Draft Submittal
(Pink Paper)

SIMULATOR SCENARIOS

BROWNS FERRY
2008-301

Browns Ferry Nuclear Plant Operations Training Group

HLT Class 0610 NRC Exam

Simulator Scenarios

Facility: BFN	Scenario Number: HLTS-3-1	Op-Test Number: HLT0610

Examiners:_____   Operators: _____

        _____   _____

        _____   _____

Initial Conditions:

Unit 3 has been operating for 192 days. Unit 2 has been operating for 56 days. Unit 1 has been operating for 274 days. 3ED Diesel Generator is tagged for water jacket leakage repair. Day 2 of the LCO. Expected to be returned to service this shift. Fuel leakers on U3 are currently at RFI 60,000. Thunderstorms are passing through the region, but no watches are in effect for the immediate area. The 3C RFP was oscillating approximating 30 RPM during last shift, but is now working properly and being monitored. The 3C RFP Pump is operating in automatic in order to collect data for the next 24 hours. A trouble shooting plan is being developed.

Turnover:

Support scheduled maintenance and testing activities. Alternate Stator Cooling Water Pumps per 3-OI-35A, Sect 6.4 per scheduled OPA.

Event Number	Malfunction Number	Event Type*	Event Description
1a	mrf an01b reset	N-ATC N-BOP N-SRO	The crew will alternate Stator Cooling Water Pumps using 3-OI-35A.
1b	N/A	TS-SRO	The US will respond to a HPCI Rupture Diaphragm pressure switch PS-73-20B failure.
2	imf fw05b 100 8:00	R-ATC C-BOP R-SRO	The crew will respond to a 3B HP FW heater isolation using 3-AOI-6-1. The crew will reduce power to ~91% using a recirc flow reduction. The crew will isolate feedwater to the 3B FW heater string. The crew will further reduce power to <79% using a recirc flow reduction.
3	imf sw10a	C-ATC C-SRO TS-SRO	The crew will respond to a trip of the 3A Fuel Pool Cooling pump using 3-AOI-78-1.
4	imf fw13b	C-ATC C-BOP C-SRO	The crew will respond to a trip of the 3B Reactor Feedwater Pump (RFP) using 3-AOI-3-1 and 3-OI-3.
5	bat rfpactrip	M All	The crew will respond to a total loss of feedwater and reactor scram.
6	bat HLTS3-1	M All	The crew will respond to a RCIC steam leak into secondary containment and a HPCI 120V AC power failure. The crew will anticipate Emergency Depressurization or perform Emergency Depressurization due to secondary containment high radiation.

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

SIMULATOR EXERCISE GUIDE

TITLE   :   SLOW LOSS OF HP FEEDWATER HEATING ON B STRING, 3A FPC PUMP TRIP, RFP TRIP, LOSS OF ALL FEEDWATER, UNISOLABLE RCIC STEAM LINE BREAK, 2 OR MORE AREA RAD LEVELS ABOVE MAX SAFE.

REVISION   :   0

DATE   :   January 19, 2008

PROGRAM   :   BFN Hot License Training

PREPARED BY: _____ \ 2/7/08
(Operations Instructor)   Date

REVIEWED BY: _____ \ 2/7/08
(Operations Training Manager or Designee)   Date

CONCURRED: _____ \ 2.7.08
(Operations Superintendent or Designee) (Required for Exam Scenarios only)   Date

VALIDATION
BY: _____ \ 2/7/08
(Operations SRO) (Required for Exam Scenarios only)   Date

NUCLEAR TRAINING REVISION/USAGE LOG				
REVISION NUMBER	DESCRIPTION OF CHANGES	DATE	PAGES AFFECTED	REVIEWED BY
0	Initial	01/19/2008	All	csf

I.   PROGRAM: BFN Licensed Operator Requalification Training

II.   COURSE: License Requalification Training (Simulator Exercise Guide)

III.   TITLE: SLOW LOSS OF HP FEEDWATER HEATING ON B STRING, FPC PUMP TRIP, RFP
                        TRIP, LOSS OF ALL FEEDWATER, UNISOLABLE RCIC STEAM LINE BREAK,
                        2 OR MORE AREA RAD LEVELS ABOVE MAX SAFE.

IV.   LENGHT OF LESSON: 1 ½ to 2 hours

V.   Training Objectives

        A.   Terminal Objectives

                1.   Perform routine shift turnover, plant assessment and routine shift operation in
                        accordance with BFN procedures.

                2.   Given uncertain or degrading conditions, the operating crew will use team skills
                        to conduct proper diagnostics and make conservative operational decisions to
                        remove equipment/unit from operation. (SOER 94-1)

                3.   Given abnormal conditions, the operating crew will place the unit in a stabilized condition
                        per normal, annunciator, abnormal, and emergency procedures.

                4.   Use step text procedural compliance.

        B.   Enabling Objectives

                1.   The operating crew will alternate stator coolant pumps as directed by 3-OI-35A
                        section 6.4.

                2.   The operating crew will recognize and respond to a high pressure heater string
                        isolation as directed by 3-ARP-9-6A and 3-AOI-6-1A.

                3.   The operating crew will recognize and respond to a spurious FPC system trip and
                        will place the 3B pump I/S in accordance with 3-ARP-94 win 1 and 3-AOI-78-1.

                4.   The operating crew will recognize and respond to a RFP Trip with 3-AOI-3-1.

                5.   The operating crew will recognize and respond to a loss of feedwater event and
                        Rx SCRAM.

                6.   The operating crew will recognize and respond to unisolable RCIC steam line break, 2 or
                        more area rad levels above max safe requiring Emergency Depressurization.

VI.   References: The procedures used in the simulator are controlled copies and are used in development and performance of simulator scenarios. Scenarios are validated prior to use, and any procedure differences will be corrected using the procedure revision level present in the simulator. Any procedure differences noted during presentation will be corrected in the same manner. As such, it is expected that the references listed in this section need only contain the reference material which is not available in the simulator.

    A. SOER 94-01

    B. SOER 96-01

VII.   Training Materials:

    A.   Calculator (If required)

    B.   Control Rod Insertion Sheet (If required)

    C.   Stopwatch (If required)

    D.   Hold Order / Caution tags (If required)

    E.   Annunciator window covers (If required)

    F.   Steam tables (If required)

VIII.   Console Operator Instructions

   A.   Scenario File Summary
      1.   File: bat HLTS3-1
                   MF/RF/IOR#   Description

         a)   ior zlofcv712[2] on   Fails 71-2 and 71-3 open
         b)   ior zlofcv713[2] on
         c)   ior zlohs712a[2] on
         d)   ior zlohs713a[2] on
         e)   ior ypovfcv712 fail_now
         f)   ior ypovfcv713 fail_now
         g)   imf rm10h (e1 :25) 30   HCU-East rad ≈ 30 mr/hr
         h)   imf rm10j (e1 :25) 25   HCU-West rad ≈ 25 mr/hr
         i)   imf rm10p (e1 2:00) 50   CS/RCIC area rad 50mr/hr
         j)   imf DG01D   D D/G Fails to Start
         k)   imf DG02D   D D/G Trip Protective Relay Operation
         l)   ior zlo3hS2113ed10a[1] OFF   1836 Green Light Off
         m)   mrf DG01D open   Opens logic breaker
         n)   imf rp08a   Auto scram failure
         o)   imf rp08b   Auto scram failure
         p)   imf rp14b   Bypass valve failure
         q)   ior zdihs47130b null   BPV jack null

      2.   File: bat HLTS3-1-1
                   MF/RF/IOR#   Description

         a)   mmf rm10p 1000 6:00   RCIC rad to max in 6 mins.
         b)   mmf rm10h 1000 13:00   HCU-West to Max in 13 mins.
         c)   mmf rm10j 1000 14:00   HCU- East to Max in 14 mins.
         d)   imf rc09 100 7:00   RCIC steam leak
         e)   imf ad01b 0   MSRV 1-19 fails closed
         f)   imf ad01f 0   MSRV 1-34 fails closed
         g)   lmf ad03b   MSRV 1-19 Stuck Closed
         h)   lmf ad03f   MSRV 1-34 Stuck Closed

      3.   File: bat HLTS3-1-2
                   MF/RF/IOR#   Description

         i)   imf fw08b 30   RFP 3B Discharge Check Valve Sticks
         j)   imf fw13b (none, :10)   3B RFPT trips on Thrust Brng Wear

IX.   Console Operator Instructions

B.   Console Operators Manipulations

ELAP TIME	PFK	DESCRIPTION/ACTION
Sim. Setup	rst 28	100% power MOC
Sim. Setup	restorepref HLTS3-1	Establishes Preference Keys
Sim. Setup	setup	Verify Preference Keys
Sim. Setup	esc	Clears Popup Window
Sim. Setup	F3	trg e1 MODESW Assigns trigger
Sim. Setup	F4	bat HLTS3-1 see file summary
Sim. Setup	manual	Tag D D/G with Hold notices

ROLE PLAY:

- **(After Stator coolant pumps alternated) As AUO, report 3-FIS-035-0065 reading 610 gpm.**
- **3-PI-035-0064 is reading 47 psig.**
- **3-HS-035-0040 selected for "A-RES" Stator Coolant pump on panel 25-114.**

When requested to reset local Stator Coolant panel alarm then:	F5	mrf an01b reset Allows resetting MCR alarm

ROLE PLAY: As an IM report that HPCI rupture diaphragm pressure switch PS-73-20B has failed low.

When directed from the Floor then:	F6	imf fw05b 100 8:00 'B' HP heater string isolation

ROLE PLAY: If sent to investigate which valve is open, wait 2 minutes and report 3-LCV-22B light is out (B2 high level dump)

ROLE PLAY: At ≈ 79% power, as the Reactor Engineer, recommend inserting the first group of Emergency Insert Control Rods.

If asked to reset local Cond Demin alarm	F7	mrf an01d reset allows reset of control room alarm
After conditions stabilized or as directed by Floor Instr.	F8	imf sw10a Trips 3A FPC pump

ROLE PLAY: (If asked) As AUO, report 3-78-506, 511, & crosstie 507 are open & 3-78-510 (B hx outlet) is closed

ROLE PLAY: (If asked) As RW UO, 3-FRC-78-24 is in manual & set to 0%

If asked to throttle 3-FCV-78-66	F9	ior zlohs7866a[2] on
If asked to close 3-FCV-78-66	F10	dor zlohs7866a[2]

ROLE PLAY: (If asked) As Rx Bldg AUO, report 3B pump discharge pressure is 140 psig (PI-78-16 on 9-25-16)

ROLE PLAY: **If sent to inspect breaker on 3A FPC pump, report bkr was found tripped and will not test**

After FPC restored and as directed by Floor Instr.	F11	bat HLTS3-1-2	Trips 3B RFP on thrust brng wear with check valve failure at 30%.

ROLE PLAY: **If sent to check 3B RFP report that there is no apparent cause but you will continue to check**

NOTE:	**Mark the time when RPV level reaches +2 inches to ensure Critical Task completion of inserting a manual scram within 60 seconds of reaching +2 inches.**

When directed by Lead Examiner	F12	imf fw13a	Trips 3A RFP on thrust brng wear
If doesn't start on low level	<shift>F1	imf rc02	Start of RCIC
After HPCI is in manual control and injecting up to -50" or directed by Lead Examiner then:	<shift>F2	imf hp07	HPCI 120V failure
After 10 minutes of RCIC operations or directed by Lead Examiner then:	<shift>F4	bat HLTS3-1-1	Max. Rad (2 areas in 13 mins.)

ROLE PLAY: **If directed to close RCIC valves 71-2 & 3 locally, respond that you are waiting on RadCon to enter the Reactor building.**

If decided to attempt to close valves locally:	mrf rc05k emer	71-2 to emerg
	mrf rc05s emer	71-3 to emerg
To return transfer switch to normal	mrf rc05k norm	71-2 to norm
	mrf rc05s norm	71-3 to norm

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

1.   All rods are fully inserted.
2.   Reactor water level is in the normal band.
3.   Emergency Depressurization has been completed.

X. Scenario Summary

With the unit operating at 100%, the crew will alternate Stator Cooling Water Pumps per 3-OI-35A. Then the operating crew will experience a slow loss of FW HTR level control on the B high pressure heater string. Once the heater is isolated and power reduced, a trip of 3A FPC pump will require the operator to start 3B FPC pump per 3-OI-78. When plant conditions are stable the 3B Reactor Feedwater Pump will trip, the crew will respond per 3-AOI-3-1. After conditions stabilize, The crew will experience a loss of the remaining RFPs which will require the crew to scram and utilize RCIC for level control. The reactor will NOT scram automatically. When RCIC is initiated it develops a steam leak which cannot be isolated forcing the crew to emergency depressurize based on 2 Area Rad Monitors above maximum safe. If HPCI is used for water level control the crew will experience a problem with the flow controller to respond in automatic. Eventually, HPCI will experience a failure of the 120V AC power supply and HPCI will no longer function.

X.   Information to Floor Instructors:

A.   Ensure recorders are inking and recording and ICS is active and updating.

B.   Assign Crew Positions based on the required rotation.

      1.   SRO: Unit Supervisor
      2.   ATC: Board Unit Operator
      3.   BOP: Desk Unit Operator

C.   Terminate the scenario when the following conditions are satisfied or at the direction of the Lead Examiner:

      1.   All rods fully inserted
      2.   Reactor Water level normal
      3.   Emergency Depressurize on 2 area RADS above max safe value

XI.   Simulator Event Guide

      Event 1a: **NORMAL OPERATIONS**

<u>TIME</u>	<u>POSITION</u>	<u>EXPECTED ACTIONS</u>
	ATC/BOP	Alternate Stator Cooling Pumps IAW 3-OI-35A, sect. 6.4.

      [1] START the Standby Stator Cooling Water Pump A(B) by placing GEN STATOR CLG WATER PUMP 3A(B), 3-HS-35-35A(36A) on Panel 3-9-8 to START.

      [2] STOP the Stator Cooling Water Pump B(A) by placing GEN STATOR CLG WATER PUMP 3B(A), 3-HS-35-36A(35A) on Panel 3-9-8 to STOP.

      [3] VERIFY the STATOR COOLING WATER GEN INLET FLOW, 3-FIS-035-0065, indicates Min. 595 to Max. 732 gpm on Panel 25-114.

      [4] VERIFY the STATOR COOLING WATER GEN INLET PRESS, 3-PI-035-0064, indicates 42 (22 psig and 20 psig head) to 52 psig on Panel 25-114.

      [5] VERIFY the pump control switch for the stator cooling water pump stopped in Step [2] above, (3A), is returned to AUTO on Panel 3-9-8.

      [6] SELECT STATOR COOLING WATER PUMPS SEL, 3-HS-035-0040 (A-RES-CO-B-RES) on Panel 25-114 to the non-operating pump.

| | ATC/BOP | Identify the improper lens configuration on Stator Cooling Water pumps and swap the lenses or informs the SRO. |

XI.   Simulator Event Guide

Event 1b: **HPCI PRESSURE SWITCH FAILURE**

TIME	**POSITION**	**EXPECTED ACTIONS**
	ATC/BOP	Responds to Report by IMs of HPCI rupture diaphragm pressure switch failure (3-PS-73-20B), by relaying information to SRO.
	SRO	**Consults Tech Spec 3.3.6.1 Function 3c and determines only three pressure switches are required.**
	SRO	Determines an INFORMATION ONLY LCO must be written for HPCI pressure switch 3-PS-73-20B.

XI.   Simulator Event Guide

Event 2:   **SLOW LOSS OF HP FEEDWATER HEATING ON "B" STRING**

<u>TIME</u>	<u>POSITION</u>	<u>EXPECTED ACTIONS</u>
	ATC/BOP	**Announces "BYPASS VALVE TO CONDENSER NOT CLOSED"** and refers to **3-ARP-9-6A, win 18.**
	ATC/BOP	**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. DISPATCH personnel to check which valve's light is extinguished on junction box 34-21, Col T-13 J-LINE, elevation 565'.
	SRO	**Direct an Upper Power Runback due to RFP speed above 5050 rpm.**
	ATC	**Initiates an Upper Power Runback of Recirc Pumps.**
	ATC/BOP	**Announces "HEATER B2 LEVEL HIGH"** and refers to **3-ARP-9-6A, win 9.**
_____		VERIFY Automatic action - Drain valve to condenser 3-LCV-6-22B opens. 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.

XI.   Simulator Event Guide

Event 2:   SLOW LOSS OF HP FEEDWATER HEATING ON "B" STRING

<u>**TIME**</u>   <u>**POSITION**</u>   <u>**EXPECTED ACTIONS**</u>

ATC/BOP   **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   **Announces B1 and B2 HP htr. Extraction isolation**

SRO   **DIRECTS Crew to enter 3-AOI-6-1A**

Contacts Reactor Engineer

XI.   Simulator Event Guide

Event 2:   SLOW LOSS OF HP FEEDWATER HEATING ON "B" STRING

TIME	POSITION	EXPECTED ACTIONS
	ATC/BOP	3-AOI-6-1A

Performs immediate actions;

REDUCE Core Thermal Power to ε 5% below initial power level to maintain thermal margin.

| | ATC/BOP | **Performs 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.

| | SRO | **Directs isolating FW to B HP heater string** |

Directs power reduction to < 79% power (Mid-power runback) per 3-OI-6, III 1 HEATERS OUT (Tube and Shell Side)** One HP string 920 MWe (79%)

Enters 3-GOI-100-12, Power Maneuvering

Notifies Rx Eng. And ODS of Feedwater Heater isolation and power reduction

XI.   Simulator Event Guide

   Event 2:   SLOW LOSS OF HP FEEDWATER HEATING ON "B" STRING

   <u>TIME</u>   <u>POSITION</u>   <u>EXPECTED ACTIONS</u>

              ATC/BOP   **Closes the following FW valves (Attachment 1)**

                            3-FCV-3-31, HP HTR 3B2 FW INLET ISOL VALVE

                            3-FCV-3-76, HP HTR 3B1 FW OUTLET ISOL VALVE

                            Performs a mid-power runback ~79%

              ATC/BOP   **[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). (Closes 3-FCV-6-95)**

                            [5] **VERIFY** automatic actions occur. **REFER TO** Attachment 1.

                            VERIFY automatic actions

                            The High Pressure Heater Extraction Isolation Valves and Moisture Separator Level
                            Control Isolation valves close.

                            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

XI.   Simulator Event Guide

Event 2:   **SLOW LOSS OF HP FEEDWATER HEATING ON "B" STRING**

<u>TIME</u>	<u>POSITION</u>	<u>EXPECTED ACTIONS</u>
	Crew	**[6] MONITOR TURB THRUST BEARING TEMPERATURE, 3-TR-47-23, for rises in metal temperature and possible active/passive plate reversal.**
		[7] DETERMINE cause which required heater isolation and PERFORM necessary corrective action. i.e. Recognizes HTR level lowers as a result of isolating the Condensate side of 3B HP HTR string (i.e. tube leak)
	SRO	**Direct ATC to insert the first group of control rods on the Emergency Shove Sheet per Reactor Engineer recommendation.**
	ATC	**Insert the first group of rods on the Emergency Shove Sheet using a peer check as directed by Rx Engineer & Unit Supervisor**

XI.   Simulator Event Guide

Event 3:   Trip of 3A FPC pump

TIME	POSITION	EXPECTED ACTIONS
	Crew	**Recognizes 3A FPC pump trip, responds per the ARP**
	ATC/BOP	**Resets MOTOR TRIPOUT 3-ARP-9-8C (W33)**
	ATC/BOP	Performs the following:

Responds to alarm FPC system abnormal 3-ARP-9-4C (W 1)

A. DISPATCH personnel to Panels 25-15 and 25-16 to determine the cause of the alarm.

H. **IF** Fuel Pool Cooling System failure has occurred, **THEN REFER TO 3-AOI-78-1.**

Enters 3-AOI-78-1 to start the standby FPC pump

Immediate Actions – None

Subsequent actions

4.2[3] **IF** fuel pool cooling system failure is from loss of cooling, **THEN:** (Otherwise N/A) **PERFORM** the following:

[3.1] **START idle FUEL POOL COOLING PUMP 3B(3A).**

XI.   Simulator Event Guide

Event 3:   Trip of 3A FPC pump

TIME	POSITION	EXPECTED ACTIONS

Coordinates with Rx Bldg AUO and Radwaste UO to start 3B FPC pump

Verifies discharge pressure >120 psig with AUO

Directs RW UO and Rx Bldg AUO to place demin in service

SRO/BOP   **Dispatch AUO/EMs to check breaker for 3A FPC pump**

SRO   **Directs restoration of system after cause is determined**

SRO   **Evaluate Tech. Spec. (TRM 3.9.2/3.9.3)**

SRO   **Determine TRM 3.9.2 Action (A) applies to maintain FP temperature below 150°F.**

XI.   Simulator Event Guide

     Event 4:   3B RFPT Trip

<u>TIME</u>	<u>POSITION</u>	<u>EXPECTED ACTIONS</u>
	ATC/BOP	**Announces "RFPT " Abnormal" alarm" and trip of RFPT 'B'.**
	ATC/BOP	Recognize that RFPT "B" speed still indicates ~4000 rpm after the trip.
	ATC/BOP	Recognize that RFPT "A" and "C" are running at the upper speed limiter.
	ATC/BOP SRO	**Diagnose the possibility that the discharge check valve on RFPT "B" has not closed.**

XI.   Simulator Event Guide

Event 4:   3B RFPT Trip

TIME	POSITION	EXPECTED ACTIONS

ATC/BOP   **Refers to ARP 9-6C and take required action**

A. **VERIFY** reactor power is within the capacity of operating RFPs.

B. CHECK core limits.

C. **WHEN** RFPT coasts down to zero speed, unless RFPT is rolling on minimum flow, **THEN VERIFY** turning gear motor starts and engages.

D. REFER TO 3-AOI-3-1 or 3-OI-3, Section 8.1.

XI.   Simulator Event Guide

         Event 4:   3B RFPT Trip

   TIME   POSITION   EXPECTED ACTIONS

               ATC/BOP   Enters 3-AOI-3-1

               [1] **VERIFY** applicable automatic actions.

                  C. Recirc Pumps receive run back signal to 75% speed at 27" (normal range) if the discharge flow of a RFP is less than 889,000 lb/hr 19% (rated flow).

               [2] IF level OR Feedwater flow is lowering due to loss of Condensate, Condensate Booster, or Feedwater Pump(s), THEN REDUCE Recirc flow as required to avoid scram on low level.

XI.   Simulator Event Guide

        Event 4:   3B RFPT Trip

<u>TIME</u>	<u>POSITION</u>	<u>EXPECTED ACTIONS</u>

[9] IF RFPs are in automatic control, THEN
VERIFY 3-LIC-46-5 raises flow of operating RFPs.

**[12] IF a RFPT has tripped and is NOT required to maintain level, THEN
SECURE tripped RFPT. REFER TO 3-OI-3.**

**[14] IF unit remains on-line, THEN
RETURN Reactor water level to normal operating level of 33" (normal
range).**

SRO   **Dispatches AUO to RFP to determine cause of trip**

ATC/BOP   Verifies that unit stable

             Verifies Rx Thermal limits

SRO   **Contacts maintenance to check reason for RFPT trip**

NOTE: LEAD EXAMINER notify Console Instructor when ready to trip the next RFP (i.e. next event)

XI.   Simulator Event Guide

   Event 5:   3A and 3C RFP Trip

TIME	POSITION	EXPECTED ACTION
	ATC/BOP	**Recognizes 3A RFP trip and need for reactor scram**
	ATC/BOP	**Recognize Auto scram failure (If not manually scrammed prior)** <mark>(Critical Task)</mark>
	SRO	**Directs Reactor scram** <mark>(Critical Task)</mark>
	ATC	<mark>**Manually scrams the reactor and performs 3-AOI-100-1 actions**</mark>
		-mode switch in S/D
		-checks power lowering
		-reports all rods in
		-recognizes trip of 3C RFP and informs SRO all RFP's are tripped
	BOP	Trip Turbine / verify isolations
	SRO	<mark>**Enters 3-EOI-1 on low reactor water level**</mark>
		Directs level be controlled by:
		-RCIC
		-CRD
		-HPCI
		-Enter AOI-100-1

XI.   Simulator Event Guide

Event 5:   3A and 3C RFP Trip

<u>TIME</u>   <u>POSITION</u>   <u>EXPECTED ACTION</u>

         ATC/BOP   **Utilizes RCIC for reactor water level control**

         -RCIC (App 5C)

         1. IF ..... BOTH of the following exist:

         RPV Pressure is at or below 50 psig, AND

         Bypass of RCIC low RPV pressure isolation interlocks is necessary, THEN ...
         EXECUTE EOI Appendix 16A concurrently with this procedure.

         2. IF ..... BOTH of the following exist:

         High temperature exists in the RCIC area, AND

         SRO directs bypass of RCIC High temperature Isolation interlocks, THEN ...
         PERFORM the following:

         a. EXECUTE EOI Appendix 16K concurrently with this procedure.

         b. RESET auto isolation logic using RCIC AUTO-ISOL LOGIC A(B) RESET
         3-XS-71-51A(B) pushbuttons.

XI.   Simulator Event Guide

Event 5:   3A and 3C RFP Trip

TIME	POSITION	EXPECTED ACTION

BOP   3. VERIFY RESET and OPEN 3-FCV-71-9, RCIC TURB TRIP/THROT VALVE RESET.

4. VERIFY 3-FIC-71-36A, RCIC SYSTEM FLOW/CONTROL, controller in AUTO with setpoint at 600 gpm.

5. OPEN the following valves:

3-FCV-71-39, RCIC PUMP INJECTION VALVE

3-FCV-71-34, RCIC PUMP MIN FLOW VALVE

3-FCV-71-25, RCIC LUBE OIL COOLING WTR VLV.

6. PLACE 3-HS-71-31A, RCIC VACUUM PUMP, handswitch in START.

7. OPEN 3-FCV-71-8, RCIC TURBINE STEAM SUPPLY VLV, to start RCIC Turbine.

XI.   Simulator Event Guide

Event 5:   3A and 3C RFP Trip

<u>TIME</u>   <u>POSITION</u>   <u>EXPECTED ACTION</u>

8. CHECK proper RCIC operation by observing the following:

a. RCIC Turbine speed accelerates above 2100 rpm.

b. RCIC flow to RPV stabilizes and is controlled automatically at 600 gpm.

c. 3-FCV-71-40, RCIC Testable Check Vlv, opens by observing 3-ZI-71-40A, DISC POSITION, red light illuminated.

d. 3-FCV-71-34, RCIC PUMP MIN FLOW VALVE, closes as flow rises above 120 gpm.

SRO   **Enters 3-EOI-3 on Rx Bldg Hi Rad**

XI.   Simulator Event Guide

        Event 6:   RCIC STEAM LEAK/LOSS OF HPCI

TIME	POSITION	EXPECTED ACTIONS
	ATC/BOP	**If HPCI is used, recognizes auto control failure and places HPCI controller in manual**
	ATC/BOP	**Recognizes and reports high area temperature for RCIC room**
		Recognizes RCIC failure to isolate and attempts to manually isolate it
	SRO	**Directs RCIC be isolated locally**
	Crew	**Monitors area radiation levels**
	SRO	**Determines has two area radiation levels above max safe IAW 3-EOI-3 and directs emergency depressurization by opening 6 ADS valves (C2) (Critical Task)**

EXAMINER NOTE: Of the 6 ADS valves, 2 will fail to open and the candidate will have to open additional valves (any two) until six are open.

	ATC/BOP	**Opens 6 ADS valves and recognizes 2 valves failed to open and opens 2 additional valves (Critical Task)**
		Verifies RFP discharge valves closed before uncontrolled injection on lowering Rx pressure

XI.   Simulator Event Guide

Event 6:   RCIC STEAM LEAK/LOSS OF HPCI

TIME	POSITION	EXPECTED ACTIONS

SRO   **Directs RPV level be maintained between +2" and +51"
with one or more of the following: (After emergency depressurization.)**
(Critical Task)

-LPCI

-Core Spray

-Condensate

ATC/BOP   After emergency depressurization maintains RPV water level TAF and
restores level +2" to +51" with one or more of the following:
(Critical Task)

-LPCI

-Core Spray

-Condensate

App 6A 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.

XI.   Simulator Event Guide

        Event 6:   RCIC STEAM LEAK/LOSS OF HPCI

TIME   **POSITION**   **EXPECTED ACTIONS**

                ATC/BOP   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.

XI.   Simulator Event Guide

        Event 6:   RCIC STEAM LEAK/LOSS OF HPCI

TIME	POSITION	EXPECTED ACTIONS
	ATC/BOP	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.

XI.   Simulator Event Guide

    Event 6:   RCIC STEAM LEAK/LOSS OF HPCI

    TIME   POSITION   EXPECTED ACTIONS

        ATC/BOP   App 6D Core Spray Sys I (Loop II similar)

                1. VERIFY OPEN the following valves:

                3-FCV-75-2, CORE SPRAY PUMP 3A SUPPR POOL SUCT VLV

                3-FCV-75-11, CORE SPRAY PUMP 3C SUPPR POOL SUCT VLV

                3-FCV-75-23, CORE SPRAY SYS I OUTBD INJECT VALVE.

                2. VERIFY CLOSED 3-FCV-75-22, CORE SPRAY SYS I TEST VALVE.

                3. VERIFY CS Pump 3A and/or 3C RUNNING.

                4. WHEN ... RPV pressure is below 450 psig, THEN ... THROTTLE 3-FCV-75-25, CORE SPRAY SYS I INBD INJECT VALVE, as necessary to control injection at or below 4000 gpm per pump.

                5. MONITOR Core Spray Pump NPSH using Attachment 1.

XI.   Simulator Event Guide

Event 6:   RCIC STEAM LEAK/LOSS OF HPCI

TIME   POSITION   EXPECTED ACTIONS

ATC/BOP   **App 6B RHR Sys I (Loop II similar)**

1. IF ..... Adequate core cooling is assured AND It becomes necessary to bypass LPCI Injection Valve Timers to control injection, THEN ... EXECUTE EOI Appendix 16F concurrently with this procedure.

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

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

4. VERIFY CLOSED the following valves:

3-FCV-74-61, RHR SYS I DW SPRAY INBD VLV

3-FCV-74-60, RHR SYS I DW SPRAY OUTBD VLV

3-FCV-74-57, RHR SYS I SUPPR CHBR/POOL ISOL VLV

3-FCV-74-58, RHR SYS I SUPPR CHBR SPRAY VALVE

3-FCV-74-59, RHR SYS I SUPPR POOL CLG/TEST VLV.

5. VERIFY RHR Pump 3A and/or 3C running.

6. WHEN ... RPV pressure is below 450 psig, THEN ... VERIFY OPEN 3-FCV-74-53, RHR SYS I LPCI INBD INJECT VALVE.

7. IF ..... RPV pressure is below 230 psig, THEN ... VERIFY CLOSED 3-FCV-68-79, RECIRC PUMP 3B DISCHARGE VALVE.

XI.   Simulator Event Guide

   Event 6:   RCIC STEAM LEAK/LOSS OF HPCI

TIME	POSITION	EXPECTED ACTIONS
	ATC/BOP	**8. THROTTLE 3-FCV-74-52, RHR SYS I LPCI OUTBD INJECT VALVE, as necessary to control injection.**

9. MONITOR RHR Pump NPSH using Attachment 1.

10. PLACE RHRSW pumps in service as soon as possible on ANY RHR Heat Exchangers discharging to the RPV.

11. THROTTLE the following in-service RHRSW outlet valves to maintain flow between 1350 and 4500 gpm:

3-FCV-23-34, RHR HX 3A RHRSW OUTLET VLV

3-FCV-23-40, RHR HX 3C RHRSW OUTLET VLV.

12. NOTIFY Chemistry that RHRSW is aligned to in-service RHR heat exchangers.

XI.   Simulator Event Guide

    Event 6:   RCIC STEAM LEAK/LOSS OF HPCI

TIME	POSITION	EXPECTED ACTIONS
	SRO	After **3-EOI-2 entered on high SP water level or temperature**
		directs the following:
		- H$_2$O$_2$ analyzers placed in service
	ATC/BOP	**Places H$_2$O$_2$ analyzers in service**
	SRO	**Directs all available Suppression Pool cooling be placed into service due to Suppression Pool water temperature**
	ATC/BOP	**App 17A**
		1. IF ..... Adequate core cooling is assured, THEN ... BYPASS LPCI Injection Valve Timers as necessary using EOI Appendices 16F and 16G.
		Calls for App 16F&G
		2. PLACE RHR SYSTEM I(II) in Suppression Pool Cooling as follows:
		a. VERIFY at least one RHRSW pump supplying each EECW header.

XI.   Simulator Event Guide

      Event 6:   RCIC STEAM LEAK/LOSS OF HPCI

<u>TIME</u>   <u>POSITION</u>   <u>EXPECTED ACTIONS</u>

_____   ATC/BOP   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 the following keylock switches in MANUAL OVERRIDE:

                        3-XS-74-122, RHR SYS I LPCI 2/3 CORE HEIGHT OVRD.

                        3-XS-74-130, RHR SYS II LPCI 2/3 CORE HEIGHT OVRD.

                        e. IF ..... LPCI INITIATION Signal exists, THEN ... MOMENTARILY PLACE the following in select:

                        3-XS-74-121, RHR SYS I CTMT SPRAY/CLG VLV SELECT.

                        3-XS-74-129, RHR SYS II CTMT SPRAY/CLG VLV SELECT.

XI.   Simulator Event Guide

Event 6:   RCIC STEAM LEAK/LOSS OF HPCI

<u>TIME</u>   <u>POSITION</u>   <u>EXPECTED ACTIONS</u>

ATC/BOP   f. IF ..... 3-FCV-74-53(67), RHR SYS I(II) LPCI INBD INJECT VALVE, is
OPEN, THEN ... VERIFY CLOSED 3-FCV-74-52(66), RHR SYS I(II) LPCI
OUTBD INJECT VALVE.

g. OPEN 3-FCV-74-57(71), RHR SYS I(II) SUPPR CHBR/POOL ISOL VLV.

h. VERIFY desired RHR pump(s) for Suppression Pool Cooling are operating.

**i. THROTTLE 3-FCV-74-59(73), RHR SYS I(II) SUPPR POOL CLG/TEST
VLV, to maintain EITHER of the following as indicated on 3-FI-74-50(64),
RHR SYS I(II) FLOW:**

**Between 7,000 and 10,000 gpm for one-pump
operation. OR**

At or below 13,000 gpm for two-pump operation.

XI.   Simulator Event Guide

        Event 6:   RCIC STEAM LEAK/LOSS OF HPCI

    TIME   POSITION   EXPECTED ACTIONS

                ATC/BOP   j. VERIFY CLOSED 3-FCV-74-7(30), RHR SYSTEM I(II) MIN FLOW VALVE
                                (VERIFY CLOSED 3-BKR-074-0007(0030) on 480V RMOV Board 3D(3E),
                                Compartment 4E(4E), if required).

                                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.**

Terminate scenario when emergency depressurization has occurred and Rx water level is under control.

XII.   Crew Critical Tasks (If an evaluated scenario)

<u>Task</u>   <u>SAT/UNSAT</u>

1.   **Maintains reactor water level above TAF**   _____

2.   **Emergency depressurize based on 2 areas radiation
       above maximum safe with a primary system
       discharging to secondary containment (within 5
       minutes)**   _____

3.   **Recognize auto scram failure within one minute. (If
       not manually scrammed)**   _____

XIII.   Scenario Verification Data

EVENT	TASK#	K/A	RO	SRO	CONTROL MANIPULATION
1. Loss of HP Feedwater Heating		295014	3.7	3.9	B17
	U-068-NO-10				
	U-006-AB-01				
	S-006-AB-01				
	T-000-AD-17				
2. 3A FPC pump trip					
3. RFPs Trip		295001A2.01	3.7	3.7	B3
	U-003-AB-01				
	S-003-AB-01				
	U-003-NO-08	295001A4.02	3.9	3.7	
		295009G12	3.8	4.4	
	T-000-AD-17				
4. HPCI Pressure Switch Failure	U-073-AL-19	206000A2.09	3.5	3.7	B5
	S-000-AD-27	2.1.12	2.9	4.0	
5. RCIC Leak/MSL Leak	U-000-EM-10	295033	3.6	3.9	A7,B14,A12,
	U-000-EM-11				B15,I4,I20
	S-000-EM-10	295032	3.5	3.6	
	S-000-EM-12				
	U-000-EM-01		3.8	4.4	
	U-000-EM-02				
	U-000-EM-03		3.6	4.2	
	S-000-EM-01		3.5	4.1	
	S-000-EM-02		3.9	4.5	
	S-000-EM-03		3.9	4.5	
	U-000-EM-14	2.4.38	2.2	4.0	
	S-000-EM-15	295026	3.6	3.8	
	S-000-EM-24				
	T-000-AD-04				
	T-000-EM-09				
	T-000-EM-11				
	T-000-EM-16				

SCENARIO REVIEW CHECKLIST

SCENARIO NUMBER <u>HLTS 3-1</u>

<u>5</u>   Total Malfunctions Inserted; List: (4-8)
1) High Pressure Heater Isolation
2) 3A FPC pump trip
3) RFPT trip
4) RCIC steam leak
5) RCIC failure to isolate (auto or manual)
6) HPCI 120V Failure
7) RPS Auto Scram Failure
8) BPV Failure
9) ARI Automatic Failure

<u>3</u>   Malfunctions That Occur After EOI Entry; List: (1-4)
1) RCIC steam leak
2) RCIC isolation failure (auto or manual)
3) Two ADS valve failures

<u>3</u>   Abnormal Events; List (1-3)
1) HP Heater Isol. (ARPs)
2) 3A FPC pump trip. (AOI & ARP)
3) RFPTs trip (ARP, AOI)

<u>1</u>   Major Transients; List: (1-2)
1) RCIC Steam Line Break

<u>3</u>   EOIs used; List: (1-3)
1)   EOI-1
2)   EOI-2
3)   EOI-3

<u>1</u>   EOI Contingencies Used; List: (0-3)
1)   C2

<u>90</u>   Run Time (minutes)

<u>29</u>   EOI Run Time (minutes); <u>30</u> % of Scenario EOI Run Time

<u>3</u>   Crew Critical Tasks

<u>yes</u> Technical Specifications Exercised (yes/no)

XIV.   SHIFT TURNOVER INFORMATION

Equipment out of service/LCOs: Unit 3 has been operating for 193 days, Unit 2 has been operating

for 56 days. Unit 1 has been operating for 290 days.

3ED Diesel Generator is tagged for water jacket leakage repair. Day 2 of LCO, will be returned to service

this shift.

_____

_____

_____

Operation/Maintenance for the Shift: Support scheduled maintenance and testing activities

 Alternate Stator Cooling Water Pumps per 3-OI-35A, Sect 6.4 for scheduled maintenance on 3A Stator

Cooling Water Pump. HPCI SR in progress for rupture disk pressure switches by IM's.

_____

_____

Unusual Conditions/Problem Areas:____ Fuel leakers on U3 are currently @ RFI 60,000.

Storms passing through the region, No Watches in effect for the immediate area.

3C RFP was oscillating approximately 30 RPM during the last shift, but currently working properly and

being monitored. 3C RFP is operating in automatic to collect data for next 24 hours. A trouble shooting

plan is being developed.

Facility: BFN	Scenario Number: HLTS-3-2	Op-Test Number: HLT0610

Examiners:_____   Operators: _____

_____   _____

_____   _____

Initial Conditions:

Unit 3 is at 79% power. 3C RHR Pump is out of service. T.S 3.5.1.A.1, 3.6.2.3, 3.6.2.4, 3.6.2.5 have been entered. Unit 3 is 6 hours into a seven day LCO. Appendix R LCO addressed and in LCO tracking. Loop II of RHR has been vented within the hour in preparation for placing Torus cooling in service. Valve 3-FCV-73-36 seal-in circuit has been disabled per step 7.6 of 3-SR-3.5.1.7

Turnover:

Continue with 3-SR-3.5.1.7 which is in progress and is complete up to Step 7.11 (HPCI Main and Booster Pump Set Developed Head and Flow Rate Test at Rated Reactor Pressure).
Alternate EHC Pumps per section 6.3 of 3-OI-47A. Increase reactor power to 85% using Recirc flow (3-GOI-100-12, step 5.132) with no pre-conditioning limitations. Reactor Engineering will evaluate further power changes.

Event Number	Malfunction Number	Event Type*	Event Description
1	N/A	N-BOP N-SRO	The crew will alternate EHC pumps using 3-OI-47A.
2	N/A	R-ATC R-SRO	The crew will continue with power ascension using 3-GOI-12 and 3-OI-68.
3	imf hp08	C-BOP C-SRO TS-SRO	The crew will recognize and respond to a HPCI steam line break. HPCI will fail to auto isolate and must be manually isolated. The SRO will enter and execute EOI-3.
4	imf ad01g 40	C-ATC C-SRO TS-SRO	The crew will recognize and respond to a stuck open SRV using 3-AOI-1-1.
5.	bat RRPAVIB imf cr02a 75 3:00	M All	The crew will recognize and respond to a recirc pump high vibration, dual seal failure, trip, core power oscillations and scram. The crew will carry out actions using EOI-1 & 2 and 3-AOI-100-1.
6	imf th22 100 1:30	M All	The crew will recognize and respond to a MSIV Closure and LOCA using EOI-1 & 2. The crew will monitor and control primary containment until reactor water level approaches TAF. The crew will transition to EOI C-1 and perform Emergency Depressurization to enable level restoration using low pressure systems.

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

SIMULATOR EVALUATION GUIDE
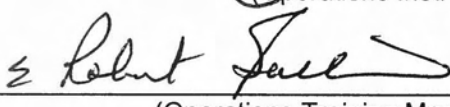
TITLE   :   HPCI STEAMLINE BREAK, SRV FAILURE, RECIRC PUMP TRIP, DRYWELL LEAK , EMERGENCY DEPRESSURIZATION ON LEVEL (C1)
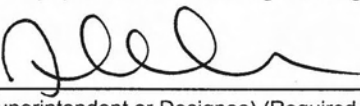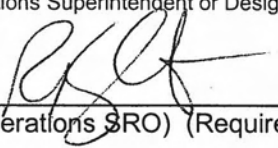
REVISION   :   0

DATE   :   January 19, 2008

PROGRAM   :   BFN Operator Training - Hot License

PREPARED BY: _____ \ _2/7/08_
                         (Operations Instructor)   Date

REVIEWED BY: _____ \ _2/7/08_
               (Operations Training Manager or Designee)   Date

CONCURRED: _____ \ _2.7.07_
   (Operations Superintendent or Designee) (Required for Exam Scenarios only)   Date

VALIDATION BY: _____ \ _2/7/08_
         (Operations SRO) (Required for Exam Scenarios only)   Date

Requires copy of 3-SR-3.5.1.7 (current rev.) completed up to step 7.11 to be provided to crew at turnover

	NUCLEAR TRAINING			
	REVISION/USAGE LOG			
REVISION NUMBER	DESCRIPTION OF REVISION	DATE	PAGES AFFECTED	REVIEWED BY
0	INITIAL	1/19/08	All	csf

I.   Program: BFN Operator Training

II.   Course: Hot License Training

III.   Title: HPCI STEAMLINE BREAK, SRV FAILURE, RECIRC PUMP TRIP, DRYWELL
                        LEAK , EMERGENCY DEPRESSURIZATION ON LEVEL (C1)

IV.   Length of Scenario: ≈1 to 1 ½ hours

V.   Examination Objectives:

A.   Terminal Objective

1.   Perform routine shift turnover, plant assessment and routine shift operation in accordance
      with BFN procedures.

2.   Given abnormal conditions, the operating crew will place the unit in a stabilized condition
      per normal, abnormal, annunciator and emergency procedures.

B.   Enabling Objectives:

1.   The operating crew will alternate EHC pumps.

2.   The operating crew will continue power ascension from ≈ 79% power.

3.   The operating crew will experience a HPCI steam line break during performance of 3-SR-
      3.5.1.7 , HPCI Flow Rate, with a failure of HPCI to auto isolate.

4.   The operating crew will recognize and respond to a safety-relief valve failed open.

5.   The operating crew will recognize and respond to a high vibration and trip of 3A Recirc
      pump.

6.   The operating crew will recognize and respond to reactor power oscillations by scramming
      the reactor.

7.   The operating crew will recognize and respond to a high drywell pressure condition.

8.   The operating crew will Emergency De-pressurize when in C1 before reactor water level
      reaches -180".

VI.   References: The procedures used in the simulator are controlled copies and are used in development and performance of simulator scenarios. Scenarios are validated prior to use, and any procedure differences will be corrected using the procedure revision level present in the simulator. Any procedure differences noted during presentation will be corrected in the same manner. As such, it is expected that the references listed in this section need only contain the reference material which is not available in the simulator.

VII.   Training Materials:

    A.   Calculator

    B.   Control Rod Insertion Sheet

    C.   Stopwatch

    D.   Hold Order/Caution tags

    E.   Annunciator window covers

    F.   Steam tables

VIII.   Console Operators Instructions

A.   Scenario File Summary

1.   File: bat HLTS3-2

MF/RF/1OR#	Description
a) trg e1 MODESW	Sets trigger
b) trg e2 adssrv1-22	Sets trigger
c) ior zlohs7416a[1] off	Tag Out 3C RHR
d) imf rh01c	3C RHR Pump trip
e) ior ypobkrpmpcrh fail_power	Control power for RHR 3C breaker
f) mrf hw01 fast	Advances all charts
g) imf th33b (e1 0) 1 2:00	B MSL break in DW
h) imf th21 (e1 5:00) 0.5 10:00	Recirc. line break
i) imf rd01a (e1 10:00)	3A CRDP trip
j) imf rd01b	3B CRDP trip
k) imf hp09	Failure of HPCI to auto isolate
l) ior zdihs718a close	Fails RCIC
m) ior ypovfcv718 fail_power	Keeps the 71-8 valve closed
n) imf rp11 (e1 1:00)	MSIV logic fuse failure

2.   File: bat RRPAVIB

MF/RF/1OR#	Description
1) imf th12a	Inserts Vibration Alarm
2) imf th10a (none 1:)	Fails Recirc Pump A Inboard Seal
3) imf th11a (none 2:)	Fails Recirc Pump A Outboard Seal)
4) ior zdihs681 open	Prevents Recirc Pump A Suction Valve Closure

B. Console Operators Manipulations

ELAP. TIME	PFK#	DESCRIPTION/ACTION
Simulator setup	rst 28	≈ 78 %Power MOC, **use mid-power runback push button**
Simulator setup	restorepref HLTS3-2	Establishes Function Keys
Simulator setup	setup	Verify Function Keys
Simulator setup	esc	Clears Function Key Popup
Simulator setup	F3	bat HLTS3-2 See Scenario File Summary
Simulator setup	manual	Place suppression pool cooling in service (Loop II)
Simulator setup	manual	Place HO tags on '3C' RHR pump
Simulator setup	manual	Place TESTING/MAINT frames on Panel 9-3F, Windows 5, 11, 26 for HPCI 3-SR-3.5.1.7 complete up to step 7.11
Simulator setup	manual	Provide a copy of 3-SR-3.6.2.1.1, Suppression Chamber Water Temperature Checks.
Simulator setup	manual	Verify lens covers on EHC pumps are correct

---

ROLE PLAY: When asked for local EHC pressure, (3-PI-047-0001(0002)) indicates 1625 psig. (3-OI-47A section 6.3 step [4].

ROLE PLAY: When asked, EHC pump 3B EHC PUMP SUCTION FILTER and EHC AUX PUMP SUCTION FILTERS, indicate CLEAN, (3-OI-47A section 6.3 step [11].

ROLE PLAY: When asked, MANUAL FLOW CONTROL VALVE, 3-047-0588, is set at 2.0 turns clockwise. (3-OI-47A section 6.3 step [12].

ROLE PLAY: If asked, state that the anti-rotation collar markings are aligned.

When HPCI is at rated pressure and flow	F4	imf hp08	Steam leak into HPCI room

ROLE PLAY: AUO at HPCI quad. Reports a large steam leak on HPCI and present location is elev. 565 Rx.Bldg.

When directed by Lead Instructor	F6	imf ad01c 40	Fails SRV-1-22 open
When RO cycles SRV then:	F7	dmf ad01c	SRV-1-22 closes
When directed by Lead Instructor	F8	bat RRPAVIB	Recirc Pump A high vibration, seal failure, suction valve fails to close and power oscillations.

ROLE PLAY: When dispatched to check 3A Recirc Vibration, wait 2 minutes and report back swinging 10 to 14 mils.

C. Console Operators Manipulations

ELAP. TIME	PFK#	DESCRIPTION/ACTION	
When 'A' Recirc trips	F9	dmf th12a	Deletes vibration high alarm
4 min. after 3A recirc. pump trip then:	F10 and	imf cr02a 75 3:00	Core power oscillations
	F11	imf th22 (none 1:30) 100	Bottom head leak
When requested, wait 3 minutes	F12	bat app16fg	Defeats RHR injection valve timers

Terminate the scenario when the following conditions are satisfied are at the direction of the Lead Examiner.

1. RPV water level +2" to +51"
2. Drywell sprayed
3. Emergency Depressurizarion completed

IX.   Scenario Summary

Given Unit 3 at 79% power, the crew will alternate EHC pumps and resume power ascension to 100%. As 3-SR-3.5.1.7, HPCI Flow Rate, is continued the crew will experience a ruptured HPCI steam line with a failure of HPCI to automatically isolate. Manual HPCI isolation will be possible. As power ascension is continued, an SRV fails open but can be closed as steps of 3-AOI-1-1 are performed. The crew experiences high vibration with a subsequent trip and seal leakage on the 3A Recirc Pump resulting in high drywell pressure. When the diesel generators automatically start the 3ED diesel generator fails to auto start but can be manually started. Finally, the crew will Emergency Depressurizes before reactor water level reaches -200".

X.   Information to Floor Instructors:

A.   Ensure recorders are inking and recording and ICS is active and updating.

B.   Assign Crew Positions based on the required rotation.

1.   SRO: Unit Supervisor
2.   ATC: Board Unit Operator
3.   BOP: Desk Unit Operator

C.   Conduct a shift turnover with the Unit Supervisor.

D.   Direct the shift crew to review the control board and take note of present conditions, alarms, etc.

E.   Terminate the scenario when the following conditions are satisfied are at the request of the floor/lead instructor/evaluator.

1.   RPV water level +2" to +51"
2.   Emergency Depressurizarion completed

XI.   Simulator Event Guide

Event 1:   Alternate EHC Pumps

TIME	POSITION	EXPECTED ACTION(S)

ATC/BOP   Receive crew briefing and walk boards down

SRO   Directs BOP to alternate EHC pumps

BOP   Alternates EHC Pumps in accordance with **3-OI-47A section 6.3**

[1] VERIFY EHC Sys is in service. REFER TO Section 5.1.

[2] REVIEW Precautions & Limitations listed in Section 3.0.

[3] START the non-operating EHC PUMP 3B(3A) using EHC HYD FLUID PUMP 3B(3A), 3-HS-47-2A(1A).

[4] CHECK the started EHC pump EHC HYD PUMP A(B) DISCH PRESS, 3-PI-047-0001(0002), indicates between 1550 psig and 1750 psig, locally at the EHC skid. (AUO reports 1625 psig)

[5] IF the started EHC pump discharge pressure is NOT between 1550 psig and 1750 psig, THEN ADJUST the pressure compensator for the started EHC pump to adjust pump discharge pressure. REFER TO Step 8.6[1].

[6] STOP EHC PUMP 3A(3B) using EHC HYD FLUID PUMP 3A(3B), 3-HS-47-1A(2A).

XI.   Simulator Event Guide

       Event 1:   Alternate EHC Pumps

   TIME   POSITION   EXPECTED ACTION(S)

                          [7] CHECK EHC HEADER PRESSURE, 3-PI-47-7, indicates between 1550 psig
                          and 1650 psig.

                          [8] IF EHC header pressure is NOT between 1550 psig
                          and 1650 psig, THEN ADJUST the pressure compensator for the operating
                          EHC pump to adjust EHC header pressure. REFER TO Step 8.6[2].

                          [9] IF there are any disagreement flags, THEN
                          RESET disagreement flags by placing the operating pump handswitch, EHC
                          HYD FLUID PUMP 3A(3B), 3-HS-47-1A(2A), to START.

                          **[10] CHECK the started EHC PUMP 3B(3A) MTR AMPS,
                          3-EI-47-2(1), indicates less than 140 amps**.

                          [11] VERIFY EHC Pump 3B(3A), EHC PUMP SUCTION FILTER and EHC AUX
                          PUMP SUCTION FILTERS, indicate CLEAN, locally at the EHC skid.

                          [12] [NER/C] VERIFY MANUAL FLOW CONTROL VALVE, 3-047-0588, is set at
                          2.0 turns clockwise. [INPO SOER 84-006]

                BOP   Swaps lens covers for EHC pumps based on new lineup

XI.   Simulator Event Guide (Continued)

Event 2:   Power Ascension

TIME	POSITION	EXPECTED ACTION(S)

SRO   **Directs power ascension per 3-GOI-100-12 step 6.2 and 3-OI-68**

ATC   Raises reactor power in accordance with **3-GOI-100-12 and 3-OI-68**

**[1] IF NOT in single loop operation, THEN
ADJUST Recirc Pump speeds 3A using, RAISE SLOW (MEDIUM), 3-HS-96-15A(15B)/LOWER SLOW(MEDIUM) 3-HS-96-17A(17B), push-buttons, to achieve balanced jet pump flows.** AND/OR ADJUST Recirc Pump speed 3B using, RAISE SLOW (MEDIUM), 3-HS-96-6A(16B) /LOWER SLOW(MEDIUM) 3-HS-96-18A(18B), pushbuttons, to achieve balanced jet pump flows.

[2] WHEN desired to control Recirc Pumps 3A and/or 3B speed with the RECIRC MASTER CONTROL, THEN
ADJUST Recirc Pump speed 3A & 3B using the following push buttons as required:

RAISE SLOW, 3-HS-96-31

RAISE MEDIUM, 3-HS-96-32

LOWER SLOW, 3-HS-96-33

LOWER MEDIUM, 3-HS-96-34

LOWER FAST, 3-HS-96-35

BOP   Performs as peer checker for recirc flow changes

XI.   Simulator Event Guide (Continued)

Event 3a: HPCI Surveillence

TIME	POSITION	EXPECTED ACTION(S)
	SRO	**Directs BOP to continue with 3-SR-3.5.1.7 at step 7[11]**
	BOP	[11] ALIGN HPCI System for a manual start by performing the following steps:

[11.1] CHECK HPCI SYSTEM FLOW/CONTROL 3-FIC-73-33 is in AUTO and SET to control at 500 (5,000 gpm).

IF required, THEN DEPRESS AUTO operation mode transfer switch and ADJUST setpoint using Setpoint up/down keys.

[11.2] PLACE HPCI STEAM PACKING EXHAUSTER by placing 3-HS-73-10A to START.

[11.3] VERIFY 3-FCV-73-36, using HPCI/RCIC CST TEST VLV 3-HS-73-36A, is OPEN.

[11.4] OPEN 3-FCV-73-35, using HPCI PUMP CST TEST VLV, 3-HS-73-35A.

[12] START the HPCI turbine by performing the following:

[12.1] [NER] VERIFY communication is established with Operations personnel in HPCI Room. [IE 93-67]

[12.2] [NER] REQUEST Operations personnel in HPCI Room, to ensure that all unnecessary personnel have exited HPCI Room. [IE 93-67]

[12.3] [NER] ANNOUNCE HPCI turbine startup over plant public address system. [IE 93-67]

XI.   Simulator Event Guide (Continued)

       Event 3a: HPCI Surveillence

<u>TIME</u>   <u>POSITION</u>   <u>EXPECTED ACTION(S)</u>

         BOP   **[12.4] PLACE HPCI AUXILIARY OIL PUMP 3-HS-73-47A to START.**

                  **[12.5] OPEN 3-FCV-73-30, using HPCI PUMP MIN FLOW
                  VALVE, 3-HS-73-30A.**

                  [12.6] ENSURE personnel are ready to monitor 3-FCV-73-18 for smooth
                  operation. AND NOTIFY the personnel monitoring that the next step will open
                  3-FCV-73-18.

                  **[12.7] OPEN 3-FCV-73-16, using HPCI TURBINE STEAM SUPPLY VLV, 3-
                  HS-73-16A.**

                  [12.8] OBSERVE that the following actions occurs:

                  ☐ HPCI AUXILIARY OIL PUMP starts.

                  ☐ [NRC/C] HPCI TURBINE STOP VALVE 3-FCV-73-18 opens by observing 3-
                  ZI-73-18 position indicating lights. [Appendix R]

                  ☐ HPCI TURBINE CONTROL VALVE 3-FCV-73-19 partially or fully opens by
                  observing 3-ZI-73-19 position indicating lights.

XI.   Simulator Event Guide (Continued)

Event 3a: HPCI Surveillence

TIME   POSITION   EXPECTED ACTION(S)

☐ [NRC/C] HPCI PUMP MIN FLOW VALVE 3-FCV-73-30 closes when HPCI
SYSTEM FLOW/CONTROL 3-FIC-73-33 indicates approximately ≥ 125 (≤ 1250
gpm) flow. [Appendix R]

☐ HPCI turbine speed rises to greater than 2400 rpm as indicated on HPCI
TURBINE SPEED 3-SI-73-51.

☐ HPCI STM LINE CNDS INBD/OUTBD DR VLVS 3-FCV-73-6A and 3-FCV-73-
6B close by observing 3-ZI-73-6A and 3-ZI-73-6B position indicating lights.

☐ HPCI AUXILIARY OIL PUMP stops as turbine speed rises.

[12.9] VERIFY Smooth operation of 3-FCV-73-18 and mark results below.

Yes _____   No _____

☐ IF the Answer above is "NO", THEN NOTIFY System Engineer to initiate a
WO and proceed with test. (Otherwise N/A)

[12.10] VERIFY RESET the following annunciators:

☐ HPCI PUMP DISCH FLOW LOW 3-FA-73-33
(3-XA-55-3F, window 5)

☐ HPCI TURBINE TRIPPED 3-ZA-73-18 (3-XA-55-3F, window 11)

☐ HPCI TURBINE GLAND SEAL DRAIN PRESSURE
HIGH 3-PA-73-46 (3-XA-55-3F, window 14)

☐ HPCI TURBINE BEARING OIL PRESSURE LOW
3-PA-73-47 (3-XA-55-3F, window 19)

[12.11] VERIFY system flow, discharge pressure, and turbine speed are stable
prior to performing the next step.

XI.   Simulator Event Guide (Continued)

Event 3b: HPCI Steam Line Break

TIME	POSITION	EXPECTED ACTION(S)

BOP   Responds to Reactor Bldg Hi Rad alarm per **3-ARP-9-3A window 22**

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.)

Determines HPCI area source of hi rad

B. IF the alarm is from the HPCI Room while Flow testing is being performed, THEN REQUEST personnel at the HPCI Quad to validate conditions.

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**

E. IF the TSC is manned and a "VALID" radiological condition exists, THEN REQUEST the TSC to evacuate non-essential personnel from affected areas.

XI.   Simulator Event Guide (Continued)

Event 3b: HPCI Steam Line Break

TIME	POSITION	EXPECTED ACTION(S)

F. MONITOR other parameters providing input to this annunciator frequently as these parameters will be masked from alarming while this alarm is sealed in.

G. IF a CREV initiation is received, THEN

1. VERIFY CREV A(B) Flow is ≥ 2700 CFM, and ≤ 3300 CFM as indicated on 0-FI-031-7214(7213) within 5 hours of the CREV initiation. [BFPER 03-017922]

2. IF CREV A(B) Flow is NOT ≥ 2700 CFM, and ≤ 3300 CFM as indicated on 0-FI-031-7214(7213) THEN
PERFORM the following: (Otherwise N/A) [BFPER 03-017922]

a. STOP the operating CREV per 0-OI-31.

b. START the standby CREV per 0-OI-31.

SRO   **Enters EOI-3 on High Rad. / High Temp.**

XI.   Simulator Event Guide (Continued)

Event 3b: HPCI Steam Line Break

TIME	POSITION	EXPECTED ACTION(S)

BOP   Responds to HPCI Leak Detection Temp Hi alarm per **3-ARP-9-3F window 10**

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.

D. DISPATCH personnel to investigate for leaks consistent with ALARA considerations in HPCI Turbine Area (El 519) and HPCI Steam Supply Area (El 550).

Recognizes HPCI not isolated when isolation lights are illuminated

Notifies Unit Supervisor HPCI failed to isolate and 3-FCV-73-2 and 3-FCV-73-3 are still open.

XI.   Simulator Event Guide (Continued)

   Event 3b: HPCI Steam Line Break

<u>TIME</u>	<u>POSITION</u>	<u>EXPECTED ACTION(S)</u>
	SRO	**Directs HPCI manually isolated** (Critical step)
	BOP	**Manually isolates HPCI steam supply by closing 3-FCV-73-2 and 3-FCV-73-3** (Critical step)
	ATC	Receives EOI-3 entry on flood level in HPCI room **3-ARP-9-4c window 10**
		A. DISPATCH personnel to VISUALLY CHECK the HPCI room.
		B. IF possible, THEN DETERMINE the source of the leak and the leak rate.
	SRO	Re-enters EOI-3 on flood level
	BOP	Notifies Rad Con and Fire Protection
		Monitors for lowering temperature and radiation levels in HPCI area (after successful isolation)

XI.   Simulator Event Guide (Continued)

Event 3b: HPCI Steam Line Break

TIME   POSITION   EXPECTED ACTION(S)

SRO   **Directs entry into 3-AOI-64-2B**

BOP   Immediate Actions

[1] VERIFY automatic actions occur.

HPCI Turbine TRIPS.

HPCI STEAM LINE INBD ISOL VALVE, 3-FCV-73-2 CLOSES.

HPCI STEAM LINE OUTBD ISOL VALVE, 3-FCV-73-3 CLOSES.

HPCI STEAM LINE WARM-UP VALVE, 3-FCV-73-81 CLOSES.

HPCI PUMP MIN FLOW VALVE, 3-FCV-73-30 CLOSES.

HPCI SUPPR POOL INBD SUCT VLV, 3-FCV-73-26 CLOSES.

HPCI SUPPR POOL OUTBD SUCT VLV, 3-FCV-73-27 CLOSES.

HPCI TURBINE STOP VALVE, 3-FCV-73-18 CLOSES.

XI.   Simulator Event Guide (Continued)

    Event 3b: HPCI Steam Line Break

TIME   POSITION   EXPECTED ACTION(S)

            BOP   Subsequent Actions

                        [1] IF ANY EOI entry condition is met, THEN ENTER the appropriate EOI(s).

                        [2] DISPATCH an operator to the HPCI Turbine room to investigate.

                        [3] CHECK the following monitors for a rise in activity or area temperature:

                        AREA RADIATION, 3-RR-90-1, Point 23 (RM-90-24), Panel 3-9-2

                        AIR PARTICULATE RAD MON, 3-MON-90-50, Address 024 (3-RM-90-58),
                        Panel 3-9-2

                        RB & TB REFUELING ZONE EXH RAD MONITOR, 0-CONS-90-362, Address
                        08, 3-RM-90-250, Panel 1-9-44

                        LEAK DET SYS, TI-69-29, Panel 3-9-21, **DEPRESS pushbutton to read TS-
                        73-55A through 55D.**

XI.   Simulator Event Guide (Continued)

   Event 3b: HPCI Steam Line Break

   TIME   POSITION   EXPECTED ACTION(S)

               BOP   [4] VERIFY the following valves OPEN to drain the HPCI steam lines.

                            MN STM LINE DRAIN INBD VLV, 3-FCV-1-55

                            OUTBD ISOLATION VLV, 3-FCV-1- -56,

                            [5] IF the HPCI TURBINE EXH DRAIN POT LEVEL HIGH 3-LA-73-8 (3-XA-55-
                            3F, Window 33) annunciator is in alarm, THEN PERFORM the following:

                            [5.1] OPEN the HPCI TURB EXH CNDS POT LCV, 3-LCV-73-8.

                            [5.2] WHEN the annunciator HPCI TURBINE EXH DRAIN POT LEVEL HIGH
                            resets, THEN **CLOSE the HPCI TURB EXH CNDS POT LCV, 3-LCV-73-8.**

               SRO   **Determines unit in 14 day LCO (TS 3.5.1.C – HPCI inop. Verify RCIC
                            OPERABLE by administrative means)**

                            Determines unit in 72 hour LCO (TS 3.5.1.D - HPCI and C RHR Inop)

                            **Tech. Specs. 3.6.1.3.B.1, on FCV 73-2 or 73-3 when tagged   (1 hour to
                            close and de-activate)**

                            **EXAMINER NOTE: When the valves are closed they are now considered
                            OPERABLE because they are in the required position following an
                            isolation signal, however the isolation logic is still INOPERATIVE.**

XI.   Simulator Event Guide (Continued)

Event 4:   SRV-1-22 Fails Open

<u>TIME</u>	<u>POSITION</u>	<u>EXPECTED ACTION(S)</u>
	CREW	Recognizes SRV open

- Main Steam Relief Valve Open alarm
- lowering generator output

SRO   **Directs response per 3-AOI-1-1**

BOP   Immediate Action

[1] IDENTIFY stuck open relief valve by OBSERVING the following:

SRV TAILPIPE FLOW MONITOR, 3-FMT-1-4, on Panel 3-9-3, OR

MSRV DISCHARGE TAILPIPE TEMPERATURE, 3-TR-1-1 on Panel 3-9-47.

Determines SRV-1-22 from acoustic monitor

[2] WHILE OBSERVING the indications for the affected Relief valve on the Acoustic Monitor; CYCLE the affected relief valve control switch several times as required:

CLOSE to OPEN to CLOSE positions

Cycles relief valve and reports SRV closed

[3] IF all SRVs are CLOSED, THEN CONTINUE at Step 4.2.3. (Otherwise N/A)

XI.   Simulator Event Guide (Continued)

    Event 4:   SRV-1-22 Fails Open (continued)

TIME	POSITION	EXPECTED ACTION(S)
	BOP	4.2.3 Other Actions and Documentation

    [1] IF ANY EOI entry condition is met, THEN ENTER the appropriate EOI(s).

    [2] REFER TO Technical Specifications Sections 3.5.1 and 3.4.3 for Automatic Depressurization System and relief valve operability requirements.

    [3] INITIATE suppression pool cooling as necessary to maintain suppression pool temperature less than 95°F.

    [4] IF the relief valve can NOT be closed AND suppression pool temperature Can NOT be maintained less than or equal to 95°F, THEN PLACE the reactor Mode 4 in accordance with 3-GOI-100-12A.

    [5] DOCUMENT actions taken and INITIATE Work Order for the valve.

    SRO   **Evaluates Tech Spec operability of ADS valve IAW TS 3.5.1(H) and 3.4.3(A). Determines valve operable and 3.5.1.H is not applicable, but requests Eng. evaluation. (Functional evaluation)**

XI.   Simulator Event Guide (Continued)

Event 5:   Recirc Vibration, Seal Leakage, Power Oscillations and Scram

TIME   POSITION   EXPECTED ACTIONS

ATC   **Announces Recirc "3A" high vibration alarm 3-ARP-9-4A window 20**

Consults ARP for Panel 9-4

A. CHECK temperatures for RECIRC PMP MTR 3A WINDING AND BRG TEMP recorder, 3-TR-68-58 on Panel 3-9-21 are below those listed for 3-XA-55-4A, Window 13.

B. CHECK for a rise in Drywell equip sump pumpout rate due to seal leakage.

C. **DISPATCH personnel to 3-LPNL-925-0412** (Vibration Mon. System) on EL 565' (S-R17) and REPORT the Vibration Data for Pump A to the Unit Operator and any other alarm indications. 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 Shift Manager, 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.

XI.   Simulator Event Guide (Continued)

Event 5:   Recirc Vibration, Seal Leakage, Power Oscillations and Scram

TIME	POSITION	EXPECTED ACTIONS
	SRO	Contacts Reactor Engineer

ATC   **Announces Recirc A Seal Leakage Alarm** 3-ARP-9-4A window 25

A. DETERMINE initiating cause by comparing No. 1 and 2 seal cavity pressure indicators on Panel 3-9-4 or ICS.

Plugging of No. 1 RO - No. 2 seal cavity pressure indicator drops toward zero, and control leakage lowers to ≤ 0.5 gpm.

Plugging of No. 2 RO - No. 2 seal pressure approaches no. 1 seal pressure and control leakage lowers to ≤ 0.5 gpm.

Failure of No. 1 seal - No. 2 seal pressure is greater than 50% of the pressure of No. 1. The controlled leakage will be ≥ 0.9 gpm.

Failure of No. 2 seal - no. 2 seal pressure is less than 50% of the No. 1 seal.

XI.   Simulator Event Guide (Continued)

Event 5:   Recirc Vibration, Seal Leakage, Power Oscillations and Scram

<u>TIME</u>	<u>POSITION</u>	<u>EXPECTED ACTIONS</u>

ATC   **Identifies Seal Failure via Instrumentation**

Recognizes lowering pressure on Recirc Pump A #1 seal

B. RECORD pump seal parameters hourly on Attachment 1, Page 28 of this procedure, unless other acceptable compensatory methods for recording these parameters is evaluated and approved by Engineering.

C. IF single seal failure is indicated, THEN INITIATE seal replacement as soon as possible. Continued operation is permissible if Drywell leakrate is within T.S. limits.

SRO   **Directs crew to watch for signs of increased leakage**

ATC   **Acknowledges Recirc Pump A seal leakoff high alarm; 3-ARP-9-4A window 18, informs SRO.**

Recognizes lowering pressure on Recirc Pump A outboard seal; informs SRO

Monitors drywell parameters; notes pressure and temperature increasing; informs SRO

XI.   Simulator Event Guide (Continued)

Event 5:   Recirc Vibration, Seal Leakage, Power Oscillations and Scram

<u>TIME</u>	<u>POSITION</u>	<u>EXPECTED ACTIONS</u>
	SRO	**When vibration report received or dual seal failure is reported, directs 'A' Recirc Pump tripped**
	ATC	C. IF dual seal failure is indicated, THEN

1. SHUTDOWN Recirc Pump 3A by depressing RECIRC DRIVE 3A SHUTDOWN, 3-HS-96-19.

2. VERIFY TRIPPED, RECIRC DRIVE 3A NORMAL FEEDER, 3-HS-57-17.

3. VERIFY TRIPPED, RECIRC DRIVE 3A ALTERNATE FEEDER, 3-HS-57-15.

4. CLOSE Recirculation Pump 3A suction valve.

- REPORT to SRO of failure of suction valve to close.

  Directs AUO to close Recirc Pump suction valve locally at Board.

5. CLOSE Recirculation Pump 3A discharge valve.

6. REFER TO 3-AOI-68-1A or 3-AOI-68-1B AND 3-OI-68.

7. DISPATCH personnel to secure Recirculation Pump 3A seal water.

XI.   Simulator Event Guide (Continued)

Event 5:   Recirc Vibration, Seal Leakage, Power Oscillations and Scram (Continued)

<u>TIME</u>	<u>POSITION</u>	<u>EXPECTED ACTIONS</u>
	ATC	[2] Checks Power to flow map to verify in region 1 or 2
		Informs SRO of being in region 1
		Checks APRMs and LPRMs for indication of power oscillations
		Informs SRO of Power Oscillations
	SRO	**Directs inserting emergency shove sheet control rods**
	BOP	Keeps SRO informed as drywell pressure approaches 2.45 psig

XI.   Simulator Event Guide (Continued)

Event 5:   Recirc Vibration, Seal Leakage, Power Oscillations and Scram (Continued)

TIME	POSITION	EXPECTED ACTIONS
	SRO	**Directs venting per 3-AOI-64-1**
		EXAMINER NOTE: Venting may not be performed based on Drywell pressure.
	BOP	**Vents per 3-AOI-64-1**

[3] VENT Drywell as follows:

[3.1] CLOSE SUPPR CHBR INBD ISOLATION VLV 3-FCV-64-34 (Panel 3-9-3).

[3.2] VERIFY OPEN, DRYWELL INBD ISOLATION VLV, 3-FCV-64-31 (Panel 3-9-3).

[3.3] VERIFY 3-FIC-84-20 is in AUTO and SET at 100 scfm (Panel 3-9-55).

[3.4] VERIFY Running, required Standby Gas Treatment Fan(s) SGTS Train(s) A, B, C (Panel 3-9-25).

[3.5] IF required, THEN REQUEST Unit 1 Operator to START Standby Gas Treatment Fan(s) SGTS Train(s) A, B. (Otherwise N/A)

XI.   Simulator Event Guide (Continued)

Event 5:   Recirc Vibration, Seal Leakage, Power Oscillations and Scram (Continued)

TIME	POSITION	EXPECTED ACTIONS
		[3.6] IF required, THEN RECORD venting data in 3-SI-4.7.A.2.a (Otherwise N/A)
		[3.7] PLACE 3-FCV-84-20 CONTROL DW/SUPPR CHBR VENT, 3-HS-64-35, in OPEN (Panel 3-9-3).
		[3.8] MONITOR stack release rates to prevent exceeding ODCM limits.
		Directs Logs person to monitor release rates
	SRO	Directs manual reactor scram prior to reaching 2.45psig DW pressure
	ATC	Scrams the reactor

XI.   Simulator Event Guide (Continued)

Event 5:   Recirc Vibration, Seal Leakage, Power Oscillations and Scram (Continued)

TIME	POSITION	EXPECTED ACTIONS
	SRO	Directs 3-AOI-100-1
	ATC	Carry out actions of 3-AOI-100-1
	SRO	Enters EOI- 1 & 2 at 2.45 psig drywell pressure
	SRO	Directs venting per Appendix 12
	BOP	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.

XI.   Simulator Event Guide (Continued)

Event 5:   Recirc Vibration, Seal Leakage, Power Oscillations and Scram (Continued)

TIME	POSITION	EXPECTED ACTIONS

3. IF ... While executing this procedure to vent the Suppression Chamber, Suppression Pool water level can not be determined to be below 20 ft, THEN . PERFORM step 13 to secure the vent path and reenter this procedure if further venting is required.

4. IF ... While executing this procedure, the desired vent path is lost or can not be established, THEN . PERFORM step 13 to secure the vent path and reenter this procedure if further venting is required.

BOP   5. IF ... While executing this procedure, CAD addition per SAMG-2, Step G-4 OR G-9, is to begin, THEN . BEFORE CAD is initiated, PERFORM Step 13 to secure the vent path.

NOTE: Venting may be accomplished using EITHER:

3-FIC-84-19, PATH B VENT FLOW CONT, OR

3-FIC-84-20, PATH A VENT FLOW CONT.

NOTE: Unless the TSC recommends otherwise, venting the Drywell DIRECTLY should be performed ONLY if the Suppression Chamber can NOT be vented.

XI.   Simulator Event Guide (Continued)

Event 5:   Recirc Vibration, Seal Leakage, Power Oscillations and Scram (Continued)

TIME   POSITION   EXPECTED ACTIONS

6. IF ... ANY of the following exists:

Suppression Pool water level can not be determined to be below 20 ft, OR

Suppression Chamber can NOT be vented, OR

SRO orders DIRECT drywell venting, THEN CONTINUE in this procedure at:

Step 10 to vent the Drywell through 3-FCV-84-19, OR

Step 11 to vent the Drywell through 3-FCV-84-20.

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.

XI.   Simulator Event Guide (Continued)

        Event 5:   Recirc Vibration, Seal Leakage, Power Oscillations and Scram (Continued)

TIME   POSITION   EXPECTED ACTIONS

_____   BOP   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.

XI.   Simulator Event Guide (Continued)

Event 5:   Recirc Vibration, Seal Leakage, Power Oscillations and Scram (Continued)

TIME	POSITION	EXPECTED ACTIONS
	BOP	**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:

i. IF. . .PRIMARY CONTAINMENT FLOODING per C-1, Alternate Level Control, is in progress
THEN. .MAINTAIN release rates below those
specified in Attachment 2.

ii. IF. . .Severe Accident Management Guidelines are being executed, THEN. .MAINTAIN release rates below those
specified by the TSC SAM Team.

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.

BOP   **Contacts LOG AUO to monitor release rates**

XI.   Simulator Event Guide (Continued)

   EVENT 6:   MSIV CLOSURE/LOCA

TIME	POSITION	EXPECTED ACTION(S)

SRO

- **Directs RPV pressure controlled 800 to 1000 psig** with one or more of the following:

   - MSRV's (App 11A)

   - RCIC (App 11B) (will not work)

- **Directs RPV level be maintained between +2" to +51"** with one or more of the following:

   -RCIC (App 5C) (will not work)

   -CRD (App 5B)

BOP

Controls pressure 800 to 1000 psig with one or more of the following:

   - MSRV's (App 11A)

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.

XI.   Simulator Event Guide (Continued)

EVENT 6:   MSIV CLOSURE/LOCA

TIME	POSITION	EXPECTED ACTIONS
	BOP	**3. OPEN MSRVs using the following sequence to control RPV pressure as directed by SRO:**

        a. 1 3-PCV-1-179 MN STM LINE A RELIEF VALVE.

        b. 2 3-PCV-1-180 MN STM LINE D RELIEF VALVE.

        c. 3 3-PCV-1-4 MN STM LINE A RELIEF VALVE.

        d. 4 3-PCV-1-31 MN STM LINE C RELIEF VALVE.

        e. 5 3-PCV-1-23 MN STM LINE B RELIEF VALVE.

        f. 6 3-PCV-1-42 MN STM LINE D RELIEF VALVE.

        g. 7 3-PCV-1-30 MN STM LINE C RELIEF VALVE.

        h. 8 3-PCV-1-19 MN STM LINE B RELIEF VALVE.

        i. 9 3-PCV-1-5 MN STM LINE A RELIEF VALVE.

        j. 10 3-PCV-1-41 MN STM LINE D RELIEF VALVE.

        k. 11 3-PCV-1-22 MN STM LINE B RELIEF VALVE.

        l. 12 3-PCV-1-18 MN STM LINE B RELIEF VALVE.

        m. 13 3-PCV-1-34 MN STM LINE C RELIEF VALVE.

XI.   Simulator Event Guide (Continued)

        EVENT 6:   MSIV CLOSURE/LOCA

TIME	POSITION	EXPECTED ACTIONS

        BOP   Recognizes MSIV closures and reports to SRO.

        BOP   Controls RPV level +2 to +51 with one or more of the following:

                   -RCIC (App 5C) (will not work)

                   -CRD (App 5B)

        BOP   -CRD (App 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.

XI.   Simulator Event Guide (Continued)

EVENT 6:   MSIV CLOSURE/LOCA

<u>TIME</u>   <u>POSITION</u>   <u>EXPECTED ACTIONS</u>

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.

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.

BOP   **Reports 3B CRD pump tripped**

XI.   Simulator Event Guide (Continued)

EVENT 6:   MSIV CLOSURE/LOCA (continued)

TIME   POSITION   **EXPECTED ACTIONS**

BOP   **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.**

e. IF ....Additional flow is necessary to prevent or mitigate core damage, THEN .....DISPATCH personnel to fully open the following valves as required:

☐ 3-THV-085-0527, CRD PUMP DISCH THROTTLING (RB NE, el 565')

☐ 3-BYV-085-0551, CRD PUMP TEST BYPASS (RB NE, el 565').

SRO   **Directs determining the cause of the isolation**

Directs H₂O₂ Analyzers placed in service

BOP   Places H₂O₂ Analyzers in service

1. Place Analyzer isolation bypass keylock switches to bypass.

2. Select DW or Supp Chmbr and momentarily pull out select switch handle to start sample pumps.

XI.   Simulator Event Guide (Continued)

EVENT 6:   MSIV CLOSURE/LOCA (continued)

TIME	POSITION	EXPECTED ACTION(S)

SRO   **Directs SP cooling be placed in service per App 17A**

BOP   Places SP cooling in service per App 17A

1. IF ..... Adequate core cooling is assured, THEN ... BYPASS LPCI Injection Valve Timers as necessary using EOI Appendices 16F and 16G.

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.

XI.   Simulator Event Guide (Continued)

EVENT 6:   MSIV CLOSURE/LOCA (continued)

TIME   POSITION   EXPECTED ACTION(S)

d. IF ..... Directed by SRO, THEN ... PLACE the following keylock switches in MANUAL OVERRIDE:

3-XS-74-122, RHR SYS I LPCI 2/3 CORE HEIGHT OVRD.

3-XS-74-130, RHR SYS II LPCI 2/3 CORE HEIGHT OVRD.

e. IF ..... LPCI INITIATION Signal exists, THEN ... MOMENTARILY PLACE the following in select:

3-XS-74-121, RHR SYS I CTMT SPRAY/CLG VLV SELECT.

3-XS-74-129, RHR SYS II CTMT SPRAY/CLG VLV SELECT.

XI.   Simulator Event Guide (Continued)

EVENT 6:   MSIV CLOSURE/LOCA (continued)

<u>TIME</u>   <u>POSITION</u>   <u>EXPECTED ACTION(S)</u>

BOP   f. IF ..... 3-FCV-74-53(67), RHR SYS I(II) LPCI INBD INJECT VALVE, is OPEN, THEN ... VERIFY CLOSED 3-FCV-74-52(66), RHR SYS I(II) LPCI OUTBD INJECT VALVE.

g. OPEN 3-FCV-74-57(71), RHR SYS I(II) SUPPR CHBR/POOL ISOL VLV.

h. VERIFY desired RHR pump(s) for Suppression Pool Cooling are operating.

i. THROTTLE 3-FCV-74-59(73), RHR SYS I(II) SUPPR POOL CLG/TEST VLV, to maintain EITHER of the following as indicated on 3-FI-74-50(64), RHR SYS I(II) FLOW:

Between 7,000 and 10,000 gpm for one-pump Operation. OR

At or below 13,000 gpm for two-pump operation.

j. VERIFY CLOSED 3-FCV-74-7(30), RHR SYSTEM I(II) MIN FLOW VALVE (VERIFY CLOSED 3-BKR-074-0007(0030) on 480V RMOV Board 3D(3E), Compartment 4E(4E), if required).

XI.   Simulator Event Guide (Continued)

    EVENT 6:   MSIV CLOSURE/LOCA (continued)

TIME	POSITION	EXPECTED ACTION(S)

k. MONITOR RHR Pump NPSH using Attachment 1.

l. NOTIFY Chemistry that RHRSW is aligned to in-service RHR Heat Exchangers.

m. IF ..... Additional Suppression Pool Cooling flow is necessary, THEN ... PLACE additional RHR and RHRSW pumps in service using Steps 2.b through 2.l.

	ATC/BOP	**Monitors containment parameters**
	SRO	<mark>Enters EOI-2 on DW pressure and re-enters EOI-1</mark> **and directs the following:**

    -    **Verify all available DW coolers in service**

	SRO	**Directs cooldown**
	ATC/BOP	Verify all available DW coolers in service
	ATC/BOP	**Commences a cooldown as directed**
	SRO	**Determines cannot maintain suppression chamber pressure less than 12 psig and directs suppression chamber sprayed**

XI.   Simulator Event Guide (Continued)

EVENT 6:   MSIV CLOSURE/LOCA (continued)

TIME   POSITION   EXPECTED ACTION(S)

BOP   **Sprays suppression chamber per App 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 by EOI-2 to spray the Suppression Chamber irrespective of adequate core cooling, THEN … **BYPASS LPCI Injection Valve Timers as necessary using EOI Appendices 16F and 16G.**

3. IF ….. Directed by SRO to spray the Suppression Chamber using Standby Coolant Supply, THEN … CONTINUE in this procedure at Step 7.

4. IF ….. Directed by SRO to spray the Suppression Chamber using Fire Protection, THEN … CONTINUE in this procedure at Step 8.

XI.   Simulator Event Guide (Continued)

EVENT 6:   MSIV CLOSURE/LOCA (continued)

TIME   POSITION   EXPECTED ACTION(S)

5. INITIATE Suppression Chamber Sprays as follows:

a. VERIFY at least one RHRSW pump supplying each EECW header.

b. IF..... EITHER of the following exists:

. LPCI Initiation signal is NOT present, OR

Directed by SRO, THEN... PLACE keylock switch 3-XS-74-122(130), RHR SYS I(II) LPCI 2/3 CORE HEIGHT OVRD, in MANUAL OVERRIDE.

c. MOMENTARILY PLACE 3-XS-74-121(129), RHR SYS I(II) CTMT SPRAY/CLG VLV SELECT, switch in SELECT.

d. IF..... 3-FCV-74-53(67), RHR SYS I(II) INBD INJECT VALVE, is OPEN, THEN... VERIFY CLOSED 3-FCV-74-52(66), RHR SYS I(II) OUTBD INJECT VALVE.

e. VERIFY OPERATING the desired RHR System I(II) pump(s) for Suppression Chamber Spray.

f. VERIFY OPEN 3-FCV-74-57(71), RHR SYS I(II) SUPPR CHBR/POOL ISOL VLV.

g. OPEN 3-FCV-74-58(72), RHR SYS I(II) SUPPR CHBR SPRAY VALVE.

XI.   Simulator Event Guide (Continued)

    EVENT 6:   MSIV CLOSURE/LOCA (continued)

TIME	POSITION	EXPECTED ACTION(S)

BOP   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 (VERIFY CLOSED 3-BKR-074-0007(0030) on 480V RMOV Board 3D(3E), Compartment 4E(4E), if required).

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 1,350 and 4,500 gpm flow:

3-FCV-23-34, RHR HX 3A RHRSW OUTLET VLV

3-FCV-23-46, RHR HX 3B RHRSW OUTLET VLV

3-FCV-23-40, RHR HX 3C RHRSW OUTLET VLV

3-FCV-23-52, RHR HX 3D RHRSW OUTLET VLV.

n. NOTIFY Chemistry that RHRSW is aligned to in-service RHR Heat Exchangers.

XI. Simulator Event Guide (Continued)

EVENT 6: MSIV CLOSURE/LOCA (continued)

<u>TIME</u> <u>POSITION</u> <u>EXPECTED ACTION(S)</u>

BOP 6. WHEN ... EITHER of the following exists:

Before Suppression Pool pressure drops below 0 psig, OR

Directed by SRO to stop Suppression Chamber Sprays, THEN ... **STOP Suppression Chamber Sprays as follows:**

a. CLOSE 3-FCV-74-58(72), RHR SYS I(II) SUPPR CHBR SPRAY VALVE.

b. VERIFY CLOSED 3-FCV-74-100, RHR SYS I U-2 DISCH XTIE

c. IF..... RHR operation is desired in ANY other mode, THEN... EXIT this EOI Appendix.

d. STOP RHR Pumps 3A and 3C (3B and 3D).

e. CLOSE 3-FCV-74-57(71), RHR SYS I(II) SUPPR CHBR/POOL ISOL VLV.

XI.   Simulator Event Guide (Continued)

   EVENT 6:   MSIV CLOSURE/LOCA (continued)

   <u>TIME</u>   <u>POSITION</u>   <u>EXPECTED ACTION(S)</u>

           SRO   **When SC pressure exceeds 12 psig or if SRO determines cannot maintain DW temp. <280 then directs the following:**

                      - Ensures Recirc. pumps shutdown

                      - DW blowers secured

                      - DW sprayed per App 17B

           ATC   **Trips Recirc. pumps**

           BOP   **Secures DW blowers**

                      Requests 16F & 16G be performed

                      Sprays the DW using RHR per App 17B

                      1. BEFORE Drywell pressure drops below 0 psig, CONTINUE in this procedure at Step 7.

                      2. IF ..... Adequate core cooling is assured, OR Directed to spray the Drywell irrespective of adequate core cooling, THEN ... **BYPASS LPCI Injection Valve Timers as necessary using EOI Appendices 16F and 16G.**

XI.   Simulator Event Guide (Continued)

EVENT 6:   MSIV CLOSURE/LOCA (continued)

TIME   POSITION   EXPECTED ACTION(S)

BOP   3. VERIFY Recirc Pumps and Drywell Blowers shutdown.

4. IF ..... Directed by SRO to spray the Drywell using Standby Coolant supply, THEN ... CONTINUE in this procedure at Step 8.

5. IF ..... Directed by SRO to spray the Drywell using Fire Protection, THEN ... CONTINUE in this procedure at Step 9.

6. INITIATE Drywell Sprays as follows:

a. VERIFY at least one RHRSW pump supplying each EECW header.

b. IF..... EITHER of the following exists:

LPCI Initiation signal is NOT present, OR

. **Directed by SRO, THEN... PLACE keylock switch 3-XS-74-122(130), RHR SYS I(II) LPCI 2/3 CORE HEIGHT OVRD, in MANUAL OVERRIDE.**

c. **MOMENTARILY PLACE 3-XS-74-121(129), RHR SYS I(II) CTMT SPRAY/CLG VLV SELECT, switch in SELECT.**

XI.   Simulator Event Guide (Continued)

EVENT 6:   MSIV CLOSURE/LOCA (continued)

<u>TIME</u>   <u>POSITION</u>   <u>EXPECTED ACTION(S)</u>

d. IF..... 3-FCV-74-53(67), RHR SYS I(II) LPCI INBD INJECT VALVE, is OPEN, THEN... VERIFY CLOSED 3-FCV-74-52(66), RHR SYS I(II) LPCI OUTBD INJECT VALVE.

e. VERIFY OPERATING the desired System I(II) RHR pump(s) for Drywell Spray.

f. OPEN the following valves:

. **3-FCV-74-60(74), RHR SYS I(II) DW SPRAY OUTBD VLV**

. **3-FCV-74-61(75), RHR SYS I(II) DW SPRAY INBD VLV.**

g. VERIFY CLOSED 3-FCV-74-7(30), RHR SYSTEM I(II) MIN FLOW VALVE (VERIFY CLOSED 3-BKR-074-0007(0030) on 480V RMOV Board 3D(3E), Compartment 4E(4E), if required).

XI.   Simulator Event Guide (Continued)

EVENT 6:   MSIV CLOSURE/LOCA (continued)

TIME   POSITION   EXPECTED ACTION(S)

BOP   **h. IF..... Additional Drywell Spray flow is necessary, THEN... PLACE the second System I(II) RHR Pump in service.**

i. MONITOR RHR Pump NPSH using Attachment 2.

j. VERIFY RHRSW pump supplying desired RHR Heat Exchanger(s).

k. THROTTLE the following in-service RHRSW outlet valves to obtain between 1,350 and 4,500 gpm RHRSW flow:

3-FCV-23-34, RHR HX 3A RHRSW OUTLET VLV

3-FCV-23-46, RHR HX 3B RHRSW OUTLET VLV

3-FCV-23-40, RHR HX 3C RHRSW OUTLET VLV

3-FCV-23-52, RHR HX 3D RHRSW OUTLET VLV.

l. NOTIFY Chemistry that RHRSW is aligned to in-service RHR Heat Exchangers.

XI.   Simulator Event Guide (Continued)

EVENT 6:   MSIV CLOSURE/LOCA (continued)

TIME	POSITION	EXPECTED ACTION(S)
	SRO	**Directs DW sprays/SC sprays be stopped when that area reaches 0 psig**
	BOP	**Stops DW/SC sprays when that area reaches 0 psig**
		Monitors containment parameters
	SRO	Monitors RPV water level, determines level is lowering. Re-enters EOI-1 at +2" RPV level
		- **Directs performance of App 7B (SLC)**
	ATC	**Calls Rx Bldg AUO to perform App 7B**
	Crew	Monitors Drywell / PSC / and RPV water level
	SRO	**Enters C1 at ≈ -100" to - 122"**
		Directs ADS inhibited
	ATC	**Closes RFP discharge valves**
		Reports 3A CRDP tripped

XI.   Simulator Event Guide (Continued)

EVENT 6:   MSIV CLOSURE/LOCA (continued)

TIME   POSITION   EXPECTED ACTION(S)

BOP   **Inhibits ADS**

SRO   **After entering C1 align all available injection systems for injection.**

-Containment sprays terminated

When water level reaches TAF (-162") and before - 200 directs the following:

Enters C2 (Critical step)

- **Six ADS valves opened** (Critical step)

- **RPV level returned +2" to +51"**

BOP   **When directed by US terminates Containment Sprays and lines up RHR for LPCI**

BOP   **Opens and verifies open 6 ADS valves** (Critical step)

SRO   **Directs restoring Rx level with Condensate, Core Spray, or RHR** (Critical step)

SRO   **Classifies event as Site Area Emergency (1.1-S1)**

ATC/BOP   **Restores RPV water level +2" to +51" using:** (Critical step)

-RHR
-Core Spray
-Condensate

XI.   Simulator Event Guide (Continued)

EVENT 6:   MSIV CLOSURE/LOCA (continued)

<u>TIME</u>   <u>POSITION</u>   <u>EXPECTED ACTION(S)</u>

App 6A 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

XI.   Simulator Event Guide (Continued)

EVENT 6:   MSIV CLOSURE/LOCA (continued)

TIME   POSITION   EXPECTED ACTION(S)

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

XI.   Simulator Event Guide (Continued)

        EVENT 6:   MSIV CLOSURE/LOCA (continued)

   <u>TIME</u>   <u>POSITION</u>   <u>EXPECTED ACTION(S)</u>

                                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.