

Final Submittal

**BROWNS FERRY EXAM
50-259, 50-260, &
50-296/2004-301**

April 23 - 30, 2004

1. As Given Simulator Scenario Operator Actions ES-D-2



Final Scenarios

(Browns Ferry 2004-301)

Facility: BFN		Scenario Number: HLT0212#2		Op-Test Number:	
Final					
Examiners: <u>Tim Kolb</u>			Operators: _____		
<u>Ron Aiello</u>			_____		
_____			_____		
Initial Conditions: IC 28, 100% pwr					
Turnover: Reduce power to 80% and remove 2B RFP from service for maintenance. 2A CRD pump in standby awaiting PMT after speed increaser inspection, place pump in service when MM is ready for PMT.					
Event Number	Malfunction Number	Event Type*	Event Description		
1	None	R-RO R-SRO N-RO N-SRO	Reduce power with Recirc to allow removal of 2B Rx Feed pump from service.		
2	Ed09a	C-RO C-BOP C-SRO	Normal feeder breaker trip and Bd lockout for 4kv Shutdown Bd A. ITS for SRO, Transfer A 480v Diesel Aux board for BOP. RO responds to loss of CRD pump from power loss.		
3	Rd08	C-SRO	Accumulator trouble for an HCU. SRO must direct AUO to recharge Accumulator and refer to ITS for required actions.		
4	Th10a 100 1:00 Th11a 100 15:00	C-RO C-SRO	Sequential failure of Recirc pump A seals. Time delay allows proper response for 1 Seal failure with subsequent failure of second seal. Seal failures will require isolation of Recirc pump. SRO makes SLO determination in ITS.		
5	Tc07 Bat atws95 east	M-all	EHC leak with Turbine Trip on loss of Hydraulic pressure with a 95% ATWS on east side rods, EOI-1 and C-5 entry, forces lower level for power control.		
6	Th23 20	C-All	Fuel failure, resultant Rad levels will cause entry into EOI-3		

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

Event Description: Reduce Reactor Power to 80% and Remove the 2B RFP from service.

Time	Position	Applicant's Action or Behavior
	SRO	Notifies ODS of Power Reduction
	SRO	Notifies Chemistry and radcon of power reduction
	BUO	Begins power drop with recirculation flow per GOI-100-12 <ul style="list-style-type: none"> • Decreases Recirc flow per OI-68 section 6.2 • Utilizing slow (medium) decrease PB • Stops power reduction @ 80% power.
	DUO	Performs peer check of power reduction
	BUO	Removes the 2B RFP from service per OI-3

Event Description: Loss of 4 KV Shutdown Board " A " (Bus Lockout)

Time	Position	Applicant's Action or Behavior
	Crew	Identifies/Reports a loss of the 4 KV Shutdown Board "A"
	DUO	Recognizes " A " D/G starts and fails to load
	BUO	Recognizes 1B CRD Pump Trip
	SRO	Directs placing 2A CRD Pump Inservice per AOI 85-3
	DUO	Dispatches AUO to 4 KV Shutdown Board "A "
	SRO	Directs " A " D/G Shutdown and AUO to monitor while running. <ul style="list-style-type: none"> • Directs Diesel Aux Board Transfer per OI-57B step 8.10 • Contacts Electrical Maintenance to troubleshoot the 4 KV Shutdown Board
	BUO	Places 2A CRD Pump in service per AOI-85-3
	DUO	Identifies loss of power to RHR 2A, CS 2A, and RHR SW A1
	SRO	Enters T.S. LCO 3.8.7 and verify no loss of safety function exists per ODP-8.
	DUO	Transfers Diesel Aux Board " A per OI-57B" <ul style="list-style-type: none"> • Verifies "A" & "C" SGT Starts and Refuel ventilation Isolates • Shuts Down "A" D/G per OI-82

Event Description: Control Rod HCU Low Gas Pressure

Time	Position	Applicant's Action or Behavior
	BUO	Reports alarm " CRD Accum Press Low/Level High ", identifies HCU as 30-55 <ul style="list-style-type: none">• Refers to ARP. dispatches AUO to CRD Module
	SRO	Refers to T.S. 3.1.5, Declares Control Rod 30-55 slow within 8 hours <ul style="list-style-type: none">• Determines no further actions required by T.S.
	BUO	Directs AUO to recharge accumulator per OI-85
	SRO	Exits LCO 3.1.5 when HCU is returned to normal

Event Description: Failure of both seals on the 2A Recirc Pump

Time	Position	Applicant's Action or Behavior
	BUO/DUO	Recognizes and responds to the 2A Recirc Pump inboard seal failure per ARP 2-FA-68-62 and reports it to the SRO
	SRO	Directs DUO to monitor 2A Recirc Pump Seal Pressures per ARP and record data per ARP 2-ARP-9-4A
	DUO	Recognizes increase in Drywell Pressure and Temperature and reports it to the SRO.
	SRO	SRO directs DUO to vent the Drywell per AOI-64-1
	DUO	Places additional drywell cooling in service and vents Drywell per 2-AOI-64-1 step 4.2.2.3
	BUO	Recognizes failure of the outboard seal on the 2A Recirc pump and reports it to the SRO (Both seals fail).
	SRO	Directs 2A Recirc Pump tripped and isolated. per 2-ARP -9-4A
	BUO	Trips and isolates the 2A Recirc Pump per 2-ARP-9-4A <ul style="list-style-type: none"> • Depresses RECIRC DRIVE A SHUTDOWN • Verifies Normal and Alternate feeder breakers trip • Closes Recirc Pump 2A pump suction and discharge valves • Directs AUOs to close CRD seal purge to Recirc Pump 2A
	SRO	Directs the following actions per AOI-68-1B, <ul style="list-style-type: none"> • Monitor Power/Flow Map to determine region in the Power to Flow Map • Maintain operating Recirc Pump less than 46,600 gpm • Notifies Reactor Engineer • Ensures Recirc Pump suction and discharge valve closed

Event Description: Failure of both seals on the 2A Recirc Pump (Continued)

Time	Position	Applicant's Action or Behavior
	SRO	Control Rods Inserted to comply with the Power Directs /Flow Map
	BUO	Ensures /Maintains operating Recirc Pump Speed less than 46,600 gpm
	BUO	Inserts Control Rods per the Emergency Shove Sheet to exit region 2 of the Power/Flow Map
	SRO	Directs Reactor Engineer to perform surveillances/actions necessary to support Single Loop Operation <ul style="list-style-type: none"> • 2-SR-3.4.1 (Single Loop Operation) • 2-TI-248 (Core Flow Determination in Single Loop Operation)
	SRO	Notifies ODS

Event Description: EHC Leak/ SCRAM

Time	Position	Applicant's Action or Behavior
	DUO	Recognizes and reports " EHC Reservoir Low Level Alarm " <ul style="list-style-type: none"> • Responds per ARP 2-XA-55-7B • Monitors EHC pump amps and discharge pressure • Dispatches AUOs to locate EHC leakage and add EHC Hydraulic fluid if necessary
	SRO	Assign dedicated operator to monitor the EHC system per the ARP
	SRO	Contacts Environmental Group to help contain EHC Fluid <ul style="list-style-type: none"> • Takes action to ensure isolation of Floor Drains associated with any EHC Leakage
	DUO	Reports Low EHC Pressure
	SRO	Directs Manual Scram of the Reactor <ul style="list-style-type: none"> • Directs Actions per AOI 100-1 •
	BUO	Inserts Manual Scram per AOI-100-1

Event Description: ATWS/Fuel Failure

Time	Position	Applicant's Action or Behavior
	BUO	Reports all rods not in and performs the following: <ul style="list-style-type: none"> • Mode Switch to Shutdown • Initiates ARI • Recognizes and reports power above 5% and Recirc pumps not tripped • Reports MSIVs are open • Inserts SRMs/IRMS
	SRO	Enters EOI-1 and C5 and directs/ensures the following : <ul style="list-style-type: none"> • Mode Switch to Shutdown • ARI initiated • Recirc Pumps tripped
	SRO	Directs ADS Inhibited
	DUO	Inhibits ADS
	SRO	Declares Site Area Emergency , EAL 1.2-S
	SRO	Directs implementation of Appendix 4 to lower Reactor Water Level to less than -50"
	BUO	Maintains Reactor Water Level -50" to -100" with RFPs, RCIC, HPCI
	DUO	Performs EOI Appendix 4 , Locks out HPCI
	SRO	Directs Appendix 1F, 2, and 1D be performed
	SRO	Directs Appendices 8A, 8C, 8E & 8G be performed
	BUO/DUO	Recognizes turbine trip and loss of Bypass Valves as accumulators depressurize

Event Description: ATWS/Fuel failure

Time	Position	Applicant's Action or Behavior
	SRO	Directs Reactor Pressure maintained less than 1073 psig with one or more of the following: <ul style="list-style-type: none"> • MSRVs • Main Steam Line Drains • RFPs
	DUO	Recognizes and reports OG Pretreatment Rad High Alarm
	DUO	Maintains Reactor Pressure less than 1073 with one or more of the following: <ul style="list-style-type: none"> • MSRVs • Main Steam Line Drains (Appendix 11D) • RFP (App 11F)
	BUO	Directs AUO to close 2-85-586
	DUO	Recognizes and reports the Reactor Area Radiation Monitors are in alarm and are increasing.
	SRO	Orders evacuation of the Reactor Building <ul style="list-style-type: none"> • Notifies HP of increasing Rad levels • Ensures that announcements are made to notify plant personnel. • Directs DUO to continue to monitor Plant radiation levels
	SRO	Directs Suppression Pool Cooling be placed in service per appendix 17A
	DUO	Places Suppression Pool Cooling in service per appendix 17A
	SRO	Directs SLC Injection BEFORE 110 deg Torus Temp.
	BUO	When field operators report that the 2-85-586 is closed: <ul style="list-style-type: none"> • Bypasses RWM • Drives Rods utilizing EMERGENCY IN in a spiral pattern per Appendix 1D

Event Description: ATWS/Fuel failure

Time	Position	Applicant's Action or Behavior
	SRO	Directs BUO to complete the actions required in Appendix 1F
	BUO	Resets Reactor Scram <ul style="list-style-type: none"> • Verifies SDV Vents and Drains open • Monitors SDV High Level Alarms
	BUO	Recognizes that SDV is drained: <ul style="list-style-type: none"> • SDV High Level Alarms Clear • Reports to SRO
	BUO	Directs AUOs to re-open the 2-85-586 valve per Appendix 1F
	SRO	Directs BUO to insert a manual scram per Appendix 1F
	BUO	Initiates Reactor Scram after the 2-85-586 valve has been re-opened <ul style="list-style-type: none"> • Verifies HCU Accumulators have been recharged • Depresses Scram PB • Verifies Control Rod Motion • Reports All Rods In
	SRO	Exits EOI-1, RC/Q, Directs SLC Injection terminated if SLC was initiated
	SRO	Directs OSUS to perform Appendix 16F & 16G
	SRO	Directs RPV Water level maintained between -162" and level at which termination and prevention stopped.
	BUO	Maintains RPV level within band as directed by SRO

Reactivity Control Plan	Issued	Expires
Unit 2 Power Reduction	Today	Next Month

	Name	Office Ext.	Home Phone	Pager
On-Call	IM ENG			
Back-Up	YOUM ENG			

Check	Activity	RE Supt (app)
<input type="checkbox"/>	Startup or Shutdown (circle one)	
<input type="checkbox"/>	Sequence Exchange (describe in purpose)	
<input type="checkbox"/>	Control Rod Pattern Adjustment (describe in purpose)	:
<input type="checkbox"/>	Surveillance Testing (describe in purpose)	
<input checked="" type="checkbox"/>	Maintenance/Modification (describe in purpose)	IMS
<input type="checkbox"/>	Other (describe in purpose)	

Purpose:

Reduce power to 80% with recirc to remove RFP B from service for repairs
 Suspend rod shuffle until RFP B is returned to service

Assumptions/Hold Points:

Reduce power to 80% with flow per OI-68

Critical Parameters/Precautions:

OPRM is inoperable, use Power Flow Map (OPRM INOPERABLE).
DO NOT ENTER REGION I or II OF THE POWER / FLOW MAP.

Power Maneuvering Instructions:

Reduce power with flow to 80%
Remove RFP B from service
Repair and return RFP B to service
RE will provide instructions for completion of rod shuffle

Special Instructions:

Approvals:

Reactor Engineer (Preparer)	IMRE	Date	today
Reactor Engineer (Reviewer)	YOUMRE	Date	today
Reactor Engineer Supervisor		Date	

Implementation Approval:

Operation Manager / Plant Manager	IMMGR	Date	today
-----------------------------------	-------	------	-------

Facility: BFN		Scenario Number: HLT0212#3		Op-Test Number:	
Final					
Examiners: <u>Tim Kolb</u>			Operators: _____		
<u>Ron Aiello</u>			_____		
_____			_____		
Initial Conditions: IC 27, 90% power					
Turnover: 2-FCV-23-34 tagged for repairs. 7 day LCO's 3.7.1, 3.6.2.3, 4, 5 entered 6 hours earlier. Repairs forecast to be complete in 12 hours. 1B CRD pump tagged for inspection. Rx power was lowered to 90% last shift to allow Turbine valve testing that has been completed. Return power to 100% at 10 MWe/min with recirc flow.					
Event Number	Malfunction Number	Event Type*	Event Description		
1	None	R-RO R-SRO	Restore power to rated with Recirc Flow.		
2	Th30v 0	C-SRO	Fails 2-LIS-3-203B downscale with expected half scram. RO responds to half scram, SRO refers to ITS		
3	Fw30a	C-RO	A Feed pump flow controller fails low requiring removal of A RFW pump and power reduction.		
4	Rd25	C-RO C-SRO	Rod 14-35 position indication fails requiring inserting rod to 46. RO must insert Rod. SRO refers to ITS.		
5	Th23 35 15:00	C-RO C-SRO	35% fuel failure ramped in over 15 minutes. RO reduces power when instructed due to rising Rad levels		
6	Th35b 8 8:00 Th23 80 1:00 Rp15a Rp15b Rc08	M-all	Steam leak from B main steam line outside containment. Fuel failure increased to 80%. SRO enters EOI-3 due to high Rad/Temp and then EOI-1 when an area reaches max safe. RO inserts manual scram. MSIV's fail to close on High Temp. RCIC steam supply valve failure to open on initiation signal.		
	Ad01m 100	C	SRV sticks open, take actions per AOI		
	Hp07 Rd01a	C	HPCI inverter power failure and trip of CRD pump. This removes available high pressure makeup and requires crew to implement the actions of Contingency C-1.		

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

SIMULATOR EVALUATION GUIDE

TITLE : RAISE POWER WITH RECIRC, RPS LOW LEVEL INSTRUMENT FAILURE, RFP FAILURES, RPIS FAILURE FOR A ROD, FUEL FAILURE, MAIN STEAM LEAK, MSRV FAILS OPEN, HPCI INVERTER FAILURE, RCIC TRIP, CRD PUMP FAILURE, CONTINGENCY C1, EMERGENCY DEPRESSURIZE BEFORE LEVEL REACHES -185"

REVISION : 0

DATE : April 1, 2004

PROGRAM : BFN Operator Training

PREPARED BY: _____ \ _____
(Operations Instructor) Date

REVIEWED BY: _____ \ _____
(Lead Examiner or Designee) Date

REVIEWED BY: _____ \ _____
(Operations Training Manager or Designee) Date

CONCURRED: _____ \ _____
(Operations Superintendent or Designee) Date

VALIDATION BY: _____ \ _____
(Operations US) (Required for Exam Scenarios only) Date

NUCLEAR TRAINING				
REVISION/USAGE LOG				
REVISION NUMBER	DESCRIPTION OF CHANGES	DATE	PAGES AFFECTED	REVIEWED/REVISED BY
0	INITIAL	04/01/04	All	JT

- I. Program: BFN Operator Training
- II. Course: Examination Guide
- III. Title: RAISE POWER WITH RECIRC, RPS LOW LEVEL INSTRUMENT FAILURE, RFP FAILURES, RPIS FAILURE FOR A ROD, FUEL FAILURE, MAIN STEAM LEAK, MSRV FAILS OPEN, HPCI INVERTER FAILURE, RCIC TRIP, CRD PUMP FAILURE, CONTINGENCY C1, EMERGENCY DEPRESSURIZE BEFORE LEVEL REACHES -185"
- IV. Length of Scenario: 1 1/2 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 raise power with recirc IAW GOI-100-12.
2. The operating crew will recognize and respond to an inadvertent half scram due to instrument failure in accordance with ARPs and Technical Specifications.
3. The operating crew will respond to a failure of RFP A per 2-AOI-3-1.
3. The operating crew will respond to a control rod reed switch failure and move the rod to a position with an operable detector per technical specifications.
5. The operating crew will recognize and respond to fuel failure in accordance with ARPs.
6. The operating crew will recognize and respond to a Main Steam line break and failure of MSIVs to auto isolate per EOI-3.
7. The operating crew will recognize and respond to a stuck open SRV in accordance with AOI-1-1 and EOI-2.
8. The operating crew will respond to RPV low water level due to HPCI, RCIC and CRD pump failure in accordance with EOI-1, RC/L C1, and C2.

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)

F. LCO/Appendix R Tracking Log

G. Calculator

H. Spray Cleaner

I. Rags

J. Markers

VIII. Scenario Summary

Unit two is at 95% power following turbine valve testing. One loop of RHRSW is tagged for repair of FCV 23-34. The crew will raise power with recirc. An inadvertent half scram will occur due to an instrument failure. The crew will respond per ARPs and Tech. Specs.

A RFP governor failure will run RFP A to minimum speed. The crew will reduce power per AOI-3-1 to within the capacity of the running RFPs.

A control rod reed switch will fail and the crew will reposition the rod to restore tech spec compliance.

Loose objects in the vessel cause fuel failure, main steam line leak, and Group 1 isolation signal. The MSIVs fail to auto close and must be manually closed.

When SRVs are cycled to maintain reactor pressure, PCV 1-179 will stick open resulting in decreasing RPV inventory and pressure. When an attempt to use HPCI is made a power failure occurs, resulting in system failure. When RCIC is operated, it will trip locally and radiation levels will preclude immediate restoration. 2A CRD pump trips. SLC should be lined to the test tank.

The scenario is terminated when the RPV level is depressurized due to inability to maintain level above – 185”.

**SURROGATE IS BRIEFED TO NOT TAKE ACTION TO CLOSE MSIVS
UNLESS DIRECTED BY SRO**

IX. Console Operator Instructions

A. Scenario File Summary

1. File: bat NRC/04NRC3

	MF/RF/IOR#	Description
a.	trg e1 HPCI trg e2 MODESW trg e3 RCIC trg e4 1-179	Sets triggers for HPCI start, Mode Switch out of Run RCIC start MSRV 1-179 HS to open
b.	imf sw03b imf swo3h ior zlohs235a[1] off ior zlohs2312a[1] off ior zlozi2331 off ior zlozi2337 off ior ypovfcv2334 fail_power ior ypovfcv2340 fail_power ior zaopi234 0 ior zaopi2311 0	Tagout of A2, C2 RHRSW pumps for repair of FCV 23-34.
c.	ior zdihs719d normal	RCIC trip appears to also be mechanical
d.	imf rp15a imf rp15b	Failure of MSIV closure on group 1 isolation
e.	imf hp07 (e1 0)	Loss of HPCI 120V AC power
f.	imf ad01m (e4 0) 100	Stuck open SRV
g.	imf rc03 (e3 0)	RCIC trip
h.	imf rd01a (e2 0)	CRD pump trip
i.	imf rd01b ior zlohs852a[1] off	Tagout of 1B CRD pump
j.	mrf sw07 aligned	Aligns RHRSW pump to EECW
k.	imf fw13c (e2 :2)	Common mode failure of RFPs
L	imf fw13b (e2 2)	
m.	trg e2 = bat NRC/04NRC3-2	Raise fuel failure amount
n.	mrf hwo1 fast	Advance recorders

2. File bat NRC/04NRC3-1

	MF/RF/IOR#	Description
a.	lmf th23 5 10:00	Fuel failure
b.	lmf th35a (none 6:00) 8 6:00	MSL break

3. File bat NRC/04NRC3-2

	MF/RF/IOR#	Description
a.	mmf th23 20 1:00	Fuel rupture

4. File bat NRC/04NRC3-3

	MF/RF/IOR#	Description
a.	dor zdihs719d normal dmf rc03	Fix RCIC

IX. Console Operator Instructions

B. Console Operator Manipulations

<u>ELAPSED TIME</u>	<u>IC/MF/RF/PFK</u>	<u>DESCRIPTION/ACTION</u>
Sim. Setup	rst 28	REDUCE POWER TO 95% WITH FLOW 95% power MOC
Sim. Setup	restorepref NRC/04NRC3	Establishes Preference Keys
Sim. Setup	Setup	Verify Preference Keys
Sim. Setup	Esc	Clears Popup Window
Sim. Setup	manual	Reduce power to 95% with recirc. (NA if IC is at 95% power)
Sim. Setup	F3	See scenario summary (bat NRC/04NRC3)
Sim. Setup	Manual	Place hold order tags on FCV 23-34, 40; A2, C2 RHRSW pumps; zi-23- 37/31 vlv pos. ind.; CRD pump 1B.

After power rise of 5% or when directed by lead evaluator	F4	Fails LIS 3-203B downscale (imf th30v 0)
---	----	--

ROLE PLAY: Wait 2 min, report LIS 3-203B about 0 inches in Aux. Inst. Room

5 min after Tech specs addressed or when directed by the lead evaluator	F5	imf fw30a
---	----	-----------

When the plant is stable or when directed by the lead evaluator	F6	imf rd25
---	----	----------

ROLE PLAY: If the failed position is not noticed in 5 minutes and with lead evaluator concurrence, call as reactor engineer and report powerplex won't run a case. Ask, "Is there a problem with the rod position indication?" (The RE hasn't determined which rod is at fault at this time.)

IX. Console Operator Instructions

B. Console Operator Manipulations

5 min after the rod is repositioned or when directed by the lead evaluator	F7	5% fuel failure and MSL leak(bat NRC/04NRC3-1)
When requested to open breaker for PCV 1-179, wait 3 min	F8	Opens breaker for PCV 1-179 (mrf ad01m out)
If requested to close breaker for PCV 1-179	F9	Closes breaker for PCV 1-179 (mrf ad01m in)
If requested to shutdown HWC	F10	Removes HWC from service (mrf OG09 shutdown)

ROLE PLAY: If asked to check RWCU Temp ATU's in Aux Inst. Room, Report 69-835 A-D Reading 120°F.

ROLE PLAY: When asked to check on HPCI, the fuse was replaced and blew again. It smells like there is a burned transformer in the inverter. A FINN team member is here and thinks they can replace the inverter in 30 to 45 minutes if there is one in the warehouse. (updates on status may be provided as requested with progress toward success indicated)

ROLE PLAY: As the RB AUO, when directed to investigate RCIC, wait 1 minute then report back that your alarming dosimeter went off and you saw a CAM in alarm when you entered the building. You are going to get Radcon to help see if you can safely get to the RCIC Room.

IX. Console Operator Instructions

B. Console Operator Manipulations

.....
NOTE: monitor FW flow. If condensate injection is observed prior to ED, imf fw18 100 to rupture the header.

<u>ELAPSED TIME</u>	<u>IC/MF/RF/PFK</u>	<u>DESCRIPTION/ACTION</u>
At about 450 psig prior to ED. Leave open if ED is initiated earlier	F11	Closes PCV-1-179 (dmf ad01m)
If requested to perform Appendix 16F & 16G wait 5 min	F12	Bypasses LPCI timers (bat app16fg)
If requested to perform Appendix 7B, wait 20 min.	<shift>F1	Aligns SLC to Test Tank (bat app07b)

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

-RPV water level restored to + 2 to + 51" (Lead examiner may desire to terminate when satisfactory progress to achieve this standard is observed)

-Reporting requirements have been made

X. Information to Evaluators:

- A. Ensure recorders are inking and recording and ICS is active and updating.
- B. Assign Crew Positions based on evaluation needs.
 - 1. SRO: Unit Supervisor/Shift Manager _____
 - 2. BUO: Board Unit Operator _____
 - 3. DUO: Desk Unit Operator _____
- C. SURROGATE DUO briefed to only close MSIVs when directed by SRO.
- D. Conduct a shift turnover with the Shift Manager and provide the Shift Manager with a copy of the Shift Turnover.
- E. Direct the shift crew to review the control board and take note of present conditions, alarms, etc.
- F. Terminate the scenario when the following conditions are satisfied or at the request of the Lead Evaluator:
 - 1. RPV level being maintained + 2 to + 51 "
 - 2. Reporting requirements have been met

XI. Simulator Event Guide

Event 1: **RAISE POWER WITH RECIRC**

<u>POSN</u>	<u>TIME</u>	<u>EXPECTED ACTIONS</u>
SRO	_____	Notifies ODS of power ascension
SRO	_____	Directs BUO to raise power at 10 MWE/min per 2-GOI-100-12
BUO	_____	Raises power to rated IAW 2-GOI-100-12 and OI-68 Section 6.2 with Recirc

XI. Simulator Event Guide

Event 2: **RPS LEVEL INSTRUMENT FAILURE**

<u>POSN</u>	<u>TIME</u>	<u>EXPECTED ACTIONS</u>
BUO	_____	Announces half scram Reports half scram due to level from 2-XA-55-4A-2 Verifies RPV level normal Refers to 2-9-4 ARP
SRO	_____	Dispatches individual to Auxiliary Instrument Room to check LIS 3-203 B and D
SRO	_____	Consults Tech Specs, 3.3.1.1, 3.3.6.1, 3.3.6.2, 3.3.7.1 determines Required actions are to place in trip in 12 hrs. which is met at this time.
SRO	_____	Directs IMs to troubleshoot and repair.
SRO	_____	Conducts briefing on loss of instrumentation.

XI. Simulator Event Guide

Event 3: **RFP A FAILURE**

<u>POSN</u>	<u>TIME</u>	<u>EXPECTED ACTIONS</u>
BUO	_____	Responds to RFP A ABN and RFP DISCH FLOW LOW annunciators (may attempt manual control of RFP A)
SRO	_____	Directs power reduction per AOI-3-1
BUO	_____	Initiates upper power runback and/or reduces recirc flow and lowers running RFP speed to <5050 rpm.
SRO	_____	Directs entry into AOI-68-1B
SRO	_____	Contacts Maintenance
	_____	Notifies ODS of power reduction
BUO/ DUO	_____	Performs 2-SR-3.3.1.1.i Directs verification that breakers 105,106, 107 are closed

XI. Simulator Event Guide

Event 4: **ROD POSITION FAILURE**

<u>POSN</u>	<u>TIME</u>	<u>EXPECTED ACTIONS</u>
BUO	_____	Identifies rod 14-35 has no position indication
SRO	_____	Enters LCO 3.1.3 and directs insertion of the rod to an operable position indication (46)
BUO	_____	Inserts rod 14-35 to position 46 and reports indication is restored
SRO	_____	Exits LCO 3.1.3
SRO	_____	Notifies Reactor Engineer
SRO	_____	Directs initiation of WR

XI. Simulator Event Guide

Event 5: **FUEL DAMAGE/MSL LEAK**

<u>POSN</u>	<u>TIME</u>	<u>EXPECTED ACTIONS</u>
DUO	_____	Announces alarms as follows: - OG Pre Trt. Rad High <ul style="list-style-type: none"> • Checks off-gas flow
SRO	_____	Notifies Chem Lab to Sample Declares NOUE (1.4-U)
DUO	_____	Announce - Turbine Bldg area radiation high <ul style="list-style-type: none"> • Check instruments as follows, reporting increase in radiation RR-90-157 (OG Pretrt) RR-90-135 (MSL Rad)
SRO	_____	Evacuates Turbine Building per ARP Notifies Rad. Con.
DUO	_____	Announce - Reactor Building Radiation High <ul style="list-style-type: none"> • Checks RB instruments to determine affected areas
SRO	_____	Evacuates Reactor Building per ARP Notifies Rad Con
SRO	_____	Enters 2-EOI-3 (may direct power reduction with recirc flow)

XI. Simulator Event Guide

Event 5: **FUEL DAMAGE/MSL LEAK** (continued)

<u>POSN</u>	<u>TIME</u>	<u>EXPECTED ACTIONS</u>
DUO	_____	Recognize and announce Group 6 isolation on high radiation
DUO	_____	Reports alarm "Main Steam Tunnel Temp High" and verifies on TI 1-60A
SRO	_____	Directs Core Flow Runback
SRO	_____	Renters 2-EOI-3
SRO	_____	Enters EOI-1 and Directs manual scram
BUO	_____	Manually scrams and verifies all rods inserted
SRO	_____	Directs BUO to carry out actions of 2-AOI-100-1
BUO	_____	Carries out 2-AOI-100-1 actions <ul style="list-style-type: none"> - Mode switch in S/D - Trips main turbine - Verify recirc pumps at minimum - Verifies Gp 2, 3, 6 and 8 isolations

XI. Simulator Event Guide

Event 5: **FUEL DAMAGE/MSL LEAK** (continued)

<u>POSN</u>	<u>TIME</u>	<u>EXPECTED ACTIONS</u>
DUO	_____	Closes MSIVs prior to isolation Or Reports MSIVs not closed on MSL high temp (189 F) on panel 9-5 alarms.
SRO	_____	Directs MSIV closure, if not already directed
DUO	_____	Closes MSIVs
BUO	_____	Announces CRD Pump Trip and loss of RFPs
SRO	_____	Directs pressure control 800 to 1000 psig
DUO	_____	Directs level control + 2" to + 51" using - RCIC(5D) - HPCI (5C) Controls pressure as directed using SRVs; (11A) Attempts to control level as directed using HPCI (5C) and RCIC (5D)

XI. Simulator Event Guide

Event 6: **STUCK OPEN SRV, HPCI/RCIC/CRD FAILURE**

<u>POSN</u>	<u>TIME</u>	<u>EXPECTED ACTIONS</u>
DUO	_____	Reports HPCI failure (120V Power Alarm)
DUO	_____	Reports RCIC TRIP Reports failure of RCIC to reset
SRO	_____	Dispatches AUO to reset RCIC Dispatches OS-US to replace HPCI power supply fuses
DUO	_____	Reports PCV 1-179 failure to close after use
DUO	_____	Cycles PCV 1-179 per AOI-1-1 and reports valve remains open
SRO	_____	Directs actions to close PCV 1-179 per AOI-1-1 outside control room
DUO	_____	Reports PCV 1-179 does not close
DUO	_____	Monitors torus temperature

XI. Simulator Event Guide

Event 6: **STUCK OPEN SRV, HPCI/RCIC/CRD FAILURE** (continued)

<u>POSN</u>	<u>TIME</u>	<u>EXPECTED ACTIONS</u>
SRO	_____	Enters EOI-2 at 95 degrees F Torus temperature
SRO	_____	Directs available RHR placed in suppression pool cooling.
DUO	_____	Places all available Torus Cooling I/S
SRO	_____	Requests appendices 16F and 16G
	_____	Directs Appendix 8G
SRO	_____	Directs Appendix 7B
BUO	_____	Performs Appendix 7B Verifies recirc pumps trip at -45"
SRO	_____	Directs preventing flooding vessel via Condensate system by closing RFP discharge valves
BUO	_____	Closes RFP discharge valves
DUO	_____	Performs Appendix 8G
SRO	_____	Enters C1, Directs ADS inhibited
DUO	_____	Inhibits ADS

XI. Simulator Event Guide

Event 6: **STUCK OPEN SRV, HPCI/RCIC/CRD FAILURE** (continued)

<u>POSN</u>	<u>TIME</u>	<u>EXPECTED ACTIONS</u>
DUO	_____	Reports DG starts; Dispatches AUO to monitor
SRO	_____	When level decreases to TAF determines/verifies that sufficient injection sources are available to not enter steam cooling and continues to wait for system restoration until RPV level approaches -185" before entering C2
SRO	_____	Directs RHR be realigned for from Torus Cooling to injection
DUO	_____	Secures Torus Cooling and aligns RHR for injection
SRO	_____	Directs opening 6 ADS valves
DUO	_____	Opens 6 ADS valves as directed
SRO	_____	Directs DUO to inject with ECCS until level is above -122" then secure systems to not exceed + 51"; Directs restoration of Torus Cooling after RWL control is established.
DUO	_____	Operates and secures ECCS injection as directed/reestablishes Torus Cooling as directed
SRO	_____	Directs BUO to restore level + 2" to + 51" with Condensate
BUO	_____	Injects with Condensate to restore level +2 " to + 51"
SRO	_____	Classifies event as Site Area Emergency (1.1-S1)

XII. Crew Critical Tasks

	<u>Task</u>	<u>SAT/UNSAT</u>
1.	Isolates MSIVs prior to 2 2-EOI-3 Area Radiations/Temperatures reaching Max Safe	_____
2.	Inhibits ADS	_____
3.	Emergency Depressurizes when below TAF and before level drops to -185"	_____

Additional Individual Critical Task

If SRO directs 2/3 core height override then the SRO will verify that the RHR system is fully realigned for injection when required.

SCENARIO REVIEW CHECKLIST

SCENARIO NUMBER 04NRC3

6 Total Malfunctions Inserted; List: (4-8)

- 1) LT failure
- 2) RFP failure
- 3) RPIS failure
- 4) Fuel Failure
- 5) MSL Leak with MSIV Auto Close Failure
- 6) Stuck Open SRV

2 Malfunctions That Occur After EOI Entry; List: (1-4)

- 1) MSIV Auto Close Failure
- 2) Stuck open SRV

3 Abnormal Events; List: (1-3)

- 1) Fuel Failure
- 2) Stuck open SRV
- 3) RFP trip

2 Major Transients; List: (1-2)

- 1) Fuel Failure
- 2) MSL Leak

2 EOIs used; List: (1-3)

- 1) EOI-3
- 2) EOI-1

2 EOI Contingencies Used; List: (0-3)

- 1) C1, C2

80 Run Time (minutes)

35 EOI Run Time (minutes); 46 % of Scenario EOI Run Time

3 Crew Critical Tasks (2-5)

Yes Technical Specifications Exercised (yes/no)

SHIFT TURNOVER SHEET

Equipment Out of Service/LCOs FCV 23-34 repair underway, clearance has both 2A & 2C
RHR Hx inop for containment cooling. Out of service 6 hours, expected back in 12 hours. 7
day LCO entered per T.S. 3.7.1, 3.6.2.3, 3.6.2.4, 3.6.2.5. All Appendix R, T.S. LCO's have
been addressed.

1B CRD pump is tagged for breaker maintenance.

Operations/Maintenance For the Shift Raise Unit 2 to 100% power at 10MWe/min. Support
maintenance on RHRSW valve.

Power was reduced for turbine valve testing which has been completed.

Unusual Conditions/Problem Areas Thunderstorm warning in effect next 2 hours in
Limestone County.

Facility: BFN

Scenario Number: HLT0212#5

Op-Test Number:

FinalExaminers: Tim Kolb
Ron AielloOperators: _____

Initial Conditions: IC 45, 77% pwr

Turnover: At ~75% power for CBP 2B repairs and rod pattern adjustment. 1B CRD pump, FCV 74-100, and RHR 2A OOS. Withdraw rods per pull sheet, then continue power ascension with flow after CBP 2B RTS.

Event Number	Malfunction Number	Event Type*	Event Description
1	None	R-RO R-SRO	Raise Power by Withdrawing rods.
2	rd05	C-RO C-SRO	Control Rod 14-47 uncouples.
3	rd04	C-RO C-SRO	Rod drift out. TS for SRO
4	I-O overrides	C-SRO	RWCU Spurious isolation TS for SRO
5	HP07	C-SRO	HPCI Power supply failure. Restore to service after RPV level is below -122.5".
6	Fw02a Ed08c	M-ALL	CBP trip and loss of unit board 2C yielding loss of normal feedwater.
7	Th22 0.2, Pc16a,b,c	M-ALL	Recirc Suction Leak/LOCA.

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

SIMULATOR EVALUATION GUIDE

TITLE : CONTROL ROD ADJUSTMENT, CONTROL ROD 14-47 UNCOUPLED,
CONTROL ROD DRIFT OUT, SPURIOUS RWCU ISOLATION, HPCI
CONTROL POWER SUPPLY FAILURE, LOSS OF NORMAL
FEEDWATER, RPV RECIRC SUCTION LEAK/LOCA, RCIC TRIP.

REVISION : 0

DATE : April 1, 2004

PROGRAM : BFN Operator Training

PREPARED BY: _____ \ _____
(Operations Instructor) Date

REVIEWED BY: _____ \ _____
(BFN Lead Examiner or Designee) Date

REVIEWED BY: _____ \ _____
(Operations Training Manager or Designee) Date

CONCURRED: _____ \ _____
(Operations Superintendent or Designee) Date

VALIDATION
BY: _____ \ _____
(Operations US) (Required for Exam Scenarios only) Date

NUCLEAR TRAINING				
REVISION/USAGE LOG				
REVISION NUMBER	DESCRIPTION OF CHANGES	DATE	PAGES AFFECTED	REVIEWED/REVISED BY
0	INITIAL	04/01/04	All	JT

- I. Program: BFN Operator Training
- II. Course: Examination Guide
- III. Title: CONTROL ROD ADJUSTMENT, CONTROL ROD 14-47 UNCOUPLED, CONTROL ROD DRIFT OUT, SPURIOUS RWCU ISOLATION, HPCI CONTROL POWER SUPPLY FAILURE, LOSS OF NORMAL FEEDWATER, RECIRC SUCTION LEAK/LOCA, RCIC TRIP
- IV. Length of Lesson: 1.5 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 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, abnormal, annunciator and emergency procedures.
 - 4. Use step text procedural compliance (WANO).

B. Enabling Objectives:

1. The operating crew will raise power with control rods per RE instructions.
2. The crew will respond to an uncoupled control rod (14-47)
3. The operating crew will respond to a control rod drifting out due to a stuck withdraw valve.
4. The operating crew will respond to Spurious RWCU isolation.
5. The operating crew will respond to failure of HPCI (Loss of Control Power)
6. The operating crew will recognize and respond to a loss of feedwater per 2-EOI-1.
7. The operating crew will recognize and respond to a small LOCA per 2-EOI-1 and 2, RCIC Trips.
8. The crew will spray the drywell to maintain containment less than 280 degrees F and pressure below PSP limit. HPCI will be returned to service and Reactor Water Level will be restored.

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)

F. LCO/Appendix R Tracking Log

G. Calculator

H. Spray Cleaner

I. Rags

J. Markers

VIII. Console Operator Instructions

A. Scenario File Summary

1 File bat NRC/04NRC5

	MF/RF/IO#	Description
a)	trg e1 MODESW	Assigns trigger
b)	trg e2 7316open	Assigns trigger
c)	imf fw02b	2B Condensate Booster Pump Trip
d)	ior zlohs0262a[1] off	Green light off for 2B Condensate Booster Pump
e)	ior zlohs0262a[2] off	White light off for 2B Condensate Booster Pump
f)	imf rh01a	2A RHR Pump tag out
g)	ior ypobkrpmparh fail_power	2A RHR Pump tag out
h)	ior zlohs745a[1] off	Green light off for 2A RHR Pump
i)	trg e7 withdraw1827	Set rod movement out trigger
j)	Imf rd04r1827 (e7 0)	Drift rod 18-27 out when withdrawn
k)	imf th21 (e1 2:00) .2 5:00	Leak in Drywell
l)	Imf pc16a (e1 4:00) Imf pc16b (e1 4:00) Imf pc16c (e1 4:00)	Drywell Vacuum Breaker Rupture
m)	Trg e6 RCIC	
n)	lor zdihs719d (e6 5:00) trip	RCIC Trip
o)	ior ypovfcv74100 fail_power_now	FCV 74-100 tag out
p)	mrf hw01 fast	Advance recorders
q)	Imf rd05r1447	14-47 Rod uncoupled
r)	Imf rd01b	CRD Pump Tagout
s)	lor zlohs852a [1] off	CRD Pump Tagout
t)	lor zdihs852a stop	CRD Pump Tagout

VIII. Console Operator Instructions

B. Scenario File Summary

2. File: bat NRC/04NRC5-1

	MF/RF/IOR#	Description
a)	imf ed08c (none :20)	Trips unit Board C 1 minute after file triggered
b)	imf fw02a (none 0:25)	Trips 2A Condensate Booster pump
c)	ior an:2xa556a19 alarm_on	Low Condensate Booster Pump Suction alarm
d)	trg e5 false	

2. File: bat NRC/04NRC5-2

	MF/RF/IOR#	Description
a)	lor zloil64a1 off lor an:2xa555b11 alarm on	Steam Tunnel Temperature Detector Failure

3. File: bat NRC/04NRC5-3

	MF/RF/IOR#	Description
a)	trg e3 pcisia trg e3 = dor zloil64a1 dor an:2xa555b11	Delete Steam Tunnel Temperature Detector Failure

4. File: bat app16fg

	MF/RF/IOR#	Description
a)	mrf rh14 byp	Loop I LPCI timers bypassed
b)	mrf rh15 byp	Loop II LPCI timers bypassed

5. File: bat NRC/04NRC5-4

	MF/RF/IOR#	Description
a)	imf rd08r1827 0	simulate valving out rod
b)	lmf rd06r1827	
c)	dmf rd04r1827	Delete rod drift

5. File: bat NRC/04NRC5-5

	MF/RF/IOR#	Description
a)	ior zdihs691 close	Close fcv 69-1
b)	trg e4 691close	
c)	trg e4 = dor zdihs691	Remove override
d)	bat rwcudeminsout	Places demins in hold

6. File: bat rwcudeminsin

	MF/RF/IOR#	Description
a)	mrf cu01 55 1:00	Roll in demin A
b)	mrf cu02 55 1:00	Roll in demin B

7. File: bat rwcudeminsout

	MF/RF/IOR#	Description
a)	mrf cu01 0 :30	Roll out demin A
b)	mrf cu02 0 :30	Roll out demin B

VIII. Console Operator Instructions

B. Console Operator Manipulations

<u>ELAPSED TIME</u>	<u>PFK</u>	<u>DESCRIPTION/ACTION</u>
Sim. Setup	pwrst 45	75% power, SU
Sim. Setup	restorepref	Establishes Preference Keys
Sim. Setup	NRC/04NRC5 setup	Verify Preference Keys
Sim. Setup	esc	Clears Popup Window
Sim. Setup	F3	Trigger e1 on mode switch (trg e1 MODESW)
Sim. Setup	manual	Trip 2B Condensate Booster Pump.
Sim. Setup	F4	See scenario summary (bat NRC/NRC5)
Sim Setup	manual	a. Tag 2A RHR Pump, b. Tag 2B CBP c. Clear alarms, d. Tag FCV 74-100
Instructor	manual	Provide turnover sheet and pull sheet to crew

ROLE PLAY: When requested as Reactor Engineer, Notify the control room that thermal limits will be checked and permission is granted to try and recouple rod 14-47 per 2-AOI-85-2

When rod is inserted to 46	F5	dmf rd05r1447, allows recoupling control rod
While rod 18-27 is being driven to full in	F6	dmf rd04r1827; removes rod drift
If requested to valve out rod 18-27	F7	Valve out rod 18-27 (bat NRC/04NRC5-4)

MORE FOLLOWS ↓

VIII. Console Operator Instructions

B. Console Operator Manipulations

ROLE PLAY: When requested as Reactor Engineer, Reactor Engineer will work with the System Engineer to get a plan together to deal with the inserted rod. Maintain power until the new pull sheet is ready.

2 minutes after RE has been consulted for rod 18-27	F8	RWCU isolation Bat NRC-04NRC5-5
---	----	------------------------------------

ROLE PLAY: 5 minutes after Call as IM supervisor and report the crew installing a mod for improving MOVATS test capabilities accidentally landed a new lead being installed in the FCV-69-1 close circuit on a hot terminal. The circuit is restored to normal and work is stopped.

ROLE PLAY: Act as RB AUO and report demins properly in hold and you are raising flow when requested to place them in service.

When ready to restore demins to service	F9	Places RWCU demins in service (bat rwcudeminsin)
2 minutes after tech specs addressed for PCIS	F10	Imf hp07 (Inserts HPCI Control Power Failure)
2 minutes after tech specs addressed for HPCI and maintenance requested to troubleshoot	F11	Bat NRC/04NRC5-1 (Loss of Unit Board and Feedwater)

VIII. Console Operator Instructions

B. Console Operator Manipulations

ROLE PLAY: If Requested, AFTER RWL drops below -122", Maintenance notifies CR that HPCI Control Power Fuses have been replaced

After RWL drops below, -122" or per Lead Instructor	F12	Dmf hp07 (Deletes HPCI loss of Control Power)
When asked to perform appendix 8e, wait 5 minutes	< shift> F1	Bat app08e
If asked to execute Appendix 16F and 16G wait 5 minutes	<shift> F2	LPCI timers bypassed (bat app16fg)
If requested to pump down the torus	<shift> F3 or <shift> F4	Lines up and starts RHR drain pump A (bat app18rhra) Lines up and starts RHR drain pump B (bat app18hrb)
When requested wait 25 minutes	<shift> F5	Bat appo7b (Aligns SLC for injection)

Terminate the scenario when the following conditions are satisfied or when requested by Lead Evaluator:

Drywell pressure is below PSP
Reactor level stable between + 2" and + 51"

IX. Scenario Summary

The unit is operating at 70% power. The 2B Condensate Booster Pump is out of service for repair of an oil leak. The 2A RHR pump is out of service for preventive maintenance. Currently in a 7 day LCO via Tech Spec 3.5.1. FCV 74-100 is tagged out for maintenance.

The crew will commence to raise power by pulling control rods, Control Rod 14-47 will uncouple and the crew will respond to an uncoupled rod per 2-AOI-85-2, Control rod 18-27 will drift out requiring the crew to fully insert it per 2-AOI-85-6.

The crew will respond to a spurious RWCU System isolation and restore the system to service.

A spurious low suction pressure signal will cause a loss of condensate booster pump 2A. Condensate booster pump 2C will trip due to a overcurrent lockout of 2C unit board. A loss of normal feedwater will occur and the reactor will scram.

HPCI fails to initiate(Loss of Control Power) , A small RPV suction leak occurs, requiring venting, suppression pool sprays, and drywell sprays per EOI-2. Three drywell vacuum breakers rupture causing a partial loss of pressure suppression function. RCIC trips, Maintenance activities allow restoration of HPCI and Reactor water Level is restored before Rx Level reaches -185"

X. Floor Instructor Instructions

A. Assign crew positions (assign positions based on evaluation requirements for personnel).

- 1. SRO : Unit Supervisor/Shift Manager _____
- 2. BUO : Board Unit Operator _____
- 3. DUO : Desk Unit Operator _____

B. Review the shift briefing information with the operating crew. Provide SRO with a copy of Shift Turnover Sheet, Reactivity Plan, and pull sheet for scenario.

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

D. Ensure recorders are inking and recording and ICS is active and updating. Note any deficiencies during shift briefing.

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

- 1. Drywell pressure is below PSP
- 2. RPV level at + 2" to + 51"

XI. Simulator Event Guide

Event 1: **RAISE POWER USING CONTROL RODS**

<u>POSN</u>	<u>TIME</u>	<u>EXPECTED ACTIONS</u>
CREW	_____	Accepts shift turnover
SRO	_____	Directs BUO to withdraw rods per movement sheet
BUO	_____	Withdraws rods per movement sheet
DUO	_____	Peer Checks rod withdrawals

XI. Simulator Event Guide

Event 2: **CONTROL ROD 14-47 UNCOUPLED**

<u>POSN</u>	<u>TIME</u>	<u>EXPECTED ACTIONS</u>
CREW	_____	Recognizes symptoms of an uncoupled rod
SRO	_____	Directs BUO to respond to uncoupled rod per 2-AOI-85-2
SRO	_____	Notifies Reactor Engineer of uncoupled rod per 2-AOI-85-2 and requests permission to proceed with re-coupling rod 14-47
BUO	_____	Performs actions to recouple rod per 2-AOI-85-2, section 4.2.3
BUO	_____	Performs coupling check of rod 14-47
SRO	_____	Determines rod is restored to Operable

XI. Simulator Event Guide

Event 3: **ROD DRIFT OUT**

<u>POSN</u>	<u>TIME</u>	<u>EXPECTED ACTIONS</u>
BUO	_____	Responds to rod drift annunciator; - identifies rod; - informs SRO; - selects rod and applies insert signal per 2-AOI-85-6 (CR 18-27)
SRO	_____	Enters 2-AOI-85-6 and directs actions Checks TS 3.1.3.C (not INOP until maintenance begins)
SRO	_____	Consults with reactor engineer (and system engineer)
BUO	_____	drives rod to 00 releases insert signal and determines rod settles at 00

XI. Simulator Event Guide

Event 4: **RWCU ISOLATION**

<u>POSN</u>	<u>TIME</u>	<u>EXPECTED ACTIONS</u>
Crew	_____	Recognizes RWCU Isolation, responds per the ARP
SRO	_____	Enters 2-AOI-64-2a
SRO	_____	Contacts Rx Engineer for heat balance
SRO	_____	Notify Chemistry and RadCon
SRO	_____	Evaluate Tech. Spec. (TRM TSR 3.4.1) Chemistry, sampling required (If not returned to service)
SRO	_____	Directs restoration of system after cause is determined
BUO	_____	Restores RWCU per 2-OI-69 (optional) -Verifies RWCU Filters are in Hold -Opens 2-FCV-69-1 -Opens 2-FCV-69-8 -Adjust 2-FCV-69-12 for pump startup -Start one RWCU pump and open 2-FCV-69-12 to achieve > 56 gpm -Start the second RWCU pump and attain ~300 gpm flow -coordinate with RB AUO and place demins in service
DUO	_____	Notifies Chemistry
DUO	_____	Notifies Rx. Engineer

XI. Simulator Event Guide

Event 5: **LOSS OF 120VAC HPCI CONTROL POWER**

<u>POSN</u>	<u>TIME</u>	<u>EXPECTED ACTIONS</u>
DUO	_____	Announces Loss of HPCI Control Power Annunciator on Panel 9-3
SRO	_____	Dispatches field personnel to investigate and troubleshoot the loss of Control Power per ARP
SRO	_____	Declares HPCI Inop per TS 3.5.1.D, 72 hour LCO due to inop RHR A.

XII. Simulator Event Guide

Event 6: **LOSS OF FEEDWATER**

<u>POSN</u>	<u>TIME</u>	<u>EXPECTED ACTIONS</u>
DUO	_____	Announces "Cnds Bstr Pump "2A" Suct Press Low" Alarm
DUO	_____	Announces Condensate Booster Pump 2A trip
Crew	_____	Identifies loss of 2C unit board
BUO	_____	Announces loss of RFP's
SRO	_____	Directs manual scram
BUO	_____	Inserts a manual scram; Places mode switch in shutdown verifies all rods in makes scram report
DUO	_____	Trips main turbine

XIII. Simulator Event Guide

Event 6: **LOSS OF FEEDWATER** (continued)

<u>POSN</u>	<u>TIME</u>	<u>EXPECTED ACTIONS</u>
SRO	_____	Enters EOI-1 on low level and directs: -Verifications of group isolations and initiations -entry into AOI-100-1 -verifies Turbine Bypass valves controlling pressure
DUO	_____	Verifies Group isolations (2, 3, 6, & 8)
DUO	_____	Starts/verifies start RCIC
BUO	_____	Inserts SRMs & IRMs and follows power down Verifies Recirc pumps run back/trip Shutdown H ₂ water chemistry
SRO	_____	Dispatches US/AUO to check status of 2C unit Board

XI. Simulator Event Guide

Event 7: **RPV Recirc Suction Leak/LOCA**

<u>POSN</u>	<u>TIME</u>	<u>EXPECTED ACTIONS</u>
Crew	_____	Identifies drywell pressure/temperature rise
SRO	_____	Enters EOI-2 and re-enters EOI-1 when drywell pressure exceeds 2.45 psig or orus level.
DUO	_____	Verifies Diesel generators start
DUO	_____	Directs AUO to monitor D/G
SRO	_____	Directs the following: <ul style="list-style-type: none"> • All available drywell cooling in service • Venting per App 12 • H₂/O₂ Analyzers placed in service • Directs Appendix 8G
DUO	_____	Verifies all drywell blowers in service
DUO	_____	Vents per Appendix 12
DUO	_____	Places H ₂ /O ₂ Analyzers in service using keylock bypass switches
DUO	_____	Performs App 8G

XI. Simulator Event Guide

Event 7: **RPV Recirc Suction Leak/LOCA (continued)**

<u>POSN</u>	<u>TIME</u>	<u>EXPECTED ACTIONS</u>
SRO	_____	Directs Appendix 5B from CRD
BUO	_____	Performs Appendix 5B
DUO	_____	Monitors containment parameters and reports rate of rise of suppression chamber pressure and drywell temperature
SRO	_____	Determines venting and plant cooldown will not maintain suppression chamber pressure <12 psig and:
SRO	_____	Directs Torus Sprays be placed in service per Appendix 17C
DUO	_____	Places Torus sprays in service per Appendix 17C
SRO	_____	When PSC pressure exceeds 12 psig or if determines drywell temperature to exceed 280 degrees F <ul style="list-style-type: none"> • verifies in Safe Region of DW spray curve • verifies SP level <18 feet
SRO	_____	Directs drywell blowers removed from service
SRO	_____	Directs drywell sprays initiated
SRO	_____	Directs drywell sprays stopped before drywell pressure drops below 0 psig

XI. Simulator Event Guide

Event 6: **RPV Recirc Suction Leak/LOCA** (continued)

<u>POSN</u>	<u>TIME</u>	<u>EXPECTED ACTIONS</u>
SRO	_____	Directs LPCI timers bypassed per Appendix 16F and 16G
DUO	_____	Trips/verifies Recirc pumps tripped
DUO	_____	Removes drywell blowers from service or reports trips of blowers
DUO	_____	Initiates drywell sprays
Crew	_____	Continues to monitor Rx Level and containment parameters
DUO	_____	Recognizes loss of RCIC
SRO	_____	Dispatches AUOs/OSUS to investigate loss of RCIC

XI. Simulator Event Guide

Event 6: **RPV Recirc Suction Leak/LOCA** (continued)

<u>POSN</u>	<u>TIME</u>	<u>EXPECTED ACTIONS</u>
SRO	_____	Directs DUO to utilize HPCI to restore level when notified by Maintenance of the successful restoration of 120 VAC Control Power
Crew	_____	Monitors PC temp and pressure
SRO	_____	Direct Drywell sprays removed before 0 psig Drywell Pressure
DUO	_____	Secures Drywell Sprays
SRO	_____	Directs level be maintained above -162 using available systems
DUO	_____	Maintains level above -162 using Core Spray, LPCi, & HPCI (If inservice)
SRO	_____	Directs Drywell spray again (if required)
SRO	_____	Classifies event as an ALERT (2.1-A)

XII. Crew Critical Tasks

	<u>TASK</u>	<u>SAT/UNSAT</u>
1.	Maintain RPV water level above TAF	_____
2.	Maintain Drywell pressure below PSP	_____

SCENARIO REVIEW CHECKLIST

SCENARIO NUMBER 2004NRC5

- 8 Total Malfunctions Inserted; List: (4-8)
- 1) Loss of 2A Condensate Booster Pump
 - 2) Coolant Leak in Drywell
 - 3) Control Rod Uncoupled
 - 4) Drywell Vacuum Breaker Failures
 - 5) Control Rod drifts out
 - 6) RWCU Isolation valve closure
 - 7) HPCI Power supply failure
 - 8) RCIC Trip
- 3 Malfunctions That Occur After EOI Entry; List: (1-4)
- 1) Steam Leak in Drywell
 - 2) RCIC Trip
 - 3) Drywell Vacuum Breaker Failure
- 3 Abnormal Events; List: (1-3)
- 1) Control Rod Uncoupled
 - 2) Control Rod Drifts Out
 - 3) RWCU isolation
- 2 Major Transients; List: (1-2)
- 1) Loss of Normal Feedwater
 - 2) Drywell Leak
- 2 EOIs used; List: (1-3)
- 1) EOI-1
 - 2) EOI-2
- 1 EOI Contingencies Used; List: (0-3)
- 1) C1
- 80 Run Time (minutes)
- 35 EOI Run Time (minutes); 25 % of Scenario EOI Run Time
- 2 Crew Critical Tasks (2-5)
- Yes Technical Specifications Exercised (yes/no)

SHIFT TURNOVER SHEET

Equipment Out of Service/LCOs Unit at 75% power due to 2B Condensate Booster Pump out of service for oil leak. 2B Condensate pump secured per GOI. CRD Pump 1B tagged out for Breaker work

2-FCV-74-100 tagged out for maintenance on the actuator, valve has a mechanical locking device installed and is closed. Actuator is removed.

2A RHR pump was found 2 hours ago with no oil in the upper sight glass. Dual Unit matrix addressed and a priority 2 work order has been initiated. The system engineer is evaluating compensatory measures. A 7 day LCO (TS 3.5.1) and 30 day LCO (TS 3.6.2, 3, 4, & 5) has been entered and the pump has been tagged.

Mech maint estimates 3 hours to repair a leaking oil fitting which was found damaged.

Operations/Maintenance For the Shift: withdraw rods per RE instructions to establish rod pattern. Do not exceed 80% power until 2B Condensate Booster Pump is repaired (expected late this shift).

When 2B CBP is restored, return to rated power.

Unusual Conditions/Problem Areas Reactor Engineer Expects Xenon to build-in over next few hours.