BRUNS\	NICK	Scenario No.:2012-2 Op Test No.: FINAL Operators: (SRO)		
		(RO)		
		(BOP)		
ditions: The out	e plant is op age. 1A NS	perating at ~ 62% power during startup following a refueling W Pump is under clearance.		
Fol ser	lowing shift vice	turnover, place the second Reactor Feedwater Pump (2B) in		
Malf. No.	Event Type*	Event Description		
	N-BOP N-SRO	Place the 2B Reactor Feedwater Pump in service.		
ES022F	C-RO C-SRO	HPCI Inadvertent Initiation with F012 Min Flow VIv failing to close (AOP-03) (TS)		
RW007F	C-RO C-SRO	Resin Intrusion (AOP-26)		
	R–RO R-SRO	Lower power IAW RRCP		
EE030M- 2TD	C-BOP C-SRO	MCC 2TD trip / Standby Stator Water Cooling Pump fails to auto start		
	C-BOP C-SRO	Main Stack Rad Monitor power failure with failure of Group 6. (TS)		
ATWS 2	M-ALL	Stator Cooling temperature controller failure ATWS condition requiring entry to LPC. Perform LEP-02.		
	C-RO	SDV Vents and Drains Failure.		
K2119A	C-SRO			
K2119A K2119A	C-SRO C-RO C-SRO	SLC pumps will not start. Perform LEP-03.		
	BRUNS BRUNS BRUNS Diffield Gitions: The out Fol ser Malf. No. ES022F RW007F EE030M- 2TD EE030M- 2TD	BRUNSWICK ditions: The plant is op outage. 1A NS Following shift service Malf. No. Event Type* Malf. No. Event Type* N-BOP N-SRO ES022F C-RO C-SRO RW007F C-SRO RW007F C-SRO RW007F C-SRO R-RO R-SRO EE030M- 2TD C-SRO C-BOP C-SRO C-BOP C-SRO ATWS 2 M-ALL		

Scenario Description

Event 1 - Place the second reactor feed pump in service IAW 2OP-32.

- Event 2 After the Feed Pump is in service HPCI will inadvertently initiate. The crew will verify level and then secure HPCI. HPCI manual isolation pushbutton will fail. If injection occurs, the crew will enter AOP-03. Technical Specifications will be addressed. I/C will report they have caused the initiation will working in panel H620. The min flow valve will fail to close while resetting HPCI.
- Event 3a A RWCU filter demin will fail resulting in resin intrusion to the reactor. The resin intrusion will cause high reactor conductivity alarms and the crew will enter AOP-26. RWCU should be isolated.
- Event 3b RRCP entered on Hi Main Steam Line Rad. Power should be reduced to clear the alarm.
- Event 4 MCC 2TD will trip and the standby stator cooling water will fail to auto start. The standby stator cooling water pump can be manually started. The 2D air compressor will also be lost and 0AOP-20.0 may be entered. Unit One may be contacted to start the 1D Air Compressor.
- Event 5 Power to the Main Stack Rad Monitor will be lost. The power results in Group 6 isolation and Secondary containment isolation. The group 6 will fail to isolate and all actions will be done manually. Technical Specifications will be addressed.
- Event 6a- The Stator Cooling system temperature control valve will fail closed. Stator coolant temperatures will rise and alarm in the control room. Temperatures continue to rise until the Stator Coolant trip circuit energizes. The APP directs a manual reactor scram and turbine trip. On the scram rods ~100 of the control rods will fail to fully insert. The crew will respond to the ATWS per LPC.
- Event 6b- Control rods can be manually driven into the core with RMCS. The SDV Vents & Drains will fail. When level has been lowered and level band has been established, the SDV V&D will be repaired. Control rods can then be inserted by repeated manual scram.
- Event 6c- When SLC initiation is attempted, neither SLC pump will start due to switch failure. If RWCU was not isolated earlier then RWCU will not automatically isolate requiring manual isolation of G31-F004. The crew will perform LEP-03 and align for alternate boron injection using CRD.
- Event 6d- The crew will terminate and prevent injection, re-injection will start when level is at 90 inches due to Table 3 conditions not met. Feedwater and RCIC will be available for level control. When all control rods are inserted and level is being raised to the normal band of 170 to 200 inches the scenario may be terminated.





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VALIDATED BY:	Operations Department Rep.	09.20.17 DATE
APPROVED BY:	Facility Representative	9/27/12 DATE

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Simulator Setup

Initial Conditions:

IC ENP-24.5 for IC 9 Rx Power 62% Core Age BOC

Events:

Event #	Trigger	Description	
1	NA		Place Reactor Feed Pump in Service
2	1	Manual	Inadvertent HPCI initiation
3	3	Manual	Resin Intrusion
4	4	Manual	MCC 2TD Loss
5	2	Manual	Main Stack Rad Monitor Power Failure
6a	5	Manual	Stator Coolant Temperature Failure
6b	NA	Auto	Scram Discharge Vents and Drains fail closed
<u>6</u> c	NA		SLC switch failure

Malfunctions Summary

Shac	ed entries are Active	
Onicic		

Malf. ID	M ID	Description	Current Value	Target Value	Ramp Time	Act. Time	Deact Time	Trig
RP010F		ATWS 3	True	True				
ES057F		HPCI TRIP FAILURE	False	True				
ES014F		HCIC INADVERTANT START	FALSE	TRUE				1
RD036F		Scram Disc Vol Drn Fails Closed	False	True				5
XY009F		Stator Cing Temp Contr Fails	False	True				5
RW007F		RWCU RESIN INJ TO RX VESSEL	False	True				3
RP005F		Auto Scram Defeat	False	True				7
EEO3OM	2TD	Individual Bus Failure	False	True				4

Remotes Summary

Remote ID	Mult. ID	Description	Current Value	Target Value	Trig
ED_IAUPB2A6		UPS 2A to Sample Detection Skid	Closed	Open	2
EP_IAEOPJP1		Bypass LL3 Group I Isol	Off	On	8
EP_IACS993U		DW CLR A&D Overide – Normal/Run	Normal	Run	10
EP_IACS994U		DW CLR B&C Overide – Normal/Run	Normal	Run	10
EP_IASW5997		SW-V106 LOCA Override	Normal	Bypass	10
EP_IASW5998		SW-V103 LOCA Override	Normal	Bypass	10
SL_IALEP03		Alt = Sub Pump / Hose Lineup	Normal	Alt	11
RS_IAFLTFVD	FILTA	FILTER OUTLET VLV MANUAL DEMAND			
RW_IAFLTFVB		FILTER B OUTLET VLV CONTROLLER MODE			
RW_IAFLTFVA		FILTER A OUTLET VLV CONTROLLER MODE			
AI_IAIU1CMPRSS		Unit 1 Air Compressor Status	Off	Off	

Switches Summary

Switch ID	Description	Target Position	Override Value	Trig
K2119A	S/B Liq Pump A-B	Stop	On	
K2119A	S/B Liq Pump A-B	Pump A	Off	
K2119A	S/B Liq Pump A-B	Pump AB	Off	
K2119A	S/B Liq Pump A-B	Pump B	Off	
K6106A	CAC PURGE & VENT VLV ISOL	Override	On	
K6106A	CAC PURGE & VENT VLV ISOL	Off	Off	
K5412A	Stat Coolant Pmp A	Auto	Off	

Annunciator Summary

Window	Description	Tagname	Override	Oval	AVal	Actime	Dactime	Trig
1-9	LOSS OF STAT COOLANT TRIP CKT ENER	ZUA219	ON	ON	OFF	20 Sec		5

Special Instructions

- 1. Ensure simulator security is established IAW TAP-411.
- 2. Ensure appropriate keys have blanks in switches.
- 3. Reset alarms on SJAE, MSL, and RWM NUMACs.
- 4. Ensure no rods are bypassed in the RWM.
- 5. Ensure hard cards and flow charts are cleaned up.
- 6. Ensure all key have blanks installed.
- 7. Ensure affected procedures are free of any marks.
- 8. Place all SPDS displays to the Critical Plant Variable display (#100).
- 9. Reset to IC-9 and place in run.
- 10. Ensure ENP-24.5 form for IC-9 is located at the P603 panel.
- 11. Raise power to ~62% using recirc.
- 12. Adjust FWLC setpoint to 190 inches.
- 13. Ensure 2B Stator Cooling Pump running and 2A in standby
- 14. Load scenario file, if required.
- 15. Place protected equipment placards on 2A and 2B NSW Pumps.
- 16. Update orange protected equipment board with 1B, 2A, and 2B NSW.
- 17. Advance all chart recorders to indicate steady state conditions.
- 18. Provide Shift Briefing sheet to the CRS.

Scenario Information

<u>Critical Tasks</u> (bolded/italicized in the required operator action statements)

- Terminate and prevent Feedwater during the ATWS (CS/RHR if LOCA signal received)
- Direct LEP-03, Alternate Boron Injection, using CRD.
- Perform LEP-02, Alternate Rod Insertion using RMCS.

References:

0ENP-24.5 0GP-04 **LEP-02 LEP-03 SEP-10** LPC RSP **RVCP** 20P-32 **Tech Specs** TRM 0AI-81 0AOP-03 0AOP-20 0AOP-26 APP A-1 (1-4) (3-5) (4-4) APP A-04 (1-4) APP UA-01 (3-2) (4-1) (6-1) (6-2) APP UA-02 (1-8) (1-9) (2-8) (6-9) APP UA-03 (5-4) (6-3) (6-4) APP UA-04 (3-5) (4-5) APP UA-05 (1-9) (2-9) (3-5) (4-6) (6-10) APP UA-06 (2-5) APP UA-13 (6-6) APP UA-25 (1-8) APP UA-28 (1-4) (1-5) (2-4) (3-4) (4-4) 0OI-50.11

BOP - Places the second reactor feed pump in service.

Malfunctions required: None.

Objectives:

<u>SCO</u> - Directs placing the second RFP in service IAW 2OP-32 Section 5.7. <u>BOP</u> - Places the second reactor feed pump in service IAW 2OP-32 Section 5.7.

Success Path:

Second RFP in service.

Simulator Operator Actions:

- □ If contacted as the RE to monitor core performance, inform crew that you will monitor core performance on the computer.
- □ Acknowledge requests for the Radwaste Operator.
- □ After *RFP B RECIRC VLV, FW-FV-V47, has* been closed and when directed by the lead examiner, proceed to the next event.

Required Operator Actions

SRO

Time	Action	Notes
	Directs Second RFP be placed in service IAW 2OP-32.	

RO

Time	Action	Notes	
	Plant Monitoring		

BOP

Time	Action	Notes
	Performs 2OP-32, Section 5.7	There are several procedural notes before this step is performed.
	Determines initial conditions met.	
	Notify Radwaste Operator to monitor CDD flows and place additional demineralizers in service as necessary.	
	Ensure <i>RFP B LP SUPPLY VLV,</i> <i>RHS-V1</i> , is open	
	Slowly raise RFPT B speed by placing RFPT B <i>LOWER /RAISE</i> speed control switch in <i>RAISE</i> until speed is greater than approximately 2550 rpm	
	When RFPT B speed is greater than approximately 2550 rpm, then raise <i>RFPT B SP CTL, C32-</i> <i>SIC-R601B</i> , output to match <i>DFCS STPT</i> and <i>SPEED STPT</i> on Panel P603 to within 100 rpm.	
	Notify Radwaste Operator to monitor CDD effluent conductivity for each demineralizers in service	

BOP (Cont'd)

Time	Action	Notes
	Confirm the following RFPT B speed signals on Panel P603 agree within approximately 100 rpm:	
	 <i>DFCS STPT</i> (speed demand from DFCS). <i>SPEED STPT</i> (speed demand from 5009 control) <i>ACT SPD</i> (actual RFPT speed) 	
	Place <i>MAN/DFCS</i> control switch in <i>DFCS</i> .	
	Slowly raise RFPT B speed by depressing the raise pushbutton on <i>C32-SIC-R601B</i> until RFP discharge pressure is approximately equal to reactor pressure.	
	Open RFP B DISCH VLV, FW-V4	
	Slowly raise RFPT B speed, using <i>RFPT B SP CTL, C32-SIC- R601B</i> , until <i>B DEM</i> is approximately equal to <i>A DEM</i> of the on line RFP.	
	DEPRESS A/M pushbutton on <i>RFPT B SP CTL</i> , <i>C32-SIC-</i> <i>R601B</i> , AND CHECK A/M indicator changes to A (automatic).	

BOP (Cont'd)

Time	Action	Notes
	When pump suction flow is greater than 3.9 X 106 lbm/hr, and heater drains are forward pumping, then close <i>RFP B RECIRC VLV, FW-</i> <i>FV-V47</i> , by momentarily placing control switch in <i>CLOSE</i> .	
	When <i>RFP B RECIRC VLV</i> closes, then adjust level setpoint on <i>MSTR RFPT SP/RX LVL CTL</i> , <i>C32-SIC-R600</i> , to 187 inches.	

EVENT 2 HPCI INADVERTENT INITIATION W/ F012 MIN FLOW VLV FAILING TO CLOSE

The crew responds to an inadvertent HPCI initiation and possible injection.

Malfunctions required: Inadvertent HPCI initiation

Objectives:

- <u>SRO</u> Direct actions in response to an inadvertent HPCI initiation and potential positive reactivity addition Determine actions required for LCO per Technical Specifications
- RO Respond to an inadvertent HPCI initiation and potential positive reactivity addition

Success Path:

Verify HPCI initiation signal not present and isolate HPCI.

Simulator Operator Actions:

- □ WHEN directed by the lead examiner, activate TRIGGER 1.(HPCI Initiation)
- If contacted as I&C to assist with troubleshooting, after Tech Spec is addressed remove the HPCI initiation and trip failures and then report that I/C caused the initiation signal while working in the H620 panel. Everything has been checked out and the initiation signal is now clear.
- □ If contacted as Reactor Engineer to look at thermal limits due to HPCI injection, report that he will evaluate and monitor.
- □ When directed by the lead examiner, proceed to the next event.

HPCI INADVERTENT INITIATION W/ F012 MIN FLOW VLV FAILING TO CLOSE EVENT 2

Required Operator Actions Tech Spec Determination

SRO

Time	Action	Notes
	Direct crew to verify no HPCI initiation signal is present	
	Direct crew to trip HPCI following verification of false initiation	
	Direct crew to isolate HPCI on failure of trip pushbutton (May use isolation pushbutton or direct steam supply valves to be closed).	
	Direct crew to enter and execute AOP-3.0 Positive Reactivity Addition, if injection has occurred.	
	Contact maintenance to look at the HPCI Initiation signal.	
	May also contact Reactor Engineer to look at thermal limits.	
	Evaluate Tech Spec 3.5.1 ECCS - Operating	
	Condition D1 - Verify RCIC is OPERABLE Condition D2 - Restore HPCI in 14 days	
	Direct HPCI shutdown IAW OP-19 after I/C confirms signal has cleared.	
	Evaluate Tech Spec 3.6.1.3, Primary Containment Isolation Valves (PCIVs)	
	Condition C1 - Isolate in 8 hours.	
	Condition C2 - Verify isolated every 31 days.	

EVENT 2 HPCI INADVERTENT INITIATION W/ F012 MIN FLOW VLV FAILING TO CLOSE

RO		
Time	Action	Notes
	Verify false HPCI initiation signal (No LL2 signal present or high drywell pressure)	
	Trip HPCI by pushing the HPCI trip pushbutton, recognize failure of trip	
	May depress Manual Isolation System A pushbutton to isolate HPCI. OR May isolate the steam supply valves (E41-F002 and F003) to HPCI to isolate system.	
	Enter and execute AOP-3.0 Positive Reactivity Addition	
	Respond to the following A-1 alarms: 1-4, HPCI LOW FLOW 3-5, HPCI ISOLATION TRIP SIG A INITIATED 4-4 HPCI SYS PRESS I O	
	Perform 20P-19 to shutdown HPCI	
	Place VACUUM PUMP control switch in START.	
	Depress INITIATION SIGNAL/ RESET push button.	
	Ensure HPCI INJECTION VLV, E41- F006, is closed.	
	Ensure BYPASS TO CST VLV, E41- F008, is closed	
	Ensure MIN FLOW BYPASS TO TORUS VLV, E41-F012, opens	This valve is failed open

EVENT 2 HPCI INADVERTENT INITIATION W/ F012 MIN FLOW VLV FAILING TO CLOSE

RO Cont'd

Time	Action	Notes
	Close TURBINE STEAM SUPPLY VLV, E41-F001, and immediately depress and hold TURBINE TRIP push button until E41-F001 is fully closed	
	Ensure TURBINE STOP VALVE, E41- V8, closes	
	Ensure AUXILIARY OIL PUMP auto starts as the turbine speed lowers	
	Close COOLING WATER SUPPLY VLV, E41-F059	
	Ensure MIN FLOW BYPASS TO TORUS VLV, E41-F012, closes	Valve is failed open, reports to CRS. May direct AO to manually close and rack out breaker.
		When Tech Spec is addressed move on to the next event.

BOP

Time	Action	Notes
	Monitor for HPCI injection	
	Enter and execute AOP-3.0 Positive Reactivity Addition, if injection has occurred.	
	Determine current operating point on the power-to-flow map Notify Reactor Engineer	

EVENT 3a RWCU RESIN INTRUSION

RWCU high conductivity followed shortly by reactor coolant high conductivity. Other conductivity alarms throughout the steam cycle begin to alarm. MSL Rad Hi and Hi-Hi alarms, alarms will clear as power is reduced, then power can be raised to burn out the resin. Resin results in high radiation at MSL monitors primarily due to N-16 (very short ½ life), therefore rising radiation is not seen on SJAE, stack or Turbine Building ARMs. Conductivity alarms will begin to clear as the resin decomposes.

Malfunctions required: RWCU Resin Inj to the Rx Vessel.

Objectives:

<u>SCO</u> -.Direct actions for a resin intrusion in the reactor vessel.

<u>BOP</u> – Perform actions for a resin intrusion into the reactor vessel.

Success Path:

Simulator Operator Actions:

- □ When directed by the lead examiner, initiate **Trigger 3** to activate resin injection to the reactor.
- □ If directed as AO to isolate A RWCU filter demin, Wait 2 minutes and report that the RWCU filter controller is messed up and the filter cannot be isolated locally.
- □ If directed as Radwaste to isolate a CDD, initiate batch file CDD Out of Service.

EVENT 3a RWCU RESIN INTRUSION

Required Operator Actions

Time	Required Actions	Notes
	Direct entry into 0AOP-26.0, High	
	Reactor Coolant or Condensate	
	Conductivity	
	Direct isolation of RWCU	
	Contact maintenance to investigate	
	If conductivity is > 2.0 µmhos/cm, enter TRM 3.13, Condition A1 and A2.	

RO

Time	Required Actions	Notes
	Diagnose conductivity alarms to be	
	RWCU resin intrusion	
	A-4, 1-4, Cleanup Sys HI	
	Conductivity	
	UA-28, 1-4, Cond Pump Discharge	
	Cndy High	
	2-3, Rx Fw Dislvd O2 High	
	2-4, Rx Feedwater	
	Conductivity High	
	4-4, Main Steam	
	Conductivity High	
	= ()	
	Enter and announce 0AOP-26.0,	
	High Reactor Coolant or	
	Condensate Conductivity	
	May direct AO to isolate the A	
	RVVCU filter demin.	
	Isolates RVVCU by shutting down the	
	the C21 F001 F001 and F010	
	the G31-F001, F004, and F042.	
	Notify abamiatry for complex	

BOP

Time	Required Actions	Notes
	Monitor Plant Parameters	

EVENT 3b RWCU RESIN INTRUSION POWER MANIPULATION

MSL Rad Hi and Hi-Hi alarms, alarms will clear as power is reduced, then power can be raised to burn out the resin. Resin results in high radiation at MSL monitors primarily due to N-16 (very short ½ life), therefore rising radiation is not seen on SJAE, stack or Turbine Building ARMs.

Malfunctions required: None.

Objectives:

SCO -. Direct actions for a resin intrusion in the reactor vessel.

BOP – Perform actions for a resin intrusion into the reactor vessel.

Success Path:

Simulator Operator Actions:

□ If asked as chemistry for samples, acknowledge the request.

EVENT 3b RWCU RESIN INTRUSION POWER MANIPULATION Required Operator Actions

SRO

Time	Required Actions	Notes
	Enter into RRCP for MSL Rad	
	alarms	
	Direct power be reduced to clear MSL Rad alarms	
	May refer to TRM 3.13 and 0AI-81 for chemistry limits.	

RO

Time	Required Actions	Notes
	Reduce power to clear MSL Rad Hi alarm. Depress the lower medium pushbutton on the Recirc master controls.	
	Continue to lower until the MSL Rad Hi alarm clears or when the 0ENP-24.5 recirc flow limit is reached (47 Mlbms/hr).	When the MSL Hi Rad alarm is clear, proceed to the next event.
	When the MSL Rad Hi alarm is clear, may be directed to raise power.	
	Depresses the raise slow pushbutton on the Recirc master controls.	

BOP

Time	Required Actions	Notes	
	Monitor Plant Parameters		

EVENT 4 MCC 2TD trip / Standby Stator Water Cooling Pump fails to auto start

The crew will respond to a trip of MCC 2TD with the standby stator cooling water pump failure to auto start. The standby stator cooling water pump can be manually started. The 2D air compressor will also be lost (loss of controls) and 0AOP-20.0, Pneumatic (Air/Nitrogen) System Failures, may be entered.

Objectives:

SCO - Direct the standby Stator Cooling Water pump to be started.

BOP – Start the standby Stator Water Cooling pump identify 2D air compressor failure.

Success Path:

Standby Stator Cooling Water Pump started and actions of 0AOP-20.0 Pneumatic (Air/Nitrogen) System Failures, addressed.

Simulator Operator Actions:

- When the directed by the lead examiner, initiate **Trigger 4** to trip the feeder breaker to MCC 2TD.
- When asked as the TB AO to investigate the 2F feeder breaker trip, report a trip of the feeder breaker to MCC 2TD, (ATO) on 480V Substation 2F is tripped with the white overcurrent indicating flag protruding from the breaker.
- □ If asked as I&C to investigate, acknowledge any requests. If asked do not recommend re-energizing 2TD until an investigation can be completed.
- If asked to investigate/acknowledge the 2B RFP alarm, acknowledge the local panel alarm and report that the alarm on the local panel is "HPU Pump 2 Running in Stby". If asked the standby pump is operating with no problems noted.
- If dispatched to verify proper operation of the standby Stator Water Cooling Water Pump or the 2B air Compressor, report no problems with the operation of the pump/compressor are noted.
- If contacted as U1, report that the 1D air compressor is not running. If asked to start the 1D Air Compressor modify remote AI_IAIU1CMPRSS to ON and report 1D air compressor is running.
- □ When directed by the lead examiner, proceed to the next event.

EVENT 4 MCC 2TD trip / Standby Stator Water Cooling Pump fails to auto start

Required Operator Actions

SRO		
Time	Action	Notes
	Acknowledges report of alarms	
	received/cleared for the BOP/RO.	
	Directs BOP operator to start the standby	
	stator water cooling pump.	
	May ask for I&C to investigate	
	1) The trip of the feeder breaker to 2TD	
	.,	
	2) The failure of the standby Stator Water	
	Cooling pump to auto-start	
	May direct entry into 0AOP-20.0.	
	Pneumatic (Air/Nitrogen) System	
	Failures	
	May review the load list for MCC 2TD	
	(001-50, 11)	

RO

1.0		
Time	Action	Notes
	Plant Monitor	
	Report alarms to the SCO.	RFP alarm may be addressed by the BOP. This alarm is due to the power loss of HPU Pump #1. HPU Pump #2 has auto-started
	UA-13, 6-6 – RFP B Control Trouble	
	May Dispatch an AO to investigate the alarm on the 2B RFP.	RFP alarm may be addressed by the BOP.

EVENT 4 MCC 2TD trip / Standby Stator Water Cooling Pump fails to auto start

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Time	Action	Notes
	Report alarms to the SCO.	
	UA-6, 2-5 – Sub 2F 480V Feeder Bkr Trip	
	UA-13, 6-6 – RFP B Control Trouble	
	UA-1, 3-2 – Air Compr D Trip	
	UA-2, 1-8 – Stat coolant Inlet Flow-Low	
	UA-2, 1-9 – Loss of Stat Coolant Trip Ckt Ener	
	UA-2, 2-8 – Stat Coolant Press-Low	
	UA-2, 6-9 – Exciter Coolant Flow-Low	
	Start the standby Stator Water Cooling Pump.	Action to start the pump is in the APPs, or an auto action that did not occur.
	UA-2, 4-9 – Stator Cool Reserve Pump Running will annunciate on starting of the standby pump and then will clear when the 2B pump is placed in off.	
	Dispatch an AO to invostigate the Sub 2E	
	Feeder Breaker Trip.	
	May dispatch an AO to investigate the Stator Water Cooling pump that was started.	
	Man antes and survey 04 OD 00.0	Actions for starting the 1D are also in the ADD
	Pneumatic (Air/Nitrogen) System Failures, for the trip of 2D Air Compressor.	Actions for starting the TD are also in the APP.
	Verifies that the 2B Air Compressor auto starts.	If 1D Air Comp. is started the 2B will go back into a standby condition when the air header pressure is
	May ask Unit One to start the 1D Air Compressor and verify 2B returns to standby.	returned to normal. 2D air compressor has lost power to the controls.
	May place the 2D A/C in Stop.	

Power to the Main Stack Rad Monitor will be lost. The power results should result in a Group 6 isolation, which fails and the crew must manually initiate a Group 6 isolation.

Malfunctions required: UPS 2A to Sample Detection Skid breaker open.

Objectives:

<u>SCO</u> - Determine actions required for LCO per Technical Specifications.

<u>BOP</u> – Respond to a process radiation monitoring downscale/inop annunciator. Performs actions to manually initiate a Group 6 Isolation.

Success Path:

Technical Specification / TRM

- 3.3.6.1 PCIS Instrumentation, Function 2c Condition A1, Place in trip condition in 24 hours. Condition B1, Restore Isolation capability in 1 hour
- 3.4.5 RCS Leakage Detection Instrumentation Condition B.1, Analyze grab samples every 12 hours Condition B.2, Restore operable in 30 days
- TRM 3.4 Post Accident Monitoring, Functions 2,5, and 6 Condition B.1, Restore one required channel in 7 days.
- ODCM 7.3.2 Gaseous Effluent Monitoring, Function 1
 - A.1, Enter the Condition referenced in Table 7.3.2-1
 - B.1, Take a grab sample once per 12 hours
 - B.2, Analyze the grab sample for gross noble gas activity within 24 hrs
 - B.3, Restore the channel in 30 days
 - C.1, C.1.1, Immediately Initiate actions to establish auxiliary sampling equipment to continuously collect samples from the associated effluent release pathway as required by Table 7.3.7-1
 - C.2, Restore the channel in 30 days
 - D.1, Estimate the flow rate through the associated pathway
 - D.2, Restore the channel in 30 days

Simulator Operator Actions:

- □ Insert **Trigger 2** at the discretion of the lead evaluator.
- □ If asked to investigate, report Ckt #6 on UPS Panel 2A to the Stack Rad Monitor is tripped.
- □ If contacted as Unit One, report that Unit One has the same alarms present.
- □ If contacted as I&C to investigate, acknowledge the request, if asked do not recommend transfer to the alternate power supply until the cause of the trip is investigated.
- □ When tech spec call is made close the UPS 2A to Sample Detection Skid breaker before going to the next event and report I&C with E&RC have repaired the problem with the Main Stack Rad Monitor.
- □ When directed by the lead examiner, proceed to the next event.

Required Operator Actions

Tech Spec Declaration.

SRO		
Time	Action	Notes
	Direct actions of the APPS for the	
	Main Stack Rad Monitor	
	Direct Group 6 isolation.	
	Direct I/C to investigate loss of UPS 2A.	
	Refer to Tech Specs.	If follow-up questioning is necessary provide Group 6 hard card and alarms to applicant (for the end of
	See success path on previous page.	isolation occurred and provide a list of alarms.

RO		
Time	Action	Notes
	Plant Monitoring .	
	May open the SW-V111 or V117 to supply cooling water to the vital header IAW 2APP-UA-05 1-9 or 2-9.	

BOP		
Time	Action	Notes
	Report loss of Main Stack Rad Monitor and references the following APPs: <u>UA-03</u> 5-4, PROCESS OG VENT PIPE RAD HI-HI 6-3, PROCESS SMPL OG VENT PIPE DNSC/INOP 6-4, PROCESS OG VENT PIPE RAD - HI <u>UA-05</u> 1-9, FAN CLG UNIT CS PUMP RM A INL PRESS LO 2-9, FAN CLG UNIT CS PUMP RM B INL PRESS LO 3-5, SBGT SYS B FAILURE 4-6, SBGT SYS A FAILURE 4-6, SBGT SYS A FAILURE 6-10, RX BLDG ISOLATED <u>UA-25</u> 1-8, CTMT ATMOS RAD MON DNSC/INOP	
	 Report TS review for the SCO from the Annunciator reviews. 3.6.4.3 3.3.6.1 Table 3.3.6.1-1, function 2c ODCM 7.3.2 Table 7.3.2-1 Function 1, 7.3.7, and 7.3.13 TRM 3.4, Table 3.4.2 function 5 	

BOP cont'd

Time	Action	Notes
	Determine that SBGT should have	
	started and Reactor Building	
	Ventilation should have isolated.	
	Starts both SBGT trains by placing them in Start.	
	Isolates RB Ventilation by either closing the BFIVs (which will trip the fans) or Shutting off the fans then closing the BEIVs	
	Dispatch AO to investigate UPS 2A condition.	
	May open the SW-V111 or V117 to supply cooling water to the vital header IAW 2APP-UA-05 1-9 or 2-9.	

BOP cont'd

Time	Action	Notes
	Determines that a Group 6 Isol did not	
	occur and closes the following valves	
	on XU-51:	
	CAC-SV-4540	
	CAC-SV-4409-1	
	CAC-SV-4409-2	
	CAC-SV-4409-3	
	CAC-SV-4409-4	
	CAC-SV-1260	
	CAC-SV-1261	
	CAC-SV-1262	
	CAC-SV-4541	
	CAC-SV-4410-1	
	CAC-SV-4410-2	
	CAC-SV-4410-3	
	CAC-SV-4410-4	
	CAC-SV-3440	
	CAC-SV-3439	
	Determines that a Group 6 Isol did not	
	occur and verifies closed the following	
	valves on XU-51	
	CAC-V216	
	CAC-V58	
	CAC-V15	
	CAC-V4	
	CAC-V5	
	CAC-V6	
	CAC-V7	
	CAC-V8	
	CAC-V9	
	CAC-V10	
	CAC-V49	
	CAC-V50	
	CAC-V55	
	CAC-V56	
	CAC-V22	
	CAC-V23	
	CAC-V172	
	CAC-V160	
	CAC-V161	
	CAC-V162	
	CAC-V163	

2012 NRC Scenario #2

BOP cont'd

Time	Action		Notes
	Determines that a Group 6 Isol did not		
	occur and closes the following valves		
	on XU-2:		
		V DOCA A	
	CAC-SV-1200B	A-49D-D V 76 P	
	CAC-SV-1223B	Λ-70-D ¥ 73 Λ	
	CAC-SV-1227A	X-73-R	
	CAC-SV-1227C	X-73-C	
	CAC-SV-1227E	X-73-E	
	CAC-SV-1205E	X-60-E	
	CAC-SV-1209A	X-57-A	
	CAC-SV-1209B	X-57-B	
	CAC-SV-1211E	X-54-E	
	CAC-SV-1211F	X-54-F	
	CAC-SV-1231B	X-244-B	
	CAC-SV-1213A	X-209B-A	
	CAC-SV-1215E	X-245-E	
	Determines that a Group	o 6 Isol did not	
	occur and verifies closed	the following	
	valves on XU-75:		
	RXS-SV-4186		
	RXS-SV-4188		
		.	
	Determines that a Group	6 Isol did not	
	occur and verifies closed	a the following	
	RXS-SV-4187		
	RXS-SV-4189		

Stator Cooling temperature controller will fail energizing the trip circuitry. The APP will direct a manual scram. On the scram rods ~100 of the control rods will fail to fully insert. The crew will respond to the ATWS per LPC.

Control rods can be manually driven into the core with RMCS. The SDV Vents & Drains will fail. When level has been lowered and level band has been established, the SDV V&D will be repaired. Control rods can then be inserted by repeated manual scram.

When SLC initiation is attempted, neither SLC pump will start due to switch failure. The crew will perform LEP-03 and align for alternate boron injection using CRD.

Malfunctions required: Stator Cooling Failure / ATWS 3 / SDV Vent & Drain failure/ SLC Switch failure

Objectives:

- <u>SCO</u> Direct actions for a reactor scram per EOP-01-RSP. Direct actions to control reactor power per EOP-01-LPC.
- <u>RO/BOP</u> Perform immediate actions for a reactor scram. Perform actions for an ATWS per EOP-01-LPC.

Success Path:

Performs actions of LPC, Inserts control rods and recognizes failure of SLC and performs alternate boron injection.

Simulator Operator Actions:

- □ When directed by the lead examiner, Initiate **Trigger 5** for the Stator Cooling failure
- □ If requested to perform alternate boron injection using CRD, acknowledge the request. (will be performed after RPV injection is re-started)
- Acknowledge request as I&C to investigate failure of Stator Cooling, SLC and/or SDV Vents and Drains.
- □ When directed by the lead examiner, proceed to the next event.

Required Operator Actions

Critical Tasks

Direct LEP-03, Alternate Boron Injection, using CRD. Perform LEP-02, Alternate Rod Insertion using RMCS.

SRO

	Desiving d Astisms	Nistaa
Time	Required Actions	Notes
	May direct I&C to investigate Stator	
	Cooling temperature controller.	
	Direct a manual reactor coram	
	Difect a manual feactor Scham.	
	Enter RSP and transition to LPC.	
		х.
	Diverse and a surface to all statements of	
	Direct mode switch to shutdown when	
	steam flow < 3 Mlbs/hr.	
	Direct ARI initiation	
	Direct Recirc Pump speeds reduced	
	to 10%.	
	Direct Recirc Pumps Tripped	
	Direct Recirc Fumps Tripped.	
	Direct SLC initiation.	
	Diverse LED 02 Alterrate hower	Critical Task CRD will be used for
	Direct LEP-03, Alternate boron	critical rask. CRD will be used for
	injection.	Injection.
	Direct ADS inhibited	
	Dirott / Do initiated.	
	Direct RWCU isolation.	
	Direct EP-02 Alternate Pod	Critical Task RMCS will be used to insert
	Incontion	rods
	insertion.	
	Contact WCC to install LEP-02	
	Section 3 jumpers when the RO	
	requests them	
1		

BOP

Time	Required Actions	Notes
	Addresses the following alarms: UA-02 1-9, LOSS OF STAT COOLANT TRIP CKT ENER 3-8, STAT COOLANT INLET TEMP-HIGH	
	4-8, STAT COOLANT OUTLET TEMP-HIGH UA-05 1-5, GENERATOR TEMPERATURE TROUBLE	
	Places ADS in inhibit.	
	Identifies RWCU does not isolate (if it was not isolated in prior event). Closes RWCU Outboard Isol Valve G31-F004.	

RO		
Time	Required Actions	Notes
	Place mode switch to shutdown when	
	steam flow < 3x10 ⁶ lb/hr.	
	Initiates ARI.	
	Places Recirc Pump speeds reduced	
	to 10%.	
	Trips Recirc Pumps.	
	• •	
	Initiates SLC.	
	Recognizes failure of SLC and reports	
	to SCO.	
	Performs LEP-03. Alternate Boron	Critical Task
	Injection.	
	Direct AO to perform LFP-03	
	Section 1. Alternate Boron	
	Injection using CRD	
	injection doing one.	
	1	1

Time	Required Actions	Notes
	Performs LEP-02, Alternate Rod Insertion. (RMCS Section)	Critical Task
	Insert IRMs.	
	When < range 3 on IRMs insert SRMs.	
	Start both CRD pumps.	
	Place CRD Flow Controller to Manual.	
	Throttle open flow controller to establish ≥ 260 drive water psid.	
	Bypass RWM.	
	Selects control rods and drives in using Emerg rod in notch override.	
	Performs alternate rod insertion per LEP-02 Section 3.	
	Request jumpers for LEP-02 Section 3.	

The crew will terminate and prevent injection, re-injection will start when level is at 90 inches due to Table 3 conditions not met. Feedwater and RCIC will be available for level control. When level has been lowered and level band has been established, the scram discharge volume vents and drains will be repaired. Control rods can then be inserted by manual scram. When all control rods are inserted and level is being maintained 170 to 200 inches the scenario may be terminated

Malfunctions required: None

Objectives:

<u>SCO</u> – Direct actions to lower reactor vessel level when the conditions of Table 3 are not met per EOP-01-LPC.

<u>RO/BOP</u> – Control reactor level during an ATWS per EOP-01 LPC.

Success Path:

When actions are taken to control reactor water level during the ATWS after terminating and preventing, the SDV vents and drains will be repaired and rods can be inserted. When all rods are inserted and level is being controlled 170 - 200 inches the scenario may be terminated.

Simulator Operator Actions:

- □ If requested to defeat Group I LL3, wait 2 minutes, initiate *Trigger 8* and inform the SCO that the jumpers are installed.
- If requested to install LEP-02, Section 3 jumpers, wait until level has been terminated and prevented or 5 minutes whichever is longer, insert *Trigger 7* and inform the SCO that the jumpers are installed.
- □ If requested as I&C to investigate the failure of the scram discharge volume vents and drains, acknowledge the request.
- □ If requested to defeat Drywell Cooler LOCA Lockout, wait three minutes, initiate *Trigger 10* and inform the SCO that the jumpers are installed.
- □ When injection to the RPV has been re-established and if requested to line up boron to the CRD system initiate *Trigger 11*.
- □ When directed by the lead evaluator, delete the following commands:
 - □ Malfunction RD036F, Scram Disc Vol Drn Fails Closed
 - Malfunction RP010F, ATWS 3 (Make sure RPS is reset before deleting)

Inform the SCO that a loose wire was found on the SDV vent and drain logic and have been fixed.

- □ If contacted as the RB AO to secure Alternate Boron Injection delete remote SL_IALEP03.
- □ When directed by the lead examiner, proceed to the next event.

Required Operator Actions

Critical Tasks

Terminate and prevent HPCI/Feedwater during the ATWS (CS/RHR if LOCA signal received)

SRO		
Time	Required Actions	Notes
	Direct Group 10 switches to override	
	reset.	
	Direct terminate and prevent	(Critical Task)
	HPCI/Feedwater (CS/RHR when	
	LOCA signal received).	
	When lovel reaches 100 inches	
	ovaluato Tablo 3:	
	evaluate Table 5.	
	• If flot met, establishes a level	
	band of LE4 to +90 mones.	
	Directs Drywell cooling restored per	
	SEP-10.	
	Evaluate TAF and LL4 indicated levels	
	using Caution 1 graphs.	
	Direct injection established to maintain	If level is lowered to less than 45 inches
	RPV level LL4 to 90 inches	(LL3) then the LP ECCS pumps will start and
	(should try to keep level above the	will need to be terminated and prevented.
	LL3 setpoint, most likely will establish	
	a level band of 60-90 inches)	
	Exit LPC and enter RVCP when all	
	rods are in.	
	Direct coording Alternate Days	
	Direct securing Alternate Boron	
	Direct level restored to 170 - 200	
	inches after rods are all in	

BOP		
Time	Required Actions	Notes
	Places Group 10 switches to override reset	
	<i>Terminate and prevent injection to RPV.</i>	(Critical Task)
	HPCI - Places HPCI Aux Oil Pump to Pull to Lock.	
	FW - IF two RFPs are operating THEN TRIP one	
	PERFORM either of the following for the operating RFP	
	1. PLACE MAN/DFCS control switch to MAN	
	RAPIDLY REDUCE speed to approximately 1000 rpm with the LOWER/RAISE speed control switch	
	OR 2. PLACE RFPT Speed Control in M	
	SELECT DEM and RAPIDLY REDUCE speed to approximately 2550 rpm	
	Close FW-V6 and FW-V8.	
	PLACE SULCV, in M. Sets demand for Zero	
	ECCS - Turns OFF low pressure ECCS pumps if they start.	

BOP Cont'd

Time	Required Actions	Notes
	May place Feedwater in service for	
	level control during ATWS when	
	directed by the SCO.	
	RAISE RFPT A(B) SP CTL speed until discharge pressure is greater than or equal to 100 psig above reactor pressure	
	ADJUST SULCV to establish desired injection	
	Restores level to 170 - 200 inches after all rod inserted.	
	Increases RCIC controller to 500 gpm.	
1.0		
------	--------------------------------------	-------
Time	Required Actions	Notes
	Continues to select control rods and	
	drive in using Emerg rod in notch	
	override.	
	Monitor APRMs for downscale	
	Porforma EP 02 Section 3 ofter	
	iumpere ere instelled	
	jumpers are installed.	
	Inhibit ARI	
	Places ARI Initiation Switch to	
	INOP	
	Places ARI Reset Switch to	
	RESET and maintains for 5	
	seconds.	
	Verifies red TRIP light above AR	
	Initiation is OFF	
	Posot PPS whon scram jumpers	
	installed	
	Ensures Disk Val Vant & Drein	
	Ensures Dish voi vent & Drain	
	l est switch is in Isolate.	
	Confirms Disch Vol Vent Valves	
	V139 and CV-F010 are closed	
	Confirms Disch Vol Drain valves	
	V140 and CV-F011 are closed.	
	Resets RPS.	
	Place Disch Vol Vent & Drain	
	Test switch to Normal	
	Boognize/report failure of seven	
	Recognize/report failure of scran	1
	discharge volume vents and	
	drains.	

EVENT 6d TERMINATE & PREVENT INJECTION / ALL RODS IN

EVENT 6d TERMINATE & PREVENT INJECTION / ALL RODS IN RO Cont'd

110 001		
Time	Required Actions	Notes
	Confirms Disch Vol. Vent & Drains are	
	open when reported fixed.	
	Inserts a scram after discharge	
	volume has drained for ~2 minutes.	
	Reports all rods in.	
	Directs AO to secure Alternate Boron	
	Injection.	

Simulator Operator Activities:

WHEN directed by the lead examiner, place the simulator in FREEZE.

CAUTION

DO NOT RESET THE SIMULATOR PRIOR TO RECEIPT OF CONCURRENCE TO DO SO FROM THE LEAD EXAMINER

2012 NRC Scenario #2

Shift Briefing

Plant Status

The plant is operating at ~62% power during startup following a refuel outage.

GP-04 is complete up to step 5.2.24.

2B RFP is idling IAW 2OP-32.

Alternate Power verifications IAW 0GP-04 are being performed by the Reactor Engineer.

A severe thunderstorm warning has been issued for Brunswick County for the next 3 hours.

Equipment Out of Service

1A NSW Pump is under clearance for breaker refurbishment, expected to be returned to service in 4 hours.

Protected Equipment

1B, 2A, and 2B NSW Pump

Plan of the Day

Place the second feed pump in service and then continue to raise power to 100%.

Facility: BRUNSV Examiners:		VICK	Scenario No.:2012-3 Operators:	Op Test No.:	FINAL				
				(SRO)					
				(RO)					
				(BOP)					
Initial Con	ditions: Un	it is operatir	ng at ~75% power (IC-10) APF	RM 2 INOP and b	oypassed.				
Turnover:	Turnover: Following shift turnover, complete Main Stop Valve Testing IAW 2OP-26.								
Event Malf. No. Event Event Description No. Type*									
1		N-BOP N-SRO	Main Turbine Stop Valve Test						
2a	RC055D	C–RO C-SRO	Recirc Pump B trip. (AOP-04)(TS) Supply breaker does not open.						
2b		R–RO R-SRO	Insert control rods and or raise region of the power to flow map	recirc flow to exit s	scram avoidance				
3	K4517A	C-BOP C-SRO	TCC Pump Trip (AOP-17)						
4	DG001F	C-BOP C-SRO	E8 Trip (AOP-36.1) (TS)						
5	RC007F RC008F	C-RO C-SRO	RR Pump A Seal Failure (AOP	-14)					
6a	NB006F	M-All	A small steam leak in the drywe (already elevated due to partial	ell, rising drywell te loss of DW cooler	emp & press rs)				
6b	K1J36A	C-BOP C-SRO	Drywell spray on RHR Loop A fails to function (Loop B spray not available due to E8 loss). Drywell temp exceeds 300°F						
7		M-All	Emergency Depressurization, Start B Loop RHR pumps.						
* (N	* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor								

Scenario Description

- Event 1 2OP-26, Section 8.6 (Main Turbine Stop Valve Test) is complete up to Step 8.6.2.7 with feedwater level control transferred to single element IAW 2OP-32. MTSV Testing will continue testing MSVs 1 through 4. DFCS will be transferred to 3-element when complete.
- Event 2 VFD coolant leakage will occur that will cause a trip of the Recirc pump. The supply breaker does not trip and must be opened manually. 0AOP-04.0 will be entered. Technical Specifications will be addressed. The plant will be in the Scram Avoidance Region of the power to flow map. Recirc flow must be increased or control rods must be inserted to exit this region. With only one recirc pump in operation reactor power must be less than 50% and core flow must be greater than 30.8 Mibs but less than 45 Mibs.
- Event 3 2B TCC pump will trip. The crew will enter AOP-17 and place the 2C TCC pump in service.
- Event 4 An alarm is received indicating a Substation E8 high temperature/ground. After a 30 second time delay a trip of E8 will occur. Trip will cause a ½ scram and ½ Group 1. A Group Isolation for groups 2, 3, 6, and 8 will be received. The crew will enter AOP-36.1. CREV A fan will have to be manually started. Distribution Panel 2AB-TB will be directed to be transferred to its alternate power supply. The SJAEs will be in ½ load and may be directed to be placed in full load. RPS B should be transferred to alternate IAW OP-03. Technical Specifications will be addressed.
- Event 5 Reactor Recirc Pump 2A seal #1 will fail and seal pressures will equalize. Shortly after the seal #1 failure, a seal #2 failure will occur. The crew will respond to the Recirc Pump seal failure and the rising drywell temperature and pressure per AOP-14.0. AOP-14.0 will direct the Recirc Pump be shutdown and then be isolated. If the pump is not isolated, a reactor scram will occur on high drywell pressure. The crew will insert a reactor scram due to no operating recirc pumps.
- Event 6 A small steam leak will develop in the drywell. Drywell temperature and pressure rises at a faster rate requiring initiation of drywell sprays. RHR Loop 2B is unavailable for spray due to loss of E8 (valve power). When RHR 2A is placed in drywell spray, the outboard spray valve (F016A) will fail. With no spray available, drywell temperature will exceed 300°F (cannot be restored and maintained below) requiring emergency depressurization.
- Event 7 During the depressurization, low pressure injection systems (RHR, Core Spray and Condensate) must be operated to prevent uncontrolled injection. B Loop of RHR will fail to auto start.

When emergency depressurization actions have been performed, the scenario may be terminated.





PREPARED BY:	Robert Bolin ColutBol	9/04/2012
	Operations Instructor/Developer	DATE
CONCURRED BY:	Dan Arheiger	9/04/12
	Operations Instructor/Developer	DATE
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·	Operations Department Rep.	DATE
		1 1
APPROVED BY:	KAN	9/27/12
	Facility Representative	DATE /

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SIMULATOR SETUP

Initial Conditions

IC	10
Rx Pwr	100%
Core Age	BOC

Events:

Event #	Trigger	Description	
1			Main Turbine Stop Valve Test
2a	1	Manual	VFD Coolant leakage.
2b			Insert control rods and or raise recirc flow
3	3	Manual	TCC Pump Trip
4	4	Manual	E8 Trip
5	6	Manual	RR Seal Failure
6a	7	Manual	Small steam leak in the drywell
6b			Drywell spray fails
7			Emergency Depressurization.

Interventions Summary

Note: Shaded entries = Active

Malfunctions Summary

Malf ID	Mult ID	Description	Current Value	Target Value	Rmptime	Actime	Dactime	Trig
RH020F	F016A	CONTAINMENT SPRAY VALVE E11-F016A	True	True				
ES046F		RHR B FAILURE TO AUTO START	False	True				
RC055D	VFD B	VFD COOLING SYSTEM LEAKAGE	0	100				1
DG001F		LOSS SUBSTATION E8	False	True		00:00:30		4
RC007F		Recirc Pump A Seal #1 Fail	0	100	00:00:10			6
RC023F		Recirc A Dual Seal Fail	False	True		00:01:00		6
NB006F	A	MSL BRK BEFORE FLOW RESTRICTORS	0.0	2.0	00:10:00			7

Remotes Summary

Remf ID	Mult ID	Description	Current Value	Target Value	Rmptime	Actime	Trig
RP_IAEPAALT		RPS ALT EPA BKRS	SET	SET			
ED_ZIEDH14		PNL 2AB-TB POWER	NORM	NORM			

Override Summary

Tag ID	Description	Position/ Target	Actual Value	Override Value	Rmptime	Actime	Dactime	Trig
K4517A	TBCCW Pump B		On	Off				3
Q4517LG4	TBCCW Pump B Green		On	Off				3
Q2735LGH	2B RECIRC GREEN		ON	OFF				
Q2735RRH	2B RECIRC RED		ON	ON				

Annunciator Summary

Window	Description	Tag Name	Override Type	OVal	AVal	Actime	Dactime	Trig
UA18 3-4	Sub E8 Temp Hi/Ground	ZUA1834	On	On	Off		00:00:31	4

Expert commands

Create trigger 8 on 2B Recirc Stop pushbutton not in norm and then enter the following expert command: trc:8,dod:q2735LGH

Create trigger 9 on 2B Recirc Stop pushbutton in STOP and then enter the following expert command: trc:9,dod:q2735RRH

Special Instructions

- 1. Ensure simulator security is established IAW TAP-411.
- 2. Ensure appropriate keys have blanks in switches.
- 3. Reset alarms on SJAE, MSL, and RWM NUMACs.
- 4. Ensure no rods are bypassed in the RWM.
- 5. Ensure hard cards and flow charts are cleaned up.
- 6. Ensure all key have blanks installed.
- 7. Ensure affected procedures are free of any marks.
- 8. Place all SPDS displays to the Critical Plant Variable display (#100).
- 9. Reset to IC-10 and place in run.
- 10. Ensure ENP-24.5 form for IC-10 is located at the P603 panel.
- 11. Place DFCS in single element.
- 12. Ensure 2B TCC pump only is running.
- 13. Load scenario file, if required.
- 14. Advance all chart recorders to indicate steady state conditions.
- 15. Provide Shift Briefing sheet to the CRS.
- 16. Provide a marked up copy of 2OP-26 Section 8.6 completed up to step 8.6.2.7

Critical Tasks

Inserting a manual Reactor Scram when Recirc Pumps are tripped or in anticipation of tripping Reactor Recirc Pumps.

Depressurize the reactor when drywell average air temperature cannot be restored and maintained below 300°F (at or before 340°F) by performing or anticipating emergency depressurization.

References:

20P-02 20P-26 20P-32 2AOP-04 0AOP-17 0AOP-14 2APP-A-05 (4-8) 2APP-A-07 (2-3) (3-3) (3-4) (4-2) (4-3) (4-6) (5-3) (5-5) 2APP-UA-03 (2-4) 2APP-UA-18 (3-4) RSP **RVCP** PCCP **SEP-02 SEP-03** Tech Spec 0ENP-24.5

EVENT 1 MAIN TURBINE STOP VALVE TESTING

2OP-26, Section 8.6 (Main Turbine Stop Valve Test) is complete up to Step 8.6.2.7 with feedwater level control transferred to single element IAW 2OP-32. MTSV Testing will continue testing MSVs 1 through 4. Annunciator A-7 4-2 *FW CTL SYS TROUBLE* during TSV testing. DFCS will be transferred to 3-element when complete.

Malfunctions required: None

Objectives:

<u>SCO</u>

Direct actions for the performance of Main Stop Valve Testing.

RO/BOP

Perform Main Stop Valve Testing

Success Path:

Complete the performance of 2OP-26 Section 8.6.

Simulator Operator Actions:

- □ If contacted as Load Dispatcher, acknowledge request or information.
- □ If contacted as System Engineer (any discussion about fast closure), inform crew fast closure of MTSVs is satisfactory matches previous performances.
- □ When directed by the lead examiner, proceed to the next event.

EVENT 1 MAIN TURBINE STOP VALVE TESTING

Required Operator Actions

SRO

Time	Required Actions	Notes
	Direct performance of Main TSV	
	lesting	

RO

Time	Required Actions	Notes	
	Monitors the Plant		

BOP

Time	Required Actions	Notes
	Performs 2OP-26, Section 8.6 Main	
	Turbine Stop valve testing.	
	For each Stop Valve:	
	Depress and hold TEST push button	
	Verify valve travel is smooth from	
	100% to 10% open	
	Verify valve travel is fast from 10%	
	open to 0% open	
	Responds to A-7 4-2 FW CTL SYS	
	TROUBLE during TSV testing	
	Transfers DFCS to 3 element IAW	
	OP-32	
	Verify on <i>SULCV, FW-LIC-</i> 3269, that	
	level error is less than ~ 2 inches.	
	Shift FEEDWATER CONTROL	
	MODE SELECT control switch to 3	
	ELEM	
	Reports results of testing and DFCS	
	alignment	

EVENT 2a/b Reactor Recirc Pump Trip / Exit Scram Avoidance Region

A coolant leak develops on VFD B that will cause the recirc pump to trip. The supply breaker does not trip and must be opened manually. 2AOP-04.0 will be entered. Technical Specifications will be addressed. The plant will be in the Scram Avoidance Region of the power to flow map. Recirc flow must be increased or control rods must be inserted to exit this region. With only one recirc pump in operation reactor power must be less than 50% and core flow must be greater than 30.8 Mlbs but less than 45 Mlbs.

Malfunctions required: VFD B Coolant Leakage / 4 kV breaker override

<u>Objectives:</u>

<u>SCO</u>

Direct Shift Response To Recirculation Pump Trip Per 2AOP-04.0.

RO/BOP

Respond to a Recirc Pump trip IAW 2AOP-04.0.

Success Path:

Identifies that the supply breaker did not trip and manually trips the breaker. Manipulates reactor power to exit the scram avoidance region using rods and / or recirc flow.

Simulator Operator Actions:

- □ When directed by the lead examiner, Initiate **Trigger 1** VFD B Coolant Leakage.
- □ If contacted as the AO to investigate VFD Alarms, wait until Recirc pump has tripped and report that the coolant pumps are tripped due to coolant leakage.
- □ If contacted as reactor engineer, report you will monitor thermal limits and use 0ENP-24.5 rods to exit scram avoidance region.
- □ If contacted as chemistry for samples, acknowledge request
- □ If contacted as NIT to backup OPRM data acknowledge the request.
- □ When directed by the lead examiner, proceed to the next event.

EVENT 2a/b Reactor Recirc Pump Trip / Exit Scram Avoidance Region Required Operator Actions

SRO		
Time	Required Actions	Notes
	Direct response to Annunciators.	
	Direct entry into 2AOP-04.0, Low Core Flow	
	Determine region of operation on power/flow map (computer display 806 may be used for reference)	
	Direct actions to exit scram avoidance region. (Flow must be maintained ≥30.8 but ≤45 Mlbs/hr and power must be ≤50%)	
	Evaluate TS 3.4.1 Recirculation Loops Operating Determine Condition A "Requirements of the LCO are not met" applies Required Action A.1 "Satisfy the requirements of the LCO" APLHGR limits and APRM setpoints must be adjusted within 6 hours	May contact I/C to prepare for changing setpoints.
	May enter GP-14, Extended Single Recirculation Loop Operation	

BOP

Time	Required Actions	Notes
	Monitors the Plant	
	Determines region of operation on power/flow map is in the Scram Avoidance Region (computer display 806 may be used for reference)	Operation is still on the TLO graph.
	Monitor for THI	

EVENT 2a/b Reactor Recirc Pump Trip / Exit Scram Avoidance Region

RO		
Time	Required Actions	Notes
	Respond to the following alarms	
	during this event:	
	A-07	
	2-3. RECIRC VFD B ALARM	
	UNACK	
	3-3 RECIRC VED B ALARM	
	3-4 RECIRC VED B COOLING	
	SYS TROUBLE	
	4-3 RECIRC VED B TRIP	
	WARNING	
	5.5 DUMD R SEAL STACING	
	5-5, POWP & SEAL STAGING	
	4-8 OPRIMITRIP ENABLED	
	4-4, E REHEATER FIRST	
	STAGE LEVEL HI-LO	
	4-5, WREHEATER FIRST	
	STAGE LEVEL HI-LO	
	Observes indications on the VFD B	
	HMI on Panel XU-4	
	Dispatch AO to investigate	
	Diagnose and report supply breaker	IAW APP A-7, 5-3, Recirc VFD B Tripped and
	not tripped	Contirmation on XU-4, 2-B32-YFD-VD1-002B, Recirc VED 2B identifies that both VED coolant
		pumps are tripped, this indicates that the supply
		breaker should have tripped.
	Opens Recirc Pump B - 4 kV Supply	
	Breaker	
	Enter and announce 2AOP-04.0,	
	Low Core Flow	
	Determine if valid core flow	
	indication exists on process	
	computer (WTCF).	

EVENT 2b Exit Scram Avoidance Region

RO Cont'd

Time	Required Actions	Notes
	Determines region of operation on	Operation is still on the TLO graph.
	power/flow map is in the Scram	
	Avoidance Region (computer display	
	806 may be used for reference)	
	May do one or both of the following	
	to exit the scram avoidance region:	
	1. Insert control rods	
	Turns select power on	
	Selects a control rod from the	
	ENP-24.5, Immediate Power	
	Reduction sheet.	
	Drive the selected rod from	
	position 08 to position 00.	
	The order of the rod selection is	
	26-35, 26-19, 18-27, and then	
	34-27.	
	2 Raise core flow using the running	
	Recirc Pump	
	Reduce CRD flow to 30 gpm	
1		1

EVENT 2b Exit Scram Avoidance Region

RO Cont'd

Time	Required Actions	Notes
	If charging pressure high alarms, may request CRD Pump A discharge valve throttled closed per the APP	
	Maintain core flow >30.8 E6 lb/hr to prevent excessive cooldown of idle loop. or If Core Flow is <30.8 E6 lb/hr log bottom head and loop temperature every 15 minutes	
	Monitor for THI	
	Notify Reactor Engineer	
	Notify chemistry	

EVENT 3 TBCCW PUMP B TRIP

TCC Pump 2B will trip and TBCCW low header pressure will alarm. The crew will respond per 0AOP-17.0 and place a TBCCW pump in service

Malfunctions required:

Trip of 2B TCC pump

Objectives:

<u>SCO</u> – Direct entry into 0AOP-17.0.

RO – Execution of 0AOP-17.0

Success Path:

2A or 2C TBCCW pump started and TCC pressures restored to normal.

Simulator Operator Actions:

- □ Insert **Trigger 3** to trip 2B TCC pump at the discretion of the lead evaluator.
- □ If contact as the TB AO, wait one minute and report that 2B TCC pump is hot to the touch and the breaker on 2TM is tripped.
- □ If contacted as Unit One CRS, report Unit One is not using the 2C TCC Pump.
- □ Acknowledge request as I&C to do troubleshooting/repair for the 2B TCC Pump.
- □ When directed by the lead examiner, proceed to the next event.

Required Operator Actions

SRO

Time	Action	Notes
	Direct entry into 0AOP-17.0.	
	Direct start of 2A and/or 2C TCC Pump.	
	Direct I/C to investigate loss of 2B TCC pump.	

RO

No			
Time	Action	Notes	
	Plant Monitoring .		

EVENT 3 (Cont'd) TBCCW PUMP B TRIP

BOP

Time	Action	Notes
	Report loss of 2B TCC Pump and refer to APPs.	
	<u>UA-03</u>	
	2-4, TBCCW PUMP DISCH HEADER PRESS LOW	
	Enter 0AOP-17.0.	
	Dispatch AO to investigate 2B TCC Pump condition.	
	May dispatch AO to perform prestart checks for 2A or 2C TCC Pump.	
	Starts 2A and/or 2C TCC pump. (Depending on the amount of time that no TCC pump is operating, one pump may not immediately restore TCC pressure due to the system loads TCC temperature control valves being wide open.)	
	If needed, verify Unit One is not using 2C TCC pump and start pump.	

EVENT 4 480V Bus E8 LOSS

An alarm is received indicating a Substation E8 high temperature/ground. After a time delay the main breaker to E8 will trip. A ½ scram and ½ Group 1 (½ Group 1 will not reset after RPS transfer). Group isolations for 2, 3, 6, 8, Secondary Containment (Inboard BFIVs do not auto close, will close by push button). CREV Fan A fails to start due to circuitry configuration (this is not a malfunction) and should be manually started. RCIC Steam Line Drain Pot Level Hi after a time delay (100 second from power loss). MSL DAQ Trouble and MSIV Pit Temp alarms after a time delay (DAQ UPS battery depletes)

Malfunctions required: E8 bus Hi Temp / Ground Alarm and E8 Trip

Objectives:

SCO

Direct Actions For A Loss of Any 4KV Buses or 480V Buses Per AOP-36.1

RO/BOP

Respond to a Loss of a 480 VAC Emergency Bus per 0AOP-36.1 Shift the RPS Bus To The Alternate Power Supply per 2OP-03

Success Path:

Transfer RPS to alternate, restart affected loads.

Simulator Operator Actions:

- □ When directed by the lead examiner, **initiate Trigger 4**, E8 Hi Temp Alarm and E8 Trip (time delayed).
- If asked as OAO to investigate, when E8 has tripped as the OAO report Sub E8 breaker tripped (white trip indicator on front of breaker). Report odor of burnt insulation (no smoke or fire)
- □ If asked as I&C to investigate alarm failure, acknowledge the request
- □ If asked as the SM, approve the placing of RPS on Alternate.
- □ If asked as I&C to investigate E8 Loss, after a couple of minutes report there is a ground on E8 that has caused the Bus loss.
- □ If requested to verify RPS Alt EPA breakers are set, verify remote function RP_IAEPAALT, SET.
- □ If requested to transfer 2AB-TB to alternate, modify remote function ED_ZIEDH14, ALT
- If requested to monitor MSIV pit temperature in back-panel (at MSL DAQ cabinets) report temperature from Monitored Parameter, Cert Testing, hvt23561 (bottom of list)
- □ When directed by the lead examiner, proceed to the next event.

EVENT 4 480V Bus E8 LOSS

Required Operator Actions

Time	Required Actions	Notes
	Direct APP for Sub E8 alarm	
	Direct entry into AOP-36.1	
	Direct I&C to investigate	
	Direct RPS be transferred to alternate and the ½ scram reset	The Group isolations cannot be reset due to the loss of E8.
	May direct entry into AOP-39.0 due to loss of battery chargers	
	Refer to Tech Spec 3.8.7 - determines 8 hour action (Condition B.1)	Sec attached Bfl Explanation 1-16-13 from litensee

RO

Time	Required Actions	Notes
	Monitor the Plant	

Question

What is the required TS call for E8 inoperable?

Response

If E8 is inoperable, for reasons other than planned maintenance, Condition B of TS 3.8.7 should be entered for both Unit 1 and Unit 2.

Per LCO 3.0.6, no supported system Conditions and Required Actions are required to be entered provided a loss of safety function does not exist. Since the question does not indicate any additional inoperable equipment, a loss of safety function per the SFDP (i.e., Appendix F of the TRM) does not exist.

Given that Required Action B.1 of TS 3.8.7 adequately maintains plant safety, no cascading to supported system TSs need to be implemented. Technical Specifications, however; do not prohibit cascading to supported systems.

Discussion

TS 3.8.7, for Units 1 and 2, deals with Division I and Division II AC and DC electrical power distribution subsystems operability. This TS requires both subsystems to be operable in Modes 1, 2, and 3.

The Bases for TS 3.8.7, Division II to consist, in part, of E2, E4, E6, and E8. With E8 inoperable for reasons other than planned maintenance, Condition B of TS 3.8.7 is entered. This requires restoration of the AC electrical power distribution subsystem within 8 hours. If this is not completed, Condition E is entered (i.e., be in Mode 3 within 12 hours and Mode 4 within 36 hours).

LCO 3.0.6 states:

When a supported system LCO is not met solely due to a support system LCO not being met, the Conditions and Required Actions associated with this supported system are not required to be entered. Only the support system LCO ACTIONS are required to be entered. This is an exception to LCO 3.0.2 for the supported system. In this event, additional evaluations and limitations may be required in accordance with Specification 5.5.11, "Safety Function Determination Program (SFDP)." If a loss of safety function is determined to exist by this program, the appropriate Conditions and Required Actions of the LCO in which the loss of safety function exists are required to be entered.

When a support system's Required Action directs a supported system to be declared inoperable or directs entry into Conditions and Required Actions for a supported system, the applicable Conditions and Required Actions shall be entered in accordance with LCO 3.0.2.

In this example, TS 3.8.7, Condition B does not direct entry into Conditions or Required Actions for a supported system.

Additionally, the Bases for LCO 3.0.6 states, in part:

Specification 5.5.11, "Safety Function Determination Program (SFDP)," ensures loss of safety function is detected and appropriate actions are taken. Upon entry into LCO 3.0.6, an evaluation shall be made to determine if loss of safety function exists. Additionally, other limitations, remedial actions, or compensatory actions may be identified as a result of the support system inoperability and corresponding exception to entering supported system Conditions and Required Actions. The SFDP implements the requirements of LCO 3.0.6.

Cross division checks to identify a loss of safety function for those support systems that support safety systems are required. The cross division check verifies that the supported systems of the redundant OPERABLE support system are OPERABLE, thereby ensuring safety function is retained. If this evaluation determines that a loss of safety function exists, the appropriate Conditions and Required Actions of the LCO in which the loss of safety function exists are required to be entered.

Attachment 1 of Appendix F to the TRM provides a table of TS Support/Supported systems. TS 3.8.7 supports numerous TS systems. Cross divisions checks for each supported system on both Units would need to be performed to ensure a loss of safety function does not exist. However, based on the plant status, no additional inoperable equipment was identified. Therefore, a loss of safety function would not exist and no supported system TSs are required to be entered.

The Bases for LCO 3.0.6 also states:

The potential confusion and inconsistency of requirements related to the entry into multiple support and supported systems' LCOs' Conditions and Required Actions are eliminated by providing all the actions that are necessary to ensure the plant is maintained in a safe condition in the support system's Required Actions.

As stated in the LCO 3.0.6, support system Required Actions (i.e., in this case Required Action B.1 of TS 3.8.7) were established to ensure plant safety without the need for cascading to supported system TSs. This is confirmed in the Bases for Required Action B.1 of TS 3.8.7 which states:

With one or more required AC buses or distribution panels in one division inoperable for reasons other than Condition A, the remaining AC electrical power distribution subsystems are capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition, assuming no single failure. The overall reliability is reduced, however, because a single failure in the remaining AC electrical power distribution subsystems could result in the minimum required ESF functions not being supported. Therefore, the required AC buses, and distribution panels must be restored to OPERABLE status within 8 hours.

TS Entry Question Loss of E8

Addressing specific examples provided:

For DG#4, the cooling water valves are both powered from MCC DGD fed from E8. Loss of safety function has not occurred for supported Technical Specification 3.8.1 as off sight power remains available to E4. As previously stated, Technical Specifications do not prohibit cascading, but cascading would not be required per LCO 3.0.6.

For the B Feedwater injection line, 2-B21-F032B, Feedwater injection outboard isolation valve is powered from E8. Containment isolation valve 2-B21-F010B is in series with 2-B21-F032B and is not affected by the loss of power. As such safety function per supported Technical Speciation 3.6.1.3 is not lost for primary containment isolation. As previously stated, Technical Specifications do not prohibit cascading, but cascading would not be required per LCO 3.0.6.

EVENT 4 480V Bus E8 LOSS

BOP

Time	Required Actions	Notes
	Reference APP for Sub E8 alarm	
	Dispatch AO to E8 to investigate	
	Diagnose and report loss of Sub E8	
	Enter and announce AOP-36.1	Section 3.2.10 IS Enclosure 2
	Manually start CREV Fan A	
	Direct 2AB-TB be transferred to alternate (E7)	
	Transfer RPS to alternate per OP- 03, Section 8.2 and reset RPS	See Enclosure 1 for OP-03 Section 8.2 The Group isolations cannot be reset due to the loss of E8.
	Verify available Division I equipment operating (RBCCW, Drywell coolers, Battery Chargers)	
	Ensure SJAE A is operating, if directed, place SJAE A in full load per OP-30	AOP-36.1 has a step 3.2.10.8 to ensure SJAE is operating IAW OP-30

EVENT 5 RECIRC PUMP SEAL FAILURE

Reactor Recirc Pump 2A seal #1 will fail and seal pressures will equalize. Shortly after the seal #1 failure, a seal #2 failure will occur. The crew will respond to the Recirc Pump seal failure and the rising drywell temperature and pressure per AOP-14.0. AOP-14.0 will direct the Recirc Pump be shutdown and then be isolated. If the pump is not isolated, a reactor scram will occur on high drywell pressure. The crew will insert a reactor scram due to no operating recirc pumps.

Malfunctions required: #1 seal failure / Dual seal failure

Objectives:

SCO Direct Shift Response To Recirculation Pump Trip

<u>RO/BOP</u> Respond To Recirc Pump Trip

Success Path:

Isolate the Recirc pump and insert a reactor scram.

Simulator Operator Actions:

- □ When directed by the lead examiner, **initiate Trigger 6**, RR Pump Seal Leakage.
- □ When directed by the lead examiner, proceed to the next event.

Required Operator Actions

<u>Critical Task</u> - Inserting a manual Reactor Scram when Recirc Pumps are tripped or in anticipation of tripping Reactor Recirc Pumps.

SRU		
Time	Required Actions	Notes
	Direct entry into and actions of 0AOP-14.0 for abnormal drywell parameters	
	Direct Recirc Pump A shutdown then isolated	
	Direct a Manual Reactor Scram	Critical Task - Inserting a manual Reactor Scram when Recirc Pumps are tripped or in anticipation of tripping Reactor Recirc Pumps.

BOP

Time	Required Actions	Notes
	Monitors the plant	

RO		
Time	Required Actions	Notes
	Review the following alarms during	
	this event:	
	5-3, OUTER SEAL LEAKAGE	
	FLOW DETECTION HI	
	FI OW HIGH/I OW	
	Enter and announce AOP-14.0	
	Stop Recirculation Pump A by	
	depressing the A Recirc Pump VFD	
	STOP pushbutton	
	Ciose Pump A Disch VIV, B32-F031A.	
	Close Seal Injection VIv B32-V22	
	Close Pump A Suction Vlv,	
	B32-F023A	
	Close Disch Bypass VIv, B32-F032A	
	Insert a manual reactor scram	Critical Task - Inserting a manual Reactor Scram
	Insert a manual reactor scram.	Critical Task - Inserting a manual Reactor Scram when Recirc Pumps are tripped or in anticipation
	Insert a manual reactor scram.	Critical Task - Inserting a manual Reactor Scram when Recirc Pumps are tripped or in anticipation of tripping Reactor Recirc Pumps.
	Insert a manual reactor scram. Performs scram immediate actions:	Critical Task - Inserting a manual Reactor Scram when Recirc Pumps are tripped or in anticipation of tripping Reactor Recirc Pumps.
	Insert a manual reactor scram. Performs scram immediate actions: 1. After steam flow is less than 3 x 106	Critical Task - Inserting a manual Reactor Scram when Recirc Pumps are tripped or in anticipation of tripping Reactor Recirc Pumps.
	 Insert a manual reactor scram. Performs scram immediate actions: 1. After steam flow is less than 3 x 106 lb/hr, PLACE the reactor mode switch 	Critical Task - Inserting a manual Reactor Scram when Recirc Pumps are tripped or in anticipation of tripping Reactor Recirc Pumps.
	 Insert a manual reactor scram. Performs scram immediate actions: 1. After steam flow is less than 3 x 106 lb/hr, PLACE the reactor mode switch to SHUTDOWN. 	Critical Task - Inserting a manual Reactor Scram when Recirc Pumps are tripped or in anticipation of tripping Reactor Recirc Pumps.
	 Insert a manual reactor scram. Performs scram immediate actions: 1. After steam flow is less than 3 x 106 lb/hr, PLACE the reactor mode switch to SHUTDOWN. 2. IF reactor power is below 2% (APRM) 	Critical Task - Inserting a manual Reactor Scram when Recirc Pumps are tripped or in anticipation of tripping Reactor Recirc Pumps.
	 Insert a manual reactor scram. Performs scram immediate actions: 1. After steam flow is less than 3 x 106 lb/hr, PLACE the reactor mode switch to SHUTDOWN. 2. IF reactor power is below 2% (APRM downscale trip), THEN TRIP the main 	Critical Task - Inserting a manual Reactor Scram when Recirc Pumps are tripped or in anticipation of tripping Reactor Recirc Pumps.
	 Insert a manual reactor scram. Performs scram immediate actions: After steam flow is less than 3 x 106 Ib/hr, PLACE the reactor mode switch to SHUTDOWN. IF reactor power is below 2% (APRM downscale trip), THEN TRIP the main turbine. 	Critical Task - Inserting a manual Reactor Scram when Recirc Pumps are tripped or in anticipation of tripping Reactor Recirc Pumps.
	 Insert a manual reactor scram. Performs scram immediate actions: After steam flow is less than 3 x 106 lb/hr, PLACE the reactor mode switch to SHUTDOWN. IF reactor power is below 2% (APRM downscale trip), THEN TRIP the main turbine. ENSURE the master reactor level 	Critical Task - Inserting a manual Reactor Scram when Recirc Pumps are tripped or in anticipation of tripping Reactor Recirc Pumps.
	 Insert a manual reactor scram. Performs scram immediate actions: After steam flow is less than 3 x 106 lb/hr, PLACE the reactor mode switch to SHUTDOWN. IF reactor power is below 2% (APRM downscale trip), THEN TRIP the main turbine. ENSURE the master reactor level controller setpoint is +170". 	Critical Task - Inserting a manual Reactor Scram when Recirc Pumps are tripped or in anticipation of tripping Reactor Recirc Pumps.
	 Insert a manual reactor scram. Performs scram immediate actions: After steam flow is less than 3 x 106 lb/hr, PLACE the reactor mode switch to SHUTDOWN. IF reactor power is below 2% (APRM downscale trip), THEN TRIP the main turbine. ENSURE the master reactor level controller setpoint is +170". IF two reactor feed pumps are 	Critical Task - Inserting a manual Reactor Scram when Recirc Pumps are tripped or in anticipation of tripping Reactor Recirc Pumps.
	 Insert a manual reactor scram. Performs scram immediate actions: After steam flow is less than 3 x 106 lb/hr, PLACE the reactor mode switch to SHUTDOWN. IF reactor power is below 2% (APRM downscale trip), THEN TRIP the main turbine. ENSURE the master reactor level controller setpoint is +170". IF two reactor feed pumps are running, and reactor vessel level is 	Critical Task - Inserting a manual Reactor Scram when Recirc Pumps are tripped or in anticipation of tripping Reactor Recirc Pumps.
	 Insert a manual reactor scram. Performs scram immediate actions: After steam flow is less than 3 x 106 lb/hr, PLACE the reactor mode switch to SHUTDOWN. IF reactor power is below 2% (APRM downscale trip), THEN TRIP the main turbine. ENSURE the master reactor level controller setpoint is +170". IF two reactor feed pumps are running, and reactor vessel level is above +160" and rising, then trip one. 	Critical Task - Inserting a manual Reactor Scram when Recirc Pumps are tripped or in anticipation of tripping Reactor Recirc Pumps.
	 Insert a manual reactor scram. Performs scram immediate actions: After steam flow is less than 3 x 106 lb/hr, PLACE the reactor mode switch to SHUTDOWN. IF reactor power is below 2% (APRM downscale trip), THEN TRIP the main turbine. ENSURE the master reactor level controller setpoint is +170". IF two reactor feed pumps are running, and reactor vessel level is above +160" and rising, then trip one. 	Critical Task - Inserting a manual Reactor Scram when Recirc Pumps are tripped or in anticipation of tripping Reactor Recirc Pumps.
	 Insert a manual reactor scram. Performs scram immediate actions: After steam flow is less than 3 x 106 lb/hr, PLACE the reactor mode switch to SHUTDOWN. IF reactor power is below 2% (APRM downscale trip), THEN TRIP the main turbine. ENSURE the master reactor level controller setpoint is +170". IF two reactor feed pumps are running, and reactor vessel level is above +160" and rising, then trip one. Maintains RPV level 170-200 inches 	Critical Task - Inserting a manual Reactor Scram when Recirc Pumps are tripped or in anticipation of tripping Reactor Recirc Pumps.
	 Insert a manual reactor scram. Performs scram immediate actions: After steam flow is less than 3 x 106 lb/hr, PLACE the reactor mode switch to SHUTDOWN. IF reactor power is below 2% (APRM downscale trip), THEN TRIP the main turbine. ENSURE the master reactor level controller setpoint is +170". IF two reactor feed pumps are running, and reactor vessel level is above +160" and rising, then trip one. Maintains RPV level 170-200 inches 	Critical Task - Inserting a manual Reactor Scram when Recirc Pumps are tripped or in anticipation of tripping Reactor Recirc Pumps.
	 Insert a manual reactor scram. Performs scram immediate actions: After steam flow is less than 3 x 106 lb/hr, PLACE the reactor mode switch to SHUTDOWN. IF reactor power is below 2% (APRM downscale trip), THEN TRIP the main turbine. ENSURE the master reactor level controller setpoint is +170". IF two reactor feed pumps are running, and reactor vessel level is above +160" and rising, then trip one. Maintains RPV level 170-200 inches	Critical Task - Inserting a manual Reactor Scram when Recirc Pumps are tripped or in anticipation of tripping Reactor Recirc Pumps.
	 Insert a manual reactor scram. Performs scram immediate actions: After steam flow is less than 3 x 106 lb/hr, PLACE the reactor mode switch to SHUTDOWN. IF reactor power is below 2% (APRM downscale trip), THEN TRIP the main turbine. ENSURE the master reactor level controller setpoint is +170". IF two reactor feed pumps are running, and reactor vessel level is above +160" and rising, then trip one. Maintains RPV level 170-200 inches Places the SULCV in service IAW Hard Card	Critical Task - Inserting a manual Reactor Scram when Recirc Pumps are tripped or in anticipation of tripping Reactor Recirc Pumps.

EVENT 5 RECIRC PUMP SEAL FAILURE

A small steam leak will develop in the drywell. Drywell temperature and pressure rises at a faster rate requiring initiation of drywell sprays. RHR Loop 2B is unavailable for spray due to loss of E8 (valve power). When RHR 2A is placed in drywell spray, the outboard spray valve (F016A) will fail. With no spray available, drywell temperature will exceed 300°F (cannot be restored and maintained below) requiring emergency depressurization. During the depressurization, low pressure injection systems (RHR, Core Spray and Condensate) must be operated to prevent uncontrolled injection. B Loop of RHR will fail to auto start. When emergency depressurization actions have been performed, the scenario may be terminated.

Malfunctions required: Small steam line break in the DW and RHR B Loop fail to start.

Objectives:

<u>SCO</u> – Directs Emergency Depressurization actions when exceeding 300°F in the DW.

BOP – Perform Emergency Depressurization actions when instructed by the SCO.

Success Path:

Perform Emergency Depressurization of the reactor due to 300°F in the DW.

Simulator Operator Actions:

- When directed by the lead examiner, initiate Trigger 7 to activate the steam leak.
- □ If asked to check breaker for E11-F016A (MCC 2XC) report thermal overload tripped, if directed to reset thermal overload, report it trips again, if directed to manually open E11-F016A, report valve is bound.
- □ If dispatched to monitor DG operation, report DG4 is running with no cooling water.
- Monitor drywell average temperature on ERFIS, if required to achieve 300 degrees DW temp, modify steam leak severity.
- □ When directed by the lead examiner, proceed to the next event.

Required Operator Actions

Critical Task - Depressurize the reactor when drywell average air temperature cannot be restored and maintained below 300°F by performing or anticipating emergency depressurization.

SRO

Time	Action	Notes
	Recognize drywell temperature and pressure rising at faster rate and diagnose as line break	
	diagnose as line break.	
	Enters PCCP and RVCP.	
	Direct suppression chamber spray per SEP-03.	
	Direct drywell spray per SEP-02.	
	Direct maintenance to investigate E11-F016A.	
	Before drywell temperature reaches 300°F, may direct anticipating emergency depressurization if MSIVs are open.	
	If drywell temperature exceeds 300°F, determines it cannot be restored below 300°F (unless actions in progress for anticipating ED) and directs emergency depressurization.	Critical Task - Anticipating may be a critical task if 300°F is not reached due to anticipating emergency depressurization.
	Direct low pressure ECCS be operated to prevent uncontrolled injection.	
	Direct B Loop RHR pumps to be started when the initiation signal is present.	
	Direct DW/Suppression Pool Sprays to be terminated if LL3 is reached.	
	Direct condensate to be operated to prevent uncontrolled injection.	

RO

Time	Action	Notes
	May recognize drywell temperature and pressure rising at faster rate and diagnose as line break.	
	Initiate suppression chamber spray per SEP-03.	See Enclosure 4.
	Initiate drywell spray per SEP-02	See Enclosure 5.
	Recognize and report failure of E11- F016A to open as thermal overload.	
	May dispatch AO to check breaker and attempt to reset thermal overload per the APP.	
	May secure Drywell/Suppression Pool Sprays if LOCA signal is reached.	

BOP

Time	Action	Notes
	May recognize drywell temperature and	
	pressure rising at faster rate and	
	diagnose as line break.	
	Dispatch AO to monitor DGs.	
	Shutdown DG4 due to loss of cooling water to the DG.	
	Performs actions to rapidly depressurize the RPV to the main condenser as directed by the SCO.	Critical task if this maintains Drywell temperature less than 300°F.
	Open Bypass valves using Bypass Jack not to exceed 3 Mlbs/hr steam flow (exceeding this value causes a Group 1 isolation)	
	<i>Opens seven ADS valves when directed by the SCO.</i>	Critical task if Drywell temperature cannot be maintained less than 300°F.
	Verifies low pressure ECCS actuations at 410# in RPV.	
	Recognizes RHR Loop B Pumps do not auto start and starts the pumps.	
	Overrides ECCS off to prevent uncontrolled injection.	Due to the E8 loss will not be able to shut off the B loop RHR Pumps.
	Operate Condensate as necessary to prevent uncontrolled injection.	To control injection pumps will have to be secured because of the power loss to some valves.
	Maintains level 170 - 200 inches. (Main Steam lines are at 250 inches)	

Simulator Operator Activities:

WHEN directed by the lead examiner, place the simulator in FREEZE.

CAUTION

DO NOT RESET THE SIMULATOR PRIOR TO RECEIPT OF CONCURRENCE TO DO SO FROM THE LEAD EXAMINER

ENCLOSURE 1

8.2	Trans	sferring RPS Bus B from Normal to Alternate Power	C	Cor
8.2	.1	Initial Conditions	<u>Initials</u>	
	1.	All applicable prerequisites of Section 4.0 are met.		
<u>.</u>	2.	2B RPS MG SET can NOT supply power to RPS Bus B OR must be removed from operation for maintenance or testing.		
NOTE:	IF the 5.3 or	white <i>ALT</i> light is NOT lit in the following step, THEN either Se 8.5 must be completed prior to performing this section.	ction	
	3.	White ALT light located above the RPS POWER SOURCE SELECT SWITCH, C72B-S1, on Panel H12-P610 is on.		
	4.	SCRAM signal is NOT present on RPS Bus A (this may be waived by Shift Manager based on plant conditions).	•••••••••••	
	5.	Tracking LCO does NOT exist on RPS breakers that would interfere with the transfer. (ref. Tech Spec 3.3.8.2)		
	6.	Shift Manager's permission has been obtained to transfer RPS Bus B from normal to alternate power.	************	
	7.	E&RC informed of impending Reactor Building ventilation isolation.	*******************	
8.2	2.2	Procedural Steps		
	1.	IF Sub E8/Pnl. 2E8 is to remain energized, THEN GO TO Section 8.5 to shift RPS alternate power source to Alternate Supply (2E8) AND RETURN TO Step 8.2.2.2.	**************	
	2.	IF the MSIVs are open, THEN ENSURE the following lights are on:		
		 MSIV SOL. COIL AC lights on Panel H12-P622 for B21-F022A-D 		
		 MSIV SOL_COIL DC lights on Panel H12-P622 for B21-F022A-D 		
		 MSIV SOL. COIL AC lights on Panel H12-P623 for B21-F028A-D 		:
		 MSIV SOL. COIL DC lights on Panel H12-P623 for B21-F028A-D 		

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ENCLOSURE 1

Ind.Ver.

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Ind.Ver.

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8.2.2 Procedural Steps

NOTE:	IF a Group 3 isolation signal is bypassed, THEN Tech Spec 3.3.6.1 requires
	SLC system declared INOPERABLE within 1 hour AND Tech Spec 3.1.7
	requires an 8-hour LCO to be in effect. WHEN a primary containment
	isolation valve is INOPERABLE AND the unit is in Mode 1, 2, 3, OR when
	instrumentation is required to be OPERABLE in accordance with LCO
	3.3.6.1, THEN an 8-hour LCO is in effect in accordance with Tech Spec
	3.6.1.3.

IF Group 3 or Group 8 Isolation signal is undesirable due to operation of RWCU or RHR shutdown cooling, THEN PERFORM the following:

- a. **OBTAIN** permission from Shift Manager to defeat the Group 3 or Group 8 Isolation signal.
- IF RWCU is in operation, THEN PLACE circuit breaker for RWCU OUTBOARD ISOLATION VALVE, G31-F004 (250V DC MCC 2XDB Compt. B48), in OFF.
- c. IF RHR shutdown cooling is operating, THEN PLACE circuit breaker for RHR SHUTDOWN COOLING ISOLATION VALVE, E11-F008 (250V DC MCC 2XDB Compt. B50), in OFF.
- d. IF RHR Loop B shutdown cooling is operating, THEN PLACE circuit breaker for LOOP B LPCI INBOARD INJECTION VALVE, E11-F015B (480V MCC 2XB-2 Compt. DL7), in OFF.
- REVIEW Table 2 with the Control Room to identify trip signals and isolations that may occur when transferring RPS Bus B to alternate power (Dead Bus Transfer).

CRS Signature:

CAUTION

Transferring RPS Bus B to alternate power following a loss of power on RPS Bus B shall always be accomplished by placing RPS POWER SOURCE SELECT SWITCH in ALT B. A SCRAM will result if the switch is placed in ALT A.

5. PLACE RPS POWER SOURCE SELECT SWITCH, C72B-S1, on Panel H12-P610 in ALT B.

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ENCLOSURE 1

		•	
	6.	PLACE REACTOR SCRAM RESET SWITCH, C72-S5, in GP 1/4 AND GP 2/3.	
	7.	ENSURE TRIP SYS B SCRAM GROUPS 1, 2, 3, 4, lights on Panel H12-P603 are on.	
	8.	ENSURE SCRAM GROUPS 1, 2, 3, 4 lights on Panel H12-P611 are on.	na élernel achthás bá
	9.	CLOSE SAMPLE OUTBD ISOL VLV, B32-F020.	· ····································
NOTE:	CREV verific perfor	' will automatically shutdown when the following step is performe ation of CREV auto start is desired, THEN verification must be med prior to the following step.	d. IF
	10.	DEPRESS ISOLATION RESET GROUPS 1, 2, 3, 6, 8, push button, A71-S32, on Panel H12-P601 to reset primary containment isolation logic.	
	11.	DEPRESS ISOLATION RESET GROUPS 1, 2, 3, 6, 8, push button, A71-S33, on Panel H12-P601 to reset primary containment isolation logic.	
	12.	ENSURE Group 1 B/D logic is reset by observing OUTBOARD MSIV LOGIC AC AND INBOARD MSIV LOGIC DC lights on Panel H12-P601 are on.	***************************
	13.	ENSURE MS/V AC LOG/C light on Panel H12-P623 is on.	
	14.	ENSURE MSIV DC LOGIC light on Panel H12-P622 is on.	
	15.	IF any of the following breakers were placed in OFF to defeat the Group 3 or Group 8 Isolation signal, THEN PLACE the appropriate circuit breakers in ON:	
		- Compt. B48 on MCC 2XDB (G31-F004)	
		- Compt. B50 on MCC 2XDB (E11-F008)	
		- Compt. DL7 on MCC 2XB-2 (E11-F015B)	
	16.	RESET main steam line radiation monitors AND ENSURE proper operation.	•

8.2.2 Procedural Steps

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8	3.2.2	Procedural Steps			
	17.	RESET Off-Gas (SJAE) r. ENSURE proper operatio	adiation monitor n.	s AND	
	18.	REALIGN affected syster	ns as directed b	y the Unit CRS.	
	19.	OPEN DW FLOOR DRAI	N OUTBD ISOL	VLV, G16-F004.	
	20.	OPEN DW EQUIPMENT G16-F020.	DRAIN OUTBD	ISOL VLV,	<u> </u>
	21.	IF desired, THEN OPEN OUTBD ISOL VLV, B21-F	STEAM LINE DI =019.	RAIN	
	22.	OPEN OUTBD SAMPLE	ISOL VLV, B32-	-F020.	
	23.	START CB WASHROOM	I EXHAUST FAI	V, 2D-EF-CB.	
	24.	REVIEW Table 2 AND EN and components are reali conditions.	NSURE affected igned for the cur	l systems rent plant	CRS
	25.	COMPLETE Attachment	7.		
NOTE:	Refer valve	ence WO #1878878 for ins s voltage.	structions to obta	ain scram pilot solen	oid
	26.	INITATE a supplemental 0OI-03.7, to have I&C con scram pilot solenoid valve 125 volts, once per shift o	check, in accord nfirm voltage su es to be less tha or as directed by	tance with pplied to the n or equal to r Unit CRS.	
			Date/Time Con	nnleted	
			Performed By ((Print)	Initials
				rren	
		Reviewed By	: Unit CRS/SRO		
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3.2.10 Loss of 4160V Bus E4 or 480V Bus E8

NOTE: Power to SRV acoustic monitors comes from Sub E8. IF power is lost to the monitors, **THEN** SRV position indication lights on the RTGB should **NOT** be used to determine valve position.

NOTE: Attachment 4 contains a listing of loads supplied from Bus E4.

- 1. **CHECK** RTGB and local annunciators for the diesel generator and electrical distribution system to determine the cause of the malfunction.
- **NOTE:** Loss of Bus E4 power causes a loss of RTGB indication and UA-01 alarms for *AIR COMPRESSOR 2B* but does **NOT** affect compressor operation.
- **NOTE:** Loss of Bus E4 power also causes *CROSS-TIE VALVE*, 2-SA-PV-5071, to fall closed with no RTGB indication.
- NOTE: In service air compressor high discharge pressure (U1 [≥125 psig] U2 [≥130 psig]) OR relief valves lifting could be an indication of air dryer high differential pressure potentially caused by valves in the flow path failing closed.
 - 2. **ENSURE** one of the following is operating:

	-	CB EMERG	RECIRC FAN,	2A-ERF-CB	П
--	---	----------	-------------	-----------	---

- CB EMERG RECIRC FAN, 2B-ERF-CB
- IF Sub E8 is de-energized, AND Sub E7 is available, THEN SHIFT the Manual Bus Transfer (MBT) device for Panel 2AB-TB to the alternate power source, (Sub E7/DP 2E7). (located on Turbine Building 20' Elev.)

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3.2.10 Loss of 4160V Bus E4 or 480V Bus E8

NOTE: IF 120 VAC Panel 2AB-TB is de-energized, THEN CROSS-TIE VALVE, 2-SA-PV-5071, fails closed and has no RTGB indication. CROSS-TIE VALVE, 2-SA-PV-5071 may be opened with the manual handwheel which will gag it in the open position.

NOTE: 1B and 2B Service Air Compressors are **NOT** designed to individually carry the full system demand of both units when the cross tie valves are open.

CAUTION

The unaffected units air compressors and air pressure should be monitored during the cross-tie operation to prevent loss of both units. If the affected unit's air header pressure has lowered significantly or depressurized, then the cross-tie could cause a loss of service air on the unaffected unit. Consequences of a loss of service air on the unaffected by both Units' CRS.

4.	IF the opposite unit has power to its Service Air
	compressors AND it is desired to cross-tie air systems,
	THEN PERFORM the following:

- OBTAIN permission from the opposite Unit CRS to cross-tie unit air systems.
- ENSURE CROSS-TIE VALVE, 2-SA-PV-5071 is open, (Unit 2, XU-2).
- c. ENSURE CROSS-TIE VALVE, 1-SA-PV-5071 is open, (Unit 1, XU-2).
- IF problems occur during cross-tie operation, THEN, at the direction of the Unit CRS or Reactor Operator, CLOSE one of the following:
 - a. IF Service Air Dryer 1B is in standby OR in service on <u>Unit 1</u>, THEN CLOSE, 2-SA-PV-5071

OR

 IF Service Air Dryer 1B is in service on <u>Unit 2</u>, THEN CLOSE, 1-SA-PV-5071.

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3.2	.10	Loss of 4160V Bus E4 or 480V Bus E8	
	5.	START RPS MG Set B in accordance with 2OP-03, Section 5.2.	
	6.	IF required THEN TRANSFER RPS bus B to alternate supply in accordance with 2OP-03, Section 8.2.	
	7.	IF required, THEN START CRD Pump A in accordance with 2OP-08, Section 8.17.	
	8.	IF required, THEN ENSURE an Off-Gas train is in service in accordance with 20P-30, Section 5.2.	
	9.	IF no RBCCW pump is running, THEN PLACE all RBCCW pump control switches in OFF AND PERFORM one of the following:	
NOTE:	Drywe	ell temperature limit for starting the RBCCW System:	
	- Gre Co	eater than or equal to 260°F below the 75° elevation, as indicat ntrol Room recorder <i>CAC-TR-4426</i> (if data is available).	ed on
	- Gro rec	eater than or equal to 258°F as indicated on Points 1, 3 & 4 of corder CAC-TR-778.	RSDP
		 IF any local drywell temperature is currently greater than the starting temperature limit OR has exceeded the starting temperature limit since the initiation of the event, THEN START RBCCW Pump A and Pump C in accordance with 20P-21, Section 8.6. 	
		- IF all local drywell temperatures have remained less than the starting temperature limit since the initiation of the event, THEN START RBCCW Pump A and Pump C in accordance with 20P-21, Section 5.2.	
NOTE:	Each a scr	drywell cooler will start automatically when its MCC is energize am signal is present.	ed while
	10.	ENSURE all available drywell coolers are operating.	
	11.	ENSURE NSW and CSW pumps are operating as appropriate for plant conditions.	

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3.2	.10	Loss of 4160V Bus E4 or 480V Bus E8	
	12.	ENSURE the available battery chargers are energized and supplying DC loads.]
		a. IF power has been removed from the battery chargers for greater than 1 hour, THEN REMOVE selected loads from the battery based upon 00I-50 load list.]
	13.	MONITOR 125V DC battery voltage for 2B-1 and 2B-2]
		a. REMOVE 125V DC battery loads as necessary prior to reaching the low voltage limit of 105 volts.]
	14.	MONITOR 24V DC battery voltage for 24B-1 and 24B-2 batteries.	
		a. REMOVE 24V DC battery loads as necessary prior to reaching the low voltage limit of 21 volts.]
	15.	REMOVE any battery from service prior to reaching the low voltage limit, 105 volts or 21 volts, as applicable.	
NOTE:	IF in M deterr 8.16, [°] Tech	Modes 1, 2 OR 3 AND the CSW Header is supplying RBCCW, wit mining SW flow to the RBCCW HX in accordance with 2OP-43, Se THEN the CSW Header should be considered inoperable (referen Spec 3.7.2).	hout ection nce
	16.	IF required, THEN PERFORM the following to transfer RBCCW HXs from the NSW header to the CSW header:	
		a. CONFIRM CSW system available.	
		b. ENSURE at least one of the following is closed:	
		-RBCCW HX SERVICE WATER INLET VALVE, [SW-V103	
		-RBCCW HX SERVICE WATER INLET VALVE, [SW-V106	
		-NUCLEAR HEADER TO RBCCW HEAT	

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3.2.10 Loss of 4160V Bus E4 or 480V Bus E8

NOTE: High differential pressure may cause the SW-V146 to be difficult to open. IF CSW is NOT supplying RHRSW, THEN temporarily securing CSW pumps on the CSW header should be considered.

> c. **OPEN** CONVENTIONAL HEADER TO RBCCW HEAT EXCHANGERS SUPPLY VALVE, SW-V146.

NOTE: Starting a fuel pool cooling pump requires approximately 50 KW.

- IF required for Spent Fuel Pool Cooling, THEN START Fuel Pool Cooling Pump A in accordance with 2OP-13, Section 8.16.
- IF Bus E4 is de-energized AND Bus E2 is available, THEN ENSURE the Electric Fire Pump power supply is aligned to Bus E2 in accordance with 0OP-41, Section 8.56.

END OF SECTION

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ATTACHMENT 6 Page 1 of 2 Feedwater Level Control Following a Reactor Scram

NOT	E	This attachment is NOT to be used for routine system operation.	
1.	EN	SURE the following:	
	٠	FW-V6 AND FW-V8 OR FW-V118 AND FW-V119 closed	
	٠	FW-FV-177 closed	
	٠	FW-V120 closed	
	٠	FW control MODE SELECT in 1 ELEM	
	٠	SULCV in M (MANUAL) closed	
	*	B21-F032A AND/OR B21-F032B open	
2.	PL	ACE the MSTR RFPT SP/RX LVL CTL in M (MANUAL), THEN:	
	٠	ADJUST to 187"	
3.	IF	any RFP is running, THEN :	
	a.	PLACE RFP A(B) RECIRC VLV, control switch to open	
	b.	PLACE RFPT A(B) SP CTL in M (MANUAL)	
4.	IF	no RFP is running, THEN :	
	a.	PLACE RFP A(B) RECIRC VLV, control switch to open	
	b.	ENSURE the following:	
		 RFP A(B) DISCH VLV, FW-V3(V4) open 	
		RFPT A(B) SP CTL in M (MANUAL) at lower limit	
		RFPT A(B) MAN/DFCS control switch in MAN	
		 Reactor water level is less than +206 inches AND RFPT A&B HIGH LEVEL TRIP reset 	
	C.	DEPRESS RFPT A(B) RESET	

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ATTACHMENT 6 Page 2 of 2 Feedwater Level Control Following a Reactor Scram

	d.	ENSURE RFPT A(B) LP AND HP STOP VLVS open	
	e.	ROLL RFPT A(B) to 1000 rpm by depressing RFP A(B) START	
	f.	RAISE RFPT A(B) to approximately 2550 rpm using the LOWER/RAISE control switch	
	g.	DEPRESS RFPT A(B) DFCS CTRL RESET	
5.	ENSU	RE MAN/DFCS control switch in DFCS	
6.	RAISE than c	ERFPT A(B) SP CTL speed until discharge pressure is greater r equal to 100 psig above reactor pressure	
7.	ADJU	ST SULCV to establish desired injection	
8.	IF des	ired, THEN PLACE SULCV in A (AUTO)	
9.	IF nee	ded, THEN THROTTLE FW-V120	
10.	IF nee	eded, THEN GO TO 20P-32 Section 8.17 for level control	

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2/1204 S/1205

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SUPPRESSION POOL SPRAY

1.0 ENTRY CONDITION

- As directed by the PC/P section of Primary Containment Control Procedure, EOP-02-PCCP

2.0 OPERATOR ACTIONS

	NO.	TE:	Manpower:	1 Reactor Operator	
			Special equipment:	None	
R	0:	2.1	IF suppression chamber pressure is EXIT this procedure.	less than 2.5 psig, THEN	
R	0:	22	IF necessary, THEN PLACE Loop A LPCI INITIATION OVERRIDE switch MANUAL OVERRD.	(B) 2/3 CORE HEIGHT a, E11-CS-S18A(S18B), in	
R	0:	2.3	IF the CTMT SPR OVRD light for the CONTAINMENT SPRAY VALVE CC E11-CS-S17A(S17B) is NOT on, TH PLACE Loop A(B) CONTAINMENT switch, E11-CS-S17A(S17B), to MAR	e Loop A(B) DNTROL switch, EN MOMENTARILY SPRAY VALVE CONTROL NUAL.	
R	0:	2.4	IF INBOARD INJECTION VLV, E11- AND injection to the reactor is NOT OUTBOARD INJECTION VLV, E11-	F015A(F015B) is open, required, THEN CLOSE F017A(F017B).	
R	0:	2.5	ENSURE RHR Loop A(B) is placed in Pool Cooling, or Drywell Spray mode	in the LPCI, Suppression	
R	0:	2.6	ENSURE TORUS DISCHARGE ISC is open.	DL VLV, E11-F028A(F028B),	
R	:0:	2.7	OPEN TORUS SPRAY ISOL VLV, E	E11-F027A(F027B).	
R	:O:	2.8	WHEN suppression chamber pressu suppression pool spray is no longer TORUS SPRAY ISOL VLV, E11-F0.	ire is less than 2.5 psig OR required, THEN CLOSE 27A(F027B).	
F	80:	2.9	IF re-initiation of suppression pool s RETURN to Step 2.1, on page 2.	pray is required, THEN	
F	80:	2.10	WHEN suppression pool spray is no EXIT this procedure AND CONTINU effect.	o longer required, THEN JE in the procedure(s) in	

DRYWELL SPRAY PROCEDURE

1.0 ENTRY CONDITIONS

- As directed by the PC/P section of Primary Containment Control Procedure, EOP-02-PCCP

OR

 As directed by the DW/T section of Primary Containment Control Procedure, EOP-02-PCCP

2.0 OPERATOR ACTIONS

NOTE:	Manpower:	1 Reactor Operator 1 Auxiliary Operator 1 Independent Verifier	
	Special equipment:	2 3095 keys 1 screwdriver 1 locking screwdriver tape	

RO: 2.1 ENSURE WELL WATER TO VITAL HEADER VLV, SW-V141, is closed.

	NOTE:	With E11			
RO: 2		2.2	IF INBO open, TI E11-F0:	ARD INJECTION VLV, E11-F015A(F015B) is HEN CLOSE OUTBOARD INJECTION VLV, 17A(F017B).	
		2.3	ENSUR	E one of the following valves is open:	
R	0:		- CC	ONV SW TO VITAL HEADER VLV, SW-V111	
R	0:		- NC	UC SW TO VITAL HEADER VLV, SW-V117	

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	2.4 CON	IMEN	CE drywell spray by performing the following:	
RO:	2.4.1	ENS tripp	URE both reactor recirculation pumps are ed.	
	2.4.2	IF:		
RO:		-	A Group 10 isolation has occurred due to a loss of power, AND	
RO:		-	Power has been restored,	
		THE the	N RESET the Group 10 isolation by performing following:	
RO:		1.	MOMENTARILY PLACE DIV I NON-INTRPT, RNA-SV-5262, control switch to OVERRIDE RESET, AND THEN to OPEN.	
RO:		2.	ENSURE DIV I NON-INTRPT, RNA-SV-5262, is open.	
RO:		3.	ENSURE DIV I BACKUP N2 RACK ISOL VLV, RNA-SV-5482, is closed.	
RO:		4.	MOMENTARILY PLACE DIV II NON-INTRPT, RNA-SV-5261, control switch to OVERRIDE RESET, AND THEN to OPEN.	
RO:		5.	ENSURE DIV II NON-INTRPT, RNA-SV-5261, is open.	
RO:		6.	ENSURE DIV II BACKUP N2 RACK ISOL VLV, RNA-SV-5481, is closed.	
RO:	2.4.3	PLA (L/C	CE all drywell cooler control switches to OFF	

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2.0 OPERATOR ACTIONS

2.0 OPERATOR ACTIONS

	2.4.4	IF the drywell coolers continue to run, THEN PERFORM the following to energize the LOCA lockout relays for the drywell cooler fans:	
RO:		 Unit 1 Only: In Panel XU-27, west side, PLACE D/W CLR A&D OVERRIDE SWITCH, VA-CS-5993, keylock switch in STOP. 	
RO:		 Unit 1 Only: In Panel XU-28, west side, PLACE D/W CLR B&C OVERRIDE SWITCH, VA-CS-5994, keylock switch in STOP. 	
RO:		 <u>Unit 2 Only</u>: In Panel XU-27, west side, PLACE D/W CLR A&D OVERRIDE SWITCH, VA-CS-5993, keylock switch in STOP. 	
RO:		 <u>Unit 2 Only</u>: In Panel XU-28, east side, PLACE D/W CLR B&C OVERRIDE SWITCH, VA-CS-5994, keylock switch in STOP. 	
RO:	2.4.5	IF the drywell coolers continue to run, THEN PERFORM Attachment 1 on page 13, AND RETURN to Step 2.4.6.	
RO:	2.4.6	IF necessary, THEN PLACE Loop A(B) 2/3 CORE HEIGHT LPCI INITIATION OVERRIDE switch, E11-CS-S18A(S18B), to MANUAL OVERRD.	
RO:	2.4.7	IF the CTMT SPR OVRD light for Loop A(B) CONTAINMENT SPRAY VALVE CONTROL switch, E11-CS-S17A(S17B), is NOT on, THEN MOMENTARILY PLACE Loop A(B) CONTAINMENT SPRAY VALVE CONTROL switch, E11-CS-S17A(S17B), to MANUAL.	
RO:	2.4.8	ENSURE TORUS COOLING ISOL VLV, E11-F024A(F024B), is closed.	

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2.0	OPERATOR A	CTIONS	
RO:	2.4.9	IF while executing the following steps drywell pressure drops below 2.5 psig, THEN TERMINATE drywell spray in accordance with Step 2.7, on page 8.	
	2.4.10	CONFIRM the following:	
RO:		 Drywell pressure and drywell temperature are in the "SAFE" region of the Drywell Spray Initiation Limit graph (see Figure 1 on next page). 	
RO:		 Suppression pool water level is below +21 inches. 	



FIGURE 1 Drywell Spray Initiation Limit

2.0	OPERATOR A	CTIONS	
RO:	2.4.11	ENSURE one RHR Pump is running.	
RO: 2.4.12		OPEN Loop A(B) DRYWELL SPRAY INBD ISOL VLV, E11-F021A(F021B).	
RO:	2.4.13	THROTTLE OPEN Loop A(B) DRYWELL SPRAY OTBD ISOL VLV, E11-F016A(F016B), to obtain between 8,000 gpm and 10,000 gpm flow.	
RO:	2.4.14	IF additional cooling is required, THEN START the second Loop A(B) RHR pump AND limit flow to less than or equal to 11,500 gpm.	
_	2.5 ENS with	URE RHRSW Loop A(B) is operating in accordance the following:	
NOTE:	: RHR SW L E11-S19A Booster Pi	BOOSTER PUMPS A & C (B & D) LOCA OVERRIDE sv (S19B), is utilized to override the LOCA trip signal to RH umps A & C (B & D).	vitch, IR SW
RO:	2.5.1	IF necessary, THEN PLACE RHR SW BOOSTER PUMPS A & C (B & D) LOCA OVERRIDE switch, E11-S19A(S19B), in MANUAL OVERRD.	
RO:	2.5.2	ALIGN the RHR Service Water System to supply cooling water to RHR Heat Exchanger A(B) (OP-43).	
	2.6 ALK	GN RHR flow through the heat exchanger as follows:	
RO:	2.6.1	ENSURE HX A(B) INLET VLV, E11-F047A(F047B) is open.	
RO:	2.6.2	ENSURE HX A(B) OUTLET VLV, E11-F003A(F003B) is open.	
NOTI	E: HX A(B) LPCI initi minutes,	BYPASS VLV, E11-F048A (F048B), is normally open, b ation signal present can NOT be closed or throttled for t	ut with a hree
RO:	2.6.3	CLOSE HX A(B) BYPASS VLV, E11-F048A(F048B).	

Shift Briefing

Plant Status

The plant is operating at ~75% power following a startup.

A severe thunderstorm warning has been issued for Brunswick County for the next 3 hours.

Equipment Out of Service

APRM 2 INOP and bypassed.

Protected Equipment

None

Plan of the Day

Complete Main Stop Valve Testing IAW 2OP-26, Section 8.6. Then transfer DFCS to 3 element control. Raise power to 85% using recirc flow.

Appendix	k D		Scenario Outline	Form ES-D-1
Facility: Examiner	Brunswick s: 		Scenario No.: <u>NRC 2012-4</u> Operators:	Op-Test No.: <u>FINAL</u>
Initial Conditions: Unit Two is o GP-10 seque due to spikin pump is in st			perating at 5% power. Reactor sta ince A2X is complete up to Step 1 g and is bypassed. 2A NSW Pump andby aligned to the Nuclear SW I	artup is in progress per GP-02. 2 Item 179. IRM A is inoperable o is under clearance. 2A CSW Header.
Turnover:		Place RFP 2 power to 10%	A in automatic control. Continue w 6 in preparation for placing the Mo	vith GP-02 actions to raise reactor de switch to RUN.
Event No.	Malf. No.	Event Type*	Event De	escription
1	N/A	N-BOP N-SRO	Place RFP A in Auto	
2	N/A	R-RO R-SRO	Raise reactor power by pulling co	ontrol rods
3	NI018F	I-RO I-SRO	IRM C Fails Upscale (TS)	
4	CW027F	C-BOP C-SRO	CSW 2C Pump Trip – CSW 2A	Auto Start Failure (AOP-19, TS)
5	RD005M	C-RO C-SRO	Rod Drift (AOP-2.0, AOP-3.0, AF	PP A-05, TS)
6	CF035F	C-BOP C-SRO	SULCV Fails Closed	
7	RP005F RP011F	M-ALL C-RO	Multiple Rod Drifts/Manual Scrar	n/ATWS
7a	K2624A K2322A	C-RO C-SRO	ARI Failure to Reset/Rod Select	Fails/SLC Pumps Fail to start
8	ES004F	C-RO C-SRO	SRV F Fails Open (AOP-30)	
8a	CA020F	M-All	SRV F Tailpipe Rupture Emergency Depressurize (PSP)	
	*(N)ormal, (R)e	activity, (I)nstrument, (C)ompo	nent, (M)ajor

SCENARIO DESCRIPTION

- Event 1 The crew will place RFP A in automatic operation IAW 0GP-02, Step 5.3.46.
- Event 2 When RFP A has been placed in automatic operation, the crew will commence raising reactor power by pulling rods in preparation for placing the Mode switch to RUN. Rod pulls will commence at Step 12, Item 179 (38-15 @ 00) of the A2X sequence.
- Event 3 IRM C will fail upscale causing a rod block and half scram. The Unit SRO will address IRM A and C inoperability IAW TS 3.3.1.1. Once addressed, Ops Center SRO will report IRM A is ready to be returned to service following proper channel check. The crew will take the actions of the APP and bypass IRM C and reset the half scram. Following bypassing of IRM C and resetting the half scram, control rods will continue to be withdrawn raising power.
- Event 4 CSW pumps are aligned with 2B and 2C running and 2A in standby aligned to the Nuclear SW header. CSW Pump 2C will trip. CSW Pump will not auto start requiring the BOP operator to manually start the pump. This will require aligning the pump to the conventional service water header. The crew will enter 0AOP-19. The Unit SRO will address CSW Pump operability IAW TS 3.7.2.
- Event 5 When Tech Specs have been addressed, the crew will continue to raise reactor power. Control Rod 30-31 will drift outward. The crew will enter AOP-2.0 and will reference AOP-3.0. IAW 2APP A-05 3-2, the operator will attempt to arrest the control rod and then will drive the rod to position 00. The SRO will address Rod Pattern Control and Control Rod Operability IAW Tech Spec 3.1.6 and 3.1.3.
- Event 6 The SULCV will fail closed stopping feed flow to the vessel. Reactor water level will drop requiring action to re-establish flow to the vessel.
- Event 7 When level control has been established, multiple control rods will drift. The RO will insert a manual reactor scram IAW the requirements of AOP-02. When the manual scram is initiated, not all control rods will insert requiring entry into LPC. The SRO will direct performance of LEP-02. SLC pumps will fail to run.
- Event 7a When performing LEP-02, ARI will fail to reset and the Rod Select will fail preventing the insertion of control rods.
- Event 8 SRV F will fail open. AOP-30 will be entered. The SRV will not reset using the control switch. Pulling fuses IAW AOP-30 results in loss of indication but the SRV remains open.
- Event 8a SRV F tailpipe will rupture, pressurizing containment.

DUKE ENERGY BRUNSWICK TRAINING SECTION SIMULATOR SCENARIO 2012 NRC Exam Scenario #4 Robut Boli Nuclear Operations Instructor 9/20/12 Date Prepared By: <u>9-20-12</u> Date Concurred By Nucear Operations Instructor ZA. <u>9/20/12</u> Date Validated By: Operations Department Representative 09.20.12 Validated By: Operations Department Representative Date 9 20 72 Date Validated By: Operations Department Representative 9/27/12 Approved By: Facility Representative 5

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SIMULATOR SETUP

Initial Conditions

IC-6

Rx Pwr 5%

Events:

Event Number	Trigger	Trigger Description		
1			Normal Ops (Place RFP A in automatic)	
2			Raise reactor power by pulling control rods	
3	1	Manual	IRM C fails upscale	
4	2	Manual	CSW Pump 2C trips	
5	3	Manual	Control rod 30-31 drifts out	
6	4	Manual	SULCV fails closed	
7	5	Manual	Multiple Rod Drifts	
7a	6	Automatic	Rod Select power fails/ATWS	
8	7	Manual	SRV F fails open	
8a	8	Manual	SRV F tail pipe rupture	

Malfunctions Summary

Malf ID	Mult ID	Description	Current Value	Target Value	Rmptime	Actime	Dactime	Trig
RD005M	30-31	CONTROL ROD WITHDRAWAL DRIFT	FALSE	TRUE			1	3
NI018F		IRM C FAILS HI	FALSE	TRUE				1
CW027F	С	CSW PUMP MOTOR WINDING FAULT	FALSE	TRUE				2
CF035F		S/U LV CONT VLV FAILS CLOSED	FALSE	TRUE				4
RD005M	22-47	CONTROL ROD WITHDRAWAL DRIFT	FALSE	TRUE				5
RD005M	14-39	CONTROL ROD WITHDRAWAL DRIFT	FALSE	TRUE				5
RD005M	30-23	CONTROL ROD WITHDRAWAL DRIFT	FALSE	TRUE				5
RP011F		ATWS-4	FALSE	TRUE				6
ES004F		ADS VALVE F FAILS OPEN	FALSE	TRUE				7
CA020F		SRV F TAIL PIPE RUPTURE	FALSE	TRUE				7

SIMULATOR SETUP

Remotes Summary

Remf ID	Mult ID	Description	Current Value	Target Value	Rmptime	Actime	Trig
ED_IABKCF12		BKR CTL FUSES NSW PUMP 2A	OUT	Ουτ			
SL_IASLRA		2A SLC PUMP MOTOR BKR	OPEN	OPEN			
SL_IASLRB		2B SLC PUMP MOTOR BKR	CLOSE	OPEN		00:00:10	10

Override Summary

Tag ID	Description	Position/ Target	Actual Value	Override Value	Rmptime	Actime	Dactime	Trig
Q4B201G4	NUC SW PMP A DISCH VLV(GREEN)	ON/OFF	ON	OFF				
K2322A	ROD SEL POWER	OFF	OFF	ON				6
K2322A	ROD SEL POWER	ON	ON	OFF				6
K2624A	CS-5562 ARI	RESET	OFF	OFF				
Q1508LGJ	SRV VLV B21-FO13F GREEN		ON	OFF				8
Q1508RRJ	SRV VLV B21-FO13F RED		ON	OFF				8
Q2211LGO	S/B LIQ PMP A GREEN	ON/OFF	ON	ON				
Q2201LAO	SQUIBA *READY AMBER	ON/OFF	ON	ON	-			
K1727A	CONT SPRAY VLV CONTROL	MANUAL	OFF	OFF				
K1227A	CONT SPRAY VLV CONTROL	MANUAL	OFF	OFF				

Annunciator Summary

Window	Description	Tagname	Override Type	Oval	AVal	Actime	Dactime	Trig
4-5	SQUIB VALVE CONTINUITY LOSS	ZA445	OFF	OFF	ON			

Special Instructions

- 1. Ensure simulator security is established IAW TAP-411.
- 2. Ensure appropriate keys have blanks in switches.
- 3. Reset alarms on SJAE, MSL, and RWM NUMACs.
- 4. Ensure no rods are bypassed in the RWM.
- 5. Ensure hard cards and flow charts are cleaned up.
- 6. Ensure all key have blanks installed.
- 7. Ensure affected procedures are free of any marks.
- 8. Place all SPDS displays to the Critical Plant Variable Display #100.
- 9. Reset to IC-6 and place in run.
- 10. Ensure no ENP-24.5 is located at the P603 panel.
- **11. Bypass IRM A and place off normal tag.**

12. Place red cap on 2A Nuclear Service Water Pump control switch.

- 13.CSW Pumps B and C operating.
- 14.CSW Pump A selected for the NSW header.
- 15. Place Protected Equipment placards on 2B NSW Pump.
- 16. Update orange Protected Equipment sign to indicate 1A, 1B, and 2B NSW Pumps.
- 17. Ensure GP-10 is completed up to Step 12 Item 179 of A2X sequence with Attachment 3.
- 18. Ensure 0GP-02 is completed up to Step 5.3.46.
- 19. Ensure Reactor pressure is 800 psig and #1 BPV open at least 40%.
- 20. Load scenario file if required.
- 21. Advance all chart recorders to indicate steady state conditions.
- 22. Provide Shift Briefing sheet to the CRS.

Scenario Information

<u>Critical Tasks</u> (Critical Tasks are bolded & italicized in required operator statements)

- 1. Emergency Depressurize when PSP is exceeded
- 2. Perform LEP-02, Alternate Control Rod Insertion

REFERENCES

- A. GP-02
- B. OP-07
- C. OP-08
- D. OP-32
- E. GP-10
- F. AOP-02.0
- G. AOP-03.0
- H. AOP-19.0
- I. AOP-23.0
- J. AOP-30.0
- K. EOP-01-RSP
- L. EOP-01-LPC
- M. EOP-01-RVCP
- N. EOP-02-PCCP
- O. EOP-LEP-02
- P. EOP-01-SEP-02
- Q. EOP-01-SEP-03
- R. Conduct Of Operations Manual
- S. Technical Specifications
- T. Annunciator Panel Procedures

EVENT 1 Shift Turnover, Place Reactor Feed Pump A in Automatic Operation

The crew will place RFP A in automatic operation IAW 0GP-02, Step 5.3.46

Malfunctions required:

None

Objectives:

<u>SCO</u>

Directs placing RFP A in automatic operation.

<u>BOP</u>

Place RFP A in automatic operation. Monitor reactor water level and proper operation of RFP and SULCV.

Success Path:

RFP A controlling reactor water level in automatic operation.

Simulator Operator Actions:

□ When directed by the lead examiner, proceed to the next event.

Required Operator Actions

Normal operation. Place RFP A in automatic operation.

SRO

Time	Required Actions	Notes
	Ensures conditions for placing RFP A in automatic operation	
	Directs RO to place RFP A in automatic operation IAW 0GP-02, Step 5.3.46.	

BOP

Time	Required Actions	Notes
	Monitors the plant.	

Time	Reau	lired Actions	Notes
	When reactor feed pump discharge pressure is greater than 900 psig, places RFP A in automatic operation.		
	0	Ensures <i>MSTR RFPT SP/RX</i> <i>LVL CTL</i> , C32- <i>SIC-R600</i> , in M (manual).	
	0	Ensures FEEDWATER CONTROL MODE SELECT in 1 ELEM.	
	0	Depresses <i>SEL</i> pushbutton on <i>RFPT A SP CTL, C32-SIC-</i> <i>R601A</i> , until <i>A BIAS</i> is indicted and ensures bias is set to 0%.	
	0	Depresses <i>SEL</i> pushbutton on <i>RFPT A SP CTL, C32-SIC-R601A</i> , until <i>PMP A DEM</i> is displayed.	
	0	Depresses SEL pushbutton on MSTR RFPT SP/RX LVL CTL, C32-SIC-R600, until MSTR DEM is displayed.	
	0	Sets <i>MSTR DEM</i> to equal <i>PMP A DEM</i> value displayed on <i>RFPT A SP CTL, C32-SIC-</i> <i>R601A</i> , using the raise lower pushbuttons on <i>MSTR RFPT</i> <i>SP/RX LVL CTL, C32-SIC-</i> <i>R600</i> ,	

EVENT 1 Shift Turnover, Place Reactor Feed Pump A in Automatic Operation RO

EVENT 1 Shift Turnover, Place Reactor Feed Pump A in Automatic Operation RO cont'd

Time	Req	uired Actions	Notes
	0	Depresses A/M pushbutton on RFPT A SP CTL, C32-SIC- R601A, and checks the indictor on control station changes to A (automatic) and PMP DEM signal remains unchanged.	
	0	Depresses SEL pushbutton on the out-of-service RFPT B SP CTL, C32-SIC-R601B, UNTIL LVL ERROR is indicated and checks LVL ERROR is approximately 0 inches.	
	0	Depresses A/M pushbutton on MSTR RFPT SP/RX LVL CTL, C32-SIC-R600, AND checks the indicator on the control station changes to A (automatic).	
	0	Ensures <i>PMP A DEM</i> and <i>VALVE DEM</i> signals <i>remain</i> unchanged.	
	0	Depresses <i>A/M</i> pushbutton on <i>SULCV, FW-LIC-3269,</i> and checks the indictor on the control station changes to <i>M</i> (manual).	
	0	Slowly opens <i>SULCV</i> , using rais pushbutton on <i>FW-LIC-</i> <i>3269</i> , until <i>VALVE DEM</i> , is 100% and check reactor water level is being maintained between 182 and 192 inches.	Momentarily depressing the raise or lower pushbuttons on <i>FW-LIC-3269</i> will cause valve demand to change in increments of 0.1%. Continually depressing the raise or lower pushbuttons will cause valve demand to change at an exponential rate.
	Info aut	orms SRO that RFP A is in omatic controlling level.	

EVENT 2 Raise power using rods

When RFP A has been placed in automatic operation, the crew will commence raising reactor power by pulling rods in preparation for placing the Mode switch to RUN. Rod pulls will commence at Step 12, Item 179 (38-15 @ 00) of the A2X sequence.

Malfunctions required:

None

Objectives:

SRO Directs and monitor reactor power ascension with control rods

<u>RO</u> Withdraw control rods to raise reactor power Monitor plant parameters during power ascension

Success Path:

Raise power using control rods

Simulator Operator Actions:

- □ If asked as RE, state that there are no high worth control rods located in steps 12 through 17 of GP-10, A2X
- □ When directed by the lead examiner, proceed to the next event.

Required Operator Actions

SRO

Time	Required Actions	Notes
	Ensures no other distracting evolutions are in progress while reactivity controls are being manipulated.	
	Directs RO to raise reactor power by withdrawing control rods IAW 0GP- 10, A2X, Step 12, Item 179.	

BOP

Time	Required Actions	Notes
	Monitor Plant Parameters	

EVENT 2 Raise power using rods

RO		
Time	Required Actions	Notes
	Commence rod withdrawal at Step 12, Item 179, GP-10, A2X sequence, per guidance of OI-01.02	From OPS-NGGC-1306, Section 9.1.4: When moving a control rod three notches or less, the control rod should be single notched for the entire move.
	20P-07,Section 5.1, Notch Control Rod Withdrawal	Concurrent Verification is required when selecting control rods to ensure the correct rod is selected prior to allowing rod movement.
	 Ensures ROD SELECT POWER control switch is in ON. 	Documentation for control rod manipulations, performed in accordance with this section, is provided in 0ENP-24.5 or GP control rod movement sheets.
	2OP-07, Attachment 14, Notch Control Rod Withdrawal	Step 12 Rods withdrawn from 00 to 04 (38-15, 14-15, 14-39, and 38-39)
	 Selects control rod by depressing its CONTROL ROD 	Step 13 rods withdrawn from 00 to 04 (30-23, 22-23, 30-21, and 22-21) Step 14 rods withdrawn from 00 to 04
	SELECT push button.	(30-15, 22-15, 38-23, 14-23, 30-31, 14-31, 30-39, and 22-39)
	 Ensures the backlighted <i>CONTROL ROD SELECT</i> push button is brightly illuminated 	
	 Ensures the white indicating light on the full core display is illuminated 	
	• Ensures <i>ROD WITHDRAWAL</i> <i>PERMISSIVE</i> indication is illuminated	
	 NOTCH WITHDRAW control rod to position 02 then 04 by momentarily placing <i>ROD</i> <i>MOVEMENT</i> in <i>NOTCH OUT</i>. 	
	 Monitors control rod position and nuclear instrumentation while withdrawing the control rod. 	

EVENT 2 Raise power using rods

RO Cont'd

 Performs the following for control rods withdrawn to an intermediate position: 	
WHEN control rod reaches designated position, confirms the following:	
 Control Rod settles into desired position 	
 Rod settle light extinguishes 	
 Repeats steps for remainder of control rods. 	The RO must wait 5 seconds after the settle light extinguishes before selecting a different control rod.

IRM C will fail upscale causing a rod block and half scram. The Unit SRO will address IRM A and C inoperability IAW TS 3.3.1.1. Once addressed, Ops Center SRO will report IRM A is ready to be returned to service following proper channel check. The crew will take the actions of the APP and bypass IRM C and reset the half scram. Following bypassing of IRM C and resetting the half scram, control rods will continue to be withdrawn raising power.

Malfunctions required:

IRM C Fails upscale

Objectives:

<u>SRO</u>

Direct actions for IRM C failure. Address IRM C TS 3.3.1.1

<u>R0</u>

Perform actions for IRM C failure

Success Path:

Technical Specification / TRM

- 3.3.1.1 Reactor Protection System (RPS) Instrumentation Determines with IRMs A & C inoperable, Condition A. One or more required channels inoperable for Function 1a (IRM Neutron Flux—High). Required Action A.1 (Place channel in trip) within 12 hours.
- TRM 3.3 Control Rod Block Instrumentation May conservatively declare a tracking LCO, Condition A.1, Restore channel to OPERABLE status within 24 hours.

Declare IRM A operable by channel check and bypass IRM C with tracking LCO for IRM C.

Simulator Operator Actions:

- □ When directed by lead examiner, initiate **Trigger 1** initiates to fail IRM C upscale.
- □ If contacted as the RE for IRM C inoperability, acknowledge request.
- When IRM C inoperability has been addressed and by lead examiners direction, contact the control room as Ops Center SRO and report IRM A can be declared OPERABLE following a satisfactory channel check and that the equipment control database will be updated with the final IRM Bypass switch alignment.
- □ When directed by the lead examiner, proceed to the next event.

Required Operator Actions

SRO

Time	Required Actions	Notes
	Directs APP reference	
	A-05 1-7 REACTOR AUTO SCRAM SYS A 4-7 NEUT MON SYS TRIP 2-4 IRM UPSCALE 2-2 ROD OUT BLOCK 3-4 IRM A UPSCALE/INOP	
	Contacts I&C for IRM C failure.	
	Evaluate TS 3.3.1.1 and determines that with IRMs A & C inoperable Condition A is applicable for Function 1a:	
	 Required Action A.1 – Place channel in trip (12 hours) 	
	May enter TRM 3.3 (Control Rod Block Instrumentation) Function 3 Condition A, Tracking LCO.	May conservatively declare a tracking LCO, Required Action A.1 Restore channel to OPERABLE status within 24 hours.

SRO cont'd

Time	Required Actions	Notes
	Evaluates IRM A operability following satisfactory channel check 2OP-09, Attachment 4, 2.3.4 (Operability Guidance) - Channel Checks are a sufficient WO PMT for SRMs and IRMs at power unless a component failure is suspected in which case an I/V curve and TDR trace is desirable. 2OP-09, Attachment 4, 2.3.5, Guidelines for Spiking SRM/IRMs: Instruments declared inoperable that were affected by a plant condition no longer occurring (such as: welding, disturbing cables under vessel, EMI pulse, etc.) can be restored to an operable status without subsequent maintenance activities. A WO PMT task will be used to document satisfactory performance of an instrument channel check (instrument is reading consistent with plant conditions and other channels).	A channel check shall be the qualitative assessment, by observation, of channel behavior during operation. This determination shall include, where possible, comparison of the channel indication and status to other indications or status derived from independent instrument channels measuring the same parameters.
	Determines IRM A is operable	
	Directs removing IRM A from Bypass and bypassing IRM C	
	Directs resetting half scram IAW APP-A-05 3-4.	

BOP

Time	Required Actions	Notes
	Monitor Plant Parameters	

RO

Time	Required Actions	Notes
	Stops withdrawing control rade when	
	Block follow and a DOD OUT	
	RIVIC fails upscale. ROD OUT	
	BLUCK	
	Determines IRM C failed upscale.	
	Reports and responds to applicable	
	alarms for IRM C failing upscale:	
	1-7 REACTOR AUTO SCRAW SYS A	
	2-4 IRM UPSCALE	
	2-2 ROD OUT BLOCK	
	3-4 IRM A UPSCALE/INOP	
	IRM A UPSCALE/INOP actions:	
	 May Reposition range switch 	
	for IRM C to bring indicated	
	power to between 15 and 50 on	
	the 0-125 scale.	
	 May verify IRM C Drawer 	
	Selector switch (Control Panel	
	H12-P606) is in OPERATE.	
	 May notify SRO of Tech Spec 	
	applicability	
	May inform SRO IRM C cannot be	
	bypassed and half scram cannot be	
	reset due to IRM A being bypassed.	
	Performs channel check of IRM A for	
	operability, (20I-03.2, RO DSR	
	Item 41)	
	Removes IRM A from Bypass and	
	bypasses IRM C per APP guidance	
	(APP-A-05 3-4)	
	Resets half scram per APP quidance	
	(APP-A-05.3-4)	

EVENT 4 CSW 2C Pump Trip – CSW 2A Auto Start Failure

CSW pumps are aligned with 2B and 2C running and 2A in standby aligned to the Nuclear SW header. CSW Pump 2C will trip. CSW Pump 2A is aligned to the nuclear header and therefore will not auto start requiring the BOP operator to start the pump IAW 2APP-UA-01 4-9. This will require aligning the pump to the conventional service water header. The crew will enter 0AOP-19. The Unit SRO will address CSW Pump operability IAW TS 3.7.2.

Malfunctions required:

Trip of 2C Conventional Service Water (CSW) Pump

Objectives:

<u>SRO</u>

Directs AOP-19 and APP actions Evaluate Service Water TS 3.7.2

<u>BOP</u>

Perform actions to start 2A CSW pump on the conventional header

<u>R0</u>

Monitors plant parameters

Success Path:

Technical Specification / TRM

• 3.7.2 Service Water (SW) System and Ultimate Heat Sink (UHS) Determines with 2C CSW Pump inoperable, Condition C, One required conventional service water pump (CSW) inoperable applies.

> Required Action C.1, Immediately verify the one OPERABLE CSW pump and one OPERABLE Unit 2 NSW pump are powered from separate 4.16 kV emergency buses.

Required Action C.2, 7 Days <u>AND</u> 14 days from discovery of failure to meet LCO, Restore required CSW pump to OPERABLE status.

2A CSW pump running on the conventional header.

EVENT 4 cont'd CSW 2C Pump Trip – CSW 2A Auto Start Failure

Simulator Operator Actions:

- □ When directed by the lead examiner, initiate **Trigger 2** to trip 2C Conventional Service Water Pump.
- □ If contacted as OSAO, report 51 devices picked up on the 2C CSW pump breaker and the pump motor is hot to the touch.
- □ If contacted as Unit One, acknowledge and reset alarms.
- □ When directed by the lead examiner, proceed to the next event.

Required Operator Actions

Start CSW Pump 2A on the conventional header Technical Specification – CSW Pump 2C inoperability.

SRO

Time	Required Actions	Notes
	Directs APP reference	
	UA-01	
	LOW	
	4-9 CONV HDR SW PUMP C TRIP	
	6-1 BUS E1 RKV MOTOR OVI D	
	May direct entry into 0AOP-19.0.	
	Conventional Service Water System	
	Failures.	
	Directs BOP to start CSW Pump 2A	
	on the conventional header.	
	Evaluate Tech Spec 3.7.2 Service	
	Vater and Ultimate Heat SINK.	
	Pump Inoperable:	
	\Box Required Action C 1 – Verify	
	the one operable CSW and	
	one operable U/2 NSW pump	
	powered from separate 4KV	
	buses (Immediately)	
	AND	
	□ Required Action C.2 - Restore	
	required pump to operable (7	
	days and 14 days from	
	discovery to meet LCO)	

EVENT 4 cont'd CSW 2C Pump Trip – CSW 2A Auto Start Failure

BOP			
Time	Req	uired Actions	Notes
	Respond to alarms: <u>UA-01</u> 1-9 CONV HDR SERV WATER PRESS- LOW 4-9 CONV HDR SW PUMP C TRIP <u>UA-15</u> 6-1 BUS E1 RKV MOTOR OVLD		
	Ann	ounce and enter 0AOP-19.0,	
	Conventional Service Water System Failures.		
	Star	t 2A CSW pump as follows:	If valve selector switch is placed in CONV HDR first, pump will auto start.
	0	Place 2A Mode Selector in MAN	
	0	Ensure valve selector switch in CONV HDR	
	0	Start CSW pump 2A	
	0	Confirm discharge valve for CSW pump 2A automatically opens	
	0	Confirm <i>Conv Hdr Serv Water</i> <i>Press-Low</i> alarm is clear.	

RO

Time	Required Actions	Notes	
	Monitor plant parameters		
EVENT 5 Control Rod Drift

When Tech Specs have been addressed, the crew will continue to raise reactor power. Control Rod 30-31 will drift outward. The crew will enter AOP-2.0 and will reference AOP-3.0. IAW 2APP A-05 3-2, the operator will attempt to arrest the control rod and then will drive the rod to position 00. The SRO will address Rod Pattern Control and Control Rod Operability IAW Tech Spec 3.1.6 and 3.1.3.

Malfunctions required:

Control Rod Drift out

Objectives:

SCO

Direct actions in response to a drifting control rod

Evaluate Technical Specifications

<u>R0</u>

Respond to a drifting control rod

Success Path:

The drifting control rod is fully inserted, valved out of service and electrically disarmed.

Tech Spec 3.1.6, Rod Pattern Control

Condition A. One or more OPERABLE control rods not in compliance with BPWS <u>Required Action</u> A.1 Move associated control rod(s) to correct position (8 hours) OR A.2 Declare associated control rod(s) inoperable (8 hours)

Tech Spec 3.1.3, Control Rod Operability

Condition C. One or more control rods inoperable for reasons other than Condition A or B <u>Required Action</u> C.1 Fully insert inoperable control rod (3 hours) AND C.2 Disarm the associated CRD (4 hours)

Simulator Operator Actions:

- □ When directed by the lead examiner, initiate **Trigger 3** to initiate control rod 30-31 drift out.
- □ When control rod has been fully inserted, delete malfunction RD005M for Control Rod 30-31. DO NOT delete rod drift malfunctions for other rods at this time.
- □ When directed by the lead examiner, proceed to the next event.

Required Operator Actions

SRO		
Time	Required Actions	Notes
	Direct actions in response to rod drift	
	alarm:	
	APP-A-05 (3-2), <i>Rod Drift</i>	
	Direct entry into 0AOP-02.0, Control	
	Rod Malfunction/Misposition.	
	Reference 0AOP-03, Positive	
	Reactivity Addition.	
	Evaluate Tech Spec 3.1.6, Rod	
	Pattern Control	
	Condition A.2 - Declare	Since the control rod does not comply with the
	associated control rod	
	inoperable (8 hours):	
	Evaluate Tech Spec 3.1.3, Control	
	Rod Operability:	
	Condition C.1 - Fully insert	
	inoperable control rod (3	
	hours),	
	AND	
	C.2 - Disarm the associated	
	CRD (4 hours).	

EVENT 5 cont'd Control Rod Drift

RO			
Time	Req	uired Actions	Notes
	Perform the actions of APP-A-05 (3-2) <i>ROD DRIFT</i> as follows:		
	0	Determines control rod 30-31 is drifting.	•
	0	Selects control rod 30-31 and determines drifting out.	
	0	Attempt to arrest the drift by giving an insert signal	If control rod drifts out beyond the banked position of 08 then the RWM will have to be bypassed to insert the rod to 00.
	0	Fully inserts control rod 30-31. May need to obtain Key #38 from the SRO key locker and bypass the RWM to insert the rod to 00.	

BOP

Time	Required Actions	Notes
	Monitor plant parameters	
	Monitors core parameters, main steam line radiation and off-gas activity	

EVENT 6 SULCV Fails Closed

The crew responds to SULCV failure and reactor water level lowering.

Malfunctions required:

SULCV fail closed

Objectives:

<u>SCO</u>

Direct actions for failed SULCV and lowering reactor water level

<u>BOP</u>

Take action to respond to a failed SULCV and lowering reactor water level

<u>R0</u>

Monitors reactor plant parameters

Success Path:

Level restored to normal band by establishing flow through an alternate path

Simulator Operator Actions:

- □ When directed by the lead examiner, initiate **Trigger 4** to initiate closure of the SULCV.
- Before a reactor scram occurs, Initiate TRIGGER 6.
- □ If contacted as TBAO to investigate SULCV, acknowledge request.
- □ If contacted as I&C to investigate failure, acknowledge request.
- □ When directed by the lead examiner, proceed to the next event.

EVENT 6 cont'd SULCV Fails Closed

Required Operator Actions

SRO

Time	Required Actions	Notes
	Direct actions in response to lowering reactor water level.	
	HIGH/LOW	
	A-05 3-3, SRM PERIOD	
	Direct AOP-23 entry	
	Direct injection to the vessel be established by manually opening one of the following valves:	
	 FW-V120 FW-V118 FW-V119 	
	Direct manual scram if level control not established and level continues to lower.	

RO			
Time	Required Actions	Notes	
	Recognize and respond to lowering reactor water level (may notice before alarm) APP-A-07 2-2 <i>REACTOR WATER LEVEL</i> <i>HIGH/LOW</i>		
	Diagnose SULCV has failed closed and attempt to OPEN		
	If direct by SRO, insert manual scram		

EVENT 6 cont'd SULCV Fails Closed

BOP			
Time	Required Actions Attempt to establish flow to the vessel by manually opening one of the following valves: • FW-V120 • FW-V118 • FW-V119	Notes Reference 20P-32, step 8.9.2.19. Step 5.2.2. 14 and GP-102, Step 5.3.14 1-	6-12
	Monitor plant parameters		

When level control has been established, multiple control rods will drift. The RO will insert a manual reactor scram IAW the requirements of AOP-02. When the manual scram is initiated, not all control rods will insert requiring entry into LPC. The SRO will direct performance of LEP-02. SLC pumps will fail to run. When performing LEP-02, ARI will fail to reset and the Rod Select will fail preventing the insertion of control rods

Malfunctions required:

Rod Drifts, ARI reset failure, Rod Select failure, SLC failure

Objectives:

<u>SCO</u>

Direct manual reactor scram Direct actions for LPC

<u>R0</u>

Insert manual scram in response to multiple rod drifts Perform actions to Terminate and Prevent injection Perform LPC actions

Success Path:

Simulator Operator Actions:

- □ When directed by the lead examiner, initiate **Trigger** 5 AND Trigger 6 to initiate multiple control rod drifts
- □ Ensure **Trigger 10** (SLC Pump failure) initiates when SLC switch is not in Stop.
- □ If directed as RBAO to perform field actions for LEP-03, acknowledge request.
- □ If contacted as I&C for Rod Select switch repairs, acknowledge request.
- □ When directed by the lead examiner, proceed to the next event.

Required Operator Actions

SRO

Time	Required Actions		Notes
	Direct actions of 0AOP-02 for multiple control rod drifts (Scram)		
	Dire	ct actions of LPC:	
	0	After steam flow is less than 3 X 10 ⁶ lb/hr Place Reactor Mode Switch to SHUTDOWN	
	0	Initiate ARI	
	0	If Reactor Power is NOT less than 2 %, Trip both Reactor Recirc Pumps	
	0	May Initiate SLC	
	0	May direct performance of LEP- 03, Alternate Boron Injection	
	0	Inhibit ADS	
	0	<i>Direct performance of LEP- 02, Alternate Control Rod Insertion</i>	Critical Task
	0	Bypass Group 1 Low Level Isolation IAW SEP-10	Will contact the WCC SRO to perform this task.
	0	Establish reactor water level band LL-4 to +200 inches	

RO			
Time	Rec	uired Actions	Notes
	Rec drift	ognize multiple control rods are ing and insert manual scram	Immediate Operator Action of AOP-02
	Per	forms LPC actions: After steam flow is less than 3 X 10 ⁶ lb/hr Place Reactor Mode Switch to SHUTDOWN	
	0	When directed, manually initiate ARI	
	0	Report failure of ARI to initiate	
	0	If directed, trip both Reactor Recirc Pumps	
	0	If directed, Initiate SLC	
	0	Report failure of SLC pumps	
	0	If directed, perform LEP-03, Alternate Boron Injection:	
	0	Dispatch AO to perform field actions.	
	0	WHEN SLC tank level reaches 0%, OR All control rods are inserted to or beyond position 00, OR It has been determined that the reactor will remain shutdown under all conditions without boron THEN Direct AO to perform field actions to secure from alternate boron injection.	

RO cont'd

Time	Rec	uired Actions	Notes
	0	When directed, perform LEP- 02,	Critical Task Perform LEP-02, Alternate Control Rod Insertion
		Report failure of Rod Select Power.	At this time the procedure cannot be completed due to the rod select power failure. The RO will attempt Sections 5 and 3 of the procedure.
			See Enclosure 1 for procedure steps.
	0	If directed, Terminate and Prevent injection from HPCI:	
	0	If NOT operating, Place HPCI Auxiliary Oil Pump Control Switch in PULL-TO-LOCK	
	0	If Operating:	
		 Depress and Hold Trip Pushbutton 	
		 When turbine speed is zero RPM AND E41-V9 is Closed, PLACE Control Switch in PULL-TO-LOCK. 	
		 When A-01 4-2, HPCI TURB BRG OIL PRESS LO is sealed in, RELEASE TRIP Pushbutton 	
		 Ensure E41-V8 and E41-V9 remain closed and HPCI does not restart 	

BOP		
Time	Required Actions	Notes
	Monitor plant parameters	
	If directed, Terminate and Prevent condensate and feedwater:	
	 Trip all operating RFPs OR Idle one RFP 	
	o Close FW-V6 and FW-V8	
	 Close SULCV: Place in M (Manual) Select DEM and Decrease signal until VALVE DEM indicates 0% 	
	 Ensure FW-V120 is closed 	
	Place the following switches to Override Reset:	Reset Group 10 Isolation actions
	 DIV I NON-INTRPT RNA-SV- 5262 DIV II NON-INTRPT RNA-SV- 5261 	

SRV F will fail open. AOP-30 will be entered. The SRV will not reset using the control switch. Pulling fuses IAW AOP-30 results in loss of indication but the SRV remains open. When reactor pressure decreases to 500 psig, the SRV F tailpipe will rupture pressurizing containment. RHR spray logic will fail to operate.

Malfunctions required:

SRV F fails open, SRV F tailpipe rupture

Objectives:

<u>SRO</u>

Directs actions of AOP-30 Directs Emergency Depressurization

RO/BOP

Perform AOP-30 actions Open 7 ADS valves Insert Control Rods

Success Path:

Control Rods are inserted, Reactor is depressurized and level restored to normal band

Simulator Operator Actions:

- □ When directed by the lead examiner, initiate **Trigger 7**, SRV F failure.
- □ If contacted as Ops Center SRO to pull fuses for SRV F, acknowledge request, wait one minute, then activate **Trigger 8** and report fuses pulled.
- □ When reactor pressure decreases to 500 psig, ensure **Trigger 9**, SRV F downcomer rupture initiates.
- □ If contacted as I&C to investigate SRV F opening, acknowledge request.
- When directed by lead examiner, delete Override K2614A, CS-5562 ARI, then inform SRO as I&C that ARI switch has been repaired. Delete Malfunction RP011F, ATWS-4. Delete Malfunction RD005M for control rods 22-47, 14-39, and 30-23.
- □ When directed by the lead examiner, the scenario may be terminated.
- □ CAUTION: DO NOT RESET THE SIMULATOR UNTIL DIRECTED BY THE LEAD EXAMINER.

Required Operator Actions

SRO

Time	Required Actions	Notes
	Direct AOP-30 actions	
	Direct pulling fuses for SRV F IAW	
	AOP-30.0	
	Monitor containment parameters	
	Enters and Directs actions of PCCP:	
	• Before Suppression Chamber	
	pressure reaches 11.5 psig	
	directs SP Spray IAW SEP-03	
	 When Suppression Chamber evenede 11 E pair directe DW 	
	Exceeds 11.5 psig directs DVV	
	Spray IAVV SEP-02	
	Directs Emergency	Critical Task Emergency Depressurize when PSP
:	Depressurization when PSP	is exceeded
	exceeded	

RO	0			
Time	Required Actions	Notes		
	Report SRV F is failed open:			
	A-03 1-10, SAFETY/RELIEF VALVE OPEN 1-1, SAFETY OR DEPRESS VLV LEAKING			
	Perform 0AOP-30.0 actions:			
	reseat until reactor pressure reduces			
	to the reseat pressure for that SRV			
	(approximately 900 to 1100 psig).			
	CVCLE the control switch of the	Immediate Operator Actions		
	affected safety/relief valve to			
	OPEN and CLOSE OR OPEN			
	and AUTO several times.			
	• ENSURE the affected			
	safety/relief valve control switch			
	is left in <i>CLOSE</i> OR <i>AUTO</i> .			

RO	cont'd
110	COLLU

Time	Required Actions	Notes
	 IF a safety/relief valve is stuck open, THEN PERFORM the following: 	
	NOTE: Pulling safety/relief valve fuses will de-energize the red and green indicating lights on Panel P601.	
	 PULL the fuses in the order listed in Attachment 1 for the affected safety/relief valve. 	
	 MONITOR the following to determine safety/relief valve position: 	
	 Tailpipe Temperatures (ERFIS Screen 241 	
	 Other indications as available (feed/steam flow mismatch, generator MWE, etc.) 	
	Report failure of RHR Spray Logic.	
	When directed by SRO, Open 7 ADS valves	Critical Task Emergency Depressurize when PSP is exceeded
	When informed ARI has been repaired, inserts manual scram IAW LEP-02:	Critical Task Perform LEP-02, Alternate Control Rod Insertion See Enclosure 1 for procedure steps. Will perform Section 3 of the procedure.

BOP

Time	Required Actions	Notes
	Restore reactor water level 170 - 200 inches using condensate system (SULCV)	

Simulator Operator Activities:

WHEN directed by the lead examiner, place the simulator in **FREEZE**.

CAUTION

DO NOT RESET THE SIMULATOR PRIOR TO RECEIPT OF CONCURRENCE TO DO SO FROM THE LEAD EXAMINER

2012 NRC Scenario #4

Section 5	The purpose of this section is to insert control rods with the Reactor
	Manual Control System.

ľ	NOTE:	Ma	npower	***	1 Reactor Operator	
		Special equipment			Main Control Room Keylocke Unit 1 Only: 1 5450 key for Unit 2 Only: 1 5451 key for	er RWM RWM
		1.	IF a C follow	RD pump is NOT operati	ng, THEN PERFORM the	
R	D :		a.	ENSURE CRD FLOW (C11(C12)-FC-R600, is	CONTROL, în MAN.	
R) :		b.	CLOSE the in-service F C11(C12)-F002A(F002	ELOW CONTROL VLV, B).	
R(D:		C.	START a CRD pump.		
R) :	2.	IF ava	illable, THEN START the	second CRD pump.	
R	0:	3.	IF no Step 2	CRD pump can be starte 2.6 on page 3.	d. THEN RETURN to	
		4.	INSE	RT control rods with RMC	CS as follows:	
R	D:		а.	ENSURE CRD FLOW C11(C12)-FC-R600, is	CONTROL, ìn MAN.	
R	0:		b.	THROTTLE OPEN FLC C11(C12)-F002A(F002 differential pressure is 260 psid.	<i>DW CONTROL VLV,</i> <i>B),</i> until drive water greater than or equal to	
R	0:		C.	IF drive water differenti 260 psid, THEN THRO PRESSURE VLV, C11 water differential press 260 psid.	al pressure is less than TTLE CLOSED DRIVE (C12)-PCV-F003, until drive ure is greater than or equal to	
R	0:		d.	BYPASS RWM.		
R	0:		e.	INSERT control rods w	Ith EMERGENCY ROD IN vitch.	

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Section 3 The purpose of this section is to insert control rods by repeated manual scram, overriding RPS if required.

	NOTE:	Manp	ower:		1 Reactor Operator	
		Spec	ial equ	Jipment	4 jumpers (15, 16, 17, and	18)
R	0:	1.	<u>Unit</u> C71-	1 Only: ENSURE READ	CTOR MODE SWITCH,	
RO: 2.		Unit 2 Only: IF steam flow is less than 3 X 10 ⁶ lb/hr, THEN ENSURE REACTOR MODE SWITCH, C72-S1, is in SHUTDOWN.				
	NOTE:	Steps	s 3 an	d 4 may be performed c	oncurrently.	
		3.	IF an availa jump	automatic scram signal able to the RPS bus, TH ers to bypass the reacto	is present AND power is EN INSTALL the following r scram:	
R	0:		-	Jumper 15 in Panel H1 from the right side of Fi Terminal 4 of Relay C7	2-P609, Terminal Board DD, use C71A(C72A)-F14A to 1A(C72A)-K12E	
R	0:		-	Jumper 16 in Panel H1 from the left side of Fus Terminal 4 of Relay C7	2-P609, Terminal Board BB, se C71A(C72A)-F14C to 1A(C72A)-K12G	
R	0:		-	Jumper 17 in Panel H1 from the right side of F Terminal 4 of Relay C7	2-P611, Terminal Board DD, use C71A(C72A)-F14B to 1A(C72A)-K12F	
R	0:		-	Jumper 18 in Panel H1 from the left side of Fu Terminal 4 of Relay C7	2-P611, Terminal Board BB, se C71A(C72A)-F14D to '1A(C72A)-K12H	

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Section 3 (Continued)

	4.	INHIBIT ARI by performing the following steps:	
RO:		a. PLACE ARI AUTO/MANUAL INITIATION switch, C11(C12)-CS-5560, to INOP.	
RO:		b. PLACE ARI RESET switch (spring return), C11(C12)-CS-5562, to RESET AND MAINTAIN for a minimum of five (5) seconds, THEN RELEASE.	
RO:		c. CONFIRM red <i>TRIP</i> light located above <i>ARI</i> <i>INITIATION</i> , <i>C11(C12)-CS-5561</i> , is off.	
RO:	5.	ENSURE DISCH VOL VENT & DRAIN TEST switch is in ISOLATE.	
	6.	CONFIRM the following valves are closed:	
RO:		- DISCH VOL VENT VLV C11(C12)-V139	
RO:		- DISCH VOL VENT VLV C11(C12)-CV-F010	
RO:		- DISCH VOL DRAIN VLV C11(C12)-V140	
RO:		- DISCH VOL DRAIN VLV C11(C12)-CV-F011	
RO:	7.	RESET RPS.	
RO:	8.	IF RPS can NOT be reset, THEN RETURN to Step 2.6 on page 3.	
RO:	9.	PLACE DISCH VOL VENT & DRAIN TEST switch to NORMAL.	
	10.	CONFIRM the following valves are open:	
RO:		- DISCH VOL VENT VLV C11(C12)-V139	
RO:		- DISCH VOL VENT VLV C11(C12)-CV-F010	
RO:		- DISCH VOL DRAIN VLV C11(C12)-V140	
RO:		- DISCH VOL DRAIN VLV C11(C12)-CV-F011	

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Section 3 (Continued)

RO:	11.	WHE appro annu proce	N the scram discharge volume has drained for eximately 2 minutes OR SDV HI-HI LEVEL RPS TRIP nciator (A-05 1-6) clears, THEN CONTINUE in this edure.	
RO:	12.	IF ve Secti to ins	nting control rod over piston area in accordance with on 6, THEN NOTIFY the AO to secure venting prior serting a manual scram.	
RO:	13.	MAN	UALLY SCRAM the reactor.	
	14.	IF co follov	ntrol rods moved inward, THEN PERFORM the ving:	
RO:		a.	IF all control rods are inserted to or beyond Position 00, THEN RETURN to Step 2.6 on page 3.	
RO:		b.	IF all control rods are NOT inserted to or beyond Position 00, THEN RETURN to Step 5 on page 15.	
RO:	15.	IF co Step	ntrol rods did NOT move inward, THEN RETURN to 2.6 on page 3.	

SHIFT BRIEFING

Plant Status

Unit startup is in progress per 0GP-02 following a refueling outage.

Reactor power is approximately 5%.

Reactor pressure is 800 psig with one bypass valve open to approximately 40%.

0GP-10, sequence A2X, is being used and is complete up to Step 12 Item 179.

Equipment Out of Service

2A NSW Pump is under clearance for maintenance.

2A CSW Pump is in standby aligned to the nuclear header.

IRM A was declared inoperable early last shift due to spiking and is bypassed.

I&C Troubleshooting has determined that the instrument loop is functioning satisfactorily and that the spiking was due to welding near the pre-amp at that time. Stable operation has been observed for the last 5 hours. The Ops Center SRO is evaluating IRM Operability.

Protected Equipment

1A, 1B and 2B NSW Pumps.

Plan of the Day

Place Reactor Feed Pump A in Automatic operation.

Continue with 0GP-02 actions to raise reactor power to 10% in preparation for placing the Mode switch to RUN.

Appendix	кD		Scenario Outline	Form ES-D-1	
Facility: <u>Brunswick</u>			Scenario No.: <u>NRC 2012-5</u>	Op-Test No.: FINAL	
Examiner	s:		Operators:	·····	
	<u></u>				
Initial Con	ditions:	Unit Two is o preparations 0GP-03. GP- INOP and by	perating at 20% power. The Main for synchronizing the generator to 10 sequence A2X is complete up passed	Turbine is at 1800 rpm and the grid are in progress IAW to Step 32, Item 299. APRM 2	
Turnover:		Continue with generator loa	n actions to synchronize the main ad to 200 MWe.	generator to the grid then raise	
Event No.	Malf. No.	Event Type*	Event De	escription	
1	N/A	N-BOP N-SRO	Synchronizing Main Generator		
2	N/A	R-RO R-SRO	Raise power using control rods IAW 0GP-03		
3	RD183F	C-RO C-SRO	CRD Pump Trip (AOP-02)		
4	CN017F	C-BOP C-SRO	AOG Guard Bed Fire		
5	ES015F	C-RO C-SRO	CST Level switch failure on HPC	CI (TS)	
6	ZUA2865	C-BOP C-SRO	Flooding in Turbine Building Cor	ndenser Pit (AOP-31)	
7	EE009F	M-ALL C-RO	Loss of Offsite Power (AOP-36.	1)	
7a	DG006F	C-BOP C-SRO	DG3 Trip and DG4 Output Breal	ker Fail to Auto Close	
8	NB009F	M-All	Small Break LOCA HPCI - Uncoupled shaft Emergency Depressurize (Level)	
8a	RH002F	C-RO C-SRO	LPCI F015B Fail to Auto Open		
*(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

SCENARIO DESCRIPTION

- Event 1 The crew will perform actions to synchronize the generator to the grid IAW OP-27.
- Event 2 The RO will continue to raise power IAW 0GP-03.
- Event 3 CRD pump 2A will trip on motor overload. AOP-02 will be entered and the RO will start CRD pump 2B.
- Event 4 An AOG off gas fire will occur in the guard bed. High temperatures will quickly spread into the charcoal adsorber beds. The APPs require bypassing and isolating the AOG system, and initiating a nitrogen purge.
- Event 5 A failure of the CST low level pressure switch will occur. The E41-F004 (HPCI CST Suction Valve) will fail to automatically close. The SRO will evaluate TS 3.5.1 Action D.
- Event 6 A water box leak will occur. Turbine Building flood status and debris filter alarms will be received. An AO will report condenser pit level at 10 inches slowly rising. The crew will determine A-S water box is leaking based on debris filter high d/p. The crew will respond per 0AOP-31.0 and take actions to isolate the leak.
- Event 7 A Loss of Offsite Power will occur. The crew will respond per 0AOP-36.1.
- Event 7a All Diesel Generators will start on the LOOP signal. DG3 will trip on Diff O/C. DG 4 output breaker will fail to auto close. The BOP operator will close DG 4 output breaker to energize bus E4.
- Event 8 After scram actions have been completed and level is stabilized, a LOCA will occur in the drywell. The crew will maximize RCIC flow and implement LEP-01 for alternate cooling systems. HPCI Pump will be uncoupled and unavailable for level control, level will lower until Emergency Depressurization is required.
- Event 8a RHR Loop B injection valve E11-F015B will fail to automatically open due to mechanical binding. Annunciator A-03 5-8, RHR B Valves Overload, will be received. The thermal overload may be reset and the valve opened using the control switch. When the vessel is depressurized and level is being restored, the scenario may be terminated.



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SIMULATOR SETUP

Initial Conditions

IC-7

Rx Pwr 20%

Events:

Event Number	Trigger	Trigger Description		
1			Synchronize main generator	
2			Raise reactor power by pulling control rods	
3	4	Manual	CRD A Pump Trip	
4	1	Manual	AOG Guard Bed Fire	
5	2	Manual	HPCI Power Supply Failure	
6	3	Manual	Flooding in Condenser Pit	
7	5	Manual	Loss of Offsite Power	
7a		Automatic	DG4 Output Breaker Fail to Auto Close	
8	6	Manual	LOCA	
8a		Manual	LPCI F015B Failure to Open	

Malfunctions Summary

Malf ID	Mult ID	Description	Current Value	Target Value	Rmptime	Actime	Dactime	Trig
CN017F		AOG GUARD BED FIRE	FALSE	TRUE				1
DG026F		DG3 DIFF FAULT	FALSE	TRUE		5 Sec		5
RD183F	A	CRD PUMP MOTOR WINDING FAULT	FALSE	TRUE				4
EE009F		LOSS OF OFFSITE POWER	FALSE	TRUE				5
RD001M	DG4	DG OUTPUT BREAKER FAIL TO CLOSE	TRUE	TRUE				
NB009F	A	SMALL RECIRC PMP SUCT LINE RUPTURE	0.00	5.0000	00:10:00			6
RH002F		RHR INJECTION VALVE F015B STUCK CLOSED	TRUE	TRUE				

Remotes Summary

Remf ID	Mult ID	Description	Current Value	Target Value	Rmptime	Actime	Trig
RD_RDSUCTF	B V307/309	SUCTION FILTER ISOL VALVES	CLOSE	OPEN			7
RD_RDVF034		CHARGING WATER ISOLATION VALVE F034	.2500	.2500			
SL_IASLCTST		SLC SUCT. LINEUP (NORM=SLCTNK/ALT=JUMPER HOSE)	NORMAL	ALT			8
EP_IACS993P		DW CLR A&D OVERIDE - NORMAL/STOP	NORMAL	STOP			9
EP_IACS994P		DW CLR B&C OVERIDE – NORMAL/STOP	NORMAL	STOP			9
EG_PSSBYP		PSS ALARM BYPASS SWITCH	BYPASS	BYPASS			
RP_K9JMP		TURB 1 ST STAGE PRESS RPS SCRAM BYP SW (C72-S10)	NORMAL	NORMAL			
XA_VHNPV80L		PURGE NITROGEN TO AOG NP-V80	SHUT	SHUT			
XA_IALPB141		AOG-XCV-141 LOCAL	OPEN	CLOSE			10
XA_IALPB142		AOG-XCV-142 LOCAL	OPEN	CLOSE			10
XA_IALPB143		AOG-XCV-143 LOCAL	OPEN	CLOSE			10
XA_IALPB147		AOG-XCV-147 LOCAL	OPEN	CLOSE			10
XA_IALPB148		AOG-XCV-148 LOCAL	OPEN	CLOSE			10
XA_IALPB102		AOG-XCV-102 LOCAL	AUTO	OPEN			11
HP_IAHPUNCP		Uncouple HPCI Turbine From Pump	YES	YES			
HP_ZVHPO41M		SUPP SUCTION VLV E41-F041	ON	OFF			2
HP_ZVHPO42M		SUPP SUCTION VLV E41-F042	ON	OFF			2
HP_VALVES	E41-F004	COND TK SUCT VLV E41-F004	ON	OFF			15

Override Summary

Tag ID	Description	Position/ Target	Actual Value	Override Value	Rmptime	Actime	Dactime	Trig
Q6A12SR9	TB PIT E R	ON/OFF	OFF	ON				3
Q1123RRL	TORUS SUCT VLV E41-F041 RED	ON/OFF	OFF	ON			-	2
Q1124RRL	TORUS SUCT VLV E41-F042 RED	ON/OFF	OFF	ON				2
Q1108LGL	CST SUCT VLV E41-F004 GREEN	ON/OFF	OFF	ON				15
G4K37G15	CIRC H2O DEBRIS FILT PRESS A-S	85	20	85				3
Q4B021G5	COND A-S VLVS FILTR HI DP	ON/OFF	OFF	ON				3
K1H01A	ADS TIMER	RESET	OFF	ON				
K1H02A	ADS TIMER	RESET	OFF	ON				:

Annunciator Summary

Window	Description	Tagname	Override Type	Oval	AVal	Actime	Dactime	Trig
6-5	TB E Cond Pit Flood Hi	ZUA2865	ON	ON	OFF			3
6-4	HPCI CND STORAGE TNK WTR LVL LO	ZA164	ON	ON	OFF			2
3-9	CW DEBRIS FILTER HI D/P	ZUA139	ON	ON	OFF			3

SIMULATOR SETUP

Special Instructions

- 1. Ensure simulator security is established IAW TAP-411.
- 2. Ensure appropriate keys have blanks in switches.
- 3. Reset alarms on SJAE, MSL, and RWM NUMACs.
- 4. Ensure no rods are bypassed in the RWM.
- 5. Ensure hard cards and flow charts are cleaned up.
- 6. Ensure all key have blanks installed.
- 7. Ensure affected procedures are free of any marks.
- 8. Place all SPDS displays to the Critical Plant Variable Display #100.
- 9. Ensure no ENP-24.5 is located at the P603 panel.
- 10. Reset to IC-7 and place in run.
- 11. Ensure GP-10 is completed up to Step 31 Item 299 of A2X sequence with Attachment 3.
- 12. Ensure OP-27 is completed up to Step 5.1.2.10
- 13. Ensure 0GP-03 is completed up to Step 5.3.3.
- 14. Ensure Reactor pressure is 930 psig with two bypass valves open.
- 15. Load scenario file if required.
- 16. Advance all chart recorders to indicate steady state conditions.
- 17. Provide Shift Briefing sheet to the CRS.

Scenario Information

<u>Critical Tasks</u> (Critical Tasks are bolded & italicized in required operator statements)

- 1. Close DG4 output breaker
- 2. Emergency Depressurize on level

REFERENCES

- A. OP-07
- B. OP-08
- C. OP-27
- D. OP-29
- E. GP-03
- F. GP-10
- G. AOP-02.0
- H. AOP-31.0
- I. EOP-01-RSP
- J. EOP-01-RVCP
- K. EOP-02-PCCP
- L. EOP-LEP-01
- M. EOP-01-SEP-02
- N. EOP-01-SEP-03
- O. EOP-01-SEP-09
- P. Conduct Of Operations Manual
- Q. Technical Specifications
- R. Annunciator Panel Procedures

The crew will synchronize the main generator to the grid IAW OP-27, Section 5.1.

Malfunctions required:

None

Objectives:

<u>SCO</u>

Directs synchronizing the main generator.

<u>BOP</u>

Synchronize the main generator IAW OP-27, Section 5.1

Success Path:

Main generator synchronized with the grid.

Simulator Operator Actions:

- □ If directed as OSAO to perform field actions for transformer fan control, acknowledge request. Wait two minutes and report field actions complete.
- □ If directed as TBAO to perform field actions for isophase bus duct and generator gas, acknowledge request. Wait two minutes and report field actions complete.
- □ If directed as TBAO to perform field actions to bypass Power System Stabilizer, report actions complete.
- □ If contacted as Ops Center SRO to ensure trip relay flags on Panel XU-8 are clear, report no flags.
- □ If contacted as I&C to troubleshoot the Transformer Bus Synchronizing Switch, acknowledge request.
- □ If contacted as Unit 1 report generator gassing is not in progress on Unit 1.
- □ If contacted as Load Dispatcher, direct generator VARs be maintained positive.
- □ When directed by the lead examiner, proceed to the next event.

Required Operator Actions

Normal operation. Synchronize main generator.

SRO

Tin	ne	Required Actions	Notes
		Directs BOP operator to synchronize the main generator IAW OP-27.	

RO

Time	Required Actions	Notes	
	Monitors plant parameters.		

BOP		
Time	Required Actions	Notes
	Synchronizes the main generator:	
	ENSURE GEN MANUAL VOLT ADJ RHEO, 70CS, LOWER LIMIT light is on. ENSURE GEN AUTO VOLT ADJ RHEO, 90CS LOWER LIMIT	
	light is on. CLOSE EXCITER FIELD BREAKER, 41CS. ENSURE field voltage increases.	
	CAUTION Generator output voltage should be raised slowly when approaching rated terminal voltage; otherwise, a generator lockout and trip may occur. The continuous raising of output voltage should NOT be used when close to rated terminal voltage.	
	SLOWLY ADJUST <i>GEN</i> <i>MANUAL VOLT ADJ RHEO,</i> <i>70CS</i> , to raise generator output voltage to 23.5 KV.	
	ADJUST GEN AUTO VOLT ADJ RHEO, 90CS, to null the GEN VOLT REG DIFF VOLT indicator.	
	WHEN GEN VOLT REG DIFF VOLT indicator is nulled, THEN PLACE REGULATOR MODESELECTOR, 43CS, in AUTO.	

BOP cont'd

Time	Required Actions	Notes
	OPEN either the TRANSFORMER BUS 230KV PCB 26A OR TRANSFORMER BUS 230KV PCB 26B.	
	NOTE: The generator should be paralleled to the 230 KV bus that is NOT feeding the unit's startup auxiliary transformer.	
	PLACE the switch key for the generator output breaker NOT supplying the SAT, in either <i>GENERATOR 2 TO BUS 2A 230</i> <i>KV BREAKER 29A</i> <i>SYNCHROSCOPE</i> OR <i>GENERATOR 2 TO BUS 2B 230</i> <i>KV BREAKER 29B</i> <i>SYNCHROSCOPE</i> switch.	
	ENSURE all <i>SYNCHROSCOPE</i> key switches on Panels XU-1 and XU -2 are in <i>OFF</i> .	
	PLACE the selected generator output breaker SYNCHROSCOPE key switch in ON.	
	NOTE: Step 5.1.2.10.I ensures generator speed (frequency) is closely matched to system frequency prior to adjusting voltage to minimize the possibility of over excitation of the generator.	
	NOTE: IF the synchroscope indicator fully stops rotating, THEN generator and system frequencies are matched.	

,

BOP cont'd

Time	Required Actions	Notes
	DEPRESS LOAD SELECTOR INCREASE OR LOAD SELECTOR DECREASE push until the SYNCHROSCOPE indicator is stopped OR rotating slowly (less than 1 rpm) in the fast direction.	
	ADJUST GEN AUTO VOLT ADJ RHEO, 90CS, to ensure INCOMING VOLTMETER equals RUNNING VOLTMETER.	
	DEPRESS LOAD SELECTOR INCREASE OR LOAD SELECTOR DECREASE push button until SYNCHROSCOPE indicator rotates slowly in the fast (clockwise approx. 3 to 6 rpm) direction.	
	NOTIFY System Load Dispatcher of pending <i>generator</i> synchronization.	
	ENSURE stability of generator speed by allowing <i>SYNCHROSCOPE</i> indicator to make several revolutions.	
	NOTE: Steps 5.1.2.10.q through 5.1.2.10.t should be performed in a quick and continuous manner.	

BOP c	ont'd
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Time	Required Actions	Notes
	CAUTION	
	The selected generator output	
	breaker should NOT be closed with	
	the synchroscope indicator standing	
	still.	
	CAUTION	
	IF the generator breaker fails to	
	lights or failure of the synchroscope	
	to stop at the "12 o'clock" position	
	THEN the control switch should	
	NOT be held in <i>CLOSE</i> .	
	WHEN the SYNCHROSCOPE is	
	at the "12 o'clock" position,	
	THEN CLOSE the selected	
	generator output breaker.	
	ENSURE the CIRCUIT	
	BREAKER CLOSED indicator	
	light is on.	
	IF the selected generator output	
	Dreaker did /VU/ close, THEN	
	to mir and investigate.	
	CAUTION	
	Operation at less than 33% turbine	
	load AND less than 25" Hg vacuum	
	(greater than 5" HGA backpressure)	
	can cause damage to the last stage	
	DEPRESS the LOAD	
	SELECTOR INCREASE push	
	button to increase generator load	
	to a minimum of 100 MWe.	
1		

BOP cont'd

Time	Required Actions	Notes
	If Annunciator 2APP-UA-04 2-10, HD DEAERATOR LEVEL HIGH – LOW, is received:	Normal Heater Drain Deaerator level is 48 inches.
	Slowly open HD-V57 to bring level to normal.	
	PLACE the selected generator breaker <i>SYNCHROSCOPE</i> key switch in <i>OFF</i> .	
	COORDINATE with the System Load Dispatcher to maintain the minimum generator MVAR load AND a voltage of 232 to 237.5 KV ((A Bus + B Bus) ÷ 2).	
	IF unable to maintain minimum MVAR, THEN CONTACT the System Load Dispatcher for additional guidance.	
	NOTE: IF only one main generator output breaker is available, startup and load increase may continue with approval from Operations Management.	
	WHEN the generator has stabilized, THEN CLOSE the remaining generator output breaker as follows:	
	PLACE the switch key in GENERATOR 2 TO BUS 2A 230 KV BREAKER 29A SYNCHROSCOPE OR GENERATOR 2 TO BUS 2B 230 KV BREAKER 29B SYNCHROSCOPE switch.	
	PLACE the selected generator output breaker SYNCHROSCOPE key switch in <i>ON</i> .	

BOP cont'd

Time	Required Actions	Notes
	ENSURE the SYNCHROSCOPE	
	indicator is NOT rotating.	
	-	
	CLOSE the selected generator	
	output breaker.	
	PLACE the selected generator	
	output breaker	
	SYNCHROSCOPE key switch in	
	OFF.	
	ANNOUNCE on the plant public	
	address system the generator is	
	synchronized to the grid.	
	PERFORM the following to re-	
	close the alternate supply	
	breaker to the SAT:	
	PLACE TRANSFORMER BUS	directly beside the PCB control switch is located
	230 KV PCB 26A/26B	
	SYNCHRONIZING SWITCH to	A common error is operating this switch instead of
	ON.	the Synchronizing Switch.
	RE-CLOSE either 230 KV PCB	
	26A OR PCB 26B.	
	230 KV PCB 26A/26B	
	SYNCHRONIZING SWITCH to	
	UFF.	
	in accordance with Section 6.0.	
	DESTORE main transformer for	
	RESIDRE main transformer fan	
	actions	
EVENT 1 Synchronize Main Generator

BOP cont'd

Time	Required Actions	Notes
	NOTE: To provide for a smooth	
	transfer of generator voltage	
	regulation in case of failure of the	
	auto voltage regulator, the GEN	
	MANUAL VOLT ADJ RHEO, 70CS,	
	should be adjusted as necessary to	
	null GEN VOLT REG DIFF VOLT	
	INCREASE push button to	
	increase generator load in	
	accordance with 0GP-03	
	WHEN all main turbine bypass	***************************************
	valves are closed, THEN RAISE	
	EHC load set to 100% by	
	depressing load set INCREASE	
	pushbutton.	
	RESET any applicable trip relay	
	flags on Panel XU-8 (Ops Ctr	
	SRU)	
	PLACE isophase bus HEATER	
	SWITCH in OFF (AO field	
	actions)	
	ENSURE Unit 1 is NOT adding	
	hydrogen to their generator.	
	WHEN generator cold gas	
	temperature (U2HC_G022)	
	temperature is greater than	
	104°F, IHEN RAISE generator	
	nyarogen gas pressure in	
	accordance with20P-27.3 to	
	(usually 60 psig)	
	INITIATE WO to request a	
	thermography scan of the main	
	generator output breaker manual	
	disconnects.	

The crew will continue to raise reactor power using control rods.

Malfunctions required:

None

Objectives:

<u>SCO</u>

Directs RO to continue raising power.

<u>R0</u>

Raise reactor power using control rods

Success Path:

Controls Rods are withdrawn to raise reactor power.

Simulator Operator Actions:

- □ If asked as RE, state that there are no high worth control rods located in steps 32 through 36 of GP-10, A2X.
- □ If asked as RE, continuous withdrawal of control rods is approved.
- □ When directed by the lead examiner, proceed to the next event.

Required Operator Actions

Raise reactor power.

SRO

Time	Required Actions	Notes
	Directo PO to reiso reactor newer by	
	Directs RO to raise reactor power by	
	withdrawing control rods IAW	
	0GP-10, A2X Sequence.	

BOP

Time	Required Actions	Notes	
	Monitors plant parameters.		

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RO		
Time	Required Actions	Notes
	Commence rod withdrawal at Step	
	32, Item 299, GP-10, A2X	
	sequence. (Control Rod 30-15)	
	20P-07, Section 5.1, Notch Control	Used for GP-10 Step 32, Items 299 through 306.
	Rod Withdrawal	Moving the rods from position 08 to 12. (30-15, 22-15, 38-23, 14-23, 38-31, 14-31, 30-39, and 22-39)
	 Ensures ROD SELECT POWER 	
	control switch is in ON.	
•	2OP-07, Attachment 14, Notch	
	Control Rod Withdrawal	
	• Selects control rod by	
	SELECT push button	
	SELECT push ballon.	
	Ensures the backlighted	
	CONTROL ROD SELECT	
	push button is brightly	
	illuminated	
	 Ensures the white indicating 	
	light on the full core display is	
	illuminated	
	Ensures ROD WITHDRAWAL	
	PERMISSIVE indication is	
	liiuminated	
	 NOTCH WITHDRAW control 	
	rod to position designated on	
	GP pull sheets by momentarily	
	placing ROD MOVEMENT in	
	NOTCH OUT.	
	 Monitors control rod position 	
	and nuclear instrumentation	
	while withdrawing the control	
	rod.	

RO cont'd

Time	Required Actions	Notes
	 Performs the following for 	
	control rods withdrawn to an	
	intermediate position:	
	- MUTN control rad receiped	
	o WHEN control rod reaches	
	the following:	
	the following.	
	Control Rod settles into	
	desired position	
	 Rod settle light extinguishes 	
	 Repeats steps for remainder of 	
	control rods.	
ļ	200 07 Continue 5.4. Continues	Llood for CD 10 Stop 22 Itom 207 forward
	20P-07, Section 5.1, Continuous	Moving the control rods from position 12 to 24.
	Control Rod Withdrawar	(30-07, 22-07, 46-23, 06-23, 06-31, 46-31, 22-47,
	• Ensures ROD SELECT POWER	and 30-47)
	control switch is in ON	
	20P-07, Attachment 13, Continuous	
	Control Rod Withdrawal	
	 Selects control rod by 	
	depressing its CONTROL ROD	
	SELECT push button.	
	DUNI RUL RUD SELECT	
	illuminated	
	Ensures the white indicating	
	light on the full core display is	
	illuminated	
	Ensures ROD WITHDRAWAL	
	PERMISSIVE indication is	
	illuminated	

RO cont'd

Time	Required Actions	Notes
	 CONTINUOUSLY WITHDRAW control rod to position designated on GP or 0ENP-24.5 pull sheets by HOLDING <i>EMERGENCY ROD IN NOTCH</i> <i>OVERRIDE</i> switch to <i>OVERRIDE</i>, while SIMULTANEOUSLY HOLDING <i>ROD MOVEMENT</i> switch to <i>NOTCH OUT</i>. 	
	 Monitors control rod position and nuclear instrumentation while withdrawing the control rod. 	
	 Performs the following for control rods withdrawn to an intermediate position: BEFORE control rod reaches the position designated on GP or ENP-24.5 pull sheets, RELEASE ROD MOVEMENT AND EMERGENCY ROD IN NOTCH OVERRIDE control switches: ENSURE control rod settles into desired position. CONFIRM rod settle light extinguishes. 	
	 Repeats steps for remainder of control rods. 	

EVENT 3 CRD Pump Trip

The crew will respond to a trip of CRD pump A.

Malfunctions required:

CRD A Pump Motor Overload

Objectives:

SCO Direct starting CRD Pump 2B

RO Start CRD Pump 2B

Success Path: CRD Pump B running.

Simulator Operator Actions:

- □ When directed by the lead evaluator, initiate **Trigger 4** to activate CRD Pump A motor overload.
- □ If asked as RBAO, report CRD pump motor is hot to the touch.
- □ If asked as OSAO, report 51 devices picked up on E3 for CRD pump 2A.
- □ If asked as RBAO, report pre-start checks completed for 2B CRD Pump.
- □ When directed as RBAO to perform OP-02, steps 8.7.2.1, 8.7.2.2, 8.7.2.5, 8.7.2.6, or 8.7.2.7, wait two minutes and report actions complete.
- □ When directed by the lead examiner, proceed to the next event.

Required Operator Actions

SRO

Time	Required Actions	Notes
· ·	Direct AOP-02 entry.	
	Direct monitoring for HCU alarms	
	Direct stopping power changes in	
	progress.	
	Contact maintenance to investigate	
	CRD Pump failure.	
	Direct starting standby CRD pump	
	IAW OP-08, Section 8.17.	

BOP

501		
Time	Required Actions	Notes
	Monitor plant parameters.	

EVENT 3 CRD Pump Trip

NU	

Time	Required Actions	Notes
	Announce and Enter AOP-02.	
	Restart CRD IAW 20P-08, Section	
	8.17:	
	 CLOSE SEAL INJECTION VALVE, B32-V22, for Recirc Pump A. 	
	 CLOSE SEAL INJECTION VALVE, B32-V30, for Recirc Pump B. 	
	 PLACE CRD FLOW CONTROL, C12-FC-R600, in MAN AND REDUCE potentiometer to minimum setting. 	
	• ENSURE <i>DRIVE PRESS VLV</i> , <i>C12-PCV-F003</i> , is fully open.	
	 ENSURE RBCCW is in operation to supply cooling water to CRD pumps. 	
	 Direct an AO to perform prestart checks for the 2B CRD Pump. 	
	o START CRD Pump B.	
	 RAISE CRD flow rate to between 30 and 60 gpm, by adjusting manual potentiometer on CRD FLOWCONTROL, C12-FC- R600. 	
	 RESTORE recirc pump seal purge IAW 2OP-02, Section 8.7, Restoring Seal Purge Flow With Pump Running – Seal Leakage Normal. (Concurrently with this section) 	

EVENT 3 CRD Pump Trip

RO cont'd

Time	Required Actions	Notes
	• NULL CRD FLOW CONTROL,	
	<i>C12-FC-R600</i> , by adjusting	
	the setpoint tape.	
	• SHIFT CRD FLOW	
	CONTROL, C12-FC-R600, to	
	AUTO.	
	 ADJUST setpoint tape on 	
	CRD FLOW CONTROL, C12-	
	FC-R600, to maintain cooling	
	water differential pressure	
	between 10 and 26 psid on	
	C12-PDI-R603 on Panel P603.	
	 ENSURE CRD flow rate is 	
	between 30 and 60 gpm.	
	 ESTABLISH drive water 	
	header differential pressure	
	between 260 and 275 psid on	
	<i>C12-PDI-R602</i> on Panel P603,	
	by throttling closed DRIVE	
	PRESS <i>VLV</i> , <i>C12-PCV-F003</i> .	
	 MONITOR operation of CRD 	
	System in accordance with	
	Section 6.0.	
	Restore seal purge flow IAW OP-02:	
	 Direct AO to perform Steps 	
	8.7.2.1 and 8.7.2.2	
	• ENSURE SEAL INJECTION	
	<i>VLV, B32-V22(V30)</i> is open.	
	• ENSURE the CRD System is	
	in operation.	
	 Direct AO to perform Steps 	
	8.7.2.5, 8.7.2.6, and 8.7.2.7.	

An AOG off gas fire will occur in the guard bed. High temperatures will quickly spread into the charcoal adsorber beds. The APPs require bypassing and isolating the AOG system, and initiating a nitrogen purge.

Malfunctions required:

None

<u>Objectives:</u>

- <u>SCO</u> Direct actions of APP for Guard Bed Hi Temp Direct Guard Bed locally isolated and nitrogen purge per OP-33 Refer to ODCM 7.3.10 for AOG being bypassed
- BOP Perform APP actions to isolate and purge AOG Guard Bed.

Success Path:

AOG fire extinguished and AOG bypassed.

ODCM 7.3.10, CONDITION A.

Simulator Operator Actions:

- □ When directed by the lead examiner, initiate **Trigger 1** to start AOG fire
- □ If asked, as OSAO initially report Guard Bed temperatures have significantly increased.
- □ When directed to locally isolate the Guard Bed, acknowledge the request. Wait two minutes then report actions complete.
- When directed as OSAO to perform step 7.1.2.3 to place AOG SYSTEM BYPASS VALVE, AOG-HCV-102 valve switch position at local control panel H2E is in OPEN, Initiate Trigger 11 then report action complete.
- □ When directed as OSAO to perform step 7.1.2.5 to place local control switches to close, Initiate **Trigger 10** then report actions complete.
- □ When directed as OSAO to perform steps 8.4.2.4, 8.4.2.5, 8.4.2.6, 8.4.2.7 and 8.4.2.9, wait two minutes and report actions are complete.
- When directed to initiate purge, initiate remote function XA_VHNPV80L to open AOP-NP-80 then immediately delete MF_CN017F, and report local temperature indication shows temperatures are dropping.
- □ When directed to close *NITROGEN PURGE SUPPLY VALVETO CHARCOAL GUARD BED D1, AOG-NP-V080*, delete Remote function XA_VHNPV80L.
- □ When directed as OSAO to perform steps 8.4.2.17, 8.4.2.18, and 8.4.2.19, acknowledge request, wait two minutes and report field actions complete.
- □ When directed as OSAO to perform step 8.4.2.22, report action complete.
- □ When directed by the lead examiner, proceed to the next event.

Required Operator Actions

SRO

Time	Required Actions	Notes
	 Direct actions of APP-UA-48 	
	3-3, for Guard Bed D1	
	l emperature High	
	• BYPASS AND ISOLATE the AOG System by performing the applicable steps of 2OP-33, Section 7.0	
	 Enter 0PFP-PBAA, Prefire Plans – Power Block Auxiliary Areas, Attachment 9. 	
	 Determines ODCM 7.3.10, CONDITION A GASEOUS RADWASTE TREATMENT SYSTEM not in operation applies: 	
	 A.1 – Place GASEOUS RADWASTE TREATMENT SYSTEM in operation – 7 days. 	

BOP		
Time	Required Actions	Notes
	 BYPASS AND ISOLATE the AOG System by performing the applicable steps of 2OP-33, Section 7.0. 	
	• CONFIRM AOG SYS VLV CONT SEL SW,AOG-CS- 3161, is in CENT at Panel XU-80.	
	• OPEN AOG SYSTEM BYPASS VALVE,AOG-HCV- 102 at Panel XU-80.	
	 Direct OSAO to perform step 7.1.2.3. 	
	• CONFIRM AOG SYSTEM BYPASS VALVE,AOG-HCV- 102 stayed open	
	 Direct OSAO to perform step 7.1.2.5. 	
	 CLOSE the following valves at Panel XU-80: 	
	 AOG SYS INLET SEC ISOL VALVE,AOG-XCV-147 	
	 AOG SYS INLET PRI ISOL VALVE,AOG-XCV-148 	
	 AOG SYS OUTLET PRI ISOL VALVE,AOG-XCV-143 	
	AOG SYS OUTLET SEC ISOL VALVE,AOG-XCV-141	
	• GUARD BED ISOLATION VALVE, AOG-XCV-142	

BOP cont'd

Time	Required Actions	Notes
	Direct OSAO to perform steps	
	7.1.2.7 and 7.1.2.8.	
	• PURGE the AOG System by	
	performing the following steps	
	from OP-33, Section 8.4	
	,	
	 Direct OSAO to perform step 	
	8.4.2.1.	
	CONFIRM AUG SYS VLV CONT SEL SW/ AOC CS	
	3161 is in CENT at Panel XIL	
	80.	
	• OPEN the following at Panel	
	AU-80.	
	AOG SYS OUTLET PRI	
	ISOL VALVE, AOG-XCV-	
	143	
	AOG SYS OUTLET SEC	
	ISOL VALVE, AOG-XCV-	
	141	
	Direct OSAO to perform steps	
	8.4.2.4, 8.4.2.5, 8.4.2.6,	
	8.4.2.7 and 8.4.2.9 (8.4.2.8 is	
	N/A).	
	SUPPLYVALVE TO	
	CHARCOAL GUARD BED D1.	
	AOG-NP-V080, to maximize	
	nitrogen flow, NOT to exceed	
	50 scfm, indicated by	
	OFFGAS SYS OUTLET	
	<i>FLOW, AUG-FI-035</i> or AOG	
	SYSTEM OUTLET FLOW,	

BOP Cont'd

Time	Required Actions	Notes
	 WHEN nitrogen purging is complete, THEN direct OSAO to CLOSE NITROGEN PURGE SUPPLY VALVE TO CHARCOAL GUARD BED D1, AOG-NP-V080. 	
	 Direct OSAO to perform steps 8.4.2.17, 8.4.2.18, and 8.4.2.19. 	
	 CLOSE the following at Panel XU-80: 	
	 AOG SYS OUTLET PRI ISOL VALVE, AOG-XCV- 143 	
	• AOG SYS OUTLET SEC ISOL VALVE, AOG-XCV- 141	
	• ENSURE AOG SYSTEM BYPASS VALVE, AOG-HCV- 102, is open at Panel XU-80.	
	 Direct OSAO to perform step 8.4.2.22. 	
	 Notify SRO that fire has been extinguished and purge is secured. 	
	Inform SRO to reference ODCM 7.3.10.	

RO

Time	Required Actions	Notes
	Monitors plant parameters.	

EVENT 5 HPCI CST LEVEL TRANSMITTER FAILS LOW / E41-F004 FAILURE

HPCI Condensate Storage Tank Level Switch E41-LSL-N002 will fail low causing HPCI suction to shift to the Suppression Pool.

Malfunctions required:

HPCI Power Supply Failure

<u>Objectives:</u>

<u>SCO</u> - Address Technical Specifications for HPCI CST level transmitter inoperability

RO – Diagnose HPCI CST low level and failure of E41-F004.

Success Path:

HPCI suction aligned to the Suppression Pool only and TS addressed

Simulator Operator Actions:

- □ When directed by the lead evaluator, initiate **Trigger 2** to initiate HPCI CST level transmitter failure.
- □ If contacted as I&C to investigate, wait 2 minutes and report E41-LSL-N002 has failed downscale and need replaced.
- □ If contacted as I&C to investigate E41-F004 auto closure failure, acknowledge request.
- If contacted as Ops Center SRO to initiate an impairment IAW 0PLP-01.5 and establish compensatory measures for ASSD and Station Blackout procedures with HPCI aligned to the Suppression Pool, acknowledge the request.
- □ When directed by the lead examiner, proceed to the next event.

Required Operator Actions

Tech Specs - 3.3.5.1 Emergency Core Cooling System (ECCS) Instrumentation

Determine Function 3.d.

REQUIRED ACTION A.1 Enter the Condition referenced in Table 3.3.5.1-1 ("D") for the channel Immediately.

CONDITION D

REQUIRED ACTION D.1 Declare HPCI System inoperable (Only applicable if HPCI pump suction is not aligned to the suppression pool) within 1 hour from discovery of loss of HPCI initiation capability.

AND

REQUIRED ACTION D.2.1 Place channel in trip.

OR

D.2.2 Align the HPCI pump suction to the suppression pool <u>Either</u> within 24 hours.

EVENT 5 HPCI CST LEVEL TRANSMITTER FAILS LOW / E41-F004 FAILURE

SRO		
Time	Required Actions	Notes
	Contact I&C to investigate HPCI	
	CST level transmitter failure and	
	E41-F004 auto closure failure.	
	Refer to Tech Spec 3.3.5.1 Emergency	
	Core Cooling System (ECCS)	
	Instrumentation and Determine	
	CONDITION A One or more channels	
	inoperable.	
	REQUIRED ACTION A.1 Enter the	
	Condition referenced in Table	
	3.3.5.1-1 ("D") for the channel	
	Immediately.	
	System inoperable (Only	
	applicable if HPCI pump suction	
	is not aligned to the suppression	
	pool) within 1 hour from	
	discovery of loss of HPCI	
	initiation capability.	
	AND	
	D.2.1 Place channel in trip.	
	D 2 2 Align the HPCI nump	
	suction to the suppression pool	
	Either within 24 hours.	
	Way reference UOI-18 to place	
	channel in trip – requires aligning	
	suction to Suppression Pool.	

BOP

Time	Required Actions	Notes	
	Monitors the plant.		

EVENT 5 HPCI CST LEVEL TRANSMITTER FAILS LOW / E41-F004 FAILURE

RO		
Time	Required Actions	Notes
	Acknowledge and report annunciator	
	A-01, 6-4 HPCI COND STORAGE	
	TNK WTR LVL LO	
	Verifies Auto Actions	
	Torus Suction Valve, E41-F041, open.	
	Torus Suction Valve, E41-F042, open.	
	CST suction Valve, E41-F004, closed.	
	Recognize and report E41-F004	
	auto closure failure.	
	Manually closes E41-F004	
	Notifies SRO HPCI suction is	
	aligned to the Suppression Pool	
	Notifies SRO of APP requirement to	
	initiate an impairment IAW 0PLP-	
	01.5 and establish compensatory	
	measures for ASSD and Station	
	Blackout procedures with HPCI	
	aligned to the Suppression Pool.	

EVENT 6 Condenser Pit Flooding

The crew will respond to flooding in the condenser pit.

Malfunctions required:

Condenser flooding

Objectives:

SCO Directs isolation of waterbox.

BOP Isolates waterbox.

Success Path:

A-S water box isolated.

Simulator Operator Actions:

- □ When directed by the lead evaluator, initiate **Trigger 3** to activate A-S water box leak
- □ If asked as TBAO, report level is 10 inches slowly rising in condenser circ water inlet pit. Report cannot tell where the leak is located due to the water spray.
- □ When the A-S water box is has been selected to close change Circ Debris Filter d/p gauge to zero and activate with a 40 sec ramp, initiate Trigger 14 when d/p is ~50, initiate Trigger 16 and when the A-S water box is fully isolated report as AO the leak appears to have been isolated.
- □ When directed by the lead examiner, proceed to the next event.

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EVENT 6 Condenser Pit Flooding Required Operator Actions

SRO

Time	Required Actions	Notes
	Direct entry into 0AOP-31.0,	
	Flooding in Turbine Building	
	Condenser Pit or Pipe Tunnel.	
	Direct isolation of A-S waterbox.	
	Contact maintenance to investigate.	

BOP

Time	Required Actions	Notes
	Announce and enter 0AOP-31.0,	
	Flooding in Turbine Building	
	Condenser Pit or Pipe Tunnel	
	Dispatch personnel to determine	
	magnitude of leak.	
	Acknowledge and address alarms:	
	UA-01, 3-9 - CW DEBRIS FILTER	
	UA-28, 6-5 - TURB BLDG E CNDSR	
	Diagnoso failura in A.S. Waterbox	
	and Isolate A S Water box IAW	
	$0 \Delta \Omega P_{31} \Omega$	
	 Place A-S water box isolation 	
	valve control switch in MAN.	
	O Close CONDENSER A-S	
	INLET VALVE, CW V12 and	
	CONDENSER A-S OUTLET	
	VALVE, CW V16.	
	o When unit stabilizes, perform	
	applicable remaining actions	
	for removal of water box from	
	service IAW OP-29.	

RO

Time	Required Actions	Notes
	Monitors Plant Parameters	

The crew will respond to a Loss of Offsite Power.

Malfunctions required:

SAT lockout DG4 output breaker fail to tie

Objectives:

SCO Direct actions of AOP-36.1

BOP Close DG4 output breaker

Success Path:

Actions of AOP-36.1 completed and DG4 output breaker closed.

Simulator Operator Actions:

- □ When directed by the lead evaluator, initiate **Trigger 5** to activate LOOP.
- □ Acknowledge and silence Fireworks alarms.
- □ If requested to monitor DGs, acknowledge alarms on DG local Alarm Panel (Instructor Aids/Panels) and report alarms if requested.
- □ If directed to align RBCCW to CSW cooling, wait 4 minutes and initiate **Trigger 13** then report valve open.
- If directed to restart RPS MG sets, wait 3 minutes and insert the following as requested: Remote Functions, RP_IARPSA, RESET; RP_IARPSB, RESET; RP_IAEPAMGA, SET; RP_IAEPAMGB, SET; RP_IAEPAALT, SET, or use Batch Files RPS.MGA.RESTART and RPS.MGB.RESTART.
- □ If directed as RBAO to ensure BFIV latching mechanisms are disengaged, wait two minutes, then report latches are disengaged.
- □ When directed by the lead examiner, proceed to the next event.
- CAUTION: DO NOT RESET THE SIMULATOR UNTIL DIRECTED BY THE LEAD EXAMINER.

EVENT 7/7a LOOP/DG4 Output Breaker Failure to Close Required Operator Actions

SRO		
Time	Required Actions	Notes
	Direct AOP-36.1 actions.	
	Direct DG4 output breaker closed.	Critical Task
	Contacts Maintenance for failure of DG3 and DG4 output breaker.	
	Enters and directs actions of RSP:	
	 Directs RO to perform scram immediate actions 	
	 Direct control of reactor pressure using SRVs (establishes pressure band 800 – 1000 psig) 	
	 Direct water level band of 170 200 inches 	
	Enters and directs actions of PCCP:	
	 Monitor and control Suppression Pool temperature below 95 deg F. 	
	 Start available RHR Loops in Suppression pool Cooling as necessary to maintain temp below 95 F. 	
	 Monitor HCTL 	
	 Operate available drywell coolers 	
	 Verify RCC operation and alignment to the drywell 	

RO		
Time	Required Actions	Notes
	Perform Scram Immediate Actions:	
	o Ensure Scram Valves Open	
	 Control reactor pressure 800 – 1000 psig 	
	 Control reactor water level 170 200 inches 	
	 Place SULCV in operation: 	
	• ENSURE the following:	
	• FW-V6 AND FW-V8 OR FW- V118 AND FW-V119 closed	
	• FW-FV-177 closed	
	• FW-V120 closed	
	• FW control MODE SELECT in 1 ELEM	
	• SULCV in M (MANUAL) closed	
	• B21-F032A AND/OR B21- F032B open	
	 PLACE the MSTR RFPT SP/RX LVL CTL in M (MANUAL), THEN ADJUST to 187" 	
	• PLACE RFP A(B) RECIRC VLV, control switch to open	
	• PLACE RFPT A(B) SP CTL in M (MANUAL)	
	• ENSURE MAN/DFCS control switch in DFCS	

RO con	cont'd			
Time	Required Actions	Notes		
	• RAISE RFPT A(B) SP CTL			
	speed until discharge pressure			
	is greater than or equal to 100			
	psig above reactor pressure			
	AD HIST SHILCY to optablish			
	• ADJUST SULCY to establish			
	• IE desired THEN PLACE			
	SULCV in A (AUTO)			
	o Insert nuclear instrumentation			
	 Ensure turbine oil system 			
	operating			
	• Ensure reactor recirc pump			
	speed lower to 34%			
	o Ensure neater drain pumps			
	linpped			
	Perform actions of RSP			
	• After steam flow is less than 3			
	mlb/hr, Place mode switch to			
	Shutdown			
	 Trip Main Turbine 			
	• Ensure Master Reactor Level			
	Controller setpoint is +170			
	inches			
	o IT two reactor feed pumps are			
	+160 inches and rising them			
	trip one			
	o If SRVs are cycling Open			
	SRVs until reactor pressure			
	decreases to 950 psig			

RO Cont'd

Time	Required Actions		Notes
	0	Maintain reactor water level	
		between 170 – 200 inches	
	0	Start available RHR Loops in	
		Suppression pool Cooling as	
		necessary	
	0	Perform LEP-02	
	0	Downrange IRMs	
	0	Ensure one CRD pump running	

BOP

Time	Required Actions	Notes
	Diagnose failure of DG4 output	
	breaker	
	<i>Manually close DG4 Output Breaker</i>	Critical Task
	Diagnose and report to the SRO DG3 tripped and Locked out.	
	Dispatch OSAO to monitor DGs	
	Observe systems operating as required for plant conditions	
	MOMENTARILY PLACE DIV I NON- INTRPT RNA, SV-5262 control switch to OVERRIDE/RESET, THEN to OPEN, AND ENSURE DIV I NON-INTRPT RNA, SV-5262 opens.	
	MOMENTARILY PLACE DIV II NON- INTRPT RNA, SV-5261 control switch to OVERRIDE/RESET, THEN to OPEN, AND ENSURE DIV II NON-INTRPT RNA, SV-5261 opens.	
	START the CRD system in accordance with OP-08, Section 8.17.	

OP Cont'd			
Required Actions		Notes	
ENSURE the associated NSW and CSW pumps are operating.			
ENSURE 125V and 24V DC battery chargers return to service for each			
energized 480V E Bus.			
PERFORM the following to transfer RBCCW HXs from the NSW header to the CSW header:			
0	CONFIRM CSW system available.		
0	ENSURE at least one of the following is closed:		
0			
0	<i>RBCCW HX SERVICE WATER INLET VALVE,SW- V103</i>		
0	RBCCW HX SERVICE WATER INLET VALVE, SW- V106		
0	NUCLEAR HEADER TO RBCCW HEAT EXCHANGER SUPPLY VALVE, SW-V193		
0	OPEN CONVENTIONAL HEADER TO RBCCW HEAT EXCHANGERS SUPPLY VALVE,SW-V146.		
	PEF RBC to th o	Required Actions ENSURE the associated NSW and CSW pumps are operating. ENSURE 125V and 24V DC battery chargers return to service for each energized 480V E Bus. PERFORM the following to transfer RBCCW HXs from the NSW header to the CSW header: • CONFIRM CSW system available. • ENSURE at least one of the following is closed: • RBCCW HX SERVICE WATER INLET VALVE, SW- V103 • RBCCW HX SERVICE WATER INLET VALVE, SW- V106 • NUCLEAR HEADER TO RBCCW HEAT EXCHANGER SUPPLY VALVE, SW-V193 • OPEN CONVENTIONAL HEADER TO RBCCW HEAT EXCHANGERS SUPPLY VALVE, SW-V146.	

BOP Cont'd			
Time	Required Actions	Notes	
	IF the opposite unit has power to its Service Air compressors AND it is desired to cross-tie air systems, THEN PERFORM the following:		
	 OBTAIN permission from the opposite Unit CRS to cross-tie unit air systems. 		
	 ENSURE CROSS-TIE VALVE, 2-SA-PV-5071 is open (Unit 2, XU-2). 		
	 ENSURE CROSS-TIE VALVE, 1-SA-PV-5071 is open (Unit 1, XU-2). 		
	PERFORM the following to start Control Building Ventilation on the affected unit:		
	 CONFIRM the Control Building Instrument Air Compressors are functioning properly. 		
	 ENSURE at least one of the following units is operating: 		
	 CTL ROOM A/C & SUPPLY FAN,1D-CU-CB and 1D-SF- CB 		
	 CTL ROOM A/C & SUPPLY FAN,2D-CU-CB and 2D-SF- CB 		
	o CTL ROOM A/C SPARE FAN, 2E-SF-CB		

Time	Required Actions		Notes
	IF available, THEN START the		
	following battery room fans, as		
	required:		
	1		
	0	BATTERY ROOM 1A VENT	
		FANS,1C-SF-CB and 1C-EF-	
		СВ	
	0	BATTERY ROOM 1B VENT	
		FANS,1B-SF-CB and 1B-EF-	
		СВ	
	0	BATTERY ROOM 2A VENT	
		FANS,2C-SF-CB and 2C-EF-	
		CB	
	0	BATTERY ROOM 2B VENT	
		FANS,2B-SF-CB and 2B-EF-	
		СВ	
	PER	FORM the following to restore	
	dryw	ell cooling:	
	0	IF three RBCCW pumps are	
		running, THEN STOP one	
		RBCCW pump, AND PLACE	
		its control switch in AUTO.	
	0	IF only one RBCCW pump is	
		running, <i>THEN</i> START a	
		second pump, if available.	
	0	IF no RBCCW pump is	
		running, THEN PLACE all	
		RBCCW pump control	
		switches in OFF, AND	
		PERFORM one of the	
		following:	

BOP C	DP Cont'd			
Time	Required Actions	Notes		
	NOTE: Drywell temperature limit for			
	starting the RBCCW System.			
	- Greater than or equal to 260°F			
	below the 75' elevation, as indicated			
	on Control Room recorder CAC-TR-			
	4420			
	- Greater than or equal to 258°F as			
	indicated on Points 1, 3 & 4 of			
	RSDP recorder CAC-TR-778.			
	 IF any local drywell 			
	temperature is currently			
	greater than the starting			
	temperature limit OR has			
	exceed the starting			
	initiation of the event THEN			
	PERFORM 20P-21. Section			
	8.6.			
	o IF all local drywell			
	less than the starting			
	temperature limit since the			
	initiation of the event, THEN			
	PERFORM 2OP-21, Section			
	5.2.			
,	• ENSURE all available drywell			
	coolers on the affected unit			
	are operating.			
	IF HPCI or RCIC is running with			
	suction from the CST AND CST			
	level indication is NOT available in			
	AND REPORT level every hour			
	START RPS MG Sets A(B) in			
	accordance with OP-03, Section 5.2			

BOP cont'd			
Time	Required Actions		Notes
	PER	FORM the following to start the	
	Reac	tor Building HVAC:	
	0	IF PROCESS OG VENT PIPE	
		AD AI-AI (UA-U3, 5-4) IS III	
		of a valid high radiation signal	
		THEN PLACE CAC PURGE	
		VENT ISOL OVRD, CAC-CS-	
		5519, in OVERRIDE	
	0	RESET the following Reactor	
		Building Ventilation Radiation	
		Monitors on Panel H12-P606:	
	0	- PROCESS REACTOR BI DG	
		VENTILATION RADIATION	
		MONITOR A, D12-RM-K609A	
	0	- PROCESS REACTOR BLDG	
		VENTILATION RADIATION	
		MONITOR B, DTZ-RM-K609B.	
	0	DEPRESS the following	
		Isolation Reset Groups push	
		buttons:	
	0	-ISOLATION RESET	
		GROUPS 1, 2, 3, 6, 8, A71-	
		002	
	0	-ISOLATION RESET	
		GROUPS 1, 2, 3, 6, 8, A71-	
		S33.	
	0	ENSURE Instrument Air	
		then 95 psig	
		than 30 psig.	
	0	Ensure BFIV latching	
		mechanisms are <i>disengaged</i> .	
		(Local)	

BOP Cont'd			
Time	Required Actions		Notes
	• OPEN RB	/ENT INBD ISOL	
	VALVES, A	-BFIV-RB and C-	
	DI IV-IND.		
	• OPEN RB	/ENT OTBD ISOL	
	VALVES, B	<i>-BFIV-RB</i> and <i>D-</i>	
	BFIV-RB.		
	CTADT three	a acta of Pagatar	
	Building Ve	ntilation Fans in	
	accordance	with OP-37.1.	
	Section 8.8	to maintain	
	Reactor Bu	ilding static	
	pressure ne	egative.	
	STAKT KWCU		
	START Fuel Poo	l Coolina	
	MONITOR sump	levels locally	

The crew will respond to a small break LOCA.

Malfunctions required:

Recirc piping break E11-F015B Overload

<u>Objectives:</u>

SCO Direct Emergency Depressurization

<u>RO</u> Emergency Depressurize

Success Path:

RPV Emergency depressurized and reactor water level restored.

Simulator Operator Actions:

- □ When directed by the lead evaluator, initiate **TRIGGER 6** to activate Small Line Break malfunction.
- If asked to perform AO actions to maximize CRD flow, initiate TRIGGER 7. When complete, contact the control room and report the AO actions to maximize CRD flow IAW SEP-09 are complete.
- □ If requested to line up SLC for demin water injection, initiate **TRIGGER 8**, wait 3 minutes and report demin water lined up.
- □ If directed to place drywell coolers to STOP, initiate **TRIGGER 9**, wait 2 minutes and report coolers are stopped.
- □ If directed to reset thermal overloads for E11-F015B, wait two minutes and delete malfunction RH002F. Report thermal overload reset.
- □ If requested to defeat RCIC low pressure isolation (SEP-10), initiate **Trigger 12**.
- □ If directed by the lead evaluator, increase LOCA by modifying Malfunction NB009F.
- □ When directed by the lead evaluator, the scenario may be terminated.

EVENT 8/8a cont'd LOCA/ED/LPCI Injection valve failure Required Operator Actions

SRO			
Time	Requ	ired Actions	Notes
	Direct E7 to E8 crosstie IAW AOP- 36.1.		
	Direct activities for EOP-02-PCCP:		
	0	Before Suppression Chamber press reaches 11.5 psig, Direct torus sprays per SEP-03.	
	0	When suppression chamber exceeds 11.5 psig, direct drywell spray per SEP-02	
	0	Confirm Drywell Spray Initiation Limit in Safe Region	
	0	Monitor PSP	
	0	Monitor HCTL	
	0	Place H2/O2 analyzers in service	
	Dire	ct activities for RVCP:	
	0	Perform LEP-01, Alternate Coolant Injection	
	0	Lineup and start Table 1 injection systems	
	0	When below TAF, verify low pressure pumps on	
	0	Determine level cannot be maintained above LL-4	See Enclosure 1 for LL4 Determination
	0	Emergency depressurization by opening 7 ADS valves	Critical Task
	0	Perform Alternate Source Term actions (Table 5)	

SRO Cont'd

Time	Requ	lired Actions	Notes
	0	Direct use of all available Table 1 systems and Alternate Coolant Injection Systems for injection Direct level be restored and maintained +170-200".	
	0	Contact maintenance for HPCI failure	

RO/BOP

Time	Requ	ired Actions	Notes
	Recognize and report rising drywell pressure.		
	Ensure RCIC injection @ 500 gpm.		
	Report failure of HPCI to SRO		
	Maximize CRD flow per SEP-09:		
		IF a CRD pump is NOT operating:	
	0	ENSURE <i>CRD FLOW</i> <i>CONTROL, C12-FC-R600</i> , is in <i>MAN</i> .	
	0	CLOSE the in-service <i>FLOW</i> CONTROL <i>VLV,C12-</i> <i>F002A(F002B).</i>	
	0	START a CRD pump.	
	0	IF a reactor scram is NOT sealed in, THEN <i>ADJUST</i> <i>CRD FLOW CONTROL, C12-</i> <i>FC-R600</i> , to greater than or equal to 30 gpm.	
	0	Direct an AO to perform field actions for two pump operation.	

RO/BOP cont'd

Time	Required Actions	Notes
	When field actions are complete:	
	• START the second CRD pump.	Due to loss of power no second pump is available.
	• ENSURE CRD FLOW CONTROL,C12-FC-R600, is in MAN.	
	• THROTTLE the following valves, as necessary, to maintain charging water pressure greater than or equal to 950 psig, but as low as possible:	
	- In-service <i>FLOW CONTROL</i> <i>VLV,C11(C12)-</i> <i>F002A(F002B)</i>	
	- DRIVE PRESSURE VLV, C11(C12)-PCV-F003	
	-CHARGING WATER HEADER THROTTLE VALVE, C11(C12)-F034 (Field Action)	
	Direct AO to rack in the E7 and E8 crosstie breakers IAW AOP-36.1.	
	After the breakers are racked in closes the crosstie breakers to energize E7.	
	Inject demin water using SLC per LEP-01:	
	 Dispatch RBAO to align SLC for demin water injection 	
	 When AO reports SLC alignment is complete, Start SLC pumps A & B 	

	RO,	BOP	cont'd
--	-----	-----	--------

Time	Required Actions	Notes
	When directed, Start drywell spray	
	per SEP-02:	
	• ENSURE WELL WATER TO	
	VITAL HEADER VLV. SW-	
	V141 is closed	
	NOTE: With a LOCA signal present	
	OUTBOARD INJECTION VI V	
	E11-E017A(E017B) can NOT be	
	closed for five minutes	
	closed for five finitutes.	
	$E11_E015A/E015B$ is open	
	INJECTION VLV, ETT-	
		· · · · · · · · · · · · · · · · · · ·
	• ENSURE one of the following	
	valves is open:	
	- CONV SW TO VITAL HEADER	
	VLV, SW-V111	
	- NUC SW TO VITAL HEADER VLV,	
	SW-V117	
	 ENSURE both reactor 	
	recirculation pumps are tripped	
	 PLACE all drywell cooler 	
	control switches to OFF (L/O).	
	o IF necessary, THEN PLACE	
	Loop A(B) 2/3 CORE HEIGHT	
	LPCI INITIATION OVERRIDE	
	switch <i>F11-CS-S18A(S18B)</i>	
	to MANUAL OVERRD	

RO/BOP cont'd

Time	Required Actions	Notes
	• IF the CTMT SPR OVRD light	
	for Loop A(B) CONTAINMENT	
	SPRAY VALVE CONTROL	
	switch, $E11-CS-S1/A(S1/B)$,	
	IS NOT ON, THEN MOMENTABLY DI ACE Loop	
	A(B) CONTAINMENT SPRAY	
	VALVE CONTROL switch	
	<i>E11-CS-S17A(S17B)</i> , to	
	MANUAL	
	 ENSURE TORUS COOLING 	
	ISOL VLV, E11-	
	F024A(F024B), is closed.	
	• CONFIRM the following:	
	- Dravell pressure and dravell	
	temperature are in the "SAFE"	
	region of the Drywell Spray	
	Initiation Limit graph	
	- Suppression pool water level is	
	below +21 inches.	

RO/BOP cont'd

Time	Requ	uired Actions	Notes
	0	ENSURE one RHR Pump is	
		running.	
	ο	OPEN Loop A(B) DRYWELL SPRAY INBD ISOL VLV, E11- F021A(F021B).	
	0	THROTTLE OPEN Loop A(B) <i>DRYWELL SPRAY OTBD</i> <i>ISOL VLV, E11-</i> <i>F016A(F016B),</i> to obtain between 8,000 gpm and 10,000 gpm flow.	
	0	IF additional cooling is required, THEN START the second Loop A(B) RHR pump <i>AND</i> limit flow to less than or equal to 11,500 gpm.	
	0	IF necessary, THEN PLACE RHR SW BOOSTER PUMPS A & C (B & D) LOCA OVERRIDE switch, E11- S19A(S19B), in MANUAL OVERRD.	
	0	ALIGN the RHR Service Water System to supply cooling water to RHR Heat Exchanger A(B) (OP-43).	
	0	ENSURE HX A(B) INLET VLV, E11-F047A(F047B) is open.	
	0	ENSURE <i>HX A(B) OUTLET</i> <i>VLV,E11-F003A(F003B)</i> is open.	

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EVENT 8/8a LOCA/ED/LPCI Injection valve failure

RO	/BOP	cont'd

Time	Required Actions	Notes
	NOTE: HX A(B) BYPASS VLV, E11-	
	F048A (F048B), is normally open,	
	but with a LPCI initiation signal	
	present can NOT be closed or	
	throttled for three minutes.	
	• CLOSE HX A(B) BYPASS	
	VLV. E11-F048A(F048B).	
	When directed. Start torus spray per	
	SEP-03:	
	o IF necessary, THEN PLACE	
	Loop A(B) 2/3 CORE HEIGHT	
	LPCI INITIATION OVERRIDE	
	switch, E11-CS-S18A(S18B),	
	in MANUAL OVERRD.	
	• IF the CTMT SPR OVRD light	
	for the Loop A(B)	
	CONTAINMENT SPRAY	
	VALVE CONTROL switch	
	F11-CS-S17A(S17B) is NOT	
	on THEN MOMENTARILY	
	PLACE Loop A(B)	
	CONTAINMENT SPRAY	
	VALVE CONTROL switch	
	E11-CS-S17A(S17B) to	
	ΜΑΝΙΙΔΙ	
	$= \frac{11}{1000} = \frac{1000}{1000} = \frac{1000}{1000$	
	AND injection to the reactor is	
	NOT required THEN CLOSE	
	$= 11 = 0.17 \Lambda (= 0.17 D)$	
	nlaged in the LPC	
	Placeu III lite LFCI,	
	Drawell Sprey mode	
	Drywell Spray mode.	

EVENT 8/8a LOCA/ED/LPCI Injection valve failure

RO/BOP cont'd

Time	Required Actions	Notes
	 ENSURE TORUS DISCHARGE ISOL VLV, E11- F028A(F028B), is open. 	
	• OPEN TORUS SPRAY ISOL VLV, E11-F027A(F027B).	
	<i>When directed, Open 7 ADS valves</i>	Critical Task
	Recognize failure of E11-F015B to open, diagnose as thermal overload, and dispatch AO to reset thermal overload	Critical Task
	Control injection flow to maintain RPV level +170-200" as directed by the SRO.	

ENCLOSURE 1



WHEN REACTOR PRESSURE IS LESS THAN 60 PSIG, USE INDICATED LEVEL. LL-4 IS -27.5 INCHES.

2012 NRC Scenario #5

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Simulator Operator Activities:

WHEN directed by the lead examiner, place the simulator in FREEZE.

CAUTION

DO NOT RESET THE SIMULATOR PRIOR TO RECEIPT OF CONCURRENCE TO DO SO FROM THE LEAD EXAMINER

2012 NRC Scenario #5

SHIFT BRIEFING

Plant Status

Unit startup is in progress.

Reactor power is approximately 20%.

0GP-10, sequence A2X, is complete up to Step 31, Item 299.

GP-03 is complete up to step 5.3.3

OP-27 is complete up to step 5.1.2.10.

Equipment Out of Service

APRM 2 INOP and bypassed

Protected Equipment

None

Plan of the Day

Synchronize main generator.

Continue with 0GP-03 actions to raise reactor power.

Reactor Engineer approval has been obtained to continuously withdraw control rods.

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Facility:	BRUNSV	VICK	Scenario No.:2012-1	Op Test No.:	FINAL	
Examiner	5.		Operators:	(SPO)		
		-0		(3KO)		
	<i>Q</i>	ARE	sed	(RO)		
	51	wot		(BOP)		
Initial Co	nditions. The	nlant is or	perating at 100% power Middle	of Cycle		
	1A	NSW Pum	o U/C.	of Cycle.		
	API	RM 2 INOP	and bypassed.			
Turnovei	r: Tra 30.	nsfer 2A S.	JAE Train to FULL LOAD and s	secure 2B SJAE	Train IAW 20P-	
Event No.	Malf. No.	Event Type*	Event D	escription		
1	N/A	N-BOP N-SRO	Transfer 2A SJAE Train to FULL LOAD, secure 2B SJAE Train			
2	RD017F	C-RO C-SRO	CRD flow controller failure			
3	CN001F	R-RO R-SRO	Small condenser leak causes lowering vacuum. (AOP-37) RO reduces reactor power with recirc flow to stabilize vacuum >24.5".			
4	CF039F	C-BOP C-SRO	Heater Drain Controller Failure (AO	P-23)		
5	CW023F	C-BOP C- SRO	NSW Pump 2BTrip, failure of NSW req'd; (TS) (AOP-18)	Pump 2A to auto sta	art, manual start	
6	NI031F	I-RO I-SRO	Recirc Loop B Flow transmitter Fail	ure (TS)		
7	RW013F/15F/ 16F	M-ALL	Un-isolable RWCU leak, SCRAM, L	oss of Vacuum, RFI	⊃s Trip	
8	ES028F	C-RO C-SRO	HPCI Injection valve fails to auto open			
9	N/A	M-ALL	Emergency Depressurization			
10	K1507A K1512A	C-BOP	Failure of two ADS valves to open, Scenario ends when reactor pressu	manually open two a re reaches 50#	additional SRV's;	
(N)ori	mal, (R)eactivi	ty, (I)nstru	ment, (C)omponent, (M)ajor			

Scenario Description

- Event 1 BOP operator will transfer SJAE 2A to FULL load using 2OP-30 Section 8.1. Task requires some component manipulations and parameter monitoring.
- Event 2 The CRD flow control valve 2A will fail closed. The crew will place the standby CRD flow control valve 2B in service per OP-08.
- Event 3 A small condenser leak which will cause condenser vacuum to slowly lower. Crew should enter AOP-37. SRO should direct RO to lower reactor power to stabilize vacuum. Once power has been reduced at least 10%, vacuum will stabilize.
- Event 4 The Heater Drain Deaerator level control system will fail causing the HD pumps discharge valves to fail full open. The crew will respond per AOP-23.0 stop 1 HD pump before HDD level goes <24" and then use the HD-V57 to control HDD level.
- Event 5 The running NSW pump will TRIP on motor overload. The STBY NSW pump will fail to AUTO start. The BOP operator should recognize the failure and manually start the STBY NSW pump. With a U1 NSW pump under clearance will require entry into TS. System parameters will return to normal. SRO should address T.S. implications. AOP-18 entry.
- Event 6 The Recirc Loop B flow transmitter to APRM Channel 4 will fail downscale resulting in a rod block and a trip input to each voter. The crew will respond per APPs and bypass APRM 4. The APRM will be declared Inoperable per TS 3.3.1.1, Condition A and placed in trip within 12 hours. APRM TS Actions to be taken requires the APRM mode selector switch to be place in INOP IAW 00I-18.
- Event 7 A large un-isolable RWCU leak will occur. Crew will enter AOP-5.0 and SCCP. SRO should direct a SCRAM. Original vacuum leak will worsen causing a complete loss of vacuum. Group 1 isolation will occur due to loss of vacuum.
- Event 8 HPCI injection valve will fail to open if HPCI AUTO initiation is received. Manual operation will open injection valve.
- Event 9 Secondary containment conditions will worsen, forcing the SRO to direct an Emergency Depressurization due to high water levels. Two ADS SRV's will fail to manually open. SRO should direct opening two additional SRV's. Scenario will end when reactor pressure reaches 100#.

DUKE ENERGY BRUNSWICK TRAINING SECTION

i.

2012 NRC EXAM SCENARIO #1

PREPARED BY:	Robert Bolin ColuMer Operations Instructor/Developer	9/04/2012 DATE
CONCURRED BY:	Dan Arhelger Operations Instructor Developer	9/04/12 DATE
VALIDATED BY:	Operations Department Rep.	09/20/1-2 DATE
VALIDATED BY:	Operations Department Rep.	<u> </u>
VALIDATED BY:	Opension Department Rep.	09. 20.12 LATE
APPROVED BY:	Facility Representative	9/27/12 DATE

I

SIMULATOR SETUP

Initial Conditions

IC

ENP-24.5	for IC 13
Rx Pwr	100%
Core Age	MOC

EVENTS

Event Number	Trigger	Trigger Description			
1	N/A		Transfer 2A SJAE to Full Load, Secure 2B SJAE		
2	1	Manual	CRD Flow Control Valve 2A Failure		
3	2	Manual	Small condenser leak, lowering vacuum, power reduction		
4	3	Manual	Manual Heater Drain Controller Failure		
5	4	Manual	nual NSW pump 2B trip, failure of NSW Pump 2A to start		
6	5	Manual	Recirc Loop B Flow transmitter failure		
7	6	Manual	Unisolable RWCU leak, SCRAM, Loss of vacuum, Grp 1 isolation		
8	N/A	Auto	HPCI Inj Valve Failure		
9	N/A		Emergency Depress		
10	N/A	Auto	Failure of 2 ADS valves to open		
	11	Auto	Trips RFP A on Scram Channel A (2 min delay)		
	11	Auto	Trips RFP B on Scram Channel B (2 min delay)		

SIMULATOR SETUP

Interventions Summary (Shaded entries = Active)

Malfunctions Summary

Malf ID	Mult ID	Description	Current Value	Target Value	Rmptime	Actime	Dactime	Trig
RD017F	FCVA	CRD FCV A Fails Closed	FALSE	TRUE				1
CF039F		HTR DRN DEAER LVL CNTRLR FAILURE	FALSE	TRUE				3
CN001F		LOSS OF CONDENSER VACUUM	0.00	825.00	00:03:00			2
CW019F	В	NUC SERVICE WATER PUMP MOTOR WINDING FAULT	False	True				4
NI063F	4	Recirc Loop B Xmitter Fail	0	0	00:00:10			5
RW013F		RWCU BRK IN TRIANGLE ROOM 77'	0.00	100.0000	00:10:00			6
RW015F		G31-F001 FAILURE TO AUTO CLOSE	TRUE					
RW016F		G31-F004 FAILURE TO AUTO CLOSE	TRUE					
ES028F		HPCI INJECT VLV FAILS TO OPEN	TRUE					

Remotes Summary

Remf ID	Mult ID	Description	Current Value	Target Value	Rmptime	Actime	Trig
RW_ZVRW004M		G31-F004 OUTBOARD ISOL VALVE	ON	OFF			8
RW_ZVRW001M		G31-F001 INBOARD ISOL VALVE	ON	OFF			9
CF_1AFWATRP		LOCAL RFP A TRIP	NORMAL	TRIPPED		00:02:00	11
CF_1AFWBTRP		LOCAL RFP B TRIP	NORMAL	TRIPPED		00:02:00	11
RD_VHRD47BL		CRD FCV B ISOL	CLOSED	OPEN			
RD_IACRDFVA		CRD FCV A CONTROL	AUTO	MAN			
RD_IACRDFVB		CRD FCV B CONTROL	MAN	AUTO			
RD_VHRD47AL		CRD FCV A ISOL	OPEN	CLOSED			

SIMULATOR SETUP

Override Summary

Tag ID	Description	Position/ Target	Actual Value	Override Value	Rmptime	Actime	Dactime	Trig
K4B20A	NUC HDR SW PMP A DISCH VLV	AUTO	ON	OFF				
K1507A	AUTO DEPRESS VLV B21-F013C	OPEN	OFF	OFF				
K1512A	AUTO DEPRESS VLV B21-F013K	OPEN	OFF	OFF				
Q1401RRK	RWCU VLV G31-F004 RED	ON/OFF	ON	ON				8
Q1401LGK	RWCU VLV G31-F004 GREEN	ON/OFF	OFF	ON				8
GK307PLZ	INTERCONDSR 2B COND DRN LVL	90	64	64	00:00:20			13

Annunciator Summary

Window	Description	Tagname	Override	Oval	AVal	Actime	Dactime	Trig
1-4	SOUTH RHR RM FLOOD LEVEL HI-HI	ZUA1214	On	On	Off			12
5-5	OTBD NSS VALVES MTR OVLD	ZA255	ON	ON	OFF			8

Special Instructions

- 1. Ensure simulator security is established IAW TAP-411.
- 2. Ensure appropriate keys have blanks in switches.
- 3. Reset alarms on SJAE, MSL, and RWM NUMACs.
- 4. Ensure no rods are bypassed in the RWM.
- 5. Ensure hard cards and flow charts are cleaned up.
- 6. Ensure all key have blanks installed.
- 7. Ensure affected procedures are free of any marks.
- 8. Place all SPDS displays to the Critical Plant Variable display (#100).
- 9. Reset to IC-13 and place in run.
- 10. Ensure ENP-24.5 form for IC-13 is located at the P603 panel.
- 11. Ensure 2A SPE in service.
- 12. Bypass APRM 2 and place blue card on joystick.
- 13. Load scenario file, if required.
- 14. Place protected equipment placards on 2A and 2B NSW Pumps.
- 15. Update orange protected equipment board with 1B, 2A, and 2B NSW.
- 16. Advance all chart recorders to indicate steady state conditions.
- 17. Provide Shift Briefing sheet to the CRS.

SCENARIO INFORMATION

Critical Tasks (bolded and italicized in the required operator actions)

- Insert a reactor scram prior to any area reaching its Max Safe Operating Value.
- Perform Emergency Depressurization when two plant areas exceed max safe water level.

References:

AOP-05 AOP-18 AOP-23 **AOP-37** ENP-24.5 OI-18 **OP-08 OP-30 OP-35** RSP, RVCP, SCCP **Tech Specs** APP-A-05 (2-2) (4-8) APP-A-06 (2-8) (3-8) (5-7) APP-UA-01 (1-10) (4-10) APP-UA-03 (1-5) (2-7) APP-UA-04 (2-10) APP-UA-05 (1-9) (2-9) (5-3) (5-4) APP-UA-12 (1-3) (1-4) (2-3) (2-4) APP-UA-18 (6-1) APP-UA-23 (1-1) (2-1) (3-1) APP-UA-45 (3-2) (4-3) (6-3) APP-UA-48 (5-3) (5-4)

EVENT 1 SHIFT TURNOVER / SJAE TRAIN MANIPULATIONS

The crew places 2A SJAE in full load per SCO direction

Malfunctions required: None

Objectives:

<u>SR0</u>

• Directs BOP to place 2A SJAE in full load and remove 2B SJAE from service per 2OP-30 section 8.1.

RO/BOP

- Places 2A SJAE in full load and removes 2B SJAE from service per 2OP-30 section 8.1.
- Monitors reactor plant during evolution

Success Path:

2A SJAE in full load, 2B SJAE secured, vacuum steady

Simulator Operator Actions:

- □ If contacted as the Auxiliary Operator, respond that you are standing by and ready to assist during the evolution.
- □ When contacted to open MVD-V5023, change INTERCONDSR 2B COND DRN LVL value to match current reading and activate with a 20 sec ramp rate, then delete the override after it ramps out.
- □ If contacted as chemistry to take samples due to spiking of the SJAE Rad Monitor, acknowledge the request.
- □ When directed by the lead examiner, proceed to the next event.

Required Operator Actions

SRO

Time	Required Actions	Notes
	Direct BOP operator to place 2A SJAE in full load and secure 2B SJAE	

EVENT 1 SHIFT TURNOVER / SJAE TRAIN MANIPULATIONS

BOP		
Time	Required Actions	Notes
	Place 2A SJAE in full load and removes 2B SJAE from service per 2OP-30, section 8.1 as follows	
	Verify Auxiliary Operator available to respond to valve or breaker problems that could be encountered during the transfer	
	Depress OFFGAS TRAIN A MASTER SWITCH, FULL LOAD pushbutton.	
	Verify the following valves auto open: SJE-V11 HTOG-V1 SJE-V4 OG-V10	
	Alarms expected for this evolution.	
	2APP-UA-45 (6-3) ICNDSR COND OUTLET VLV CO-V17 OPEN	
	2APP-UA-45 (4-3) AFTER CNDSR COND LVL HIGH/LO	
	2APP-UA-45 (3-2) RECOMBINER INLET TEMP LOW	
	Check SJAE Off Gas Rad Monitors A&B Contact Chemistry for sampling due to SJAE Rad monitor spiking.	The rad monitors will increase requiring Chemistry to be notified.
	Depress OFFGAS TRAIN B MASTER SWITCH, OFF/RESET pushbutton.	
	Verify the following valves close: SJE-V12 OG-V13 MVD-V56	

lime	Required Actions	Notes
	After three minutes, verify the	
	following valves have closed:	
	SJE-V1	
	SJE-V17	
	HTOG-V4	
	Confirms intercondenser	
	condensate drain level	
	MVD-LI-4332 on the 2B SJAE	
	train is RISING.	
	Directs AO to open bypass	
	valve to lower level	
	Directs AO to close valve when	
	level is less than 80 inches	
	level is less than of merics.	
	Verifies that 24 SPE is in	
	convice and N/A's stop 9	
	service and N/A's step 6.	
	Close the following condenants	
	Close the following condensate	
	system valves:	
	<u>CO-V16</u> , SPE COND INL VALVE	
	CO-V182 AFTERCONDSR	
	COND OUTLET VALVE	
	<u>CO-V17</u> , SJAE INTERCONDSR	
	COND OUTLET VALVE	
	Ensures condenser vacuum is	
	stable.	
	Informs SCO to initiate a 24	Tracking for Function 6 until E&RC can verify
	hour tracking LCO on ODCM	setpoints are within ODCM limits.
	table 7.3.2-1.	
	Place recombiner electric strip	
	heaters to OFF	
RO		L
Time	Required Actions	Notes
	Monitor reactor plant parameters	
	during evolution	

EVENT 1 SHIFT TURNOVER / SJAE TRAIN MANIPULATIONS BOP Continued

The crew will receive CRD charging header pressure high alarm and lose drive header pressure. The crew will place the standby CRD flow control value in service per OP-08.

Malfunctions required: CRD FCV A Fails Closed

Objectives:

<u>SR0</u>

Direct action to swap CRD Flow Control Valves.

<u>RO/BOP</u>

Performs actions to swap CRD Flow Control Valves.

Success Path:

Places CRD Flow Control Valve B in service IAW 2OP-02 Section 8.3

Simulator Operator Actions:

- □ When directed by the lead examiner, initiate **Trigger 1** to initiate CRD FCV Failure.
- □ If asked to investigate the CRD flow controller failure, as the RBAO report that the A FCV is in service but no flow indicated and no apparent cause for the failure is seen.
- □ If asked to check the R018 temperature recorder, report as the RBAO that none of the CRDs indicate an alarm present.
- If asked as RBAO to transfer CRD FCV per OP-08 (steps 8.3.2.6a-6g, when control room has placed CRD Flow Control to Manual @ zero output, then enter Remote Functions, RD_VHRD47BL, OPEN, (CRD FCV B Isol), RD_IACRDFVA, MANUAL (CRD FCV A Control), RD_IACRDFVB, AUTO, (CRD FCV B Control) and report OP-08 completed up to step 8.3.2.6h. After control room has completed step 8.3.2.6h. report step 8.3.2.6i is complete.
- □ When requested, isolate CRD FCV using RD_VHRD47AL CLOSE, (CRD FCV A Isol) and report steps 8.3.2.12 and 13 are complete.
- □ If asked as I&C to investigate, acknowledge the request.
- □ When directed by the lead examiner, proceed to the next event.

Required Operator Actions SRO

Time	Required Actions	Notes
	May direct entry into 0AOP-02.0, Control Rod Misposition/Malfunction, for inability to move control rods	
	Direct standby CRD FCV placed in service IAW OP-08.	
	Contact I&C to investigate 2A CRD FCV Failure	

BOP

Time	Required Actions	Notes	
	Monitors the plant		

RO		
Time	Required Actions	Notes
	Diagnose and report failure of CRD FCV	
	Enter and announce 0AOP-02.0, if directed by the SRO.	
	Addresses Annunciator: A-5 2-2, CRD Charging Wtr Press Hi	
	Determine steps of 2OP-08 (section 8.3) required to shift FCVs	
	Station an operator in direct communication with the Control Room at CRD Master Flow Control Station	
	Shift CRD FLOW CONTROL, C12-FC-R600, to BAL.	
	Null CRD FLOW CONTROL, C12-FC-R600, by adjusting manual potentiometer.	
	Shift CRD FLOW CONTROL, C12-FC-R600, to MAN.	
	Maintain CRD flow rate between 30 and 60 gpm, by adjusting manual potentiometer.	With the failure of the FCV this step should be noted and approved by SRO as not being able to be done. (IAW PRO-NGGC-0200, Section 9.7)
	Direct RBAO to perform 2OP-08 Section 8.3 Step 6a - 6g	

RO

Time	Required Actions	Notes
	Null CRD FLOW CONTROL VALVE CONTROLLER, C12-FK-D009B, by adjusting manual potentiometer on CRD FLOW CONTROL, C12-FC- R600	
	Direct RBAO to perform 2OP-08 Section 8.3 Step 6i.	
	Determines 2OP-08 Section 8.3 step 7 is N/A.	
	Null CRD FLOW CONTROL, C12- FC-R600, by adjusting setpoint tape.	
	Shift CRD FLOW CONTROL, C12- FC-R600, to AUTO.	
	Adjust setpoint tape on <i>CRD FLOW</i> <i>CONTROL, C12-FC-R600,</i> to maintain cooling water differential pressure between 10 and 26 psid.	
	Ensure CRD flow rate is between 30 and 60 gpm.	
	Direct RBAO to perform 2OP-08 Section 8.3 Steps 12 & 13.	
	Monitor operation of CRD System in accordance with Section 6.0.	CRD Drive Water Pressure operating band is 260 to 275 psid.
	Complete 2OP-08 Attachment 6.	

EVENT 3 SMALL CONDENSER LEAK / LOWERING VACUUM/POWER REDUCTION

The crew responds to lowering condenser vacuum.

NOTE: Vacuum will stabilize as crew lowers power.

Malfunctions required:

• Condenser leak

<u>Objectives:</u>

<u>SRO</u>

Direct actions in response to lowering condenser vacuum

RO/BOP

- Respond to lowering condenser vacuum
- Reduce reactor power, as directed by SRO, to stabilize vacuum above 24.5" Hg

Success Path:

Reduce reactor power approx. 10% to stabilize condenser vacuum above 24.5" Hg

Simulator Operator Actions:

- WHEN directed by lead examiner, activate TRIGGER 2 (Condenser Leak)
- □ IF asked as the Rad Waste Operator to maintain hotwell level using manual hotwell level control, respond in the affirmative.
- □ IF contacted as Ops Center to assist with vacuum leak search, acknowledge request.
- □ IF contacted as chemistry to perform actions for 15% power reduction, acknowledge.
- □ IF contacted as HP to assist in SJAE room entry, acknowledge request.
- □ IF contacted as AO to check closed MVD-5023, acknowledge request.
- □ When crew lowers power ~10%, stabilize condenser vacuum by **changing severity of condenser leak to ~500**.
- □ When directed by the lead examiner, proceed to the next event.

EVENT 3 SMALL CONDENSER LEAK / LOWERING VACUUM/POWER REDUCTION Required Operator Actions

<u>Required</u>	<u>Operator</u>	Actions
SRO		

Time	Required Actions	Notes
	Direct crew to enter and execute AOP-37, Low Condenser Vacuum.	
	Direct RO to reduce reactor power per ENP-24.5 to maintain vacuum greater than 24.5" Hg.	May direct the use of Manual Runback pushbutton, which reduces recirc flow to the 0ENP-24.5 flow limit of 47 Mlbm/hr or ~75% power
	Contact Nuclear Engineering of the reduction in power due to condenser leak.	
	Contact System Load Dispatcher of the reduction in power.	
	Contact AO's and Maintenance to help with Condenser Air Leak hunting.	
	Contact Chemistry to take samples if power was reduce >15%.	
	Direct inserting control rods to maintain operation below the MELLL.	
	May direct entry into GP-12 after the power reduction.	
	Refer to ODCM LCO 7.3.10 if AOG Bypass occurs (2APP-UA-48 (5-4) AOG SYSTEM BYPASS).	
	Condition A1 applies to place AOG in service in 7 days.	

EVENT 3 SMALL CONDENSER LEAK / LOWERING VACUUM/POWER REDUCTION

BOP		
Time	Required Actions	Notes
	Announce and Enter AOP-37, Low	
	Condenser Vacuum.	
	Direct Radwaste to maintain hotwell level between -7 and +7 inches in manual hotwell level control	
	Dispatch AOs to perform Condenser Leak hunting in the field.	
	Verify proper SJAE operation.	
	Respond to Alarms.	
	2APP-UA-48 (5-4) AOG SYSTEM BYPASS	
	2APP-UA-48 (5-3) AOG SYSTEM OUTLET FLOW/TEMP HIGH 2APP-UA-23 (2-1) EXH HOOD A VACCUM LOW	
	2APP-UA-23 (3-1) EXH HOOD B VACUUM LOW	

EVENT 3 SMALL CONDENSER LEAK / LOWERING VACUUM/POWER REDUCTION

RO		
Time	Required Actions	Notes
	Enter and execute 0AOP-37.0, Low	
	Condenser Vacuum.	
	Reduce reactor power as required to	
	maintain condenser vacuum greater	
	than 24.5" Hg per 0ENP-24.5. (This	
	is an Immediate Operator Action	
	from 0AOP-37.0.)	
	Reduce recirc flow on both	May be directed to use Manual Runback
	pumps using the Recirc Master	pushbutton, which reduces recirc flow to the 0ENP-
	Control, Lower Fast	used expect A-5, 4-8 - OPRM Trip Enabled
	pushbutton.	Annunciator.
	Continues with Recirc pump	
	reductions until vacuum is	
	steady and greater than 24.5	
	inches HG.	
	Verifies operation on the Power	
	to Flow map.	
	Recognizes operation above	
	the MELLL line and informs	
	SCO.	
	Inserts control rods using ENP-	
	24.5 to get below the MELLL	
	line. (Should only need to insert	
	one control rod 22-19)	
	Turns control rod power on.	
	Selects control rod (22-19) in	
	accordance with ENP-24.5	
	sheet. May also insert 30-35,	
	30-19, or 22-35. (in this order to	
	establish margin to MELLL	
	line).	
	Continuously drives selected	
	rod in using RMCS.	
	-	

EVENT 4 Heater Drain Deaerator Controller Failure

HDD level will slowly lower. If level reaches 36", *HD DEAERATOR LEVEL HIGH-LOW* will alarm. If level reaches 54", *HD DEAERATOR LEVEL HIGH-LOW* will alarm on high level. If level gets too high, a HDD Extraction Trip will occur and require additional operator actions.

Malfunctions required: Htr Drn Deaer Lvl Cntrlr Failure

Objectives:

<u>SCO</u>

Direct Actions for a Condensate/Feedwater System Failure per 0AOP-23.0

RO/BOP

Respond to a Condensate/Feedwater System Failure per 0AOP-23.0

Success Path:

The crew should trip one HD pump before HDD level is <24" and then control HDD level with HD-V57.

Simulator Operator Actions:

- □ When directed by the lead examiner, initiate **Trigger 3**, HDD Controller failure.
- □ If directed as I&C to investigate the HDD level controller acknowledge only.
- □ If contacted as AO to investigate, report LC-91 is in master and is sending a full open signal.
- □ When HDD level is stabilized and if directed to place controller in Manual or to swap master controllers, Delete CF039F and report controller in manual maintaining level.
- □ When directed by the lead examiner, proceed to the next event.

EVENT 4 Heater Drain Deaerator Controller Failure

Required Operator Actions

Time	Required Actions	Notes
	Direct entry into AOP-23.0	
	May direct lowering power	
	Direct I&C to investigate HDD level control problem	
	Direct trip of 1 HD pump and HDD level control with HD-V57	
	May direct HDD level control to be placed in Manual or swapped.	

RO		
Time	Required Actions	Notes
	Monitors the plant	
	May reduce reactor power with	
	control rods IAW 0ENP-24.5 as	
	directed by the CRS	

- EVENT 4 Heater Drain Deaerator Controller Failure

BOP

Time	Required Actions	Notes
	Acknowledge and report UA-4 2-10 HD DEAERATOR LEVEL HIGH- LOW alarm.	
	Diagnose HD Pump discharge valves full open	
	Enter and announce 0AOP-23.0	
	Trips one of the operating Heater Drain pump	
	Maintains heater drain deaerator level less than 60 inches indicated on HEATER DRAIN DEAERATOR LEVEL, HD-LI-97	If level reaches 60 inches UA-4, 3-10 may alarm and the HDD Moisture removal valves MVD-LV-266 and 267 will open. Move to the next event when level is being controlled with the HD-V57.
	May dispatch TBAO to check HD Pump Air-Operated Discharge Level Control Valves, HD-LV-91-1, 2, & 3.	
	May direct TBAO to place HDD level control in Manual IAW 2OP-35 Section 8.2. or swap controller IAW 2OP-35, Section 8.8	
	Monitors main condenser vacuum and condensate parameters	
	May have to secure a CBP if one auto started during the evolution.	

EVENT 5 2B NSW PUMP TRIP / FAILURE OF 2A NSW PUMP TO START

The crew responds to the trip of a NSW pump and the failure of the auto pump to start.

Malfunctions required: NSW Pump trip, NSW pump auto select switch off

- 'B' NSW Pump motor overload
- Failure of STBY NSW pump to start

Objectives:

<u>SCO</u>

- Direct actions for loss of NSW
- Evaluates Tech Specs 3.7.2 Service Water System and Ultimate Heat Sink

<u>RO/BOP</u>

- Respond to the trip of B NSW pump
- Respond to the failure of an automatic start of the A NSW pump

Success Path:

STBY NSW pump started and NSW system pressure returned to normal band

Simulator Operator Activities:

- □ WHEN directed by lead examiner, activate TRIGGER 4. (NSW pump trip)
- □ **IF** contacted as OAO to investigate NSW pump and breaker, report 51 devices are tripped for at the breaker.
- □ IF contacted as maintenance or I&C to investigate trip, acknowledge request.
- □ When directed by the lead examiner, proceed to the next event.

EVENT 5 2B NSW PUMP TRIP / FAILURE OF 2A NSW PUMP TO START

<u>Required Operator Actions</u> SRO

Time	Required Actions	Notes
	Direct entry into AOP-18 NSW System Failure.	
	Contact maintenance to investigate trip of 2B NSW Pump.	
	May also report to I/C that 2A NSW Pump did not auto start.	
	Evaluate Tech Spec 3.7.2 Service Water System and Ultimate Heat Sink.	Failure to auto start due to failed pressure switch does not make the pump INOP.
	Determine 2B NSW pump inoperable	
	Determine 1A NSW Pump inoperable due to clearance.	
	Per the Bases, 3 NSW pumps required site wide.	
	3.7.2 Condition B. One required NSW pump inoperable for reasons other than condition A. Required Action B.1 Restore required NSW pump to Operable status in 7 days	

RO

Time	Required Actions	Notes
	Monitor reactor plant parameters during evolution.	

EVENT 5 2B NSW PUMP TRIP / FAILURE OF 2A NSW PUMP TO START

BOP		
Time	Required Actions	Notes
	Monitor NSW system parameters.	
	Recognize lowering NSW system pressure.	
	Announce and execute 0AOP-18.0, NSW System Failure.	
	Recognize trip of 2B NSW pump.	
	Recognize the failure of the STBY NSW pump to start and starts standby pump.	
	Places 2A NSW pump in Manual.	
	Starts 2A NSW Pump.	
	Refer to alarms.	
	UA-01 (4-10) NUCLEAR HDR SW PUMP B TRIP	
	UA-01 (1-10) NUCLEAR HEADER SERV WTR PRESS-LOW	
	UA-03 (1-5) RBCCW HEAD TANK LEVEL HI/LO	
	UA-05 (1-9) FAN CLG UNIT CS PUMP RM A INL PRESS LO	
	UA-05 (2-9) FAN CLG UNIT CS PUMP RM B INL PRESS LO	
	UA-18 (6-1) BUS E4 4KV MOTOR OVLD	

2012 NRC Scenario #1

EVENT 6 RECIRC LOOP B FLOW TRANSMITTER FAILURE

Flow reference off normal alarm, rod block and scram signal to all 4 voters Flow transmitter signals are displayed on PC display 845, and on individual NUMACs by selecting Input Status.

Malfunctions required: APRM Flow Unit Failure

Objectives:

SCO - Determine LCO for APRM 4 inoperability and direct placing channel in trip.

<u>RO</u> - Respond To A Flow Unit/Transmitter Failure Per APP A-06 5-7

Success Path:

ARPM 4 TS 3.3.1.1 declaration and placed in trip condition IAW 00I-18.

Simulator Operator Actions:

- □ When directed by lead evaluator, **INITIATE TRIGGER 5** to activate APRM 4 failure.
- □ If asked as I&C to investigate, acknowledge the request.
- □ If asked to pull fuses (for TRM 3.3 actions) acknowledge the request.
- After LCO entries have been determined and SRO is waiting for I&C, call as WCCSRO and request APRM 4 be placed in tripped condition to support I&C trouble shooting. The WCC will hang the status control tag paperwork.

Required Operator Actions

SRO		
Time	Action	Notes
	Direct actions of APPs	
	Direct I&C to investigate	
	Evaluate Tech Spec 3.3.1.1 Reactor Protection System Instrumentation TS 3.3.1.1, Function 2b, Required Action A1. With one or more required	
	channels inoperable, place in trip condition in 12 hours Evaluate TRM 3.3 Control Rod Block	
	Instrumentation TRM 3.3, Function 1a, Required	
	Condition A1. With one of the required channels not operable - 24 hours to restore to operable.	

EVENT 6 RECIRC LOOP B FLOW TRANSMITTER FAILURE

SRO cont'd

Time	Action	Notes
	Refers to 0OI-18 for actions to place APRM 4 in a tripped condition.	
	Direct APRM 4 mode selector switch placed in INOP to allow I&C troubleshooting.	

BOP

Time	Action	Notes
	Monitors the plant.	
	May check back panel APRM indications.	

RO

Time	Action	Notes
	Acknowledges, refers to & reports annunciators A-6 2-8 APRM UPSCALE 3-8 APRM UPSCALE TRIP/INOP 5-7 FLOW REF OFF NORMAL A-5 2-2 ROD OUT BLOCK 4-8 OPRM TRIP ENABLED	
	Diagnose and report failure of APRM 4 Flow Transmitter	
	Obtains key number 114 from the SRO key locker to place APRM 4 in trip.	
	Places APRM mode selector switch in INOP IAW 0OI-18.	

The crew will respond to an un-isolable RWCU leak in secondary containment.

Malfunctions required:

- RWCU leak Triangle Room 77ft
- RWCU isolation valve failures
- Vacuum Loss
- HPCI Injection valve failure to open

Objectives:

<u>SCO</u>

- Direct response to un-isolable primary system breach in secondary containment
- Direct execution of applicable AOPs & EOPs

<u>BOP/RO</u>

- Respond to un-isolable primary system breach in secondary containment
- Perform SCRAM actions

Success Path:

Crew enters and executes AOP-5.0 and SCCP, attempts to isolate RWCU, inserts reactor scram, recognizes Group.I isolation, Both RFPs trip after five minutes from scram, recognizes failure of HPCI injection valve, maintains reactor water level above LL3, controls reactor pressure with SRVs.

Simulator Operator Actions:

- □ WHEN directed by lead examiner, activate TRIGGER 6
- □ WHEN crew inserts a SCRAM, increase Condenser Air In-Leakage malfunction setting (vacuum leak) to maximum.
- □ If contacted as engineering, acknowledge request for EQ envelopes for the U2 Reactor Building
- □ When directed by the lead examiner, proceed to the next event.

Critical Tasks

Insert a reactor scram prior to any area reaching its Max Safe Operating Value.

RO		
Time	Required Actions	Notes
	Enter and execute AOP-5.0 High Radiation.	
	Diagnose source of radiation as RWCU leak.	
	Trip RWCU Pumps	
	May close G31-F042 valve.	
	Recognize RWCU isolation valve failures and report to SRO.	
	(F001 – Breaker trip) (F004 – Overload trip)	
	Insert Reactor scram as directed by SRO.	<i>Critical Task - Insert a reactor scram prior to any area reaching its Max Safe Operating Value. These can be monitored on SPDS screen 410.</i>
	Complete scram actions	
	Recognize Grp.I Isolation (vacuum loss) and report to crew.	
	Maintain reactor pressure with SRVs as directed by SRO.	
	Maintain reactor water level as directed by SRO.	
	Perform reactor cooldown as directed by SRO.	
	Recognize failure of E41-F006, HPCI injection valve to open and open manually.	
	Recognize and report to SRO alarm A-2 RB 50/20 ft Temp Hi.	

Required Operator Actions

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Time	Required Actions	Notes
	Direct entry into AOP-5.0 High	
	Radiation	
	Direct RO to trip and isolate RWCU	
	Enter and execute SCCP.	Critical Task - Insert a reactor scram prior
	Direct a reactor scram.	to any area reaching its Max Safe Operating
		Value. These can be monitored on SPDS
	Direct cool down at normal cool	screen 410. (It will take ~10 minutes to
	down rates (<100°F/hr).	reach max sale operating values)
	Request EQ envelopes for the	
	U2 Rx Bldg	
	Enter RSP and exit to RVCP due to	
	the scram required.	
	Enter and execute RVCP.	
	Direct RO/BOP to stabilize	
	reactor pressure below 1050	
	psig.	
	Verify Instrument operability per	
	Caution 1.	
	Direct crow to water NOCOA (D	
	due to 50' temperatures of	
	50' clorm reported	
	50 alarm reported.	
	Direct vorification of group	
	isolations ECCS initiations and	
	DG starts as appropriate	
	20 starts as appropriate.	
	Direct RO/BOP to restore and	
	maintain reactor water level	
	170"-200" using systems	
	available in Table 1	
	Direct E41-F006, HPCI injection	
	valve to be opened.	
	,	
	Contact I/C for assistance with	
<u> </u>	RWCU isolation valve failures.	

Required Actions	Notes
Respond to alarm UA-03, 2-7 Area Rad Rx Bldg Hi.	
Enter and execute AOP-5.0.	
Evacuate Unit 2 Reactor Bldg.	
Direct AO to close PIV-33 RB Sprinkler Shutoff Valve.	
Direct E&RC to take applicable AOP-5.0 actions.	
Check area radiation readings at back panels.	
Diagnose source of radiation as RWCU leak.	
Recognize Grp.I Isolation (vacuum loss) and report to crew. 2APP-UA-23 (2-1, 3-1) EXH HOOD A/B LOW VACCUUM	
2APP-UA-23 (1-1) TURB VACCUUM TRIP	
2APP-A-5 (5-4, 5-3) GP.I ISOL LOGIC TRIPPED	
Maintain reactor pressure with SRVs as directed by SRO.	
Maintain reactor water level as directed by SRO.	Aligns SULCV per hard card (OP-32, Attachment 6) See Enclosure 1.
Perform reactor cooldown as directed by SRO.	
	Required ActionsRespond to alarm UA-03, 2-7 AreaRad Rx Bldg Hi.Enter and execute AOP-5.0.Evacuate Unit 2 Reactor Bldg.Direct AO to close PIV-33 RBSprinkler Shutoff Valve.Direct E&RC to take applicableAOP-5.0 actions.Check area radiation readingsat back panels.Diagnose source of radiation asRWCU leak.Recognize Grp.I Isolation (vacuumloss) and report to crew.2APP-UA-23 (2-1, 3-1) EXH HOODA/B LOW VACCUUM2APP-A-5 (5-4, 5-3) GP.I ISOLLOGIC TRIPPEDMaintain reactor pressure with SRVsas directed by SRO.Perform reactor cooldown asdirected by SRO.

BOP Continued

Time	Required Actions	Notes
	Recognize failure of HPCI injection valve to open and open manually.	
	Recognize and report to SRO alarm A-2 RB 50/20 ft Temp Hi.	
	Recognize and report to SRO alarm UA-12 South Core Spray Flood Level Hi.	
EVENT 9 & 10 EMERGENCY DEPRESSURIZATION / ADS VALVE FAILURES

The crew will perform and respond to a manual emergency depressurization with ADS valve failures.

Malfunctions required:

• 'C' and 'K' ADS valves fail to open manually

Objectives:

<u>SR0</u>

Evaluate plant conditions and direct an Emergency Depressurization

<u>BOP/RO</u>

- Perform Emergency Depressurization
- Recognize and respond to component malfunctions

Success Path:

Emergency depressurization performed as required by SCCP

Simulator Operator Actions:

- 2 minutes after receiving annunciator UA-12 (2-4) SOUTH RHR RM FLOOD HI, initiate TRIGGER 12 (South RHR RM Flood HI-HI)
- □ When directed by the lead examiner, proceed to the next event.

<u>Critical Tasks</u>

Perform Emergency Depressurization when two plant areas exceed max safe water level.

EVENT 9 & 10 EMERGENCY DEPRESSURIZATION / ADS VALVE FAILURES

Required Operator Actions:

SRO

Time	Required Actions	Notes
	Continue reactor cooldown per	
	SCCP direction.	
	Direct Emergency Depressurization when RHR RM FLOOD LEVEL HI-HI alarm (Two plant areas with radiation levels above Max Safe – South CS and RHR)	<i>Critical Task - Perform Emergency Depressurization when two plant areas exceed max safe water level.</i>
	Direct RO/BOP to open 7 ADS valves.	
	If informed by RO/BOP that 2 SRVs failed to open, direct opening additional SRVs until 7 SRVs are open.	SRVs C and K fail to open
	Enter PCCP when torus temperature exceeds 95°F.	
	Directs all available loops to be	
	placed in suppression pool cooling.	

EVENT 9 & 10 EMERGENCY DEPRESSURIZATION / ADS VALVE FAILURES

RO / BOP

Time	Required Actions	Notes
	Continue reactor cool down as	
	directed by SRO.	
	Recognize and report South CS and	
	South RHR Room Flood Hi-Hi	
	alarms.	
	Open seven ADS valves as	Critical Task - Perform Emergency
	directed by SRO.	Depressurization when two plant areas
		exceed max safe water level.
	Recognize failure of 2 ADS valves to	SRVs C and K fail to open
	OPEN and report to SRO.	
	Open 2 additional SRVs as directed	
	by SRO.	
	Maintain reactor water level as	Should use condensate system via SULCV
	directed by SRO.	,
	Place available loops in suppression	See Enclosure 2 for SPC Hard Card actions.
	Pool Cooling IAW hard card.	

Simulator Operator Activities:

WHEN directed by the lead examiner, place the simulator in FREEZE.

CAUTION

DO NOT RESET THE SIMULATOR PRIOR TO RECEIPT OF CONCURRENCE TO DO SO FROM THE LEAD EXAMINER

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ATTACHMENT 6 Page 1 of 2 Feedwater Level Control Following a Reactor Scram

NOTE This attachment is N		This attachment is NOT to be used for routine system operation	and the second secon
1.	EN	SURE the following:	
	•	FW-V6 AND FW-V8 OR FW-V118 AND FW-V119 closed	
	٠	FW-FV-177 closed	
		FW-V120 closed	
	٠	FW control MODE SELECT in 1 ELEM	
	٠	SULCV in M (MANUAL) closed	
	٠	B21-F032A AND/OR B21-F032B open	
2.	PLA	ACE the MSTR RFPT SP/RX LVL CTL in M (MANUAL), THEN:	
	٠	ADJUST to 187"	
3.	IF a	ny RFP is running, THEN:	
	a.	PLACE RFP A(B) RECIRC VLV, control switch to open	
	b.	PLACE RFPT A(B) SP CTL in M (MANUAL)	
4.	IF n	o RFP is running, THEN :	
	a.	PLACE RFP A(B) RECIRC VLV, control switch to open	
	b.	ENSURE the following:	<u> </u>
		 RFP A(B) DISCH VLV, FW-V3(V4) open 	
		 RFPT A(B) SP CTL in M (MANUAL) at lower limit 	
		 RFPT A(B) MAN/DFCS control switch in MAN 	
		 Reactor water level is less than +206 inches AND RFPT A&B HIGH LEVEL TRIP reset 	
	C.	DEPRESS RFPT A(B) RESET	

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ATTACHMENT 6 Page 2 of 2 Feedwater Level Control Following a Reactor Scram

	d.	ENSURE RFPT A(B) LP AND HP STOP VLVS open	
	e.	ROLL RFPT A(B) to 1000 rpm by depressing RFP A(B) START	
	f.	RAISE RFPT A(B) to approximately 2550 rpm using the LOWER/RAISE control switch	
	g.	DEPRESS RFPT A(B) DFCS CTRL RESET	
5.	ENSL	IRE MAN/DFCS control switch in DFCS	
6.	RAISI than c	E RFPT A(B) SP CTL speed until discharge pressure is greater or equal to 100 psig above reactor pressure	
7.	ADJU	ST SULCV to establish desired injection	1
8.	IF des	ired, THEN PLACE SULCV in A (AUTO)	
9.	IF nee	ded, THEN THROTTLE FW-V120	
10.	IF nee	ded, THEN GO TO 20P-32 Section 8.17 for level control	

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ENCLOSURE 2

ATTACHMENT 8A Page 1 of 1 Emergency Suppression Pool Cooling Using Loop A (20P-17)

NOTE: This attachment is NOT to be used for normal system operations.					
START RHR SW A LOOP (CONV) START RHR SW A LOOP (NUC)					
OPEN SW-V101		OPEN SW-V105	Γ		
CLO S E SW-V143		OPEN SW-V102	Г		
START CSW PUMPS AS NEEDED		CLOSE SW-V143	Г		
IF LOCA SIGNAL IS PRESENT THEN		START PUMPS ON NSW HDR AS NEEDED			
PLACE RHR SW BOOSTER PUMPS		IF LOCA SIGNAL IS PRESENT THEN	Г		
A & C LOCA OVERRIDE SWITCH		PLACE RHR SW BOOSTER PUMPS A & CLOCA			
TO MANUAL OVERRIDE		OVERRIDE SWITCH TO MANUAL OVERRIDE	~ `		
START RHR SW PMP		START RHR SW PMP	Г		
ADJUST E11-PDV-F068A		ADJUST E11-PDV-F068A			
ESTABLISH CLG WTR TO VITAL HDR		ESTABLISH CLG WTR TO VITAL HDR			
START ADDITIONAL RHR SW PUMP AND ADJUST FLOW AS NEEDED		START ADDITIONAL RHR SW PUMP AND ADJUST FLOW AS NEEDED			
	STAR	T RHR LOOP A			
IF LOCA SIGNAL IS PRESENT, THEN					
IF E11-F015A IS OPEN, THEN					

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OPEN E11-F028A

START LOOP A RHR PMP

THROTTLE E11-F024A

THROTTLE E11-F048A

START ADDITIONAL LOOP A RHR PMP AND ADJUST FLOW AS NEEDED

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ENCLOSURE 2

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ATTACHMENT 8B Page 1 of 1 Emergency Suppression Pool Cooling Using Loop B (20P-17)

This attachment is NOT to be used for normal system operations. NOTE:

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START RHR SW B LOOP (NUC) OPEN SW-V105

CLOSE SW-V143

START PMPS ON NSW HDR AS NEEDED

IF LOCA SIGNAL IS PRESENT THEN Π

PLACE RHR SW BOOSTER PUMPS

B & D LOCA OVERRIDE SWITCH

то	MANUAL	OVERRIDE
10	MANUAL	UVERRIDE

START RHR SW PMP

ADJUST E11-PDV-F068B Π

ESTABLISH CLG WTR TO VITAL HDR

START ADDITIONAL RHR SW PUMP AND ADJUST FLOW AS NEEDED

START RHR SW B LOOP (CONV) OPEN SW-V101

OPEN SW-V102

CLOSE SW-V143

START CSW PUMPS AS NEEDED

IF LOCA SIGNAL IS PRESENT THEN

PLACE RHR SW BOOSTER PUMPS B & D LOCA

OVERRIDE SWITCH TO MANUAL OVERRIDE

START RHR SW PMP

ADJUST E11-PDV-F068B ESTABLISH CLG WTR TO VITAL HDR

START ADDITIONAL RHR SW PUMP AND ADJUST FLOW AS NEEDED

START RHR LOOP B

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	START A AND AD.	DDITIONAL LOOP B RHR F IUST FLOW AS NEEDED	PMP	
	THROTT	LE E11-F048B		
	THROTT	LE E11-F024B		
	OPEN E	11-F028B		
	START	OOP B RHR PMP		
	IF <i>E11-F</i> CLOSE	015B IS OPEN, THEN E11-F017B		
	IF LOCA VERIFY	SIGNAL IS PRESENT, THE SPRAY LOGIC IS MADE UP	EN 🗍	

SHIFT BRIEFING

Plant Status

The plant is operating at 100% power, Middle of Cycle.

Equipment Out of Service

1A NSW Pump

APRM 2 INOP and bypassed

Protected Equipment

1B, 2A, and 2B NSW Pumps

Plan of the Day

Maintain current power.

Following shift turnover, place 2A SJAE in full load and remove 2B SJAE from service per the direction of 2OP-30 Section 8.1. (An AO has been briefed and is standing by in the field with a copy of the procedure)

The 2B SJAE is being removed from service for periodic maintenance and will be unavailable for 48 hours.