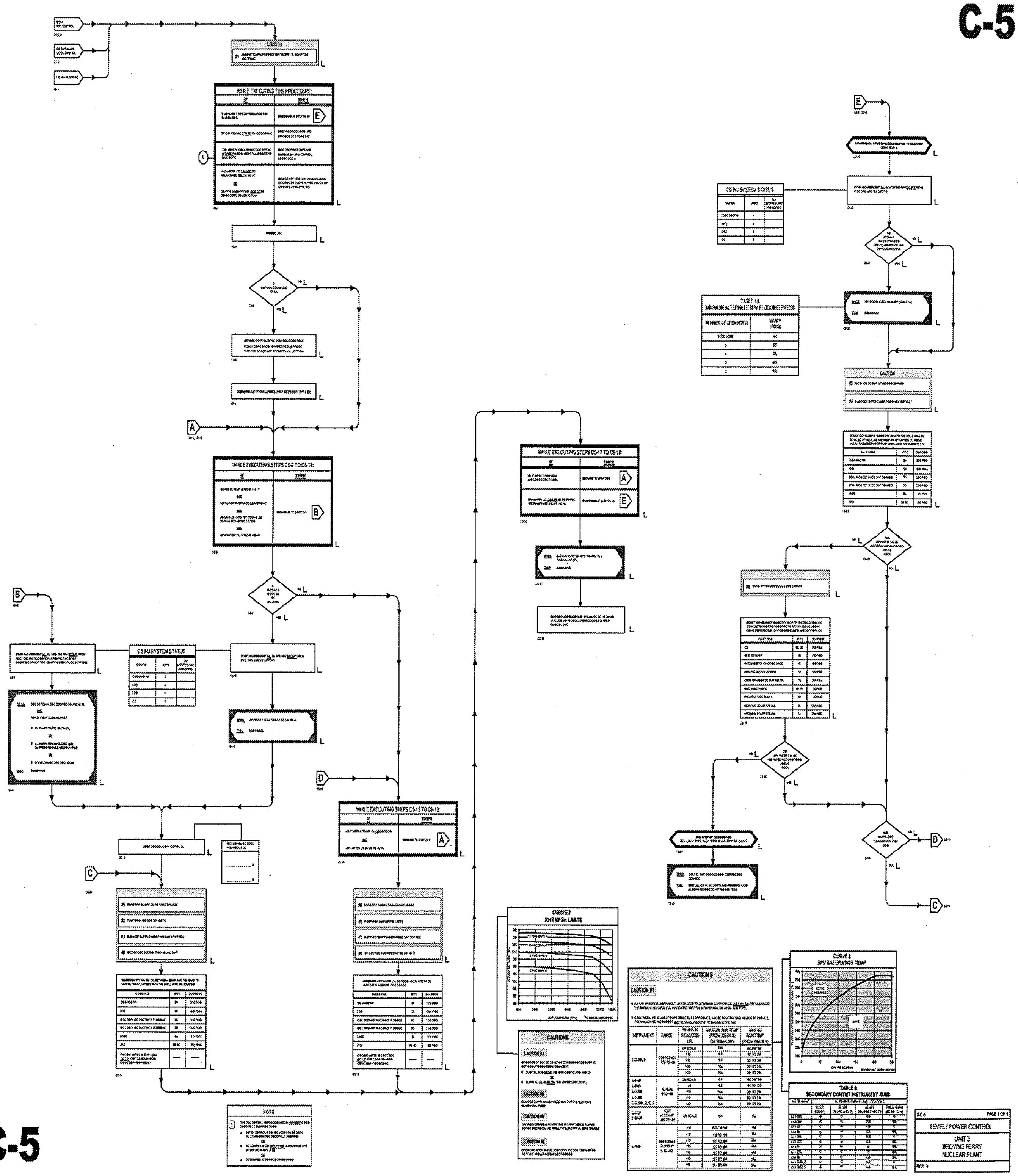
EOI-1



EOI-1

C-5
UNIT 3

C-5



C-5

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.1 Recirculation Loops Operating

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

<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.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. Requirements of the LCO not met.	A.1	Satisfy the requirements of the LCO.	24 hours
B. Required Action and associated Completion Time of Condition A not met. <u>OR</u> No recirculation loops in operation.	B.1	Be in MODE 3.	12 hours

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

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 4.	12 hours 36 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. HPCI System inoperable.	C.1 Verify by administrative means RCIC System is OPERABLE.	Immediately
	AND	
	C.2 Restore HPCI System to OPERABLE status.	14 days
D. HPCI System inoperable. AND Condition A entered.	D.1 Restore HPCI System to OPERABLE status.	72 hours
	OR	
	D.2 Restore low pressure ECCS injection/spray subsystem to OPERABLE status.	72 hours
E. One ADS valve inoperable.	E.1 Restore ADS valve to OPERABLE status.	14 days
F. One ADS valve inoperable. AND Condition A entered.	F.1 Restore ADS valve to OPERABLE status.	72 hours
	OR	
	F.2 Restore low pressure ECCS injection/spray subsystem to OPERABLE status.	72 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
G. Two or more ADS valves inoperable. OR Required Action and associated Completion Time of Condition C, D, E, or F not met.	G.1 AND G.2	Be in MODE 3. Reduce reactor steam dome pressure to ≤ 150 psig.	12 hours 36 hours
H. Two or more low pressure ECCS injection/spray subsystems inoperable for reasons other than Condition A. OR HPCI System and one or more ADS valves inoperable.	H.1	Enter LCO 3.0.3.	Immediately

SCRAM FAILURE	REACTOR COOLANT ACTIVITY	
Description	Description	
	1.3-U Reactor coolant activity exceeds 26 µCi/gm dose equivalent I-131 (Technical Specification Limits) as determined by chemistry sample. OPERATING CONDITION ALL	UNUSUAL EVENT
1.2-A NOTE Failure of RPS automatic scram functions to bring the reactor subcritical **AND** Manual scram or ARI (automatic or manual) was successful. OPERATING CONDITION: Mode 1 or 2	**1.3-A** Reactor coolant activity exceeds 300 µCi/gm dose equivalent Iodine-131 as determined by chemistry sample. OPERATING CONDITION: Mode 1 or 2 or 3	ALERT
1.2-S NOTE Failure of automatic scram, manual scram, and ARI to bring the reactor subcritical. OPERATING CONDITION: Mode 1		SITE EMERGENCY
1.2-G CURVE US Failure of automatic scram, manual scram, and ARI. Reactor power is above 3% **AND** Either of the following conditions exists: • Suppression Pool temp exceeds HCTL. Refer to Curve 1.2-G. • Reactor water level can NOT be restored and maintained at or above -180 inches. OPERATING CONDITION: Mode 1 or 2		GENERAL EMERGENCY

Facility: **Browns Ferry NPP** Scenario No.: **E** Op-Test No.: **ILT 1102**

Examiners:	

Operators:	
	SRO:
	ATC:
	BOP:

Initial Conditions: IC105/ Unit 2 Reactor Power 20%/ Start Bus 1A Out of Service/ Shutdown Board C Alternate Feeder Breaker is out of service for PMs. Severe Thunderstorm Warning in affect.

Turnover: Raise Power with Control Rods to commence Main Turbine Roll. Roll the Main Turbine IAW 2-OI-47 section 5.4. Severe Thunderstorm Warning in affect.

Event No.	Malf. No.	Event Type*	Event Description
1		R-ATC R-SRO	Raise Power with Control Rods
2	rd05r1859	C-ATC TS-SRO	Uncoupled Control Rod
3		N-BOP N-SRO	Commence Main Turbine Roll
4	trg 1	C-BOP C-SRO	Turbine Speed Control Unit Failure
5	f4	C-ATC C-SRO	RFPT Seal Injection Pump Trip
6	dg01c	C-BOP TS-SRO	DG C Automatic start failure
7	th30	M-ALL	Level 8 Instrument Failures – Loss of High Pressure Injection / ATWS
8	th21	C	LOCA
9	cs02b	C	Core Spray Loop 2 Inboard Injection Valve Auto Open failure

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

Console Operator Instructions

A. Scenario File Summary

1. File: batch and trigger files for scenario 2-E

Batch NRC/110203

Bat atws 90

Trge1 NRC/100rpm = zdihs4777e.eq.1

Trge1 = bat NRC/110203-1

Trge2 NRC/turbtrip = zdihs4767d.eq.1

Trge2 = bat NRC/110203-2

Trge3 NRC/rfpseal = zdihs0369a[3].eq.1

Trge3 = bat NRC/110203-4

Imf dg01c

Trge4 NRC/dgstart = zdi0hs820a1a[4].eq.1

Trg e4 = dmf ed09c

Imf th30e (e5 0) 100 60

Imf th30f (e5 120) 100 60

Imf th30g (e5 60) 100 60

Imf th30h (e5 120) 100 30

Imf th22 (e5 180) 100

Imf th21 (e5 420) .25 240 0

Imf cs02b

Ior zlohs0369a[2] off

Ior zlohs0369a[1] on

Batch NRC/110203-1

Ior zlohs4777h[1] off

Ior zlohs4777e[1] on

Ior zdihs4777[h] (none 30) select

Batch NRC/110203-2

Dor zlohs4777e[1]

Dor zdihs4777h

Batch NRC/110203-3

Ior xa556c15 alarm_on

Ior xa556c18 alarm_on

Ior zdihs0368a[1] stop

Ior zlohs0368a[1] off

Batch NRC/110203-4

Dor xa556c15

Dor xa556c18

Dor zlohs0369a[2]

Dor zlohs0369a[1]

Pref NRC/110203

F3 imf rd05r1859

F4 bat NRC/110203

F5 bat NRC/110203-3

F6 imf ed09c

F7 mrf rd06 open

F8 bat app01f

F9 bat app02

F10 mrf rd06 close

F11 bat sdv

Console Operator Instructions

Scenario 2-E

		DESCRIPTION/ACTION
Simulator Setup	manual	Reset to IC 105
Simulator Setup	**Load File**	RestorePref NRC/110203
Simulator Setup	manual	Tag out Start Bus 1A, SD BD C Alternate Feeder Breaker 1624 Tagged Out
Simulator Setup		F3 and F4 Verify file loaded

RCP required (Raise Power with Rods to obtain 5 to 6 turbine bypass valves open)
RCP for Urgent Load Reduction
Provide marked up copy of 2-GOI-100-1A Step 18

With Unit 2 at 20% power, the ATC will withdraw control rods to obtain 5 bypass valves open and the sixth bypass valve 25% to 50% open; in order to commence Main Turbine roll. When withdrawing control rods, Control Rod 18-59 will fail the coupling check, the ATC will respond IAW 2-AOI-85-2 and re-couple Control Rod 18-59. The SRO will refer to Technical Specification 3.1.3; with the control rod coupled, no entry will be required. Follow up question after the scenario for Tech Spec action if control rod failed to couple.

Once the required bypass position is achieved, the BOP will commence Main Turbine roll IAW 2-OI-47 section 5.4. Once Main Turbine roll is commenced, the Turbine Speed Control Unit will fail and turbine speed will continue to increase. The BOP will be required to trip the Main Turbine.

The operating RFPT Seal Injection Pump will trip, with a failure of the standby seal injection pump to start. The ATC will respond IAW the ARPs and start the standby seal injection pump to restore seal water to the operating RFPTs.

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. When DG C is started, it will automatically tie to the board. The SRO will evaluate Technical Specifications and determine TS 3.8.1 Condition B is entered. Since one required offsite source 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.

The 208A –D Level instruments will begin to fail high, tripping the operating RFPTs and not allowing HPCI or RCIC to inject. The crew will insert a scram on lowering Reactor Level. An ATWS will exist and the crew will enter 2-EOI-1, "RPV Control" and 2-C-5, "Level/Power Control" to take required actions.

2-EOI-2, "Primary Containment Control" will be entered when a small LOCA develops; eventually the SRO will determine that Reactor Level cannot be restored and maintained above -180 inches and will transition to 2-C-2, "Emergency RPV Depressurization". Core Spray Loop 2 inboard injection valve will fail to auto open but can be manually opened.

The Crew will insert all control rods and restore level to +2 to +51 inches.

The Emergency Classification is 1.2-S or 1.1-S1

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

Control are inserted or being inserted

Emergency Depressurization Complete

Reactor Level restored and maintained above TAF

Simulator Event Guide:

Event 1 Reactivity: Raise Power with Control Rods

	SRO	Direct Power Increase
		Direct Power increase IAW Reactivity Control Plan [18] **WHEN** 5 to 6 turbine bypass valves are open (being careful **NOT** to exceed 25% Reactor power)
	ATC	Raise Power with Control Rods per 2-OI-85, section 6.6
		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 1 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. [6] **IF** control rod is notch withdrawn to rod notch Position 48, **THEN** **PERFORM** control rod coupling integrity check as follows: [6.1] **PLACE** CRD CONTROL SWITCH, 2-HS-85-48, in ROD OUT NOTCH, and **RELEASE**. [6.2] **CHECK** control rod coupled by observing the following: • Four rod display digital readout and the full core display digital readout and background light remain illuminated. • CONTROL ROD OVERTRAVEL annunciator, 2-XA-55-5A, Window 14, does not alarm. [6.3] **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** 2-AOI-85-2.

Simulator Event Guide:

Event 1 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**.

Simulator Event Guide:

Event 1 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.

Simulator Event Guide:

Event 1 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 [7] **IF** continuously withdrawing the control rod to position 48 and the control rod coupling integrity check will be performed after the CRD NOTCH OVERRIDE, 2-HS-85-47, and CRD CONTROL SWITCH, 2-HS-85-48 are to be released, **THEN** **PERFORM** control rod coupling integrity check as follows (otherwise N/A): [7.1] **PLACE AND HOLD** CRD NOTCH OVERRIDE, 2-HS-85-47, in NOTCH OVERRRIDE. [7.2] **PLACE AND HOLD** CRD CONTROL SWITCH, 2-HS-85-48, in ROD OUT NOTCH. [7.3] **WHEN** position 48 is reached, **THEN** **RELEASE** CRD NOTCH OVERRIDE, 2-HS-85-47, and CRD CONTROL SWITCH, 2-HS-85-48. [7.4] **VERIFY** control rod settles into position 48. [7.5] **PLACE** CRD CONTROL SWITCH, 2-HS-85-48, in ROD OUT NOTCH and **RELEASE**. [7.6] **CHECK** control rod coupled by observing the following: • Four rod display digital readout **AND** full core display digital readout **AND** background light will remain illuminated. • CONTROL ROD OVERTRAVEL annunciator (2-XA-55-5A, Window 14) does **NOT** alarm.

Simulator Event Guide:

Event 1 Reactivity: Raise Power with Control Rods

	ATC	[7.7] **CHECK** control rod settles into position 48 and ROD SETTLE light extinguishes. [7.8] **IF** control rod coupling integrity check fails, **THEN REFER TO** 2-AOI-85-2. **6.6.5 Return to Normal After Completion of Control Rod Withdrawal** [1] **WHEN** control rod movement is no longer desired **AND** deselecting control rods is desired, **THEN**: [1.1] **PLACE** CRD POWER, 2-HS-85-46, in OFF. [1.2] **PLACE** CRD POWER, 2-HS-85-46, in ON.

Simulator Event Guide:

Event 2 Component: Uncoupled Control Rod

	ATC	Respond to Annunciator 5A-14 and 28 CONTROL ROD OVERTRAVEL and CONTROL ROD DRIFT CONTROL ROD OVERTRAVEL A. **VALIDATE** alarm as follows: 1. Full Core Display will have no digital readout. 2. Background light extinguished. 3. Rod DRIFT light on. B. **IF** alarm valid, **THEN REFER TO** 2-AOI-85-2. C. **NOTIFY** Reactor Engineer. D. **REFER TO** Tech Spec 3.1.3, 3.10.8.5, 3.3.2.1, and TRM TABLE 3.3.5-1. Reports Control Rod 18-59 is Uncoupled or over traveled
	SRO	Enter 2-AOI-85-2 Uncoupled Control Rod
	ATC	**2-AOI-85-2** **4.1 Immediate Actions** [1] **STOP** all control rod withdrawal.
	SRO	**4.2 Subsequent Actions** [1] **NOTIFY** Reactor Engineer to evaluate the suspect uncoupled control rod for its impact on core thermal limits and rod worth. [2] **ADJUST** the rod pattern as directed by the Reactor Engineer throughout the performance of this procedure.
Driver	Driver	Acknowledge uncoupled control rod, concur with coupling attempt per 2-AOI-85-2

Simulator Event Guide:

Event 2 Component: Uncoupled Control Rod

	SRO	[3] **IF** the control rod drive is at position 48 **AND** with Reactor Engineer concurrence, **THEN PERFORM** the following: Direct ATC to attempt to couple Control Rod 18-59
	ATC	**PERFORM** the following: [3.1] **NOTCH INSERT** the control rod drive to position 46 to attempt to couple the control rod. [3.2] **RESET** associated annunciators. [3.3] **NOTCH WITHDRAW** the control rod drive to position 48. [3.4] **PERFORM** a coupling check. [3.5] **IF** coupling integrity check fails, **THEN CONTINUOUSLY INSERT** control rod drive to position 00 to attempt to latch control rod with control rod drive mechanism. [3.5.1] **RESET** associated annunciators. [3.5.2] **NOTCH WITHDRAW** control rod to position 48. [3.5.3] **PERFORM** a coupling check. Report Control Rod 18-59 is Coupled
Driver	Driver	When control rod 18-59 is inserted to position 48 delete the failure rd05r1859
	SRO	Makes notifications that Control Rod 18-59 is Coupled
	SRO	Exits 2-AOI-85-2 and directs power ascension to continue
NRC	NRC	At completion of scenario if SRO does not address Tech Spec 3.1.3 Follow up for Tech Spec call if rod failed to couple TS 3.1.3 Condition C

Simulator Event Guide:

Event 3 Normal: Main Turbine Roll

	SRO	Direct Turbine Roll
		[18] **WHEN** 5 to 6 turbine bypass valves are open (being careful **NOT** to exceed 25% Reactor power), **THEN**: [18.1] **ROLL** Turbine-Generator. REFER TO 2-OI-47.
	BOP	Roll the Main Turbine IAW 2-OI-47 section 5.4 starting at step 11
	BOP	[11] **VERIFY OPEN** the following valves on Panel 2-9-7: • STEAM LINES TO HP TURBINE DR VLV, 2-HS-6-109A • STOP VALVE 1 BEFORE SEAT DR VLV, 2-HS-6-100A • STOP VALVE 2 BEFORE SEAT DR VLV, 2-HS-6-101A • STOP VALVE 3 BEFORE SEAT DR VLV, 2-HS-6-102A • STOP VALVE 4 BEFORE SEAT DR VLV, 2-HS-6-103A • CONTROL VALVE 1 BEFORE SEAT DR VLV, 2-HS-6-104A • CONTROL VALVE 2 BEFORE SEAT DR VLV, 2-HS-6-105A • CONTROL VALVE 3 BEFORE SEAT DR VLV, 2-HS-6-106A • CONTROL VALVE 4 BEFORE SEAT DR VLV, 2-HS-6-107A • LP STEAM LINES TO RFPTS DRAIN VALVES, 2-HS-6-111A • LP STEAM LINES TO RFPTS DRAIN VALVES, 2-HS-6-112A

Simulator Event Guide:

Event 3 Normal: Main Turbine Roll

	BOP	[12] **START** EMERGENCY BEARING OIL PUMP using 2-HS-47-8A.
		[13] **OBSERVE** pump operates for at least two minutes, **THEN STOP** EMERGENCY BEARING OIL PUMP using 2-HS-47-8A.
		[14] **PERFORM** EHC Control System Lamp Test. **REFER TO** Section 6.2.
		[15] **VERIFY** MOTOR SUCTION PUMP, 2-HS-47-12A, is in service.
		[16] **IF** any Turbine lift pump motor has been disabled, N/A.
		[17] **VERIFY** the following on EHC TURBINE CONTROL panel: • EHC SETPOINT, 2-PI-47-162, indicates approximately 955 psig in Reactor Pressure Control, if available. • Either REACTOR PRESSURE CONTROL, 2-HS-47-204, or HEADER PRESSURE CONTROL, 2-HS-1-16, is ILLUMINATED. • BPV DEMAND, 2-ZI-47-130, indicates zero. • TURBINE TRIPS NORMAL green light, 2-IL-47-87, is illuminated. • VACUUM TRIP BYPASSED, 2-IL-47-72, is extinguished. • BPV VACUUM INHIBIT, 2-IL-47-73, is extinguished. • ALL VALVES CLOSED pushbutton backlight, 2-HS-47-77D, is illuminated. • CV POSITION LIMIT, 2-XI-47-157, set at approximately 66%. • LOAD SET, 2-XI-47-75, set at approximately zero.

Simulator Event Guide:

Event 3 Normal: Main Turbine Roll

	BOP	[18] **CHECK** all first out annunciators are RESET.
		[19] **STATION** an Operator on the turbine floor and **PERFORM** the following: [19.1] **CHECK** the following oil pressures at the front standard: • TURB SHAFT OIL PUMP SUCTION PRESS, 2-PI-47-53, indicates greater than 15 psig. • TURB BRG OIL HEADER PRESS, 2-PI-07-56, indicates greater than 15 psig. [19.2] **MONITOR** for rubbing, vibration, or unusual noises during turbine roll, **AND CHECK** for adequate bearing oil flow by comparison to other bearing discharge weirs.
Driver	Driver	Oil Pressures greater 15 psig, no abnormal noise, oil flow in all weirs
		[20] **IF** Turbine seals have been in service with the Turbine Turning Gear secured **AND** unit is to be returned to operation, **THEN** (Otherwise N/A)
		[21] **VERIFY** the following initial conditions are satisfied. • Turbine shaft eccentricity is less than 0.5 mils or has been less than two mils for the last one hour as indicated on TURB GEN ECC/SPEED/VALVE POSN, 2-XR-47-16, Local Vibration Monitoring from portable analyzer, or from Engineering Judgment from Observation of Trend Recorder at EHC Work Station on Panel 9-31, Auxiliary Instrument Room. • EXTERNAL VALVE CHEST UPPER INNER SURFACE temperature, 2-XR-47-20, Point 1, located on Panel 2-9-8, indicates greater than 485°F. • TURB FIRST STAGE BOWL INNER SURFACE TEMP, 2-XR-47-20, Point 5, indicates greater than 250°F. • Reactor is at rated pressure with 4.5 (four and a half) to 6 (six) turbine bypass valves open. • Condenser vacuum is greater than 25" Hg vacuum. • Turbine oil temperature is being controlled by TURBINE OIL TEMPERATURE CONT, 2-TIC-24-75. • **IF** oil temperature is lower than 2-TIC-24-75 setpoint, **THEN** (Otherwise N/A)

Simulator Event Guide:

Event 3 Normal: Main Turbine Roll

	BOP	[22] **SHUT DOWN** from chest warming as follows. [22.1] **DEPRESS** MSV-2 Pilot Position LOWER pushbutton, 2-HS-47-78B, **UNTIL** MSV-2 PILOT POSITION, 2-ZI-47-78, indicates zero. [22.2] **MOMENTARILY DEPRESS** Main Stop Valve Position Demand OFF pushbutton, 2-HS-47-78A.
		[23] **PERFORM** the following: [23.1] At TURBINE OIL TEMPERATURE CONT, 2-TIC-24-75: [23.1.1] **VERIFY** controller in auto. [23.1.2] **ADJUST** setpoint to 100°F using and keys. [23.1.3] **DEPRESS** SET/ENT key to lock in new setpoint at 100°F.
		[24] **NOTIFY** Radiation Protection an RPHP is in effect for the impending action to roll the main turbine. **RECORD** time Radiation Protection notified in NOMS Narrative Log . [24.1] **VERIFY** appropriate data and signatures recorded on Appendix A per Appendix A instructions.
		[25] **SELECT** proper turbine start up rate as follows: [25.1] **IF** TURB FIRST STAGE BOWL INNER SURFACE TEMP, 2-XR-47-20, Point 5, located on Panel 2-9-8, indicates between 250°F and 350°F, **THEN DEPRESS** MEDIUM pushbutton, 2-HS-47-77B. [25.2] **IF** TURB FIRST STAGE BOWL INNER SURFACE TEMP, 2-XR-47-20, Point 5, located on Panel 2-9-8, indicates greater than 350°F, **THEN DEPRESS** FAST pushbutton, 2-HS-47-77C. [26] **VERIFY** all Turbine lift pump motors are operating.
		[27] **VERIFY** MAIN TURBINE VIB TRIP BYPASS, 2-HS-47-26, in TRIP BYPASS, **AND CHECK** amber light illuminates above the handswitch.

Simulator Event Guide:

Event 4 Component: Turbine Speed Control Unit Failure

	BOP	[28] On TURBINE SPEED SELECT Section, **DEPRESS** 100 RPM pushbutton, 2-HS-47-77E, **AND OBSERVE** the following: • Main Stop Valve, MSV-2, 2-ZI-1-78, begins to open. • When MSV-2 reaches full open, MSV-1, MSV-3, and MSV-4 open slowly. • Combined Intermediate Valves ISV/IV-1, ISV/IV-3, and ISV/IV-5 open slowly. • When IV-1, 3, and 5 are full open, IV-2, IV-4, and IV-6 will open. • Control Valves, CV-1, CV-2, CV-3, and CV-4 throttle open and the turbine rolls off the turning gear. • The TURBINE ACCEL light, 2-IL-47-77A, illuminates. • CONTROLLING PARAMETER Section SPEED light, 2-IL-47-77, is illuminated. • TURB GEN ECC/SPEED/VALVE POSN, 2-XR-47-16, tracks turbine speed instead of eccentricity, (If Available). (Red Pen) • Digital speed indication rising on TURBINE SPEED, 2-SI-47-77.
		[29] **PLACE** Generator Condition Monitor in service. Refer to 2-OI-35. [30] **PLACE** hydrogen purity analyzer from vent to normal operation. Refer to 2-OI-35.
Driver	Driver	Acknowledge communication to place generator condition monitor in service and hydrogen analyzer
		[31] **IF** while performing step 5.4[32]the turbine continues to accelerate, indicating a Control System Failure **THEN PERFORM** the following : [31.1] **DEPRESS** Turbine TRIP pushbutton, 2-HS-47-67D. [31.2] **VERIFY** the Main Stop, Control and Combined Intermediate Valves CLOSE and Turbine speed lowers.
	BOP	Trips the Main Turbine
	NRC	When Ready RFPT Seal Injection Pump Trip
Driver	Driver	At NRC Direction F5 (bat NRC/110203-3) RFPT Seal Injection Pump Trip

Simulator Event Guide:

Event 4 Component: Turbine Speed Control Unit Failure

	SRO	Enter 2-AOI-47-1
	BOP	**4.2 Subsequent Actions** [1] **VERIFY** Automatic Actions listed in Section 3.0 have occurred. [2] **PLACE** TURNING GEAR OIL PUMP, 2-HS-47-11A, in START. [3] **PLACE** MOTOR SUCTION PUMP, 2-HS-47-12A, in START. [4] **SET** TURBINE OIL TEMPERATURE CONT, 2-TIC-24-75, to 85°F.
		[5] **OPEN** the following drain valves by placing the following control switches to OPEN: • STOP VALVE A BEFORE SEAT DR VLV, 2-HS-6-100A. • STOP VALVE B BEFORE SEAT DR VLV, 2-HS-6-101A. • STOP VALVE C BEFORE SEAT DR VLV, 2-HS-6-102A. • STOP VALVE D BEFORE SEAT DR VLV, 2-HS-6-103A. • CONTROL VALVE A BEFORE SEAT DR VLV, 2-HS-6-104A. • CONTROL VALVE B BEFORE SEAT DR VLV, 2-HS-6-105A. • CONTROL VALVE C BEFORE SEAT DR VLV, 2-HS-6-106A. • CONTROL VALVE D BEFORE SEAT DR VLV, 2-HS-6-107A. • STEAM LINES TO HP TURBINE DR VLV, 2-HS-6-109A. • LP STEAM LINES TO RFPTS DRAIN VLVS, 2-HS-6-111A. • LP STEAM LINES TO RFPTS DRAIN VLVS, 2-HS-6-112A.
		[6] **WHEN** Turbine speed lowers to ≤900 RPM, **THEN START** the bearing lift pumps by placing TURBINE TURNING GEAR MOTOR, 2-HS-47-10A, to ON. [7] **VERIFY** the exhaust hood sprays maintain exhaust hood temperature below 135°F.
	NRC	When Ready RFPT Seal Injection Pump Trip
Driver	Driver	At NRC Direction F5 (bat NRC/110203-3) RFPT Seal Injection Pump Trip

Simulator Event Guide:

Event 5 Component: RFPT Seal Injection Pump Trip

	ATC	Respond to Alarm 6C-18
		6C-18 RFP Seal Injection Water Pressure Low **NOTE** If the alarm is the result of a common loss of injection water pressure, the spare injection water pump will auto start at 22 psid on injection water common header. A. **IF** only one Feedpump abnormal alarm is illuminated, **THEN** B. **IF** one or more Feedpump abnormal alarm is illuminated and cannot be cleared by the above methods, **THEN** 1. **VERIFY** spare injection water pump started on Panel 2-9-6. 2. **DISPATCH** personnel to check injection water pumps. 3. **ALTERNATE** if required injection water strainers in accordance with 2-OI-3, if 2-PDIS-003-0230 is reading 5 psid or greater.
	ATC	Start Spare RFPT Seal Injection Pump to return seal injection to service.
	BOP	Dispatch personnel
river	Driver	Pump motor is very hot to touch, Breaker 480V TMOV 2C-9C is tripped free. If requested strainer DP is 2.0 psid when standby pump started
	NRC	When ready DG C Automatic start failure on trip of shutdown board C Normal feeder breaker
Driver	Driver	When directed by NRC F6 (IMF ED09C)

Simulator Event Guide:

Event 6 Component: DG C Automatic Start Failure

	BOP	Respond to alarms 8B-29, 30 and 33, 23C-28, 23B-19 and 20, 23A-20
		8B-33 4KV SHUTDOWN BD C DEGRADED VOLTAGE A. **VERIFY** Diesel starts and ties to board, if required. B. **REFER TO** 0-OI-57A, Tech Spec 3.8.7 and 3.8.8.
		8B-29 480V SHUTDOWN BD 2A UV OR XFR B. **IF** 480V Shutdown Bd 2A is lost, **THEN** Manually **TRANSFER** to alternate source by placing CS in **ALTERNATE** position on Panel 2-9-8. C. **IF** manual transfer is accomplished, **THEN REFER TO** 0-OI-57B, 2-OI-99, and appropriate OIs for recovery or realignment of equipment.
		8B-30 480V SHUTDOWN BD 2B UV OR XFR B. **IF** 480V Shutdown Bd 2B is lost, **THEN** Manually **TRANSFER** to alternate source by placing CS in **ALTERNATE** position on Panel 2-9-8. C. **IF** manual transfer is accomplished, **THEN REFER TO** 0-OI-57B, 2-OI-99, and appropriate OIs for recovery or realignment of equipment.
	BOP	Starts DG C, verifies DG Energizes Shutdown Board C
	Crew	Dispatch personnel to investigate
	SRO	Evaluate Technical Specification 3.8.1
	NRC	When ready Major, loss of high pressure injection
Driver	Driver	When directed by NRC trigger 5, trg! 5

Simulator Event Guide:

Event 6 Component: DG C Automatic Start Failure

	BOP	Respond to alarms 8B-29, 30 and 33, 23C-28, 23B-19 and 20, 23A-20
		23C-28 4160V SD BD C DEGRADED VOLTAGE Automatic Action: A. Diesel generator starts. Operator Action: A. **VERIFY** unit in stable condition by checking: 1. Auto actions have occurred and diesel at rated frequency and voltage. 2. Diesel connects properly to assigned 4160V Shutdown Bd. 3. Diesel reaches proper loading when supplying equipment fed from board.
	BOP	Starts DG C, verifies DG Energizes Shutdown Board C
Driver	Driver	After DG C is started call and report that a Maintenance crew in the area hit the preferred breaker 1718 with a hand truck while staging equipment. The Breaker tripped.
	SRO	Evaluate Technical Specification 3.8.1
	NRC	When ready Major, loss of high pressure injection
Driver	Driver	When directed by NRC trigger 5, trg! 5

Simulator Event Guide:

Event 6 Component: DG C Automatic Start Failure

	SRO	Evaluate Technical Specification 3.8.1
		Condition B — One required Unit 1 and 2 DG inoperable Required Action B.1 — Verify power availability from the offsite transmission network. Required Action B.2 — Declare required feature(s), supported by the inoperable Unit 1 and 2 DG, inoperable when the redundant required feature(s) are inoperable. Required Action B.3.1 — Determine OPERABLE Unit 1 and 2 DG(s) are not inoperable due to common cause failure. OR B.3.2 — Perform SR 3.8.1.1 for OPERABLE Unit 1 and 2 DG(s). Required Action B.4 — Restore Unit 1 and 2 DG to OPERABLE status. Completion Time — B.1 1 hour and once per 8 hours thereafter B.2 4 hours from discovery of condition B concurrent with inoperability of redundant required feature(s). B.3.1 or B.3.2 24 hours B.4 7 Days and 14 days from discovery of failure to meet LCO Condition G — Note: Applicable when only one 4.16 kv shutdown board is affected. One required offsite circuit inoperable. And One Unit 1 and 2 DG Inoperable. Required Action G.1 — Declare the affected 4.16 kv shutdown board inoperable. Completion Time — Immediately
	SRO	Evaluate Technical Specification 3.8.7
		Condition A — One Unit 1 and 2 4.16 kv Shutdown Board inoperable. Required Action A.1 — Restore the Unit 1 and 2 4.16 kv Shutdown Board to OPERABLE status. Required Action A.2 — Declare the associated diesel generator inoperable. Completion Time — A.1 5 days and 12 days from discovery of failure to meet LCO. A.2 Immediately
	NRC	When ready Major, loss of high pressure injection
Driver	Driver	When directed by NRC trigger 5, trg! 5

Simulator Event Guide:

Event 7 Major: Loss of High Pressure Injection/ATWS

	ATC	Recognizes Trip of RFPTs on Level 8 and lowering Reactor Level
	SRO	Direct Reactor Scram and Enter EOI-1 RPV Control on Scram
	ATC	Scram the Reactor and place the mode switch in shutdown, report ATWS and initiate one channel of ARI
Driver	Driver	Right after the scram enter F11 bat SDV
	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 - 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	Direct a Pressure Band of 800 to 1000 psig
	ATC/BOP	Maintain directed pressure band

Simulator Event Guide:

Event 7 Major: Loss of High Pressure Injection/ATWS

	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
		IF 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
CS#1	SRO	Direct ADS Inhibited
CS#1	ATC/BOP	Inhibits ADS
	SRO	Is any Main Steam Line Open - YES
		Direct Bypass of isolation interlocks Appendix 8A and Appendix 8E
	Crew	Call for Appendix 8A and 8E
Driver	Driver	When called for appendix 8A and 8E wait 6 minutes and call back that field actions are complete for Appendix 8A and 8E is complete.
	ATC/BOP	Appendix 8A 3. Operator to verifies closed the following valves (Unit 2 Control Room, Panel 9-3): 2-FCV-43-13, RX RECIRC SAMPLE INBD ISOLATION VLV 2-FCV-43-14, RX RECIRC SAMPLE OUTBD ISOLATION VLV.

Simulator Event Guide:

Event 7 Major: Loss of High Pressure Injection/ATWS

	SRO	C5 Level / Power Control
		Crosstie CAD to DW Control Air if necessary (Appendix 8G) NOT Necessary
		IF Suppression Pool Temperature is above 110°F AND Reactor Power is above 5% AND An MSRV is open or cycling or drywell pressure is above 2.4 psig AND RPV water level is above -162 inches -NO
	SRO	Is Reactor Power above 5% IF YES
		Stop and Prevent all injection into the RPV except from RCIC, CRD, and SLC (Appendix 4)
		Direct Terminate and Prevent IAW Appendix 4
	ATC/BOP	Terminate and Prevent IAW Appendix 4
CS#2	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** 2-HS-73-18A, HPCI TURBINE TRIP push-button. b. WHEN HPCI Turbine is at zero speed, THEN **PLACE** 2-HS-73-47A, HPCI AUXILIARY OIL PUMP control switch in PULL TO LOCK and **RELEASE** 2-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 7 Major: Loss of High Pressure Injection/ATWS

CS#2	BOP/ATC	Terminate and Prevent IAW Appendix 4 **Appendix 4 (continued)** 4. PREVENT injection from LPCI SYSTEM I by performing the following: NOTE Injection may be prevented by performing EITHER step 4.a or step 4.b. a. Following automatic pump start, PLACE RHR SYSTEM I pump control switches in STOP. OR b. BEFORE RPV pressure drops below 450 psig, 1) PLACE 2-HS-74-155A, LPCI SYS I OUTBD INJ VLV BYPASS SEL in BYPASS. AND 2) VERIFY CLOSED 2-FCV-74-52, RHR SYS I LPCI OUTBD INJECT VALVE. 5. PREVENT injection from LPCI SYSTEM II by performing the following: NOTE Injection may be prevented by performing EITHER step 5.a or step 5.b. a. Following automatic pump start, PLACE RHR SYSTEM II pump control switches in STOP. OR b. BEFORE RPV pressure drops below 450 psig, 1) PLACE 2-HS-74-155B, LPCI SYS II OUTBD INJ VLV BYPASS SEL in BYPASS. AND 2) VERIFY CLOSED 2-FCV-74-66, RHR SYS II LPCI OUTBD INJECT VALVE. 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 7 Major: Loss of High Pressure Injection/ATWS

CS#2	BOP/ATC	Terminate and Prevent IAW Appendix 4
		Appendix 4 (continued) c. **CLOSE** the following valves BEFORE RPV pressure drops below 500 psig: • 2-FCV-3-19, RFP 2A DISCHARGE VALVE • 2-FCV-3-12, RFP 2B DISCHARGE VALVE • 2-FCV-3-5, RFP 2C DISCHARGE VALVE • 2-LCV-3-53, RFW START-UP LEVEL CONTROL
		d. **TRIP** RFPTs as necessary to prevent injection by **DEPRESSING** the following push-buttons: • 2-HS-3-125A, RFPT 3A TRIP • 2-HS-3-151A, RFPT 3B TRIP • 2-HS-3-176A, RFPT 3C TRIP.
	SRO	Direct a Level Band

Simulator Event Guide:

Event 7 Major: Loss of High Pressure Injection/ATWS

CS#5	SRO	IF RPV Water Level Cannot be Restored and Maintained Above -180 inches THEN continue at step C5-19
		C5-19 Emergency Depressurization is required
		Enter C2 Emergency Depressurization
		Will the Reactor remain subcritical without Boron under all conditions NO
CS#2		When all injection into the RPV is stopped and prevented except from RCIC, CRD, and SLC per C5 THEN Continue
		Is Suppression Pool Level above 5.5 Feet - YES
		Open all ADS Valves
CS#5	ATC/BOP	Opens 6 ADS Valves
	SRO	Can 6 ADS Valves be Opened - YES
		C5 Level / Power Control
		Are at least 2 MSRVs Open per C2 Emergency RPV Depressurization - YES
CS#3		When RPV Pressure is Below MARFP (190 psig) THEN Continue
		Start and slowly raise RPV injection with the following injection sources to restore and maintain RPV water level above -180 inches. Condensate Appendix 6A, LPCI Appendix 6B, 6C
CS#3	ATC/BOP	Once Reactor Pressure is below 190 psig commence injection IAW Appendix 6A, 6B and 6C.

Simulator Event Guide:

Event 7 Major: Loss of High Pressure Injection/ATWS

	SRO	EOI-1 Power Control
		Monitor and Control Reactor Power
		IF The reactor will remain sub subcritical without boron under all conditions - NO
		IF The reactor is 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
		Trip Recirc Pumps
	ATC	Trips Recirc Pumps
CS#4	SRO	Before Suppression Pool temperature rises to 110°F Continue
		Boron injection is required (If still critical with challenge to BIIT)
CS#4	ATC/BOP	Initiate SLC IAW Appendix 3A
CS#4	SRO	Direct ARI Reset Appendix 2
CS#4		Insert Control Rods Using one or more of the following methods: Appendix 1F, Appendix 1D
Driver	Driver	When directed to perform Appendix 1F and Appendix 2 wait 4 minutes and report appendix 2 complete and field action for appendix 1f complete. F8 bat app01f and F9 bat app02
CS#4	ATC	Insert Control Rods IAW Appendix 1D and 1F

Simulator Event Guide:

Event 7 Major: Loss of High Pressure Injection/ATWS

CS#4	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 2-9-4, 2-XA-55-4A, Window 1) • EAST CRD DISCH VOL WTR LVL HIGH HALF SCRAM (Panel 2-9-4, 2-XA-55-4A, Window 29). 5. **DISPATCH** personnel to **VERIFY OPEN** 2-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	Driver	When dispatched to open wait 2 minutes and report 2-SHV-085-0586 Open, when asked to close wait 2 minutes and report. F10 mrf rd06 close F7 mrf rd06 open

Simulator Event Guide:

Event 7 Major: Loss of High Pressure Injection/ATWS

CS#4	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** 2-SHV-085-0586, CHARGING WATER SOV (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** 2-SHV-085-0586, CHARGING WATER SOV (RB NE, El 565 ft).
Driver	Driver	When dispatched to close wait 2 minutes and report 2-SHV-085-0586 closed, when asked to open wait 2 minutes and report open. F10 mrf rd06 close F7 mrf rd06 open.

Simulator Event Guide:

Event 7 Major: Loss of High Pressure Injection/ATWS

CS#4	BOP/ATC	Initiate SLC IAW Appendix 3A
		1. **UNLOCK** and **PLACE** 2-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 2-9-5 (2-XA-55-5B, Window 20). • 2-PI-63-7A, SLC PUMP DISCH PRESS, indicates above RPV pressure. • System flow, as indicated by 2-IL-63-11, SLC FLOW, red light illuminated on Panel 2-9-5, • SLC INJECTION FLOW TO REACTOR Annunciator in alarm on Panel 2-9-5 (2-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 • 2-FCV-69-1, RWCU INBD SUCT ISOLATION VALVE closed • 2-FCV-69-2, RWCU OUTBD SUCT ISOLATION VALVE closed. • 2-FCV-69-12, RWCU RETURN ISOLATION VALVE closed. 5. **VERIFY** ADS inhibited. 6. **MONITOR** reactor power for downward trend. 7. **MONITOR** 2-LI-63-1A, SLC STORAGE TANK LEVEL, and **CHECK** that level is dropping approximately 1% per minute.

Simulator Event Guide:

Event 7 Major: Loss of High Pressure Injection/ATWS

CS#3	ATC/BOP	Once Reactor Pressure is below 190 psig commence injection IAW Appendix 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
		Restores Level to directed level band
	ATC/BOP	Once Reactor Pressure is less than 450 psig report failure of Core Spray Loop 2 Inboard Injection Valve to Auto Open.

Simulator Event Guide:

Event 7 Major: Loss of High Pressure Injection/ATWS

CS#3	ATC/BOP	Once Reactor Pressure is below 190 psig commence injection IAW Appendix 6B.
		1. IF Adequate core cooling is assured, **AND** It becomes necessary to bypass the LPCI injection valve auto open signal to control injection, THEN **PLACE** 2-HS-74-155A, LPCI SYS I OUTBD INJ VLV BYPASS SEL in **BYPASS.**
		2. **VERIFY OPEN** 2-FCV-74-1, RHR PUMP 2A SUPPR POOL SUCT VLV
		3. **VERIFY OPEN** 2-FCV-74-12, RHR PUMP 2C SUPPR POOL SUCT VLV.
		4. **VERIFY CLOSED** the following valves: • 2-FCV-74-61, RHR SYS I DW SPRAY INBD VLV • 2-FCV-74-60, RHR SYS I DW SPRAY OUTBD VLV • 2-FCV-74-57, RHR SYS I SUPPR CHBR/POOL ISOL VLV • 2-FCV-74-58, RHR SYS I SUPPR CHBR SPRAY VALVE • 2-FCV-74-59, RHR SYS I SUPPR POOL CLG/TEST VLV
		5. VERIFY RHR Pump 2A and/or 2C running.
		6. WHEN RPV pressure is below 450 psig, THEN **VERIFY OPEN** 2-FCV-74-53, RHR SYS I LPCI INBD INJECT VALVE.
		7. IF RPV pressure is below 230 psig, THEN **VERIFY CLOSED** 2-FCV-68-79, RECIRC PUMP 2A DISCHARGE VALVE.
		8. **THROTTLE** 2-FCV-74-52, RHR SYS I LPCI OUTBD INJECT VALVE, as necessary to control injection.
		9. **MONITOR** RHR Pump NPSH using Attachment 1.
		10. **PLACE** RHRSW pumps in service as soon as possible on ANY RHR Heat Exchangers discharging to the RPV.
		11. **THROTTLE** the following in-service RHRSW outlet valves to maintain flow between 1350 and 4500 gpm: 2-FCV-23-34, RHR HX 2A RHRSW OUTLET VLV 2-FCV-23-40, RHR HX 2C RHRSW OUTLET VLV.
		Restores Level to directed level band
	ATC/BOP	Once Reactor Pressure is less than 450 psig report failure of Core Spray Loop 2 Inboard Injection Valve to Auto Open.

Simulator Event Guide:

Event 7 Major: Loss of High Pressure Injection/ATWS

CS#3	ATC/BOP	Once Reactor Pressure is below 190 psig commence injection IAW Appendix 6C.
		1. IF Adequate core cooling is assured, **AND** It becomes necessary to bypass the LPCI injection valve auto open signal to control injection, THEN **PLACE** 2-HS-74-155B, LPCI SYS II OUTBD INJ VLV BYPASS SEL in **BYPASS.**
		2. **VERIFY OPEN** 2-FCV-74-24, RHR PUMP 2B SUPPR POOL SUCT VLV
		3. **VERIFY OPEN** 2-FCV-74-35, RHR PUMP 2D SUPPR POOL SUCT VLV.
		4. **VERIFY CLOSED** the following valves: • 2-FCV-74-75, RHR SYS II DW SPRAY INBD VLV • 2-FCV-74-74, RHR SYS II DW SPRAY OUTBD VLV • 2-FCV-74-71, RHR SYS II SUPPR CHBR/POOL ISOL VLV • 2-FCV-74-72, RHR SYS II SUPPR CHBR SPRAY VALVE • 2-FCV-74-73, RHR SYS II SUPPR POOL CLG/TEST VLV
		5. VERIFY RHR Pump 2B and/or 2D running.
		6. WHEN RPV pressure is below 450 psig, THEN **VERIFY OPEN** 2-FCV-74-67, RHR SYS II LPCI INBD INJECT VALVE.
		7. IF RPV pressure is below 230 psig, THEN **VERIFY CLOSED** 2-FCV-68-3, RECIRC PUMP 2A DISCHARGE VALVE.
		8. **THROTTLE** 2-FCV-74-66, RHR SYS II LPCI OUTBD INJECT VALVE, as necessary to control injection.
		9. **MONITOR** RHR Pump NPSH using Attachment 1.
		10. **PLACE** RHRSW pumps in service as soon as possible on ANY RHR Heat Exchangers discharging to the RPV.
		11. **THROTTLE** the following in-service RHRSW outlet valves to maintain flow between 1350 and 4500 gpm: 2-FCV-23-46, RHR HX 2B RHRSW OUTLET VLV 2-FCV-23-52, RHR HX 2D RHRSW OUTLET VLV.
		Restores Level to directed level band
	ATC/BOP	Once Reactor Pressure is less than 450 psig report failure of Core Spray Loop 2 Inboard Injection Valve to Auto Open.

Simulator Event Guide:

Event 7 Major: Loss of High Pressure Injection/ATWS

	SRO	Enter EOI-2 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 - NO
		Operate all Available Drywell Cooling
	SRO	Primary Containment Hydrogen
		If PCIS Group 6 isolation exists – YES Then 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 – YES until Emergency Depressurization
		After Emergency Depressurization 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	The Emergency Classification is 1.2-S or 1.1-S1

Simulator Event Guide:

Event 7 Major: Loss of High Pressure Injection/ATWS

	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
	SRO	EOI-2 Primary Containment Pressure
		Monitor and Control PC Pressure Below 2.4 psig Using the Vent System As Necessary (Appendix 12)
		Direct Appendix 12 Vent
	SRO	Can Primary Containment pressure be maintained below 2.4 psig – NO
	BOP	Vent Containment IAW Appendix 12
	SRO	Before Suppression Chamber Pressure rises to 12 psig Continue
		Initiate Suppression Chamber Sprays Using only pumps not required to assure adequate core cooling by continuous injection. Appendix 17C
	ATC/BOP	Initiate Suppression Chamber Sprays IAW Appendix 17C
	SRO	When Suppression Chamber Pressure exceeds 12 psig THEN Continue
	SRO	The Emergency Classification is 1.2-S or 1.1-S1

Simulator Event Guide:

Event 7 Major: Loss of High Pressure Injection/ATWS

	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.
		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 High Pressure Injection/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	Driver	Acknowledge Notification

Simulator Event Guide:

Event 7 Major: Loss of High Pressure Injection/ATWS

	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** 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.
		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: • 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. d. IF Directed by SRO, THEN **PLACE** 2-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 2-FCV-74-53(67), RHR SYS I(II) LPCI INBD INJECT VALVE, is OPEN, THEN **VERIFY CLOSED** 2-FCV-74-52(66), RHR SYS I(II) LPCI OUTBD INJECT VALVE. g. **OPEN** 2-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** 2-FCV-74-59(73), RHR SYS I(II) SUPPR POOL CLG/TEST VLV, to maintain EITHER of the following as indicated on 2-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** 2-FCV-74-7(30), RHR SYSTEM I(II) MIN FLOW VALVE. k. **MONITOR** RHR Pump NPSH using Attachment 1.

Simulator Event Guide:

Event 7 Major: Loss of High Pressure Injection/ATWS

	ATC/BOP	Initiate Suppression Chamber Sprays IAW 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 auto open signal as necessary by **PLACING** 2-HS-74-155A(B), LPCI SYS I(II) OUTBD INJ VLV BYPASS SEL in **BYPASS**.
		Step 3 and 4 are NA
		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 2/3CORE HEIGHT OVRD, in MANUAL OVERRIDE. c. **MOMENTARILY PLACE** 3-XS-74-121(129), RHR SYS I(II) CTMT SPRAY/CLG VLV SELECT, switch in SELECT. d. IF 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.

Simulator Event Guide:

Event 7 Major: Loss of High Pressure Injection/ATWS

	ATC/BOP	Initiate Suppression Chamber Sprays IAW Appendix 17C
		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** 3-FCV-74-7(30), RHR SYSTEM I(II) MIN FLOW VALVE. j. **RAISE** system flow by placing the second RHR System I(II) pump in service as necessary. k. **MONITOR** RHR Pump NPSH using Attachment 2.
		l. **VERIFY** RHRSW pump supplying desired RHR Heat Exchanger(s). m. **THROTTLE** the following in-service RHRSW outlet valves to obtain between 1350 and 4500 gpm flow: • 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.

Critical Tasks - Five

CS#1-With reactor scram required and the reactor not shutdown, to prevent an uncontrolled RPV depressurization and subsequent power excursion, inhibit ADS.

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

2. Cues:
   Procedural compliance.

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

4. Feedback:
   RPV pressure trend.
   RPV level trend.
   ADS "ADS Logic Bus Inhibited" annunciator status.

CS#2-During an ATWS, when conditions with Emergency Depressurization required, Terminate and Prevent RPV injection from ECCS and Feedwater until reactor pressure is below the MARFP as directed by US.

1. Safety Significance:
   Prevention of fuel damage due to uncontrolled feeding.

2. Cues:
   Procedural compliance.

3. Measured by:
   Observation - No ECCS injection prior to being less than the MARFP.
   <u>AND</u>
   Observation - Feedwater terminated and prevented until less than the MARFP.

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

Critical Tasks - Five

CS#3-With RPV pressure <MARFP, slowly increase and control injection into RPV to restore and maintain RPV level above TAF (-180") as directed by US.

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

2. Cues:
   Procedural compliance.
   RPV pressure indication.

3. Measured by:
   Observation - Injection not commenced until less than MARFP, and injection controlled such that power spikes are minimized, level restored and maintained greater than or equal to -180".

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

CS#4-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 per 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 or B Pump control switch in ON, when directed by US.
   AND
   Control Rod insertion commenced in accordance with EOI Appendixes.

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

Critical Tasks - Five

CS#5-After RPV water level drops to -50 inches, when RPV level cannot be restored and maintained above -180", RO initiates Emergency Depressurization as directed by US.

1. Safety Significance:
   Maintaining adequate core cooling.

2. Cues:
   Procedural compliance.
   RPV level indication.

3. Measured by:
   At least 6 SRV's are opened when RPV level cannot be restored and maintained above -180".

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

Scenario Tasks

EVENT	TASK NUMBER	K/A	RO	SRO
1	Main Turbine Roll			
	RO U-047-NO-04	245000A1.02	2.6	2.5
2	Raise Power with Control Rods			
	RO U-085-NO-07 SRO S-000-AD-31	2.2.2	4.6	4.1
3	Uncoupled Control Rod			
	RO U-085-AL-06 SRO S-085-AB-02	201003A2.02	3.7	3.8
4	Turbine Speed Control Unit Failure			
	RO U-047-AB-02 SRO S-047-AB-01	245000A3.12	3.3	3.5
5	RFPT Seal Injection Pump Trip			
	RO U-003-AL-12	259001K6.10	2.5	2.5
6	DG C Auto Start Failure			
	RO U-082-AL-07 SRO S-000-AD-27	264000A4.04	3.7	3.7
7	Loss of High Pressure Injection/ATWS			
	RO U-000-EM-17 SRO S-000-EM-03 SRO S-000-EM-05 SRO S-000-EM-18	295031EA1.06	4.4	4.4

SCENARIO REVIEW CHECKLIST

SCENARIO NUMBER: 2-E

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)
2	EOI's used: List (1-3)
2	EOI Contingencies used: List (0-3)
90	Run Time (minutes)
5	Crew Critical Tasks: (2-5)
YES	Technical Specifications Exercised (Yes/No)

SHIFT TURNOVER SHEET

Equipment Out of Service/LCO's:

Start Bus 1A is out of service Unit 3 is performing 0-SR-3.8.1.A.1 Verification of Offsite Power Availability to 4.16 KV Shutdown Boards every 8 hours.

Shutdown Board C Alternate Feeder Breaker 1624 is out of service for Breaker Swap.

Operations/Maintenance for the Shift:

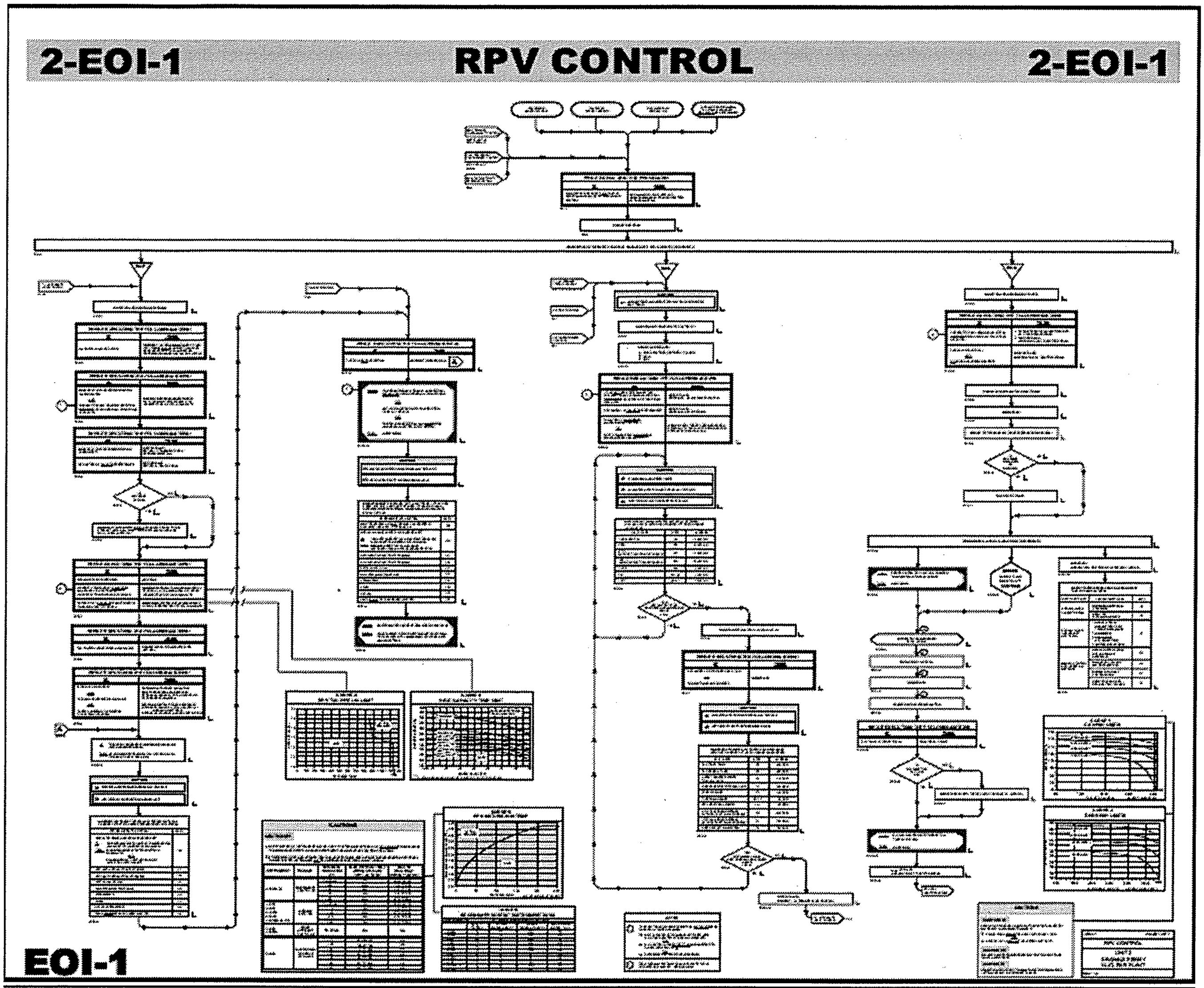
Raise Reactor Power with Control Rods to meet step 18 of 2-GOI-100-1A section 5.5.

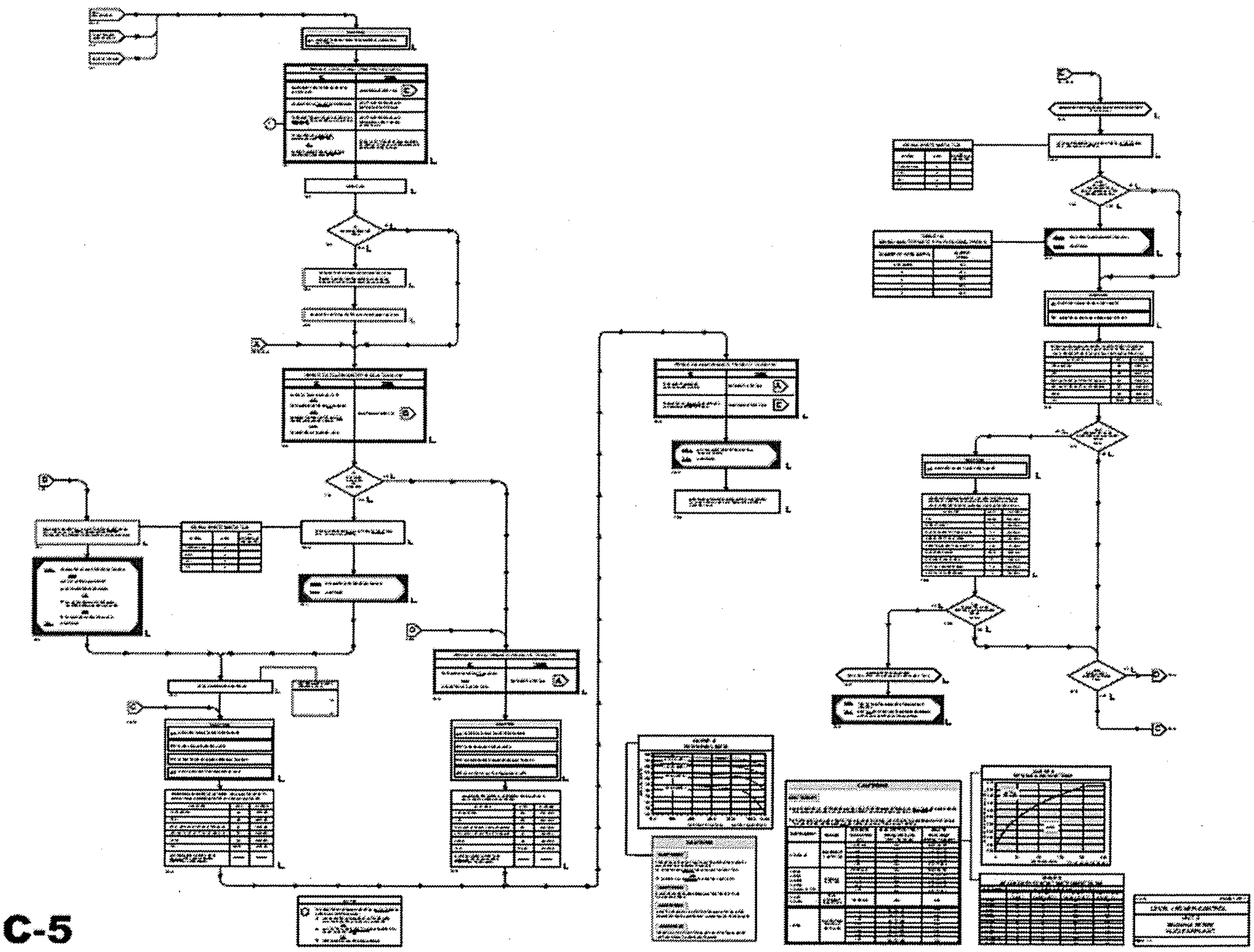
When 5 to 6 turbine bypass valves are open, complete Main Turbine Roll IAW 2-OI-47 section 5.4 starting at step 11.

Units 1 and 3 are at 100% power.

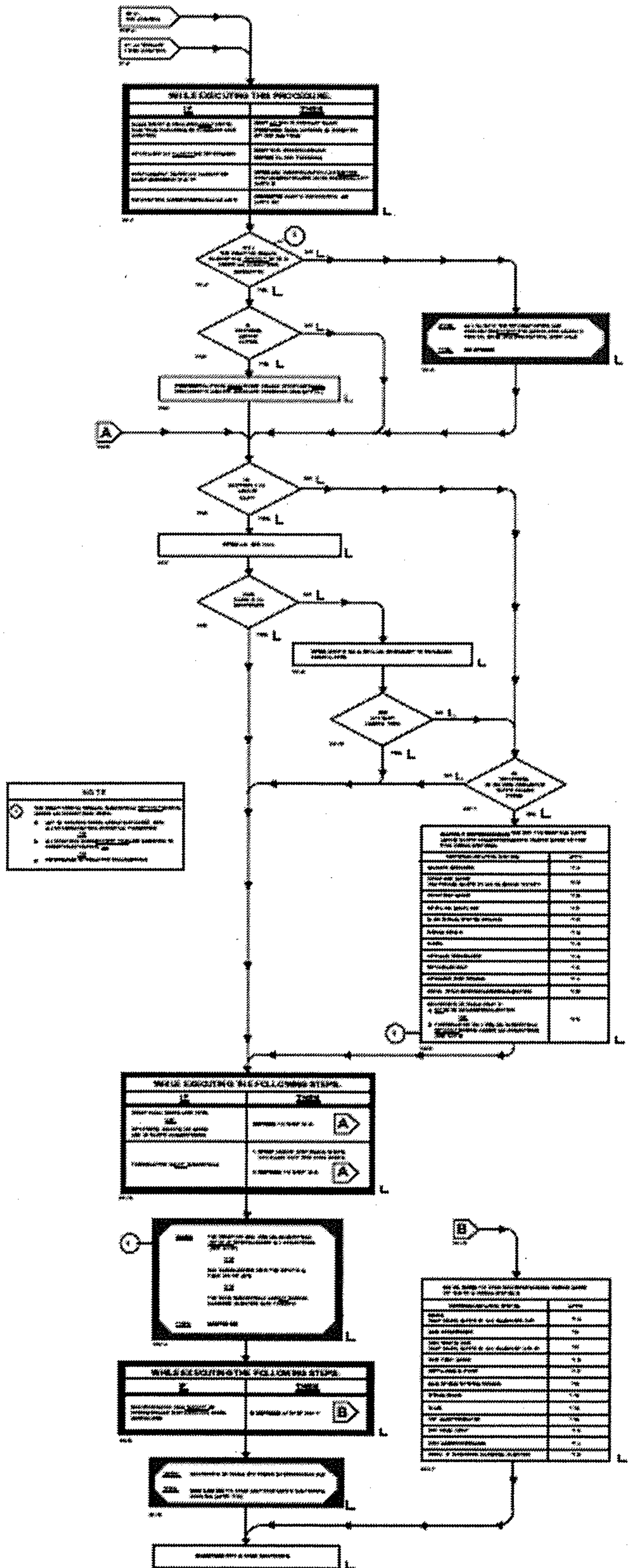
Unusual Conditions/Problem Areas:

Severe Thunderstorm Warning in affect for the next 2 hours.


2-EOI-1
RPV CONTROL
2-EOI-1
EOI-1



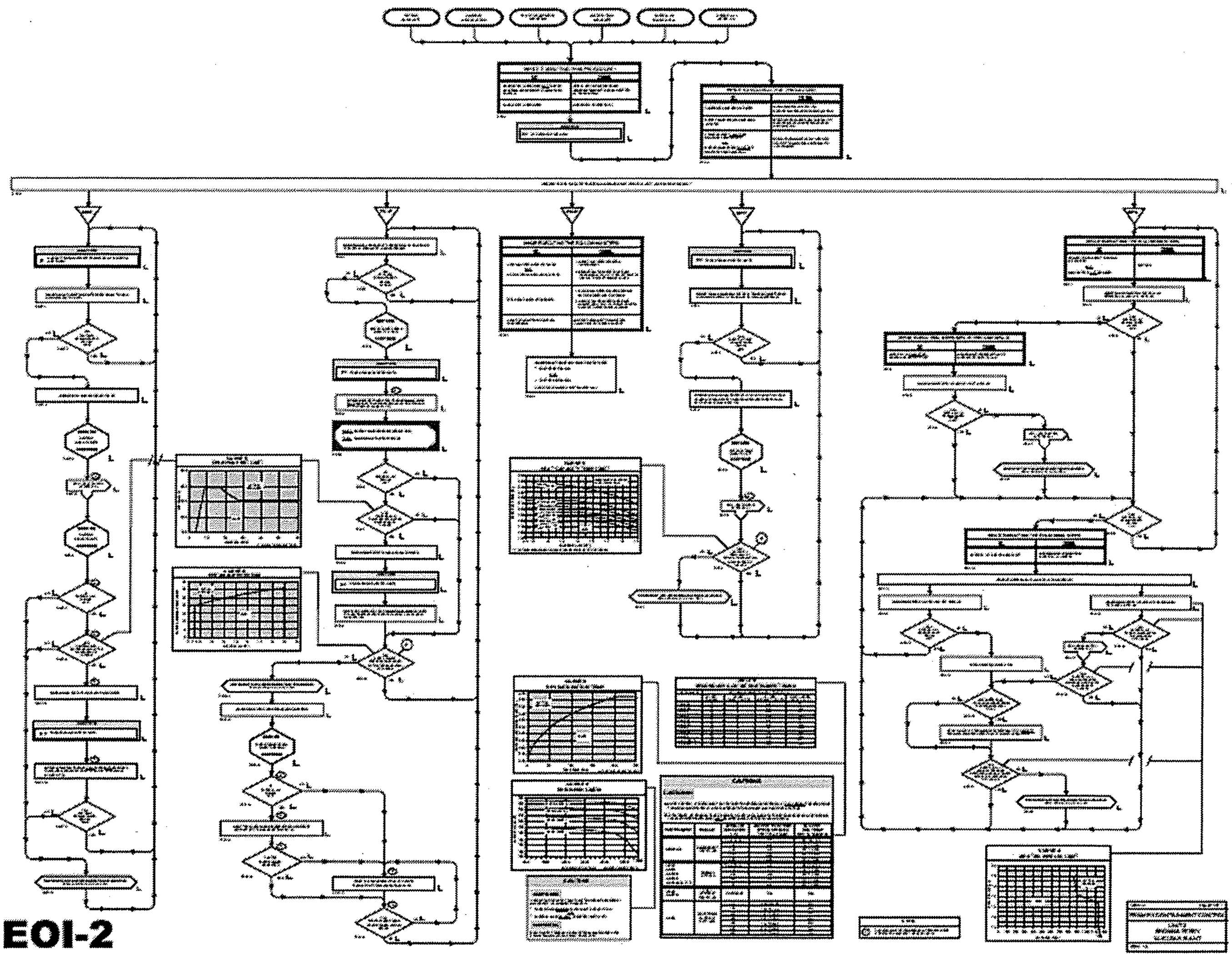
2-C-2 EMERGENCY RPV DEPRESSURIZATION



EMERGENCY RPV DEPRESSURIZATION	
UNIT 2 BROWNS FERRY NUCLEAR PLANT	

C-2

2-EOI-2 PRIMARY CONTAINMENT CONTROL 2-EOI-2



EOI-2

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.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One withdrawn control rod stuck.	----------------NOTE---------------- Rod worth minimizer (RWM) may be bypassed as allowed by LCO 3.3.2.1, "Control Rod Block Instrumentation," if required, to allow continued operation. ---	
	A.1 Verify stuck control rod separation criteria are met.	Immediately
	AND	
	A.2 Disarm the associated control rod drive (CRD).	2 hours
	AND	

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. (continued)	A.3	Perform SR 3.1.3.2 and SR 3.1.3.3 for each withdrawn OPERABLE control rod.	24 hours from discovery of Condition A concurrent with THERMAL POWER greater than the low power setpoint (LPSP) of the RWM
	<u>AND</u>		
	A.4	Perform SR 3.1.1.1.	72 hours
B. Two or more withdrawn control rods stuck.	B.1	Be in MODE 3.	12 hours
C. One or more control rods inoperable for reasons other than Condition A or B.	C.1	------------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.	3 hours
	<u>AND</u>		
	C.2	Disarm the associated CRD.	4 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. ------------NOTE----------- Not applicable when THERMAL POWER > 10% RTP. ------------------------------- Two or more inoperable control rods not in compliance with banked position withdrawal sequence (BPWS) and not separated by two or more OPERABLE control rods.	D.1	Restore compliance with BPWS.	4 hours
	OR		
	D.2	Restore control rod to OPERABLE status.	4 hours
E. Required Action and associated Completion Time of Condition A, C, or D not met. OR Nine or more control rods inoperable.	E.1	Be in MODE 3.	12 hours

3.8 ELECTRICAL POWER SYSTEMS

3.8.1 AC Sources - Operating

LCO 3.8.1 The following AC electrical power sources shall be OPERABLE:

a. Two qualified circuits between the offsite transmission network and the onsite Class 1E AC Electrical Power Distribution System;

b. Unit 1 and 2 diesel generators (DGs) with two divisions of 480 V load shed logic and common accident signal logic OPERABLE; and

c. Unit 3 DG(s) capable of supplying the Unit 3 4.16 kV shutdown board(s) required by LCO 3.8.7, "Distribution Systems - Operating."

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

-----NOTE-----

LCO 3.0.4.b is not applicable to DGs.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One required offsite circuit inoperable.	A.1	Verify power availability from the remaining OPERABLE offsite transmission network.	1 hour AND Once per 8 hours thereafter
	AND		

(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. (continued)	A.2	Declare required feature(s) with no offsite power available inoperable when the redundant required feature(s) are inoperable.	24 hours from discovery of no offsite power to one shutdown board concurrent with inoperability of redundant required feature(s)
	AND		
	A.3	Restore required offsite circuit to OPERABLE status.	7 days AND 14 days from discovery of failure to meet LCO
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		
			(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
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)
	<u>AND</u>		
	B.3.1	Determine OPERABLE Unit 1 and 2 DG(s) are not inoperable due to common cause failure.	24 hours
	<u>OR</u>		
	B.3.2	Perform SR 3.8.1.1 for OPERABLE Unit 1 and 2 DG(s).	24 hours
	<u>AND</u>		
	B.4	Restore Unit 1 and 2 DG to OPERABLE status.	7 days <u>AND</u> 14 days from discovery of failure to meet LCO

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. One division of 480 V load shed logic inoperable.	C.1	Restore required division of 480 V load shed logic to OPERABLE status.	7 days
D. One division of common accident signal logic inoperable.	D.1	Restore required division of common accident signal logic to OPERABLE status.	7 days
E. Two required offsite circuits inoperable.	E.1	Declare required feature(s) inoperable when the redundant required feature(s) are inoperable.	12 hours from discovery of Condition E concurrent with inoperability of redundant required feature(s)
	<u>AND</u>		
	E.2	Restore one required offsite circuit to OPERABLE status.	24 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
------------NOTE------------ Only applicable when more than one 4.16 kV shutdown board is affected. ------------------------------	------------NOTE------------ Enter applicable Conditions and Required Actions of LCO 3.8.7, "Distribution Systems - Operating," when Condition F is entered with no AC power source to any 4.16 kV shutdown board. ------------------------------		
F. One required offsite circuit inoperable. <u>AND</u> One Unit 1 and 2 DG inoperable.	F.1	Restore required offsite circuit to OPERABLE status.	12 hours
	<u>OR</u>		
	F.2	Restore Unit 1 and 2 DG to OPERABLE status.	12 hours
------------NOTE------------ Applicable when only one 4.16 kV shutdown board is affected. ------------------------------			
G. One required offsite circuit inoperable. <u>AND</u> One Unit 1 and 2 DG inoperable.	G.1	Declare the affected 4.16 kV shutdown board inoperable.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
H. Two or more Unit 1 and 2 DGs inoperable.	H.1 Restore all but one Unit 1 and 2 DG to OPERABLE status.	2 hours
I. Required Action and Associated Completion Time of Condition A, B, C, D, E, F, or H not met.	I.1 Be in MODE 3. <u>AND</u> I.2 Be in MODE 4.	12 hours 36 hours
J. One or more required offsite circuits and two or more Unit 1 and 2 DGs inoperable. <u>OR</u> Two required offsite circuits and one or more Unit 1 and 2 DGs inoperable. <u>OR</u> Two divisions of 480 V load shed logic inoperable. <u>OR</u> Two divisions of common accident signal logic inoperable.	J.1 Enter LCO 3.0.3.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
K. One or more required Unit 3 DGs inoperable.	K.1 Declare required feature(s) supported by the inoperable Unit 3 DG inoperable when the redundant required feature(s) are inoperable.	4 hours from discovery of Condition K concurrent with inoperability of redundant required feature(s)
	<u>AND</u>	
	K.2 Declare affected SGT and CREVs subsystem(s) inoperable.	30 days

3.8 ELECTRICAL POWER SYSTEMS

3.8.7 Distribution Systems - Operating

LCO 3.8.7 The following AC and DC electrical power distribution subsystems shall be OPERABLE:

a. Unit 1 and 2 4.16 kV Shutdown Boards;

b. Unit 2 480 V Shutdown Boards;

c. Unit 2 480 V RMOV Boards 2A, 2B, 2D, and 2E;

d. Unit 1 and 2 DG Auxiliary Boards;

e. Unit DC Boards and 250 V DC RMOV Boards 2A, 2B, and 2C;

f. Unit 1 and 2 Shutdown Board DC Distribution Panels; and

g. Unit 1 and 3 AC and DC Boards needed to support equipment required to be OPERABLE by LCO 3.6.4.3, "Standby Gas Treatment (SGT) System," and LCO 3.7.3, "Control Room Emergency Ventilation (CREV) System."

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One Unit 1 and 2 4.16 kV Shutdown Board inoperable.	------------------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.	5 days <u>AND</u> 12 days from discovery of failure to meet LCO
	<u>AND</u>	
	A.2 Declare associated diesel generator inoperable.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One Unit 2 480 V Shutdown Board inoperable. OR 480 V RMOV Board 2A inoperable. OR 480 V RMOV Board 2B inoperable.	----------------NOTE-------------- Enter Condition C when Condition B results in no power source to 480 volt RMOV board 2D or 2E. ------------------------------------ B.1 Restore Board to OPERABLE status.	8 hours AND 12 days from discovery of failure to meet LCO
C. Unit 2 480 V RMOV Board 2D inoperable. OR Unit 2 480 V RMOV Board 2E inoperable.	C.1 Declare the affected RHR subsystem inoperable.	Immediately
D. One Unit 1 and 2 DG Auxiliary Board inoperable.	D.1 Restore Unit 1 and 2 DG Auxiliary Board to OPERABLE status.	5 days AND 12 days from discovery of failure to meet LCO

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
E. One Unit DC Board inoperable. <u>OR</u> One Unit 1 and 2 Shutdown Board DC Distribution Panel inoperable. <u>OR</u> 250 V DC RMOV Board 2A inoperable. <u>OR</u> 250 V DC RMOV Board 2B inoperable. <u>OR</u> 250 V DC RMOV Board 2C inoperable.	E.1	Restore required Board or Shutdown Board DC Distribution Panel to OPERABLE status.	7 days <u>AND</u> 12 days from discovery of failure to meet LCO

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. Unit 1 and 2 4.16 kV Shutdown Board A and B inoperable. OR Unit 1 and 2 4.16 kV Shutdown Board C and D inoperable.	------------------NOTE--------------- Enter applicable conditions and required actions of Condition B, C, D, and G when Condition F results in no power source to a required 480 volt board. --- F.1 Restore one 4.16 kV Shutdown Board to OPERABLE status.	8 hours AND 12 days from discovery of failure to meet LCO
G. One or more required Unit 1 or 3 AC or DC Boards inoperable.	G.1 Declare the affected SGT or CREV subsystem inoperable.	Immediately
H. Required Action and associated Completion Time of Condition A, B, D, E, or F not met.	H.1 Be in MODE 3. AND H.2 Be in MODE 4.	12 hours 36 hours
I. Two or more electrical power distribution subsystems inoperable that result in a loss of function.	I.1 Enter LCO 3.0.3.	Immediately

	SCRAM FAILURE	REACTOR COOLANT ACTIVITY
	Description	Description
UNUSUAL EVENT		**1.3-U** Reactor coolant activity exceeds 26 µCi/gm dose equivalent I-131 (Technical Specification Limits) as determined by chemistry sample. OPERATING CONDITION ALL
ALERT	**1.2-A** NOTE Failure of RPS automatic scram functions to bring the reactor subcritical AND Manual scram or ARI (automatic or manual) was successful. OPERATING CONDITION: Mode 1 or 2	**1.3-A** Reactor coolant activity exceeds 300 µCi/gm dose equivalent Iodine-131 as determined by chemistry sample. OPERATING CONDITION: Mode 1 or 2 or 3
SITE EMERGENCY	**1.2-S** NOTE Failure of automatic scram, manual scram, and ARI to bring the reactor subcritical. OPERATING CONDITION: Mode 1	
GENERAL EMERGENCY	**1.2-G** CURVE US Failure of automatic scram, manual scram, and ARI. Reactor power is above 3% AND Either of the following conditions exists: • Suppression Pool temp exceeds HCTL. Refer to Curve 1.2-G. • Reactor water level can NOT be restored and maintained at or above -180 inches. OPERATING CONDITION: Mode 1 or 2	

WATER LEVEL

Description	Description	
1.1-U1 NOTE Uncontrolled water level decrease in Reactor Cavity with irradiated fuel assemblies expected to remain covered by water. OPERATING CONDITION: Mode 5	**1.1-U2** Uncontrolled water level decrease in Spent Fuel Pool with irradiated fuel assemblies expected to remain covered by water. OPERATING CONDITION ALL	UNUSUAL EVENT
1.1-A1 NOTE Uncontrolled water level decrease in Reactor Cavity expected to result in irradiated fuel assemblies being uncovered. OPERATING CONDITION: Mode 5	**1.1-A2** Uncontrolled water level decrease in Spent Fuel Storage Pool expected to result in irradiated fuel assemblies being uncovered. OPERATING CONDITION: ALL	ALERT
1.1-S1 NOTE Reactor water level can NOT be maintained above -162 inches. (TAF) OPERATING CONDITION: ALL	**1.1-S2** Reactor water level can NOT be determined. OPERATING CONDITION: Mode 1 or 2 or 3	SITE EMERGENCY
1.1-G1 Reactor water level can NOT be restored and maintained above -180 inches. OPERATING CONDITION: Mode 1 or 2 or 3	**1.1-G2** NOTE TABLE US Reactor water level can NOT be determined AND Either of the following exists: • The reactor will remain subcritical without boron under all conditions, and ➢ Less than 4 MSRVs can be opened, or ➢ Reactor pressure can NOT be restored and maintained above Suppression Chamber pressure by at least ❖ UNIT 1 – 90 psi ❖ UNIT 2 – 80 psi ❖ UNIT 3 – 70 psi • It has NOT been determined that the reactor will remain subcritical without boron under all conditions and unable to restore and maintain MARFP in Table 1.1-G2. OPERATING CONDITION: Mode 1 or 2 or 3	GENERAL EMERGENCY

Facility: **Browns Ferry NPP** Scenario No.: **F** Op-Test No.: **ILT 1102**

Examiners:	

Operators:	**SRO:**
	ATC:
	BOP:

Initial Conditions: IC104/ Unit 2 Reactor Power 70%/ EECW A3 Pump tagged Out/ RFPT B Out of Service

Turnover: Remove LPRM 8-49B from bypass IAW 2-OI-92B section 6.4, then raise power with Control Rods as directed by the RCP.

Event No.	Malf. No.	Event Type*	Event Description
1		N-BOP N-SRO	Remove an LPRM from Bypass 8-49B
2		R-ATC R-SRO	Raise Power with Control Rods
3	rd25 rd07r1435	C-ATC TS-SRO	RPIS Position Failure rod 14-35 with drift in on insert
4	sw03m	C-BOP TS-SRO	EECW Pump Trip
5	ms05h	C-BOP TS-SRO	MSIV Partial Closure
6	fw26a/b	I-ATC I-SRO	Feedwater Flow Transmitter failures
7	mc04	M-ALL	Degrading Vacuum, ATWS with out MSIVs
8	ia02	C	Loss of Drywell Control Air
9	rd01	C	CRD Pump Trip

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

Console Operator Instructions

A. Scenario File Summary

1. File: batch and trigger files for scenario 2-F

Batch NRC/110202

Imf sw07b

Bat atws70

Imf rd01a (e2 120)

Trge1 NRC/msivd = zdihs0152a[1].eq.1

Trge1 = bat NRC/110202-3

Ior xa555b23 alarm_off

Trge3 NRC/singleelement = zdihs466a.eq.1

Trge3 = bat NRC/110202-4

Imf ia02a (e2 15) 100 10 0

Imf ia02b (e2 60) 100 30 0

Batch NRC/1102-1

Ior zlohs466a off

Ior zlohs466b on

Imf fw26a (none 0) 0

Imf fw26b (none 60) 100 30 0

Batch NRC/1102-2

Imf th27e

Ior zlohs0152a[2] on

Imf ms05h

Ior za0fi464 1.6

Batch NRC/1102-3

Dor zlohs0152a[2]

Dor zaofi464

Batch NRC/1102-4

Dor zlohs466a

Dor zlohs466b

Pref file

F3 imf rd25

F4 imf rd07r1435

F5dmf rd071435

F6 imf sw03m

F7 bat NRC/110202

F8 bat NRC/1102-1

F9 bat NRC/1102-2

F10 dmf th27e

F11

F12 trg e2 modesw

Shift fl imf mc04 100

Shift f4 mrf rd06 open

Shift f5 bat app01f

Shift f6 bat app02

Shift f7 mrf rd06 close

Shift f8 bat sdv

Console Operator Instructions

Scenario 2-F

		DESCRIPTION/ACTION
Simulator Setup	manual	Reset to IC 104
Simulator Setup	**Load Batch**	RestorePref NRC/110202
Simulator Setup	manual	Tag Out EECW Pump A3
Simulator Setup	manual	F7 and F12
Simulator Setup		Verify file loaded

RCP required (70% - 85% with control rods and flow) and RCP for Urgent Load Reduction
Provide marked up copy of 3-GOI-100-12

BOP will remove LPRM 8-49B from bypass IAW 2-OI-92B section 6.4.

ATC will raise Reactor Power with control rods as directed by the Reactivity Control Plan.

During power ascension Control Rod 14-35 will experience an RPIS position failure. The crew will respond IAW ARPs and 2-AOI-85-4. The ATC will insert Control Rod 14-35 one notch to establish position indication. After Control Rod 14-35 is inserted it will begin to drift in; the ATC will respond IAW 2-AOI-85-5 and insert the control rod to position 00.

EECW D3 Pump will trip and the standby EECW Pump B3 will fail to auto start, the BOP will respond IAW ARPs and start EECW Pump B3 to EECW flow to the north header.
The SRO will evaluate Technical Specification 3.7.2 and Condition A is entered.

Outboard MSIV D will drift closed; the crew will respond IAW 2-AOI-1-3. The ATC will lower Reactor Power to less than 66% and the BOP will fully close Outboard MSIV D. The SRO will evaluate Technical Specification 3.6.1.3 and Condition A is entered.

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

Vacuum will begin to degrade and the crew will respond IAW 2-AOI-47-3, the crew will insert a manual Reactor scram prior to the Main Turbine trip. An ATWS will exist and the crew will enter 2-EOI-1 and 2-C-5.

After the scram, an airline break will occur in the drywell causing MSIV closure and transition to SRVs for pressure control and RCIC for level control. Until the crew performs Appendix 8G, SRV operation will degrade due to the loss of air.

CRD Pump 2A will trip and the ATC will start CRD Pump 1B in order to insert control rods.

The crew will maintain directed level and pressure bands, insert all control rods and enter EOI-2 and place RHR in Suppression Pool Cooling.

The Emergency Classification is 1.2-S

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

Controls Rods are being inserted

Reactor Level is being maintained in directed level band

Simulator Event Guide:

Event 1 Normal: Remove LPRM 8-49B from bypass IAW 2-OI-92B section 6.4

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

Simulator Event Guide:

Event 2 Reactivity: Raise Power with Control Rods

	SRO	Notify ODS of power increase.
		Direct Power increase using Recirc Flow per 3-GOI-100-12. [20] **IF** desired to raise power with only two (2) Reactor feedpumps in service, **THEN RAISE** Reactor power, as desired, maintaining each Reactor feedpump less than 5850 RPM.
	ATC	Raise Power with Control Rods per 2-OI-85, section 6.6.
		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

	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. [6] **IF** control rod is notch withdrawn to rod notch Position 48, **THEN** **PERFORM** control rod coupling integrity check as follows: [6.1] **PLACE** CRD CONTROL SWITCH, 2-HS-85-48, in ROD OUT NOTCH, and **RELEASE**. [6.2] **CHECK** control rod coupled by observing the following: • Four rod display digital readout and the full core display digital readout and background light remain illuminated. • CONTROL ROD OVERTRAVEL annunciator, 2-XA-55-5A, Window 14, does **NOT** alarm. [6.3] **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** 2-AOI-85-2.

Simulator Event Guide:

Event 2 Reactivity: Raise Power with Control Rods

	ATC	**6.6.4 Continuous Rod Withdrawal** [1] **SELECT** desired Control Rod by depressing appropriate CRD ROD SELECT, 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**.

Simulator Event Guide:

Event 2 Reactivity: Raise Power with Control Rods

	ATC	**6.6.4 Continuous Rod Withdrawal (Continued)** [5.5] **WHEN** control rod settles into the intended notch, **THEN** **CHECK** the following. • Four rod display digital readout and the full core display digital readout and background light remain illuminated. • CONTROL ROD OVERTRAVEL annunciator, 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.

Simulator Event Guide:

Event 2 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. [7] **IF** continuously withdrawing the control rod to position 48; and the control rod coupling integrity check will be performed after the CRD NOTCH OVERRIDE, 2-HS-85-47, and CRD CONTROL SWITCH, 2-HS-85-48 are to be released, **THEN:** **PERFORM** control rod coupling integrity check as follows (otherwise N/A): [7.1] **PLACE AND HOLD** CRD NOTCH OVERRIDE, 2-HS-85-47, in NOTCH OVERRRIDE. [7.2] **PLACE AND HOLD** CRD CONTROL SWITCH, 2-HS-85-48, in ROD OUT NOTCH. [7.3] **WHEN** position 48 is reached, **THEN:** **RELEASE** CRD NOTCH OVERRIDE, 2-HS-85-47, and CRD CONTROL SWITCH, 2-HS-85-48. [7.4] **VERIFY** control rod settles into position 48. [7.5] **PLACE** CRD CONTROL SWITCH, 2-HS-85-48, in ROD OUT NOTCH and **RELEASE**. [7.6] **CHECK** control rod coupled by observing the following: • Four rod display digital readout **AND** full core display digital readout **AND** background light will remain illuminated. • CONTROL ROD OVERTRAVEL annunciator (2-XA-55-5A, Window 14) does **NOT** alarm.

Simulator Event Guide:

Event 2 Reactivity: Raise Power with Control Rods

	ATC	[7.7] **CHECK** control rod settles into position 48 and ROD SETTLE light extinguishes. [7.8] **IF** control rod coupling integrity check fails, **THEN REFER TO** 2-AOI-85-2. **6.6.5 Return to Normal After Completion of Control Rod Withdrawal** [1] **WHEN** control rod movement is no longer desired **AND** deselecting control rods is desired, **THEN**: [1.1] **PLACE** CRD POWER, 2-HS-85-46, in OFF. [1.2] **PLACE** CRD POWER, 2-HS-85-46, in ON.
NRC	NRC	When satisfied with reactivity manipulation, RPIS Position Failure rod 14-35
Driver	Driver	When directed by the NRC F3 imf rd25 for RPIS Position Failure rod 14-35

Simulator Event Guide:

Event 3 Instrument: RPIS Position Failure Control Rod 14-35

	ATC	Report Control Rod Drift Alarm 5A-28, reports no control rods drifting.
		Reports loss of position indication on Control Rod 14-35.
	SRO	Enter 2-AOI-85-4 Loss of RPIS.
	ATC	**4.1 Immediate Actions** [1] **STOP** all control rod movement.
	SRO	**4.2 Subsequent Actions** **NOTE** Reference TRM 3.3.5, RPIS Indicated Channel Operability, for applicable 7 or 30 day LCO relating to an inoperable RPIS indication. [1] **IF** control rod movement is required with a Total loss of RPIS, **THEN MANUALLY SCRAM** reactor. [2] **NOTIFY** the Operations Superintendent and Reactor Engineer for actions to be taken in a timely manner.
	SRO	[9] **IF** unable to restore position indication for an individual control rod or rods, **THEN NOTIFY** Reactor Engineer and **DETERMINE** additional corrective action. Control Rods may be moved to an Operable Position Indication as a means of position verification (**REFER TO** Tech Spec Bases SR 3.1.3.1). As a minimum, rod position will be verified, preferably with an independent position indication or other method.
Driver	Driver	Acknowledge notifications, if asked for recommendation; ask caller to recommend action.
	SRO	Direct ATC to insert Control Rod 14-35 one notch to attempt to establish position indication.
	ATC	Insert Control Rod 14-35 to position 46.
	SRO	Evaluate Technical Requirements Manual 3.3.5. Information LCO for TRM 3.3.5 Condition A and C from table 3.3.5-1.
Driver	Driver	When control rod 14-35 is inserted to position 46; initiate F4 imf rd07r1435, when the control rod is near position 08; delete the drift in malfunction F5 dmf rd07r1435.
	NRC	When ready EECW Pump D3 Trip.
Driver	Driver	When directed by the NRC F6 imf sw03m.

Simulator Event Guide:

Event 3 Instrument: RPIS Position Failure Control Rod 14-35

	ATC	Report Control Rod Drift Alarm 5A-28, reports Control Rod 14-35 drifting in.
	SRO	Enter 2-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 2-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 2-AOI-100-1.
	ATC	Inserts Control Rod 14-35 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).
	ATC	[6] **IF** CRD Cooling Water Header DP is excessive and causing the control rod drift, **THEN:**
		[7] **VERIFY** scram pilot air header aligned to scram inlet and outlet valves.
	Crew	Dispatch AUO to check scram valves.
Driver	Driver	As Reactor engineer when called have crew stop control rod pattern adjustment. As AUO after dispatched report scram valves are normal.
	NRC	When ready EECW Pump D3 Trip.
Driver	Driver	When directed by the NRC F6 imf sw03m.

Simulator Event Guide:

Event 4 Component: EECW Pump D3 Trip

	BOP	Respond to alarms 20A-21 and 23D-26.
		23D-26 4160V SD BD D MOTOR OL or TRIP Overload or trip out, on any one of the following: CS pump 1D, 2D, RHR pump 1D, 2D, RHRSW pump D2, D3 A. **CHECK** control room for white light illuminated on effected equipment. B. **DISPATCH** personnel to check: 1. Relays at associated electrical bd. 2. Equipment for abnormal conditions, relay targets, smell, burned paint, breaker.
		20A-21EECW NORTH 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 pump for affected header. **REFER TO** 0-OI-67.
		8.11 Recovering from an EECW Pump Trip [1] **VERIFY** < 25 minutes has elapsed since the EECW pump trip and header pressure > 0 psig. [3] **IF** the south header pump has tripped, **THEN:** [3.1] **START** desired RHRSW Pump using one of the following: • RHRSW PUMP D3(B3) EECW SOUTH HDR, 0-HS-23-94A/2(88A/2) on Unit 2.
		[4] For the EECW(RHRSW) pump(s) started, **PERFORM** the following: • **VERIFY** running current is less than 53 amps. • **VERIFY** locally, Pump breaker charging spring recharged by observing amber breaker spring charged light is on and closing spring target indicates charged. • **VERIFY** Pump upper and lower motor bearing oil level is in the normal operating range. • **NOTIFY** Chemistry of running RHRSW (EECW) pump(s).
	BOP	Start EECW Pump B3.
	SRO	Evaluate Technical Specification 3.7.2.
Driver	Driver	When dispatched report EECW Pump D3 nothing abnormal at pump, breaker indicates instantaneous over current 4kv SD BD D compt 10.

Simulator Event Guide:

Event 4 Component: EECW Pump D3 Trip

	SRO	Evaluate Technical Specification 3.7.2.
		Condition A: One required EECW pump inoperable. Required Action A.1: Restore the required EECW pump to OPERABLE status. Completion Time: 7 days
	NRC	When ready, MSIV Partial closure.
Driver	Driver	When directed F9 bat NRC/110202-2, when alarm 5B-18 alarms F10 dmf th27e.

Simulator Event Guide:

Event 5 Component: MSIV Partial Closure

	ATC	Respond to alarm 5B-18 MAIN STEAM LINE CH A FLOW HIGH.
		5B-18 MAIN STEAM LINE CH A FLOW HIGH A. **VERIFY** alarm by checking main steam flow indicators. B. **IF** alarm is valid on any steam line, **THEN MANUALLY SCRAM** Reactor and **PLACE** Rx Mode Sw. in Shutdown and **CLOSE** MSIVs. C. **IF** any flow indicators are low, **THEN CHECK** all MSIVs open. D. **REFER TO** 2-AOI-1-3. E. **REFER TO** Tech Spec Table 3.3.6.1-1.
	ATC	Report Steam flow in D line is lower than A, B and C lines.
	ATC/BOP	Report Outboard MSIV D 1-52, indicates partially closed.
	SRO	Enter 2-AOI-1-3, MSIV Closure at Power.
		4.1 Immediate Action None **4.2 Subsequent Action** [1] **IF** any EOI entry condition is met, **THEN** (Otherwise N/A):
	ATC	[2] **LOWER** reactor power with recirc flow and insert control rods as necessary, when directed by the Reactor Engineer/Unit Supervisor, to ensure that rated steam line flow (3.54 x 106 lbm/hr) is **NOT** exceeded; as indicated on Main Steam Line Flow Indicators.
	ATC/BOP	[3] **IF** an MSIV is partially closed, **THEN:** [3.1] **LOWER** reactor power to ≤ 66%. [3.2] **PLACE** the associated MSIV control switch to **CLOSE**.
	ATC	Lower Power to ≤ 66%.
	BOP	**PLACE** the Outboard MSIV D, 1-52 control switch, to **CLOSE.**

Simulator Event Guide:

Event 5 Component: MSIV Partial Closure

	ATC	Respond to alarm 5B-18 MAIN STEAM LINE CH A FLOW HIGH.
		5B-18 MAIN STEAM LINE CH A FLOW HIGH A. **VERIFY** alarm by checking main steam flow indicators. B. **IF** alarm is valid on any steam line, **THEN MANUALLY SCRAM** Reactor and **PLACE** Rx Mode Sw. in Shutdown and **CLOSE** MSIVs. C. **IF** any flow indicators are low, **THEN CHECK** all MSIVs open. D. **REFER TO** 2-AOI-1-3. E. **REFER TO** Tech Spec Table 3.3.6.1-1.
	ATC	Report Steam flow in D line is lower than A, B and C lines.
	ATC/BOP	Report Outboard MSIV D 1-52 indicates partially closed.
	SRO	Enter 2-AOI-1-3, MSIV Closure at Power.
		4.1 Immediate Action None **4.2 Subsequent Action** [1] **IF** any EOI entry condition is met, **THEN** (Otherwise N/A):
	ATC	[2] **LOWER** reactor power with recirc flow and insert control rods as necessary, when directed by the Reactor Engineer/Unit Supervisor, to ensure that rated steam line flow (3.54 x 106 lbm/hr) is **NOT** exceeded; as indicated on Main Steam Line Flow Indicators.
	ATC/BOP	[3] **IF** an MSIV is partially closed, **THEN:** [3.1] **LOWER** reactor power to $\leq$ 66%. [3.2] **PLACE** the associated MSIV control switch to **CLOSE**.
	ATC	Lower Power to $\leq$ 66%.
	BOP	**PLACE** the Outboard MSIV D 1-52 control switch to **CLOSE.**

Simulator Event Guide:

Event 5 Component: MSIV Partial Closure

	SRO	Evaluate Technical Specification 3.6.1.3.
		Condition A: NOTE Only applicable to penetration flow paths with two PCIVs. One or more penetration flow paths with one PCIV inoperable except due to MSIV leakage not within limits Required Action A.1: Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured. Completion Time: 8 hours for main steam lines Required Action A.2: NOTE Isolation devices in high radiation areas may be verified by use of administrative means. Verify the affected penetration flow path is isolated. Completion Time: Once per 31 days for isolation devices outside primary containment
	NRC	When ready, Feedwater Flow Transmitter Failure.
Driver	Driver	When directed F8 bat NRC/110202-1.

Simulator Event Guide:

Event 6 Instrument: Feedwater Flow Transmitter Failures

	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 for FW Line A.
	ATC	Report FW Line B Feedwater Flow signal failing.
	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.
	NRC	When ready for Major Vacuum Leak.
Driver	Driver	Upon Lead examiner direction <shift F1> imf mc04 100.

Simulator Event Guide:

Event 7 Major: ATWS without MSIVs

	BOP	Respond to alarm 53-14 OG HOLDUP LINE INLET FLOW HIGH.
	ATC	Report degrading condenser Vacuum.
	SRO	Enter 2-AOI-47-3, “Loss of Condenser Vacuum”.
		4.1 Immediate Actions None **4.2 Subsequent Actions** [1] **IF** ANY EOI entry condition is met? **THEN:**
		[2] **IF** unable to maintain hotwell pressure below -25 inches Hg, as indicated on 2-XR-2-2, with Reactor power less than 30%, **THEN TRIP** the main turbine.
		[4] **REDUCE** reactor power in an attempt to maintain condenser vacuum.
	SRO	Determines a trigger value for Reactor Scram prior to Turbine Trip; at 25 inches.
	ATC	Insert Reactor Scram when directed; and place mode switch in shutdown. Report ATWS and initiate first channel of ARI.
Driver	Driver	Right after the scram enter <shift F8> Bat SDV.
	SRO	Enter 2-EOI-, “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 7 Major: ATWS without MSIVs

	SRO	2-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? – YES. **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.
	BOP	Crosstie CAD to Drywell control air, IAW Appendix 8G.
	SRO	IF Main Steam Relief Valve Air Accumulator Low annunciator, (XA-55-3D-18) is in alarm, **THEN:** place each MSRV Control Switch in Close/Auto **AND** Place MSRV Auto Actuation Logic Inhibit XS-1-202 to Inhibit.
	ATC/BOP	Places XS-1-202 to inhibit.
	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.
Driver	Driver	If Appendix 8G is performed, **THEN** delete Instrument Air Leaks ia02a and ia02b.

Simulator Event Guide:

Event 7 Major: ATWS without MSIVs

	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 7 Major: ATWS without MSIVs

	ATC/BOP	Pressure Control IAW Appendix11A, RPV Pressure Control SRVs
		3. 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:
		4. 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:
		6. IF BOTH Drywell Control Air headers are depressurized, **THEN PERFORM** the following as directed by EOI-1, RPV Control, RC/P Section: • **PLACE** each MSRV control switch in CLOSE/AUTO, and **PLACE** 2-XS-1-202, MSRV AUTO ACTUATION LOGIC INHIBIT, to INHIBIT. **AND** • **MINIMIZE** MSRV cycling by using sustained openings for RPV depressurization.
	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	Augment RPV Pressure Control, if directed by SRO.
Driver	Driver	If Appendix 8G is performed, **THEN** delete Instrument Air Leaks ia02a and ia02b.

Simulator Event Guide:

Event 7 Major: ATWS without MSIVs

	BOP	Crosstie CAD to Drywell control air, IAW Appendix 8G.
		1. **OPEN** the following valves: • 0-FCV-84-5, CAD SYSTEM A N2 SHUTOFF VALVE (Panel 9-54) • 0-FCV-84-16, CAD SYSTEM B N2 SHUTOFF VALVE (Panel 9-55).
		2. **VERIFY** 0-PI-84-6, N2 VAPORIZER A OUTLET PRESSURE, and 0-PI-84-17, N2 VAPORIZER B OUTLET PRESSURE, indicate approximately 100 psig (Unit 1, Panel 9-54 and 9-55).
		3. **PLACE** keylock switch 2-HS-84-48, CAD A CROSS TIE TO DW CONTROL AIR, in OPEN (Unit 2, Panel 9-54).
		4. **CHECK OPEN** 2-FSV-84-48, CAD A CROSS TIE TO DW CONTROL AIR, (Unit 2, Panel 9-54).
		5. **PLACE** keylock switch 2-HS-84-49, CAD B CROSS TIE TO DW CONTROL AIR, in OPEN (Unit 2, Panel 9-55).
		6. **CHECK OPEN** 2-FSV-84-49, CAD B CROSS TIE TO DW CONTROL AIR (Unit 2, Panel 9-55).
		7. **CHECK** MAIN STEAM RELIEF VLV AIR ACCUM PRESS LOW, 2-PA-32-31, alarm cleared (2-XA-55-3D, Window 18).
		8. IF MAIN STEAM RELIEF VLV AIR ACCUM PRESS LOW, 2-PA-32-31, annunciator is or remains in alarm (2-XA-55-3D, Window 18), **THEN DETERMINE** which Drywell Control Air header is depressurized as follows: a. **DISPATCH** personnel to Unit 2, RB, El 565 ft, to **MONITOR** the following indications for low pressure:
		b. **MONITOR** 0-FI-84-7(18), CAD LINE A(B) N2 FLOW, on Unit 1, Panel 1-9-54(55) for high flow.
		c. **MONITOR** inboard MSIV indication status for valves drifting closed.
		9. IF Drywell Control Air header supplied from CAD System A shows indications of being depressurized, **THEN CLOSE** the following valves: • 0-FCV-84-5, CAD SYSTEM A N2 SHUTOFF VALVE (Panel 9-54) • 2-FSV-84-48, CAD A CROSS TIE TO DW CONTROL AIR (Panel 9-54). 10. IF Drywell Control Air header supplied from CAD B shows indications of being depressurized, **THEN CLOSE** the following valves: • 0-FCV-84-16, CAD SYSTEM B N2 SHUTOFF VALVE (Panel 9-55) • 2-FSV-84-49, CAD B CROSS TIE TO DW CONTROL AIR (Panel 9-55).
Driver	Driver	If Appendix 8G is performed, **THEN** delete Instrument Air Leaks ia02a and ia02b.
Driver	Driver	IF dispatched CAD N2 PRESSURE TO DWCA for CAD A pressure is 105 psig. DW CONT AIR N2 SUPPLY PRESS for CAD B pressure is 110 psig.

Simulator Event Guide:

Event 7 Major: ATWS without MSIVs

	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.
		Is 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
S#3	SRO	Directs ADS Inhibited.
CS#3	ATC/BOP	Inhibits ADS.
	SRO	Is any Main Steam Line Open?- NO

Simulator Event Guide:

Event 7 Major: ATWS without MSIVs

	SRO	C5 Level / Power Control
		Crosstie CAD to DW Control Air, if necessary (Appendix 8G).
		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:
CS#2		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:
CS#2		Direct Terminate and Prevent, IAW Appendix 4.
	ATC/BOP	Terminate and Prevent IAW Appendix 4
CS#2	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** 2-HS-73-18A, HPCI TURBINE TRIP push-button. b. **WHEN** HPCI Turbine is at zero speed, **THEN PLACE** 2-HS-73-47A, HPCI AUXILIARY OIL PUMP control switch in PULL TO LOCK and **RELEASE** 2-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 7 Major: ATWS without MSIVs

CS#2	BOP/ATC	Terminate and Prevent IAW Appendix 4 **Appendix 4 (continued)** 4. PREVENT injection from LPCI SYSTEM I by performing the following: **NOTE** Injection may be prevented by performing EITHER step 4.a or step 4.b. a. Following automatic pump start, PLACE RHR SYSTEM I pump control switches in STOP. **OR** b. BEFORE RPV pressure drops below 450 psig, 1) PLACE 2-HS-74-155A, LPCI SYS I OUTBD INJ VLV BYPASS SEL in BYPASS. **AND** 2) VERIFY CLOSED 2-FCV-74-52, RHR SYS I LPCI OUTBD INJECT VALVE. 5. PREVENT injection from LPCI SYSTEM II by performing the following: **NOTE** Injection may be prevented by performing EITHER step 5.a or step 5.b. a. Following automatic pump start, PLACE RHR SYSTEM II pump control switches in STOP. **OR** b. BEFORE RPV pressure drops below 450 psig, 1) PLACE 2-HS-74-155B, LPCI SYS II OUTBD INJ VLV BYPASS SEL in BYPASS. **AND** 2) VERIFY CLOSED 2-FCV-74-66, RHR SYS II LPCI OUTBD INJECT VALVE. 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 7 Major: ATWS without MSIVs

CS#2	BOP/ATC	Terminate and Prevent IAW Appendix 4
		Appendix 4 (continued) c. **CLOSE** the following valves BEFORE RPV pressure drops below 500 psig: • 2-FCV-3-19, RFP 2A DISCHARGE VALVE • 2-FCV-3-12, RFP 2B DISCHARGE VALVE • 2-FCV-3-5, RFP 2C DISCHARGE VALVE • 2-LCV-3-53, RFW START-UP LEVEL CONTROL
		d. **TRIP** RFPTs as necessary to prevent injection by **DEPRESSING** the following push-buttons: • 2-HS-3-125A, RFPT 3A TRIP • 2-HS-3-151A, RFPT 3B TRIP • 2-HS-3-176A, RFPT 3C TRIP.
	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 and HPCI.
	ATC/BOP	Maintain Directed Level Band with RCIC, Appendix 5C and HPCI, Appendix 5D.

Simulator Event Guide:

Event 7 Major: ATWS without MSIVs

	ATC/BOP	Maintain Directed Level Band with RCIC, Appendix 5C
		3. **VERIFY RESET** and **OPEN** 2-FCV-71-9, RCIC TURB TRIP/THROT VALVE RESET.
		4. **VERIFY** 2-FIC-71-36A, RCIC SYSTEM FLOW/CONTROL, controller in AUTO with setpoint at 600 gpm.
		5. **OPEN** the following valves: • 2-FCV-71-39, RCIC PUMP INJECTION VALVE • 2-FCV-71-34, RCIC PUMP MIN FLOW VALVE • 2-FCV-71-25, RCIC LUBE OIL COOLING WTR VLV.
		6. **PLACE** 2-HS-71-31A, RCIC VACUUM PUMP, handswitch in START.
		7. **OPEN** 2-FCV-71-8, RCIC TURBINE STEAM SUPPLY VLV, to start RCIC Turbine.
		8. **CHECK** proper RCIC operation by observing the following: a. RCIC Turbine speed accelerates above 2100 rpm. b. RCIC flow to RPV stabilizes and is controlled automatically at 600 gpm. c. 2-FCV-71-40, RCIC Testable Check Vlv, opens by observing 2-ZI-71-40A, DISC POSITION, red light illuminated. d. 2-FCV-71-34, RCIC PUMP MIN FLOW VALVE, closes as flow rises above 120 gpm.
		9. IF BOTH of the following exist? - NO
		10. **ADJUST** 2-FIC-71-36A, RCIC SYSTEM FLOW/CONTROL, controller as necessary to control injection.

Simulator Event Guide:

Event 7 Major: ATWS without MSIVs

	ATC/BOP	Maintain Directed Level Band with HPCI, Appendix 5D
		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 5,000 gpm.
		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.
		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 5000 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 7 Major: ATWS without MSIVs

	SRO	EOI-1 (Power Control)
		Monitor and Control Reactor Power.
		Will the reactor will remain sub subcritical without boron under all conditions? - NO
		Is 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.
CS#1	SRO	Before Suppression Pool temperature rises to 110°F, continue:
CS#1		Boron injection is required.
CS#1	ATC/BOP	Initiate SLC, IAW Appendix 3A.
	SRO	Directs ARI Reset Appendix 2.
CS#1		Insert Control Rods Using **one or more** of the following methods: • Appendix 1F • Appendix 1D
Driver	Driver	**WHEN** directed to perform Appendix 1F and Appendix 2, wait 4 minutes and report appendix 2 complete and field action for appendix 1F complete. <Shift>F5 bat app01f **AND** <Shift>F6 bat app02
CS#1	ATC	Inserts Control Rods, IAW Appendix 1D and 1F.

Simulator Event Guide:

Event 7 Major: ATWS without MSIVs

CS#1	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 2-9-4, 2-XA-55-4A, Window 1) • EAST CRD DISCH VOL WTR LVL HIGH HALF SCRAM (Panel 2-9-4, 2-XA-55-4A, Window 29). 5. **DISPATCH** personnel to **VERIFY OPEN** 2-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.
Driver	Driver	**WHEN** dispatched to close Charging Water Shutoff, wait 2 minutes and report 2-SHV-085-0586 closed. (<Shift>F7 mrf rd06 close) **WHEN** asked to open Charging Water Shutoff, wait 2 minutes and report 2-SHV-085-0586 open. (<Shift>F4 mrf rd06 open).

Simulator Event Guide:

Event 7 Major: ATWS without MSIVs

<table>
<tr><td>CS#1</td><td>ATC</td><td>Insert Control Rods IAW Appendix 1D</td></tr>
<tr><td></td><td></td><td>Reports Trip of CRD 2A and Start CRD Pump 1B, IAW 2-AOI-85-3</td></tr>
<tr><td></td><td></td><td>[1] IF operating CRD pump has failed AND standby CRD pump is available, THEN PERFORM the following at Panel 2-9-5:

[1.1] PLACE CRD SYSTEM FLOW CONTROL, 2-FIC-85-11, in MAN at minimum setting.

[1.2] START associated standby CRD Pump using one of the following:
• CRD PUMP 1B, using 2-HS-85-2A.

[1.3] IF CRD Pump 1B was started, THEN OPEN CRD PUMP 1B DISCH TO U2, using 2-HS-85-8A

[1.4] ADJUST CRD SYSTEM FLOW CONTROL, 2-FIC-85-11, to establish the following conditions:
• CRD CLG WTR HDR DP, 2-PDI-85-18A, approximately 20 psid.
• CRD SYSTEM FLOW CONTROL, 2-FIC-85-11, between 40 and 65 gpm.

[1.5] BALANCE CRD SYSTEM FLOW CONTROL, 2-FIC-85-11, AND PLACE in AUTO or BALANCE.</td></tr>
<tr><td></td><td></td><td>1. VERIFY at least one CRD pump in service.

2. IF Reactor Scram or ARI CANNOT be reset, THEN DISPATCH personnel to CLOSE 2-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 2-SHV-085-0586, CHARGING WATER SHUTOFF (RB NE, El 565 ft).</td></tr>
<tr><td>Driver</td><td>Driver</td><td>WHEN dispatched to close Charging Water Shutoff, wait 2 minutes and report 2-SHV-085-0586 closed. (<Shift>F7 mrf rd06 close)
WHEN asked to open Charging Water Shutoff, wait 2 minutes and report 2-SHV-085-0586 open. (<Shift>F4 mrf rd06 open).</td></tr>
</table>

Simulator Event Guide:

Event 7 Major: ATWS without MSIVs

CS#1	BOP/ATC	Initiate SLC IAW Appendix 3A
		1. **UNLOCK** and **PLACE** 2-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 2-9-5 (2-XA-55-5B, Window 20). • 2-PI-63-7A, SLC PUMP DISCH PRESS, indicates above RPV pressure. • System flow, as indicated by 2-IL-63-11, SLC FLOW, red light illuminated on Panel 2-9-5. • SLC INJECTION FLOW TO REACTOR Annunciator in alarm on Panel 2-9-5 (2-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. • 2-FCV-69-1, RWCU INBD SUCT ISOLATION VALVE closed. • 2-FCV-69-2, RWCU OUTBD SUCT ISOLATION VALVE closed. • 2-FCV-69-12, RWCU RETURN ISOLATION VALVE closed. 5. **VERIFY** ADS inhibited. 6. **MONITOR** reactor power for downward trend. 7. **MONITOR** 2-LI-63-1A, SLC STORAGE TANK LEVEL, and **CHECK** that level is dropping approximately 1% per minute.

Simulator Event Guide:

Event 7 Major: ATWS without MSIVs

	SRO	**ENTER** 2-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	The Emergency Classification is 1.2-S.

Simulator Event Guide:

Event 7 Major: Loss of High Pressure Injection/ATWS

	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
	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
	SRO	The Emergency Classification is 1.2-S.

Simulator Event Guide:

Event 7 Major: Loss of High Pressure Injection/ATWS

	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** 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.
		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: • 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. d. **IF** Directed by SRO, **THEN PLACE** 2-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 2-FCV-74-53(67), RHR SYS I(II) LPCI INBD INJECT VALVE, is OPEN, THEN **VERIFY CLOSED** 2-FCV-74-52(66), RHR SYS I(II) LPCI OUTBD INJECT VALVE. g. **OPEN** 2-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** 2-FCV-74-59(73), RHR SYS I(II) SUPPR POOL CLG/TEST VLV, to maintain **EITHER** of the following as indicated on 2-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** 2-FCV-74-7(30), RHR SYSTEM I(II) MIN FLOW VALVE. k. **MONITOR** RHR Pump NPSH using Attachment 1.

Critical Tasks - Three

CS#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 per EOI-1 and C-5, US determines that SLC is required (indicated by verbal direction or EOI placekeeping) before exceeding 110° F 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 with EOI Appendixes.

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

CS#2 - During an ATWS, when conditions are met to deliberately lower RPV level, Terminate and Prevent injection into the RPV; from ECCS and Feedwater; until conditions are met to reestablish injection.

1. Safety Significance:
   Precludes loss of primary containment integrity and uncontrolled release of radioactivity into the environment.

2. Cues:
   Procedural compliance.

3. Measured by:
   Observation - With Emergency Depressurization not required and > 5% power, injection systems are terminated and prevented until:
   - < 5% power **or** < (-)162" with Suppression Pool Temp > 110° F
     OR
   - Level < (-) 50 inches with Suppression Pool Temp < 110° F

4. Feedback:
   Injection system flow rates into RPV
   Reactor Power lowering

Critical Tasks - Three

CS#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 "ADS LOGIC BUS A/B INHIBITED" annunciator status.

Scenario Tasks

EVENT	TASK NUMBER	K/A	RO	SRO
1	Remove an LPRM from Bypass			
	RO U-92B-NO-05	215005A4.04	3.2	3.2
2	Raise Power with Control Rods			
	RO U-085-NO-07 SRO S-000-AD-31	2.2.2	4.6	4.1
3	RPIS Position Failure			
	RO U-085-AL-14 SRO S-085-AB-04	214000A2.01	3.1	3.3
4	EECW Pump Trip			
	RO U-067-NO-12	400000A2.01	3.3	3.4
5	MSIV Partial Closure			
	RO U-001-AB-02 SRO S-001-AB-02	239001A2.03	4.0	4.2
6	Feedwater Flow Transmitter Failure			
	RO U-003-NO-12 SRO S-003-AB-01	259002A2.02	3.3	3.4
7	Vacuum Loss/ATWS			
	RO U-000-EM-17 SRO S-000-EM-06 SRO S-000-EM-18 SRO S-032-AB-02	295037EA2.06	4.0	4.1

SCENARIO REVIEW CHECKLIST

SCENARIO NUMBER: 2-F

6 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)

60 Run Time (minutes)

3 Crew Critical Tasks: (2-5)

YES Technical Specifications Exercised (Yes/No)

SHIFT TURNOVER SHEET

Equipment Out of Service/LCO's:

EECW Pump A3 is out of service and tagged out.

RFPT B Out of Service

Operations/Maintenance for the Shift:

Remove LPRM 8-49B from bypass IAW 2-OI-92B section 6.4.

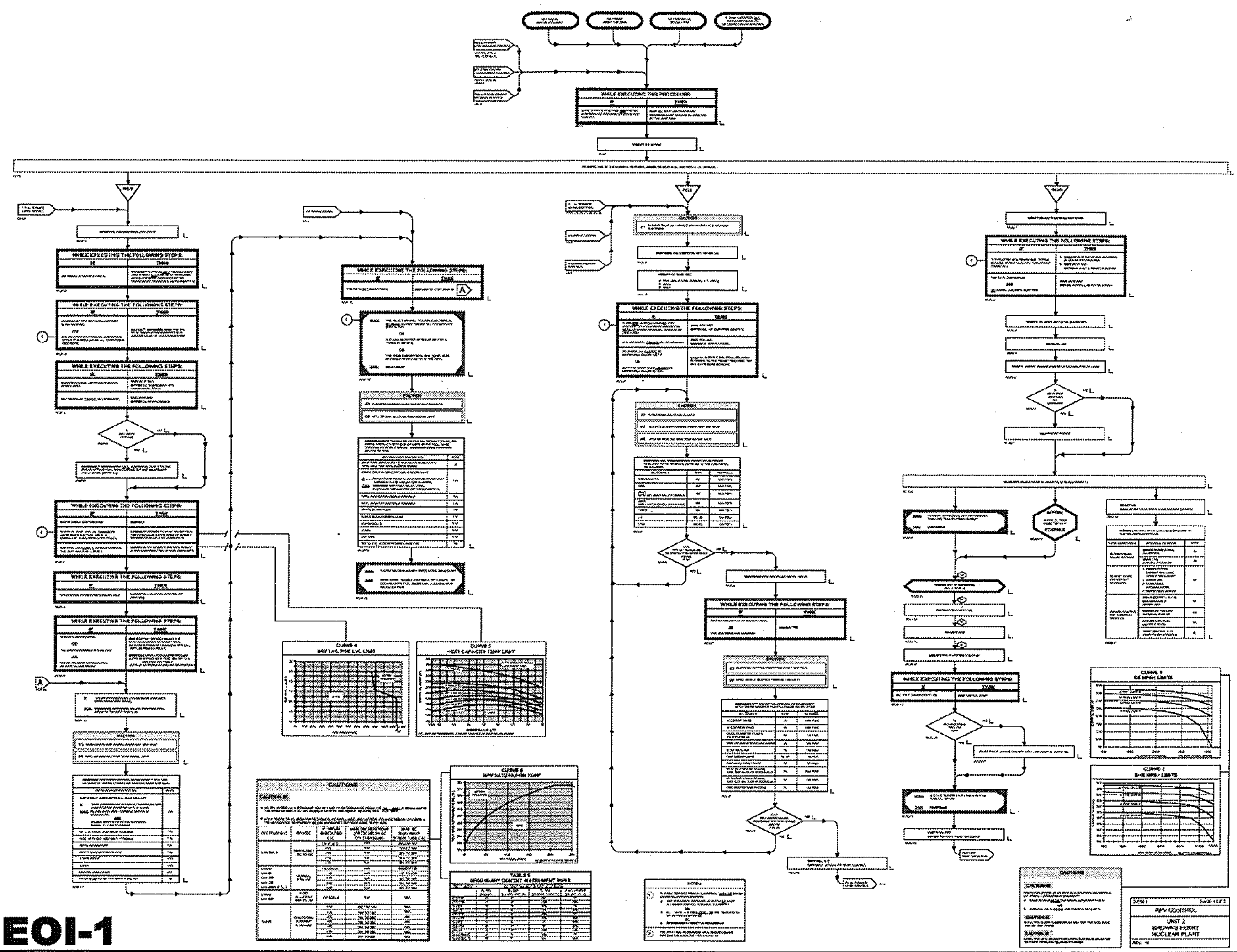
Once completed adjust load line IAW RCP and 2-GOI-100-12 section 5.0 step 20 and continue power ascension as directed by the RCP.

Units 1 and 3 are at 100% power.

Unusual Conditions/Problem Areas:

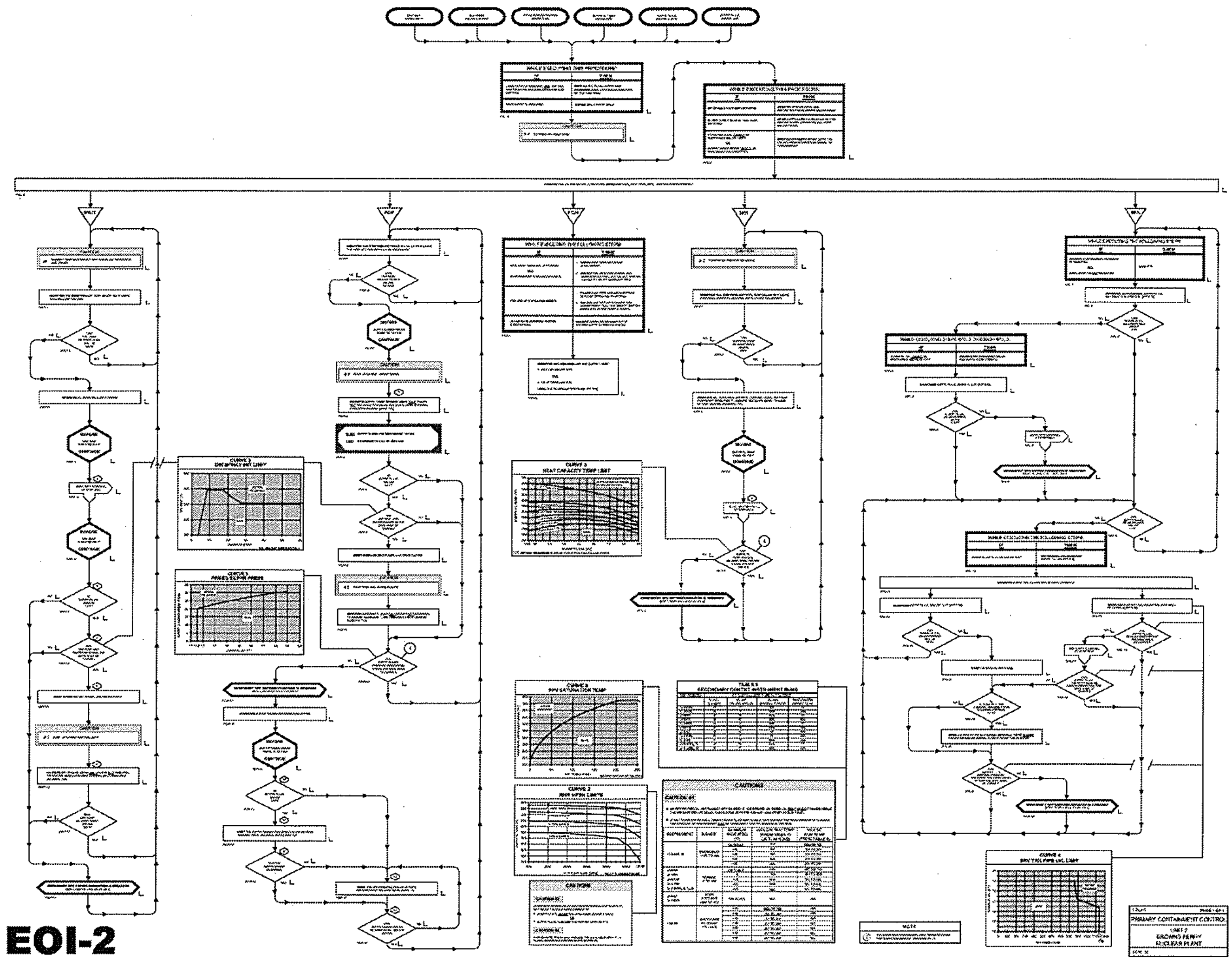
None

2-EOI-1 RPV CONTROL 2-EOI-1

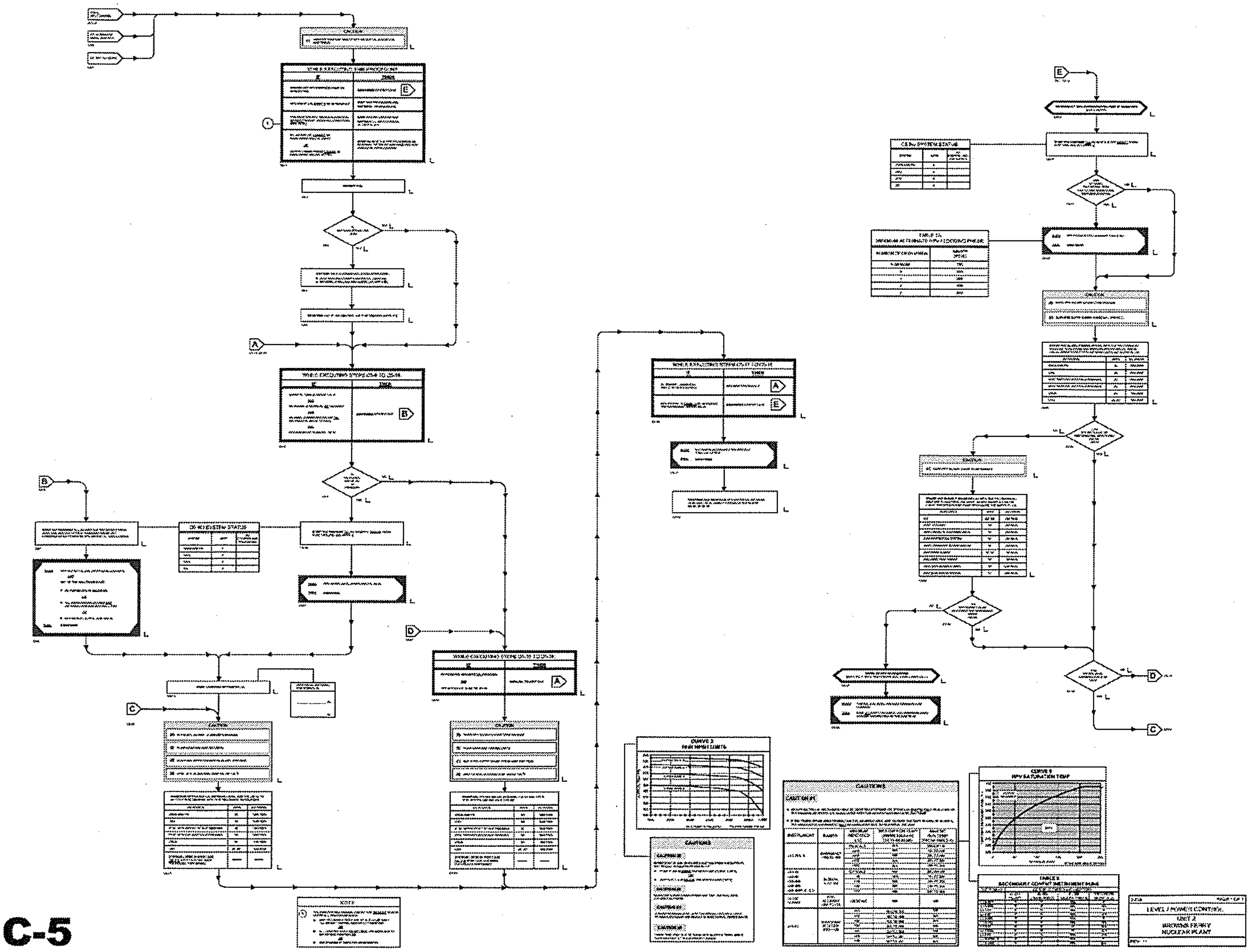


EOI-1

2-EOI-2 PRIMARY CONTAINMENT CONTROL 2-EOI-2



EOI-2


CAUTIONS
CURVE 9
RPV SATURATION TEMP
NOTE
LEVEL / POWER CONTROL
UNIT 2
BROWNS FERRY
NUCLEAR PLANT

C-5

TR 3.3 INSTRUMENTATION

TR 3.3.5 Surveillance Instrumentation

LCO 3.3.5 The surveillance instrumentation for each parameter in Table 3.3.5-1 shall be OPERABLE .

APPLICABILITY: According to Table 3.3.5-1

NOTE

TRM LCO 3.0.4 is not applicable.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required channels inoperable.	A.1 Enter the Condition referenced in Table 3.3.5-1 for the channel.	Immediately
B. As required by Required Action A.1 and referenced in Table 3.3.5-1.	B.1 Restore required control room indication channel to OPERABLE status.	7 days
C. As required by Required Action A.1 and referenced in Table 3.3.5-1.	C.1 Restore one of the required control room indication channels for each associated parameter to OPERABLE status. AND	7 days from discovery of both redundant channels for one or more associated parameters not indicating in the control room
	C.2 Restore required control room indication channels to OPERABLE status.	30 days

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. As required by Required Action A.1 and referenced in Table 3.3.5-1.	D.1 Monitor torus temperature to observe any unexplained temperature increase which might be indicative of an open relief valve.	Once per 12 hours
	<u>AND</u>	
	D.2 Restore control room indication by either the Tailpipe Thermocouple Temperature or Acoustic Monitor to OPERABLE status for each relief valve.	30 days
	<u>AND</u>	
	D.3 When inoperable for more than 30 days, initiate a Problem Evaluation Report (PER).	24 hours

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. As required by Required Action A.1 and referenced in Table 3.3.5-1.	---------------NOTE--------------- Required Actions E.1.1 and E.1.2 are not applicable when in MODES 4 and 5.	
	E.1.1 Restore required control room indication channel to OPERABLE status.	72 hours
	<u>OR</u>	
	E.1.2 Initiate the preplanned alternate method of monitoring the parameter.	72 hours
	<u>AND</u>	
	E.2 When inoperable for more than seven days, initiate a Problem Evaluation Report (PER).	24 hours

(continued)

ACTIONS

CONDITION		REQUIRED ACTION		COMPLETION TIME
F.	Required Action and associated Completion Time of Condition B or D not met. <u>OR</u> Required Action and associated Completion Time of Condition C not met for Instruments 3.a or 3.b.	F.1	Be in MODE 4.	24 hours
G.	Required Action and associated Completion Time of Condition C not met for Instruments 2.a, 2.b, 4.a, or 4.b.	G.1	Be in MODE 3.	12 hours
H.	Required Action and associated Completion Time of Condition C not met for Instrument 5 channels.	H.1	Reduce THERMAL POWER to $\leq$ 15% RTP.	12 hours

TABLE 3.3.5-1 (page 1 of 2)
Surveillance Instrumentation

PARAMETER AND INSTRUMENTS	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	TECHNICAL SURVEILLANCE REQUIREMENTS	TYPE INDICATION AND RANGE
1. Suppression Chamber Air Temperature (XR-64-52)	1,2,3	1	B	TSR 3.3.5.1 TSR 3.3.5.6	Recorder 0-400°F
2. Control Rod Motion					
a. Control Rod Position (a)	1,2	1(b)	C	TSR 3.3.5.2	Indicators 00-48
b. Neutron Monitoring (a)	1,2	1(c)	C	TSR 3.3.5.3 TSR 3.3.5.4 TSR 3.3.5.7 TSR 3.3.5.8 TSR 3.3.5.9	SRM Indicators $0.1\text{-}10^6$ cps IRM Indicators 0-125 LPRM Indicators 0-125
3. Drywell Pressure/ Temperature Alarm					
a. Drywell Pressure (PS-64-67B) (d)	1,2,3	1	C	TSR 3.3.5.14	Alarm at 35 psig
b. Drywell Temperature and Pressure and Timer (TS-64-52A and PIS-64-58A and IS-64-67A) (d)	1,2,3	1	C	TSR 3.3.5.10 TSR 3.3.5.13	Alarm if temp. > 281°F and pressure > 2.5 psig after 30 minute delay

(continued)

(a) The channel of Control Rod Position instruments and the channel of Neutron Monitoring instruments are considered redundant to each other for the parameter of Control Rod Motion.

(b) The Control Rod Position channel consists of full core display position indicators or four-rod display position indicators capable of determining position of all OPERABLE control rods. Position indicators are considered to be capable of determining rod position when they display the rod position or the rod can be moved to a position where rod position is displayed.

(c) The Neutron Monitoring channel contains the following:
1. In MODE 2 with IRMs on Range 2 or below a minimum of 3 OPERABLE channels of SRMs.
2. In MODE 2 a minimum of 6 OPERABLE channels of IRMs.
3. In MODES 1 and 2, 43 LPRM detector assemblies, each containing four fission chambers. Individual failed chambers can be bypassed to the extent that APRMs remain OPERABLE.

(d) The channel of Drywell Pressure and the channel of Drywell Temperature and Pressure and Timer instruments are considered redundant to each other for the parameter of Drywell Pressure/Temperature Alarm.

3.7 PLANT SYSTEMS

3.7.2 Emergency Equipment Cooling Water (EECW) System and Ultimate Heat Sink (UHS)

LCO 3.7.2 The EECW System with three pumps and UHS shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required EECW pump inoperable.	A.1 Restore the required EECW pump to OPERABLE status.	7 days
B. Required Action and associated Completion Time of Condition A not met. OR Two or more required EECW pumps inoperable. OR UHS inoperable.	B.1 Be in MODE 3. AND B.2 Be in MODE 4.	12 hours 36 hours

3.6 CONTAINMENT SYSTEMS

3.6.1.3 Primary Containment Isolation Valves (PCIVs)

LCO 3.6.1.3 Each PCIV, except reactor building-to-suppression chamber vacuum breakers, shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
When associated instrumentation is required to be OPERABLE per LCO 3.3.6.1, "Primary Containment Isolation Instrumentation."

ACTIONS

-----NOTES-----

1. Penetration flow paths except for 18 and 20 inch purge valve penetration flow paths may be unisolated intermittently under administrative controls.
2. Separate Condition entry is allowed for each penetration flow path.
3. Enter applicable Conditions and Required Actions for systems made inoperable by PCIVs.
4. Enter applicable Conditions and Required Actions of LCO 3.6.1.1, "Primary Containment," when PCIV leakage results in exceeding overall containment leakage rate acceptance criteria in MODES 1, 2, and 3.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. -----NOTE----- Only applicable to penetration flow paths with two PCIVs. ----- One or more penetration flow paths with one PCIV inoperable except due to MSIV leakage not within limits.	A.1	Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured.	4 hours except for main steam line AND 8 hours for main steam line
	AND		

(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. (continued)	A.2	------------NOTE------------ Isolation devices in high radiation areas may be verified by use of administrative means. ------------------------------------- Verify the affected penetration flow path is isolated.	Once per 31 days for isolation devices outside primary containment <u>AND</u> Prior to entering MODE 2 or 3 from MODE 4, if primary containment was de-inerted while in MODE 4, if not performed within the previous 92 days, for isolation devices inside primary containment

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. ------------NOTE------------ Only applicable to penetration flow paths with two PCIVs. -------------------------------- One or more penetration flow paths with two PCIVs inoperable except due to MSIV leakage not within limits.	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.	1 hour
C. ------------NOTE------------ Only applicable to penetration flow paths with only one PCIV. -------------------------------- One or more penetration flow paths with one PCIV inoperable.	C.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.	4 hours except for excess flow check valves (EFCVs) <u>AND</u> 12 hours for EFCVs
	<u>AND</u>		
	C.2	------------NOTE------------ Isolation devices in high radiation areas may be verified by use of administrative means. -------------------------------- Verify the affected penetration flow path is isolated.	Once per 31 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. One or more penetration flow paths with MSIV leakage not within limits.	D.1	Restore leakage rate to within limit.	4 hours
E. Required Action and associated Completion Time of Condition A, B, C, or D not met in MODE 1, 2, or 3.	E.1	Be in MODE 3.	12 hours
	<u>AND</u>		
	E.2	Be in MODE 4.	36 hours
F. Required Action and associated Completion Time of Condition A, B, C, or D not met for PCIV(s) required to be OPERABLE during MODE 4 or 5.	F.1	Initiate action to suspend operations with a potential for draining the reactor vessel (OPDRVs).	Immediately
	<u>OR</u>		
	F.2	-----NOTE----- Only applicable for inoperable RHR Shutdown Cooling Valves. ----- Initiate action to restore valve(s) to OPERABLE status.	Immediately

SCRAM FAILURE	REACTOR COOLANT ACTIVITY	
Description	Description	
	1.3-U Reactor coolant activity exceeds 26 µCi/gm dose equivalent I-131 (Technical Specification Limits) as determined by chemistry sample. OPERATING CONDITION ALL	UNUSUAL EVENT
1.2-A NOTE Failure of RPS automatic scram functions to bring the reactor subcritical AND Manual scram or ARI (automatic or manual) was successful. OPERATING CONDITION: Mode 1 or 2	1.3-A Reactor coolant activity exceeds 300 µCi/gm dose equivalent Iodine-131 as determined by chemistry sample. OPERATING CONDITION: Mode 1 or 2 or 3	ALERT
1.2-S NOTE Failure of automatic scram, manual scram, and ARI to bring the reactor subcritical. OPERATING CONDITION: Mode 1		SITE EMERGENCY
1.2-G CURVE US Failure of automatic scram, manual scram, and ARI. Reactor power is above 3% AND Either of the following conditions exists: • Suppression Pool temp exceeds HCTL. Refer to Curve 1.2-G. • Reactor water level can NOT be restored and maintained at or above -180 inches. OPERATING CONDITION: Mode 1 or 2		GENERAL EMERGENCY