



BRUNSWICK TRAINING SECTION
OPERATIONS TRAINING
INITIAL LICENSED OPERATOR
SIMULATOR EVALUATION GUIDE

LOIX-029
2014 NRC SCENARIO 1

RBV Rad Mon Failure, DWEDT Failure , VFD Cell Failure, Condenser Tube Leak,
RWCU Leak, Emerg Depress

REVISION 0

Developer: Robert Bolin

Date: 7/18/2014

Technical Review: Lou Sosler

Date: 7/18/2014

Validator: Derek Pickett

Date: 7/18/2014

Validator: Bruce Leitch

Date: 7/18/2014

Facility Representative: Jerry Pierce

Date: 8/15/2014

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REVISION SUMMARY	
0	Scenario developed for 2014 Exams.

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1.0 SCENARIO OUTLINE

Event	Malf. No.	Type*	Event Description
1	RM004F	C-BOP	RBV Rad Monitor failure / SBGT fails to auto start (TS)
2	ZA411	C-RO	DWEDT Pump failure
3	RC053F	C-RO	VFD Cell Failure / Power maneuver (TS)(AOP)
4	CN012F	C-BOP	Condenser Tube leak (AOP)
5		R	Power reduction to remove waterbox from service
6		N	Remove waterbox from service
7	RW013F	M C C	RWCU leak (AOP) / Scram Room Cooler Failures Bypass Jack failure
8	K1507A	M C	ED Failure of 2 ADS valves to open
*(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

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2.0 SCENARIO DESCRIPTION SUMMARY

Event	Description
1	Reactor Building Vent Radiation Monitor A will fail resulting in a Group 6 isolation, Secondary Containment isolation and SBTG initiation. SBTG A will fail to auto start requiring manual action. The crew will address TS.
2	Annunciator A-04 1-1, Drywell Equip Drain Sump Lvl Hi, will annunciate and the sumps will not auto start. One of the sump pumps will need to be manually started
3	A power cell in VFD A will fail. Recirc Pump 2A speed will lower and a speed hold will initiate. Loop flows will be outside mismatch limits. The crew will address TS and reset the speed hold and match loop flows.
4	A tube leak will occur in the main condenser resulting in high conductivity alarms. The crew will respond per 0AOP-26.0
5	Power should be reduced to 53% for water box removal
6	The water box will be removed from service per 2OP-29.0.
7	A large un-isolable RWCU leak will occur. Crew will enter AOP-5.0 and SCCP. SRO should direct a SCRAM. The south room cooler will not start and the north room cooler will run for 5 minutes and then trip. A cooldown should be established in which the bypass opening jack will fail. The crew should use steam line drains to establish the cooldown.
8	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.

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3.0 CREW CRITICAL TASKS

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

4.0 TERMINATION CRITERIA

When emergency depressurization has been performed and the reactor has been depressurized to <100 psig the scenario may be terminated.

5.0 IMPLEMENTING REFERENCES

NOTE: Refer to the most current revision of each Implementing Reference.

Number	Title
A-04, 1-1	Drywell Equip Drain Sump Lvl Hi
UA-3, 3-5	Process Rx Bldg Vent Rad Hi-Hi
UA-3, 3-6	Process Rx Bldg Vent Dnsc/Inop
UA-3, 4-5	Process Rx Bldg Vent Rad Hi
UA-5, 4-6	SBGT SYSA Failure
UA-5, 6-10	Rx Bldg Isolated
UA-25,1-8	Ctmt Atmos Rad Mon Dnsc/Inop
UA-12, 2-4	South RHR Rm Flood Hi
UA-12, 1-4	South RHR Rm Flood Hi-Hi
2AOP-04.0	Low Core Flow
0AOP-05.0	Radioactive Spills, High Radiation, And Airborne Activity
0AOP-26.0	High Reactor Coolant or Condensate Conductivity
0AOP-29.0	Malfunction of Annunciators
2OP-29, Section 8.17	Condenser Water Box Air Removal System Shutdown

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6.0 SETUP INSTRUCTIONS

1. **PERFORM** TAP-409, Miscellaneous Simulator Training Guidelines, Attachment 5, Checklist for Simulator Exam Security.
2. **RESET** the Simulator to IC-25.
3. **ENSURE** the RWM is set up as required for the selected IC.
4. **ENSURE** appropriate keys have blanks in switches.
5. **RESET** alarms on SJAE, MSL, and RWM NUMACs.
6. **ENSURE** no rods are bypassed in the RWM.
7. **PLACE** all SPDS displays to the Critical Plant Variable display (#100).
8. **ENSURE** hard cards and flow charts are cleaned up
9. **TAKE** the SIMULATOR OUT OF FREEZE
10. **LOAD** Scenario File.
11. **ALIGN** the plant as follows:

Manipulation
Start the third condensate pump. Verify CRD pressure is within operating band of 260 – 275 psig.

12. **IF desired**, take a **SNAPSHOT** and save into an available IC for later use.
13. **PLACE** a clearance on the following equipment.

Component	Position
APRM 2 (blue tag)	Bypassed

14. **INSTALL** Protected Equipment signage and **UPDATE** RTGB placard as follows:
 - a. 2A / 2B NSW Pumps
15. **VERIFY** 0ENP 24.5 Form 2 (Immediate Power Reduction Form) for IC-25 is in place.
16. **ENSURE** each Implementing References listed in Section 7 is intact and free of marks.

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17. ENSURE all materials in the table below are in place and marked-up to the step identified.

Required Materials

18. ENSURE Station Duty Manager and Work Week Manager names are filled in on the Shift Turnover Sheet.

19. ADVANCE the recorders to prevent examinees from seeing relevant scenario details.

20. PROVIDE Shift Briefing sheet for the CRS.

21. VERIFY all actions contained in TAP-409, Miscellaneous Simulator Training Guidelines, Attachment 4, Simulator Training Instructor Checklist, are complete.

7.0 INTERVENTIONS

TRIGGERS

Trig	Type	ID
1	Annunciator	ZA411 - [DRYWELL EQUIP DRAIN SUMP LVL HI]
2	Annunciator	ZUA345 - [PROCESS RX BLDG VENT RAD HIGH]
2	Malfunction	RM004F - [RX. BLDG. VENT MON A FAILS UPSCL]
3	Malfunction	RC053F - [VFD A POWER CELL COMMUNICATION FAILURE]
4	Malfunction	CN012F - [MAIN COND 2A-S TUBE LEAK]
5	Remote Function	CF_IAHWRJM - [HW MAN CNTRL S.P. FOR REJECT (0.0:1.0)]
5	Remote Function	CF_IAHWRJC - [HOTWELL REJECT VLV CONTROLER]
6	Remote Function	CW_ZVCW016M - [CW-V16 CW V-16 A-S CW OUTLET VLV BRK]
7	Remote Function	CW_ZVCW177M - [CW-V177 CW V-177 A-S DEBR FIL VLV BRK]
7	Remote Function	CW_ZVCW177D - [CW-V177 CW V-177 A-S DEBR FIL VLV]
8	DI Override	K5624A - [RHR PMP ROOM VENT FAN B]
8	DI Override	K5624A - [RHR PMP ROOM VENT FAN B]
8	DI Override	K5623A - [RHR PMP RM VENT FAN A]
8	DI Override	K5623A - [RHR PMP RM VENT FAN A]
8	DI Override	K5623A - [RHR PMP RM VENT FAN A]
8	DI Override	K5624A - [RHR PMP ROOM VENT FAN B]
8	DO Override	Q5623DRG - [RHR PUMP RM VENT FAN A ON R]
8	DO Override	Q5623UGG - [RHR PUMP RM VENT FAN A OFF G]
8	Malfunction	RW013F - [RWCU BRK IN TRIANGLE ROOM 77']
8	Malfunction	RP005F - [AUTO SCRAM DEFEAT]
9	Remote Function	CF_CDDFAUTO - [CDD E VALVE AUTO/MANUAL]
9	Remote Function	CF_CDDEVLV - [CDD E VALVE CONTROL SWITCH]
9	Remote Function	CF_FCDDDMAN - [CDD E VALVE MANUAL DEMAND]
10	Trigger Command	did:k2115a
11	Trigger Command	did:k2116a
12	Trigger Command	did:k6101a
13	Remote Function	RW_ZVRW001M - [G31-F001 INBOARD ISOLATION VALVE]
14	Malfunction	RW017F - [BYPASS G31-F031 ON FLOW ORIFICE FROM RWC]
15	Annunciator	ZUA1214 - [SOUTH RHR RM FLOOD LEVEL HI-HI]

Trigger #	Trigger Text
10	K2115JBU - [DRYWELL EQUIP DR PUMP A]
11	K2116JBU - [DRYWELL EQUIP DR PUMP B]
12	K6101WOV - [SBGT SYS A]
13	K1314JCK - [RWCU VLV G31-F001]
14	K1410JCK - [RWCU VLV G31-F004]

MALFUNCTIONS

Malf ID	Mult ID	Description	Current Value	Target Value	Rmp time	Actime	Dactime	Trig
RM004F		RX. BLDG. VENT MON A FAILS UPSCL	False	True				2
RC053F	CELL A1	VFD A POWER CELL COMMUNICATION FAILURE	False	True				3
CN012F		MAIN COND 2A-S TUBE LEAK	0.00	100.00	01:00:00			4
RW013F		RWCU BRK IN TRIANGLE ROOM 77`	0.00	100.00	00:10:00			8
RW015F		G31-F001 FAILURE TO AUTO CLOSE	True	True				
RW016F		G31-F004 FAILURE TO AUTO CLOSE	True	True				
RW017F	G31-F004	REAC WTR CLEANUP * VLV G31-F004	False	True				14
RP005F		AUTO SCRAM DEFEAT	False	True				8
NI032F	APRM 2	APRM FAILS LO	True	True				

REMOTES

Remf Id	Mult Id	Description	Current Value	Target Value	Rmp time	Actime	Trig
CF_IHWRJC		HOTWELL REJECT VLV CONTROLER	MANUAL	MANUAL			5
CF_IHWRJM		HW MAN CNTRL S.P. FOR REJECT (0.0:1.0)	.1400	0			5
CF_CDDFAUTO	CDD A	CDD E VALVE AUTO/MANUAL	AUTO	MAN			9
CF_FCDDDMAN	CDD A	CDD E VALVE MANUAL DEMAND	61.9501	0	00:01:00	00:00:05	9
CF_CDDEVLV	CDD A	CDD E VALVE CONTROL SWITCH	AUTO *	CLOSE		00:01:05	9
CW_ZVCW016M		CW-V16 CW V-16 A-S CW OUTLET VLV BRK	ON	OFF			6
CW_ZVCW177D		CW-V177 CW V-177 A-S DEBR FIL VLV	NORMAL	OPEN			7
CW_ZVCW177M		CW-V177 CW V-177 A-S DEBR FIL VLV BRK	ON	OFF		00:00:01	7
RW_ZVRW001M		G31-F001 INBOARD ISOLATION VALVE	ON	OFF			13

PANEL OVERRIDES

Tag ID	Description	Position / Target	Actual Value	Override Value	Rmp time	Actime	Dactime	Trig
K2115A	DRYWELL EQUIP DR PUMP A	OUT	OFF	ON				
K2115A	DRYWELL EQUIP DR PUMP A	NORM	ON	OFF				
K2116A	DRYWELL EQUIP DR PUMP B	OUT	OFF	ON				
K2116A	DRYWELL EQUIP DR PUMP B	NORM	ON	OFF				
K6101A	SBGT SYS A CONT PUSH OFF	OFF	OFF	ON				
K5624A	RHR PMP ROOM VENT FAN B	AUTO	ON	OFF				8
K5624A	RHR PMP ROOM VENT FAN B	OFF	OFF	ON				8
K5624A	RHR PMP ROOM VENT FAN B	ON	OFF	OFF				8
K5623A	RHR PMP RM VENT FAN A	AUTO	ON	OFF		00:05:00		8
K5623A	RHR PMP RM VENT FAN A	OFF	OFF	ON		00:05:00		8
K5623A	RHR PMP RM VENT FAN A	ON	OFF	OFF		00:05:00		8
Q5623UGG	RHR PUMP RM VENT FAN A OFF G	ON/OFF	ON	OFF		00:05:00		8
Q5623DRG	RHR PUMP RM VENT FAN A ON R	ON/OFF	OFF	OFF		00:05:00		8
Q1512RRJ	ADS VLV B21-F013K RED	ON/OFF	OFF	OFF				
Q1507RRJ	ADS VLV B21-F013C RED	ON/OFF	OFF	OFF				
K1512A	AUTO DEPRESS VLV B21-F013K	AUTO	ON	OFF				
K1512A	AUTO DEPRESS VLV B21-F013K	OPEN	OFF	OFF				
K1507A	AUTO DEPRESS VLV B21-F013C	AUTO	ON	OFF				
K1507A	AUTO DEPRESS VLV B21-F013C	OPEN	OFF	OFF				
K3C17A	INCREASE	INCREASE	OFF	OFF				

ANNUNCIATOR OVERRIDES

Window	Description	Tagname	Override Type	OVal	AVal	Actime	Dactime	Trig
1-1	DRYWELL EQUIP DRAIN SUMP LVL HI	ZA411	ON	ON	OFF			1
1-4	SOUTH RHR RM FLOOD LEVEL HI-HI	ZUA1214	ON	ON	OFF			15
4-5	PROCESS RX BLDG VENT RAD HIGH	ZUA345	ON	ON	OFF	00:00:01		2

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8.0 OPERATOR RESPONSE AND INSTRUCTIONAL STRATEGIES

EVENT 1: RBV RAD MONITOR FAILURE	
Simulator Operator Actions	
	Ensure Monitored Parameters is open and Scenario Based Testing Variables are loaded.
	At the discretion of the lead evaluator, Initiate Trigger 2 to fail RBV Rad Monitor upscale.

Simulator Operator Role Play	
	If asked as I&C to investigate, acknowledge the request
	If asked for MSIV pit temperature report value from monitored parameters.

Evaluator Notes	
Plant Response:	Reactor Building Vent Radiation Monitor A will fail resulting in a Group 6 isolation, Secondary Containment isolation and SBGT initiation. SBGT A will fail to auto start requiring manual action.
Objectives:	SRO - Direct actions to start SBGT and isolate RBV. Determines TS Actions. RO - Recognize failure of auto action and start SBGT A.
Success Path:	SBGT A manually started and TS actions determined.
Event Termination:	Go to Event 2 at the discretion of the lead evaluator.

EVENT 1: RBV RAD MONITOR FAILURE

Time	Pos	EXPECTED Operator Response	Comments
	SRO	Conduct shift turnover shift briefing.	May perform Reactivity Management briefing utilizing 0ENP-24.5, Immediate Power Reduction Form.
	SRO	Acknowledge report of alarms for RBV Rad Monitor failure. UA-3, 3-5 - Process Rx Bldg Vent Rad Hi-Hi UA-3, 3-6 - Process Rx Bldg Vent Dnsc/Inop UA-3, 4-5 - Process Rx Bldg Vent Rad Hi UA-5, 4-6 – SBTG SYS A Failure UA-5, 6-7 – Rx Bldg Static Press Dif-Low UA-5, 6-10 – Rx Bldg Isolated UA-25,1-8 -Ctmt Atmos Rad Mon Dnsc/Inop Later: A-02, 5-7 – Stm Leak Det Ambient Temp High	
	SRO	Direct verification of auto actions for rad monitor failure. SBTG start. Direct failed auto action to be manually performed.	
	SRO	Direct I&C to investigate failure of vent rad monitor.	
	SRO	Determine Tech Specs: TS 3.3.6.2 Condition A1, place the channel in trip in 24 hours (Function 3). TS 3.3.6.1 Condition A1, place the channel in trip in 24 hours (Function 2d). TS 3.4.5 Condition B1, Analyze grab samples of primary containment atmosphere once every 12 hours and Condition TS 3.4.5 Condition B2, Restore required primary containment atmosphere radioactivity monitoring system to operable status in 30 days. TRM 3.4 Condition A, Restore required channel to operable status in 31 days. Condition B, Restore one required channel to operable status in 7 days. TS 3.6.4.3 Condition A, Restore SGT subsystem to operable status in 7 days	

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EVENT 1: RBV RAD MONITOR FAILURE

Time	Pos	EXPECTED Operator Response	Comments
	OATC	Monitors the plant	
	BOP	<p>Report annunciators for RBV Rad Monitor failure and review to APPs.</p> <p>UA-3, 3-5 - Process Rx Bldg Vent Rad Hi-Hi UA-3, 3-6 - Process Rx Bldg Vent Dnsc/Inop UA-3, 4-5 - Process Rx Bldg Vent Rad Hi UA-5, 4-6 – SBTG SYS A Failure UA-5, 6-7 – Rx Bldg Static Press Dif-Low UA-5, 6-10 – Rx Bldg Isolated UA-25,1-8 -Ctmt Atmos Rad Mon Dnsc/Inop Later: A-02, 5-7 – Stm Leak Det Ambient Temp High</p>	APP states to enter EOP-03, but if the cause is known (loss of power) this may not be entered.
	BOP	<p>Recognize and report failure of auto actions for rad monitor failure.</p> <p>SBGT start.</p> <p>Start SBTG System by placing the control switches in Start.</p>	
	BOP	Will establish cooling to the vital header by opening SW-V111 or SW-V117 valve. (IAW APP UA-5, 2-9 and 1-9 actions)	

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EVENT 2: DWEDT PUMP FAILURE	
Simulator Operator Actions	
NOTE	If the simulator is left in run the DWED Sump Lvl Hi Alarm will annunciate on its own after approximately 50 minutes. (The malfunctions will still work if it is allowed to annunciate)
	At the discretion of the lead evaluator, Initiate Trigger 1 to activate the DWED Sump Lvl Hi Annunciator.
	When either sump pump has been running for ~30 seconds delete malfunction for the DWED Sump Lvl Hi Annunciator.

Simulator Operator Role Play	
	Acknowledge requests as I&C for troubleshooting DWED Sump Pump auto start failure.

Evaluator Notes	
Plant Response: Annunciator A-04 (1-1), Drywell Equip Drain Sump Lvl Hi.	
Objectives: RO - Pump the DWEDT	
Success Path: Pumps the DEWDT.	
Event Termination: Go to Event 3 at the discretion of the lead evaluator.	

EVENT 2: TS / DWEDT PUMP FAILURE

Time	Pos	EXPECTED Operator Response	NOTES
	SRO	Direct actions of APPs Direct RO to start DWEDS, if asked	
		Direct I&C to investigate	
	OATC	Refer to APP: A-04 (1-1), Drywell Equip Drain Sump Lvl Hi	
	OATC	Diagnose failure of DWEDS Pump	
	OATC	Start a DWEDS Pump Verifies pump shuts off after a period of time.	
	BOP	Monitors the plant	

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EVENT 3: VFD A CELL FAILURE	
Simulator Operator Actions	
	At the discretion of the lead evaluator, Initiate Trigger 3 to activate VFD A Cell failure.

Simulator Operator Role Play	
	If requested as I&C to investigate, acknowledge the request
	If asked as Reactor Engineer for guidance on restoring Loop flow limits, ask the CRS for their recommendations, then concur with that recommendation.

Evaluator Notes	
Plant Response:	A power cell in VFD A will fail. Recirc Pump 2A speed will lower and a speed hold will initiate. Loop flows will be outside mismatch limits. The crew will respond per AOP-04.0, reset the speed hold and match loop flows or lower the speed of 2B to get within tech spec limits.
Objectives:	SRO - Direct Shift Response To A Recirculation Flow Control Failure Causing A Decreasing Flow Per AOP-04.0 RO - Respond To A Recirc Flow Control Failure Decreasing Per AOP-04.0
Success Path:	Reset the speed hold condition and match recirc loop flows.
Event Termination:	Go to Event 4 at the discretion of the lead evaluator.

EVENT 3: VFD A CELL FAILURE

Time	Pos	EXPECTED Operator Response	Comments
	SRO	Direct entry into AOP-04.0	
	SRO	With recirculation loops flows mismatched, enter LCO 3.4.1 Condition A. <u>TS 3.4.1 Condition A.1.</u> Satisfy the requirements of the LCO within 6 hours by restoring matched flows or impose limits specified by the LCO.	Declare the loop with lower flow not in operation
	SRO	Direct speed hold reset on VFD A	
	SRO	Direct loop flow mismatch restored to within limit	
	SRO	Direct I&C to investigate cell failure	
	BOP	Monitors the plant	
	BOP	Determine cause to be cell failure at HMI	
	OATC	Recognize/report lowering Recirc A speed/speed hold	
	OATC	Reference applicable APPs: A-06, 3-1, Recirc VFD A Alarm Unack. A-06, 4-5, Recirc A Only Out Of Serv.	
	OATC	Enter/announce 2AOP-04.0, Low Core Flow	
	OATC	Determine Loop flow outside mismatch limits	With core flow >57.5 Mlbs Jet Pump flows must be within 3 Mlbs.
	OATC	Reset speed hold on VFD A	2OP-02 Section 6.3.4
	OATC	Restore loop flows to within limits as directed by CRS	

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EVENT 4: CONDENSER TUBE LEAK	
Simulator Operator Actions	
	At the discretion of the lead evaluator, Initiate Trigger 4 to start condenser tube leak..
	If requested to secure reject to CST, Initiate Trigger 5 .
	If requested to secure a CDD, Initiate Trigger 9 to isolate A CDD.

Simulator Operator Role Play	
	If contacted as chemistry to sample reactor coolant and condensate, acknowledge the request.
	If contacted as Reactor Engineer for instructions on power reduction, ask the CRS for their recommendation and then concur with the recommendation.
	If requested as radwaste to secure reject to CST or isolate a CDD, acknowledge request and inform Sim Operator.
	If informed as plant management of chemistry conditions, acknowledge receipt of information.

Evaluator Notes	
Plant Response:	A tube leak will occur in the main condenser resulting in high conductivity alarms. The crew will respond per 0AOP-26.0 and remove the water box from service per 2OP-29.0. Power should be reduced to 53% for water box removal.
Objectives:	SRO - Direct Actions For High Reactor Coolant Or Condensate Conductivity Per AOP-26.0. RO - Respond To A High Reactor Coolant Or Condensate Conductivity Per AOP-26.
Success Path:	The crew will respond per AOP-26 and lower power to 53% and remove the waterbox from service.
Event Termination:	Go to Event 5 at the discretion of the lead evaluator.

EVENT 4: CONDENSER TUBE LEAK

Time	Pos	EXPECTED Operator Response	Comments
	SRO	Enter and direct activities of 0AOP-26.0 Direct power reduction to 53%.	
	SRO	May refer to TRM 3.13 for RCS chemistry limits	TRM 3.13 Conductivity <2.0 unhos/cm Chlorides <0.5 umhos/cm
	OATC	Monitors the plant	
	BOP	Acknowledge conductivity alarms. UA-4, 3-5 – Condenser A Hotwell Cndy High.	As the scenario progresses more conductivity alarms will annunciate until the waterbox is isolated.
	BOP	Enter and execute 0AOP-26.0.	
	BOP	Monitor reactor water, condensate, feedwater, and hotwell conductivity	
	BOP	Determine high conductivity is from A-S water box	
	BOP	Direct hotwell reject be secured.	

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EVENT 5/6: REACTOR POWER REDUCTION/WATER BOX REMOVAL	
Simulator Operator Actions	
	If requested to turn breaker off to CW-V16, Initiate Trigger 6.
	If requested to open flush valve CW-V177 and turn off breaker to flush valve Initiate Trigger 7.
	If asked to isolate a CDD, Initiate Trigger 9 for CDD Out of Service

Simulator Operator Role Play	
	<p>If asked to perform steps of 2OP-29 sect 8.9 or actions of 0AOP-26, coordinate actions with Sim Operator and proceed as follows:</p> <ul style="list-style-type: none"> <input type="checkbox"/> If asked to shutdown condenser waterbox air removal system report 2OP-29, Section 8.17 has been completed. <input type="checkbox"/> Inform CR cathodic protection is shutdown for condenser 2A. <input type="checkbox"/> Turn breaker off to CW-V16 (Step 5) wait 1 minute inform Sim Operator to perform action and then report complete <input type="checkbox"/> Open flush valve CW-V177 and turn off breaker to flush valve (steps 7 & 8) wait 1 minute and inform Sim Operator to perform action and then report complete. <input type="checkbox"/> If asked as Radwaste to isolate a CDD, wait 3 minutes and inform Sim Operator to perform action and then report complete. <input type="checkbox"/> If asked to close AR-V7 & V5, wait 10 min and report valves closed

Evaluator Notes	
Plant Response:	Conductivity rises and then turns as water box is isolated.
Objectives:	RO - Isolate A (Condenser) Waterbox Per OP-29.
Success Path:	2A-S waterbox removed from service.
Event Termination:	Go to Event 7 at the discretion of the lead evaluator.

EVENT 5/6: REACTOR POWER REDUCTION/WATER BOX REMOVAL

Time	Pos	EXPECTED Operator Response	Comments
	SRO	Direct 2A-S Water box isolated	
	SRO	Direct power be reduced to 53% to support water box removal	
	SRO	If condensate pump discharge conductivity exceeds 10 μ mho (2-CO-CR-3075), determine AI-81 action level 3 applies.	
	BOP	<p>Isolate the 2A-S water box per 0AOP-26.0 and 2OP-29, when power is reduced to 53%.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Direct Condenser Water Box Air Removal System shutdown IAW Section 8.17 <input type="checkbox"/> PLACE <i>CW ISOL VALVES MODE SELECTOR</i> in position C or B <input type="checkbox"/> Direct the A-S Tube Sheet Cathodic Protection System breaker in OFF. <input type="checkbox"/> Direct the Condenser 2A South, CW-V16 breaker, MCC 2TF Compt. CZ7 placed in OFF. <input type="checkbox"/> PLACE control switch for affected water box in MAN. <input type="checkbox"/> Close CONDENSER A-S INLET VALVE, CW-V12. <input type="checkbox"/> Direct flush valve CW-V177 opened and breaker to flush valve turned OFF. <input type="checkbox"/> Close HOTWELL OUTLET VLV, CO-V2, SJAEC RECIRC VLV, CO-V112, and LP FLASH TANK DRAIN VLV, HD-V54. <input type="checkbox"/> Close COND A-S OFFGAS OUTL VLV, OG-V4. 	
	OATC	<p>Reduce reactor power: IAW 0ENP-24.5:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Reduce reactor recirc to ~47 Mlbms/hr <input type="checkbox"/> Inserts control rods until power is <53%. 	May reduce flow by using the Manual Runback feature.

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EVENT 7: RWCU LEAK	
Simulator Operator Actions	
	At the discretion of the lead evaluator, Initiate Trigger 8 to activate the RWCU Leak.

Simulator Operator Role Play	
	If contacted as engineering, acknowledge request for EQ envelopes for the U2 Reactor Building.
	If HP's contacted to perform field surveys acknowledge the request.
	If directed to reset breakers for the RWCU isolation valves, wait 2 minutes and report HP has restricted access to the reactor building.

Evaluator Notes	
Plant Response:	A large un-isolable RWCU leak will occur. Crew will enter AOP-5.0 and SCCP. SRO should direct a SCRAM.
Objectives:	<p>SRO - Direct response to un-isolable primary system breach in secondary containment.</p> <p>RO - Respond to un-isolable primary system breach in secondary containment. Perform SCRAM actions.</p>
Success Path:	Reactor scram is inserted before max norm operating value is exceeded.
Event Termination:	When a reactor scram is inserted and SCCP entered.

EVENT 7: RWCU LEAK

Time	Pos	EXPECTED Operator Response	Comments
	SRO	Direct entry into AOP-5.0 High Radiation	
	SRO	Direct RO to trip and isolate RWCU.	
	SRO	<i>Direct a reactor manual scram prior to any area reaching its Max Safe Operating Value</i>	<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>
	SRO	May direct a cool down at normal cool down rates (<100°F/hr).	The bypass opening jack is failed, so the crew should use steam line drains instead of SRVs to establish the cooldown.
	SRO	Request EQ envelopes for the U2 Rx Bldg	
	SRO	Enter and execute RVCP. <ul style="list-style-type: none"> <input type="checkbox"/> Direct RO/BOP to stabilize reactor pressure below 1050 psig. <input type="checkbox"/> Verify Instrument operability per Caution 1. <ul style="list-style-type: none"> <input type="checkbox"/> Direct crew to not use N026A/B due to 50' temperatures after 50' alarm reported. <input type="checkbox"/> Direct verification of group isolations, ECCS initiations and DG starts as appropriate. <input type="checkbox"/> Direct RO/BOP to restore and maintain reactor water level 170"-200" using systems available in Table 1. 	Table 1 systems are Condensate/Feedwater, CRD, RCIC, HPCI, Core Spray, and LPCI.
	SRO	Contact I/C for assistance with RWCU isolation valve failures	
	SRO	May enter RRCP due to Rx Bldg Diff Press low (Unmonitored release)	

EVENT 7: RWCU LEAK

Time	Pos	EXPECTED Operator Response	Comments
	RO BOP	Enter and execute AOP-5.0 High Radiation. <input type="checkbox"/> Diagnose source of radiation as RWCU leak. <input type="checkbox"/> Trip RWCU Pumps <input type="checkbox"/> May close G31-F042 valve. <input type="checkbox"/> Recognize RWCU isolation valve failures and report to SRO. <input type="checkbox"/> (F001 – Breaker trip) <input type="checkbox"/> (F004 – Overload trip)	
	OATC	<i>Insert Reactor scram as directed by SRO.</i> Complete scram actions <input type="checkbox"/> After steam flow is less than 3 x 10 ⁶ lb/hr, PLACE the reactor mode switch to SHUTDOWN. <input type="checkbox"/> IF reactor power is below 2% (APRM downscale trip), THEN TRIP the main turbine. <input type="checkbox"/> ENSURE the master reactor level controller setpoint is +170". <input type="checkbox"/> IF two reactor feed pumps are running, AND reactor vessel level is above 160" AND rising, THEN TRIP one.	<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>

EVENT 7: RWCU LEAK

Time	Pos	EXPECTED Operator Response	Comments
	BOP	<p>Respond to alarm UA-03, 2-7 Area Rad Rx Bldg Hi.</p> <p>Enter and execute AOP-5.0.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Evacuate Unit 2 Reactor Bldg. <input type="checkbox"/> Direct AO to close PIV-33 RB Sprinkler Shutoff Valve. <input type="checkbox"/> Direct E&RC to take applicable AOP-5.0 actions. <input type="checkbox"/> Check area radiation readings at back panels. <input type="checkbox"/> Diagnose source of radiation as RWCU leak. 	
	RO BOP	Recognize and report to CRS alarm A-2 RB 50/20 ft Temp Hi.	
	RO BOP	<p>Maintain reactor pressure with SRVs as directed by SRO.</p> <p>If directed to establish a cooldown, will recognize failure of the bypass opening jack.</p> <p>Establish cooldown using the Main Steam Line Drains IAW with Hard Card.</p>	See Enclosure 3 for MSL drains Hard Card
	RO BOP	Maintain reactor water level as directed by SRO.	Aligns SULCV per hard card (OP-32, Attachment 6) See Enclosure 1.
	RO BOP	Continue reactor cool down as directed by SRO.	

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EVENT 8: ED / TERMINATION	
Simulator Operator Actions	
	2 minutes after receiving Annunciator UA-12 (2-4) SOUTH RHR RM FLOOD HI, Initiate TRIGGER 15 (South RHR RM Flood HI-HI)
	When directed by the lead evaluator, place the simulator in FREEZE
	DO NOT RESET THE SIMULATOR PRIOR TO RECEIPT OF CONCURRENCE TO DO SO FROM THE LEAD EXAMINER

Simulator Operator Role Play	

Evaluator Notes	
Plant Response:	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#.
Objectives:	SRO - Evaluate plant conditions and direct an Emergency Depressurization. RO - Performs actions for Emergency Depressurization.
Success Path:	ED has been performed.
Scenario Termination:	<i>When emergency depressurization has been performed and the reactor has been depressurized to <100 psig the scenario may be terminated.</i> Remind students not to erase any charts and not to discuss the scenario until told to do so by the evaluator/instructor.

EVENT 8: ED / TERMINATION

Time	Pos	EXPECTED Operator Response	Comments
	SRO	Continue reactor cooldown per SCCP direction.	
	SRO	<i>Direct Emergency Depressurization when RHR RM FLOOD LEVEL HI-HI alarm (Two plant areas with water levels above Max Safe – South CS and RHR)</i>	<i>Critical Task - Perform Emergency Depressurization when two plant areas exceed max safe water level.</i>
	SRO	Direct RO/BOP to open 7 ADS valves.	
	SRO	If informed by RO/BOP that 2 SRVs failed to open, direct opening additional SRVs until 7 SRVs are open.	
	SRO	Enter PCCP when torus temperature exceeds 95°F. Directs all available loops to be placed in suppression pool cooling.	
	RO BOP	Recognize and report failure of RHR Room coolers. S RHR will not start. N RHR will trip 5 min after the leak started.	
	RO BOP	Recognize and report South CS and South RHR Room Flood Hi-Hi alarms.	
	RO BOP	<i>Open seven ADS valves as directed by SRO.</i>	<i>Critical Task - Perform Emergency Depressurization when two plant areas exceed max safe water level.</i>
	RO BOP	Recognize failure of 2 ADS valves to OPEN and report to SRO.	SRVs C and K fail to open
	RO BOP	Open 2 additional SRVs as directed by SRO.	
	RO BOP	Maintain reactor water level as directed by SRO.	Should use condensate system via SULCV.
	RO BOP	Place available loops in suppression Pool Cooling IAW hard card.	See Enclosure 2 for SPC Hard Card actions.

Enclosure 1

Page 1 of 2

Feedwater Level Control Following a Reactor Scram**NOTE** This attachment is **NOT** to be used for routine system operation.

1. **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 ☐
2. **PLACE** the MSTR RFPT SP/RX LVL CTL in M (MANUAL), **THEN:**
 - **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 ☐

Enclosure 1

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. **ENSURE** MAN/DFCS control switch in DFCS ☐
- 6. **RAISE** RFPT A(B) SP CTL speed until discharge pressure is greater than or equal to 100 psig above reactor pressure ☐
- 7. **ADJUST** SULCV to establish desired injection ☐
- 8. **IF** desired, **THEN PLACE** SULCV in A (AUTO) ☐
- 9. **IF** needed, **THEN THROTTLE** FW-V120 ☐
- 10. **IF** needed, **THEN GO TO** 2OP-32 Section 8.17 for level control ☐

Enclosure 2**Page 1 of 2****Emergency Suppression Pool Cooling Using Loop A (2OP-17)**

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

START RHR SW A LOOP (CONV)

OPEN SW-V101 ☐

CLOSE SW-V143 ☐

START CSW PUMPS AS NEEDED ☐

IF LOCA SIGNAL IS PRESENT THEN ☐

PLACE RHR SW BOOSTER PUMPS
A & C LOCA OVERRIDE SWITCH
TO MANUAL OVERRIDE

START RHR SW PMP ☐

ADJUST E11-PDV-F068A ☐

ESTABLISH CLG WTR TO VITAL HDR ☐

START ADDITIONAL RHR SW PUMP
AND ADJUST FLOW AS NEEDED ☐

START RHR SW A LOOP (NUC)

OPEN SW-V105 ☐

OPEN SW-V102 ☐

CLOSE SW-V143 ☐

START PUMPS ON NSW HDR AS NEEDED ☐

IF LOCA SIGNAL IS PRESENT THEN ☐

PLACE RHR SW BOOSTER PUMPS A & C LOCA
OVERRIDE SWITCH TO MANUAL OVERRIDE

START RHR SW PMP ☐

ADJUST E11-PDV-F068A ☐

ESTABLISH CLG WTR TO VITAL HDR ☐

START ADDITIONAL RHR SW PUMP
AND ADJUST FLOW AS NEEDED ☐

START RHR LOOP A

IF LOCA SIGNAL IS PRESENT, THEN
VERIFY SPRAY LOGIC IS MADE UP ☐

IF E11-F015A IS OPEN, THEN
CLOSE E11-F017A ☐

START LOOP A RHR PMP ☐

OPEN E11-F028A ☐

THROTTLE E11-F024A ☐

THROTTLE E11-F048A ☐

START ADDITIONAL LOOP A RHR PMP
AND ADJUST FLOW AS NEEDED ☐

Enclosure 2**Page 1 of 2****Emergency Suppression Pool Cooling Using Loop B (2OP-17)****NOTE:** This attachment is NOT to be used for normal system operations.**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 ☐
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 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

IF LOCA SIGNAL IS PRESENT, THEN ☐
VERIFY SPRAY LOGIC IS MADE UP
IF E11-F015B IS OPEN, THEN ☐
CLOSE E11-F017B
START LOOP B RHR PMP ☐
OPEN E11-F028B ☐
THROTTLE E11-F024B ☐
THROTTLE E11-F048B ☐
START ADDITIONAL LOOP B RHR PMP ☐
AND ADJUST FLOW AS NEEDED

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Enclosure 3**Page 1 of 1****RPV Pressure Control Using the Main Steam Line Drains****Utilizing Drains “Up-Stream” of MSIVs**

- OPEN MAIN STEAM LINE DRAIN OTBD ISOL VLVS, B21-F019** ☐
- OPEN MAIN STEAM LINE DRAIN INBD ISOL VLVS, B21-F016** ☐
- THROTTLE MAIN STEAM LINE DRAIN VLV, MVD-F021 as desired.** ☐

Utilizing Drains “Down-Stream” of MSIVs

- OPEN MAIN STEAM LINE DRAIN VLV, MS-F020.** ☐
- OPEN MAIN STEAM LINE DRAIN VLV(S) on unisolated main steam lines,** ☐
MS-F038A ☐ F038B ☐ F038C ☐ F038D ☐.
- THROTTLE MAIN STEAM LINE DRAIN VLV, MVD-F021 as desired.** ☐
- THROTTLE OR OPEN** the following valves **OR** combination of valves as necessary to control pressure:
- *MN STM LN BEFORE SV DRNS,* ☐
MS-V46 ☐ V47 ☐ V48 ☐ V49 ☐
 - *MN STM TO BPV CHEST DRN VLV, MS-V35* ☐
 - *MN STM SPLY MSR RFP SJAE, MS-V28* ☐
AND DRN VLV, MS-V45
 - *MN STM SPLY MSR RFP SJAE, MS-V28* ☐
AND STM TO EAST MSR DRAIN VLV, MS-V43
 - *MN STM SPLY MSR RFP SJAE, MS-V28* ☐
AND STM TO WEST MSR DRAIN VLV, MS-V44

ATTACHMENT 1 - Scenario Quantitative Attribute Assessment

Category	NUREG 1021 Rev. 2 Supp. 1 Req.	Scenario Content
Total Malfunctions	5-8	9
Malfunctions after EOP Entry	1-2	3
Abnormal Events	2-4	2
Major Transients	1-2	2
EOPs Used	1-2	1
EOP Contingency	0-2	1
Run Time	60-90 min	90
Crew Critical Tasks	2-3	2
Tech Specs	2	2
Instrument / Component Failures before Major	2 – OATC 2 - BOP	4
Instrument / Component Failures after Major	2	3
Normal Operations	1	1
Reactivity manipulation	1	1

ATTACHMENT 2 – Shift Turnover

Brunswick Unit 2 Plant Status					
Station Duty Manager:				Workweek Manager:	
Mode:	1	Rx Power:	95%	Gross*/Net MWe*:	935 / 909
Plant Risk: Current EOOS Risk Assessment is:	Green				
SFP Time to 200 Deg F:	128.7 hrs			Days Online:	142 days
Turnover:	Feedwater Temperature Reduction will be implemented this weekend				
Protected Equipment:	2A / 2B NSW Pumps				
Comments:	APRM 2 has failed downscale and is bypassed. 1A NSW pump is under clearance for motor rebuild				

Action Statements in Effect					
Item	Date/Time	Reference	Required Actions	Responsibility	Due



BRUNSWICK TRAINING SECTION
OPERATIONS TRAINING
INITIAL LICENSED OPERATOR
SIMULATOR EVALUATION GUIDE

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2014 NRC SCENARIO 2

BOP Bus Transfer, ADHR Pump Trip, HPCI Logic failure, Raise Power, Master level controller failure, AOG Fire, LOOP / LOCA, DG Failures, RHR Vlv Failure, ED (level)

REVISION 0

Developer: Robert Bolin	Date: 7/18/2014
Technical Review: Lou Sosler	Date: 7/18/2014
Validator: Derek Pickett	Date: 7/18/2014
Validator: Bruce Leitch	Date: 7/18/2014
Facility Representative: Jerry Pierce	Date: 8/15/2014

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REVISION SUMMARY	
0	Scenario developed for 2014 Exams.

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2.0	SCENARIO DESCRIPTION SUMMARY	5
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	ATTACHMENT 1 - Scenario Quantitative Attribute Assessment.....	47
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1.0 SCENARIO OUTLINE

Event	Malf. No.	Type*	Event Description
0		SRO	N004A failing downscale (TS)
1		N - BOP	BOP Bus Transfer
2	K4526A	C-BOP	ADHR Pump Trip (AOP)
3	ES013F	C-RO	HPCI Logic failure (TS)
4		R - RO	Raise Power
5	K2811A	C-RO	Master Controller Failure (AOP)
6	CN017F	C-BOP	AOG Guard Bed Fire
7	EE009F	M C	LOOP DG Failures
8	NB002F	M C	LOCA / ED RHR Inj Vlv Failure
*(N)ormal, (R)eactivity, (C)omponent or Instrument, (M)ajor			

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2.0 SCENARIO DESCRIPTION SUMMARY

Event	Description
0	The SRO will make a determination of the TS actions for a failure of the C32-LT-N004A failing downscale. (TS 3.3.2.2 – 7 day LCO to place in a trip condition)
1	The crew will transfer BOP 2C and 2D Buses from the SAT to the UAT per OP-50
2	The running ADHR Secondary Loop Pump (RCC Pump D) will trip. The crew will have to start RCC Pump C. Shutdown RCC Pump A. Re-align RCC Pump A for ADHR mode and then start the pump for ADHR. (AOP-38.1 will be entered.
3	The HPCI logic power fuse will blow requiring HPCI to be manually isolated per the APP and declared Inoperable per TS 3.5.1, Condition D.
4	Raise reactor power to ~60% using reactor recirculation flow
5	The master level controller will fail. The crew should either place the master controller in manual, the reactor feed pump controller in manual or place DFCS in manual to control level. (AOP-23)
6	An AOG off gas fire will occur in the guard bed. High temperatures will quickly spread into the charcoal absorber beds. The APPs require bypassing and isolating the AOG system, and initiating a nitrogen purge
7	A Loss of Offsite Power will occur. The crew will respond per 0AOP-36.1. 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. (AOP-36.1)
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. Level will lower until Emergency Depressurization is required. ADS auto blowdown will not occur. 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.

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3.0 CREW CRITICAL TASKS

Description
Close DG4 output breaker to energize E4.
Emergency Depressurize the reactor when level cannot be maintained above LL4.

4.0 TERMINATION CRITERIA

When the reactor is depressurized and level is being restored to 170-200 inches the scenario may be terminated.

5.0 IMPLEMENTING REFERENCES

NOTE: Refer to the most current revision of each Implementing Reference.

Number	Title
UA-01, 3-3	ADHR Secondary Trouble
A-01, 5-5	HPCI Logic Bus A Pwr Failure
A-01, 6-4	HPCI Cond Storage Tnk Wtr Lvl Lo
UA-48, 3-3	Guard Bed D1 Temperature High
0AOP-17.0	Turbine Building Closed Cooling Water System Failure
0AOP-36.1	Loss of Any 4160v Buses or 480v E-Buses
0AOP-38.1	Loss of Supplemental Spent Fuel Pool Cooling
2OP-21, Section 8.9	Transferring to the Standby RBCCW Pump
2OP-21, Section 8.20	Starting an RBCCW Pump - ADHR Mode
2OP-13.1, Section 5.1.2	ADHR Primary Loop System Operation
2OP-32, Section 8.4	Transfer of Feedwater Level Select Switch
2OP-33, Section 6.2.1	AOG Charcoal Adsorber System Shutdown
2OP-33, Section 6.3.4	Purging Charcoal Guard Bed With Nitrogen
2OP-33, Section 6.3.6	Bypassing The AOG Charcoal Adsorber System
2OP-50, Section 6.1.6	Transferring Auxiliary Power From The SAT To The UAT

6.0 SETUP INSTRUCTIONS

1. **PERFORM** TAP-409, Miscellaneous Simulator Training Guidelines, Attachment 5, Checklist for Simulator Exam Security.
2. **RESET** the Simulator to IC-9.
3. **ENSURE** the RWM is set up as required for the selected IC.
4. **ENSURE** appropriate keys have blanks in switches.
5. **RESET** alarms on SJAE, MSL, and RWM NUMACs.
6. **ENSURE** no rods are bypassed in the RWM.
7. **PLACE** all SPDS displays to the Critical Plant Variable display (#100).
8. **ENSURE** hard cards and flow charts are cleaned up
9. **TAKE** the SIMULATOR OUT OF FREEZE
10. **LOAD** Scenario File.
11. **ALIGN** the plant as follows:

Manipulation
<ol style="list-style-type: none"> 1. Lower power to ~54%. 2. Place 2C & D BOP Buses on the SAT. 3. Ensure RCC Pumps A&B are running, C S/D and D lined up for ADHR. 4. Bypass APRM 2. 5. Verify GAFs are ≤ 1.0. 6. Null the DVM

12. **IF desired**, take a **SNAPSHOT** and save into an available IC for later use.
13. **PLACE** a clearance on the following equipment.

Component	Position
APRM 2 (blue tag)	Bypassed

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14. INSTALL Protected Equipment signage and **UPDATE** RTGB placard as follows:

- a. All NSW Pumps
- b. ADHR / FPC Pumps
- c. Demin Transfer Pumps

15. VERIFY 0ENP 24.5 Form 2 (Immediate Power Reduction Form) for IC-9 is in place.

16. ENSURE each Implementing References listed in Section 7 is intact and free of marks.

17. ENSURE all materials in the table below are in place and marked-up to the step identified.

Required Materials

18. ENSURE Station Duty Manager and Work Week Manager names are filled in on the Shift Turnover Sheet.

19. ADVANCE the recorders to prevent examinees from seeing relevant scenario details.

20. PROVIDE Shift Briefing sheet for the CRS.

21. VERIFY all actions contained in TAP-409, Miscellaneous Simulator Training Guidelines, Attachment 4, Simulator Training Instructor Checklist, are complete.

7.0 INTERVENTIONS

TRIGGERS

Trig	Type	ID
1	DI Override	K2811A - [MASTER A/M]
2	DI Override	K4526A - [RBCCW PMP D AUTO]
2	DI Override	K4526A - [RBCCW PMP D AUTO]
2	DI Override	K4526A - [RBCCW PMP D AUTO]
2	DO Override	Q4526AMW - [RBCCW PMP D ADHR MODE]
2	DO Override	Q4526LG4 - [RBCCW PMP D OFF G]
3	Remote Function	CC_MODE - [RBCCW/ADHR VALVE LINEUPS]
3	Remote Function	CC_MODE - [RBCCW/ADHR VALVE LINEUPS]
3	Remote Function	CC_MSS - [RBCCW/ADHR PUMP MODE SELECTOR SWITCH]
4	Malfunction	ES014F - [INADVERTANT HPCI SYS INITIATION]
4	Malfunction	ES013F - [HPCI LOGIC BUS A AUTO START FAILS]
7	Malfunction	CN017F - [AOG GUARD BED FIRE]
8	Remote Function	XA_IALPB102 - [AOG-XCV-102 LOCAL]
9	Remote Function	XA_IALPB142 - [AOG-XCV-142 LOCAL]
9	Remote Function	XA_IALPB148 - [AOG-XCV-148 LOCAL]
9	Remote Function	XA_IALPB147 - [AOG-XCV-147 LOCAL]
9	Remote Function	XA_IALPB141 - [AOG-XCV-141 LOCAL]
9	Remote Function	XA_IALPB143 - [AOG-XCV-143 LOCAL]
10	Malfunction	EE009F - [LOSS OF OFF-SITE POWER]
11	Remote Function	SW_VHSW146L - [CONV SW TO RBCCW HXS V146]
12	Malfunction	NB002F - [RECIRC PUMP SUCTION LINE RUPTURE]
13	Remote Function	RD_RDSUCTB - [SUCTION FILTER BYPASS VLV CO-V306]
14	Remote Function	SL_IASLCTST - [SLC SUCT. LINEUP (NORM=SLC TNK / ALT=JUMPER HOSE)]
15	Remote Function	EP_IACS994P - [DW CLR B & C OVERRIDE - NORMAL/STOP]
15	Remote Function	EP_IACS993P - [DW CLR A & D OVERRIDE - NORMAL/STOP]
16	Remote Function	EP_IAEOPJP2 - [DEFEAT RCIC LOW PRESS ISOL (SEP-10)]
17	Remote Function	XA_VHNPV80L - [PURGE NITROGEN TO AOG NP-V80]
18	Remote Function	RP_IAEPAMGA - [RPS M-G SET A EPA BKRS]
18	Remote Function	RP_IARPSA - [RESTART RPS MG SET A]
18	Remote Function	RP_IAEPAALT - [RPS ALT EPA BKRS]
19	Remote Function	RP_IAEPAMGB - [RPS M-G SET B EPA BKRS]
19	Remote Function	RP_IARPSB - [RESTART RPS MG SET B]
20	Remote Function	ED_ZIEDHX0 - [PNL 32AB PWR (E7=NORM/E8=ALT)]
20	Remote Function	ED_ZIEDH11 - [PNL 2AB-RX PWR (E7=NORM/E8=ALT)]
20	Remote Function	ED_ZIEDH08 - [PNL 2AB PWR (E7=NORM/E8=ALT)]

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Trigger	Trigger Text
5	!Q1123RRL - Not [TORUS SUCT VLV E41-F041 RED]
6	!Q1124RRL - Not [TORUS SUCT VLV E41-F042 RED]

MALFUNCTIONS

Malf ID	Mult ID	Description	Current Value	Target Value	Rmp time	Actime	Dactime	Trig
NI032F	APRM 2	APRM FAILS LO	True	True				
NB007F		RX LVL TRANSMITTER C32-N004A FAILS	62.36347	0.00				
DG006F	DG 4	DG OUTPUT BREAKER FAIL TO AUTO CLOSE	True	True				
DG026F		DG3 DIFFERENTIAL FAULT	True	True				
ES013F		HPCI LOGIC BUS A AUTO START FAILS	False	True				4
ES014F		INADVERTANT HPCI SYS INITIATION	False	True				4
CN017F		AOG GUARD BED FIRE	False	True				7
EE009F		LOSS OF OFF-SITE POWER	False	True				10
RH002F		RHR INJ VLV F015B STUCK CLOSED	True	True				
NB002F	A	RECIRC PUMP SUCTION LINE RUPTURE	0.00	5.00	00:10:00			12

ANNUCIATOR OVERRIDES

Window	Description	Tagname	Override Type	OVal	AVal	Actime	Dactime	Trig

PANEL OVERRIDES

Tag ID	Description	Position / Target	Actual Value	Override Value	Rmp time	Actime	Dactime	Trig
K4526A	RBCCW PUMP D OFF	OFF/RESEST	OFF	ON				2
K4526A	RBCCW PMP D AUTO	AUTO	OFF	OFF				2
K4526A	RBCCW PMP D ON	ON	ON	OFF				2
Q4526AMW	RBCCW PMP D ADHR MODE	ON/OFF	ON	OFF				2
Q4526LG4	RBCCW PMP D OFF G	ON/OFF	OFF	OFF				2
K1H01A	ADS TIMER	RESET	OFF	ON				
K1H02A	ADS TIMER	RESET	OFF	ON				
K2811A	MASTER A/M	A	OFF	OFF				1

REMOTES

Remf Id	Mult Id	Description	Current Value	Target Value	Rmp time	Actime	Trig
ED_ZIEDH08		PNL 2AB PWR (E7=NORM/E8=ALT)	NORMAL	ALT		00:00:30	20
CC_MODE	PUMP-A	RBCCW/ADHR VALVE LINEUPS	RBCCW	ADHR			3
CC_MSS	A	RBCCW/ADHR PUMP MODE SELECTOR SWITCH	RBCCW	ADHR		00:00:05	3
HP_ZVHP041M		SUPP SUCTION VLV E41-F041	ON	ON			
CC_MODE	PUMP-D	RBCCW/ADHR VALVE LINEUPS	ADHR	RBCCW			3
HP_ZVHP042M		TORUS SUCTION VLV E41-F042	ON	ON			
XA_IALPB102		AOG-XCV-102 LOCAL	AUTO	OPEN			8
XA_IALPB147		AOG-XCV-147 LOCAL	OPEN	CLOSE			9
XA_IALPB148		AOG-XCV-148 LOCAL	OPEN	CLOSE		00:00:01	9
XA_IALPB143		AOG-XCV-143 LOCAL	OPEN	CLOSE		00:00:02	9
XA_IALPB141		AOG-XCV-141 LOCAL	OPEN	CLOSE		00:00:03	9
XA_IALPB142		AOG-XCV-142 LOCAL	OPEN	CLOSE		00:00:04	9
XA_VHNPV80L		PURGE NITROGEN TO AOG NP-V80	SHUT	OPEN			17
SW_VHSW146L		CONV SW TO RBCCW HXS V146	SHUT	OPEN			11
RP_IARPSA		RESTART RPS MG SET A	NORMAL	RESET			18
RP_IARPSB		RESTART RPS MG SET B	NORMAL	RESET			19
RP_IAEPAMGA		RPS M-G SET A EPA BKRS	SET	SET		00:00:05	18
RP_IAEPAMGB		RPS M-G SET B EPA BKRS	SET	SET		00:00:05	19
RP_IAEPAALT		RPS ALT EPA BKRS	SET	SET		00:00:10	18
RD_RDSUCTB		SUCTION FILTER BYPASS VLV CO-V306	CLOSE	OPEN			13
SL_IASLCTST		SLC SUCT. LINEUP (NORM=SLC TNK / ALT=JUMPER HOSE)	NORMAL	ALT			14
EP_IACS993P		DW CLR A & D OVERRIDE - NORMAL/STOP	NORMAL	STOP			15
EP_IACS994P		DW CLR B & C OVERRIDE - NORMAL/STOP	NORMAL	STOP			15
EP_IAEOPJP2		DEFEAT RCIC LOW PRESS ISOL (SEP-10)	OFF	ON			16
ED_ZIEDHX0		PNL 32AB PWR (E7=NORM/E8=ALT)	NORMAL	ALT		00:01:30	20
ED_ZIEDH11		PNL 2AB-RX PWR (E7=NORM/E8=ALT)	NORMAL	ALT		00:02:30	20

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8.0 OPERATOR RESPONSE AND INSTRUCTIONAL STRATEGIES

EVENT 0: C32-N004A TS DETERMINATION	
Simulator Operator Actions	
	Ensure Monitored Parameters is open and Scenario Based Testing Variables are loaded.

Simulator Operator Role Play	

Evaluator Notes	
Plant Response:	Remains stable.
Objectives:	SRO - Determine actions required for LCO per Technical Specifications
Success Path:	Determine TS actions.
Event Termination:	Go to Event 1 at the discretion of the lead evaluator.

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EVENT 0: C32-N004A TS DETERMINATION			
Time	Pos	EXPECTED Operator Response	Comments
	SRO	Performs TS Assessment: LCO 3.3.2.2 <u>Condition A</u> One feedwater and main turbine high water level trip channel inoperable. <u>Required Action</u> A.1 Place channel in trip within 7 days.	
	OATC	Plant Monitoring	
	BOP	Plant Monitoring	

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EVENT 1: TRANSFER BOP BUSES	
Simulator Operator Actions	

Simulator Operator Role Play	

Evaluator Notes	
Plant Response: BOP Bus C & D are transferred from the SAT to the UAT.	
Objectives: RO - Transfers BOP Buses to the UAT	
Success Path: BOP Bus C & D is transferred from the SAT to the UAT.	
Event Termination: Go to Event 2 at the discretion of the lead evaluator.	

EVENT 1: TRANSFER BOP BUSES

Time	Pos	EXPECTED Operator Response	NOTES
	SRO	Conduct shift turnover shift briefing.	May perform Reactivity Management briefing utilizing 0ENP-24.5, Immediate Power Reduction Form.
		Direct BOP Bus 2C & 2D to be transferred to the UAT per OP-50	
	OATC	Monitors the plant	
	BOP	Transfer BOP Bus 2C to the UAT per OP-50 <ul style="list-style-type: none"> <input type="checkbox"/> Place UAT To Bus 2D Synchronizing Switch in ON. <input type="checkbox"/> Confirm Synchroscope is at the "12 o'clock" position, and close AD6 (UAT To Bus 2D Breaker) <input type="checkbox"/> Confirm AD6 (UAT To Bus 2D Breaker) has CLOSED using the breaker indicating lights <input type="checkbox"/> Confirm AD4 (SAT To Bus 2D Breaker) has opened using the breaker indicating lights <input type="checkbox"/> Place UAT To Bus 2D Synchronizing Switch in OFF. <input type="checkbox"/> Place UAT To Bus 2C Synchronizing Switch in ON. <input type="checkbox"/> Confirm Synchroscope is at the "12 o'clock" position, and close AC4 (UAT To Bus 2C Breaker). <input type="checkbox"/> Confirm AC4 (UAT To Bus 2C Breaker) has CLOSED using the breaker indicating lights. <input type="checkbox"/> Confirm AC6 (SAT To Bus 2C Breaker) has OPENED using the breaker indicating lights. <input type="checkbox"/> Place UAT To Bus 2C Synchronizing Switch in OFF 	

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EVENT 2: ADHR PUMP TRIP	
Simulator Operator Actions	
	At the discretion of the lead evaluator, Initiate Trigger 2 to trip the 2D ADHR Pump.
	When directed to perform RCC Pump A alignment for ADHR Mode Initiate Trigger 3 .

Simulator Operator Role Play	
	If contacted to perform valve lineup to place RCC Pump A in ADHR Mode, wait 3 minutes, have Sim Operator initiate trigger 3 and then report actions complete.
	If contacted as AO to investigate RCC Pump Trip, report that the pump has tripped on overcurrent.
	If contacted as I/C to investigate RCC Pump Trip, acknowledge the request.

Evaluator Notes	
Plant Response: The running ADHR Secondary Loop Pump (RCC Pump D) will trip. The crew will have to start RCC Pump C. Shutdown RCC Pump A. Re-align RCC Pump A for ADHR mode and then start the pump for ADHR. (AOP-38.1 will be entered).	
Objectives:	<p>SRO – Direct swapping of RCC pumps and then direct starting of RCC Pump in ADHR Mode.</p> <p>RO – Swap RCC pumps, Place RCC Pump in ADHR Mode.</p>
Success Path: Standby ADHR Pump placed in service.	
Event Termination: Go to Event 3 at the discretion of the lead evaluator.	

EVENT 2: ADHR PUMP TRIP

Time	Pos	EXPECTED Operator Response	Comments
	SRO	Acknowledge report of annunciator: UA-01 (3-3) ADHR SECONDARY TROUBLE	
	SRO	Direct entry into AOP-38.1	
	SRO	Direct I/C to investigate trip of RCC Pump D	
	SRO	Direct: RCC Pump 2C started. RCC Pump 2A shutdown. RCC Pump 2A lined up into ADHR Mode. RCC Pump 2A started in ADHR Mode.	
	OATC	Monitors the plant	
	BOP	Acknowledges annunciator: UA-01 (3-3) ADHR SECONDARY TROUBLE <input type="checkbox"/> Secure all ADHR primary pumps. <input type="checkbox"/> Acknowledges UA-01 (2-3), ADHR PRIMARY TROUBLE <input type="checkbox"/> Enter 0AOP-38.1, Loss of Supplemental Spent Fuel Pool Cooling.	
	BOP	Recognizes failure of RCC Pump 2D.	
	BOP	May dispatch an AO to investigate the pump trip.	
	BOP	Swaps RCC Pumps <input type="checkbox"/> Starts RCC Pump 2C. <input type="checkbox"/> Shutdowns RCC Pump 2A.	2OP-21 Section 8.9
	BOP	Directs AO to align RCC Pump 2A for ADHR Mode.	
	BOP	Starts RCC Pump 2A in ADHR Mode.	2OP-21 Section 8.20
	BOP	Starts ADHR primary loop pump	2OP-13.1 Section 5.1.2

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EVENT 3: HPCI LOGIC FAILURE	
Simulator Operator Actions	
	At the discretion of the lead evaluator, Initiate Trigger 4 to de-energize the HPCI logic.
	If requested to open breakers for E41-F041 and F042 (MCC 2XDA) when valves are shut: <ul style="list-style-type: none"> <input type="checkbox"/> Change HP_ZVHP041M, SUPP SUCTION VLV E41-F041 to Off and assign to trigger 5. <input type="checkbox"/> Change HP_ZVHP042M, SUPP SUCTION VLV E41-F042 to Off and assign to trigger 6.

Simulator Operator Role Play	
	If asked as AO to investigate, report all circuit breakers in DC SWBD 2A & Panel 4A are closed.
	If asked as I&C to investigate, wait 2 minutes and report fuse E41-F1 in panel P620 is blown (blows again if replaced).
	If asked as WCC/OC SRO for clearance or Equipment Control tags, acknowledge request.
	If requested to open breakers for E41-F041 and F042 (MCC 2XDA) when valves are shut, coordinate actions with Sim Operator.

Evaluator Notes	
Plant Response:	The HPCI logic power fuse will blow requiring HPCI to be manually isolated per the APP and declared Inoperable per TS 3.5.1.
Objectives:	SRO - Declare HPCI Inoperable RO - Recognize logic failure and Isolate HPCI.
Success Path:	HPCI declared inoperable IAW TS 3.5.1 and isolated IAW APP.
Event Termination:	Go to Event 4 at the discretion of the lead evaluator.

EVENT 3: HPCI LOGIC FAILURE

Time	Pos	EXPECTED Operator Response	Comments
	SRO	Direct annunciator response for A-1 5-5 <i>HPCI LOGIC BUS A PWR FAILURE</i> 6-4 <i>HPCI COND STORAGE TNK</i> <i>WTR LVL LO</i>	
	SRO	May identify requirement to initiate an impairment IAW 0PLP-01.5. (This action may be directed to Ops Center SRO)	This is only in effect while aligned to the torus.
	SRO	Directs BOP to monitor the plant.	
	SRO	Determines depressurization of steam supply is NOT required.	
	SRO	Contacts I&C to investigate HPCI LOGIC BUS A PWR FAILURE	
	SRO	Refers to Tech Spec 3.5.1 ECCS —Operating and Determines: CONDITION D REQUIRED ACTION: D.1 Verify by administrative means RCIC System is OPERABLE. Immediately <u>AND</u> D.2. Restore HPCI System to OPERABLE status. 14 days	
	SRO	May request equipment control tags to support abnormal HPCI system alignment.	
	BOP	Plant monitoring	

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EVENT 3: HPCI LOGIC FAILURE			
Simulator Operator Actions			
	OATC	<p>Acknowledge and report A-01 annunciators:</p> <p>5-5 <i>HPCI LOGIC BUS A PWR FAILURE</i> 6-4 <i>HPCI COND STORAGE TNK WTR LVL LO</i></p>	
	OATC	Report HPCI Suction is aligned to both the CST and Suppression Pool.	
	OATC	<p>Performs APP A-1 5-5 (<i>HPCI LOGIC BUS A PWR FAILURE</i>) actions:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Close the Condensate Storage Tank Suction Valve, E41-F004. <p>Isolate the HPCI Steam Supply per OP-19, Section 8.5:</p> <ul style="list-style-type: none"> <input type="checkbox"/> CLOSE STEAM SUPPLY INBOARD ISOL VLV, E41-F002. <input type="checkbox"/> CLOSE STEAM SUPPLY OUTBOARD ISOL VLV, E41-F003. <input type="checkbox"/> Depressurizing steam supply is <u>NOT</u> required, but if performed will require performance of OPT-02.3.1b, Suppression Pool to Drywell Vacuum Breaker Position Check, within 6 hours. <input type="checkbox"/> Close the Turbine Exhaust Vacuum Breaker Valve, E41-F075. 	<p>Informs SRO of expected alarm A-1 1-1 <i>HPCI VAC BKR VLV F075/F079 NOT FULL OPEN</i></p>
	OATC	<p>Contacts RBAO to standby for opening breakers on MCC 2XDA when the following valves indicate Full Closed:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Torus Suction Valve, E41-F041. <input type="checkbox"/> Torus Suction Valve, E41-F042. 	
	OATC	Notifies SRO APP actions are complete and to reference TS 3.5.1 and TRM 3.6.	

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EVENT 4: RAISE POWER	
Simulator Operator Actions	

Simulator Operator Role Play	
	If contacted as the RE for power increase guidance, inform crew to raise power using Reactor Recirc flow to 60%
	If contacted as the RE to monitor power increase, inform crew that you will monitor core performance. When the plant is at ~60% power, if asked, inform crew Alt Power verification is SAT

Evaluator Notes	
Plant Response:	Raise reactor power to ~ 60% using reactor recirculation flow
Objectives:	SRO - Reactor power to be raised using Recirc pump speed control. RO - Performs power increase using Recirc flow control.
Success Path:	Reactor power is raised to ~60%.
Event Termination:	Go to Event 5 at the discretion of the lead evaluator.

EVENT 4: RAISE POWER

Time	Pos	EXPECTED Operator Response	Comments
	SRO	Directs Power to be raised to ~60% power	
	OATC	Raises power using recirculation flow to ~60% power Raise flow using the master raise fast or medium pushbutton to increase recirc pump speeds (core flow) until power is ~60%.	Mismatch criteria: 6×10^6 Mlbs jet pump flow if < than 57.5 Mlbs or 3×10^6 Mlbs if > than 57.5 Mlbs.
	OATC	Reports alarm clear as RR flow is raised. <i>A-5 4-8 OPRM TRIP ENABLED</i>	
	BOP	Monitors the plant.	
	BOP	May monitor the 2A Condensate Pump recirc valve, which may close during the power increase.	

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EVENT 5: MASTER CONTROLLER FAILURE	
Simulator Operator Actions	
	At the discretion of the lead evaluator, Initiate Trigger 1 to fail the master level controller.

Simulator Operator Role Play	
	If contacted as I&C to investigate, acknowledge the request.

Evaluator Notes	
Plant Response:	The master level controller will fail causing level to rise and the Feedpump demand to increase. Feed flow rises and steam flow/feed flow mismatch will be indicated on recorder. The crew will take manual control of level and maintain within the band of 170 – 200 inches.
Objectives:	SRO - Reactor power to be raised using Recirc pump speed control. RO – Maintains level with the controller in manual.
Success Path:	Maintains level 170 – 200 inches.
Event Termination:	Go to Event 6 at the discretion of the lead evaluator.

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EVENT 5: MASTER CONTROLLER FAILURE			
Time	Pos	EXPECTED Operator Response	Comments
	SRO	Acknowledges report of high reactor water level.	
	SRO	Directs entry into AOP-23.0.	
	SRO	Directs I/C to investigate failure of control system.	
	OATC	Diagnose and report failure of feedwater to control level in Auto.	
	OATC	<p>Take manual control of feedwater in one of the following manners:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Places RFP controller in manual and adjusts demand signal to control level. <input type="checkbox"/> Places the Manual/DFCS switch in manual and adjusts demand using the raise/lower switch to control level. 	
	BOP	Announces and enters 0AOP-23.0.	

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EVENT 6: AOG GUARD BED FIRE	
Simulator Operator Actions	
	At the discretion of the lead evaluator, Initiate Trigger 7 to initiate an AOG Guard Bed Fire.
	When directed to place AOG SYSTEM BYPASS VALVE, AOG-HCV-102 valve switch position at local control panel H2E in OPEN, Initiate Trigger 8 .
	When directed to perform step 6.3.6.8 to place local control switches to close Initiate Trigger 9 .
	When directed to initiate purge, initiate remote function Initiate Trigger 17 to open AOG-NP-V080 then immediately delete MF_CN017F.
	When directed to close NITROGEN PURGE SUPPLY VALVE TO CHARCOAL GUARD BED D1, AOG-NP-V080, delete Remote function XA_VHNPV80L

Simulator Operator Role Play	
	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.
	After fire brigade has mustered, report as the fire brigade leader that based on thermal imaging it looks like the fire is in the Guard Bed.
	When directed as OSAO to perform step 6.3.6.6 to ensure AOG SYSTEM BYPASS VALVE, AOG-HCV-102 valve switch position at local control panel H2E is in OPEN, have Sim Operator initiate trigger 8 and report action complete
	When directed as OSAO to perform step 6.3.6.8 to place local control switches to close, have Sim Operator initiate trigger 9 then report actions complete
	When directed as OSAO to perform steps 6.2.1.10 and 11, wait two minutes and report actions are complete.
	When directed to initiate purge, OP33, Section 6.3.4 step 2 is complete after two minutes. After 143 & 141 are opened, wait two minutes have Sim Operator perform purge actions and then report nitrogen purge has been started. If asked report local temperature indication shows temperatures are dropping.
	When directed to close NITROGEN PURGE SUPPLY VALVE TO CHARCOAL GUARD BED D1, AOG-NP-V080, have Sim Operator perform action and report actions are complete.
	When directed as OSAO to perform nitrogen purge shutdown steps, acknowledge request, wait two minutes and report field actions complete.

Evaluator Notes	
Plant Response:	An AOG off gas fire will occur in the guard bed. High temperatures will quickly spread into the charcoal absorber beds. The APPs require bypassing and isolating the AOG system, and initiating a nitrogen purge.
Objectives:	SRO - Direct actions of APP for Guard Bed Hi Temp. RO - Perform APP actions to isolate and purge AOG Guard Bed.
Success Path:	AOG fire extinguished and AOG bypassed.
Event Termination:	Go to Event 6 at the discretion of the lead evaluator.

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EVENT 6: AOG GUARD BED FIRE			
Time	Pos	EXPECTED Operator Response	Comments
	SRO	Direct actions of APP-UA-48 3-3, for Guard Bed D1 Temperature High Direct Fire Brigade mustered and Fire Alarm initiated.	
	SRO	Direct Charcoal Absorber System bypassed by performing the applicable steps of 2OP-33, Section 6.3.6.	
	SRO	Direct Purge Charcoal Guard Bed with Nitrogen IAW 2OP-33, Section 6.3.4.	
	SRO	Enter 0PFP-PBAA, Pre Fire Plans – Power Block Auxiliary Areas, Attachment 9.	
	SRO	Determines E-Plan: Unusual Event – HU2.1 Fire not extinguished within 15 minutes of control room notification or verification of a control room fire alarm in any Table H-1 or Table H-3 areas.	Table H-3 contains the 30 min Holdup Line and associated piping,
	SRO	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.	
	OATC	Monitors the Plant.	
	OATC	Initiates Fire Alarm and musters the fire Brigade.	

EVENT 6: AOG GUARD BED FIRE

Time	Pos	EXPECTED Operator Response	Comments
	BOP	<p>Charcoal Absorber System Bypassed by performing by performing the applicable steps of 2OP-33, Section 6.3.6.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Confirm AOG SYS VLV CONT SEL SW,AOG-CS-3161, is in CENT at Panel XU-80. <input type="checkbox"/> OPEN AOG SYSTEM BYPASS VALVE,AOG-HCV-102 at Panel XU-80. <input type="checkbox"/> Direct OSAO to perform step 6.3.6.6 <input type="checkbox"/> CONFIRM AOG SYSTEM BYPASS VALVE,AOG-HCV-102 stayed open <input type="checkbox"/> Direct OSAO to perform step 6.3.6.8. <input type="checkbox"/> CLOSE the following valves at Panel XU-80: <input type="checkbox"/> AOG SYS INLET SEC ISOL VALVE,AOG-XCV-147 <input type="checkbox"/> AOG SYS INLET PRI ISOL VALVE,AOG-XCV-148 <input type="checkbox"/> AOG SYS OUTLET PRI ISOL VALVE,AOG-XCV-143 <input type="checkbox"/> AOG SYS OUTLET SEC ISOL VALVE,AOG-XCV-141 <input type="checkbox"/> GUARD BED ISOLATION VALVE, AOG-XCV-142 <input type="checkbox"/> Purge the AOG System by performing the following steps from OP-33, Section 6.3.4 <input type="checkbox"/> Direct OSAO to perform steps 6.2.1.10 and 11. <input type="checkbox"/> Direct OSAO to perform step 6.3.4.2. <input type="checkbox"/> Confirm AOG SYS VLV CONT SEL SW, AOG-CS-3161, is in CENT at Panel XU-80. 	<p>May Inform SRO to reference ODCM 7.3.10</p> <p>Off Gas Timer alarm is not in alarm.</p> <p>May determine that section 6.2 needs to be performed which included the actions from 6.3.6</p>

EVENT 6: AOG GUARD BED FIRE

Time	Pos	EXPECTED Operator Response	Comments
	BOP	Open the following at Panel XU-80: <input type="checkbox"/> AOG SYS OUTLET PRI ISOL VALVE, AOG-XCV-143 <input type="checkbox"/> AOG SYS OUTLET SEC ISOL VALVE, AOG-XCV-141	
	BOP	Direct OSAO to perform steps 6.3.4.5 through 6.3.4.10.	Step 6.3.4.9 is N/A
	BOP	Direct OSAO to throttle open <i>NITROGEN PURGE SUPPLY VALVE TO CHARCOAL GUARD BED D1</i> , AOG-NP-V080, to maximize nitrogen flow, NOT to exceed 50 scfm, indicated by <i>OFFGAS SYS OUTLET FLOW</i> , AOG-FI-035 or <i>AOG SYSTEM OUTLET FLOW</i> , AOG-UR-157.	
	BOP	When nitrogen purging is complete, then direct OSAO to close <i>NITROGEN PURGE SUPPLY VALVE TO CHARCOAL GUARD BED D1</i> , AOG-NP-V080	
	BOP	Direct OSAO to perform steps 6.3.4.18, 19, and 20.	
	BOP	CLOSE the following at Panel XU-80: <input type="checkbox"/> AOG SYS OUTLET PRI ISOL VALVE, AOG-XCV-143 <input type="checkbox"/> AOG SYS OUTLET SEC ISOL VALVE, AOG-XCV-141	
	BOP	Ensure <i>AOG SYSTEM BYPASS VALVE</i> , AOG-HCV-102, is open at Panel XU-80.	
	BOP	Direct OSAO to perform step 6.3.4.23.	
	BOP	Notify SRO that fire has been extinguished and purge is secured.	

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EVENT 7: LOOP / DG FAILURES	
Simulator Operator Actions	
	At the discretion of the lead evaluator, Initiate Trigger 10 to active the LOOP.
	Acknowledge and silence Fireworks alarms
	If directed to align RBCCW to CSW cooling, wait 4 minutes and Initiate Trigger 11 .
	If directed to restart RPS MG sets, wait 3 minutes and insert the following as requested: For RPS A Initiate Trigger 18 and/or for RPS B Initiate Trigger 19 .
	If directed to swap AB panels Initiate Trigger 20 and inform Sim Role Player when timed out.

Simulator Operator Role Play	
	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 inform Sim Operator to align RBCCW to CSW cooling then report valve open.
	If directed to restart RPS MG sets, wait 3 minutes and inform Sim Operator to restart RPS then report actions complete.
	If directed as RBAO to ensure BFIV latching mechanisms are disengaged, wait two minutes, then report latches are disengaged.
	If requested to transfer 2AB, 32AB, 2AB-RX, acknowledge request, inform Sim operator and when the remotes are timed out inform the control room the action is complete.

Evaluator Notes	
Plant Response:	The crew will respond to a Loss of Offsite Power. The reactor will scram on MSIV closure on the LOOP. 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
Objectives:	SRO - Direct actions of AOP-36.1 RO - Close DG4 output breaker. Perform scram immediate operator actions.
Success Path:	TS addressed and HPCI system isolated.
Event Termination:	Scram immediate operator actions are complete and DG4 output breaker is closed.

EVENT 7: LOOP / DG FAILURES

Time	Pos	EXPECTED Operator Response	Comments
	SRO	Direct AOP-36.1 entry.	
	SRO	<i>Direct DG4 output breaker closed.</i>	<i>Critical Task</i>
	SRO	Contacts Maintenance for failure of DG3 and DG4 output breaker.	
	SRO	Enters and directs actions of RSP: <ul style="list-style-type: none"> <input type="checkbox"/> Direct control of reactor pressure using SRVs (establishes pressure band 800 – 1000 psig) <input type="checkbox"/> Direct water level band of 170 – 200 inches 	
	SRO	Enters and directs actions of PCCP: <ul style="list-style-type: none"> <input type="checkbox"/> Monitor and control Suppression Pool temperature below 95 deg F. <input type="checkbox"/> Start available RHR Loops in Suppression pool Cooling as necessary to maintain temp below 95 F. <input type="checkbox"/> Monitor HCTL <input type="checkbox"/> Operate available drywell coolers <input type="checkbox"/> Verify RCC operation and alignment to the drywell 	

EVENT 7: LOOP / DG FAILURES

Time	Pos	EXPECTED Operator Response	Comments
	BOP	Diagnose failure of DG4 output breaker	
	BOP	<i>Manually close DG4 Output Breaker</i>	<i>Critical Task</i>
	BOP	Diagnose and report to the SRO DG3 tripped and Locked out.	
	BOP	Dispatch OSAO to monitor DGs	
	BOP	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.	
	BOP	Start the CRD system in accordance with OP-08, Section 8.17.	
	BOP	Ensure the associated NSW and CSW pumps are operating.	
	BOP	Direct an AO to swap the AB panels to their alternate source.	
	BOP	Ensure 125V and 24V DC battery chargers return to service for each energized 480V E Bus.	
	BOP	<p>Perform the following to transfer RBCCW HXs from the NSW header to the CSW header:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Confirm CSW system available. <p>Ensure at least one of the following is closed:</p> <ul style="list-style-type: none"> <input type="checkbox"/> RBCCW HX SERVICE WATER INLET VALVE, SW-V103 <input type="checkbox"/> RBCCW HX SERVICE WATER INLET VALVE, SW-V106 <input type="checkbox"/> NUCLEAR HEADER TO RBCCW HEAT EXCHANGER SUPPLY VALVE, SW-V193 <input type="checkbox"/> Direct an AO to open CONVENTIONAL HEADER TO RBCCW HEAT EXCHANGERS SUPPLY VALVE, SW-V146. 	

EVENT 7: LOOP / DG FAILURES

Time	Pos	EXPECTED Operator Response	Comments
	BOP	<p>If the opposite unit has power to its Service Air compressors and it is desired to cross-tie air systems, then perform the following:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Obtain permission from the opposite Unit CRS to cross-tie unit air systems. <input type="checkbox"/> Ensure CROSS-TIE VALVE, 2-SA-PV-5071 is open (Unit 2, XU-2). <input type="checkbox"/> Ensure CROSS-TIE VALVE, 1-SA-PV-5071 is open (Unit 1, XU-2). 	
	BOP	<p>Perform the following to start Control Building Ventilation on the affected unit:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Confirm the Control Building Instrument Air Compressors are functioning properly. <input type="checkbox"/> Ensure at least one of the following units is operating: <input type="checkbox"/> CTL ROOM A/C & SUPPLY FAN, 1D-CU-CB and 1D-SF-CB <input type="checkbox"/> CTL ROOM A/C & SUPPLY FAN, 2D-CU-CB and 2D-SF-CB <input type="checkbox"/> CTL ROOM A/C SPARE FAN, 2E-SF-CB 	
	BOP	<p>If available, then start the following battery room fans, as required:</p> <ul style="list-style-type: none"> <input type="checkbox"/> BATTERY ROOM 1A VENT FANS, 1C-SF-CB and 1C-EF-CB <input type="checkbox"/> BATTERY ROOM 1B VENT FANS, 1B-SF-CB and 1B-EF-CB <input type="checkbox"/> BATTERY ROOM 2A VENT FANS, 2C-SF-CB and 2C-EF-CB <input type="checkbox"/> BATTERY ROOM 2B VENT FANS, 2B-SF-CB and 2B-EF-CB 	

EVENT 7: LOOP / DG FAILURES

Time	Pos	EXPECTED Operator Response	Comments
	BOP	Perform the following to restore drywell cooling: <ul style="list-style-type: none"> <input type="checkbox"/> If three RBCCW pumps are running, then STOP one RBCCW pump, and place its control switch in AUTO. <input type="checkbox"/> If only one RBCCW pump is running, then START a second pump, if available. <input type="checkbox"/> If no RBCCW pump is running, then place all RBCCW pump control switches in OFF, and perform one of the following: 	
	BOP	IF any local drywell temperature is currently greater than the starting temperature limit OR has exceed the starting temperature limit since the initiation of the event, then perform 2OP-21, Section 8.6. IF all local drywell temperatures have remained less than the starting temperature limit since the initiation of the event, then perform 2OP-21, Section 5.2.	NOTE: Drywell temperature limit for starting the RBCCW System: <ul style="list-style-type: none"> • Greater than or equal to 260°F below the 75' elevation, as indicated on Control Room recorder CAC-TR-4426 • Greater than or equal to 258°F as indicated on Points 1, 3 & 4 of RSDP recorder CAC-TR-778.
	BOP	ENSURE all available drywell coolers on the affected unit are operating.	
	BOP	IF HPCI or RCIC is running with suction from the CST AND CST level indication is NOT available in the Control Room or Radwaste, then monitor CST level locally and report level every hour.	
	BOP	Start RPS MG Sets A(B) in accordance with OP-03, Section 5.2	

EVENT 7: LOOP / DG FAILURES

Time	Pos	EXPECTED Operator Response	Comments
	BOP	<p>Perform the following to start the Reactor Building HVAC:</p> <ul style="list-style-type: none"> <input type="checkbox"/> If PROCESS OG VENT PIPE RAD HI-HI (UA-03, 5-4) is in alarm, and is NOT the result of a valid high radiation signal, then place CAC PURGE VENT ISOL OVRD, CAC-CS-5519, in OVERRIDE <p>Reset the following Reactor Building Ventilation Radiation Monitors on Panel H12-P606:</p> <ul style="list-style-type: none"> <input type="checkbox"/> PROCESS REACTOR BLDG VENTILATION RADIATION MONITOR A, D12-RM-K609A <input type="checkbox"/> PROCESS REACTOR BLDG VENTILATION RADIATION MONITOR B, D12-RM-K609B. <p>Depress the following Isolation Reset Groups push buttons:</p> <ul style="list-style-type: none"> <input type="checkbox"/> ISOLATION RESET GROUPS 1, 2, 3, 6, 8, A71-S32 <input type="checkbox"/> ISOLATION RESET GROUPS 1, 2, 3, 6, 8, A71-S33. <ul style="list-style-type: none"> <input type="checkbox"/> Ensure Instrument Air header pressure is greater than 95 psig. <input type="checkbox"/> Ensure BFIV latching mechanisms are disengaged. (Local). <input type="checkbox"/> Open RB VENT INBD ISOL VALVES, A-BFIV-RB and C-BFIV-RB. <input type="checkbox"/> Open RB VENT OTBD ISOL VALVES, B-BFIV-RB and D-BFIV-RB. <input type="checkbox"/> Start three sets of Reactor Building Ventilation Fans in accordance with OP-37.1, Section 8.8 to maintain Reactor Building static pressure negative. 	

EVENT 7: LOOP / DG FAILURES

Time	Pos	EXPECTED Operator Response	Comments
	OATC	Perform Scram Immediate Actions:	
	OATC	Perform actions of RSP: <ul style="list-style-type: none"> <input type="checkbox"/> Ensure Scram Valves Open <input type="checkbox"/> After steam flow is less than 3 mlb/hr, Place mode switch to Shutdown <input type="checkbox"/> Trip Main Turbine <input type="checkbox"/> Ensure Master Reactor Level Controller setpoint is +170 inches <input type="checkbox"/> If two reactor feed pumps are running and level is above +160 inches and rising, then trip one <input type="checkbox"/> Ensure reactor recirc pump speed lower to 34% <input type="checkbox"/> Ensure heater drain pumps tripped <input type="checkbox"/> If SRVs are cycling, Open SRVs until reactor pressure decreases to 950 psig <input type="checkbox"/> Maintain reactor water level between 170 – 200 inches <input type="checkbox"/> Start available RHR Loops in Suppression pool Cooling as necessary <input type="checkbox"/> Perform LEP-02 <input type="checkbox"/> Insert Nuclear Instrumentation and maintain on range <input type="checkbox"/> Ensure turbine oil system operating <input type="checkbox"/> Ensure one CRD pump running 	
	OATC	Control reactor pressure 800 – 1000 psig	
	OATC	Control reactor water level 170 – 200 inches	

EVENT 7: LOOP / DG FAILURES

Time	Pos	EXPECTED Operator Response	Comments
	OATC	<p>Place SULCV in operation:</p> <p>Ensure the following:</p> <ul style="list-style-type: none"> <input type="checkbox"/> FW-V6 AND FW-V8 OR FW-V118 AND FW-V119 closed <input type="checkbox"/> FW-FV-177 closed <input type="checkbox"/> FW-V120 closed <input type="checkbox"/> FW control MODE SELECT in 1 ELEM <input type="checkbox"/> SULCV in M (MANUAL) closed <input type="checkbox"/> B21-F032A AND/OR B21-F032B open <input type="checkbox"/> Place the MSTR RFPT SP/RX LVL CTL in M (MANUAL), then adjust to 187" <input type="checkbox"/> Place RFP A(B) RECIRC VLV, control switch to open <input type="checkbox"/> Place RFPT A(B) SP CTL in M (MANUAL) <input type="checkbox"/> Ensure MAN/DFCS control switch in DFCS <input type="checkbox"/> Raise RFPT A(B) SP CTL speed until discharge pressure is greater than or equal to 100 psig above reactor pressure <input type="checkbox"/> Adjust SULCV to establish desired injection <input type="checkbox"/> If desired, then place SULCV in A (AUTO) 	

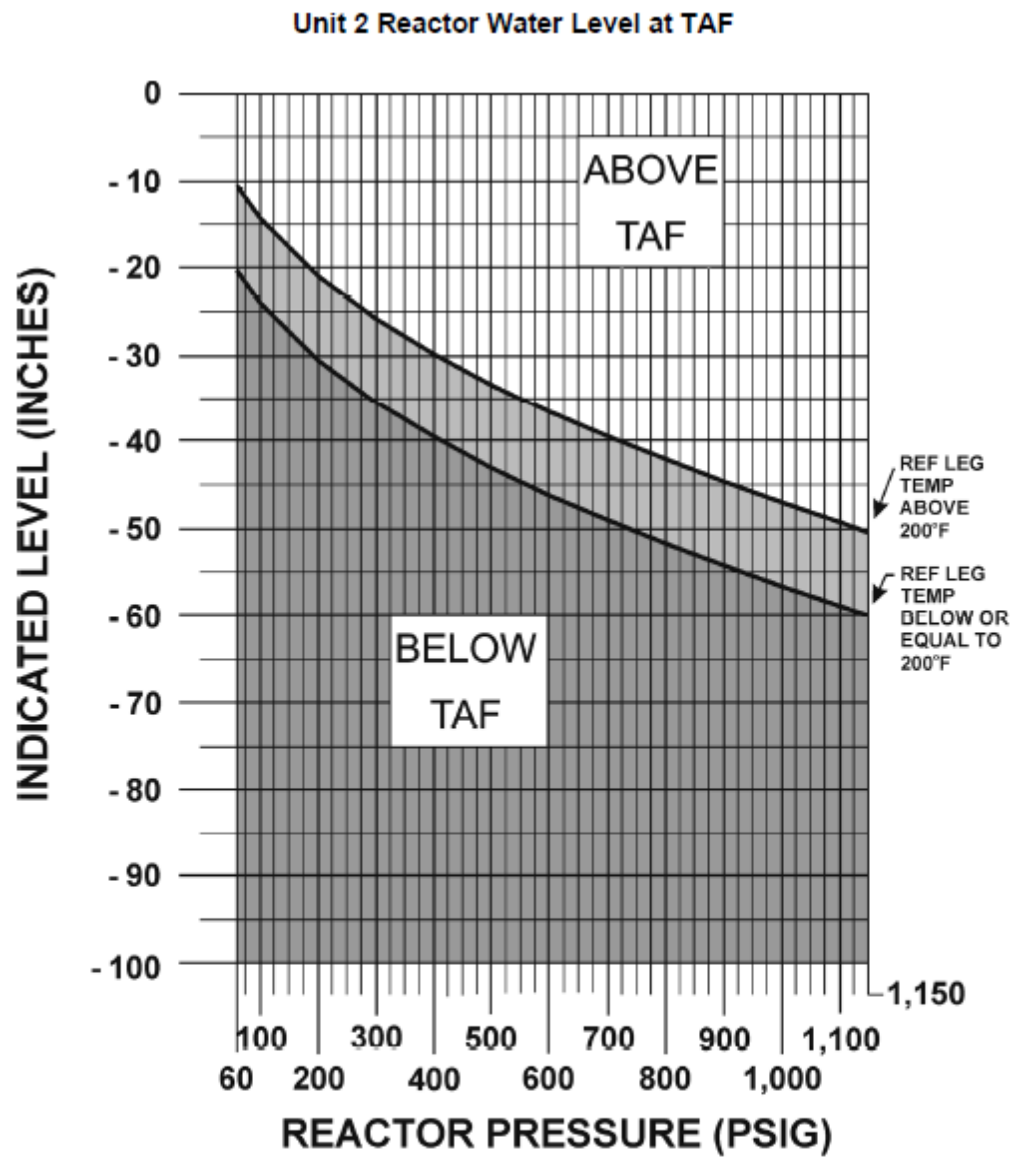
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EVENT 8: LOCA / TERMINATION	
Simulator Operator Actions	
	When directed by the lead evaluator, Initiate Trigger 12 to activate Small Line Break malfunction
	If directed by the lead evaluator, increase LOCA by modifying the value of Malfunction NB009F to make sure level lowers to ensure the crew emergency depressurizes.
	If asked to maximize CRD flow, Initiate Trigger 13 . Inform Sim Role Player when completed.
	If requested to line up SLC for demin water injection, Initiate Trigger 14 .
	If directed to place drywell coolers to STOP, Initiate Trigger 15 .
	If directed to reset thermal overloads for E11-F015B, wait two minutes and delete malfunction RH002F. Inform Sim Role Player when completed
	If requested to defeat RCIC low pressure isolation (SEP-10), initiate Trigger 16 .
	When directed by the lead evaluator, place the simulator in FREEZE
	DO NOT RESET THE SIMULATOR PRIOR TO RECEIPT OF CONCURRENCE TO DO SO FROM THE LEAD EXAMINER

Simulator Operator Role Play	
	If asked to perform AO actions to maximize CRD flow, inform Sim Operator to initiate trigger 13. 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, inform Sim Operator to initiate trigger 14, wait 3 minutes and report demin water lined up.
	If directed to place drywell coolers to STOP, inform Sim Operator to initiate trigger 15, wait 2 minutes and report coolers are stopped.
	If directed to reset thermal overloads for E11-F015B, When complete report thermal overload reset.
	If requested to defeat RCIC low pressure isolation (SEP-10), inform Sim Operator to initiate trigger 16 and report completed.

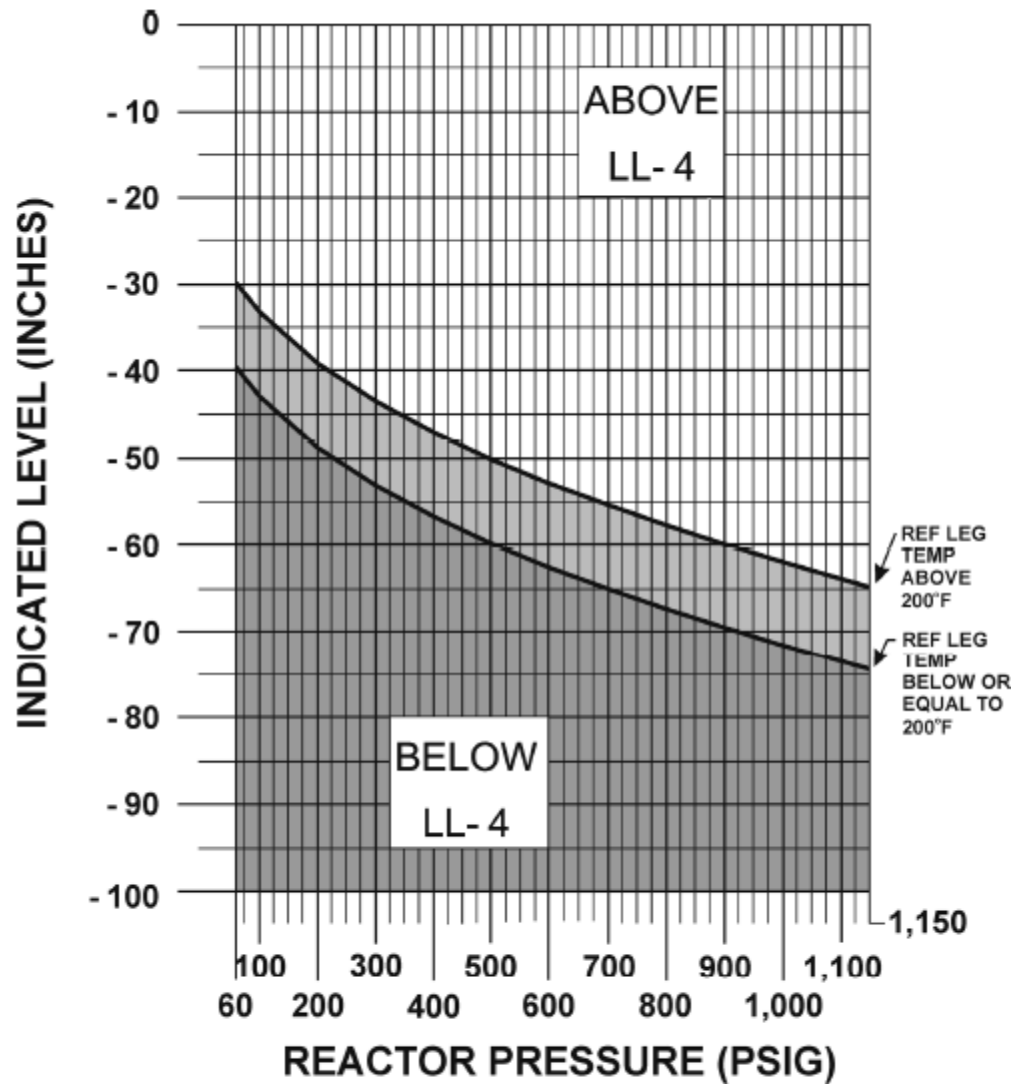
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Evaluator Notes	
Plant Response:	After scram actions have been completed and level is stabilized, a LOCA will occur in the drywell. The crew will maximize RCIC flow and implement LEP-01 for alternate cooling systems. Level will lower until Emergency Depressurization is required. 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
Objectives:	SRO - Direct Emergency Depressurization. RO - Perform Emergency Depressurization.
Success Path:	RPV Emergency depressurized and reactor water level being restored.
Scenario Termination:	<i>When the reactor is depressurized and level is being restored to 170-200 inches the scenario may be terminated.</i> Remind students not to erase any charts and not to discuss the scenario until told to do so by the evaluator/instructor.



WHEN REACTOR PRESSURE IS LESS THAN
60 PSIG, USE INDICATED LEVEL.
TAF IS -7.5 INCHES.

**Unit 2 Reactor Water Level at LL-4
(Minimum Steam Cooling Level)**



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

EVENT 8: LOCA / TERMINATION

Time	Pos	EXPECTED Operator Response	Comments
	SRO	Direct E7 to E8 crosstie IAW AOP-36.1.	
	SRO	Direct activities for EOP-02-PCCP: <ul style="list-style-type: none"> <input type="checkbox"/> Before Suppression Chamber press reaches 11.5 psig, Direct torus sprays per SEP-03. <input type="checkbox"/> When suppression chamber exceeds 11.5 psig, direct drywell spray per SEP-02 <input type="checkbox"/> Confirm Drywell Spray Initiation Limit in Safe Region <input type="checkbox"/> Monitor PSP <input type="checkbox"/> Monitor HCTL <input type="checkbox"/> Place H2/O2 analyzers in service 	
	SRO	Direct activities for RVCP: <ul style="list-style-type: none"> <input type="checkbox"/> Perform LEP-01, Alternate Coolant Injection <input type="checkbox"/> Lineup and start Table 1 injection systems <input type="checkbox"/> When below TAF, verify low pressure pumps on <input type="checkbox"/> Determine level cannot be maintained above LL-4 <input type="checkbox"/> Emergency depressurization by opening 7 ADS valves <input type="checkbox"/> Perform Alternate Source Term actions (Table 5) <input type="checkbox"/> Direct use of all available Table 1 systems and Alternate Coolant Injection Systems for injection <input type="checkbox"/> Direct use of all available Table 1 systems and Alternate Coolant Injection Systems for injection <input type="checkbox"/> Direct level be restored and maintained +170-200" 	May determine that an auto action has failed, ADS Blowdown, and ED's based on this failure.

EVENT 8: LOCA / TERMINATION

Time	Pos	EXPECTED Operator Response	Comments
	RO BOP	Recognize and report rising drywell pressure.	
	RO BOP	Ensure RCIC injection @ 500 gpm.	
	RO BOP	Maximize CRD flow per SEP-09:	
	RO BOP	<p>IF a CRD pump is NOT operating:</p> <ul style="list-style-type: none"> <input type="checkbox"/> ENSURE CRD FLOW CONTROL, C12-FC-R600, is in MAN. <input type="checkbox"/> CLOSE the in-service FLOW CONTROL VLV,C12-F002A(F002B). <input type="checkbox"/> START a CRD pump. <input type="checkbox"/> IF a reactor scram is NOT sealed in, THEN ADJUST CRD FLOW CONTROL, C12-FC-R600, to greater than or equal to 30 gpm. <input type="checkbox"/> Direct an AO to perform field actions for two pump operation <p>When field actions are complete:</p> <ul style="list-style-type: none"> <input type="checkbox"/> START the second CRD pump. <input type="checkbox"/> ENSURE CRD FLOW CONTROL,C12-FC-R600, is in MAN. <p>THROTTLE the following valves, as necessary, to maintain charging water pressure greater than or equal to 950 psig, but as low as possible:</p> <ul style="list-style-type: none"> <input type="checkbox"/> In-service FLOW CONTROL VLV,C11(C12)-F002A(F002B) <input type="checkbox"/> DRIVE PRESSURE VLV, C11(C12)-PCV-F003. <input type="checkbox"/> CHARGING WATER HEADER THROTTLE VALVE, C11(C12)-F034 (Field Action) 	
	RO BOP	<p>Direct AO to rack in the E7 and E8 crosstie breakers IAW AOP-36.1.</p> <p>After the breakers are racked in closes the crosstie breakers to energize E7</p>	

EVENT 8: LOCA / TERMINATION

Time	Pos	EXPECTED Operator Response	Comments
	RO BOP	Inject demin water using SLC per LEP-01: <ul style="list-style-type: none"> <input type="checkbox"/> Dispatch RBAO to align SLC for demin water injection <input type="checkbox"/> When AO reports SLC alignment is complete, Start SLC pumps A & B 	
	RO BOP	When directed, Start drywell spray per SEP-02: <ul style="list-style-type: none"> <input type="checkbox"/> Ensure WELL WATER TO VITAL HEADER VLV, SW-V141, is closed. <input type="checkbox"/> If INBOARD INJECTION VLV, E11-F015A(F015B) is open, then close OUTBOARD INJECTION VLV, E11-F017A(F017B). Ensure one of the following valves is open: <ul style="list-style-type: none"> <input type="checkbox"/> CONV SW TO VITAL HEADER VLV, SW-V111 <input type="checkbox"/> NUC SW TO VITAL HEADER VLV, SW-V117 <input type="checkbox"/> Ensure both reactor recirculation pumps are tripped <input type="checkbox"/> Place all drywell cooler control switches to OFF (L/O). <input type="checkbox"/> If necessary, then place Loop A(B) 2/3 CORE HEIGHT LPCI INITIATION OVERRIDE switch, E11-CS-S18A(S18B), to MANUAL OVERRD. <input type="checkbox"/> 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 <input type="checkbox"/> Ensure TORUS COOLING ISOL VLV, E11-F024A(F024B), is closed. 	NOTE: With a LOCA signal present, OUTBOARD INJECTION VLV, E11-F017A(F017B) can NOT be closed for five minutes.

EVENT 8: LOCA / TERMINATION

Time	Pos	EXPECTED Operator Response	Comments
	RO	<input type="checkbox"/> Confirm the following: <input type="checkbox"/> Drywell pressure and drywell temperature are in the "SAFE" region of the Drywell Spray Initiation Limit graph <input type="checkbox"/> Suppression pool water level is below +21 inches <input type="checkbox"/> Ensure one RHR Pump is running. <input type="checkbox"/> Open Loop A(B) DRYWELL SPRAY INBD ISOL VLV, E11-F021A(F021B). <input type="checkbox"/> Throttle open Loop A(B) DRYWELL SPRAY OTBD ISOL VLV, E11-F016A(F016B), to obtain between 8,000 gpm and 10,000 gpm flow. <input type="checkbox"/> 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. <input type="checkbox"/> If necessary, then place RHR SW BOOSTER PUMPS A & C (B & D) LOCA OVERRIDE switch, E11-S19A(S19B), in MANUAL OVERRD.	
	BOP	<input type="checkbox"/> Align the RHR Service Water System to supply cooling water to RHR Heat Exchanger A(B) (OP-43). <input type="checkbox"/> Ensure HX A(B) INLET VLV, E11-F047A(F047B) is open. <input type="checkbox"/> Ensure HX A(B) OUTLET VLV, E11-F003A(F003B) is open. <input type="checkbox"/> CLOSE HX A(B) BYPASS VLV, E11-F048A(F048B).	<p>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.</p>

EVENT 8: LOCA / TERMINATION

Time	Pos	EXPECTED Operator Response	Comments
	RO BOP	<p>When directed, Start torus spray per SEP-03:</p> <ul style="list-style-type: none"> <input type="checkbox"/> If necessary, then place Loop A(B) 2/3 CORE HEIGHT LPCI INITIATION OVERRIDE switch, E11-CS-S18A(S18B), in MANUAL OVERRD. <input type="checkbox"/> If the CTMT SPR OVRD light for the 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. <input type="checkbox"/> If INBOARD INJECTION VLV, E11-F015A(F015B) is open, and injection to the reactor is not required, then close OUTBOARD INJECTION VLV, E11-F017A(F017B). <input type="checkbox"/> Ensure RHR Loop A(B) is placed in the LPCI, Suppression Pool Cooling, or Drywell Spray mode. <input type="checkbox"/> Ensure TORUS DISCHARGE ISOL VLV, E11-F028A(F028B), is open. <input type="checkbox"/> Open TORUS SPRAY ISOL VLV, E11-F027A(F027B). 	
	RO BOP	When directed, Open 7 ADS valves	Critical Task
	RO BOP	Recognize failure of E11-F015B to open, diagnose as thermal overload, and dispatch AO to reset thermal overload	
	RO BOP	Control injection flow to maintain RPV level 170-200" as directed by the SRO.	

ATTACHMENT 1 - Scenario Quantitative Attribute Assessment

Category	NUREG 1021 Rev. 2 Supp. 1 Req.	Scenario Content
Total Malfunctions	5-8	8
Malfunctions after EOP Entry	1-2	2
Abnormal Events	2-4	3
Major Transients	1-2	2
EOPs Used	1-2	2
EOP Contingency	0-2	2
Run Time	60-90 min	90
Crew Critical Tasks	2-3	2
Tech Specs	2	2
Instrument / Component Failures before Major	2 – OATC 2 - BOP	4
Instrument / Component Failures after Major	2	2
Normal Operations	1	1
Reactivity manipulation	1	1

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ATTACHMENT 2 – Shift Turnover

Brunswick Unit 2 Plant Status					
Station Duty Manager:				Workweek Manager:	
Mode:	1	Rx Power:	54%	Gross*/Net MWe*:	493 / 475
Plant Risk: Current EOOS Risk Assessment is:	Green				
SFP Time to 200 Deg F:	40 hrs			Days Online:	1 day
Turnover:	<p>Transfer 2C/2D buses from the SAT to the UAT which were transferred to the SAT for maintenance which is now complete.</p> <p>The Reactivity Plan states to raise power to 60% (using recirc flow) then place the second feedwater pump in service.</p>				
Protected Equipment:	<p>2A / 2B NSW Pumps</p> <p>ADHR and Fuel Pool Cooling</p> <p>Demin Transfer Pump</p>				
Comments:	<p>Performing startup (The unit was shutdown due to a hurricane), 0GP-04 is complete through step 6.2.25.</p> <p>APRM 2 has failed downscale and is bypassed.</p> <p>1A NSW pump is under clearance for motor rebuild.</p> <p>C32-LT-N004A has just failed downscale. After taking the watch determine the TS implications for this failed equipment.</p>				

Action Statements in Effect					
Item	Date/Time	Reference	Required Actions	Responsibility	Due
C32-LT-N004A	5 min ago		Being Assessed		



BRUNSWICK TRAINING SECTION
OPERATIONS TRAINING
INITIAL LICENSED OPERATOR
SIMULATOR EVALUATION GUIDE

LOIX-031
2014 NRC SCENARIO 3

Swap CP, NSW Pp Trip, APRM Failure, HD Level Controller Failure, Recirc Pp
Seal Failure, ATWS, T/P Level, SLC Failure, SDV Failure

REVISION 0

Developer: Robert Bolin

Date: 7/18/2014

Technical Review: Lou Sosler

Date: 7/18/2014

Validator: Derek Pickett

Date: 7/18/2014

Validator: Bruce Leitch

Date: 7/18/2014

Facility Representative: Jerry Pierce

Date: 8/15/2014

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REVISION SUMMARY	
0	Scenario developed for 2014 Exams.

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6.0	SETUP INSTRUCTIONS.....	8
7.0	INTERVENTIONS.....	10
8.0	OPERATOR RESPONSE AND INSTRUCTIONAL STRATEGIES	12
	ATTACHMENT 1 - Scenario Quantitative Attribute Assessment	36
	ATTACHMENT 2 – Shift Turnover	47

1.0 SCENARIO OUTLINE

Event	Malf. No.	Type*	Event Description
1		R - RO	Reduce power for CP swap
2		N - BOP	Swap CP
3	CW025F	C-BOP	NSW Pump trip (AOP-18)(TS)
4	NI031F	C-RO	APRM failure (TS)
5	CF039F	C-BOP	HD level controller failure (AOP-23)
6	RC007F RC009F	C-RO	Recirc Pump seal failures (AOP-14)
7	RP010F	M C C	ATWS T/P Level Recirc Pump Discharge valve thermal overload SLC Failure
8	RD036F	C	SDV Failure
*(N)ormal, (R)eactivity, (C)omponent or Instrument, (M)ajor			

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2.0 SCENARIO DESCRIPTION SUMMARY

Event	Description
1	In order to swap Condensate pumps the crew will determine that power must be reduced to ~80% (Operating with B & C Condensate pumps, condensate flow is limited to 13,500 gpm). The crew will lower power using recirc.
2	Swap condensate pumps in accordance with 2OP-32. The crew will re-align LOCA/Unit Trip Load Shed switches.
3	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. (AOP-18)(TS)
4	APRM 4 will fail upscale resulting in a rod block. The APRM will be declared Inoperable per TS 3.3.1.1. WCC SRO will request APRM TS Actions be taken in order to troubleshoot which requires the APRM mode selector switch to be place in INOP IAW 0OI-18.
5	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.
6	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 0AOP-14.0. 0AOP-14.0 will direct the Recirc Pump be shutdown and then be isolated. The discharge valve will have thermal overload, can be reset after the crew initiates a reactor scram. A reactor scram signal will occur on high drywell pressure. The auto scram signals will not cause a scram but the manual scram signal will
7	When a scram is inserted due to DW pressure an ATWS will occur. Scram discharge volume vents and drain fail closed on the scram, SLC flowpath will have blockage requiring alternate boron injection. Rods will be able to be driven in with RMCS
8	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

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3.0 CREW CRITICAL TASKS

Description
Inserting a manual reactor scram when an auto scram signal is received and the reactor does not scram.
Terminate and prevent HPCI/Feedwater during the ATWS (CS/RHR if LOCA signal received) to lower reactor water level to 90 inches or until all control rods are inserted.
Direct LEP-03, Alternate Boron Injection.
Perform LEP-02, Alternate Rod Insertion, to insert all control rods.

4.0 TERMINATION CRITERIA

When all rods are inserted and level is being controlled above TAF the scenario may be terminated.

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5.0 IMPLEMENTING REFERENCES

NOTE: Refer to the most current revision of each Implementing Reference.

Number	Title
UA-01, 1-10	Nuclear Header Serv Wtr Press-Low
UA-01, 1-5	RBCCW Head Tank Level Hi/Lo
UA-18, 6-1	Bus E4 4KV Motor Ovld
A-06, 2-8	APRM Upscale
A-06, 3-7	APRM Trouble
A-06, 3-8	APRM Upscale Trip/Inop
A-05, 2-2	Rod Out Block
UA-4, 2-10	HD Deaerator Level High-Low
A-06, 5-3	Outer Seal Leakage Flow Detection Hi
A-06, 6-3	Pump A Seal Staging Flow High/Low
0AOP-14.0	Abnormal Primary Containment Conditions
0AOP-18.0	Nuclear Service Water System Failures
0AOP-23.0	Condensate/Feedwater System Failures
2OP-32, Section 8.5	Transferring to Standby Condensate Pump

6.0 SETUP INSTRUCTIONS

1. **PERFORM** TAP-409, Miscellaneous Simulator Training Guidelines, Attachment 5, Checklist for Simulator Exam Security.
2. **RESET** the Simulator to IC-25.
3. **ENSURE** the RWM is set up as required for the selected IC.
4. **ENSURE** appropriate keys have blanks in switches.
5. **RESET** alarms on SJAE, MSL, and RWM NUMACs.
6. **ENSURE** no rods are bypassed in the RWM.
7. **PLACE** all SPDS displays to the Critical Plant Variable display (#100).
8. **ENSURE** hard cards and flow charts are cleaned up
9. **TAKE** the SIMULATOR OUT OF FREEZE
10. **LOAD** Scenario File.
11. **ALIGN** the plant as follows:

Manipulation
<ol style="list-style-type: none"> 1. Reduce power to ~90% using recirc. 2. Null the DVM. 3. Ensure A & B condensate pumps running. 4. Ensure 2B NSW pump is running, 2A in standby.

12. **IF desired**, take a **SNAPSHOT** and save into an available IC for later use.
13. **PLACE** a clearance on the following equipment.

Component	Position
APRM 2 (blue tag)	Bypassed

14. **INSTALL** Protected Equipment signage and **UPDATE** RTGB placard as follows:
 - a. All NSW pumps
15. **VERIFY** 0ENP 24.5 Form 2 (Immediate Power Reduction Form) for IC-25 is in place.

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16. **ENSURE** each Implementing References listed in Section 7 is intact and free of marks.
17. **ENSURE** all materials in the table below are in place and marked-up to the step identified.

Required Materials

18. **ENSURE** Station Duty Manager and Work Week Manager names are filled in on the Shift Turnover Sheet.
19. **ADVANCE** the recorders to prevent examinees from seeing relevant scenario details.
20. **PROVIDE** Shift Briefing sheet for the CRS.
21. **VERIFY** all actions contained in TAP-409, Miscellaneous Simulator Training Guidelines, Attachment 4, Simulator Training Instructor Checklist, are complete.

7.0 INTERVENTIONS

TRIGGERS

Trig	Type	ID
1	Remote Function	EE_UTSHED3 - [UNIT TRIP LOAD SHED SEL SW, 2C CONDENSATE PUMP]
1	Remote Function	EE_LSHED3 - [LOCA LOAD SHED SEL SW, 2C CONDENSATE PUMP]
2	Remote Function	EE_LSHED1 - [LOCA LOAD SHED SEL SW, 2A CONDENSATE PUMP]
2	Remote Function	EE_UTSHED1 - [UNIT TRIP LOAD SHED SEL SW, 2A CONDENSATE PUMP]
3	Malfunction	CW025F - [NUC SERVICE WATER PUMP MOTOR OVERLOAD]
3	Remote Function	EL_IALSNS2B - [MECH TRIP NSW PUMP 2B]
4	Malfunction	NI031F - [APRM FAILS HI]
5	Malfunction	CF039F - [HTR DRN DEAER LVL CNTRLR FAILURE]
6	Malfunction	RC009F - [RECIRC PUMP A SEAL #2 FAILS]
6	Malfunction	RC007F - [RECIRC PUMP A SEAL #1 FAILS]
7	Remote Function	EP_IAEOPJP1 - [BYPASS LL-3 GROUP I ISOL (SEP-10)]
8	Remote Function	EP_IACS994U - [DW CLR B & C OVERRIDE - NORMAL/RUN]
8	Remote Function	EP_IACS993U - [DW CLR A & D OVERRIDE - NORMAL/RUN]
9	Malfunction	RD036F - [SCRAM DISC VOL DRN FAILS CLOSED] on depressing RX SCRAM A pushbutton
10	Remote Function	SL_IASLCCRD - [SLC DISCH (NORM=CRD / ALT=RCIC/HPCI)]
10	Remote Function	SL_IALEP03 - [ALT = SUBMERSIBLE PUMP/HOSE LINEUP]

MALFUNCTIONS

Malf ID	Mult ID	Description	Current Value	Target Value	Rmp time	Actime	Dactime	Trig
NI032F	APRM 2	APRM FAILS LO	True	True				
CW025F	B	NUC SERVICE WATER PUMP MOTOR OVERLOAD	False	True				3
NI031F	APRM 4	APRM FAILS HI	False	True				4
CF039F		HTR DRN DEAER LVL CNTRLR FAILURE	False	True				5
RC007F		RECIRC PUMP A SEAL #1 FAILS	0.00	100.00	00:01:30			6
RC009F		RECIRC PUMP A SEAL #2 FAILS	0.00	100.00	00:01:30	00:02:00		6
RP005F		AUTO SCRAM DEFEAT	True	True				
RC057F	B32-F031A	DISCHARGE B32-F031A FROM RX. RECIRCULATI	True	True				
RP010F		ATWS 3	True	True				
RD036F		SCRAM DISC VOL DRN FAILS CLOSED	False	True				9

REMOTES

Remf Id	Mult Id	Description	Current Value	Target Value	Rmp time	Actime	Trig
CC_IACW4518		2C TBCCW PUMP UNIT ALIGNMENT	1	1			
EE_LSHED3		LOCA LOAD SHED SEL SW, 2C CONDENSATE PUMP	ENABLE	DISABLE			1
EE_UTSHED3		UNIT TRIP LOAD SHED SEL SW, 2C CONDENSATE PUMP	ENABLE	DISABLE			1
EE_LSHED1		LOCA LOAD SHED SEL SW, 2A CONDENSATE PUMP	DISABLE	ENABLE			2
EE_UTSHED1		UNIT TRIP LOAD SHED SEL SW, 2A CONDENSATE PUMP	DISABLE	ENABLE			2
EL_IALSNS2B		MECH TRIP NSW PUMP 2B	NORMAL	TRIP		00:02:00	3
EP_IAEOPJP1		BYPASS LL-3 GROUP I ISOL (SEP-10)	OFF	ON			7
EP_IACS993U		DW CLR A & D OVERRIDE - NORMAL/RUN	NORMAL	RUN			8
EP_IACS994U		DW CLR B & C OVERRIDE - NORMAL/RUN	NORMAL	RUN			8
SL_VHSL008M		INBOARD MANUAL INJ VLV F008	CLOSE	CLOSE			
SL_IASLCCRD		SLC DISCH (NORM=CRD / ALT=RCIC/HPCI)	NORMAL	NORMAL			10
SL_IALEP03		ALT = SUBMERSIBLE PUMP/HOSE LINEUP	NORMAL	ALT			10

PANEL OVERRIDES

Tag ID	Description	Position / Target	Actual Value	Override Value	Rmp time	Actime	Dactime	Trig
K4B20A	NUC HDR SW PMP A DISCH VLV	AUTO	ON	OFF				
Q2206LGO	MAN INJ GREEN	ON/OFF	ON	OFF				
Q2206RRO	MAN INJ RED	ON/OFF	OFF	ON				

ANNUCIATOR OVERRIDES

Window	Description	Tagname	Override Type	OVal	AVal	Actime	Dactime	Trig

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8.0 OPERATOR RESPONSE AND INSTRUCTIONAL STRATEGIES

EVENT 1: Power Reduction	
Simulator Operator Actions	
	Ensure Monitored Parameters is open and Scenario Based Testing Variables are loaded.

Simulator Operator Role Play	
	If contacted as the NE for power reduction guidance, inform crew the reactivity plan has power reduced to ~80% (~56 Mlbms) using recirc flow.
	If contacted as the NE to monitor power reduction, inform crew that you will monitor core performance on the computer.
	If contacted as Radwaste operator acknowledge any requests.
	If contacted as the TBAO, to perform prestart checks for the 2C Condensate Pump, report that all prestart checks are SAT.
	If contacted as the Load Dispatcher, acknowledge report that Brunswick Unit Two will be lowering power.

Evaluator Notes	
Plant Response:	Power will be lowered to reduce condensate flow <13,500 gpm.
Objectives:	SRO - Directs power reduction. RO - Perform power reduction using recirc flow.
Success Path:	Condensate flow is reduced to <13,500 gpm by reducing power using recirc flow.
Event Termination:	When condensate flow is reduced to <13,500 gpm go to Event 2.

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EVENT 1: Power Reduction			
Time	Pos	EXPECTED Operator Response	NOTES
	SRO	Conduct shift turnover shift briefing.	
	SRO	Directs power to be reduced using recirculation flow in order to swap Condensate Pumps.	Condensate flow is limited to 13,500 gpm.
	BOP	Monitors the plant	
	OATC	May reference 2OP-02 section 7.1	
	OATC	Request peer checker / reactivity team.	
	OATC	Reduces power using recirculation flow to ~80% power. <ul style="list-style-type: none"> <input type="checkbox"/> Reduce RR Pump speed by depressing the Master Lower fast or Lower medium pushbutton <input type="checkbox"/> Continues lowering Recirc pump reductions until ~80% power. 	The real goal is to reduce power to limit condensate flow to <13,500 gpm.
	OATC	Verifies operation on the Power to Flow Map	

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EVENT 2: SWAP CP	
Simulator Operator Actions	
	When contacted to disable the LOCA and Unit Trip Load Shed switches, Initiate Trigger 1.
	When contacted to enable the LOCA and Unit Trip Load Shed switches, Initiate Trigger 2.

Simulator Operator Role Play	
	When contacted as RW to place an additional CFD and/or CDD in service report that this has already been completed
	If contacted as the TB AO report that the prestart checks for the 2C Condensate pump were complete SAT
	When contacted as the TB AO to disable the LOCA and Unit Trip Load Shed switches acknowledge request, inform Sim Operator to initiate trigger 1 and inform control room that the LOCA Load Shed and Unit Trip Load Shed switches are disabled for the 2C Condensate pump.
	When contacted as the TB AO to enable the LOCA and Unit Trip Load Shed switches acknowledge request, inform Sim Operator to initiate trigger 2 and inform control room that the LOCA Load Shed and Unit Trip Load Shed switches are enabled for the 2A Condensate pump.
	When contacted as the RW operator to secure CFD and/or CDD from service, as needed, acknowledge the request

Evaluator Notes
Plant Response: After condensate flow is reduced to 13,500 gpm, the crew will swap condensate pumps. The crew will re-align LOCA/Unit Trip Load Shed switches.
Objectives: SRO - Directs starting of the 2C Condensate Pump and securing the 2A Condensate Pump. RO - Starts the 2C Condensate Pump and secures the 2A Condensate Pump.
Success Path: 2C condensate pump running and the 2A condensate pump shutdown.
Event Termination: Go to Event 3 at the discretion of the lead evaluator.

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EVENT 2: SWAP CP			
Simulator Operator Actions			
	SRO	Directs BOP to swap Condensate Pumps in accordance with 2OP-32.	
	OATC	Monitors the plant	

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EVENT 2: SWAP CP**Simulator Operator Actions**

BOP

Swaps condensate pumps in accordance with 2OP-32, Section 8.5.

- ☐ Notifies RW operator to place an additional CFD in service.
- ☐ Notifies RW operator to place an additional CDD in service, if needed.
- ☐ Notifies TB AO to perform prestart checks for the 2C Condensate pump (ensures proper motor oil level and motor cooling).
- ☐ Place 2C condensate pump mode selector switch in MAN.
- ☐ Notifies TB AO to place Unit Trip Load Shed and LOCA Load Shed selector switches to DISABLED for the 2C Condensate Pump.
- ☐ Makes a PA announcement for starting 2C condensate Pump.
- ☐ Starts the 2C Condensate Pump.
- ☐ Observes discharge valve opens for the 2C Condensate Pump and condensate discharge pressure stabilizes.
- ☐ Stops the 2A condensate Pump.
- ☐ Places 2A condensate pump mode selector switch in AUTO.
- ☐ Notifies TB AO to place Unit Trip Load Shed and LOCA Load Shed selector switches to ENABLED for the 2A Condensate Pump.
- ☐ Notifies TB AO to place Unit Trip Load Shed and LOCA Load Shed selector switches to DISABLED for the 2C Condensate Pump
- ☐ Informs SCO that Attachment 8 needs to be completed

An initial condition is that condensate flow is limited to 13,500 gpm.

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EVENT 3: NSW PUMP FAILURE	
Simulator Operator Actions	
	At the discretion of the lead evaluator, Initiate Trigger 3 to trip the NSW pump.

Simulator Operator Role Play	
	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

Evaluator Notes	
Plant Response:	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.
Objectives:	SRO - Direct actions for loss of NSW Determine actions required for LCO per Technical Specifications RO - Respond to the failure of an automatic start of the A NSW pump
Success Path:	Determine TS required actions and Start 2A NSW Pump.
Event Termination:	Go to Event 4 at the discretion of the lead evaluator.

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EVENT 3: NSW PUMP FAILURE			
Time	Pos	EXPECTED Operator Response	Comments
	SRO	Direct entry into AOP-18 NSW System Failure.	
	SRO	Contact maintenance to investigate trip of 2B NSW Pump. May also report to I/C that 2A NSW Pump did not auto start.	
	SRO	Evaluate Tech Spec 3.7.2 Service Water System and Ultimate Heat Sink. <ul style="list-style-type: none"> 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 	
	SRO	May direct 2C CSW pump to be placed on the NSW header.	
	OATC	Monitor reactor plant parameters during evolution.	

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EVENT 3: NSW PUMP FAILURE

Time	Pos	EXPECTED Operator Response	Comments
	BOP	Acknowledge / reference UA-18 (6-1) BUS E4 4KV MOTOR OVLD	This is the first alarm in. Will verify on the alarm log which pump has the overload.
	BOP	Recognize trip of 2B NSW pump and lowering NSW system pressure.	
	BOP	Announce and execute 0AOP-18.0, NSW System Failure.	
	BOP	Recognize the failure of the STBY NSW pump to start and starts standby pump. <ul style="list-style-type: none"> Places 2A NSW pump in Manual. Starts 2A NSW Pump. 	
	BOP	Refer to alarms. <ul style="list-style-type: none"> <input type="checkbox"/> UA-01 (1-10) NUCLEAR HEADER SERV WTR PRESS-LOW <input type="checkbox"/> UA-03 (1-5) RBCCW HEAD TANK LEVEL HI/LO <input type="checkbox"/> UA-05 (1-9) FAN CLG UNIT CS PUMP RM A INL PRESS LO <input type="checkbox"/> UA-05 (2-9) FAN CLG UNIT CS PUMP RM B INL PRESS LO 	
	BOP	May align the 2C CSW pump to the NSW header.	

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EVENT 4: APRM 4 FAILURE - UPSCALE	
Simulator Operator Actions	
	At the discretion of the lead evaluator, Initiate Trigger 4 to fail APRM 4.

Simulator Operator Role Play	
	If contacted 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 that the OATC place APRM 4 in a tripped condition to support I&C trouble shooting.

Evaluator Notes	
Plant Response:	APRM 4 will fail upscale resulting in a rod block. The APRM will be declared Inoperable per TS 3.3.1.1, Condition A and placed in trip within 12 hours. WCCSRO will request APRM TS Actions be taken in order to troubleshoot which requires the APRM mode selector switch to be place in INOP IAW 00I-18.
Objectives:	SRO - Determine LCO for APRM 4 inoperability and direct placing channel in trip. RO - Diagnose APRM 4 failure and place in INOP.
Success Path:	ARPM 4 declared inoperable IAW TS 3.3.1.1 and placed in trip condition IAW 00I-18.
Event Termination:	Go to Event 5 at the discretion of the lead evaluator.

EVENT 4: APRM 4 FAILURE - UPSCALE

Time	Pos	EXPECTED Operator Response	Comments
	SRO	Direct actions of APPs	
	SRO	Direct I&C to investigate	
	SRO	<p>Evaluate Tech Spec 3.3.1.1 Reactor Protection System Instrumentation</p> <p>Determine APRM 4 and 2 are inoperable. Determine 2 of 4 the available channels are operable for Function 2.</p> <p>Condition A, Required Action with one or more required channels inoperable, place in trip condition in 12 hours</p> <p>Evaluate TRM 3.3 Control Rod Block Instrumentation</p> <p>Determine one of the required channels is not operable for Function 1 –</p> <p>Condition A - 24 hours to restore to operable.</p>	
	SRO	Refers to OOI-18 for actions to place APRM 4 in a tripped condition.	
	SRO	Direct APRM 4 mode selector switch placed in INOP to allow I&C troubleshooting.	
	BOP	Monitors the plant.	
	OATC	<p>Acknowledges, refers to & reports annunciators</p> <p>A-6 2-8 <i>APRM UPSCALE</i></p> <p>3-7 <i>APRM TROUBLE</i></p> <p>3-8 <i>APRM UPSCALE TRIP/INOP</i></p> <p>A-5 2-2 <i>ROD OUT BLOCK</i></p>	
	OATC	Determines APRM 4 has a critical fault (CPU Failure) and cannot be bypassed (APRM 2 already bypassed).	
	OATC	Places APRM 4 in the tripped condition by placing APRM OPER/INOP mode selector switch in "INOP" on Panel P608.	Will need Key #114 from Control room Key locker

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EVENT 5: HD LEVEL CONTROLLER FAILURE	
Simulator Operator Actions	
	At the discretion of the lead evaluator, Initiate Trigger 5 to activate HDD Controller failure.
	If directed to place controller in Manual or to swap master controllers, Delete CF039F.

Simulator Operator Role Play	
	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, have Sim Operator delete CF039F and report controller in manual maintaining level

Evaluator Notes	
Plant Response:	The Heater Drain Deaerator level control system will fail causing the HD pumps discharge valves to fail full open. The crew will respond per 0AOP-23.0 stop one HD pump before HDD level goes <24 inches and then use the HD-V57 to control HDD level.
Objectives:	SRO - Direct Actions for a Condensate/Feedwater System Failure per 0AOP-23.0 RO - 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 inches and then control HDD level with HD-V57.
Event Termination:	Go to Event 6 when level is being maintained in the deaerator and concurrence from the lead evaluator.

EVENT 5: HD LEVEL CONTROLLER FAILURE

Time	Pos	EXPECTED Operator Response	Comments
	SRO	Direct entry into 0AOP-23.0, Condensate/Feedwater System Failures	
	SRO	May direct lowering power	May need to reduce power to maintain condensate flow <13,500 gpm
	SRO	Direct I&C to investigate HDD level control problem	
	SRO	Direct trip of 1 HD pump and HDD level control with HD-V57	
	SRO	May direct HDD level control to be placed in Manual or swapped.	
	OATC	Plant monitoring	
	OATC	May reduce reactor power IAW 0ENP-24.5 as directed by the CRS	May initiate a manual runback using the pushbutton.

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EVENT 5: HD LEVEL CONTROLLER FAILURE

Time	Pos	EXPECTED Operator Response	Comments
	BOP	Acknowledge and report alarm: UA-4 2-10 HD DEAERATOR LEVEL HIGH-LOW.	Alarm at 30 inches and lowering. Pump trip at 24 inches and lowering.
		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 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.	

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EVENT 6: REACTOR RECIRC PUMP SEAL FAILURE	
Simulator Operator Actions	
	At the discretion of the lead evaluator, Initiate Trigger 6 to activate the RR Pump Seal Leakage.
	When contacted to reset thermals on the A Recirc Loop discharge valve (F031A) delete the malfunction.

Simulator Operator Role Play	
	If contacted to reset the thermals on the Recirc Discharge valve, wait until DW pressure is greater than 1.7 psig, have Sim Operator delete the malfunction and report that the thermals have been reset.
	If contacted as the RBAO to check recirc seal flow indication, acknowledge the request.

Evaluator Notes	
Plant Response:	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. The discharge valve will have thermal overload, can be reset after the crew initiates a reactor scram. A reactor scram signal will occur on high drywell pressure. The auto scram signals will not cause a scram but the manual scram signal will.
Objectives:	SRO - Direct Shift Response To Recirculation Pump Seal Failure. RO - Isolate the Recirc pump and insert a reactor scram.
Success Path:	Recirc pump is being isolated and reactor scram inserted.
Event Termination:	When a manual scram is inserted go to the next event.

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EVENT 6: REACTOR RECIRC PUMP SEAL FAILURE			
Time	Pos	EXPECTED Operator Response	Comments
	SRO	Direct entry into and actions of 0AOP-14.0 for abnormal drywell parameters	
	SRO	Direct Recirc Pump A shutdown then isolated	
	SRO	<i>Direct a reactor manual scram if auto scram has not occurred</i>	<i>Critical Task</i> <i>May direct as conservative decision before scram signal occurs.</i>
	BOP	Monitors the plant.	
	OATC	Review the following alarms during this event: <u>A-06</u> 5-3, OUTER SEAL LEAKAGE FLOW DETECTION HI 6-3, PUMP A SEAL STAGING FLOW HIGH/LOW	
	OATC	Enter and announce AOP-14.0	
	OATC	Stop Recirculation Pump A by: <ul style="list-style-type: none"> <input type="checkbox"/> Depressing the A Recirc Pump VFD STOP pushbutton <input type="checkbox"/> Close Pump A Disch Vlv, B32-F031A. <input type="checkbox"/> Close Seal Injection Vlv, B32-V22 <input type="checkbox"/> Close Pump A Suction Vlv, <input type="checkbox"/> B32-F023A <input type="checkbox"/> Close Disch Bypass Vlv, B32-F032A 	Discharge valve will have a thermal overload.
	OATC	Recognize failure of the discharge valve to close. May dispatch an AO to reset the thermal overload.	
	OATC	Recognize rising DW pressure.	
	OATC	<i>Insert a manual reactor scram.</i>	<i>Critical Task - Inserting a manual Reactor Scram on a failure of an auto scram signal.</i>

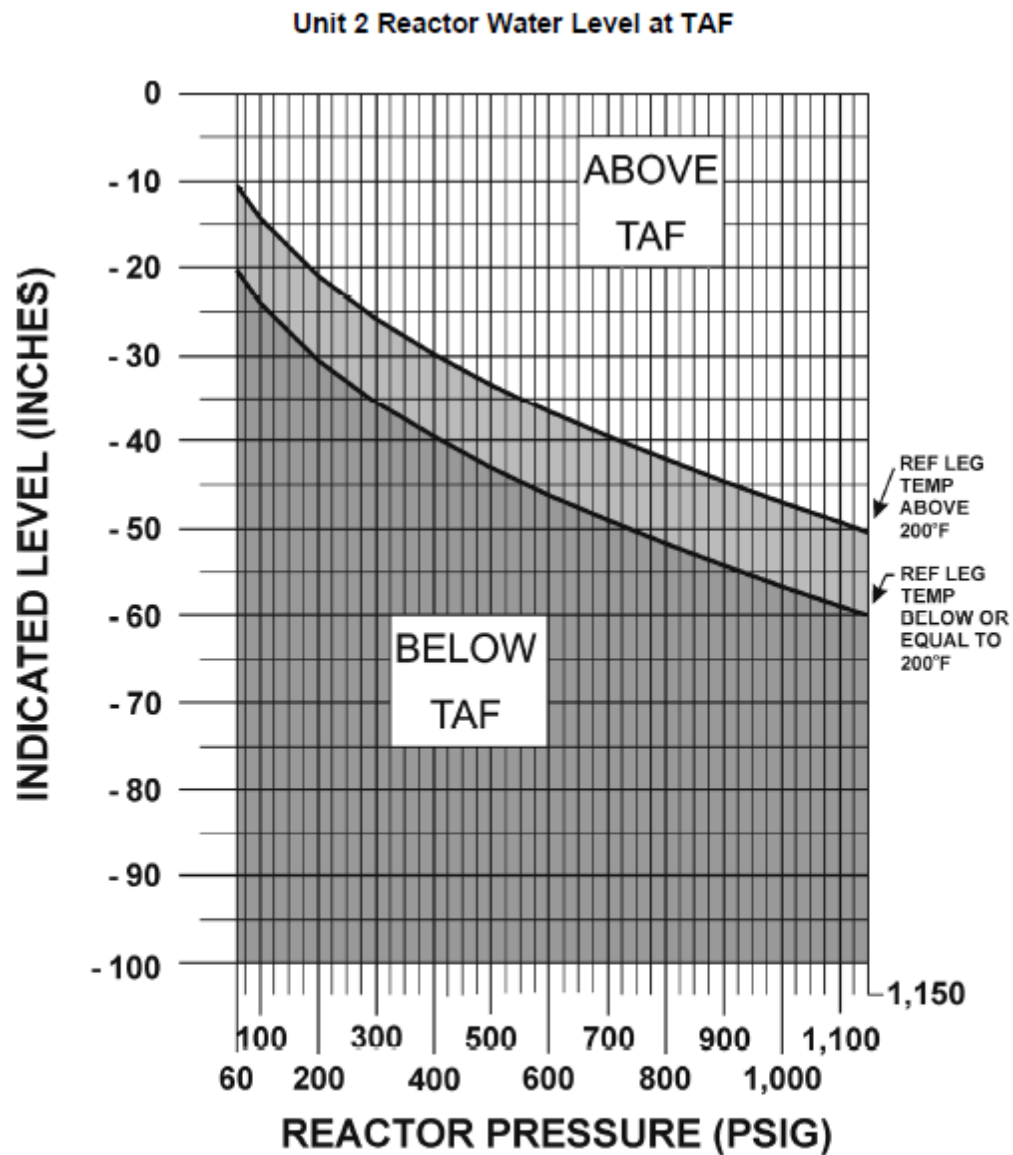
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EVENT 7: ATWS	
Simulator Operator Actions	
	After the manual scram has been inserted modify malfunction RP005F to False.
	If requested to defeat Group I LL3, Initiate Trigger 7.
	If requested to install LEP-02, Section 3 jumpers, modify malfunction RP005F to True
	If requested to defeat Drywell Cooler LOCA Lockout, Initiate Trigger 8.
	If requested to line up SLC to CRD, Initiate Trigger 10.

Simulator Operator Role Play	
	If requested to perform alternate boron injection using CRD, acknowledge the request. When level has been T/P, then inform Sim Operator to initiate trigger 10 and inform control room SLC is being injected via CRD.
	Acknowledge request as I&C to investigate failure of SLC.
	If requested to defeat Group I LL3, wait 2 minutes, inform Sim Operator to initiate trigger # and inform the SCO that the jumpers are installed.
	If requested to install LEP-02, Section 3 jumpers, wait 5 minutes, inform Sim Operator to modify malfunction RP005F 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, inform Sim Operator to initiate trigger 8 and inform the SCO that the jumpers are installed

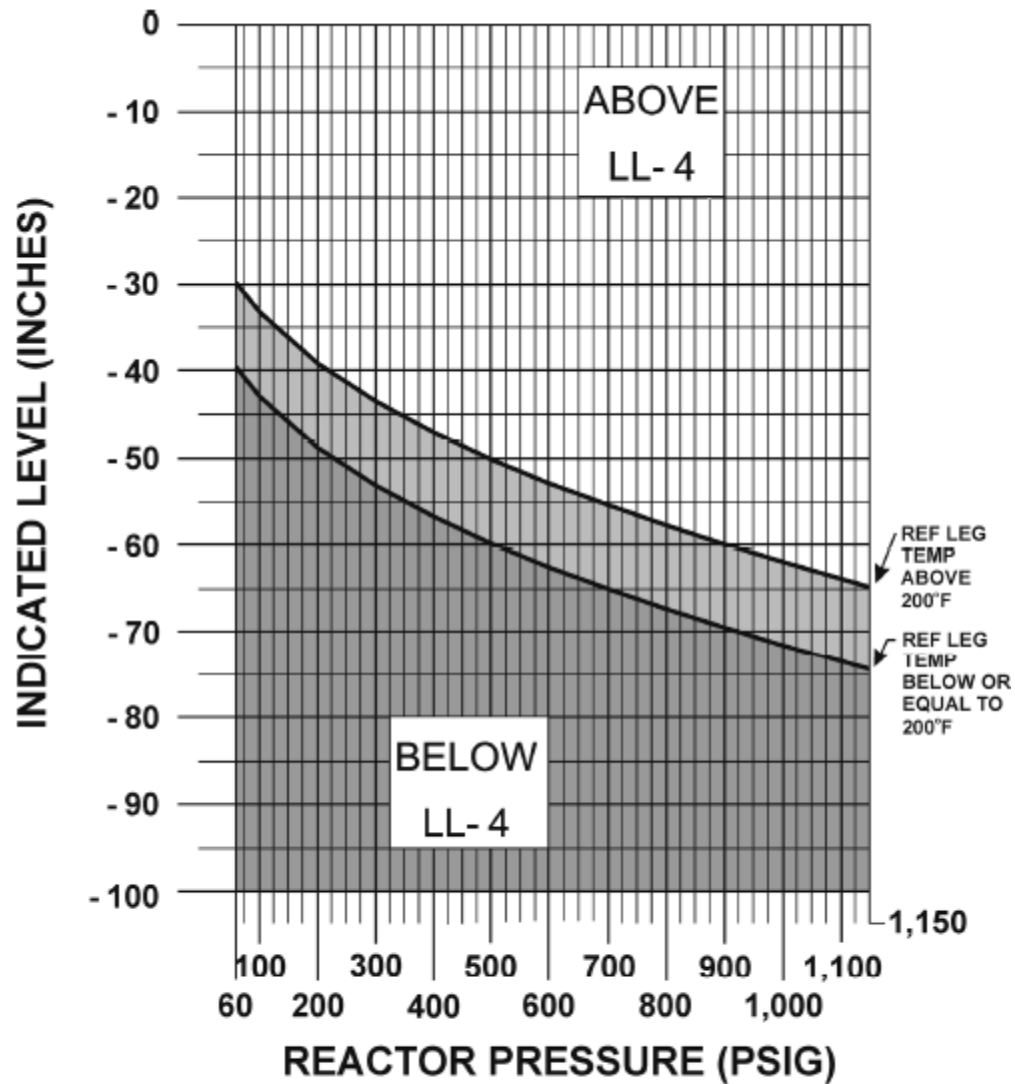
Evaluator Notes	
Plant Response:	When a scram is inserted due to DW pressure an ATWS will occur. Scram discharge volume vents and drain fail closed on the scram, SLC flowpath will have blockage requiring alternate boron injection. Rods will be able to be driven in with RMCS.
Objectives:	SRO - Direct actions to control reactor power per EOP-01-LPC.. RO - Perform actions for an ATWS per EOP-01-LPC.
Success Path:	Injection is terminated and prevented and power is <2%.
Event Termination:	Injection is terminated and prevented to lower power per LPC.

Time	Pos	EXPECTED Operator Response	Comments
	SRO	Enter RSP and transition to LPC. <input type="checkbox"/> Direct mode switch to shutdown when steam flow < 3 Mlbs/hr. <input type="checkbox"/> Direct ARI initiation. <input type="checkbox"/> Direct Recirc Pumps Tripped. <input type="checkbox"/> Direct SLC initiation. <input type="checkbox"/> Direct LEP-03, Alternate boron injection. <input type="checkbox"/> Direct ADS inhibited. <input type="checkbox"/> Direct RWCU isolation verification. <input type="checkbox"/> Direct LEP-02, Alternate Rod Insertion	Critical Task Critical Task
	SRO	Direct Group 10 switches to override reset.	
	SRO	Direct terminate and prevent HPCI/Feedwater (CS/RHR when LOCA signal received) to lower level to 90 inches.	Critical Task
	SRO	When level reaches 90 inches, evaluate Table 3: <input type="checkbox"/> If not met, establishes a level band of LL4 to +90 inches. <input type="checkbox"/> When met, direct injection be or remain terminated.	
	SRO	When Suppression Pool is greater than 95° F, enters PCCP and directs Suppression Pool Cooling.	
	SRO	Directs Drywell cooling restored per SEP-10.	
	SRO	Evaluate TAF and LL4 indicated levels using Caution 1 graphs.	
	SRO	Direct injection established to maintain RPV level LL4 to TAF (or the level at which APRMs indicate downscale)	



WHEN REACTOR PRESSURE IS LESS THAN
60 PSIG, USE INDICATED LEVEL.
TAF IS -7.5 INCHES.

**Unit 2 Reactor Water Level at LL-4
(Minimum Steam Cooling Level)**



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

EVENT 7: ATWS

Time	Pos	EXPECTED Operator Response	Comments
	OATC	Place mode switch to shutdown when steam flow < 3×10^6 lb/hr.	
	OATC	Initiates ARI.	
	OATC	Trips Recirc Pumps.	
	OATC	Initiates SLC.	
	OATC	Recognizes failure of SLC and reports to SCO.	
	OATC	Monitor APRMs for downscale.	
	OATC	<i>Performs LEP-03, Alternate Boron Injection.</i> <input type="checkbox"/> Direct AO to perform LEP-03, Section 1, Alternate Boron Injection using CRD	<i>Critical Task</i>
	OATC	Performs LEP-02, Alternate Rod Insertion. (RMCS Section) <input type="checkbox"/> Insert IRMs. <input type="checkbox"/> When < range 3 on IRMs insert SRMs. <input type="checkbox"/> Start both CRD pumps. <input type="checkbox"/> Place CRD Flow Controller to Manual. <input type="checkbox"/> Throttle open flow controller to establish > 260 drive water psid. <input type="checkbox"/> Bypass RWM. <input type="checkbox"/> <i>Selects control rods and drives in using Emerg rod in notch override.</i>	<i>Critical Task</i>

EVENT 7: ATWS

Time	Pos	EXPECTED Operator Response	Comments
	OATC	<p>Performs LEP-02 Section 3:</p> <ul style="list-style-type: none"><input type="checkbox"/> Inhibit ARI<input type="checkbox"/> Places ARI Initiation Switch to INOP<input type="checkbox"/> Places ARI Reset Switch to RESET and maintains for 5 seconds.<input type="checkbox"/> Verifies red TRIP light above ARI Initiation is OFF<input type="checkbox"/> Request LEP-02 Section 3 Jumpers be installed.<input type="checkbox"/> Reset RPS when scram jumpers installed.<input type="checkbox"/> Ensures Disch Vol Vent & Drain Test switch is in Isolate.<input type="checkbox"/> Confirms Disch Vol Vent Valves V139 and CV-F010 are closed<input type="checkbox"/> Confirms Disch Vol Drain valves V140 and CV-F011 are closed.<input type="checkbox"/> Resets RPS.<input type="checkbox"/> Place Disch Vol Vent & Drain Test switch to Normal<input type="checkbox"/> Recognize/report failure of scram discharge volume vents and drains.	

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EVENT 7: ATWS

Time	Pos	EXPECTED Operator Response	Comments
	BOP	Places ADS in inhibit.	
	BOP	Verifies Isolation of RWCU.	
	BOP	Places Group 10 switches to override / reset	
	BOP	<i>Terminate and prevent injection to RPV.</i> <ul style="list-style-type: none"> <input type="checkbox"/> Terminates and prevents HPCI IAW Hard Card. <input type="checkbox"/> Terminates and Prevents Feedwater IAW Hard Card. 	<i>Critical Task</i> See Enclosure 1 for actions for HPCI T/P. See Enclosure 3 for actions for C&F T/P.
	BOP	May place HPCI in service for level control during ATWS when directed by the CRS.	See Enclosure 2 for HPCI Restart actions
	BOP	Restart RFP to maintain level as directed by CRS	See Enclosure 4 for RFP Restart actions

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EVENT 8: ALL RODS IN	
Simulator Operator Actions	
	When directed by the lead evaluator, delete the following commands: <ul style="list-style-type: none"> <input type="checkbox"/> Malfunction - RD036F, Scram Disch Vol Drn Fails Closed <input type="checkbox"/> Malfunction – RP010F, ATWS 3 (Make sure RPS is reset and scram air header pressurized before deleting)
	When directed by the lead evaluator, place the simulator in FREEZE
	DO NOT RESET THE SIMULATOR PRIOR TO RECEIPT OF CONCURRENCE TO DO SO FROM THE LEAD EXAMINER

Simulator Operator Role Play	
	After Sim Operator has deleted SDV malfunction, Inform the CRS that a loose wire was found on the SDV vent and drain logic and it has been repaired.
	If contacted as the RB AO, acknowledge request to secure Alternate Boron Injection

Evaluator Notes	
Plant Response:	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.
Objectives:	SRO - Directs actions for an ATWS. RO - Insert control rods IAW LEP-02.
Success Path:	Rods inserted with LEP-02, Alternate Rod Insertion.
Scenario Termination:	<i>When all rods are inserted and level is being controlled above TAF the scenario may be terminated.</i> Remind students not to erase any charts and not to discuss the scenario until told to do so by the evaluator/instructor.

EVENT 8: ALL RODS IN

Time	Pos	EXPECTED Operator Response	Comments
	SRO	Exit LPC and enter RVCP when all rods are in.	
	SRO	Direct securing Alternate Boron Injection.	
	SRO	Direct level restored to 170 – 200 inches after rods are all in.	
	OATC	Confirms Disch Vol Vent & Drains are open when reported fixed.	
	OATC	<i>Inserts a scram after discharge volume has drained for ~2 minutes.</i>	<i>Critical task</i>
	OATC	Reports all rods in.	
	OATC	Directs AO to secure Alternate Boron Injection.	
	BOP	Maintains reactor pressure as determined by the CRS.	
	BOP	Maintains level as directed by the SCO.	
	BOP	Restores level to 170 – 200 inches after all rod inserted.	See Enclosure 4 for restart of Condensate & Feedwater.

ENCLOSURE 1

Page 1 of 1

SECURING HPCI INJECTION**8.12.1 INITIAL CONDITIONS**

1. **WHEN DIRECTED** BY 2EOP-01-LPC TO "TERMINATE AND PREVENT" HPCI INJECTION, **OR** ☐
2. **WHEN DIRECTED** BY 0EOP-01-RXFP TO "TERMINATE AND PREVENT" HPCI INJECTION, **OR** ☐
3. **WHEN** PERMISSION GIVEN BY THE UNIT CRS TO SECURE HPCI INJECTION WITH A HPCI AUTO START SIGNAL PRESENT. ☐

8.12.1 PROCEDURAL STEPS

1. **IF** HPCI IS **NOT** OPERATING, **PERFORM** THE FOLLOWING:
 - a. **PLACE** HPCI AUXILIARY OIL PUMP CONTROL SWITCH IN PULL-TO-LOCK. ☐
2. **IF** HPCI IS OPERATING, **PERFORM** THE FOLLOWING:
 - a. **DEPRESS AND HOLD** THE HPCI TURBINE TRIP PUSHBUTTON. ☐
 - b. **WHEN** HPCI TURBINE SPEED IS 0 RPM, **AND** HPCI TURBINE CONTROL VALVE, E41-V9 IS CLOSED, **THEN PLACE** HPCI AUXILIARY OIL PUMP CONTROL SWITCH IN PULL-TO-LOCK. ☐
 - c. **WHEN** HPCI TURB BRG OIL PRESS LO, A-01 4-2, IS SEALED IN, **THEN RELEASE** THE HPCI TURBINE TRIP PUSHBUTTON. ☐
 - d. **ENSURE** HPCI TURBINE STOP VALVE, E41-V8, **AND** HPCI TURBINE CONTROL VALVE, E41-V9, REMAIN CLOSED, **AND** HPCI DOES **NOT** RESTART. ☐

ENCLOSURE 2

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HPCI INJECTION IN EOPs

1. **IF** HPCI IS TRIPPED ON HIGH WATER LEVEL, **DEPRESS** HIGH WATER LEVEL SIGNAL RESET, E41-S25, PUSH BUTTON, **AND ENSURE** THE INDICATING LIGHT IS OFF. ☐
2. **ENSURE** AUXILIARY OIL PUMP IS **NOT** RUNNING ☐
3. **ENSURE** E41-V9 AND E41-V8 ARE CLOSED ☐
4. **OPEN** E41-F059 ☐
5. **PLACE** HPCI FLOW CONTROL, E41-FIC-R600, IN MANUAL (M), **AND ADJUST** OUTPUT DEMAND TO APPROXIMATELY MIDSCALE, USING THE MANUAL LEVER. ☐
6. **START** VACUUM PUMP **AND LEAVE** IN START ☐
7. **OPEN** E41-F001 ☐
8. **START** AUXILIARY OIL PUMP **AND LEAVE** IN START ☐
9. **OPEN** E41-F006, IMMEDIATELY AFTER E41-V8 HAS DUAL INDICATION ☐
10. **ENSURE** E41-V9 AND E41-V8 ARE OPEN ☐
11. **WHEN** SPEED STOPS INCREASING, **THEN ADJUST** SPEED TO APPROXIMATELY 2100 RPM ☐
12. **ADJUST** HPCI FLOW CONTROL, E41-FIC-R600, TO OBTAIN DESIRED FLOW RATE ☐
13. **ENSURE** E41-F012 IS CLOSED WHEN FLOW IS GREATER THAN 1400 GPM ☐
14. **ADJUST** HPCI FLOW CONTROL, E41-FIC-R600, SETPOINT TO MATCH SYSTEM FLOW, AND THEN PLACE E41-FIC-R600 IN AUTO (A) ☐
15. **ENSURE** E41-F025 AND E41-F026 ARE CLOSED ☐
16. **START** SBTG (OP-10) ☐
17. **ENSURE** BAROMETRIC CNDSR CONDENSATE PUMP IS OPERATING ☐

ENCLOSURE 3

Page 1 of 1

Terminating and Preventing Injection From Condensate and Feedwater During EOP's (2OP-32)

1. **IF** desired **TRIP** all operating RFPs. ☐
2. **IF** one or more RFPs are in service **IDLE** one RFP as follows:
 - a. **IF** two RFPs are operating **THEN TRIP** one. ☐
 - b. **PERFORM** either of the following for the operating RFP:
 1. **PLACE** MAN/DFCS control switch to MAN. ☐
 2. **RAPIDLY REDUCE** speed to approximately 1000 rpm with the LOWER/RAISE speed control switch. ☐
- OR**

 1. **PLACE** RFPT Speed Control in M (MANUAL) ☐
 2. **SELECT** DEM and **RAPIDLY REDUCE** speed to approximately 2550 rpm. ☐
3. **CLOSE** the following valves:
 - FW HTR 5A OUTLET VLVS, FW-V6 ☐
 - FW HTR 5B OUTLET VLVS, FW-V8 ☐

OR

 - FW HTR 4A INLET VLV, FW-V118 ☐
 - FW HTR 4B INLET VLV, FW-V119 ☐
4. **ENSURE** the SULCV is closed by performing the following:
 - a. **PLACE** SULCV, in M (Manual). ☐
 - b. **SELECT** DEM and **DECREASE** signal until VALVE DEM indicates 0%. ☐
5. **ENSURE** FW-V120, is closed. ☐

ENCLOSURE 4

Page 1 of 2

Feedwater Level Control Following a Reactor Scram**NOTE** This attachment is **NOT** to be used for routine system operation.

1. **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 ☐
2. **PLACE** the MSTR RFPT SP/RX LVL CTL in M (MANUAL), **THEN**:
 - **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 ☐

ENCLOSURE 4

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. **ENSURE** MAN/DFCS control switch in DFCS ☐
- 6. **RAISE** RFPT A(B) SP CTL speed until discharge pressure is greater than or equal to 100 psig above reactor pressure ☐
- 7. **ADJUST** SULCV to establish desired injection ☐
- 8. **IF** desired, **THEN PLACE** SULCV in A (AUTO) ☐
- 9. **IF** needed, **THEN THROTTLE** FW-V120 ☐
- 10. **IF** needed, **THEN GO TO** 2OP-32 Section 8.17 for level control ☐

ATTACHMENT 1 - Scenario Quantitative Attribute Assessment

Category	NUREG 1021 Rev. 2 Supp. 1 Req.	Scenario Content
Total Malfunctions	5-8	8
Malfunctions after EOP Entry	1-2	3
Abnormal Events	2-4	3
Major Transients	1-2	1
EOPs Used	1-2	2
EOP Contingency	0-2	2
Run Time	60-90 min	90
Crew Critical Tasks	2-3	4
Tech Specs	2	2
Instrument / Component Failures before Major	2 – OATC 2 - BOP	4
Instrument / Component Failures after Major	2	2
Normal Operations	1	1
Reactivity manipulation	1	1

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ATTACHMENT 2 – Shift Turnover

Brunswick Unit 2 Plant Status					
Station Duty Manager:				Workweek Manager:	
Mode:	1	Rx Power:	90%	Gross*/Net MWe*:	869 / 848
Plant Risk: Current EOOS Risk Assessment is:	Green				
SFP Time to 200 Deg F:	128.7 hrs			Days Online:	42 days
Turnover:	Swap condensate pumps, Start 2C, Secure 2A. Feedwater Temperature Reduction will be implemented this weekend				
Protected Equipment:	2A / 2B NSW Pumps				
Comments:	APRM 2 has failed downscale and is bypassed. 1A NSW pump is under clearance for motor rebuild 2A Condensate Pump will be placed under clearance later in the shift.				

Action Statements in Effect					
Item	Date/Time	Reference	Required Actions	Responsibility	Due



BRUNSWICK TRAINING SECTION
OPERATIONS TRAINING
INITIAL LICENSED OPERATOR
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2014 NRC SCENARIO 4

IRM failure, CRD Pump Failure, Swap SPE, Stack Rad Monitor Failure, Raise Power, Difficult to move rod, SULCV Failure, Rods Drift, SRV Failure, Tailpipe Rupture, ED

REVISION 0

Developer: Robert Bolin	Date: 7/18/2014
Technical Review: Lou Sosler	Date: 7/18/2014
Validator: Derek Pickett	Date: 7/18/2014
Validator: Bruce Leitch	Date: 7/18/2014
Facility Representative: Jerry Pierce	Date: 8/15/2014

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REVISION SUMMARY	
0	Scenario developed for 2014 Exams.

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5.0	IMPLEMENTING REFERENCES	7
6.0	SETUP INSTRUCTIONS.....	8
7.0	INTERVENTIONS.....	10
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1.0 SCENARIO OUTLINE

Event	Malf. No.	Type*	Event Description
1	NI018F		IRM C Fails Upscale (TS)
2		C-RO	CRD Pump trip (AOP)
3		N	Shift Steam Packing Exhauster
4	ED-IAUPB2A6 K5608A K5609A	C-BOP	Stack Rad Monitor Failure - RBV failure to isolate (TS)(AOP)
5a		R-RO	Raise Reactor Power by Pulling Control Rods
5b	RD012M RD032M	C-RO	Difficult to Move Control Rod (AOP)
6	CF035F	C-BOP	SULCV failure (AOP)
7	RD005M	M	4 Control Rods Drift / Scram
8	ES004F CA020F	C C M	SRV Failure (AOP) Tailpipe Rupture ED
*(N)ormal, (R)eactivity, (C)omponent or Instrument, (M)ajor			

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2.0 SCENARIO DESCRIPTION SUMMARY

Event	Description
1	The crew will continue raising power by pulling control rods in preparation for placing the Mode switch to RUN. Rod pulls will commence at Step 166 (10-23 @ 12) of the A2X sequence. While withdrawing control rod 10-23 from position 12, IRM C will fail upscale causing a rod block and half scram. SRO will address IRM A and C inoperability IAW TS 3.3.1.1. Once addressed, I&C 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.
2	The running CRD pump will trip and the crew will start the 2B CRD Pump IAW 2OP-08.
3	Maintenance will contact the control room and request SPEs be swapped due to low oil level. Shift Steam Packing Exhausters (SPE) IAW 2OP-26.1, Section 8.
4	Power to the Main Stack Radiation Monitor will fail. The loss of power will result in a Group 6 Isolation signal, but the Reactor Building Ventilation will fail to isolate and must be manually isolated. Technical Specifications will be addressed. AOP-12 will be entered.
5	Control rods will continue to be withdrawn raising power. When control rod 26-23 is selected for withdrawal, it will be stuck at position 12. AOP-02 may be entered and 2OP-07, Section 8.2 actions are required to withdraw a difficult intermediate control rod.
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.
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.
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. SRV F tailpipe will rupture, pressurizing containment. Emergency Depressurization is required.

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3.0 CREW CRITICAL TASKS

Description
Insert a manual Reactor Scram when more than 1 control rod is drifting.
Emergency Depressurize the RPV when PSP has been exceeded.

4.0 TERMINATION CRITERIA

When control rods are inserted, the Reactor is depressurized, level is being restored to normal band, and Containment and Drywell Sprays are being place in service, the scenario may be terminated.

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5.0 IMPLEMENTING REFERENCES

NOTE: Refer to the most current revision of each Implementing Reference.

Number	Title
A-05, 1-7	Reactor Auto Scram Sys A
A-05, 4-7	Neut Mon Sys Trip
A-05, 2-4	IRM Upscale
A-05, 2-2	Rod Out Block
A-05, 3-4	IRM A Upscale/Inop
UA-02, 4-5	Gland Seal Vacuum Loss
UA-03, 5-4	Process OG Vent Pipe Rad Hi-Hi
UA-03, 6-3	Process Smpl OG Vent Pipe Dnsc/Inop
UA-03, 6-4	Process OG Vent Pipe Rad Hi
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-05, 3-5	SBGT Sys B Failure
UA-05, 4-6	SBGT Sys A Failure
UA-05, 6-10	Rx Bldg Isolated
UA-25, 1-8	Ctmt Atmos Rad Mon Dnsc/Inop
A-07, 2-2	Reactor Water Level High/Low
0AOP-30.0	Safety/Relief Valve Failures
0AOP-23.0	Condensate/Feedwater System Failures
0AOP-12.0	Loss of Uninterruptible Power Supply (UPS)
0AOP-02.0	Control Rod Malfunction/Misposition
2OP-02, Section 6.3.7	Restoring Seal Purge Flow with Pump Running – Seal Leakage Normal
2OP-07, Section 6.4.2	Control Rod Difficult To Withdraw And Control Rod NOT At Position 00
2OP-08, Section 6.3.20	Restarting CRD Hydraulic System Following Loss of CRD Pump
2OP-26.1, Section 8.1	Shifting Steam Packing Exhausters

6.0 SETUP INSTRUCTIONS

1. **PERFORM** TAP-409, Miscellaneous Simulator Training Guidelines, Attachment 5, Checklist for Simulator Exam Security.
2. **RESET** the Simulator to IC-06.
3. **ENSURE** the RWM is set up as required for the selected IC.
4. **ENSURE** appropriate keys have blanks in switches.
5. **RESET** alarms on SJAE, MSL, and RWM NUMACs.
6. **ENSURE** no rods are bypassed in the RWM.
7. **PLACE** all SPDS displays to the Critical Plant Variable display (#100).
8. **ENSURE** hard cards and flow charts are cleaned up
9. **TAKE** the SIMULATOR OUT OF FREEZE
10. **ALIGN** the plant as follows:

Manipulation
<ol style="list-style-type: none"> 1. Insert control rods until Step 165 of GP-10, Sequence A2X is completed. 2. Ensure Step 6.3.46 of OGP-02 is complete. 3. Check scavenging steam valves are closed.

11. **LOAD** Scenario File.
12. **IF desired**, take a **SNAPSHOT** and save into an available IC for later use.
13. **PLACE** a clearance on the following equipment.

Component	Position
IRM A (Blue Tag)	Bypassed

14. **INSTALL** Protected Equipment signage and **UPDATE** RTGB placard as follows:
 - a. ADHR / FPC/ Demin Transfer Pump

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15. **ENSURE** each Implementing References listed in Section 7 is intact and free of marks.
16. **ENSURE** all materials in the table below are in place and marked-up to the step identified.

Required Materials
None

17. **ENSURE** Station Duty Manager and Work Week Manager names are filled in on the Shift Turnover Sheet.
18. **ADVANCE** the recorders to prevent examinees from seeing relevant scenario details.
19. **PROVIDE** Shift Briefing sheet for the CRS.
20. **VERIFY** all actions contained in TAP-409, Miscellaneous Simulator Training Guidelines, Attachment 4, Simulator Training Instructor Checklist, are complete.

7.0 INTERVENTIONS

TRIGGERS

Trig	Type	ID
1	Malfunction	NI018F - [IRM C FAILS HI]
2	Malfunction	RD032M - [CONTROL ROD WITHDRAWAL SLUGGISH]
2	Trigger Command	mfd:rd012m,26-23
3	Remote Function	ED_IAUPB2A6 - [UPS LOAD BKR DIST PNL 2A TO SMPL DT SKD]
4	Malfunction	CF035F - [S/U LVL CONT VLV FAILS CLOSED]
5	Malfunction	RD001M - [CONTROL ROD SLOW INSERTION DRIFT]
5	Malfunction	RD001M - [CONTROL ROD SLOW INSERTION DRIFT]
5	Malfunction	RD001M - [CONTROL ROD SLOW INSERTION DRIFT]
5	Malfunction	RD001M - [CONTROL ROD SLOW INSERTION DRIFT]
6	Malfunction	ES004F - [ADS VALVE F FAILS OPEN]
7	Malfunction	CA020F - [SRV F TAIL PIPE RUPTURE]
9	Remote Function	ED_IAUPDSSW - [UPS SAMPLE DET SKD XFER SW (N=U2/A=U1)]
10	Trigger Command	did:k5608a
11	Trigger Command	did:k5609a
12	DO Override	Q1508RRJ - [SRV VLV B21-F013F RED]
12	DO Override	Q1520SA9 - [AMBER LED +5V]
12	DO Override	Q1508LGJ - [SRV VLV B21-F013F GREEN]
13	Malfunction	RD183F - [CRD PUMP MOTOR WINDING FAULT]
15	Trigger Command	dod:Q1717 gn
16	Trigger Command	dod:Q1217 gn

Trig #	Trigger Text
1	K2324JGD - [NOTCH OVERRIDE]
2	G2910G1D >= 0.857 - [DRIVE HEADER D/P] Greater Than Or Equal To 0.857
7	K1508BNJ - [MAN DEPRESS VLV B21-F013F]
10	K5608JCV - [RB VENT INBD ISOL VALVES CLOSE]
11	K5609JCV - [RB VENT OTBD ISOL VALVES CLOSE]
15	K1717ENN - [TORUS ISO VLV E11-F028B]
16	K1217ENN - [TORUS ISO VLV E11-F028A]

MALFUNCTIONS

Malf ID	Mult ID	Description	Current Value	Target Value	Rmp time	Actime	Dactime	Trig
NI018F		IRM C FAILS HI	False	True				1
RD032M	26-23	CONTROL ROD WITHDRAWAL SLUGGISH	False	True				2
RD012M	26-23	STUCK CONTROL ROD	True	True				
CF035F		S/U LVL CONT VLV FAILS CLOSED	False	True				4
ES004F		ADS VALVE F FAILS OPEN	False	True				6
CA020F		SRV F TAIL PIPE RUPTURE	False	True				7
RD001M	10-39	CONTROL ROD SLOW INSERTION DRIFT	False	True				5
RD001M	14-19	CONTROL ROD SLOW INSERTION DRIFT	False	True		00:00:03		5
RD001M	34-39	CONTROL ROD SLOW INSERTION DRIFT	False	True		00:00:06		5
RD001M	42-15	CONTROL ROD SLOW INSERTION DRIFT	False	True		00:00:10		5
RD183F	A	CRD PUMP MOTOR WINDING FAULT	False	True				13

REMOTES

Remf Id	Mult Id	Description	Current Value	Target Value	Rmp time	Actime	Trig
ED_IAUPB2A6		UPS LOAD BKR DIST PNL 2A TO SMPL DT SKD	CLOSE	OPEN			3
ED_IAUPDSSW		UPS SAMPLE DET SKD XFER SW (N=U2/A=U1)	NORMAL	ALT			9
RH_ZVRH28BM		E11-F028B TORUS ISOLATION	OFF	OFF			
RH_ZVRH28AM		E11-F028A TORUS ISOLATION	OFF	OFF			

PANEL OVERRIDES

Tag ID	Description	Position / Target	Actual Value	Override Value	Rmp time	Actime	Dactime	Trig
K5608A	RB VENT INBD ISOL VALVES OPEN	OPEN	OFF	ON				
K5609A	RB VENT OTBD ISOL VALVES OPEN	OPEN	OFF	ON				
Q1508LGJ	SRV VLV B21-F013F GREEN	ON/OFF	ON	OFF				12
Q1508RRJ	SRV VLV B21-F013F RED	ON/OFF	OFF	OFF				12
Q1520SA9	AMBER LED +5V	ON/OFF	OFF	OFF				12
Q1717LGN	TORUS ISOL E11-F028B GREEN	ON/OFF	OFF	ON				
Q1217LGN	TORUS ISO VLV E11-F028A GREEN	ON/OFF	OFF	ON				

ANNUNCIATOR OVERRIDES

Window	Description	Tagname	Override Type	OVal	AVal	Actime	Dactime	Trig

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8.0 OPERATOR RESPONSE AND INSTRUCTIONAL STRATEGIES

EVENT 1: SHIFT TURNOVER, RAISE REACTOR POWER, IRM C FAILURE	
Simulator Operator Actions	
	Ensure Monitored Parameters is open and Scenario Based Testing Variables are loaded.
	While continuously withdrawing control rods, verify Trigger 1 initiates when Rod Withdrawal Switch is taken to Notch Override, to fail IRM C upscale.

Simulator Operator Role Play	
	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.
	If asked as the RE, continuous rod withdrawal is allowed.

Evaluator Notes	
Plant Response:	The crew will continue raising power by pulling control rods in preparation for placing the Mode switch to RUN. Rods pulls will commence at Step 166 (10-23 @ 12) of the A2X sequence. While withdrawing control rod 10-23 from position 12, IRM C will fail upscale causing a rod block and half scram.
Objectives:	SRO - Directs and monitor reactor power ascension with control rods Determine Technical Specification application. RO - Withdraw control rods to raise reactor power. Perform actions for IRM C failure
Success Path:	Declare IRM A operable by channel check and bypass IRM C with tracking LCO for IRM C.
Event Termination:	Go to Event 2 at the discretion of the Lead Evaluator.

EVENT 1: SHIFT TURNOVER, RAISE REACTOR POWER, IRM C FAILURE

Time	Pos	EXPECTED Operator Response	Comments
	SRO	Conduct shift turnover shift briefing.	
	SRO	Ensures no other distracting evolutions are in progress while reactivity controls are being manipulated.	
	SRO	Directs RO to raise reactor power by withdrawing control rods IAW OGP-10 Item 10 Step 166. (Continuous withdrawal allowed).	
	SRO	Directs APP reference.	
	SRO	Contacts I&C for IRM C failure. May contact Shift Manager also.	
	SRO	References TS 3.3.1.1 and determines with IRMs A & C inoperable: Condition A is applicable for Function 1a <u>Required Action</u> A.1 is required within 12 hours.	
	SRO	May enter TRM 3.3 (Control Rod Block Instrumentation) Function 3 Condition A, Tracking LCO.	
	SRO	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 Definitions provide guidance as to how.
	SRO	Directs IRM A channel check be performed.	Channel Check definition in the RO DSR.

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EVENT 1: SHIFT TURNOVER, RAISE REACTOR POWER, IRM C FAILURE			
Time	Pos	EXPECTED Operator Response	Comments
	SRO	Determines IRM A is operable	
	SRO	Directs removing IRM A from Bypass	
	SRO	Directs bypassing IRM C	
	SRO	Directs resetting half scram	
	BOP	Monitors the plant	

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EVENT 1: SHIFT TURNOVER, RAISE REACTOR POWER, IRM C FAILURE

Time	Pos	EXPECTED Operator Response	Comments
	OATC	Commence rod withdrawal at step 166 of GP-10 per guidance of OI-01.02	
	OATC	<u>2OP-07 Continuous Rod Withdraw</u> 1. ENSURE ROD SELECT POWER control switch is in ON. 2. SELECT desired control rod by depressing its CONTROL ROD SELECT push button. 3. ENSURE the backlighted CONTROL ROD SELECT push button is brightly illuminated AND the white indicating light on the full core display is also illuminated. 4. ENSURE ROD WITHDRAWAL PERMISSIVE indication has illuminated. 5. CONTINUOUSLY WITHDRAW control rod to position designated on GP pull sheets by holding EMERGENCY ROD IN NOTCH OVERRIDE switch to OVERRIDE, while simultaneously holding ROD MOVEMENT switch to NOTCH OUT. 6. MONITOR control rod position AND nuclear instrumentation while withdrawing the control rod. 7. PERFORM the following for control rods to be fully withdrawn: a. WHEN control rod reaches position 48, THEN PERFORM either of the following: - MAINTAIN the continuous withdraw signal for the desired time - APPLY a separate notch withdraw signal. b. ENSURE control rod does NOT retract beyond position 48. (ref. SR 3.1.3.4) c. RELEASE ROD MOVEMENT and EMERGENCY ROD IN NOTCH OVERRIDE switches, if used. d. ENSURE control rod settles at position 48 AND rod settle light extinguishes. e. ENSURE control rod reed switch position indicators agree with FULL OUT indication on full core display.	
	OATC	Stops withdrawing control rods when IRM C fails upscale. <i>ROD OUT BLOCK</i>	

EVENT 1: SHIFT TURNOVER, RAISE REACTOR POWER, IRM C FAILURE

Time	Pos	EXPECTED Operator Response	Comments
	OATC	Determines IRM C failed upscale.	
	OATC	<p>Responds and reports applicable alarms for IRM C failing upscale. A-5</p> <p><i>1-7 REACTOR AUTO SCRAM SYS A</i></p> <p><i>4-7 NEUT MON SYS TRIP</i></p> <p><i>2-4 IRM UPSCALE</i></p> <p><i>2-2 ROD OUT BLOCK</i></p> <p><i>3-4 IRM A UPSCALE/INOP</i></p>	
	OATC	<p>A-5 IRM A UPSCALE/INOP actions:</p> <p>May Reposition range switch for IRM C to bring indicated power to between 15 and 50 on the 0-125 scale.</p> <p>May verify IRM C Drawer Selector switch (Control Panel H12-P606) is in OPERATE.</p> <p>May notify SRO of Tech Spec applicability</p>	
	OATC	May inform SRO IRM C cannot be bypassed and half scram cannot be reset due to IRM A being bypassed.	
	OATC	Performs channel check of IRM A for operability. RO DSR Item # 9 (IRM channel check) 2OI-03.2, Definition 5.1.	
	OATC	Removes IRM A from Bypass	
	OATC	Bypasses IRM C per APP guidance.	
	OATC	Resets half scram per APP guidance.	

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EVENT 2: CRD PUMP TRIP	
Simulator Operator Actions	
	At the discretion of the Lead Evaluator, Initiate trigger 13 to trip the 2A CRD Pump.

Simulator Operator Role Play	
	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 6.3.7.2, 6.3.7.3, 6.3.7.6, 6.3.7.7, or 6.3.7.8, report actions complete.

Evaluator Notes	
Plant Response:	The running CRD Pump will trip requiring the other pump to be started IAW 2OP-08, Section 6.3.20. The crew will also use 2OP-02, Section 6.3.7 for establishing seal purge flow.
Objectives:	SRO - Directs start of standby CRD Pump. RO – Starts standby CRD Pump IAW 2OP-08, Section 6.3.20.
Success Path:	CRD Pump B placed in service.
Event Termination:	Go to Event 3 at the discretion of the Lead Evaluator.

EVENT 2: CRD PUMP TRIP

Time	Pos	EXPECTED Operator Response	Comments
	SRO	Direct AOP-02 entry. Direct monitoring for HCU alarms	
	SRO	Direct stopping power changes in progress.	
	SRO	Contact maintenance to investigate CRD Pump failure.	
	SRO	Direct starting standby CRD pump IAW OP-08, Section 6.3.20.	
	BOP	Monitor plant parameters.	
	OATC	Announce and Enter 0AOP-02.	
	OATC	Restart CRD IAW 2OP-08, Section 6.3.20: <ul style="list-style-type: none"> <input type="checkbox"/> CLOSE SEAL INJECTION VALVE, B32-V22, for Recirc Pump A. <input type="checkbox"/> CLOSE SEAL INJECTION VALVE, B32-V30, for Recirc Pump B. <input type="checkbox"/> PLACE CRD FLOW CONTROL, C12-FC-R600, in <i>MAN</i> <input type="checkbox"/> REDUCE potentiometer to minimum setting. <input type="checkbox"/> ENSURE DRIVE PRESS VLV, C12-PCV-F003, is fully open. <input type="checkbox"/> ENSURE RBCCW is in operation to supply cooling water to CRD pumps. <input type="checkbox"/> May direct an AO to perform prestart checks for the 2B CRD Pump. <input type="checkbox"/> START CRD Pump B. 	May do a PA announcement for starting the CRD pump.

EVENT 2: CRD PUMP TRIP

Time	Pos	EXPECTED Operator Response	Comments
	OATC	<input type="checkbox"/> RAISE CRD flow rate to between 30 and 60 gpm, by adjusting manual potentiometer on CRD FLOWCONTROL, C12-FC-R600. <input type="checkbox"/> 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) <input type="checkbox"/> NULL CRD FLOW CONTROL, C12-FC-R600, by adjusting the setpoint tape. <input type="checkbox"/> SHIFT CRD FLOW CONTROL, C12-FC-R600, to AUTO. <input type="checkbox"/> 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. <input type="checkbox"/> ENSURE CRD flow rate is between 30 and 60 gpm. <input type="checkbox"/> ESTABLISH drive water header differential pressure between 260 and 275 psid on C12-PDI-R602 on Panel P603, by throttling closed DRIVE PRESS VLV, C12-PCV-F003. <input type="checkbox"/> MONITOR operation of CRD System.	
	OATC	Restore seal purge flow IAW OP-02: <ul style="list-style-type: none"> ○ Direct AO to perform Steps 6.3.7.2 and 6.3.7.3 ○ ENSURE SEAL INJECTION VLV, B32-V22(V30) is open. ○ ENSURE the CRD System is in operation. ○ Direct AO to perform Steps 6.3.7.6, 6.3.7.7, and 6.3.7.8. 	

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EVENT 3: SHIFT STEAM PACKING EXHAUSTERS	
Simulator Operator Actions	

Simulator Operator Role Play	
	Following half scram reset and by direction of the Lead examiner, Contact the control room as Maintenance and request SPE A be shutdown due to low oil level to prevent equipment failure.
	As AO, when requested, report MVD-V52 is open
	As AO, when requested, report MVD-V51 is closed

Evaluator Notes	
Plant Response:	Maintenance will contact the control room and request SPEs be swapped due to low oil level in SPE A. Shift SPE IAW 2OP-26.1, Section 8.1.
Objectives:	SRO - Directs SPE shift A to B. RO - Shift SPEs IAW 2OP-26.1, Section 8.1.
Success Path:	SPE B placed in service and SPE A shutdown IAW 2OP-26.1, Section 8.1.
Event Termination:	Go to Event 4 at the discretion of the Lead Evaluator.

EVENT 3: SHIFT STEAM PACKING EXHAUSTERS

Time	Pos	EXPECTED Operator Response	Comments
	SRO	Direct RO to stop power maneuver and monitor plant while shifting SPEs.	
	SRO	Directs BOP to shift SPEs to remove A from service.	
	SRO	May direct continuing control rod withdrawal following SPE shift.	
	OATC	Monitors the plant	
	BOP	Communicates maintenance request for shutting down SPE A to SRO.	
	BOP	Identifies 2OP-26.1, Section 8.1 (Shifting Steam Packing Exhausters) is required.	
	BOP	Shifts SPEs	
	BOP	Directs AO to OPEN <i>FLOAT TRAP OUTLET VALVE, MVD-V52</i> .	
	BOP	Makes plant PA announcement and Starts SPE B	
	BOP	Ensures <i>STEAM SEAL SPE 2B MO INLET VLV, OG-MOV-E2</i> , is open.	
	BOP	Throttles closed <i>STEAM SEAL SPE 2A MO DISCH VLV, OG-MOV-D1</i> , AND Throttles open <i>STEAM SEAL SPE 2B MO DISCH VLV, OG-MOV-D2</i> , while maintaining <i>GLAND EXHAUST HEADER, OG-PI-EPT-9</i> , located on Panel XU-2, between 10 and 20 inches water vacuum.	

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EVENT 3: SHIFT STEAM PACKING EXHAUSTERS			
	BOP	May get annunciator UA-02 4-5 <i>GLAND SEAL VACUUM LOSS</i> If Gland seal vacuum on OG-PI-EPT9-SPE drops below 5 inches of water.	
	BOP	Ensures STEAM SEAL SPE 2A MO DISCH VLV, OG-MOV-D1, is closed.	
	BOP	Makes plant PA announcement and Stops SPE A	
	BOP	Directs AO to close <i>FLOAT TRAP OUTLET VALVE, MVD-V51</i>	
	BOP	Ensures STEAM SEAL SPE 2A MO INLET VALVE, OG-MOV-E1, is closed.	
	BOP	Informs SRO SPE shift is complete.	
	BOP	Notifies maintenance SPE A is shutdown.	

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EVENT 4: STACK RAD MONITOR FAILURE – RBV FAILURE TO ISOLATE	
Simulator Operator Actions	
	At the discretion of the Lead Evaluator, Initiate Trigger 3 , to fail power to the Stack Rad Monitor.
	Transfer Stack Rad Monitor to Unit 1 UPS using Trigger 9 .

Simulator Operator Role Play	
	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.

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EVENT 4: STACK RAD MONITOR FAILURE – RBV FAILURE TO ISOLATE	
Evaluator Notes	
Plant Response:	Power failure to the Stack Rad Monitor will initiate a Group 6 Isolation. Group 6 valves will isolate, but the Reactor Building Ventilation will not isolate. It will require manual isolation.
Objectives:	SRO - Determine actions required for LCO per Technical Specifications. RO - Respond to a process radiation monitoring downscale/inop annunciator. Performs actions to manually isolate Reactor Building Ventilation
Success Path:	<p>Technical Specification / TRM</p> <ul style="list-style-type: none"> • 3.3.6.1 PCIS Instrumentation, Function 2c Condition A1, Place in trip condition in 24 hours. • 3.6.4.2 Secondary Containment Isolation Dampers (SCIDs) Condition B, Isolate and deactivate in 4 hours. • 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 A.1 (F2/F6), Restore 31 days Condition B.1, (F2/F5), 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
Event Termination:	Go to Event 5 at the discretion of the Lead Evaluator.

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EVENT 4: STACK RAD MONITOR FAILURE – RBV FAILURE TO ISOLATE			
Time	Pos	EXPECTED Operator Response	Comments
	SRO	Direct actions of the APPS for the Main Stack Rad Monitor	
	SRO	Direct Reactor Building Ventilation isolation.	
	SRO	May direct entry into 0AOP-12.0	
	SRO	Direct I/C to investigate loss of UPS 2A.	
	SRO	Refer to Tech Specs. <i>See success path on previous page.</i>	
	OATC	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.	

EVENT 4: STACK RAD MONITOR FAILURE – RBV FAILURE TO ISOLATE

Time	Pos	EXPECTED Operator Response	Comments
	BOP	<p>Report loss of Main Stack Rad Monitor and references the following APPs:</p> <p><u>UA-03</u></p> <p>5-4, PROCESS OG VENT PIPE RAD HI-HI</p> <p>6-3, PROCESS SMPL OG VENT PIPE DNSC/INOP</p> <p>6-4, PROCESS OG VENT PIPE RAD – HI</p> <p><u>UA-05</u></p> <p>1-9, FAN CLG UNIT CS PUMP RM A INL PRESS LO</p> <p>2-9, FAN CLG UNIT CS PUMP RM B INL PRESS LO</p> <p>3-5, SBTG SYS B FAILURE</p> <p>4-6, SBTG SYS A FAILURE</p> <p>6-10, RX BLDG ISOLATED</p> <p><u>UA-25</u></p> <p>1-8, CTMT ATMOS RAD MON DNSC/INOP</p>	
	BOP	<p>Report TS review for the CRS from the Annunciator reviews.</p> <ul style="list-style-type: none"> • 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	<p>Determine that Reactor Building Ventilation should have isolated.</p> <p>Isolates RB Ventilation by either closing the BFIVs (which will trip the fans) or Shutting off the fans then closing the BFIVs.</p>	
	BOP	Dispatch AO to investigate UPS 2A condition.	
	BOP	May open the SW-V111 or V117 to supply cooling water to the vital header IAW 2APP-UA-05 1-9 or 2-9.	

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EVENTS 5a and 5b: RAISE REACTOR POWER /STUCK CONTROL ROD	
Simulator Operator Actions	
	When drive water DP has been raised to 300 psid, ensure Trigger 2 deletes RD012M , Stuck Control Rod, and inserts RD032M , Sluggish Control Rod.
	If inserted to position 46 from position 48 delete RD032M .

Simulator Operator Role Play	
	If contacted as the RE for Control Rod 26-23 stuck, concur with 2OP-07 guidance and double clutch withdrawal if requested

Evaluator Notes	
Plant Response:	Control rods will continue to be withdrawn until control rod 26-23 which is difficult to move at position 12, requires OP-07 actions to move.
Objectives:	<p>SRO - Directs and monitor reactor power ascension with control rods Direct actions for a stuck control rod.</p> <p>RO - Withdraw control rods to raise reactor power Perform 2OP-07 actions for stuck control rod</p>
Success Path:	Control rod 26-23 withdrawn to position 48 by use of increase drive water DP.
Event Termination:	Go to Event 6 at the discretion of the Lead Evaluator.

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EVENTS 5a and 5b: RAISE REACTOR POWER /STUCK CONTROL ROD			
Time	Pos	EXPECTED Operator Response	Comments
	SRO	Directs RO to continue to raise reactor power by withdrawing control rods. (Continuous withdrawal allowed).	
	SRO	Directs RO to perform 2OP-07.	
	SRO	May direct AOP-02 (Control Rod malfunction) – Provides notifying RE and Using 2OP-07 to move rod.	
	BOP	Monitors plant while control rods are being withdrawn.	

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EVENTS 5a and 5b: RAISE REACTOR POWER /STUCK CONTROL ROD			
Time	Pos	EXPECTED Operator Response	Comments
	OATC	Continues rod withdrawal per GP-10 IAW guidance of OI-01.02 and 2OP-07.	
	OATC	Report A-6 2-7 <i>APRM DOWNSCALE</i> annunciator clears.	
	OATC	Recognizes control rod 26-23 is stuck.	
	OATC	Notifies SRO control rod 26-23 is stuck.	
	OATC	Identifies 2OP-07, Reactor Manual Control System Operating Procedure, Section 6.4.2 (Control Rod Difficult to Withdraw, Control Rod NOT at Position 00) is required.	
	OATC	Notifies SRO to consult TS 3.1.3 & 3.3.2.1.	
	OATC	Verifies no Rod Blocks.	
	OATC	Raises drive water DP to 300 psid. Maintains CRD flow rate 30 to 60 gpm May raise CRD flow and/or throttle closed DRIVE PRESSURE VLV, C12-PCV-F003	
	OATC	Attempts to withdraw control rod 26-23 Normal withdraw attempts may be repeated at elevated drive water DP.	
	OATC	Performs coupling check following fully withdrawing control rod to position 48.	

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EVENT 6: SULCV FAILS CLOSED	
Simulator Operator Actions	
	At the discretion of the Lead Evaluator, Initiate Trigger 4 to activate the SULCV failing closed.

Simulator Operator Role Play	
	If contacted as TBAO to investigate SULCV, acknowledge request.
	If contacted as I&C to investigate failure, acknowledge request.

Evaluator Notes	
Plant Response: SULCV fails closed and Reactor water level lowers.	
Objectives: SRO - Direct actions for failed SULCV and lowering reactor water level RO - Monitors reactor plant parameters Take action to respond to a failed SULCV and lowering reactor water level	
Success Path: Level restored to normal band by establishing flow through an alternate path	
Event Termination: Go to Event 7 at the discretion of the Lead Evaluator.	

EVENT 6: SULCV FAILS CLOSED

Time	Pos	EXPECTED Operator Response	Comments
	SRO	Direct actions in response to lowering reactor water level. <i>A-07 2-2, REACTOR WATER LEVEL HIGH/LOW</i> <i>A-05 3-3, SRM PERIOD</i>	
	SRO	Direct AOP-23 entry	
	SRO	Direct injection to the vessel be established by manually opening one of the following valves: <ul style="list-style-type: none"> • FW-V120 • FW-V118 • FW-V119 	
	SRO	Direct manual scram if level control not established and level continues to lower.	
	OATC	Recognize and respond to lowering reactor water level (may notice before alarm) APP-A-07 2-2 REACTOR WATER LEVEL HIGH/LOW	
	OATC	Diagnose SULCV has failed closed and attempt to OPEN	
	OATC	If direct by SRO, insert manual scram	
	BOP	Attempt to establish flow to the vessel by manually opening one of the following valves: <ul style="list-style-type: none"> • FW-V120 • FW-V118 • FW-V119 	
	BOP	Monitor plant parameters	

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EVENT 7: MULTIPLE CONTROL ROD DRIFTS / REACTOR SCRAM	
Simulator Operator Actions	
	At the discretion of the Lead Evaluator, Initiate Trigger 5 to drift multiple Control Rods.

Simulator Operator Role Play	

Evaluator Notes	
Plant Response:	Multiple Control Rods will drift. A Reactor Scram will be inserted.
Objectives:	SRO - Direct manual reactor scram RO - Insert manual scram in response to multiple rod drifts
Success Path:	Insert Reactor Scram and carry out 2EOP-01-RSP, Reactor Scram Procedure
Event Termination:	Go to Event 8 at the discretion of the Lead Evaluator.

EVENT 7: MULTIPLE CONTROL ROD DRIFTS / REACTOR SCRAM

Time	Pos	EXPECTED Operator Response	Comments
	SRO	Direct actions of 0AOP-02 for multiple control rod drifts (Scram)	<i>Critical Task</i>
	SRO	Directs actions of 2EOP-01-RSP, Reactor Scram Procedure:	
	SRO	<ul style="list-style-type: none"> After steam flow is less than 3×10^6 lb/hr., place Reactor Mode Switch to Shutdown 	
	SRO	<ul style="list-style-type: none"> Trip Main Turbine 	
	SRO	<ul style="list-style-type: none"> Ensure Master Reactor Level Controller setpoint is +170 inches 	
	SRO	<ul style="list-style-type: none"> IF two Reactor Feed Pumps are running, and level is above +160 inches and rising, THEN trip one 	
	SRO	<ul style="list-style-type: none"> Maintain Reactor pressure between 800-1000 psig 	
	SRO	<ul style="list-style-type: none"> Maintain Reactor water level between +170-+200 inches 	
	OATC	<i>Recognize multiple control rods are drifting and insert manual scram</i>	<i>Immediate Operator Action of AOP-02</i> <i>Critical Task</i>
	OATC	Perform actions of 2EOP-01-RSP, Reactor Scram Procedure: See above	
	BOP	Monitor plant parameters	
	BOP	If directed maintain Reactor pressure between 800-1000 psig	

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EVENT 8: SRV FAILURE, TAILPIPE RUPTURE, EMERGENCY DEPRESSURIZATION	
Simulator Operator Actions	
	At the discretion of the Lead Evaluator, Initiate Trigger 6 to fail open SRV F
	When SRV F Control Switch is taken to open, ensure Trigger 7 , SRV F downcomer rupture, initiates.
	When directed by the Lead Evaluator, place the simulator in FREEZE
	When informed to pull fuses for SRV F, Initiate Trigger 12 and inform Sim Role Player.
	DO NOT RESET THE SIMULATOR PRIOR TO RECEIPT OF CONCURRENCE TO DO SO FROM THE LEAD EXAMINER

Simulator Operator Role Play	
	If contacted as Ops Center SRO to pull fuses for SRV F, acknowledge request, wait one minute, inform Sim Operator to activate Trigger 12 and report fuses pulled.
	If contacted as I&C to investigate SRV F opening, acknowledge request.

Evaluator Notes	
Plant Response:	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 the control switch for SRV F is taken to open, SRV F tailpipe will rupture pressurizing containment. Emergency Depressurization will be required due to exceeding PSP.
Objectives:	<p>SRO - Direct actions of AOP-30, Safety/Relief Valve Failures Direct Emergency Depressurization</p> <p>RO - Perform AOP-30 actions Open 7 ADS valves</p>
Success Path:	Reactor is depressurized and level restored to normal band
Scenario Termination:	<i>Control Rods are inserted, Reactor is depressurized, level is being restored to normal band, Containment and Drywell Sprays are being placed in service.</i>

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EVENT 8: SRV FAILURE, TAILPIPE RUPTURE, EMERGENCY DEPRESSURIZATION			
Time	Pos	EXPECTED Operator Response	Comments
	SRO	Direct actions of OAOP-30, Safety/Relief valve Failures	
	SRO	Monitor Containment parameters	
	SRO	Enters and Directs actions of PCCP:	
	SRO	<ul style="list-style-type: none"> Before Suppression Chamber pressure reaches 11.5 psig directs SP Spray IAW SEP-03 	
	SRO	<ul style="list-style-type: none"> When Suppression Chamber exceeds 11.5 psig directs DW Spray IAW SEP-02 	
	SRO	<ul style="list-style-type: none"> Direct Emergency Depressurization when PSP is exceeded 	<i>Critical Task</i>

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EVENT 8: SRV FAILURE, TAILPIPE RUPTURE, EMERGENCY DEPRESSURIZATION

Time	Pos	EXPECTED Operator Response	Comments
	OATC	Perform OAOP-30.0 actions: NOTE: A full open SRV will not reseal until reactor pressure reduces to the reseal pressure for that SRV (approximately 900 to 1100 psig). <ul style="list-style-type: none"> • CYCLE the control switch of the 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 CLOSE OR AUTO. 	<i>Immediate Operator Action of AOP-30</i>
	OATC	<ul style="list-style-type: none"> • IF a safety/relief valve is stuck open, THEN PERFORM the following: • 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: <ul style="list-style-type: none"> ◦ Tailpipe Temperatures (ERFIS Screen 241) • Other indications as available (feed/steam flow mismatch, generator MWE, etc.) 	NOTE: Pulling safety/relief valve fuses will de-energize the red and green indicating lights on Panel P601.
	OATC	When directed by SRO, Open 7 ADS valves	<i>Critical Task</i>
	BOP	Monitor plant parameters	
	BOP	Restore reactor water level 170 - 200 inches using FW-V120, FW Htrs 4 & 5 Bypass Vlv.	
	BOP	Place Suppression Pool Sprays in service IAW SEP-03	See Enclosure 1
	BOP	Place Drywell Sprays in service IAW SEP-02.	See Enclosure 2

Enclosure 1**Page 1 of 2****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

NOTE: Manpower:	1 Reactor Operator
Special equipment:	None

- RO: 2.1 IF suppression chamber pressure is less than 2.5 psig, **THEN EXIT** this procedure. ☐
- RO: 2.2 IF necessary, **THEN PLACE** Loop A(B) *2/3 CORE HEIGHT LPCI INITIATION OVERRIDE* switch, E11-CS-S18A(S18B), in *MANUAL OVERRD*. ☐
- RO: 2.3 IF the *CTMT SPR OVRD* light for the 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 IF *INBOARD INJECTION VLV*, E11-F015A(F015B) is open, **AND** injection to the reactor is **NOT** required, **THEN CLOSE** *OUTBOARD INJECTION VLV*, E11-F017A(F017B). ☐
- RO: 2.5 **ENSURE** RHR Loop A(B) is placed in the LPCI, Suppression Pool Cooling, or Drywell Spray mode. ☐
- RO: 2.6 **ENSURE** *TORUS DISCHARGE ISOL VLV*, E11-F028A(F028B), is open. ☐
- RO: 2.7 **OPEN** *TORUS SPRAY ISOL VLV*, E11-F027A(F027B). ☐
- RO: 2.8 **WHEN** suppression chamber pressure is less than 2.5 psig **OR** suppression pool spray is no longer required, **THEN CLOSE** *TORUS SPRAY ISOL VLV*, E11-F027A(F027B). ☐

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- RO: 2.9 IF re-initiation of suppression pool spray is required, THEN RETURN to Step 2.1, on page 2. ☐
- RO: 2.10 WHEN suppression pool spray is no longer required, THEN EXIT this procedure AND CONTINUE in the procedure(s) in effect. ☐

Enclosure 2**Page 1 of 5****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 a LOCA signal present, <i>OUTBOARD INJECTION VLV, E11-F017A(F017B)</i> can NOT be closed for five minutes.
--------------	--

RO: 2.2 **IF INBOARD INJECTION VLV, E11-F015A(F015B) is open, THEN CLOSE OUTBOARD INJECTION VLV, E11-F017A(F017B).** ☐

2.3 **ENSURE one** of the following valves is open:

RO: - *CONV SW TO VITAL HEADER VLV, SW-V111* ☐

RO: - *NUC SW TO VITAL HEADER VLV, SW-V117* ☐

Enclosure 2**Page 2 of 5****2.4 COMMENCE** drywell spray by performing the following:

RO: 2.4.1 **ENSURE** both reactor recirculation pumps are tripped. ☐

2.4.2 IF:

RO: - A Group 10 isolation has occurred due to a loss of power, **AND** ☐

RO: - Power has been restored, ☐

THEN RESET the Group 10 isolation by performing the 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 **PLACE** all drywell cooler control switches to *OFF (L/O)*. ☐

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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** *DW CLR A&D OVERRIDE SWITCH*, VA-CS-5993, keylock switch in *STOP*. ☐

RO: - **Unit 1 Only:** In Panel XU-28, west side, **PLACE** *DW CLR B&C OVERRIDE SWITCH*, VA-CS-5994, keylock switch in *STOP*. ☐

RO: - **Unit 2 Only:** In Panel XU-27, west side, **PLACE** *DW CLR A&D OVERRIDE SWITCH*, VA-CS-5993, keylock switch in *STOP*. ☐

RO: - **Unit 2 Only:** In Panel XU-28, east side, **PLACE** *DW 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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- 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. ☐
- 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. ☐

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- 2.5 **ENSURE** RHR SW Loop A(B) is operating in accordance with the following:

NOTE: *RHR SW BOOSTER PUMPS A & C (B & D) LOCA OVERRIDE switch, E11-S19A(S19B), is utilized to override the LOCA trip signal to RHR SW Booster Pumps A & C (B & D).*

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 **ALIGN** 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. ☐

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.*

RO: 2.6.3 **CLOSE** *HX A(B) BYPASS VLV, E11-F048A(F048B).* ☐

ATTACHMENT 1 - Scenario Quantitative Attribute Assessment

Category	NUREG 1021 Rev. 2 Supp. 1 Req.	Scenario Content
Total Malfunctions	5-8	8
Malfunctions after EOP Entry	1-2	2
Abnormal Events	2-4	3
Major Transients	1-2	2
EOPs Used	1-2	2
EOP Contingency	0-2	2
Run Time	60-90 min	90
Crew Critical Tasks	2-3	2
Tech Specs	2	2
Instrument / Component Failures before Major	2 – OATC 2 - BOP	4
Instrument / Component Failures after Major	2	2
Normal Operations	1	1
Reactivity manipulation	1	1

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ATTACHMENT 5
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Neutron Monitoring Spiking Troubleshooting Form

R
Reference
Use

1. Initiator's name <u>Unit Two SRO</u>	
2. Check all instruments that are spiking and the associated Unit:	
<input type="checkbox"/> Unit 1	<input type="checkbox"/> SRM A <input checked="" type="checkbox"/> IRM A <input type="checkbox"/> IRM E
<input checked="" type="checkbox"/> Unit 2	<input type="checkbox"/> SRM B <input type="checkbox"/> IRM B <input type="checkbox"/> IRM F
	<input type="checkbox"/> SRM C <input type="checkbox"/> IRM C <input type="checkbox"/> IRM G
	<input type="checkbox"/> SRM D <input type="checkbox"/> IRM D <input type="checkbox"/> IRM H
3. Time and date of event <u>Today - Previous Shift</u>	
4. What is the duration of the spiking (duration of individual spike)? Add additional information below to characterize spiking event.	
<input type="checkbox"/> Seconds <input checked="" type="checkbox"/> Minutes <input type="checkbox"/> Hours	
5. Ensure all required observations to support operability are appropriately documented.	
6. Has a WO or AR been initiated? If yes, list number(s): <u>00345765</u>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
7. Has a log entry been made?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
8. Is there any welding occurring in the plant?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
9. Are there any personnel under-vessel?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
10. Are there any plant evolutions in progress?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
11. Is there any electrical switching occurring?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
12. Are any control rods being moved or selected?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
13. Has there been a recent change in the mode switch?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
14. Is there any major equipment being started?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
15. Has there been any observed relay chatter?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
16. Is there any refuel bridge movement?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
17. Are the rod interlocks being affected?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
18. Completed copy of this attachment sent to engineer	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Please note below any additional information that may aid troubleshooting (such as 2 instruments spiking but not in the same manner):	
Multiple upscale and downscale alarms during startup over a 15 minute period. All other IRMs responded normally.	

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ATTACHMENT 2 – Shift Turnover

Brunswick Unit 2 Plant Status					
Station Duty Manager:				Workweek Manager:	
Mode:	2	Rx Power:	3.8%	Gross*/Net MWe*:	NA
Plant Risk: Current EOOS Risk Assessment is:	Green				
SFP Time to 200 Deg F:	65 hrs			Days Online:	0 days
Turnover:	In OGP-03 at step 6.1.5, raise power to 6-10%. A2X sequence at step 166.				
Protected Equipment:	ADHR / FPC Loop A / Demin Transfer Pump				
Comments:	IRM A was bypassed due to spiking and the paperwork is being evaluated for its return to service.				

Action Statements in Effect					
Item	Date/Time	Reference	Required Actions	Responsibility	Due