

Facility:	NRC Exam 1 August 2010	Scenario No.: 1	Op Test No.: 1
Examiners:	_____	Operators:	SRO
	_____		RO
	_____		BOP
Initial Conditions: 100% power, BOL. RCS boron is 1031 ppm. Control Bank D is at 220 steps.			
Turnover: Train A/Channel I Work Week. Perform a load reduction to 93% to support turbine valve tests and EHC testing. 1A Containment Spray pump out-of-service for pump bearing replacement. Expected return to service in 12 hours. LCO 3.6.6.A was entered 4 hours ago. A Severe Thunderstorm Warning has been issued for Rhea, Meigs McMinn Counties for the next 2 hours.			

Event No.	Malf. No.	Event Type*	Event Description
1	n/a	N-BOP R-RO	Reduce power to perform turbine valve testing and EHC calibration using GO-4, "Normal Power Operations," and 1-TRI-47-3, "Main Turbine Steam Inlet Valve Testing."
2	rx02d	I-RO TS-SRO	Loop 4 RTD fails high, causing rod insertion. Requires AOI-2, "Malfunction of Reactor Control System," entry and a Tech Spec evaluation.
3	rw14a	C-BOP TS-SRO	1A ERCW header breaks in the Intake Pumping Station. Requires AOI-13, "Loss of Essential Raw Cooling Water," entry and a Tech Spec evaluation.
4	rx20	I-BOP	Steam Pressure transmitter, 1-PT-1-33 fails low, requiring manual control of main feedwater pump speed, and AOI-16, "Loss of Normal Feedwater," entry.
5	cv18c	C-RO	Number 2 seal failure on #3 RCP. Requires entry into ARI 97-C, RCP 3 STANDPIPE LEVEL HI/LO, and AOI-24, "RCP Malfunctions During Pump Operation," for actions.
6	cv11	I-RO	1-LT-62-129 fails high, requiring entry into ARI 109-A, VCT LEVEL HI/LO, and manual actions to ensure VCT level is maintained properly.
7	rw09 th04b	M-All	Raw cooling water temperature control valve to the Stator Water Cooler fails closed. Requires a manual trip of the reactor/turbine due to high stator water temperature. A vapor space break develops 15 seconds after the reactor trip.
8	rp02b	I-RO	Automatic SI fails to actuate, requiring manual initiation.
9	ed01	M-All	Loss of offsite power which occurs 10 seconds after the safety injection is manually initiated.
10	si08i si08j	C-BOP	1A-A DG and 1B-B DG fail to automatically start on a blackout or safety injection signal. Requires an emergency start from panel 1-M-1 or from panel 0-M-26.

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

DRAFT

Scenario 1 - Summary

Initial Condition 100% power, BOL. RCS boron is 1031 ppm. Control Bank D is at 220 steps.

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- Event 1** Reduce power to perform turbine valve test using GO-4, "Normal Power Operations," and 1-TRI-47-3,"Main Turbine Steam Inlet Valve Testing."
- Event 2** Loop 4 RTD fails high causing the Rod Control System to detect a large mismatch between Auctioneered HI Tavg and T-reference and insert rods 72 steps per minute. The SRO enters AOI-2, "Malfunction of Reactor Control System," and directs the RO to defeat the Loop 4 temperature functions. The SRO evaluates conditions and enters Tech Specs LCO 3.3.1, Reactor Trip System (RTS) Instrumentation Conditions W, X and V; LCO 3.3.2, ESFAS Instrumentation, Condition N.
- Event 3** 1A ERCW header breaks in the Intake Pumping Station (IPS). The BOP will dispatch an AUO to the IPS. The SRO will enter and direct actions of AOI-13, "Loss of Essential Raw Cooling Water," Section 3.5, "Supply Header Rupture in IPS." The SRO evaluates conditions and enters Tech Specs LCO 3.0.3, based on the cross-connection of the A and B ERCW trains.
- Event 4** Steam Pressure transmitter, 1-PT-1-33 fails low, requiring manual control of the main feedwater pump master controller, 1-PC-46-20. AOI-16, "Loss of Normal Feedwater," Section 3.7, "Failure of MFW Pump Control" will be implemented. Manual control of the main feedwater pump master controller will be required for the remainder of power operations.
- Event 5** Alarm 97-C RCP STANDPIPE LEVEL HI/LO is received. The alarm, in addition to a reduction in RCP 3 seal return flow indicates a failure of the Number 2 seal. Based on the ARI, the RO will align primary water to containment and fill RCP 3 standpipe in an attempt to clear the alarm. The alarm will not clear, indicating a failure of the Number 2 seal. The SRO enters and directs actions of AOI-24, "RCP Malfunctions during pump operations."
- Event 6** 1-LT-62-129A VCT LEVEL fails high. VCT level indication is off-scale high. 1-LCV-62-118 is diverted to the Holdup Tank. CVCS VCT to RWST low-level transfer partial logic is defeated. Auto makeup to the VCT remains operable, but VCT level cannot be maintained without aligning the divert valve to the VCT.
- Event 7** Raw cooling water temperature control valve to the Stator Water Cooler fails closed. Requires a manual trip of the reactor/turbine due to high stator water temperature. A PZR vapor space break develops 15 seconds after the reactor trip. Requires manual initiation of safety injection.
- Event 8** Automatic SI fails to actuate, requiring manual initiation.
- Event 9** Loss of offsite power occurs 10 seconds after the safety injection is manually initiated.
- Event 10** 1A-A DG and 1B-B DG fail to automatically start on a blackout or safety injection signal. Requires an emergency start from panel 1-M-1 or from panel 0-M-26.

Scenario 1 - Critical Task Summary

Critical Task 1
from WOG ERG
Critical Task List,
E-0, D

Manually actuate at least one train of SIS-actuated safeguards before any of the following:

- *Transition to any E-1 series, E-2 series, or E-3 series procedure or transition to any FRG*
- *Completion of step 5.a of ES-0.1*

Critical Task 2
from WOG ERG
Critical Task List,
E-0, C.

Energize at least one ac emergency bus before transition out of E-0, unless the transition is to ECA-0.0, in which case the critical task must be performed before placing safeguards equipment handswitches in the pull-to-lock position.

Guideline ECA-0.0 is developed and structured to address the condition where all ac emergency power is lost. It is entered on the symptom of all ac emergency busses being de-energized. Its objective is to cope with the loss of ac emergency power until at least one ac emergency bus can be energized. ECA-0.0 should not be entered if at least one ac emergency bus is energized since the other optimal recovery guidelines and function restoration guidelines contain guidance that accommodates multiple failures.

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 1
Simulator Console Operators Instructions

SIMULATOR SETUP INFORMATION

1. ENSURE NRC Examination Security has been established.
2. RESET to Initial Condition 347 by performing the following actions:
 - a. Select ICManger on the THUNDERBAR menu (right hand side of Instructor Console Screen).
 - b. Locate IC# 347.
 - c. Right "click" on IC# 347.
 - d. Select Reset on the drop down menu.
 - e. Right "click" on RESET.
 - f. Enter the password for IC 347.
 - g. Select "Yes" on the INITIAL CONDITION RESET pop-up window.
 - h. Perform SWITCH CHECK.
3. SELECT Director on the THUNDERBAR menu (right hand side of Instructor Console Screen).
4. ENSURE the following information appears on the Director Screen:

Key	Description	Type	Event	Delay	Inserted	Ramp	Initial	Final	Value
csr03	containment spray pump a power	R		00:00:00	00:00:00	00:00:00		off	off
hs-72-27a-1	06020 cntmnt spray pump a mtr sw(green)	O		00:00:00	00:00:00	00:00:00		Off	Off
hs-72-22a-1	05020 rwst spray hdr a fcv(green)	O		00:00:00	00:00:00	00:00:00		Off	Off
hs-72-44a-1	05040 cntmnt sump hdr a fcv(green)	O		00:00:00	00:00:00	00:00:00		Off	On
hs-72-34a-1	05060 cs pump a recirc fcv(green)	O		00:00:00	00:00:00	00:00:00		Off	On
hs-72-39a-1	05080 cs hdr a isol vlv sw.(green)	O		00:00:00	00:00:00	00:00:00		Off	On

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 1
Simulator Console Operators Instructions

SIMULATOR SETUP INFORMATION

Key	Description	Type	Event	Delay	Inserted	Ramp	Initial	Final	Value
rp02b	auto si initiation signal failure	M		00:00:00	00:00:00	00:00:00		Active	Active
si08i	failure of auto si and blackout signals dg 1a-a	M		00:00:00	00:00:00	00:00:00		Active	Active
si08j	failure of auto si and blackout signals dg 1b-b	M		00:00:00	00:00:00	00:00:00		Active	Active
ed01	total loss of offsite power	M	11	00:00:10		00:00:00		Active	InActive
th11	pzr vapor space leak)x	M	19	00:00:05		00:00:00		24	0
rx02d	cold leg 4 rtd 1 failure	M	2	00:00:00		00:00:00		100	54.9441
nwr05	valve fcv-67-22 breaker position	R	20	00:00:00		00:00:00		close	open
nwr12	power to appendix r valve 67-147	R	21	00:00:00		00:00:00		on	00:00:00
nwr22	power to appendix r valve 67-458	R	22	00:00:00		00:00:00		on	00:00:00
nwr29	power to 2-fcv-67-22 strainer 2a-a inlet	R	23	00:00:00		00:00:00		on	off
nw14a	ercw ips header a break	M	3	00:00:00		00:00:00		50	0
rx20	main steam header pressure transmitter fails to pos pt-1-33	M	4	00:00:00		00:00:00		20	76.5349
cv18c	rcp 2 seal failure rcp #3	M	5	00:00:00		00:00:00		0.5	0
cv11	vct level transmitter fails to position; 129-a	M	6	00:00:00		00:00:00		100	30.787
nw09	rcw tcv on stator water cooler fails closed	M	7	00:00:00		00:00:00		Active	InActive

5. Place simulator in RUN and acknowledge any alarms.

6. Place 1-HS-72-27A, CNTMT SPRAY PMP A, in STOP.PULL-TO-LOCK. Place a RED Hold Notice Tag on 1-HS-72-27A CNTMT SPRAY PMP A; 1-HS-72-22A RWST TO CS-PMP A SUCTION; 1-HS-72-34, CNTMT SPRAY PMP A MINI FLOW; 1-HS-72-44A, CNTMT SUMP TO CS PMP A SUCT; 1-HS-72 -39A, CNTMT SPRAY HDR A TO CNTMT. ENSURE pink "Protected Equipment" Tag is placed on 1-HS-72-10A, CNTMT SPRAY PMP B.

8. ENSURE the "Train A Week - Channel I" sign is placed on 1-M-30.

9. Place simulator in FREEZE.

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 1
Simulator Console Operators Instructions

SIMULATOR SETUP INFORMATION

10. **ENSURE** Watts Bar Nuclear Plant Unit 1 Reactivity Briefing Book (Simulator Copy) BOL (Beginning Of Life) is updated and on the desk, and that the BOL placards are on 1-M-6, below the Boric Acid and Primary Water Integrators. **ENSURE** Reactivity Plan for power maneuver is available to the crew.2.

Item 3	•AFD	<div style="border-bottom: 1px solid black; padding: 2px;">-2.8</div> <div style="border-bottom: 1px solid black; padding: 2px;">%</div> <div style="border-bottom: 1px solid black; padding: 2px;">Lower Band</div>	<div style="border-bottom: 1px solid black; padding: 2px;">0.2</div> <div style="border-bottom: 1px solid black; padding: 2px;">%</div> <div style="border-bottom: 1px solid black; padding: 2px;">Target</div>	<div style="border-bottom: 1px solid black; padding: 2px;">3.3</div> <div style="border-bottom: 1px solid black; padding: 2px;">%</div> <div style="border-bottom: 1px solid black; padding: 2px;">Upper Band</div>	
			0.0		
			Actual		
			Manual		
Item 4	•Control Rods	<input checked="" type="checkbox"/> Auto <input type="checkbox"/> Negative <input type="checkbox"/> 1-CCP A	<input type="checkbox"/> Positive <input type="checkbox"/> 1-CCP B	<input checked="" type="checkbox"/> None <input type="checkbox"/> C _B 1030	<div style="border-bottom: 1px solid black; padding: 2px;">220</div> <div style="border-bottom: 1px solid black; padding: 2px;">steps</div> <div style="border-bottom: 1px solid black; padding: 2px;">Control Bank D1/D2</div>
Item 5	Current RCS C _B :	1030	ppm		
	Current fluid inside the blender is:	<input type="checkbox"/> Acid <input type="checkbox"/> Water		<input checked="" type="checkbox"/> Blended	

PW flow rate 1-FC-62-142, dial setting BA flow rate 1-FC-62-139 dial setting	70 gpm 35% 12 gpm 30%
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6. Boric Acid (BA) and Primary Water (PW) volumes for the following changes:

1°F Tav _g increase 1°F Tav _g decrease 10% Downpower @ 5%/hr 50% Downpower @ 5%/hr 1000 MW (85%) Runback 950 MW (80%) Runback 900 MW (75%) Runback 790 MW or 800 MW Runback	175 gal PW 32 gal BA 130 gal BA 800 gal BA 200 gal BA 285 gal BA 369 gal BA 535 gal PW
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11. **WHEN prompted by the Chief Examiner, place the Simulator in RUN.**

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 1
Simulator Console Operators Instructions

Exam Event No.	Simulator Event No.	Description/Role Play
1	n/a	<p>Power reduction to perform 1-TRI-47-3, Main Turbine Steam Valve Testing.”</p> <p>ROLE PLAY: <i>If contacted as the Turbine Building AUO, report that you are standing by to support turbine valve testing.</i></p> <p>ROLE PLAY: <i>If contacted as the Turbine Building AUO, acknowledge the request to check 1-PT-1-33 locally. Report back that there are no leaks and everything in the area appears normal.</i></p>
2	2	<p>Cold leg 4 RTD 1 failure which results in automatic rod insertion at 72 steps per minute until rod control is taken to MANUAL.</p> <p>ROLE PLAY: <i>When contacted as Work Control, acknowledge the report of the failure of Cold Leg 4 RTD failure. If requested, state that a package to troubleshoot the failed circuit will be prepared. When requested to trip bistable, state that IMI-160.004 will be prepared and that personnel will contact the control room prior to tripping any bistables.</i></p>
3	3	<p>1A ERCW Header rupture in the Intake Pumping Station.</p> <p>ROLE PLAY: <i>When contacted as the Outside Routine AUO, acknowledge direction to go to the Intake Pumping Station assist in determination of leak location. Report that there is a large leak, the strainer room is flooded and that it appears to be on the A header near the strainer.</i></p> <p>ROLE PLAY: <i>When contacted as the Outside Routine AUO, acknowledge request for 1B Strainer ΔP. If the leak has been isolated, report that the ΔP is 4 psid and dropping.</i></p> <p>ROLE PLAY: <i>When contacted as the Control Building AUO, acknowledge the request to go to the Reactor MOV boards to close breakers for specific valves. Use rwr05 to restore power to 1-FCV-67-22; use rwr12 to restore power to 1-FCV-67-147; use rwr22 to restore power to 1-FCV-67-458; use rwr29 to restore power to 2-FCV-67-22.</i></p> <p>ROLE PLAY: <i>When contacted as the AUO dispatched to the diesel generator buildings, report ERCW flow to each diesel generator is between 700 and 800 gpm.</i></p>

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 1
Simulator Console Operators Instructions

Exam Event No.	Simulator Event No.	Description/Role Play
4	4	<p>1A Steam Pressure transmitter, 1-PT-1-33 fails low.</p> <p>ROLE PLAY: When contacted as Work Control, acknowledge the report of the failure of 1-PT-1-33 low. When requested, state that a package to trouble shoot and repair the pressure transmitter will be prepared.</p> <p>ROLE PLAY: If contacted as the Turbine Building AUO, acknowledge the request to check the main feedwater pumps locally.</p>
5	5	<p>Number 2 seal failure on #3 RCP. Requires entry into ARI, AOI-24 for actions.</p> <p>ROLE PLAY: When contacted as System Engineering, acknowledge the report concerning #3 RCP standpipe level response. Inform the Unit Supervisor that additional equipment will be installed to monitor Number 2 seal leakoff. Recommend that the RCP remain in service.</p> <p>ROLE PLAY: If contacted to monitor #3 RCP vibrations, report that vibrations are stable at this time and that you will inform the crew of any change observed.</p> <p>ROLE PLAY: If contacted to monitor RCDT level at 0-L-2, use ThunderView to call up the Waste Disposal system drawing, WD1. Local RCDT level indication is displayed. Report values from the ThunderView screen to the operators.</p>
6	6	<p>1-LT-62-129 VCT LEVEL fails high.</p> <p>ROLE PLAY: If dispatched to the Auxiliary Control Room to monitor 1-LT-62-129C, report level using InSight cv/vct point. Report level as indicated, level will be dropping, until makeup begins or 1-LCV-62-118 is placed to the VCT position.</p>
7	7	<p>Raw cooling water temperature control valve to the Stator Water Cooler fails closed. Reactor and turbine trip due to high stator water temperature.</p> <p>ROLE PLAY: When contacted as the Turbine Building AUO, report that the TVC has closed, and that you are unable to open the TCV or the bypass valve at this time.</p>

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 1
Simulator Console Operators Instructions

Exam Event No.	Simulator Event No.	Description/Role Play
7	7	<p>PZR vapor space break.</p> <p>ROLE PLAY: When requested, acknowledge the request to shutdown the Upper and Lower Containment Radiation monitors sampling pumps.</p> <p>ROLE PLAY: When requested, acknowledge the need to perform E-1 Appendix A, B, C and D. Use remote function sir01 to complete E-1 Appendix A (place power on CLA outlet valves). Use remote sir14 to complete E-1 Appendix C (place power on 1-FCV-63-1. Use remote function sir06 to complete E-1 Appendix D (place power on 1-FCV-63-22). After remote functions are entered, report that the Appendices are complete.</p> <p>ROLE PLAY: When contacted as Chemistry, acknowledge request to sample steam generators for activity.</p> <p>ROLE PLAY: When contacted as Radiation Protection, acknowledge request to survey steam lines and blowdown lines.</p> <p>ROLE PLAY: When contacted as the Auxiliary Building AUO, acknowledge the request to check low analyzer temperature lights. Report back that the lights are NOT LIT.</p>
8	n/a	<p>Automatic Safety Injection fails to occur, requiring manual initiation.</p> <p>ROLE PLAY: None.</p>

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 1
Simulator Console Operators Instructions

Exam Event No.	Simulator Event No.	Description/Role Play
9	n/a	<p>Loss of Offsite Power:</p> <p>ROLE PLAY: <i>If contacted as the NEAD, inform the crew that a series of severe thunderstorms have caused severe damage to the grid. The extent of the damage is not known at this point, but personnel have been dispatched to numerous locations to determine the extent. The duration of the power outage is expected to be no less than 4 hours.</i></p> <p>ROLE PLAY: <i>If dispatched as the Outside Routine AUO, report that the DGs are running and all parameters appear to be normal at this time. If asked to determine why the DGs failed to auto start, state that assistance will be needed for the evaluation, and that there are no obvious reasons for the failure to start.</i></p> <p>ROLE PLAY: <i>If dispatched as the Turbine Building AUO, report that there are no air compressors currently in service. When requested, state that you will use AOI-10 actions to start the compressors. Start the 1A and 1B air compressors using the ThunderView IA1 screen for Instrument Air System.</i></p>

**Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 1
Simulator Console Operators Instructions**

WBN Unit 1	Loss of Essential Raw Cooling Water	AOI-13 Rev. 0038
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Step	Action/Expected Response	Response Not Obtained
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3.5 Supply Header Rupture in IPS (continued)

NOTE MOVs with power normally removed may not travel to full closed position under high flow conditions; local verification of isolation may be required.

3. CHECK Train A Supply Header pressure at expected values for existing plant conditions.

PERFORM the following:

- a. **UNLOCK**, and **CLOSE** bkr on Rx MOV Bd 1A2-A p7B, 1-FCV-67-22.
- b. **UNLOCK**, and **CLOSE** bkr on Rx MOV Bd 1A2-A p11B, 1-FCV-67-147.
- c. **UNLOCK**, and **CLOSE** bkr on Rx MOV Bd 1A2-A p16E, 1-FCV-67-458.
- d. **UNLOCK**, and **CLOSE** bkr on Rx MOV Bd 2A2-A p7B, 2-FCV-67-22.
- e. **ENSURE** 1-FCV-67-223, ERCW Hdr 1B To 2A Xtie, **OPEN**.
- f. **ENSURE** 2-FCV-67-223, ERCW Hdr 2A To 1B Xtie, **OPEN**.
- g. **OPEN** 1-FCV-67-458, CCS Hx A Sup From Hdr 1B.

step continued on next page.

Op Test No.: NRC Scenario # 1 Event # 1 Page 1 of 57

Event Description: Reduce power using GO-4, "Normal Power Operations," to support valve testing per 1-TRI-47-

Time	Position	Applicant's Actions or Behavior
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EXAMINER: The following actions are taken from GO-4, "Normal Power Operation," Section 5.3, "Unit Shutdown from 100% to 30% Reactor Power," beginning at Step 12, as indicated in the Shift Turnover.

NOTES

- 1) Turbine maybe operated in IMP IN above 30% turbine load as long as IMP IN does NOT cause unit instability IMP IN will control turbine load as a percentage of impulse pressure that correlates to % load vs. % of valve opening in IMP OUT. This will allow for a more linear load ascension
- 2) Turbine load change may be stopped by depressing the HOLD push button, using VPL, or by depressing the MANUAL push button

	BOP	[12] IF desired to operate in IMP IN, THEN OBTAIN Unit SRO concurrence to operate in IMP IN AND PLACE Turbine in IMP IN.
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EXAMINER: The following actions are taken from SOI-62.02, "Boron Concentration Control," Section 6.7, Minor Boration."

NOTES

- 1) Section 6.7, may be reproduced, laminated, displayed, reused, etc. as desired.
- 2) Minor Boration is defined as the addition of Boric Acid done several times each shift early in core life, to compensate for burnable poison burn-up, and maintain Tavg on program.

	RO	[1] ENSURE 1-HS-68-341H, BACKUP HEATER C [1-M-4], is ON, to equalize RCS-Pzr CB.																											
	RO	[2] ADJUST 1-FC-62-139, BA TO BLENDER [1-M-6], for desired flow rate.																											
	RO	[3] ADJUST 1-FQ-62-139, BA BATCH COUNTER [1-M-6], for required quantity.																											
	RO	[4] PLACE 1-HS-62-140B, VCT MAKEUP MODE [1-M-6], in BOR.																											
	RO	[5] TURN 1-HS-62-140A, VCT MAKEUP CONTROL [1-M-6], to START. [5.1] CHECK Red light is LIT.																											
	RO	[6] MONITOR the following parameters: <table border="1"> <thead> <tr> <th>Instrument</th><th>Location</th><th>Parameters</th></tr> </thead> <tbody> <tr> <td>1-PI-62-122</td><td>1-M-6</td><td>VCT PRESS</td></tr> <tr> <td>1-LI-62-129A</td><td>1-M-6</td><td>VCT LEVEL</td></tr> <tr> <td>1-FI-62-139</td><td>1-M-6</td><td>BA TO BLENDER FLOW</td></tr> <tr> <td>1-FQ-62-139</td><td>1-M-6</td><td>BA BATCH COUNTER</td></tr> <tr> <td>1-FI-62-142</td><td>1-M-6</td><td>PW TO BLENDER FLOW</td></tr> <tr> <td>1-FQ-62-142</td><td>1-M-6</td><td>PW BATCH COUNTER</td></tr> <tr> <td>1-LI-62-238</td><td>1-M-6</td><td>BAT A LEVEL</td></tr> <tr> <td>1-LI-62-242</td><td>1-M-6</td><td>BAT C LEVEL</td></tr> </tbody> </table>	Instrument	Location	Parameters	1-PI-62-122	1-M-6	VCT PRESS	1-LI-62-129A	1-M-6	VCT LEVEL	1-FI-62-139	1-M-6	BA TO BLENDER FLOW	1-FQ-62-139	1-M-6	BA BATCH COUNTER	1-FI-62-142	1-M-6	PW TO BLENDER FLOW	1-FQ-62-142	1-M-6	PW BATCH COUNTER	1-LI-62-238	1-M-6	BAT A LEVEL	1-LI-62-242	1-M-6	BAT C LEVEL
Instrument	Location	Parameters																											
1-PI-62-122	1-M-6	VCT PRESS																											
1-LI-62-129A	1-M-6	VCT LEVEL																											
1-FI-62-139	1-M-6	BA TO BLENDER FLOW																											
1-FQ-62-139	1-M-6	BA BATCH COUNTER																											
1-FI-62-142	1-M-6	PW TO BLENDER FLOW																											
1-FQ-62-142	1-M-6	PW BATCH COUNTER																											
1-LI-62-238	1-M-6	BAT A LEVEL																											
1-LI-62-242	1-M-6	BAT C LEVEL																											

Op Test No.:	<u>NRC</u>	Scenario #	<u>1</u>	Event #	<u>1</u>	Page	<u>2</u>	of	<u>57</u>
Event Description: Reduce power using GO-4, "Normal Power Operations," to support valve testing per 1-TRI-47-									
Time	Position	Applicant's Actions or Behavior							

	RO	[7] WHEN Boration is COMPLETE, THEN PLACE 1-HS-62-140B, VCT MAKEUP MODE, in AUTO.
	RO	[8] TURN 1-HS-62-140A, VCT MAKEUP CONTROL, to START. [8.1] CHECK Red light is LIT.
	RO	[9] RETURN 1-FC-62-139, BA TO BLENDER [1-M-6], to desired flow rate.
EXAMINER: The following actions are taken from GO-4, "Normal Power Operation," Section 5.3, "Unit Shutdown from 100% to 30% Reactor Power."		
	BOP	<p>[13] INITIATE load reduction by PERFORMING the following on the Turbine EHC panel:</p> <p>[13.1] IF during any of the following steps the REFERENCE changes in an undesired manner THEN ADJUST VPL to stop turbine load rise.</p> <p>OR</p> <p>PUSH TURBINE MANUAL to place the turbine control mode in manual mode and proceed to section 5.6.</p> <p>[13.2] PUSH REFERENCE CONTROL ▽ (lower) button to set desired load in SETTER display.</p> <p>[13.3] SET LOAD RATE as required.</p> <p>[13.4] PUSH GO button.</p> <p>[13.5] MONITOR Generator Megawatts DROPPING.</p> <p>[13.6] CHECK that load change has STOPPED when reference display equals setter</p> <p>OR</p> <p>IF desired to stop the load change, THEN STOP the load change by DEPRESSING the HOLD pushbutton</p> <p>[13.7] WHEN desired to resume the load change, THEN PRESS the GO push button and continue to monitor load.</p> <p>[13.8] ADJUST VALVE POSITION LIMIT to ≤ 5% above the Gov Control Indication or as needed.</p> <p>[13.9] REPEAT Steps 5.3[13.2] to 5.3[13.5] to achieve desired load.</p>
CAUTION		
Do not exceed load rate of 5%/minute, or 10% step change		

Op Test No.:	<u>NRC</u>	Scenario #	<u>1</u>	Event #	<u>1</u>	Page	<u>3</u>	of	<u>57</u>
Event Description: Reduce power using GO-4, "Normal Power Operations," to support valve testing per 1-TRI-47-									
Time	Position	Applicant's Actions or Behavior							

	RO	[14] MONITOR the following during the load reduction: [14.1] TAVG following TREF program. [14.2] All RPIs, Step Counters, Loop ΔT , and NIS for correct power distribution, quadrant power tilts, rod insertion, rod misalignment, inoperable RPIs, and inoperable rods.
	SRO	Crew Brief would typically be conducted for this event as time allows prior to the next event.
	SRO	Notifications should be addressed as applicable if not specifically addressed by the procedure or in the crew brief. <u>Operations Management</u> - Typically Shift Manager. <u>Maintenance Personnel</u> – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
Cue Simulator Operator to insert Event 2.		

Op Test No.: NRC Scenario # 1 Event # 2 Page 4 of 57

Event Description: Loop 4 RTD fails high, causing rod insertion. Requires AOI-2 entry and a Tech Spec evaluation.

Time	Position	Applicant's Actions or Behavior
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Indications:

93A, "RCS LOOP Δ T DEVIATION"

93F, "EAGLE PROC PROT CH-IV RTD FAILURE"

94A, "T AVG-T REF DEVIATION"

94B, "T AVG - TAUCT DEVIATION"

110F, "PROT SET TROUBLE"

If in AUTO at the time of the failure, rods inserting at 72 steps per minute, as indicated by GREEN indicating light on 1-M-4 and CERPI indication of rod speed.

	RO	Diagnoses and announces continuous rod insertion.
	RO	May place rods in MANUAL to stop the rod insertion.
	RO	May place 1-HIC-62-93A, CHARGING FLOW PZR LEVEL CONTROL in MANUAL to control pressurizer level.
	SRO	Enters and directs actions of AOI-2, "Malfunction of Reactor Control System," Sub Section 3.2, "Continuous Rod Withdrawal/Insertion."

EXAMINER: The following actions are taken from AOI-2, "Malfunction of Reactor Control System," Sub Section 3.2, "Continuous Rod Withdrawal/Insertion."

	RO	1. PLACE control rods in MAN.
	RO	2. CHECK control rod movement STOPPED.
	RO	3. MAINTAIN T-avg on PROGRAM. (Reference Attachment 1) <ul style="list-style-type: none"> • USE control rods. OR <ul style="list-style-type: none"> • ADJUST turbine load.
	RO	4. CHECK loop T-avg channels NORMAL.
	RO	4. RESPONSE NOT OBTAINED: DEFEAT failed loop Δ T and loop T-avg channels by placing 1-XS-68-2D, Δ T CHANNEL DEFEAT, and 1-XS-68-2M, TAVG CHANNEL DEFEAT in failed channel position then PULL. ENSURE TR-68-2A placed to operable channel using 1-XS-68-2B, Δ T RCDR TR-68-2A LOOP SELECT [1-M-5]. NOTIFY Maintenance to implement IMI-160 for failed channel. WHEN at least 3 minutes have elapsed since failed T-avg channel is defeated, THEN a) ENSURE T-avg and T-ref within 1°F. b) ENSURE zero demand on control rod position indication [1-M-4]. c) PLACE rods in AUTO.

Op Test No.: NRC Scenario # 1 Event # 2 Page 5 of 57

Event Description: Loop 4 RTD fails high, causing rod insertion. Requires AOI-2 entry and a Tech Spec evaluation.

Time	Position	Applicant's Actions or Behavior
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	RO	5. CHECK Auct Tavg NORMAL on 1-TR-68-2B.
EXAMINER: The SRO may have interpreted this step to be the conditions at the time of the failure. If so, the RNO may be entered.		
	RO	5. RESPONSE NOT OBTAINED: CONTROL pwr level in MAN 1-FCV-62-93. (Reference Attachment 1) <i>1-HIC-62-93A may have already been placed in MANUAL upon discovery of failure, and actions initiated to control level may be in progress.</i>
	RO	6. CHECK NIS power range channels NORMAL.
	RO	7. CHECK the following: <ul style="list-style-type: none"> • Turbine impulse pressure channel 1-PI-1-73, NORMAL. • Tref and Auct Tavg NORMAL on 1-TR-68-2B (Reference Attachment 1)
	RO	8. MONITOR core power distribution parameters: <ul style="list-style-type: none"> • Power range channels. • ΔFlux Indicators. • T-avg. • Loop ΔT. • Incore TCs. • Feed flow/Steam flow.
	SRO	9. INITIATE repairs to failed equipment.

Op Test No.: NRC Scenario # 1 Event # 2 Page 6 of 57

Event Description: Loop 4 RTD fails high, causing rod insertion. Requires AOI-2 entry and a Tech Spec evaluation.

Time	Position	Applicant's Actions or Behavior
	SRO	<p>10. REFER TO Tech Specs:</p> <ul style="list-style-type: none"> 3.1.1, Shutdown Margin - Not applicable. 3.1.5, Rod Group Alignment Limits - Not applicable. 3.1.6, Shutdown Bank Insertion Limits - Not applicable. 3.1.7, Control Bank Insertion Limits - Not applicable. 3.2.1, Heat Flux Hot Channel Factor - Not applicable. 3.2.2, Nuclear Enthalpy Rise Hot Channel Factor - Not applicable. 3.2.4, Quadrant Power Tilt Ratio - Not applicable. 3.2.3, Axial Flux Difference - Not applicable. 3.3.1-1, "Rx Trip System (RTS)" <p>Function 6. Overtemperature ΔT Condition W. Place channel in trip within 72 hours OR be in Mode 3 within 78 hours.</p> <p>Function 7. Overpower ΔT Condition W. Place channel in trip within 72 hours OR reduce THERMAL POWER to <P-7.</p> <p>Function 13. b. SG Water Level - Low-Low Coincident with Vessel ΔT Equivalent to power > 50% RTP with no time delay (Ts and Tm = 0). Condition V - Set the Trip Time Delay threshold power level for (TS) and (TM) to 0% power within 72 hours OR be in Mode 3 within 78 hours.</p> <ul style="list-style-type: none"> 3.3.2-1, "ESFAS Instrumentation. <p>Function 6. Auxiliary Feedwater b. 2. SG Water Level - Low-Low Coincident with Vessel coincident with Vessel ΔT equivalent to power > 50% RTP with no time delay (Ts and Tm = 0) Condition N - Set the Trip Time Delay threshold power level for (Ts) and (Tm) to 0% power within 72 hours OR be in MODE 3 within 78 hours.</p>
<p style="text-align: center;">CAUTION</p> <p>Allowing at least 5 minutes between any rod control input (i.e., T-avg, T-ref, or NIS) changes and placing rods in AUTO, will help prevent undesired control rod movement.</p>		
	SRO	<p>11. NOTIFY Chemistry of any reactor power changes greater than 15% in one hour.</p>
	SRO	<p>12. IF loop ΔT and loop Tavg channels were defeated due to Tavg channel failure, and Tavg channel has been repaired, THEN PUSH IN 1-XS-68-2D, ΔT CHANNEL DEFEAT, and 1-XS-68-2M, TAVG CHANNEL DEFEAT, and select away from all ΔT and Tavg channels. SRO determines that step is N/A since the Tavg channel has not been repaired.</p>

Op Test No.:	<u>NRC</u>	Scenario #	<u>1</u>	Event #	<u>2</u>	Page	<u>7</u>	of	<u>57</u>
Event Description:		Loop 4 RTD fails high, causing rod insertion. Requires AOI-2 entry and a Tech Spec evaluation.							
Time	Position	Applicant's Actions or Behavior							

	RO	13. WHEN conditions allow auto rod control, THEN : a. ENSURE T-avg and T-ref within 1°F. b. ENSURE zero demand on control rod position indication [1-M-4]. c. PLACE rods in AUTO.
	RO	14. WHEN conditions allow auto pwr level control, THEN ENSURE pwr level returned to normal program, AND PLACE 1-FCV-62-93 in AUTO
	SRO	15. RETURN TO Instruction in effect.
	SRO	Crew Brief would typically be conducted for this event as time allows prior to the next event.
	SRO	Notifications should be addressed as applicable if not specifically addressed by the procedure or in the crew brief. <u>Operations Management</u> - Typically Shift Manager. <u>Maintenance Personnel</u> – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
Cue Simulator Operator to insert Event 3.		

Op Test No.: NRC Scenario # 1 Event # 3 Page 8 of 57

Event Description: 1A ERCW supply header ruptures in the Intake Pumping Station. AOI-13 entry and a Tech Spec evaluation are required.

Time	Position	Applicant's Actions or Behavior
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Indications:

225-E TR A/B ERCW TO C&SS COMPR FLOW HI

223-A ERCW HDR A SUP PRESS LO

223-B ERCW PMP A-A DISCH PRESS LO

226-B ERCW PMP D-A DISCH PRESS LO

170-E IPS VLV & STRNR ROOM A SUMP LEVEL HI

	BOP	Diagnoses and announces the 1A ERCW header rupture in the Intake Pumping Station.
	BOP	May dispatch the Outside Routine AUO to the Intake Pumping Station to determine location of rupture.
	SRO	Enters and directs actions of AOI-13, "Loss of Essential Raw Cooling Water," Section 3.5, "Supply Header Rupture at IPS."

EXAMINER: The following actions are taken from ARI 223-A, "ERCW HDR A SUP PRESS LO."

	BOP	[1] CHECK 0-PI-67-18A, A ERCW SUP HDR PRESS [0-M-27A].
	BOP	[2] DISPATCH Operator to check ERCW Train A pumps.
	SRO	[3] CHECK valve alignment to ERCW Hdr A per SOI-67.01, <i>ESSENTIAL RAW COOLING WATER SYSTEM</i> .
	SRO	[4] REFER TO AOI-13, LOSS OF ESSENTIAL RAW COOLING WATER.

EXAMINER: The following actions are taken from AOI-13, "Loss of Essential Raw Cooling Water," Sub Section 3.5, "Supply Header Rupture at IPS."**CAUTION**

This Section applies to a header break prior to the ERCW Strainer inlet valves or as directed by another section in this procedure.

	BOP	1. DISPATCH personnel to determine location of rupture. <i>Report from the field - 1A strainer room flooded, appears ruptured</i>
	BOP	2. DISPATCH AUO, with a radio, to the Rx MOV Bds.

NOTE

MOV's with power normally removed may not travel to full closed position under high flow conditions; local verification of isolation may be required.

	BOP	3. CHECK Train A Supply Header pressure at expected values for existing plant conditions.
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Op Test No.:	<u>NRC</u>	Scenario #	<u>1</u>	Event #	<u>3</u>	Page	<u>9</u>	of	<u>57</u>
Event Description: 1A ERCW supply header ruptures in the Intake Pumping Station. AOI-13 entry and a Tech Spec evaluation are required.									
Time	Position	Applicant's Actions or Behavior							

	BOP	<p>3. <u>RESPONSE NOT OBTAINED:</u></p> <p>PERFORM the following:</p> <ol style="list-style-type: none"> UNLOCK, and CLOSE bkr on Rx MOV Bd 1A2-A c/7B, 1-FCV-67-22. UNLOCK, and CLOSE bkr on Rx MOV Bd 1A2-A c/11B, 1-FCV-67-147. UNLOCK, and CLOSE bkr on Rx MOV Bd 1A2-A c/15E, 1-FCV-67-458. UNLOCK, and CLOSE bkr on Rx MOV Bd 2A2-A c/7B, 2-FCV-67-22. ENSURE 1-FCV-67-223, ERCW Hdr 1B To 2A Xtie, OPEN. ENSURE 2-FCV-67-223, ERCW Hdr 2A To 1B Xtie, OPEN. OPEN 1-FCV-67-458, CCS Hx A Sup From Hdr 1B. STOP, and PULL TO LOCK all Tr A ERCW Pumps. CLOSE 1-FCV-67-22, Strainer 1A-A Inlet. CLOSE 2-FCV-67-22, Strainer 2A-A Inlet. START additional Tr B ERCW Pumps as required. OPEN 1-FCV-67-147, CCS Hx C Sup From Hdr 1A. ENSURE 2-FCV-67-147, CCS Hx C Sup From Hdr 2B, is OPEN. GO TO Step 5.
<p>NOTE 1 With ruptured header strainer inlet valves closed, the flow indicators on the isolated supply headers will be off-scale low.</p> <p>NOTE 2 With ERCW headers cross-tied, evaluate LCO 3.0.3 applicability.</p>		
	BOP	5. CHECK in-service header(s) flow(s) and pressure(s) return to expected values for existing plant conditions.
	BOP	6. CHECK pump amps within limits.

Op Test No.:	<u>NRC</u>	Scenario #	<u>1</u>	Event #	<u>3</u>	Page	<u>10</u>	of	<u>56</u>
Event Description: 1A ERCW supply header ruptures in the Intake Pumping Station. AOI-13 entry and a Tech Spec evaluation are required.									
Time	Position	Applicant's Actions or Behavior							

	SRO	<p>7. REFER TO Tech Specs:</p> <ul style="list-style-type: none"> 3.0.3, Applicability <i>Since the ERCW headers are cross-connected, entry into LCO 3.0.3 is required.</i> 3.4.6, RCS Loops-Mode 4 - <i>Not applicable.</i> 3.7.8, Essential Raw Cooling Water System (ERCW) <i>Entered, but LCO 3.0.3 is most limiting.</i> <p><i>Condition A. One ERCW train inoperable, other than for Condition C, 1. Enter applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources-Operating," for emergency diesel generator made inoperable by ERCW. Restore ERCW train to OPERABLE status within 72 hours</i></p> <ul style="list-style-type: none"> 3.8.1, AC Sources-Operating <i>Condition C. Two required DGs in Train A inoperable may be entered. However, LCO 3.0.3 is the most limiting and a Safety Function Determination would be required in this situation.</i>
	SRO	<p>8. EVALUATE ERCW availability to DGs. <i>SRO may contact Work Control or Shift Manager to perform this evaluation.</i></p>
	SRO	<p>9. INITIATE repair.</p>
	SRO	<p>10. IF ERCW to in-service CCS heat exchanger was interrupted, THEN NOTIFY Duty System Engineer to initiate evaluation for effect on CCS equipment and piping.</p>
	SRO	<p>Crew Brief would typically be conducted for this event as time allows prior to the next event.</p>
	SRO	<p>Notifications should be addressed as applicable if not specifically addressed by the procedure or in the crew brief. <u>Operations Management</u> - Typically Shift Manager. <u>Maintenance Personnel</u> - Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).</p>
Cue Simulator Operator to insert Event 4.		

Op Test No.: NRC Scenario # 1 Event # 3 Page 11 of 57

Event Description: 1A ERCW supply header ruptures in the Intake Pumping Station. AOI-13 entry and a Tech Spec evaluation are required.

Time	Position	Applicant's Actions or Behavior
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Cue Simulator Operator to insert Event 4.

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Op Test No.: NRC Scenario # 1 Event # 4 Page 12 of 57

Event Description: Steam Pressure transmitter, 1-PT-1-33 fails low, requiring manual control of main feedwater pump speed, and AOI-16 entry.

Time	Position	Applicant's Actions or Behavior
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Indications:

63-F."SG LEVEL DEVIATION"

MFP speed dropping.

Main Feed Reg valves fully open.

All SG levels dropping.

	BOP	Diagnoses and announces failure of 1-PT-1-33.
	RO	May place control rods in MANUAL to stabilize the reactor during the feedwater transient.
	BOP	May place Main Feedwater Pump Master controller, 1-PC-46-20, in MANUAL and raise speed.
	SRO	Enters and directs actions of AOI-16, "Loss of Normal Feedwater," Sub Section 3.7, "MFW pump speed control circuit failure."
EXAMINER: The following actions are taken from AOI-16, "Loss of Normal Feedwater," Sub Section 3.7, "MFW pump speed control circuit failure."		
	BOP	1. CHECK MFWPT speed controller(s) NORMAL.
	BOP	1. RESPONSE NOT OBTAINED: CONTROL MFP speed using MANUAL control of master controller or individual controller(s) as required. (p) IF MANUAL control of individual MFWPT controller is ineffective, THEN TRIP affected MFWPT, and GO TO Section 3.4 or 3.5 as applicable.
	RO	2. PLACE control rods in MANUAL.
	BOP	3. CHECK MFW pumps recirc valves NORMAL.
	RO	4. (p) ENSURE T-avg and T-ref within 3°.
	BOP	5. MAINTAIN MFWP discharge press on PROGRAM.
	BOP	6. ENSURE S/G levels return to PROGRAM.
	BOP	7. CHECK steam dump mode in T-AVG position.
	SRO	8. INITIATE repairs to failed equipment.
	RO	9. (p) IF desired to place control rods in AUTO, THEN ENSURE T-avg and T-ref within 1° and PLACE control rods in auto.
	SRO	10. WHEN MFP pump control repairs completed, THEN, PLACE MFP speed control in AUTO. 1-PT-1-33 will NOT be repaired, so MFP speed control will remain in MANUAL for the duration of the scenario.
	SRO	11. RETURN TO Instruction in effect.

Op Test No.:	<u>NRC</u>	Scenario #	<u>1</u>	Event #	<u>4</u>	Page	<u>13</u>	of	<u>57</u>
Event Description:	Steam Pressure transmitter, 1-PT-1-33 fails low, requiring manual control of main feedwater pump speed, and AOI-16 entry.								
Time	Position	Applicant's Actions or Behavior							

	SRO	Crew Brief would typically be conducted for this event as time allows prior to the next event.
	SRO	Notifications should be addressed as applicable if not specifically addressed by the procedure or in the crew brief. <u>Operations Management</u> - Typically Shift Manager. <u>Maintenance Personnel</u> – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
Cue Simulator Operator to insert Event 5.		

Op Test No.: NRC Scenario # 1 Event # 5 Page 14 of 57

Event Description: Number 2 seal failure on #3 RCP.

Time	Position	Applicant's Actions or Behavior
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97-C RCP 3 STANDPIPE LEVEL HI/LO

100-E RCP SEAL LEAKOFF FLOW LO

	RO	Announces RCP 3 standpipe level high/lo alarm.
	SRO	Enters and directs actions of ARI 97-C, RCP 3 STANDPIPE LEVEL HI/LO.

EXAMINER: The following actions are taken from ARI 97-C, "RCP 3 STANDPIPE LEVEL HI/LO."

Note If this annunciator resets during the performance of Corrective Action Step [1], the standpipe level was low. This indicates a possible #3 seal problem. If the annunciator remains illuminated after one to two minutes, the stand pipe level is high and a #1 or #2 seal failure may exist.

Note A high RCP Standpipe level in conjunction with reduced #1 seal leakoff flow and rising flow to the RCDT is indicative of a failed #2 seal.

		[1] ATTEMPT to clear alarm by performing the following: [a] ENSURE Primary Water Pump running UNLESS in the PWST BYPASS MODE. [b] OPEN 1-FCV-81-12 and -15, AND OBSERVE annunciator for reset. [c] CLOSE 1-FCV-81-12 and -15, promptly after alarm clears, when alarm reflashes (HI), when directed by another instruction, OR after two minutes, from start of fill.
		[2] CHECK 1-FR-62-50, RCP Seal Leak Off High Range, OR ICS Point F1022A to determine if any changes occurred in seal return flow.
		[3] ENSURE VCT pressure at least 15 psig greater than RCDT pressure.
		[4] NOTIFY Radwaste Operator to monitor RCDT level, pressure and temperature for possible rises, Control Panel 0-L-2 [el. 692]
		[5] IF alarm fails to clear or clears and reoccurs, THEN EVALUATE going to AOI-24, <i>RCP MALFUNCTIONS DURING PUMP OPERATION</i> .

EXAMINER: The following actions are taken from AOI-24, "RCP MALFUNCTIONS DURING PUMP OPERATION," Section 3.5, "# 2 Seal Leakoff Flow High."

NOTE 1 During plant startup after seal maintenance, the #2 seal may require 24 hours of run time before the seal seats fully and operates normally.

NOTE 2 Normal #2 seal leakoff is less than 0.5 gpm. A leakoff rate of between 0.5 and 1.1 gpm indicates a problem exists but pump operation may continue.

Op Test No.: NRC Scenario # 1 Event # 5 Page 15 of 57

Event Description: Number 2 seal failure on #3 RCP.

Time	Position	Applicant's Actions or Behavior
		1. CHECK standpipe level HI a. OPEN primary water valve, 1 FCV-81-12. b. OPEN affected RCP standpipe fill valve. c. CHECK standpipe level alarm stays LIT. d. CLOSE primary water valve, 1 FCV-81-12. e. CLOSE affected RCP standpipe fill valve.
		2. CHECK #2 seal leakoff less than 1.1 gpm: • CONTACT System Engineer for assistance. • PERFORM 1-SI-68-32 and compare results to last performance. <i>Applicants may use 1-SI-68-32 computer program to get a rough estimate of leakage. Determination of leakage will be approximately 0.8 gpm (less than 1.1 gpm.)</i>
		3. MONITOR RCP vibration analog reading for affected pump: • Within normal operating limits. • STABLE or DROPPING .
		4. CONSULT plant staff for recommendations for continued RCP operation <i>When the SRO contacts the plant staff, the Console Operator will inform the SRO that the #3 RCP is to remain in service and will be monitored for analysis and trending of the #2 seal degradation.</i>
		5. RETURN TO Instruction in effect.
	SRO	Crew Brief would typically be conducted for this event as time allows prior to the next event.
	SRO	Notifications should be addressed as applicable if not specifically addressed by the procedure or in the crew brief. <u>Operations Management</u> - Typically Shift Manager. <u>Maintenance Personnel</u> – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
Cue Simulator Operator to insert Event 6.		

Op Test No.: NRC Scenario # 1 Event # 6 Page 16 of 57

Event Description: 1-LT-62-129 VCT LEVEL fails high, requiring entry into ARI 109-A, VCT LEVEL HI/LO.

Time	Position	Applicant's Actions or Behavior
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Indications:

109-A VCT LEVEL HI/LO

1-LI-62-129A, VCT LEVEL indication is off-scale high.

	RO	Diagnoses and announces failure of 1-LT-62-129A high.
	RO	May place 1-LCV-62-118, LETDOWN DIVERT TO HUT to the "VCT" position.
	SRO	Enters and directs actions of ARI 109 A, VCT LEVEL HI/LO.

EXAMINER: The following actions are taken from ARI 109-A, VCT LEVEL HI/LO.**CAUTION 1** If either VCT level transmitter fails high, then auto swap over to RWST on low level is disabled.**CAUTION 2** 1-LT-62-129A failing high will divert letdown flow but will not prevent auto makeup. 1-LI-62-129 will indicate offscale high; however, computer point L0112A will indicate actual level.**CAUTION 3** 1-LT-62-130A failing high will divert letdown and prevent auto makeup; however, 1-LI-62-129 will indicate actual level.

		[1] IF high level, THEN [a] ENSURE 1-LCV-62-118 diverted to HUT and OPEN . [b] ENSURE NO VCT makeup in progress.
		[2] IF low level, THEN <ul style="list-style-type: none"> • ENSURE 1-LCV-62-118 aligned to VCT. • INITIATE makeup in accordance with SOI-62.02, <i>BORON CONCENTRATION CONTROL</i>. • ENSURE suction to the Centrifugal Charging Pump swaps over to the RWST at 7% VCT level.
		[3] VERIFY letdown and charging in service and that Reactor Coolant Filter is not clogged.
		[4] IF 1-LCV-62-118 diverted to HUT due to instrument failure, THEN [a] PLACE 1-HS-62-118 in VCT position until repairs completed. [b] PLACE 1-HS-62-118 in P-AUTO position when repairs completed.
		[5] IF RCS leakage is suspected, THEN GO TO AOI-6, <i>SMALL REACTOR COOLANT SYSTEM LEAK</i> .
	SRO	Crew Brief would typically be conducted for this event as time allows prior to the next event.

Op Test No.: NRC Scenario # 1 Event # 6 Page 17 of 57

Event Description: 1-LT-62-129 VCT LEVEL fails high, requiring entry into ARI 109-A, VCT LEVEL HI/LO.

Time	Position	Applicant's Actions or Behavior
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	SRO	Notifications should be addressed as applicable if not specifically addressed by the procedure or in the crew brief. <u>Operations Management</u> - Typically Shift Manager. <u>Maintenance Personnel</u> – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
Cue Simulator Operator to insert Event 7. The remaining malfunction will enter 10 seconds after the reactor trip initiation.		

Op Test No.: NRC Scenario # 1 Event # 7, 8, 9 and 10 Page 18 of 57

Event Description: Raw cooling water temperature control valve to the Stator Water Cooler fails closed. 15 seconds after the trip, a PZR vapor space break occurs, requiring a manual safety injection and entry into E-0. 10 seconds after the SI, offsite power is lost, and the DGs fail to auto start.

Time	Position	Applicant's Actions or Behavior
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Indications:

22-E, "GEN AUX PNL 1-L-39 ALARM"

1-C, "STATOR TEMP HI"

1-B, "STATOR COOLING FAILURE"

	BOP	Diagnoses and announces the loss of Raw Cooling water.
	BOP	Dispatches an AUO to investigate 22-E, GEN AUX PNL 1-L-39 ALARM.
	SRO	May direct reactor trip based on stator cooling water alarms, however, an automatic trip may take place before the alarm can be validated using ICS.

EXAMINER: This event will cause a reactor trip after approximately 2 minutes. The operators will dispatch personnel to investigate the reason for the loss of Raw Cooling Water, but will not have time to implement AOI-46, "Loss of Raw Cooling Water."

EXAMINER: The following actions are taken from ARI 22-E, "GEN AUX PNL 1-L-39 ALARM".

	BOP	[1] DISPATCH Operator to determine cause of alarm.
	BOP	[2] REFER TO ARI-1-L-39, ANNUNCIATOR RESPONSE INSTRUCTION.

EXAMINER: The following actions are taken from ARI 1-C, "STATOR TEMP HI."

	SRO	[1] INITIATE stator temperature monitoring per SOI-35.01, Generator Hydrogen Cooling System.
	BOP	[2] ENSURE generator operating within capability curve limits.
	SRO	[3] CONSIDER load reduction per GO-4, Normal Power Operation, to keep temperature within limits.
	BOP	[4] DISPATCH Operator to investigate and check proper operation of 1-TCV-24-52.
	BOP	[5] IF 1-TCV-24-52 not controlling temperature properly, THEN THROTTLE OPEN 1-BYV-24-926, STATOR COIL HS 1A/1B TEMP CNTL VLV BYPASS.
	BOP	[6] MONITOR stator coil discharge temperature on Plant Computer point, T3098A.
	SRO	[7] IF alarm is due to loss or partial loss of Raw Cooling Water, THEN REFER TO AOI-46, Loss of Raw Cooling Water.

EXAMINER: The following actions are taken from ARI 1-B, "STATOR COOLING FAILURE."

	BOP	[1] DISPATCH Operator to Panel 1-L-39 to determine cause of
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Op Test No.: NRC Scenario # 1 Event # 7, 8, 9 and 10 Page 19 of 57

Event Description: Raw cooling water temperature control valve to the Stator Water Cooler fails closed. 15 seconds after the trip, a PZR vapor space break occurs, requiring a manual safety injection and entry into E-0. 10 seconds after the SI, offsite power is lost, and the DGs fail to auto start.

Time	Position	Applicant's Actions or Behavior
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		alarm and initiate corrective action.
	SRO/BOP	[2] REDUCE unit load to less than 15% of rated power.
	SRO	[3] IF turbine trips above 50% power, THEN ENSURE reactor trip, and GO TO E-0, Reactor Trip Or Safety Injection.
	SRO	[4] IF turbine trips below 50% power, THEN GO TO AOI-17, Turbine Trip.
	SRO	[5] IF alarm is due to loss or partial loss of Raw Cooling Water, THEN REFER TO AOI-46, Loss of Raw Cooling Water.
	SRO	[6] NOTIFY Work Control to initiate corrective action, if necessary.

EXAMINER: The following actions are taken from E-0, "Reactor Trip or Safety Injection."

NOTE 1 Steps 1 thru 4 are **IMMEDIATE ACTION STEPS**.

NOTE 2 Status Trees / SPDS should be monitored when transitioned to another instruction.

	RO	1. ENSURE reactor trip: <ul style="list-style-type: none"> • Reactor trip and bypass breakers OPEN. • RPIs at bottom of scale. • Neutron flux DROPPING.
	RO	2. ENSURE Turbine Trip: <ul style="list-style-type: none"> • All turbine stop valves CLOSED.
	RO	3. CHECK 6.9 kV shutdown boards: a. At least one board energized from: CSST (offsite), OR D/G (blackout).

Critical Task 2

WOG Critical Task List, E-0, C.

Energize at least one ac emergency bus before transition out of E-0, unless the transition is to ECA-0.0, in which case the critical task must be performed before placing safeguards equipment handswitches in the pull-to-lock position.

Guideline ECA-0.0 is developed and structured to address the condition where all ac emergency power is lost. It is entered on the symptom of all ac emergency busses being de-energized. Its objective is to cope with the loss of ac emergency power until at least one ac emergency bus can be energized. ECA-0.0 should not be entered if at least one ac emergency bus is energized since the other optimal recovery guidelines and function restoration guidelines contain guidance that accommodates multiple failures.

Op Test No.:	<u>NRC</u>	Scenario #	<u>1</u>	Event #	<u>7, 8, 9 and 10</u>	Page	<u>20</u>	of	<u>57</u>
Event Description: Raw cooling water temperature control valve to the Stator Water Cooler fails closed. 15 seconds after the trip, a PZR vapor space break occurs, requiring a manual safety injection and entry into E-0. 10 seconds after the SI, offsite power is lost, and the DGs fail to auto start.									
Time	Position	Applicant's Actions or Behavior							

Critical Task 2	RO	<p>3. RESPONSE NOT OBTAINED: RESTORE power to at least one train of shutdown boards:</p> <p>1) EMERGENCY START D/G [1-M-1].</p> <p>2) IF both trains shutdown boards remain de-energized, THEN PLACE 6.9kV SD Bd transfer switch in MAN [1-M-1], and CLOSE supply breaker from energized source. IF power can NOT be restored to at least one train of shutdown boards, THEN ** GO TO ECA-0.0, Loss of Shutdown Power.</p>
	RO	<p>4. CHECK SI actuated:</p> <p>a. Any SI annunciator LIT.</p> <p>b. Both trains SI ACTUATED.</p> <ul style="list-style-type: none"> • 1-XX-55-6C • 1-XX-55-6D
<p>EXAMINER: A PZR vapor space break occurs 10 seconds after the reactor trip, and automatic safety injection actuation fails to occur. Performance of Step 4 RNO actions is expected.</p>		
<p>Critical Task 1 from WOG Critical Task List, E-0, D Manually actuate at least one train of SIS-actuated safeguards before any of the following:</p> <ul style="list-style-type: none"> • Transition to any E-1 series, E-2 series, or E-3 series procedure or transition to any FRG • Completion of step 5.a of ES-0.1 		
Critical Task 1 Manually initiate SI (Auto SI failure).	SRO/RO	<p>4. RESPONSE NOT OBTAINED: DETERMINE if SI required:</p> <p>a. IF ANY of the following exists:</p> <ul style="list-style-type: none"> • S/G press less than 675 psig, OR • RCS press less than 1870 psig, OR • Cntmt press greater than 1.5 psig <p>THEN ACTUATE SI manually.</p> <p>IF SI NOT required, THEN ** GO TO ES-0.1,</p> <p>b. ACTUATE SI manually.</p>
<p>EXAMINER: The following actions are taken from ECA-0.0, "Loss of Shutdown Power," and will not be used if the DGs are started during the performance of E-0.-</p>		
<p align="center">NOTE</p> <ul style="list-style-type: none"> • Steps 1 and 2 are IMMEDIATE ACTION STEPS. • Status Trees should be monitored for information only. The FRs should NOT be implemented. 		

Op Test No.:	<u>NRC</u>	Scenario #	<u>1</u>	Event #	<u>7, 8,9 and 10</u>	Page	<u>21</u>	of	<u>57</u>
Event Description: Raw cooling water temperature control valve to the Stator Water Cooler fails closed. 15 seconds after the trip, a PZR vapor space break occurs, requiring a manual safety injection and entry into E-0. 10 seconds after the SI, offsite power is lost, and the DGs fail to auto start.									
Time	Position	Applicant's Actions or Behavior							

	RO	1. ENSURE reactor trip: <ul style="list-style-type: none"> • Reactor trip and bypass breakers OPEN. • RPIs at bottom of scale. • Neutron flux DROPPING.
	BOP	2. ENSURE turbine trip: <ul style="list-style-type: none"> • All turbine stop valves CLOSED.
	RO	3. ENSURE RCPs STOPPED, and Momentarily PLACE Handswitches in STOP to break seal-in.
	RO	4. ENSURE RCS isolated: <ul style="list-style-type: none"> a. CHECK pwr PORVs CLOSED. b. ENSURE letdown orifice valves CLOSED. c. ENSURE letdown isolation valves CLOSED: <ul style="list-style-type: none"> • 1-FCV-62-69. • 1-FCV-62-70. d. ENSURE excess letdown isolation valves CLOSED: <ul style="list-style-type: none"> • 1-FCV-62-54. • 1-FCV-62-55.
	BOP	5. ENSURE TD AFW pump operation: <ul style="list-style-type: none"> a. ENSURE flow greater than 410 gpm. b. IF loss of control air is imminent, THEN DISPATCH operator to locally control S/G levels USING SOI-3.02, Auxiliary Feedwater System.
Critical Task 2 WOG Critical Task List, E-0, C. Energize at least one ac emergency bus before transition out of E-0, unless the transition is to ECA-0.0, in which case the critical task must be performed before placing safeguards equipment handswitches in the pull-to-lock position. Guideline ECA-0.0 is developed and structured to address the condition where all ac emergency power is lost. It is entered on the symptom of all ac emergency busses being de-energized. Its objective is to cope with the loss of ac emergency power until at least one ac emergency bus can be energized. ECA-0.0 should not be entered if at least one ac emergency bus is energized since the other optimal recovery guidelines and function restoration guidelines contain guidance that accommodates multiple failures.		
Critical Task 2	BOP	6. RESTORE power to shutdown boards: <ul style="list-style-type: none"> a. ENERGIZE shutdown boards: <ul style="list-style-type: none"> 1) EMERGENCY START D/G. 2) ENSURE shutdown boards ENERGIZED. 3) ENSURE ERCW supply to running D/Gs. b. IF at least one shutdown board energized, THEN RETURN TO Instruction in effect, AND IMPLEMENT FRGs as necessary.

Op Test No.: NRC Scenario # 1 Event # 7, 8, 9 and 10 Page 22 of 57

Event Description: Raw cooling water temperature control valve to the Stator Water Cooler fails closed. 15 seconds after the trip, a PZR vapor space break occurs, requiring a manual safety injection and entry into E-0. 10 seconds after the SI, offsite power is lost, and the DGs fail to auto start.

Time	Position	Applicant's Actions or Behavior
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EXAMINER: The following actions are taken from E-0, "Reactor Trip or Safety Injection," since E-0 was the procedure in effect prior to the loss of power.

NOTE 1 Steps 1 thru 4 are IMMEDIATE ACTION STEPS.

NOTE 2 Status Trees / SPDS should be monitored when transitioned to another instruction.

	RO	1. ENSURE reactor trip: • Reactor trip and bypass breakers OPEN. • RPIs at bottom of scale. • Neutron flux DROPPING.
	RO	2. ENSURE Turbine Trip: • All turbine stop valves CLOSED.
	RO	3. CHECK 6.9 kV shutdown boards: a. At least one board energized from: CSST (offsite), OR D/G (blackout).
	RO	4. CHECK SI actuated: a. Any SI annunciator LIT. b. Both trains SI ACTUATED . • 1-XX-55-6C • 1-XX-55-6D
EXAMINER: Appendices A and B (E-0) are provided on pages 30 through 44.		
	BOP	5. EVALUATE support systems: • REFER TO Appendixes A and B (E-0), Equipment Verification pages 15-28.
	SRO	6. ANNOUNCE reactor trip and safety injection over PA system.
	RO	7. ENSURE secondary heat sink available with either: • Total AFW flow greater than 410 gpm, OR • At least one S/G NR level greater than 29% [39% ADV].
	RO	8. MONITOR RCS temp stable at or trending to 557°F: • IF any RCP running, THEN MONITOR RCS Loop T-avg trending to 557°F. OR • IF NO RCP running, THEN MONITOR RCS Loop T-cold trending to 557°F.

Op Test No.:	<u>NRC</u>	Scenario #	<u>1</u>	Event #	<u>7, 8, 9 and 10</u>	Page	<u>23</u>	of	<u>57</u>
Event Description:		Raw cooling water temperature control valve to the Stator Water Cooler fails closed. 15 seconds after the trip, a PZR vapor space break occurs, requiring a manual safety injection and entry into E-0. 10 seconds after the SI, offsite power is lost, and the DGs fail to auto start.							
Time	Position	Applicant's Actions or Behavior							

		<p>8. <u>RESPONSE NOT OBTAINED:</u></p> <p>IF temp less than 557°F, THEN ENSURE steam dumps and S/G PORVs CLOSED.</p> <p>IF cooldown continues, THEN:</p> <ul style="list-style-type: none"> • PLACE steam dump controls OFF. • CONTROL total AFW flow to maintain greater than 410 gpm UNTIL NR level in at least one S/G greater than 29% [39% ADV]. <p>IF cooldown continues after AFW flow is controlled, THEN</p> <ul style="list-style-type: none"> • CLOSE MSIVs. • ENSURE MSIV bypasses CLOSED. <p>IF RCS temp greater than 564°F, THEN ENSURE either steam dumps or S/G PORVs OPEN.</p>
	RO	<p>9. ENSURE excess letdown valves CLOSED:</p> <ul style="list-style-type: none"> • 1-FCV-62-54 • 1-FCV-62-55
	RO	<p>10. CHECK pzs PORVs and block valves:</p> <ul style="list-style-type: none"> a. Pzs PORVs CLOSED. b. At least one block valve OPEN.
		<p>11. CHECK pzs safety valves CLOSED:</p> <ul style="list-style-type: none"> • EVALUATE tailpipe temperatures and acoustic monitors.
		12. CHECK pzs sprays CLOSED.
NOTE		
Seal injection flow should be maintained to all RCPs.		
EXAMINER: Due to the loss of offsite power, the RCPs are off.		
		<p>13. CHECK if RCPs should remain in service:</p> <ul style="list-style-type: none"> a. Phase B signals DARK [MISSP]. b. RCS pressure greater than 1500 psig.
		<p>14. CHECK S/G pressures:</p> <ul style="list-style-type: none"> • All S/G pressures controlled or rising. • All S/G pressures greater than 120 psig.
		<p>15. CHECK for RUPTURED S/G</p> <ul style="list-style-type: none"> • All S/Gs narrow range levels CONTROLLED or DROPPING. • Secondary side radiation NORMAL from Appendix A.

Op Test No.: NRC Scenario # 1 Event # 7, 8, 9 and 10 Page 24 of 57

Event Description: Raw cooling water temperature control valve to the Stator Water Cooler fails closed. 15 seconds after the trip, a PZR vapor space break occurs, requiring a manual safety injection and entry into E-0. 10 seconds after the SI, offsite power is lost, and the DGs fail to auto start.

Time	Position	Applicant's Actions or Behavior
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EXAMINER: 1B Containment Spray Pump will receive an automatic start signal prior to the loss of offsite power. When power is lost, the Containment Spray pump will be shed, and then reloaded after a 184 second time delay. The BOP will monitor this process during performance of E-0, Appendix A.

		16. CHECK cntmt conditions: <ul style="list-style-type: none"> • Cntmt pressure NORMAL. • Radiation NORMAL from Appendix A. • Cntmt sump level NORMAL. • Cntmt temp ann window DARK [104-B].
		16. RESPONSE NOT OBTAINED: ** GO TO E-1, Loss of Reactor or Secondary Coolant.

EXAMINER: The following actions are taken from E-1, "Loss of Reactor or Secondary Coolant."

EXAMINER: When the vapor space break occurs, containment temperature and pressure will rise sharply. 265-A UPPER CNTMT RE-271/272 RAD HI and 265-B LOWER CNTMT RE-273/274 are expected to alarm, since testing has shown rad monitor to give unreliable indication for up to 2 minutes following a rapid increase or decrease in containment temperature. The alarms will clear after the initial temperature transient.

NOTE

Seal injection flow should be maintained to all RCPs.

	RO	1. CHECK if RCPs should remain in service: <ul style="list-style-type: none"> a. Phase B DARK [MISSP]. b. RCS pressure greater than 1500 psig.
	SRO	2. REFER TO EPIP-1, Emergency Plan Classification Flowchart.

NOTE

Time since initiation of event is defined by performance of Step 3.

	SRO	3. RECORD current time to mark initiation of LOCA and determination of time for hot leg recirc.
	RO	4. CHECK S/G pressures: <ul style="list-style-type: none"> • All S/G pressures controlled or rising. • All S/Gs pressures greater than 120 psig.
	BOP	5. MAINTAIN Intact S/G NR levels: <ul style="list-style-type: none"> a. MONITOR levels greater than 29% [39% ADV]. b. CONTROL intact S/G levels between 29% and 50% [39% and 50% ADV].

EXAMINER: The status of secondary radiation may have already been reported by the BOP during performance of E-0 Appendix A.

Op Test No.: NRC Scenario # 1 Event # 7, 8,9 and 10 Page 25 of 57

Event Description: Raw cooling water temperature control valve to the Stator Water Cooler fails closed. 15 seconds after the trip, a PZR vapor space break occurs, requiring a manual safety injection and entry into E-0. 10 seconds after the SI, offsite power is lost, and the DGs fail to auto start.

Time	Position	Applicant's Actions or Behavior
	BOP	6. CHECK secondary radiation: <ul style="list-style-type: none"> • S/G discharge monitors NORMAL. • Condenser vacuum exhaust rad monitors NORMAL. • S/G blowdown rad monitor recorders NORMAL trend prior to isolation.
	BOP	7. ENSURE cntmt hydrogen analyzers in service: <ul style="list-style-type: none"> • PLACE 1-HS-43-200A in ANALYZE [M-10]. • PLACE 1-HS-43-210A in ANALYZE [M-10]. • CHECK low flow lights not lit [M-10]. • Locally CHECK low analyzer temp lights NOT lit [North wall of Train A 480V SD Bd rm].
	RO	8. MONITOR pzs PORVs and block valves: <ol style="list-style-type: none"> a. Pzs PORVs CLOSED. b. At least one block valve OPEN.
EXAMINER: Containment pressure may not be below 2.0 psig when the operators evaluate this step initially. Since it is a continuous action step, when containment pressure does drop below 2.0 psig, the actions will be performed.		
	SRO	9. DETERMINE if cntmt spray should be stopped: <ol style="list-style-type: none"> a. MONITOR cntmt pressure less than 2.0 psig. b. CHECK at least one cntmt spray pump RUNNING. c. RESET cntmt spray signal. d. STOP cntmt spray pumps, and PLACE in A-AUTO. e. CLOSE cntmt spray discharge valves 1-FCV-72-2 and 1-FCV-72-39.
	RO	<ol style="list-style-type: none"> a. <u>RESPONSE NOT OBTAINED:</u> WHEN cntmt pressure is less than 2.0 psig, THEN PERFORM Sub steps 9b thru e.
	BOP	10. ENSURE both pocket sump pumps STOPPED [M-15]: <ul style="list-style-type: none"> • 1-HS-77-410. • 1-HS-77-411.
	RO	11. CHECK SI termination criteria: <ol style="list-style-type: none"> a. CHECK RCS subcooling greater than 65°F [85°F ADV].
	SRO	<ol style="list-style-type: none"> a. <u>RESPONSE NOT OBTAINED:</u> ** GO TO Caution prior to Step 12.
CAUTION If offsite power is lost after SI reset, manual action will be required to restart the SI pumps and RHR pumps due to loss of SI start signal.		

Op Test No.: NRC Scenario # 1 Event # 7, 8, 9 and 10 Page 26 of 57

Event Description: Raw cooling water temperature control valve to the Stator Water Cooler fails closed. 15 seconds after the trip, a PZR vapor space break occurs, requiring a manual safety injection and entry into E-0. 10 seconds after the SI, offsite power is lost, and the DGs fail to auto start.

Time	Position	Applicant's Actions or Behavior
	RO	12. RESET SI and CHECK the following: <ul style="list-style-type: none"> • SI ACTUATED permissive DARK. • AUTO SI BLOCKED permissive LIT.
	RO	13. DETERMINE if RHR pumps should be stopped: <ul style="list-style-type: none"> a. CHECK RCS pressure greater than 150 psig. b. CHECK RHR suction aligned from RWST. c. CHECK RCS pressure stable or rising. d. STOP RHR pumps and PLACE in A-AUTO. e. MONITOR RCS pressure greater than 150 psig.
	RO	14. CHECK pressure in all S/Gs controlled or rising.
	RO	15. CHECK RCS pressure stable or dropping.
	BOP	16. MONITOR electrical board status: <ul style="list-style-type: none"> a. CHECK offsite power available.
EXAMINER: AOI-35, "Loss of Offsite Power," steps are provided on Pages 45 through 49.		
	BOP	16. RESPONSE NOT OBTAINED: <ul style="list-style-type: none"> a. RESTORE offsite power USING AOI-35, Loss of Offsite Power.
EXAMINER: AOI-17, "Turbine Trip," BOP Realignment steps are provided on pages 50 through 57.		
	BOP	17. INITIATE BOP realignment: <ul style="list-style-type: none"> • REFER TO AOI-17, Turbine Trip.
	BOP	18. INITIATE 480V board room breaker alignments USING the following: <ul style="list-style-type: none"> • Appendix A (E-1), CLA Breaker Operation. • Appendix B (E-1), Ice Condense AHU Breaker Operation. • Appendix C (E-1), 1-FCV-63-1 Breaker Operation. • Appendix D (E-1), 1-FCV-63-22 Breaker Operation.
	BOP	19. DETERMINE if hydrogen igniters should be energized: <ul style="list-style-type: none"> a. CHECK hydrogen analyzers in service. b. CHECK cntmt hydrogen less than 5% [M-10]. c. ENERGIZE hydrogen igniters [M-10]: <ul style="list-style-type: none"> • 1-HS-268-73 ON. • 1-HS-268-74 ON.

Op Test No.:	<u>NRC</u>	Scenario #	<u>1</u>	Event #	<u>7, 8, 9 and 10</u>	Page	<u>27</u>	of	<u>57</u>
Event Description: Raw cooling water temperature control valve to the Stator Water Cooler fails closed. 15 seconds after the trip, a PZR vapor space break occurs, requiring a manual safety injection and entry into E-0. 10 seconds after the SI, offsite power is lost, and the DGs fail to auto start.									
Time	Position	Applicant's Actions or Behavior							

	RO	<p>20. ENSURE RHR available for cntmt sump recirculation:</p> <ul style="list-style-type: none"> • Power to at least one operable RHR pump AVAILABLE. • Cntmt sump valve 1-FCV-63-72 or 1-FCV-63-73 to operable RHR pump AVAILABLE.
EXAMINER: Appendix E (E-1), "Equipment Evaluation" is provided on page 47.		
	BOP	<p>21. EVALUATE plant equipment status:</p> <ul style="list-style-type: none"> • REFER TO Appendix E (E-1), Equipment Evaluation.
	BOP	<p>22. CHECK Aux Bldg radiation for loss of RCS inventory outside cntmt:</p> <ul style="list-style-type: none"> a. Area monitor recorders 1-RR-90-1 and 0-RR-90-12A Aux Bldg points NORMAL. b. Vent monitor recorder 0-RR-90-101 NORMAL trend prior to isolation.
	SRO	23. NOTIFY Chemistry of event status and plant conditions.
	SRO	<p>24. DETERMINE if RCS cooldown and depressurization is required:</p> <ul style="list-style-type: none"> a. CHECK RCS pressure greater than 150 psig. b. ** GO TO ES-1.2, Post LOCA Cooldown and Depressurization.
EXAMINER: The following actions are taken from ES-1.2, "Post-LOCA Cooldown and Depressurization."		
	SRO	<p>1. PREPARE for switchover to RHR cntmt sump:</p> <ul style="list-style-type: none"> a. RESTORE power to 1-FCV-63-1, RWST to RHR suction, USING Appendix A, (ES-1.2) 1-FCV-63-1 Breaker Operation. b. WHEN RWST level less than 34%, THEN ** GO TO ES-1.3, Transfer to Containment Sump.
<p style="text-align: center;">CAUTION</p> <p>If offsite power is lost after SI reset, manual action will be required to restart the SI pumps and RHR pumps due to loss of SI start signal.</p>		
	RO	<p>2. RESET SI, and CHECK the following:</p> <ul style="list-style-type: none"> • SI ACTUATED permissive DARK. • AUTO SI BLOCKED permissive LIT.
	RO	3. RESET Phase A and Phase B.

Op Test No.: NRC Scenario # 1 Event # 7, 8, 9 and 10 Page 28 of 57

Event Description: Raw cooling water temperature control valve to the Stator Water Cooler fails closed. 15 seconds after the trip, a PZR vapor space break occurs, requiring a manual safety injection and entry into E-0. 10 seconds after the SI, offsite power is lost, and the DGs fail to auto start.

Time	Position	Applicant's Actions or Behavior
	BOP	<p>4. ENSURE cntmt air in service:</p> <p>a. Aux air press greater than 75 psig [M-15].</p> <p>b. Cntmt air supply valves OPEN [M-15]:</p> <ul style="list-style-type: none"> • 1-FCV-32-80. • 1-FCV-32-102. • 1-FCV-32-110.
	BOP	<p>5. MONITOR electrical board status:</p> <p>a. CHECK offsite power available.</p>
	SRO	<p>5. <u>RESPONSE NOT OBTAINED:</u></p> <p>a. RESTORE offsite power USING AOI-35, Loss of Offsite Power.</p> <p><i>AOI-35 is already in progress.</i></p>
<p style="text-align: center;">NOTE</p> <p>Backup heater C bank may need to be placed in AUX at the breaker compt to ensure it is turned OFF.</p>		
	RO	<p>6. ENSURE pzs heaters off:</p> <ul style="list-style-type: none"> • PLACE Backup heaters A-A OFF. • PLACE Backup heaters B-B OFF. • PLACE Backup heaters C OFF. • PLACE Control heaters D OFF.
	RO	<p>7. DETERMINE if RHR pumps should be stopped:</p> <p>a. CHECK RHR suction aligned from RWST.</p> <p>b. CHECK RCS press:</p> <ul style="list-style-type: none"> • RCS press greater than 150 psig. • RCS press stable or rising. <p>c. STOP RHR pumps, and PLACE in A-AUTO.</p> <p>d. MONITOR RCS press greater than 150 psig.</p>
	RO	<p>8. MONITOR Intact S/G NR levels:</p> <p>a. At least one intact S/G NR level greater than 29% [39% ADV].</p> <p>b. CONTROL intact S/G levels between 29% and 50% [39% and 50% ADV].</p>
	SRO	<p>9. EVALUATE Motor-Driven AFW Pumps recirc flow per FOP.</p>
<p style="text-align: center;">NOTE</p> <p>The following boration will result in a CB in the ACTIVE portion of the RCS which will be higher than the calculated cold shutdown CB.</p>		

Op Test No.: NRC Scenario # 1 Event # 7, 8, 9 and 10 Page 29 of 57

Event Description: Raw cooling water temperature control valve to the Stator Water Cooler fails closed. 15 seconds after the trip, a PZR vapor space break occurs, requiring a manual safety injection and entry into E-0. 10 seconds after the SI, offsite power is lost, and the DGs fail to auto start.

Time	Position	Applicant's Actions or Behavior
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	SRO	<p>10. INITIATE RCS boration to cold shutdown boron concentration:</p> <p>a. DETERMINE cold shutdown CB:</p> <ul style="list-style-type: none"> • REFER TO 1-SI-0-10, Shutdown Margin, OR REACTINW Computer Program. <p>b. INITIATE RCS boration:</p> <ul style="list-style-type: none"> • REFER TO SOI-62.02, CVCS Boron Concentration Control.
	SRO	<p>11. MONITOR shutdown margin during RCS cooldown:</p> <p>a. NOTIFY Chemistry to monitor RCS boron concentration at the following sample points:</p> <ul style="list-style-type: none"> • RCS hot leg. • CVCS letdown line.
<p style="text-align: center;">NOTE</p> <p>After the low steamline pressure SI signal is blocked, main steamline isolation will occur if the high steam pressure rate setpoint is exceeded.</p>		
	SRO	<p>12. INITIATE RCS cooldown to cold shutdown:</p> <p>a. WHEN RCS pressure is less than 1962 psig (P-11), THEN</p> <ul style="list-style-type: none"> • BLOCK low pwr pressure SI. • BLOCK low steam pressure SI. <p>b. MAINTAIN T-cold cooldown rate less than 100°F in one hour.</p> <p><i>SRO determines that the RCS has cooled down more than 100 °F in the last hour, and that an additional cooldown will not be accomplished at this time.</i></p>
<p>EXAMINER: When Step 12 is addressed, and the SRO determines that a cooldown cannot be performed, inform the crew that another crew will take over from this point.</p>		
END OF SCENARIO		

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A

(E-0)

Page 1 of 10

EQUIPMENT VERIFICATION

1. **ENSURE** PCBs OPEN: **OPEN** manually.
 - PCB 5084.
 - PCB 5088.

2. **ENSURE** AFW pump operation: **ESTABLISH** at least one train AFW operation.
 - Both MD AFW pumps RUNNING.
 - TD AFW pump RUNNING.
 - LCVs in AUTO, or controlled in MANUAL.

3. **ENSURE** MFW isolation: Manually **CLOSE** valves and **STOP** pumps, as necessary.
 - MFW isolation and bypass isolation valves CLOSED.
 - MFW reg and bypass reg valves CLOSED.
 - MFP A and B TRIPPED.
 - Standby MFP STOPPED.
 - Cond demin pumps TRIPPED.
 - Cond booster pumps TRIPPED.

IF any valves can **NOT** be closed, **THEN** **CLOSE** #1 heater outlet valves.

WBN

REACTOR TRIP OR SAFETY INJECTION

E-0
Rev 28

Step

Action/Expected Response

Response Not Obtained

APPENDIX A
(E-0)

Page 2 of 10

EQUIPMENT VERIFICATION

4. **MONITOR** ECCS operation:

- | | |
|--|--|
| a. Charging pumps RUNNING . | a. Manually START charging pumps. |
| b. Charging pump alignment: <ul style="list-style-type: none"> • RWST outlets 1-LCV-62-135 and 1-LCV-62-136 OPEN. • VCT outlets 1-LCV-62-132 and 1-LCV-62-133 CLOSED. • Charging 1-FCV-62-90 and 1-FCV-62-91 CLOSED. | b. ENSURE at least one valve in each set aligned. |
| c. RHR pumps RUNNING . | c. Manually START RHR pumps. |
| d. SI pumps RUNNING . | d. Manually START SI pumps. |
| e. BIT alignment: <ul style="list-style-type: none"> • Outlets 1-FCV-63-25 and 1-FCV-63-26 OPEN. • Flow thru BIT. | e. ENSURE at least one valve aligned, and flow thru BIT. |
| f. RCS pressure greater than 1650 psig. | f. ENSURE SI pump flow.

IF RCS press drops to less than 150 psig,
THEN
ENSURE RHR pump flow. |

WBN

REACTOR TRIP OR SAFETY INJECTION

E-0

Rev 28

Step

Action/Expected Response

Response Not Obtained

APPENDIX A
(E-0)

Page 3 of 10

EQUIPMENT VERIFICATION

5 **CHECK** cntmt isolation:

a. Phase A isolation:

- Train A GREEN.
- Train B GREEN.

b. Cntmt vent isolation:

- Train A GREEN.
- Train B GREEN.

ACTUATE Phase A and Cntmt Vent
Isolation signal,**OR**Manually **CLOSE** valves and
dampers as necessary.

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A
(E-0)

Page 4 of 10

EQUIPMENT VERIFICATION

- | | |
|--|---|
| <p>6. CHECK cntmt pressure:</p> <ul style="list-style-type: none"> • Phase B DARK [MISSP]. • Cntmt Spray DARK [MISSP]. • Cntmt press less than 2.8 psig. | <p>PERFORM the following:</p> <ol style="list-style-type: none"> 1) ENSURE Phase B actuated. 2) ENSURE Cntmt Spray actuated. 3) ENSURE cntmt spray pumps running. 4) ENSURE cntmt spray flow. 5) ENSURE Phase B isolation: <ul style="list-style-type: none"> • Train A GREEN. • Train B GREEN • Manually CLOSE valves and dampers as necessary. 6) STOP all RCPs. 7) ENSURE MSIVs and bypasses CLOSED. 8) PLACE steam dump controls OFF. 9) WHEN 10 minutes has elapsed since Phase B actuated,
THEN
ENSURE air return fans start. 10) USE adverse cntmt [ADV] setpoints where provided. |
|--|---|

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A
(E-0)

Page 5 of 10

EQUIPMENT VERIFICATION

- | | |
|---|---|
| <p>7. CHECK plant radiation NORMAL:</p> <ul style="list-style-type: none"> • S/G blowdown rad recorder 1-RR-90-120 NORMAL prior to isolation [M-12]. • Condenser vacuum exhaust rad recorder 1-RR-90-119 NORMAL prior to trip [M-12]. • 1-RR-90-106 and 1-RR-90-112 radiation recorders NORMAL prior to isolation [M-12]. • S/G main steamline discharge monitors NORMAL [M-30]. • Upper and Lower containment high range monitors NORMAL [M-30]. • NOTIFY Unit Supervisor conditions NORMAL. | <p>NOTIFY Unit Supervisor IMMEDIATELY.</p> |
| <p>8. ENSURE all D/Gs RUNNING.</p> | <p>EMERGENCY START D/Gs</p> |

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A
(E-0)

Page 6 of 10

EQUIPMENT VERIFICATION

- | | |
|---|---|
| <p>9. ENSURE ABGTS operation:</p> <p>a. ABGTS fans RUNNING.</p> <p>b. ABGTS dampers OPEN:</p> <ul style="list-style-type: none"> • FCO-30-146A. • FCO-30-146B. • FCO-30-157A. • FCO-30-157B. | <p>a. Manually START fans.</p> <p>b. Locally OPEN dampers.</p> |
| <p>10. ENSURE at least four ERCW pumps RUNNING, one on each shutdown board preferred.</p> | <p>Manually START pumps as necessary.</p> |
| <p>11. ENSURE ERCW supply valves OPEN to running D/Gs.</p> | <p>IF ERCW can NOT be aligned to running D/G,
THEN
EMERGENCY STOP affected D/G.</p> |
| <p>12. ENSURE CCS HX C ALT DISCH TO HDR B, 0-FCV-67-152, is open to position A.</p> | <p>Manually OPEN 0-FCV-67-152 to position A.</p> |

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A (E-0)

Page 7 of 10

EQUIPMENT VERIFICATION

13. **CLOSE** CCS HX C
DISCH TO HDR A,
0-FCV-67-144.

14. **MONITOR** EGTS operation:
- EGTS fans RUNNING.
 - ENSURE** dampers OPEN
VERIFY filter bank dp between
5 and 9 inches of water.

Manually **START** fans **OPEN**
dampers.

15. **ENSURE** CCS pumps RUNNING:
- 1A-A CCS pump.
 - 1B-B CCS pump.
 - C-S OR 2B-B CCS pump.

Manually **START** pumps as
necessary.

- NOTE**
- The Upper and Lower Cntmt rad monitors sampling pumps should be shutdown if the sample flowpath is isolated.
 - The following equipment is located on 1-M-9.

16. **CHECK** CNTMT PURGE fans
STOPPED:

STOP fans and
PLACE handswitch in
PULL-TO-LOCK.

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A
(E-0)

Page 8 of 10

EQUIPMENT VERIFICATION

- | | |
|--|--|
| 17. CHECK FUEL HANDLING EXH fans STOPPED, Fuel and Cask loading dampers CLOSED: | STOP fans and PLACE handswitch in PULL-TO-LOCK, manually CLOSE dampers. |
| 18. ENSURE AB GEN SUPPLY and EXH fans STOPPED. | STOP fans and PLACE handswitch in PULL-TO-LOCK. |

NOTE • Dampers 1-HS-30-158 and 2-HS-30-270 remain open during ABL.

- | | |
|---|--------------------------------|
| 19. ENSURE AB GEN SUP & EXH dampers CLOSED. | Manually CLOSE dampers. |
| 20. ENSURE MCR & SPREAD RM FRESH AIR dampers CLOSED:
• FCV-31-3.
• FCV-31-4. | Manually CLOSE dampers. |

WBN

REACTOR TRIP OR SAFETY INJECTION

E-0
Rev 28

Step

Action/Expected Response

Response Not Obtained

APPENDIX A
(E-0)

Page 10 of 10

EQUIPMENT VERIFICATION

23. **ENSURE** Control Building fans
STOPPED and dampers CLOSED:

- SPREADING ROOM SUPPLY and
EXH FANS AND dampers.
- TOILET & LKR RM EXHAUST FAN
AND dampers.

Manually **STOP** fans.**NOTIFY** TSC if any
damper NOT CLOSED.

24. **INITIATE** Appendix B.

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX B
(E-0)

Page 1 of 1

PHASE B PIPE BREAK CONTINGENCIES

- | | | |
|----|--|--|
| 1. | CHECK PHASE B actuated.
(MISSP - 1-XX-55-6C, -6D) | WHEN PHASE B actuation occurs;
THEN
GO TO step 2. |
| 2. | ENSURE 1-FCV-32-110 CLOSED.
(CISP - 1-XX-55-6E)
[A-train, window 13] | DISPATCH AUO to perform
ATTACHMENT B1. |
| 3. | ENSURE 1-FCV-67-107 CLOSED.
(CISP - 1-XX-55-6E)
[A -train, window 43] | DISPATCH AUO to perform
ATTACHMENT B2. |
| 4. | ENSURE 1-FCV-70-92 CLOSED.
(CISP - 1-XX-55-6E)
[A -train, window 73] | DISPATCH AUO to perform
ATTACHMENT B3. |
| 5. | ENSURE 1-FCV-70-140 CLOSED.
(CISP - 1-XX-55-6F)
[B -train, window 74] | DISPATCH AUO to perform
ATTACHMENT B4. |

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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ATTACHMENT B1

(E 0)

Page 1 of 1

CONTROL AIR ISOLATION

1. **CLOSE** 0-ISV-32-1013 - CONTROL AIR EL 713 AB HDR ISOL
[A6/S EL. 713] (chain operated - behind Fuel and Waste Handling Bd. A).
2. IF 0-ISV-32-1013 CANNOT BE CLOSED,
THEN:

OPEN and **DISCONNECT** C&SS air compressor breakers:

- a) 0-BKR-32-25 - 480V SD BD 1A2-A, C/3D
- b) 0-BKR-32-26 - 480V SD BD 1B1-B, C/3D
- c) 0-DKR-32-27 - 480V AUX BLDG COM BD, C/6C
- d) 0-BKR-32-1900A - 480V TURB BLDG COM BD, C/6C

WBN

REACTOR TRIP OR SAFETY INJECTION

E-0

Rev 28

ATTACHMENT B2

(E-0)

Page 1 of 1

ERCW ISOLATION

1. **UNLOCK AND CLOSE** 1-ISV-67-523D - LOWER CNTMT VENT CLR 1D & 1D
ERCW SUP ISOL [A2U/692] (U-1 penetration room - North of AB Pipe Chase
Cooler 1B-B in overhead)

WBN

REACTOR TRIP OR SAFETY INJECTION

E-0
Rev 28

ATTACHMENT B3

(E-0)

Page 1 of 1

CCS RETURN ISOLATION

1. **CLOSE** 1-HSV-70-700 RCP OIL COOLER CCS RETURN ISOLATION
[A4/V EL. 710 U-1 Penetration Room] (approximately 10 ft. North of Penetration
Room Cooler 1B-B on mezzanine above RHR Sump Valve Room)

ATTACHMENT B4

(E-0)

Page 1 of 1

CCS SUPPLY ISOLATION

1. **CLOSE** 1-SV-70-516 REACTOR BUILDING CCS SUPPLY ISOLATION
[A6/T EL. 737] (Behind Elevator approximately 2 ft. west on mezzanine above
"A" CCS Heat Exchanger)

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WBN	LOSS OF OFFSITE POWER	ADI-35 Revision 37 Page 7 of 39
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3.3 OPERATOR ACTIONS (Loss Of Both 161 KV Power Supplies)

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE Operation or realignment of any equipment which is in service (or removed from service) as directed by AOI-43 series of instructions requires Shift Manager approval.

- | | | |
|----|--|---|
| 1. | CHECK all 6.9 KV Shutdown Boards ENERGIZED. | REFER TO AOI-43 series |
| 2. | ANNOUNCE loss of power over PA. | |
| 3. | CHECK Station Service is supplied from USSTs. | PERFORM the following:

a. ENSURE Reactor TRIPPED.

b. ** GO TO E-0 Reactor Trip Or Safety Injection, WHILE continuing with this instruction. |
| 4. | CHECK duration of the power outage will be two hours or more. | ** GO TO Step 6. |
| 5. | CONTACT the Operations Duty Specialist (ODS) to verify the Telecommunications backup D/G is supplying the telecommunications building equipment (their alarm should be clear). | CONTACT ODS or HELP line (4357) to dispatch personnel to ensure D/G to the communications building equipment operating properly. |

WDN

LOSS OF OFFSITE POWER

AOI-35

Revision 37

Page 8 of 39

3.3 OPERATOR ACTIONS (Loss Of Both 161 KV Power Supplies)**ACTION/EXPECTED RESPONSE****RESPONSE NOT OBTAINED**

6. PERFORM the following for each bus or board listed in the table below:

- a. CLEAR white disagreement lights.
- b. PLACE Auto transfer switches to MANUAL.

BUS/BOARD	BREAKER I.D.	TRANSFER SW.
6.9 KV Common Board A	1526	1-XS-57-89 [1-M-1]
6.9 KV Common Board B	1626	2-XS-57-89 [2-M-1]
Start Bus A	1512	START BUS 1 [ECB]
Start Bus B	1612	START BUS 2 [ECB]
RCP Start Bus A	2512	RCP ST BUS A [ECB]
RCP Start Bus B	2612	RCP ST BUS B [ECB]

7. CHECK RCP's OFF.

** GO TO Step 9.

8. PLACE normal supply hand switch for each RCP to STOP (pushed in) position (spring return to mid-position).

9. PLACE alternate supply hand switch for each RCP to MANUAL (pushed in) and then STOP position (spring return to mid-position).

10. CHECK Unit in Mode 6

** GO TO ATTACHMENT 1 "Control Of Plant Systems During LOOP (Loss Of Offsite Power)",
AND

** GO TO CAUTION prior to Step 12.

WBN

LOSS OF OFFSITE POWER

AOI-35

Revision 37

Page 9 of 32

3.3 OPERATOR ACTIONS (Loss Of Both 161 KV Power Supplies)

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINED

11. SUSPEND core alterations.

CAUTION Deenergizing both 6.9Kv common boards will cause fire-RSW header pressure to drop quickly (loss of RCW pumps), deluge type fire protection valves may open.

- | | |
|--|---|
| <p>12. CHECK 6.9 KV Common Board A transferred to alternate feed (USSTs).</p> | <p>ENERGIZE the deenergized 6.9 KV Common Board from the associated USST IF the Unit is not tripped.</p> |
| <p>13. NOTIFY Northeast Area Dispatcher [NEAD] of loss of 161Kv line(s), and request lines returned to service.</p> | |
| <p>14. REFER TO EPIP-1, Emergency Plan Classification Flowchart:</p> <p>a. DETERMINE classification of event, and</p> <p>b. INITIATE manning the TSC. (if necessary)</p> | <p>b. IF TSC is <u>NOT</u> to be manned, THEN REFER TO TI-128, and PLACE ERCW strainers & traveling screens in continuous backwash per SOI.67.01.</p> |
| <p>15. CHECK cooling water available to Secondary Systems (RCW Pumps running).</p> | <p>PERFORM controlled shutdown USING GO-4, GO-5, and GO-6 as applicable.</p> |

WBN

LOSS OF OFFSITE POWER

AOI-35

Revision 37

Page 10 of 39

3.3 OPERATOR ACTIONS (Loss Of Both 161 KV Power Supplies)

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINED

16. DISPATCH personnel to the following locations to inspect for equipment abnormalities:

- Relay room.
- 6.9KV CSST switchgear housing.
- Start bus switchgear housing.

17. CHECK control air NORMAL:

- Required compressors running [T4M/706].
- Pressure between 90 and 105 psig [T4M/706].

REFER TO AOI-10. Loss of Control Air.

18. CHECK aux air header pressure greater than 75 psig [1-M-15].

REFER TO AOI-10. Loss of Control Air.

19. DISPATCH AUC to D/G Bldg to monitor D/G conditions USING SOI-82 series, Appendix A, for operating parameters.

WBN

LOSS OF OFFSITE POWER

AQI 35

Revision 37

Page 11 of 39

3.3 OPERATOR ACTIONS (Loss Of Both 161 KV Power Supplies)

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINED

NOTE Attachment 3 provides reference to applicable Tech Specs as well as recovery actions for loss of both 161KV lines.

20. REFER TO Attachment 3 for considerations for recovery from loss of both 161kV lines.
21. DO NOT CONTINUE this instruction UNTIL one 161KV power line has been reenergized.
22. ENSURE station service returned to NORMAL, USING applicable sections from the following:

Bus or Board	Instruction
6.9Kv Stan Buses	SOI-200.01
6.9Kv RCP Stan Buses	SOI-200.02
6.9Kv Comm. Bds. A & B	SOI-200.03
6.9Kv Unit Bds.	SOI-201 series
6.9Kv RCP Bds.	SOI-202 series

23. ENSURE 6.9kV SD Bds returned to NORMAL with D/Gs removed from service after emergency start and returned to standby alignment, USING applicable sections from the following:

Diesel Generator	Instruction
1A-A	SOI-52.01
1B-B	SOI-52.02
2A-A	SOI-52.03
2B-B	SOI-52.04

WBN	TURBINE TRIP	AOI-17 Revision 43 Page 11 of 26
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3.3 BOP Realignment

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION Performance of this instruction should not be allowed to delay or interfere with actions required by applicable emergency procedures or abnormal operating procedures.

NOTE 1 Control room operators may initiate shutdown of pumps and equipment from the benchboard immediately after a trip. Performance of this instruction will subsequently verify proper secondary equipment alignment.

NOTE 2 Steps in this section and items in Attachment 1 may be performed out of sequence.

1. **DISPATCH** turbine building NAUO to perform Attachment 1.
2. **NOTIFY** condensate demineralizer NAUO prior to Operator initiated press changes in condensate.
3. **REMOVE** generator excitation from service:
 - a. **PLACE** voltage regulator to TEST.
 - b. **ZERO** exciter base adjuster.
 - c. **OPEN** exciter field breaker.
 - d. **PLACE** exciter regulator control to OFF.

WBN	TURBINE TRIP	AOI-17 Revision 43 Page 12 of 26
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3.3 BOP Realignment (Continued)

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

4. MONITOR main turbine:

- a. **WHEN** less than 1500 rpm,
THEN:
 - **ENSURE** seal oil backup pump RUNNING.
 - **ENSURE** turning gear oil pump RUNNING.
- b. **WHEN** less than 600 rpm,
THEN
ENSURE bearing lift oil pump RUNNING.
- c. **WHEN** turbine is at ZERO RPM,
THEN
ENSURE turbine on turning gear.
- d. **MAINTAIN** MTOT lube oil temp between 95° and 100°F (may require RCW isolation if TCV has excessive leakage).
- e. **MAINTAIN** GENERATOR H2 (Cold Gas) temp 95°F (may require RCW isolation if TCV has excessive leakage).
- f. **ENSURE** Gland Steam Spillover Bypass valve is CLOSED using 1-HS-47-191A.

WBN	TURBINE TRIP	AOI-17 Revision 43 Page 13 of 26
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3.3 BOP Realignment (Continued)**ACTION/EXPECTED RESPONSE****RESPONSE NOT OBTAINED****5. ALIGN MSRs:**

- a. **PUSH** RESET on MSR control panel.
- b. **CLOSE** MSR HP steam and bypass isol.
- c. **ENSURE** MSR warming valves CLOSED.
- d. **OPEN** MSR startup vents.
- e. **CLOSE** MSR operating vents.

6. CHECK MSIVs OPEN.

IF vacuum is to be maintained,
THEN
ENSURE auxiliary boiler is aligned for steam seals.

WBN	TURBINE TRIP	AOI-17 Revision 43 Page 14 of 26
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3.3 BOP Realignment (Continued)**ACTION/EXPECTED RESPONSE****RESPONSE NOT OBTAINED****7. ENSURE** adequate FW press:

- a. **ENSURE** two hotwell pumps RUNNING.
- b. IF FW isolation reset,
THEN
ENSURE one condensate booster pump RUNNING if needed for unit conditions.
- c. **ENSURE** CNDS demin pumps OFF.
- d. **STOP** #3 HDT pumps, and
CLOSE the discharge valves to condensate heater strings. Notify NAUO performing Attachment 1 that #3 HDT pumps are stopped.
- e. **STOP** #7 HDT pumps, and
CLOSE the discharge valves to condensate heater strings.

8. SHUTDOWN any MFW pump NOT required.**9. SHUTDOWN** any RCW pumps NOT required.**10. SHUTDOWN** any CCW pumps NOT required.

WBN	TURBINE TRIP	AOI-17 Revision 43 Page 15 of 26
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3.3 BOP Realignment (Continued)

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

11. **ALIGN** extraction steam valves and drain valves:

- a. **CLOSE** #1 and #2 Heater extraction steam valves.
- b. **ENSURE** turbine drain valves OPEN.
- c. **OPEN** MFW pump turbine drain valves.

12. **PERFORM** as required:

- a. **OBTAIN** switching instructions from NEAD, and **OPEN** main generator PCB(s) MODs.
- b. **PULL-TO-LOCK** bus duct cooling fans.
- c. **VERIFY** MTOT and seal oil temps STABLE and trending to 95°F.

13. **IF** MFW isolated to steam generators,
THEN
REQUEST Chem Lab sample condensate and feedwater prior to re-admitting water to S/Gs from condensate-feedwater system.

WBN	TURBINE TRIP	AOI-17 Revision 43 Page 16 of 26
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3.3 BOP Realignment (Continued)

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

14. IF EGTS started,
THEN
SHUTDOWN one train after 30 minutes and place in P-AUTO:

- REFER TO SOI-65.02, Emergency Gas Treatment System, section on Auto EGTS Actuation.

15. IF ABGTS started,
THEN
SHUTDOWN one train after 30 minutes and place in P-AUTO:

- REFER TO SOI-30.06, Auxiliary Building Gas Treatment System, section on Auto Start of ABGTS.

CAUTION Rx trip bkrs must be cycled to allow reset of MFW when isolated by SI, HI-HI S/G level, or flood level in MS valve vault room. If any SI signal is present with Auto SI blocked, cycling Rx trip bkrs will initiate SI actuation.

16. IF MFW NOT in service,
THEN
ESTABLISH MFW:

- REFER TO Attachment 2, Establishing MFW Following Reactor Trip.

WBN	TURBINE TRIP	AOI-17 Revision 43 Page 17 of 26
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3.3 BOP Realignment (Continued)**ACTION/EXPECTED RESPONSE****RESPONSE NOT OBTAINED**

17. **CHECK** S/G NR levels between 38% and 50%.

IF S/G level can **NOT** be maintained,
THEN
START M-D AFW pumps.

18. **RETURN TO** applicable Instruction.

- END OF SUBSECTION -

WBN

LOSS OF REACTOR OR SECONDARY COOLANT

E-1
Rev 15

APPENDIX E

(E-1)

Page 1 of 1

EQUIPMENT EVALUATION

1. **EVALUATE** plant equipment and systems needed to support long term cooling and recovery actions, as time and personnel availability permits:
 - a. Contmt Isolation Status.
 - b. Emergency Gas Treatment System:
One train in operation, **REFER TO** SOI-65.02.
 - c. Auxiliary Building Gas Treatment:
One train in operation, **REFER TO** SOI-30.06.
 - d. Auxiliary Building Isolation alignment:
REFER TO SOI-30.06.
 - e. Main Control Room Isolation alignment:
REFER TO SOI-31.01.
 - f. ERCW System:
Both trains in operation.
 - g. Component Cooling Water System:
Both trains in operation.

SHIFT TURNOVER CHECKLIST

Page 1 of 2

SHIFT TURNOVER CHECKLIST									
		Page _____ of _____							
<input type="checkbox"/> SM <input checked="" type="checkbox"/> US/MCR <input type="checkbox"/> UO <input type="checkbox"/> AUO <input type="checkbox"/> STA (STA Function)	Unit _____ Unit _____ Station _____		_____ <u>Off-going - Name</u> _____ <u>On-coming - Name</u>						
Part 1 - Completed by off-going shift/Reviewed by on-coming shift:									
<ul style="list-style-type: none"> • Abnormal equipment lineup/conditions: 1A Containment Spray pump out-of-service for pump bearing replacement. Expected return to service in 12 hours. LCO 3.6.6.A was entered 4 hours ago. A Severe Thunderstorm Warning has been issued for Rhea, Meigs and McMinn Counties for the next 2 hours. _____ _____ • SI/Test in progress/planned: (including need for new brief) 1-TRI-47-3, "Main Turbine Steam Inlet Valve Testing." _____ _____ _____ _____ • Major Activities/Procedures in progress/planned: 100% power, BOL. RCS boron is 1031 ppm. Control Bank D is at 220 steps. Train A/Channel I Work Week. Perform a load reduction to 93% support turbine valve tests and EHC control calibrations. Currently in GO-4, "Normal Power Operation," Section 5.3, Unit Shutdown from 100% to 30% Reactor," at Step 12. Reactivity Plan for the power maneuver has been provided by Reactor Engineering. _____ _____ • Radiological changes in plant during shift: None planned _____ _____ _____ 									
Part 2 - Performed by on-coming shift									
<input type="checkbox"/> A review of the Operating Log since last held shift or 3 days, whichever is less. <input type="checkbox"/> A review of the Rounds sheets/Abnormal readings (AUOs only) Review the following for changes since last shift turnover: <table style="width: 100%; border: none;"> <tr> <td><input type="checkbox"/> Standing Orders</td> <td><input type="checkbox"/> LCO(s) in actions (N/A for AUOs)</td> <td><input type="checkbox"/> PER review (N/A for AUOs)</td> </tr> <tr> <td><input type="checkbox"/> TACFs (N/A for AUOs)</td> <td><input type="checkbox"/> Operator workarounds, burdens</td> <td><input type="checkbox"/> Immediate required reading.</td> </tr> </table> and other challenges				<input type="checkbox"/> Standing Orders	<input type="checkbox"/> LCO(s) in actions (N/A for AUOs)	<input type="checkbox"/> PER review (N/A for AUOs)	<input type="checkbox"/> TACFs (N/A for AUOs)	<input type="checkbox"/> Operator workarounds, burdens	<input type="checkbox"/> Immediate required reading.
<input type="checkbox"/> Standing Orders	<input type="checkbox"/> LCO(s) in actions (N/A for AUOs)	<input type="checkbox"/> PER review (N/A for AUOs)							
<input type="checkbox"/> TACFs (N/A for AUOs)	<input type="checkbox"/> Operator workarounds, burdens	<input type="checkbox"/> Immediate required reading.							
Part 3 - Performed by both off-going and on-coming shift									
<input type="checkbox"/> A walkdown of the MCR control boards (N/A for AUOs) Relief Time: _____ Relief Date: _____									

SHIFT TURNOVER CHECKLIST

Page 2 of 2

SHIFT TURNOVER CHECKLIST									
Page _____ of _____									
<input type="checkbox"/> SM <input type="checkbox"/> US/MCR <input checked="" type="checkbox"/> UO <input type="checkbox"/> AUO <input type="checkbox"/> STA (STA Function)	Unit _____ Unit _____ Station _____		_____ <u>Off-going - Name</u> _____ <u>On-coming - Name</u>						
Part 1 - Completed by off-going shift/Reviewed by on-coming shift:									
<ul style="list-style-type: none"> • Abnormal equipment lineup/conditions: 1A Containment Spray pump out-of-service for pump bearing replacement. Expected return to service in 12 hours. LCO 3.6.6.A was entered 4 hours ago. A Severe Thunderstorm Warning has been issued for Rhea, Meigs and McMinn Counties for the next 2 hours. _____ _____ • SI/Test in progress/planned: (including need for new brief) 1-TRI-47-3, "Main Turbine Steam Inlet Valve Testing." _____ _____ _____ • Major Activities/Procedures in progress/planned: 100% power, BOL. RCS boron is 1031 ppm. Control Bank D is at 220 steps. Train A/Channel I Work Week. Perform a load reduction to 93% support turbine valve tests and EHC control calibrations. Currently in GO-4, "Normal Power Operation," Section 5.3, Unit Shutdown from 100% to 30% Reactor," at Step 12. Reactivity Plan for the power maneuver has been provided by Reactor Engineering. _____ • Radiological changes in plant during shift: _____ _____ _____ 									
Part 2 - Performed by on-coming shift									
<input type="checkbox"/> A review of the Operating Log since last held shift or 3 days, whichever is less. <input type="checkbox"/> A review of the Rounds sheets/Abnormal readings (AUOs only) Review the following for changes since last shift turnover: <table style="width: 100%; border: none;"> <tr> <td style="width: 33%;"><input type="checkbox"/> Standing Orders</td> <td style="width: 33%;"><input type="checkbox"/> LCO(s) in actions (N/A for AUOs)</td> <td style="width: 33%;"><input type="checkbox"/> PER review (N/A for AUOs)</td> </tr> <tr> <td><input type="checkbox"/> TACFs (N/A for AUOs)</td> <td><input type="checkbox"/> Operator workarounds, burdens</td> <td><input type="checkbox"/> Immediate required reading.</td> </tr> </table> and other challenges				<input type="checkbox"/> Standing Orders	<input type="checkbox"/> LCO(s) in actions (N/A for AUOs)	<input type="checkbox"/> PER review (N/A for AUOs)	<input type="checkbox"/> TACFs (N/A for AUOs)	<input type="checkbox"/> Operator workarounds, burdens	<input type="checkbox"/> Immediate required reading.
<input type="checkbox"/> Standing Orders	<input type="checkbox"/> LCO(s) in actions (N/A for AUOs)	<input type="checkbox"/> PER review (N/A for AUOs)							
<input type="checkbox"/> TACFs (N/A for AUOs)	<input type="checkbox"/> Operator workarounds, burdens	<input type="checkbox"/> Immediate required reading.							
Part 3 - Performed by both off-going and on-coming shift									
<input type="checkbox"/> A walkdown of the MCR control boards (N/A for AUOs) <div style="display: flex; justify-content: space-between; margin-top: 10px;"> Relief Time: _____ Relief Date: _____ </div>									

Facility:	Watts Bar NRC Exam 1 August 2010	Scenario No.: 2	Op Test No.: 1
Examiners:	_____	Operators:	SRO
	_____		RO
	_____		BOP
Initial Conditions: Train B/Channel II Work Week. Perform a load reduction to 75% power at 2%/minute to support removing the 1B MFP from service.			
Turnover: 100% power, MOL. RCS boron is 747 ppm. Control Bank D is at 220 steps. Train B/Channel II Work Week. 1B MD AFW pump out-of-service for pump bearing replacement. Expected return to service in 18 hours. 1B MFP turbine and pump vibration alarms are currently lit and Operations Management has directed a plant shutdown to 75% using AOI-39 at 2%/minute to remove the MFP from service.			
Event No.	Malf. No.	Event Type*	Event Description
1	n/a	N-BOP R-RO	Reduce power to shutdown 1B Main Feedwater Pump.
2	fw018b	C-BOP TS-SRO	1B Main Feedwater Pump vibrations increase, requiring the pump to be tripped. Entry into AOI-16, "Loss of Normal Feedwater," is required, and a Tech Spec evaluation of Axial Flux Difference must be conducted.
3	pic-1-13a open	C-BOP TS-SRO	SG 2 PORV controller fails, causing PORV to open. Entry into AOI-38, "Main Steam or Feedwater Line Leak," is required. Requires Tech Spec evaluation.
4	ed06a	C-RO TS-SRO	1A-A CCP trips on instantaneous overcurrent. Requires entry into AOI-20, "Malfunction of Pressurizer Level Control System." Requires Tech Spec evaluation.
5	rc13d	I-RO	Pressurizer Spray Valve 1-PCV-68-340D opens, requiring transfer of the controller to MANUAL to close of the valve. Requires entry into AOI-18, "Malfunction of Pressurizer Pressure Control System."
6	rc02d rp01c	M-All	RCP 4 trips, requiring a reactor trip. Crew enters FR-S.1."Nuclear Power Generation/ATWS."
7	rp55a rp55c	C-BOP	1A Motor Driven and the Turbine Driven Auxiliary Feedwater Pumps fail to automatically start, requiring manual starts.
8	hs-62-138a close	C-BOP	1-FCV-62-138 fails closed, requiring local operation to begin boration.
9	ms0d	M-All	Steam line break inside containment on SG 4. Requires entry into E-0, "Reactor Trip or Safety Injection and E-2, "Faulted Steam Generator Isolation."
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

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Scenario 2 - Summary

Initial Condition Train B/Channel II Work Week. Perform a load reduction to 75% power at 2%/minute to support removing the 1B MFP from service.

Turnover 100% power, MOL. RCS boron is 747 ppm. Control Bank D is at 220 steps. Train B/Channel II Work Week. 1B MD AFW pump out-of-service for pump bearing replacement. Expected return to service in 18 hours. 1B MFP turbine and pump vibration alarms are currently lit and Operations Management has directed a plant shutdown to 75% using AOI-39 at 2%/minute to remove the MFP from service

- Event 1** Reduce power to shutdown 1B Main Feedwater Pump.
- Event 2** As power is reduced, 1B Main Feedwater Pump and Motor vibrations increase to 10 mils (indicated on the Integrated Computer System (ICS)), requiring the SRO to direct the BOP operator shutdown the pump. The SRO enters and directs the actions of AOI-16, "Loss of Normal Feedwater." The SRO enters Tech Spec LCO 3.2.3 Axial Flux Difference Condition A and informs the crew that AFD must be restored within 30 minutes. The SRO directs the RO to perform a boration to restore AFD to within limits. The SRO enters and exits LCO 3.4.1, RCS Pressure, Temperature and DNB Limits, Condition A.
- Event 3** Controller 1-PIC-1-13A, SG 2 PORV PCV-1-12, fails causing the PORV to open. The BOP reports the PORV open. The SRO enters AOI-38, "Main Steam or Feedwater Line Break," and directs the BOP to close the PORV. The SRO evaluates conditions and enters Tech Spec 3.7.4, Atmospheric Dump Valves, Condition A.
- Event 4** 1A-A CCP trips on instantaneous overcurrent. The SRO enters AOI-20, "Malfunction of Pressurizer Level Control System," and directs actions for the 1A-A CCP. The SRO evaluates conditions and enters LCO 3.5.2.ECCS - Operating, Condition A and Tech Requirement 3.1.4, Charging Pumps -Operating.
- Event 5** Controller 1-PIC-68-340D, Loop 1 Spray Control fails, causing the spray valve to open. The RO reports the spray valve open and closes the valve using the controller in MANUAL. The SRO enters and directs actions of AOI-18, "Malfunction of Pressurizer Pressure Control System." The SRO enters and exits LCO 3.4.1, RCS Pressure, Temperature and DNB Limits, Condition A.
- Event 6** RCP 4 trips, requiring a reactor trip. The reactor does NOT trip. RO and BOP take immediate operator actions associated with FR-S.1, Nuclear Power Generation/ATWS. The SRO enters and directs actions of FR-S.1.
- Event 7** 1A Motor Driven and the Turbine Driven Auxiliary Feedwater Pumps fail to automatically start, requiring manual starts.
- Event 8** 1-FCV-62-138 fails to open, requiring local operation to begin boration. Performance of FR-S.1 steps direct the BOP to contact an AUO to locally attempt to open 1-FCV-62-138. Report from the field is that 1-FCV-62-138 is mechanically bound. BOP directs 1-ISV-62-929 Boration Valve to be closed.
- Event 9** Steam line break inside containment. Requires transition from FR-S.1, "Nuclear Power Generation/ATWS," to E-0, "Reactor Trip or Safety Injection," and a transition to E-2, "Faulted Steam Generator Isolation." The scenario is terminated upon transition to ES-1.1, "SI Termination," from E-2, "Faulted Steam Generator Isolation," or E-1, "Loss of Reactor or Secondary Coolant."

Scenario 2 - Critical Task Summary

<i>Critical Task 1</i> <i>From WOG</i> <i>Critical Task List</i> <i>for FR-S.1. C</i>	<i>Insert negative reactivity into the core by at least one of the following methods before completing the immediate-action steps of FR-S.1:</i> <ul style="list-style-type: none">• <i>Insert RCCAs</i> <i>Reactor trip must be verified to ensure that the only heat being added to the RCS is from decay heat and reactor coolant pump heat. The safeguards systems that protect the plant during accidents are designed assuming that only decay heat and pump heat are being added to the RCS. If the reactor cannot be tripped, then the control rods should be manually inserted into the core in order to decrease reactor power.</i>
<i>Critical Task 2</i> <i>From WOG</i> <i>Critical Task List</i> <i>for FR-S.1, A</i>	<i>Manually trip the main turbine.</i> <i>The turbine is tripped to prevent an uncontrolled cooldown of the RCS due to steam flow that the turbine would require. For an ATWS event where a loss of normal feedwater has occurred, analyses have shown that a turbine trip is necessary (within 30 seconds) to maintain SG inventory.</i>
<i>Critical Task 3</i> <i>From WOG</i> <i>Critical Task List</i> <i>for FR-S.1, B</i>	<i>Manually start the AFW pumps.</i> <i>The MD AFW pumps start automatically on an SI signal and SG low level to provide feed to the SGs for decay heat removal. If SG levels drop below the appropriate setpoint, the turbine-driven AFW pump will also automatically start to supplement the MD pumps. The ATWS analyses have shown that actuation of AFW within 60 seconds after the failure to scram provides acceptable results.</i>
<i>Critical Task 4</i> <i>From WOG</i> <i>Critical Task List</i> <i>for E-2, A</i>	<i>Isolate the faulted SG before transition out of E-2.</i> <i>Isolation of the feedwater to the faulted SG maximizes the cooldown capability of the non-faulted loops following a feedline break and minimizes the RCS cooldown and mass and energy release following a steamline break. Isolation of steam paths from the faulted SG also minimizes the RCS cooldown and mass and energy release to containment. In addition, isolation of these steam paths could isolate the break.</i>

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 2
Simulator Console Operators Instructions

SIMULATOR SETUP INFORMATION

1. ENSURE NRC Examination Security has been established.
2. RESET to Initial Condition 342 by performing the following actions:
 - a. Select ICManger on the THUNDERBAR menu (right hand side of Instructor Console Screen).
 - b. Locate IC# 342.
 - c. Right "click" on IC# 342.
 - d. Select Reset on the drop down menu.
 - e. Right "click" on RESET.
 - f. Enter the password for IC 342.
 - g. Select "Yes" on the INITIAL CONDITION RESET pop-up window.
 - h. Perform SWITCH CHECK.
3. SELECT Director on the THUNDERBAR menu (right hand side of Instructor Console Screen).
4. ENSURE the following information appears on the Director Screen:

Key		Type	Event	Delay	Inserted	Ramp	Initial	Final	Value
rp01c	manual and automatic reactor signal failure (atws)	M		00:00:00	00:00:00	00:00:00		Active	Active
hs-3-359-2	hs-3-359 indicating lights	O		00:00:00	00:00:00	00:00:00		Off	00:00:00
rp55c	failure of auto start on turbine driven aux feed pump	M		00:00:00	00:00:00	00:00:00		Active	Active
hs-3-359-1	hs-3-359 indicating lights	O		00:00:00	00:00:00	00:00:00		Off	00:00:00
hs-3-128a	hs-3-128a auxiliary feedwater pump b-b motor sw	O		00:00:00	00:00:00	00:00:00		ptlock	00:00:00
hs-62-138a	hs-62-138a emergency boration flow control valve sw	O		00:00:00	00:00:00	00:00:00		close	00:00:00

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 2
Simulator Console Operators Instructions

SIMULATOR SETUP INFORMATION

Key	Description	Type	Event	Delay	Inserted	Ramp	Initial	Final	Value
hs-3-359	Intentionally left blank	O		00:00:00	00:00:00	00:00:00		close	00:00:00
rp55a	failure of auto start on motor driven aux feedpump a								
hs-3-128a-1	01170 aux fw pmp b-b motor sw(green)	O		00:00:00	00:00:00	00:00:00		Off	00:00:00
fw18b	feed water pump turbine vibration pump b	M		00:00:00	00:00:00	00:00:00		20	20
rp51b	reactor trip breaker rtb trip	M	20	00:00:00		00:00:00		Active	InActive
rp51a	reactor trip breaker rta trip	M	20	00:00:00		00:00:00		Active	InActive
rdr09	rod control mg set #2 load bkr 52-2	O	21	00:00:00		00:00:00		close	00:00:00
rdr08	rod control mg set #1 load bkr 52-1	O	21	00:00:00		00:00:00		close	00:00:00
rdr02	rod control mg set #2 bkr	O	22	00:00:00		00:00:00		close	close
rdr01	rod control mg set #1 bkr	O	22	00:00:00		00:00:00		close	close
cvr10	emergency boration [62-929]	O	23	00:00:00		00:00:00		close	close
pic-1-13a	09040 sg 2 main steam hdr press co	O	3	00:00:00		00:00:00		0	42.2363
cv01a	charging pump a trip	M,	4	00:00:00		00:00:00		Active	InActive
rc13b	fail input to pic-68-340d	M	5	00:00:00		00:00:00		100	43.0311
rc02d	rcp trip rcp #4	M	6	00:00:00		00:00:00		Active	InActive
ms01d	main steam line break inside containment sg #4	M	7	00:00:00		00:01:00		10	0

5. Place simulator in RUN and acknowledge any alarms.
6. Place RED HOLD NOTICE tags on 1-HS-3-128A, AFW PMP B-B and 1-HS-3-359, MD AFWP 1B RECIRC VALVE handswitches. Ensure the indicating lights on 1-HS-3-128A, AFW PMP B-B and 1-HS-3-359, MD AFWP 1B RECIRC VALVE handswitch are DARK. ENSURE 1-HS-3-128A, AFW PMP B-B is in the STOP, PULL-TO-LOCK position.
7. Place pink "Protected Equipment" tag on 1-HS-3-118A, AFW PMP A-A and 1-HS-46-56A-S, T-D AFWP T&T VLV handswitches.
8. ENSURE the "Train B Week - Channel II" sign is placed on 1-M-30.
9. Place simulator in FREEZE.

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 2
Simulator Console Operators Instructions

SIMULATOR SETUP INFORMATION

10. ENSURE Watts Bar Nuclear Plant Unit 1 Reactivity Briefing Book (Simulator Copy) MOL (Middle of Life) is updated and on the desk, and that the MOL placards are on 1-M-6, below the Boric Acid and Primary Water Integrators.

Item 3	•AFD	-11.8	%	-2.3	%	5.8	%
		Lower Band		Target	Upper Band		
				-2.7			
		Actual					
				Manual		220	steps
	•Control Rods	<input checked="" type="checkbox"/> Auto	<input type="checkbox"/>			Control Bank D1/D2	
Item 4		<input type="checkbox"/> Negative	<input type="checkbox"/>	Positive	<input checked="" type="checkbox"/>	None	
Item 5		<input type="checkbox"/> 1-CCP A	<input checked="" type="checkbox"/>	1-CCP B	<input type="checkbox"/>	748	ppm
	Current RCS C _B :	748		ppm			
	Current fluid inside the blender is:	<input type="checkbox"/> Acid	<input type="checkbox"/>	Water	<input checked="" type="checkbox"/>	Blended	
	PW flow rate	70 gpm					
	1-FC-62-142, dial setting	35%					
	BA flow rate	8 gpm					
	1-FC-62-139 dial setting	21%					
	6. Boric Acid (BA) and Primary Water (PW) volumes for the following changes:						
	1°F Tav _g increase	373	gal	PW			
	1°F Tav _g decrease	46	gal	BA			
	10% Downpower @ 5%/hr	145	gal	BA			
	50% Downpower @ 5%/hr	440	gal	BA			
	1000 MW (85%) Runback	179	gal	BA			
	950 MW (80%) Runback	262	gal	BA			
	900 MW (75%) Runback	341	gal	BA			
	790 MW or 800 MW Runback	487	gal	PW			

11. WHEN prompted by the Chief Examiner, place the Simulator in RUN.

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 2
Simulator Console Operators Instructions

Exam Event No.	Simulator Event No.	Description/Role Play
1	none	Reduce power to shutdown 1B Main Feedwater Pump. ROLE PLAY: When requested, as the Turbine Building AUO, report that vibrations are rising on the 1B MFP. State that the control room will be notified if vibrations on the pump or turbine rise to 10 mils.
2	none	1B Main Feedwater Pump vibrations increase, requiring the pump to be tripped. ROLE PLAY: Role play as the Turbine Building AUO and state that vibrations are greater than 10 mils on both the 1B MFP pump and turbine. ROLE PLAY: If requested, as the Turbine Building AUO, acknowledge request to reset vibration alarms locally at the Bentley-Nevada panel. Delete malfunction fw18b, then report back to the control room that the vibration alarms have been reset locally.
3	3	SG 3 PORV controller fails, causing PORV to open. ROLE PLAY: Information provided is dependent on the position of the handswitch for #3 PORV. If the handswitch is in the P-AUTO position, report steam from the North Valve Vault Room. If the handswitch has been placed to the CLOSE position, report that there was steam coming from the North Valve Vault Room, but the steam has now stopped.
4	4	1A-A CCP trips on instantaneous overcurrent. ROLE PLAY: When requested, as Control Building AUO repeat back request to investigate the cause of the 1A CCP trip at its breaker. Report back that the breaker tripped on instantaneous overcurrent. ROLE PLAY: When requested, as the Auxiliary Building AUO repeat back request to check out the 1B-B CCP for a start. Report back that the 1B-B CCP is ready for start. After the pump is running, report that all pump parameters are normal. ROLE PLAY: When requested, as the Auxiliary Building AUO repeat back request to check out the status of the 1A-A CCP to determine cause of the trip. Report that there are scorch marks on the 1A-A CCP motor, and the motor is extremely hot to the touch.

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 2
Simulator Console Operators Instructions

Exam Event No.	Simulator Event No.	Description/Role Play
5	5	<p>Pressurizer Spray Valve 1-PCV-68-340D opens, requiring entry into AOI-18, "Malfunction of Pressurizer Pressure Control System."</p> <p>ROLE PLAY: Role Play as Work Control and state that a package to troubleshoot and repair 1-PCV-68-340D spray valve will be developed.</p>
6	none	<p>#4 RCP trips and the reactor fails to trip, requiring entry into FR-S.1, "Nuclear Power Generation/ATWS.".</p> <p>ROLE PLAY: When dispatched as the Control Building AUO to open the Rod Drive MG set breakers and the Reactor Trip breakers, wait 2 minutes then clear malfunction rp01c, then enter Event 20 (Malfunction rp51a to open Reactor Trip Breaker A, and malfunction rp51b to open Reactor Trip breaker B.)</p> <p>ROLE PLAY: When dispatched as the Turbine Building AUO to open the Rod Drive MG set supply breakers, wait 2 minutes then enter Remote Functions rdr01 and rdr02.</p>
7	none	<p>1A Motor Driven and the Turbine Driven Auxiliary Feedwater Pumps fail to automatically start, requiring manual starts.</p> <p>ROLE PLAY: None, BOP can manually start the pumps from their associated control switches on 1-M-4.</p>
8	none	<p>1-FCV-62-138 fails to open, requiring local operation to begin boration.</p> <p>ROLE PLAY: When dispatched as the Auxiliary Building AUO, report that 1-FCV-62-138 will not open locally. When directed, open 1-ISV-62-929 using Remote Function cvr10 set to open.</p>

Op Test No.: NRC Scenario # 2 Event # 1 Page 1 of 47

Event Description: Reduce power to shutdown 1B Main Feedwater Pump.

Time	Position	Applicant's Actions or Behavior
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EXAMINER: The following actions are from AOI-39, "Rapid Load Reduction," Section 3.2, "Power Reduction From Greater than 50% Power."

CAUTION Condenser Backpressure limits are on previous page.

CAUTION TURBINE MANUAL Operation requires continuous operator monitoring and control.

CAUTION LOSS OF CONDENSER VACUUM may be made worse if steam dumps are actuated. AOI-11 requires T-ave and T-ref be maintained within 3°F.

NOTE If the initiating condition is corrected, the power reduction may be terminated.

	SRO RO	<p>1. ESTABLISH a turbine load reduction rate less than or equal to 5%/min:</p> <ul style="list-style-type: none"> a. PLACE turbine in IMP IN b. SET a desired load in the SETTER with the REFERENCE CONTROL. c. SET the LOAD RATE at less than or equal to 5%/min. d. DEPRESS GO pushbutton.
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CAUTION Over boration may result in excessive rod withdrawal or Tavg lower than desired for at power conditions.

NOTE

- Rod Control should remain in automatic for Tavg Control
- Reactivity Briefing Sheet, "Thumb Rules" (page 3), lists boration flows and volumes for different reduction rates.
- Effect of boration will lag behind turbine load reduction and can be compensated for by temporarily increasing boric acid flow rate above recommended rate.

	RO	<p>2. INITIATE a manual boration:</p> <ul style="list-style-type: none"> a. DETERMINE recommended boration flow rate and volume from Reactivity Briefing Sheet: b. INITIATE normal boration: <ul style="list-style-type: none"> 1) ADJUST BA flow controller, 1-FC-62-139, to desired flow rate. 2) ADJUST BA batch counter 1-FQ-62-139 to required quantity. 3) PLACE mode selector 1-HS-62-140B to BOR. 4) PLACE VCT makeup control 1-HS-62-140A, to START. 5) VERIFY desired boric acid flow indicated on 1-FI-62-139.
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EXAMINER: The following actions are taken from SOI-62.02, "Boron Concentration Control," Section 6.7, "Minor Boration."

Op Test No.: NRC Scenario # 2 Event # 1 Page 2 of 47

Event Description: Reduce power to shutdown 1B Main Feedwater Pump.

Time	Position	Applicant's Actions or Behavior
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NOTES

- 1) Section 6.7, may be reproduced, laminated, displayed, reused, etc. as desired.
- 2) Minor Boration is defined as the addition of Boric Acid done several times each shift early in core life, to compensate for burnable poison burn-up, and maintain Tavg on program.

	RO	[1] ENSURE 1-HS-68-341H, BACKUP HEATER C [1-M-4], is ON, to equalize RCS-Pzr CB.																											
	RO	[2] ADJUST 1-FC-62-139, BA TO BLENDER [1-M-6], for desired flow rate.																											
	RO	[3] ADJUST 1-FQ-62-139, BA BATCH COUNTER [1-M-6], for required quantity.																											
	RO	[4] PLACE 1-HS-62-140B, VCT MAKEUP MODE [1-M-6], in BOR.																											
	RO	[5] TURN 1-HS-62-140A, VCT MAKEUP CONTROL [1-M-6], to START. [5.1] CHECK Red light is LIT.																											
	RO	[6] MONITOR the following parameters: <table border="1"> <thead> <tr> <th>Instrument</th><th>Location</th><th>Parameters</th></tr> </thead> <tbody> <tr> <td>1-PI-62-122</td><td>1-M-6</td><td>VCT PRESS</td></tr> <tr> <td>1-LI-62-129A</td><td>1-M-6</td><td>VCT LEVEL</td></tr> <tr> <td>1-FI-62-139</td><td>1-M-6</td><td>BA TO BLENDER FLOW</td></tr> <tr> <td>1-FQ-62-139</td><td>1-M-6</td><td>BA BATCH COUNTER</td></tr> <tr> <td>1-FI-62-142</td><td>1-M-6</td><td>PW TO BLENDER FLOW</td></tr> <tr> <td>1-FQ-62-142</td><td>1-M-6</td><td>PW BATCH COUNTER</td></tr> <tr> <td>1-LI-62-238</td><td>1-M-6</td><td>BAT A LEVEL</td></tr> <tr> <td>1-LI-62-242</td><td>1-M-6</td><td>BAT C LEVEL</td></tr> </tbody> </table>	Instrument	Location	Parameters	1-PI-62-122	1-M-6	VCT PRESS	1-LI-62-129A	1-M-6	VCT LEVEL	1-FI-62-139	1-M-6	BA TO BLENDER FLOW	1-FQ-62-139	1-M-6	BA BATCH COUNTER	1-FI-62-142	1-M-6	PW TO BLENDER FLOW	1-FQ-62-142	1-M-6	PW BATCH COUNTER	1-LI-62-238	1-M-6	BAT A LEVEL	1-LI-62-242	1-M-6	BAT C LEVEL
Instrument	Location	Parameters																											
1-PI-62-122	1-M-6	VCT PRESS																											
1-LI-62-129A	1-M-6	VCT LEVEL																											
1-FI-62-139	1-M-6	BA TO BLENDER FLOW																											
1-FQ-62-139	1-M-6	BA BATCH COUNTER																											
1-FI-62-142	1-M-6	PW TO BLENDER FLOW																											
1-FQ-62-142	1-M-6	PW BATCH COUNTER																											
1-LI-62-238	1-M-6	BAT A LEVEL																											
1-LI-62-242	1-M-6	BAT C LEVEL																											
	RO	[7] WHEN Boration is COMPLETE, THEN PLACE 1-HS-62-140B, VCT MAKEUP MODE, in AUTO.																											
	RO	[8] TURN 1-HS-62-140A, VCT MAKEUP CONTROL, to START. [8.1] CHECK Red light is LIT.																											
	RO	[9] RETURN 1-FC-62-139, BA TO BLENDER [1-M-6], to desired flow rate.																											

EXAMINER: The following actions are from AOI-39, "Rapid Load Reduction," Section 3.2, "Power Reduction From Greater than 50% Power."

NOTE AFD green target band can be monitored using ICS Turn On code DOGHOUSE.

	RO	3. MONITOR rod position: <ul style="list-style-type: none"> • Rods above Lo-Lo insertion limit • AFD within Target Band
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Op Test No.: NRC Scenario # 2 Event # 1 Page 3 of 47

Event Description: Reduce power to shutdown 1B Main Feedwater Pump.

Time	Position	Applicant's Actions or Behavior
	SRO	4. REFER to EPIP-1, Emergency Plan Classification Flowchart. EXAMINER: Step is N/A for given conditions.
	SRO	5. NOTIFY the Load Coordinator of the required load reduction and expected ramp rate.
NOTE If reactor power is stabilized at a lower level a drop in Tavg will occur due to Xenon build up. Dilution may be required to maintain power level.		
	SRO RO	6. MONITOR Tavg and Tref: <ul style="list-style-type: none"> Tavg trending to Tref. Mismatch less than 5°F.
	SRO	7. CHECK rate of power reduction is rapid enough for existing plant conditions.
	SRO	8. NOTIFY Cnds Demin AUO of impending pmp shutdowns.
	SRO	9. WHEN rated thermal power change exceeds 15% in one hour, NOTIFY Chemistry to initiate 1-SI-68-128.
EXAMINER: Further steps of AOI-39, "Rapid Power Reduction" are not included, since the crew will only reduce power to 85%, and the remainder of AOI-39 steps are power level dependent. Simulator Operator enters Event 2.		
	SRO	Crew Brief would typically be conducted for this event as time allows prior to the next event.
	SRO	Notifications should be addressed as applicable if not specifically addressed by the procedure or in the crew brief. <u>Operations Management</u> - Typically Shift Manager. <u>Maintenance Personnel</u> - Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
Cue Simulator Operator to modify the severity of malfunction fw18b to increase 1B MFP vibrations to greater than 10 mils after applicants have decreased power by approximately 5%.		

Op Test No.: NRC Scenario # 2 Event # 2 Page 4 of 47

Event Description: 1B Main Feedwater Pump vibrations increase, requiring the pump to be tripped. Entry into AOI-16 is required, and a Tech Spec evaluation of Axial Flux Difference must be conducted.

Time	Position	Applicant's Actions or Behavior
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Indications:

Main Feedwater Pump 1B vibrations are sufficiently high at the beginning of the scenario for 53-D, "TURBINE VIBRATION HI", and 54-D, "PUMP VIBRATION HI" to be LIT.

When the severity of the vibration malfunction is raised, the ICS display will indicate 1B Main Feedwater pump and turbine and bearing vibrations are above the criteria for stopping the MFP.

	BOP	Diagnoses and announces 1B MFP vibrations rising above setpoints for pump removal.
	BOP	May trip 1B Main Feedwater pump, to comply with ARI 53-D and 54-D corrective actions and directions provided in the Shift Turnover Instructions.
	SRO	Enter and direct actions of AOI-16, "Loss of Normal Feedwater," Sub Section 3.5, "MFWP TRIP greater than or equal to 800 MWe (67% Turbine Load)."

EXAMINER: The following actions are taken from AOI-16, "Loss of Normal Feedwater," Sub Section 3.5, "MFWP TRIP greater than or equal to 800 MWe (67% Turbine Load)."

EXAMINER: During the runback, it is likely that RCS pressure will drop below the DNB limit of Tech Spec LCO 3.4.1 (2214 psig). The RO will notify the SRO of the entry, and report when pressure returns above 2214 psig.

	BOP	1. (p) IF loss of S/G level is imminent, THEN TRIP reactor, and ** GO TO E-0, Reactor Trip or Safety Injection.
	BOP	2. CHECK turbine load less than or equal to 1000 MWe (85%).
	BOP-	3. PLACE tripped MFP recirc valve controller in MANUAL, and CLOSE recirc valve.
	BOP	4. CHECK turbine load less than 800 MWe (67%),
	BOP	4. RESPONSE NOT OBTAINED: ENSURE Standby MFWP running. <i>Since the standby MFWP is running, the portion of the RNO addressing actions to reduce load further are not provided.</i>
	BOP	5. ENSURE MFWP speed rising to control S/G Δ-P and levels on program.

CAUTION Continued load reductions below 800 MWe should be done using normal turbine controls at less than or equal to 5% min.

	BOP	6. ENSURE adequate feed flow for existing conditions: <ul style="list-style-type: none"> • Feed flow greater than or equal to steam flow. • S/G levels returning to program.
	RO	7. ENSURE T-avg and T-ref within 3°.

Op Test No.: NRC Scenario # 2 Event # 2 Page 5 of 47

Event Description: 1B Main Feedwater Pump vibrations increase, requiring the pump to be tripped. Entry into AOI-16 is required, and a Tech Spec evaluation of Axial Flux Difference must be conducted.

Time	Position	Applicant's Actions or Behavior
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CAUTION Runback may result in exceeding Tech Spec 3.2.3 limits on Axial Flux Difference (AFD).

	SRO	8. MONITOR AFD within limits of LCO 3.2.3.
		8. RESPONSE NOT OBTAINED: (p) INITIATE boration to return AFD within limits. <i>After the runback occurs, the SRO will enter Tech Spec LCO 3.2.3, Axial Flux Difference, Condition A, requiring power to be reduced to less than 50% RTP if AFD is not restored to within limits within 30 minutes. Boration will be in accordance with TI-7.012, approximately 262 gallons of boron.</i>
	BOP	9. IF feed flow greater than 40%, THEN ENSURE tripped MFWP turbine condenser valves CLOSED: <ul style="list-style-type: none"> Pump A, 1-FCV-2-205 and -210, OR <ul style="list-style-type: none"> Pump B, 1-FCV-2-211 and -216. <i>Since the 1B MFP was tripped, 1-FCV-2-211 and 1-FCV-2-216 will be verified closed.</i>
	BOP	10. MONITOR reg valves controlling S/G levels on program.
	BOP	11. LOCALLY MAINTAIN oil temp between 110 to 130°F on running Standby MFP using 1-THV-24-948 <i>Report from the field will state that current temperature is 120°F</i>
	BOP	12. IF C-7 LOSS OF LOAD STM DUMP INTERLOCK annunciator LIT [66E], THEN a. ENSURE steam dump valves have zero demand. b. RESET loss-of-load interlock with steam dump mode switch.
	SRO	13. ENSURE Condensate System Pumps in service as necessary: <ul style="list-style-type: none"> REFER TO GO-4, Normal Power Operation.
	SRO	14. IF reactor power dropped by greater than or equal to 15% in one hour, THEN NOTIFY Chemistry to initiate power change sampling requirements.
	BOP	15. CHECK VALVE POS LIMIT LIT.
	BOP	16. RETURN valve position limiter to normal: a. ENSURE turbine in IMP OUT b. (p) REDUCE turbine load setpoint using REFERENCE CONTROL ▽ (lower) AND GO button until VALVE POS LIMIT LIGHT not LIT, c. SET valve position limiter to 95%.
	SRO	17. INITIATE repairs on failed pump.

Op Test No.: NRC Scenario # 2 Event # 2 Page 6 of 47

Event Description: 1B Main Feedwater Pump vibrations increase, requiring the pump to be tripped. Entry into AOI-16 is required, and a Tech Spec evaluation of Axial Flux Difference must be conducted.

Time	Position	Applicant's Actions or Behavior
	SRO	18. RETURN TO Instruction in effect.
	SRO	Crew Brief would typically be conducted for this event as time allows prior to the next event.
	SRO	Notifications should be addressed as applicable if not specifically addressed by the procedure or in the crew brief. <u>Operations Management</u> - Typically Shift Manager. <u>Maintenance Personnel</u> – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
Cue Simulator Operator to insert Event 3.		

Op Test No.: NRC Scenario # 2 Event # 3 Page 7 of 47

Event Description: SG 2 PORV controller fails, causing PORV to open. Tech Spec evaluation.

Time	Position	Applicant's Actions or Behavior
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Indications:

RED indicating light on 1-HS-1-12 LIT.

RCS temperature dropping.

Reactor power rising on all power range monitors.

	BOP	Diagnose and announce failure of SG PORV 1-PCV-1-12 open.
	BOP	May place 1-PIC-1-13A PORV controller in MANUAL and attempt to close.
	BOP	May transfer handswitch 1-HS-1-13 from P-AUTO to CLOSE.
	SRO	Enters and directs actions of AOI-38, "Main Steam or Feedwater Line Break."

EXAMINER: The following actions are taken from AOI-38, "Main Steam or Feedwater Line Break."

	SRO	1. IF leak threatens personnel safety, THEN : a. TRIP Rx. b. CLOSE the following: • MSIVs. • MSIV bypass valves. c. ** GO TO E-0, Reactor Trip or Safety Injection.
	BOP	2. CHECK S/G PORVs CLOSED.
	BOP	2. RESPONSE NOT OBTAINED : IF S/G press less than 1130 psig, THEN CLOSE S/G PORV or local isolation valve.
	BOP	3. CHECK steam dump valves CLOSED.
	RO	4. CHECK reactor power less than or equal to 100%: • Loop ΔT . • NIS power range monitors
	RO	5. ENSURE T-avg and T-ref. within 3°F.

NOTE

- It is a normal condition for Turbine load and Rx power to exhibit a nominal mismatch for loads less than 50%.
- Hotwell makeup will rise following a rapid runback. The makeup flow should be allowed to stabilize before making any determination of leak size.

Op Test No.: NRC Scenario # 2 Event # 3 Page 8 of 47

Event Description: SG 2 PORV controller fails, causing PORV to open. Tech Spec evaluation.

Time	Position	Applicant's Actions or Behavior
	BOP	6. MONITOR leak less than 3% of required steam or FW flow: IF power greater than 50%, THEN COMPARE turbine load to reactor power and ΔT . <ul style="list-style-type: none"> • OBSERVE steam and FW flow recorders. • OBSERVE hotwell level makeup less than 950 gpm.
	BOP	7. MONITOR CST volume greater than 200,000 gallons.
	BOP	8. ENSURE SG levels on program.
CAUTION FW or condensate leaks upstream of the FW isol valves should be promptly dealt with to limit hazards to Turbine Bldg personnel.		
	BOP	9. DISPATCH personnel to perform secondary plant inspection for main steam and feedwater leaks.
	BOP	10. CHECK Cntmt conditions NORMAL: <ul style="list-style-type: none"> • Pressure (1-PDR-30-133 between -0.1 and +0.3 psig). • Temperature (Window 104-B DARK). • Humidity (Window 103-B DARK). • Sump level (Window 127-E DARK).
	RO	11. MONITOR Cntmt press stable or dropping.
	BOP	12. IDENTIFY leak location based upon ANY of the following: a. FW/Steam flow recorder. b. SG enclosure temperatures high: <ul style="list-style-type: none"> • T1002A for 2 and 3. • T1003A for 1 and 4. c. Local indication of break in any of the following: <ul style="list-style-type: none"> • Main steam lines. • Main feed lines. • Other secondary piping. • S/G safety valves.
	BOP	13. ANNOUNCE steam leak and give possible location.
	BOP	14. ISOLATE leak if possible. Step 2 RNO isolated the leak.

Op Test No.: NRC Scenario # 2 Event # 3 Page 9 of 47

Event Description: SG 2 PORV controller fails, causing PORV to open. Tech Spec evaluation.

Time	Position	Applicant's Actions or Behavior
	SRO	15. IF operation can continue, THEN RETURN TO Instruction in effect. <i>Evaluates Tech Specs and determines that LCO 3.7.4, Atmospheric Dump Valves (ADV) Condition A is applicable. Condition A states that with one required ADV line inoperable restore the required ADV to OPERABLE status within 7 days.</i>
	CREW	Crew Brief would typically be conducted for this event as time allows prior to the next event.
	CREW	Notifications should be addressed as applicable if not specifically addressed by the procedure or in the crew brief. <u>Operations Management</u> - Typically Shift Manager. <u>Maintenance Personnel</u> - Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
Console Operator: When directed, initiate Event 4.		

Op Test No.: NRC Scenario # 2 Event # 4 Page 10 of 47

Event Description: 1A-A Charging Pump trip.

Time	Position	Applicant's Actions or Behavior
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Indications:

15-E M-1 THRU M-6 MOTOR TRIPOUT

108-A CHARGING FLOW HI/LO

1-FI-62-93A CHARGING FLOW indicating a drop in flow.

RCP Seal Supply flow indications indicating a drop in flow.

	RO	Diagnoses and announces the 1A-A CCP trip.
	RO	May isolate letdown, since charging flow has been lost.
	SRO	Enters and directs actions of AOI-20, "Malfunction of Pressurizer Level Control System."

EXAMINER: The following actions are taken from AOI-20, "Malfunction of Pressurizer Level Control System."

CAUTION Charging and letdown must be in service together. If letdown isolates or charging is lost, the other must be isolated.

	RO	1. CHECK pwr level program signal NORMAL: <ul style="list-style-type: none"> 1-LR-68-339 (green pen).
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NOTE 1-XS-68-339E selects one channel to control level to program and one backup channel for control interlocks.

	RO	2. CHECK if 1-XS-68-339E is selected to FAILED channel (control or backup): <ul style="list-style-type: none"> LI-68-339, OR <ul style="list-style-type: none"> LI-68-320, OR <ul style="list-style-type: none"> LI-68-335.
	SRO	2. RESPONSE NOT OBTAINED: IF pwr level is low OR dropping, THEN ** GO TO Step 12. <i>With no charging pump in service the PZR level trend is dropping, so Step 12 will be taken.</i>
		12. CHECK any charging pump RUNNING.

EXAMINER: Actions to isolate letdown may have been taken when 1A-A CCP tripped.

Op Test No.: NRC Scenario # 2 Event # 4 Page 11 of 47

Event Description: 1A-A Charging Pump trip.

Time	Position	Applicant's Actions or Behavior
	RO	<p>12. RESPONSE NOT OBTAINED:</p> <p>PERFORM the following:</p> <p>a. ISOLATE letdown:</p> <ul style="list-style-type: none"> • CLOSE letdown orifice(s). • CLOSE 1-FCV-62-69. • CLOSE 1-FCV-62-70. <p>b. RESTORE charging and letdown:</p> <ul style="list-style-type: none"> • REFER TO Attachment 1. <p>c. ** GO TO Step 18.</p>
EXAMINER: The following actions are taken from AOI-20,"Malfunction of Pressurizer Level Control System," Attachment 1, "Alignment of Charging and Letdown."		
	RO	<p>1. IF charging NOT established, THEN PERFORM the following:</p> <p>a. CLOSE 1-FCV-62-89, CHRG HDR-RCP SEALS FLOW CONTROL.</p> <p>b. ENSURE Charging Pump running.</p> <p>c. OPEN 1-FCV-62-90 and 1-FCV-62-91, CHARGING LINE ISOL.</p> <p>d. ENSURE 1-FCV-62-85, NORM CHARGING TO LOOP 1, or 1-FCV-62-86, ALT CHARGING TO LOOP 4, OPEN.</p> <p>e. ADJUST 1-FCV-62-93 to maintain seal injection flow between 8 and 13 gpm for each RCP.</p>
	RO	<p>2. ENSURE letdown isol valves OPEN:</p> <ul style="list-style-type: none"> • 1-FCV-62-69, CVCS LETDOWN ISOLATION. • 1-FCV-62-70, CVCS LETDOWN ISOLATION. • 1-FCV-62-77, CVCS LP LETDOWN ISOLATION.
	RO	<p>3. PLACE 1-HIC-62-78A, LETDOWN HX OUTLET TEMP TCV-70-192 CNTL, in MANUAL at 25% OPEN.</p>
	RO	<p>4. PLACE 1-HIC-62-81A, LETDOWN PRESS CONTROL, in MANUAL at 40-50% OPEN if using 75 gpm orifice (20-30% OPEN if using 45 gpm orifice).</p>
	RO	<p>5. THROTTLE OPEN 1-FCV-62-89 and ESTABLISH 75 gpm or greater charging flow while maintaining seal injection flow between 8 and 13 gpm for each RCP using 1-FCV-62-93.</p>
	RO	<p>6. OPEN letdown orifices as needed:</p> <ul style="list-style-type: none"> • 1-FCV-62-72 (45 gpm). • 1-FCV-62-73 (75 gpm). • 1-FCV-62-74 (75 gpm). • 1-FCV-62-76 (5 gpm).

Op Test No.: NRC Scenario # 2 Event # 4 Page 12 of 47

Event Description: 1A-A Charging Pump trip.

Time	Position	Applicant's Actions or Behavior
	RO	7. ADJUST 1-HIC-62-81A, LETDOWN PRESS CONTROL, for desired press, (320 psig at normal letdown temp), and PLACE in AUTO.
	RO	8. PLACE 1-HIC-62-78A, LETDOWN HX OUTLET TEMP TCV-70-192 CNTL, in AUTO.
	RO	9. RETURN pZR level to program.
	RO	10. RETURN 1-HIC-62-93A, CHARGING FLOW PZR LEVEL CONTROL, in AUTO.
EXAMINER: The following actions return to AOI-20, "Malfunction of Pressurizer Level Control System," at Step 18.		
	SRO	18. NOTIFY Work Control to initiate corrective action, if necessary.
	SRO	19. EVALUATE system alignment/status: <ul style="list-style-type: none"> • REVIEW actions performed in this Instruction. • REFER TO SOI-62.01, CVCS - Charging and Letdown SRO evaluates Tech Specs, and determines that the following are applicable: <i>LCO 3.5.2. ECCS - Operating, Condition A restore train(s) to operable status within 72 hours.</i> <i>Tech Requirement 3.1.4, Charging Pumps -Operating. A. A. One required charging pump inoperable. A.1 Restore required charging pump to OPERABLE status. In 72 hours.</i>
	SRO	20. RETURN TO instruction in effect.
	CREW	Crew Brief would typically be conducted for this event as time allows prior to the next event.
	CREW	Notifications should be addressed as applicable if not specifically addressed by the procedure or in the crew brief. <u>Operations Management</u> - Typically Shift Manager. <u>Maintenance Personnel</u> - Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
Console Operator: When directed, initiate Event 5.		

Op Test No.:	<u>NRC</u>	Scenario #	<u>2</u>	Event #	<u>5</u>	Page	<u>13</u>	of	<u>47</u>
Event Description: Pressurizer Spray Valve 1-PCV-68-340D controller fails, requiring entry into AOI-18, "Malfunction of Pressurizer Pressure Control System," and manual closure of the spray valve.									
Time	Position	Applicant's Actions or Behavior							

<p>Indications:</p> <p>90-B PZR PRESS LO-DEVN BACKUP HTRS ON</p> <p>RCS/PZR pressure dropping slowly on all indicators.</p> <p>Loop 1 Spray valve RED light LIT, when both spray valves should be partially open.</p>		
	RO	Diagnoses and announces failure of 1-PCV-68-340D, LOOP 1 SPRAY VALVE.
	RO	May manually close 1-PCV-68-340D, Loop 1 Spray valve using 1-PIC-68-340D, LOOP 1 SPRAY CONTROL.
	SRO	Enters and directs actions of AOI-18, "Malfunction of Pressurizer Pressure Control System."
<p>EXAMINER: The following actions are taken from AOI-18, Malfunction of Pressurizer Pressure Control System."</p>		
<p style="text-align: center;">NOTE</p> <p>120 AC VITAL PWR BD 1-IV [breaker 2] supplies the plugmold power strip associated with both PZR spray valves and several other instruments required to respond to this event.</p>		
	RO	<p>1. CHECK pressurizer pressure stable or trending to desired pressure:</p> <ul style="list-style-type: none"> • 1-PI-68-340A, • 1-PI-68-334, • 1-PI-68-323, • 1-PI-68-322.
	RO	<p>1. RESPONSE NOT OBTAINED:</p> <p>PLACE pzs master controller 1-PIC-68-340A in MANUAL and RESTORE press to normal.</p>
	RO	<p>2. CHECK 1-XS-68-340D selected to a failed controlling or backup channel.</p>
	RO	<p>2. RESPONSE NOT OBTAINED:</p> <p>IF pzs press is abnormally low THEN **GO TO Step 6</p>
	RO	<p>6. CHECK pzs spray valves CLOSED:</p> <ul style="list-style-type: none"> • Green indicating lights LIT. • Pzs spray demand meters, 1-PIC-68-340B and 1-PIC-68-340D indicating ZERO [1-M-4].
	RO	<p>6. RESPONSE NOT OBTAINED:</p> <p>CLOSE pzs spray valve(s) manually.</p> <p>RO is successful in closing the PZR spray valve in MANUAL so reactor trip and Safety injection are NOT required.</p>

Op Test No.: NRC Scenario # 2 Event # 5 Page 14 of 47

Event Description: Pressurizer Spray Valve 1-PCV-68-340D controller fails, requiring entry into AOI-18, "Malfunction of Pressurizer Pressure Control System," and manual closure of the spray valve.

Time	Position	Applicant's Actions or Behavior
	RO	7. CHECK pzs PORVs CLOSED: • EVALUATE tailpipe temperatures and acoustic monitor.
	RO	8. CHECK pzs Safeties CLOSED: • EVALUATE tailpipe temperatures and acoustic monitor.
	RO	9. ENSURE pzs heaters on as required: • Control Group on at 2220 psig. • Backup Groups on at 2210 psig.
	RO	10. CHECK aux spray, 1-FCV-62-84, CLOSED.
	RO	11. CHECK pzs press STABLE or RISING
	SRO	12. GO TO Step 16.
	RO	16. WHEN pressurizer pressure stable and equipment status supports returned to normal, THEN ENSURE the following in AUTO: • Pzs Master controller, • Pzs spray controllers, • All heater groups.
	SRO	17. REFER TO the following Tech Specs: a. 3.3.1, RTS Instrumentation. Not Applicable. b. 3.3.2, Engineered Safety Feature Actuation System (ESFAS) Instrumentation. Not Applicable. c. 3.3.4, Remote Shutdown System. Not Applicable. d. 3.4.1, RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits. See note below. e. 3.4.3, RCS Pressure and Temperature (P/T) Limits. f. 3.4.9, Pressurizer. Not Applicable. g. 3.4.10, Pressurizer Safety Valves. Not Applicable. h. 3.4.11, Pressurizer Power - Operated Relief Valves. Not Applicable. SRO determines that LCO 3.4.1, RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits was entered during the initial pressure drop, and was exited when pressure rose above 2214 psig. No other Tech Spec entry is required for the failed spray valve.
	SRO	18. INITIATE repairs to failed equipment.
	SRO	19. RETURN TO Instruction in effect.
	CREW	Crew Brief would typically be conducted for this event as time allows prior to the next event.

Op Test No.: NRC Scenario # 2 Event # 5 Page 15 of 47

Event Description: Pressurizer Spray Valve 1-PCV-68-340D controller fails, requiring entry into AOI-18, "Malfunction of Pressurizer Pressure Control System," and manual closure of the spray valve.

Time	Position	Applicant's Actions or Behavior
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	CREW	<p>Notifications should be addressed as applicable if not specifically addressed by the procedure or in the crew brief.</p> <p><u>Operations Management</u> - Typically Shift Manager.</p> <p><u>Maintenance Personnel</u> - Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).</p>
Console Operator: When directed, initiate Event 5.		

Op Test No.: NRC Scenario # 2 Event # 6 Page 16 of 47

Event Description: Anticipated Transient Without Scram, requiring entry into FR-S.1.
 1A and 1B Motor Driven Auxiliary Feedwater Pumps fail to automatically start, requiring manual start. 1-FCV-62-138 fails to open, requiring local operation to begin boration.

Time	Position	Applicant's Actions or Behavior
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Indications:

78-D ONE LOOP FLOW LO (First Out Alarm)

123-B RCS LOOP 4 FLOW LO

1-FI-68-71A, -71B, -71D LOOP 4 FLOW all dropping.

	RO	Announces the trip of RCP #4, and the Reactor Trip First Out alarm. 78-D.
	RO	Performs IMMEDIATE ACTION of FR-S.1, after attempting to initiate a manual reactor trip from panel 1-M-1 and 1-M-6.
	RO	Announces the ATWS condition.
	RO	Performs IMMEDIATE ACTION of FR-S.1. During rod insertion in MANUAL, the RO may contact multiple AUOs to trip the Rod Drive MG supply breakers; the Rod Drive MG set output breakers and/or the reactor trip breakers locally.
	BOP	Performs IMMEDIATE ACTION of FR-S.1.
	SRO	Enters and directs performance of FR-S.1, "Nuclear Power Generation/ATWS."

EXAMINER: The following steps are from FR-S.1 "Nuclear Power Generation/ATWS."

	RO	1. ENSURE Reactor Trip: <ul style="list-style-type: none"> Reactor trip and bypass breakers OPEN. RPIs at bottom of scale. Neutron flux DROPPING.
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CRITICAL TASK 1

WOG Critical Task List for FR-S.1. C

Insert negative reactivity into the core by at least one of the following methods before completing the immediate-action steps of FR-S.1:

- Insert RCCAs

Reactor trip must be verified to ensure that the only heat being added to the RCS is from decay heat and reactor coolant pump heat. The safeguards systems that protect the plant during accidents are designed assuming that only decay heat and pump heat are being added to the RCS. If the reactor cannot be tripped, then the control rods should be manually inserted into the core in order to decrease reactor power.

CRITICAL TASK 1	RO	1. RESPONSE NOT OBTAINED Manually TRIP reactor. IF reactor will NOT trip, THEN INSERT control rods.
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Op Test No.: NRC Scenario # 2 Event # 6 Page 17 of 47

Event Description: Anticipated Transient Without Scram, requiring entry into FR-S.1.
 1A and 1B Motor Driven Auxiliary Feedwater Pumps fail to automatically start, requiring manual start. 1-FCV-62-138 fails to open, requiring local operation to begin boration.

Time	Position	Applicant's Actions or Behavior
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CRITICAL TASK 2

WOG Critical Task List for FR-S.1, A

Manually trip the main turbine.

The turbine is tripped to prevent an uncontrolled cooldown of the RCS due to steam flow that the turbine would require. For an ATWS event where a loss of normal feedwater has occurred, analyses have shown that a turbine trip is necessary (within 30 seconds) to maintain SG inventory.

CRITICAL TASK 2	BOP	2. ENSURE Turbine Trip: <ul style="list-style-type: none"> • All turbine stop valves CLOSED.
	BOP	3. CHECK AFW pumps operation: a. Both MD AFW pumps RUNNING. b. TD AFW pump RUNNING. c. LCVs in AUTO or controlled in MANUAL.

CRITICAL TASK 3

WOG Critical Task List for FR-S.1, B

Manually start the AFW pumps.

The MD AFW pumps start automatically on an SI signal and SG low level to provide feed to the SGs for decay heat removal. If SG levels drop below the appropriate setpoint, the turbine-driven AFW pump will also automatically start to supplement the MD pumps. The ATWS analyses have shown that actuation of AFW within 60 seconds after the failure to scram provides acceptable results.

CRITICAL TASK 3	BOP	3. RESPONSE NOT OBTAINED: Manually START pumps and open valves as necessary. The 1A and TD AFW Pumps did not automatically start. The BOP must manually start the pumps.
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Op Test No.: NRC Scenario # 2 Event # 6 Page 18 of 47

Event Description: Anticipated Transient Without Scram, requiring entry into FR-S.1.
 1A and 1B Motor Driven Auxiliary Feedwater Pumps fail to automatically start, requiring manual start. 1-FCV-62-138 fails to open, requiring local operation to begin boration.

Time	Position	Applicant's Actions or Behavior
	BOP	<p>4. INITIATE RCS Boration:</p> <ul style="list-style-type: none"> a. ENSURE at least one centrifugal charging pump RUNNING. b. OPEN RWST outlet valves 1-LCV-62-135 and 1-LCV-62-136. c. CLOSE VCT outlet valves 1-LCV-62-132 and 1-LCV-62-133. d. OPEN BIT outlet valves 1-FCV-63-25 and 1-FCV-63-26 e. CHECK BIT flow. f. PLACE BA pumps in FAST speed. g. Throttle OPEN emergency borate valve 1-FCV-62-138 to maintain boric acid flow greater than 35 gpm. g. <u>RESPONSE NOT OBTAINED:</u> <ul style="list-style-type: none"> IF BA flow less than or equal to 35 gpm, THEN: <ul style="list-style-type: none"> • Locally OPEN emergency borate valve 1-FCV-62-138 [blender station el 713], OR • ALIGN manual boration: <ul style="list-style-type: none"> 1) Locally OPEN alternate boration valve 1-ISV-62-929 [blender station el 713]. 2) OPEN blender BA supply 1-FCV-62-140. 3) MONITOR BA flow.
	RO	5. CHECK p2r pressure less than 2335 psig.
	RO	<p>6. VERIFY Cntmt Vent Isolation:(on 1-XX-55-6E and 1-XX-55-6F)</p> <ul style="list-style-type: none"> * Train A GREEN * Train B GREEN
	BOP	<p>7. IF AFW flow established, THEN</p> <ul style="list-style-type: none"> a. PLACE 1-HS-3-45 to LONG CYCLE RECIRC. b. PLACE MFW Bypass Reg Valves in AUTO.
	SRO	8. IF SI actuated OR required, THEN PERFORM Steps 1 through 6 of E-0, Reactor Trip or Safety Injection, as time allows.
	RO	<p>9. ENSURE the following trips:</p> <ul style="list-style-type: none"> a. Reactor Trip.
<p>EXAMINER: The RO may have already dispatched an AUO to open Rod Drive MG set input breakers at 480 V Unit Boards, and an AUO to open Reactor Trip breakers locally while initially inserting the control rods.</p>		
	RO/BOP	<p>9. <u>RESPONSE NOT OBTAINED:</u></p> <ul style="list-style-type: none"> a. DISPATCH operator to locally trip reactor: <ul style="list-style-type: none"> • OPEN reactor trip breakers and MG set output breakers [MG set room]. • OPEN breakers to MG sets [480V unit boards A and B]. b. Turbine Trip.

Op Test No.: NRC Scenario # 2 Event # 6 Page 19 of 47

Event Description: Anticipated Transient Without Scram, requiring entry into FR-S.1.
 1A and 1B Motor Driven Auxiliary Feedwater Pumps fail to automatically start,
 requiring manual start. 1-FCV-62-138 fails to open, requiring local operation to
 begin boration.

Time	Position	Applicant's Actions or Behavior
	RO	10. MAINTAIN rod insertion UNTIL rods fully inserted.
	SRO	11. REFER TO EPIP-1, Emergency Plan Classification Flowchart for ATWS event.
	SRO	12. MONITOR reactor subcriticality: a. CHECK Power range channels less than 5%. b. CHECK Intermediate range startup rate NEGATIVE . c. ** GO TO Step 21.
	RO	21. TERMINATE emergency boration: a. PLACE BA transfer pumps in SLOW speed. b. CLOSE emergency borate valve 1-FCV-62-138. c. IF alternate boration opened, THEN Locally CLOSE 1-ISV-62-929.
NOTE If the reactor is verified to be subcritical, Status Trees may be implemented for other Red or Orange paths		
	SRO	22. IMPLEMENT other Red or Orange paths identified on Status Trees
	SRO	23. IF SI actuated, THEN RETURN TO Instruction in effect.
CAUTION Evaluation of boration requirements should consider subsequent cooldown actions in addition to current conditions.		
	SRO	24. DETERMINE shutdown margin requirements: a. NOTIFY Chemistry to sample RCS. b. REFER TO 1-SI-0-10, Shutdown Margin, OR REACTINW Computer Program. c. INITIATE RCS boration as necessary: • REFER TO SOI-62.02, CVCS BORON Concentration Control. d. INITIATE flushing boric acid piping as necessary: • REFER TO AOI-34, Immediate Boration.
	RO	25. CHECK reactor trip breakers OPEN .
	SRO	26. NOTIFY IMs to check P-4 contacts USING 1-SI-99-4-A and 1-SI-99-4-B, Test of Reactor Trip P-4 ESFAS Interlock.

Op Test No.: NRC Scenario # 2 Event # 6 Page 20 of 47

Event Description: Steam line break inside containment.

Time	Position	Applicant's Actions or Behavior
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EXAMINER: Cue Console Operator to enter Event 9, for the steam line break inside containment at this point.

EXAMINER: The SRO will enter E-0, "Reactor Trip or Safety Injection," at this point.

NOTE 1 Steps 1 thru 4 are **IMMEDIATE ACTION STEPS**.

NOTE 2 Status Trees / SPDS should be monitored when transitioned to another instruction.

	RO	1. ENSURE reactor trip: <ul style="list-style-type: none"> Reactor trip and bypass breakers OPEN. RPIs at bottom of scale. Neutron flux DROPPING.
	BOP	2. ENSURE Turbine Trip: <ul style="list-style-type: none"> All turbine stop valves CLOSED.
	BOP	3. CHECK 6.9 kV shutdown boards: <ul style="list-style-type: none"> At least one board energized from: <ul style="list-style-type: none"> CSST (offsite), OR D/G (blackout).
	RO	4. CHECK SI actuated: <ul style="list-style-type: none"> Any SI annunciator LIT. Both trains SI ACTUATED. <ul style="list-style-type: none"> 1-XX-55-6C 1-XX-55-6D
EXAMINER: Appendices A and B (E-0) are provided on pages 26 through 40.		
	BOP	5. EVALUATE support systems: <ul style="list-style-type: none"> REFER TO Appendices A and B (E-0), Equipment Verification pages 15-28.
	SRO	6. ANNOUNCE reactor trip and safety injection over PA system.
	RO	7. ENSURE secondary heat sink available with either: <ul style="list-style-type: none"> Total AFW flow greater than 410 gpm, OR At least one S/G NR level greater than 29% [39% ADV].
	RO	8. MONITOR RCS temp stable at or trending to 557°F: <ul style="list-style-type: none"> IF any RCP running, THEN MONITOR RCS Loop T-avg trending to 557°F. OR IF NO RCP running, THEN MONITOR RCS Loop T-cold trending to 557°F.

Op Test No.: NRC Scenario # 2 Event # 6 Page 21 of 47

Event Description: Steam line break inside containment.

Time	Position	Applicant's Actions or Behavior
	RO	<p>8. RESPONSE NOT OBTAINED:</p> <p>IF temp less than 557°F, THEN ENSURE steam dumps and S/G PORVs CLOSED.</p> <p>IF cooldown continues, THEN:</p> <ul style="list-style-type: none"> • PLACE steam dump controls OFF. • CONTROL total AFW flow to maintain greater than 410 gpm UNTIL NR level in at least one S/G greater than 29% [39% ADV]. <p>IF cooldown continues after AFW flow is controlled, THEN</p> <ul style="list-style-type: none"> • CLOSE MSIVs. • ENSURE MSIV bypasses CLOSED. <p>IF RCS temp greater than 564°F, THEN ENSURE either steam dumps or S/G PORVs OPEN.</p>
	RO	<p>9. ENSURE excess letdown valves CLOSED:</p> <ul style="list-style-type: none"> • 1-FCV-62-54 • 1-FCV-62-55
	RO	<p>10. CHECK pZR PORVs and block valves:</p> <ul style="list-style-type: none"> a. PZR PORVs CLOSED. b. At least one block valve OPEN.
	RO	<p>11. CHECK pZR safety valves CLOSED:</p> <ul style="list-style-type: none"> • EVALUATE tailpipe temperatures and acoustic monitors.
	RO	<p>12. CHECK pZR sprays CLOSED.</p>
	RO	<p>13. CHECK if RCPs should remain in service:</p> <ul style="list-style-type: none"> a. Phase B signals DARK [MISSP]. b. RCS pressure greater than 1500 psig.
	RO	<p>14. CHECK S/G pressures:</p> <ul style="list-style-type: none"> • All S/G pressures controlled or rising. • All S/G pressures greater than 120 psig.
	SRO	<p>14. RESPONSE NOT OBTAINED:</p> <p>IF S/G pressure low OR dropping uncontrolled, THEN GO TO E-2, Faulted Steam Generator Isolation.</p>
EXAMINER: The SRO will enter E-2, "Faulted Steam Generator Isolation," at this point.		
CAUTION If a faulted S/G is NOT needed for RCS cooldown, it should remain isolated during subsequent recovery actions.		
	BOP	<p>1. ENSURE all MSIVs and MSIV bypasses CLOSED.</p>

Op Test No.: NRC Scenario # 2 Event # 6 Page 22 of 47

Event Description: Steam line break inside containment.

Time	Position	Applicant's Actions or Behavior
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NOTE If it is known that a steam leak exists in the Turbine building, the following step should not be performed until the affected steam header is depressurized.

	BOP	2. PLACE steam dump controls OFF: <ul style="list-style-type: none"> • 1-HS-1-103A, STEAM DUMP FSV "A". • 1-HS-1-103B, STEAM DUMP FSV "B".
	BOP	3. CHECK for at least one Intact S/G: <ul style="list-style-type: none"> • Any S/G pressure controlled or rising, OR <ul style="list-style-type: none"> • Any S/G pressure greater than P-sat for RCS incore temperature.
	BOP	4. IDENTIFY Faulted S/G based on ANY of the following: <ul style="list-style-type: none"> • Any S/G pressure dropping in an uncontrolled manner, OR • Any S/G pressure less than 120 psig, OR • S/G enclosure temps high: <ol style="list-style-type: none"> 1) T1002A for 2 and 3, 2) T1003A for 1 and 4. OR <ul style="list-style-type: none"> • Local indication of break in any of the following: <ol style="list-style-type: none"> 1) Main steam lines, 2) Main feedwater lines, 3) Other secondary piping

CAUTION • If the turbine-driven AFW pump is the only available source of feed flow, steam supply to the turbine-driven AFW pump must be maintained from one SG.

• RCS cooldown requires the availability of at least one S/G.

CRITICAL TASK 4

WOG Critical Task List for E-2, A

Isolate the faulted SG before transition out of E-2.

Isolation of the feedwater to the faulted SG maximizes the cooldown capability of the non-faulted loops following a feedline break and minimizes the RCS cooldown and mass and energy release following a steamline break. Isolation of steam paths from the faulted SG also minimizes the RCS cooldown and mass and energy release to containment. In addition, isolation of these steam paths could isolate the break.

Op Test No.: NRC Scenario # 2 Event # 6 Page 23 of 47

Event Description: Steam line break inside containment.

Time	Position	Applicant's Actions or Behavior
CRITICAL TASK 4	BOP	<p>5. ISOLATE Faulted S/G:</p> <p>a. ISOLATE AFW flow to Faulted S/G.</p> <p>b. ENSURE MFW ISOLATED to Faulted S/G:</p> <ul style="list-style-type: none"> • MFW isolation and bypass isolation valves CLOSED. • MFW reg and bypass reg valves CLOSED. • MFPs TRIPPED. <p>c. ENSURE Faulted S/G PORV CLOSED.</p> <p>d. ENSURE Faulted S/G blowdown ISOLATED.</p>
	BOP	6. ENSURE TD AFW pump being supplied from Intact S/G.
	BOP	7. MONITOR CST volume greater than 200,000 gal.
	RO	<p>8. WHEN RCS temperature is stable or rising following Faulted S/G blowdown, THEN ADJUST Intact S/G PORV controllers in AUTO to:</p> <ul style="list-style-type: none"> • P-sat for the highest RCS temp (one or more RCPs running) <p>OR</p> <ul style="list-style-type: none"> • P-sat for the highest T-cold temp (no RCPs running)
	SRO	<p>9. CHECK secondary side radiation:</p> <ul style="list-style-type: none"> • S/G discharge monitors NORMAL. • Condenser vacuum exhaust rad monitors NORMAL. • S/G blowdown rad monitor recorders NORMAL trend prior to isolation. • S/G sample results by Chemistry.
	SRO	<p>10. CHECK SI termination criteria:</p> <p>a. CHECK RCS subcooling greater than 65°F [85°F ADV].</p> <p>b. CHECK secondary heat sink available with either:</p> <ul style="list-style-type: none"> • Total feed flow to Intact S/Gs greater than 410 gpm, <p>OR</p> <ul style="list-style-type: none"> • At least one Intact S/G NR level greater than 29% [39% ADV]. <p>c. CHECK RCS pressure stable or rising.</p> <p>d. CHECK pwr level greater than 15% [33% ADV].</p> <p>e. GO TO ES-1.1, SI Termination.</p>

Op Test No.: NRC Scenario # 2 Event # 6 Page 24 of 47

Event Description: Steam line break inside containment.

Time	Position	Applicant's Actions or Behavior
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EXAMINER: It is possible that the crew will get to step 10 of E-2, "Faulted Steam Generator Isolation," and determine that RCS pressure is not stable or rising. If this is the case then the crew will transition to E-1, "Loss of Reactor or Secondary Coolant. If the transition to E-1 is made, then the following steps are applicable.

If conditions do allow transition to ES-1.1 without a transition to E-1, then terminate the scenario when ES-1.1 is entered.

	RO	c. RESPONSE NOT OBTAINED: ** GO TO Step 11.
	SRO	11. GO TO E-1, Loss of Reactor or Secondary Coolant.
EXAMINER: The following actions are taken from E-1, "Loss of Reactor or Secondary Coolant."		
NOTE		
Seal injection flow should be maintained to all RCPs.		
	SRO	1. CHECK if RCPs should remain in service: a. Phase B DARK [MISSP]. b. RCS pressure greater than 1500 psig.
	SRO	2. REFER TO EPIP-1, Emergency Plan Classification Flowchart.
NOTE Time since initiation of event is defined by performance of Step 3.		
	RO	3. RECORD current time to mark initiation of LOCA and determination of time for hot leg recirc.
		4. CHECK S/G pressures: • All S/G pressures controlled or rising. • All S/Gs pressures greater than 120 psig.
		5. MAINTAIN Intact S/G NR levels: a. MONITOR levels greater than 29% [39% ADV]. b. CONTROL intact S/G levels between 29% and 50% [39% and 50% ADV].
		6. CHECK secondary radiation: • S/G discharge monitors NORMAL. • Condenser vacuum exhaust rad monitors NORMAL. • S/G blowdown rad monitor recorders NORMAL trend prior to isolation.

Op Test No.: NRC Scenario # 2 Event # 6 Page 25 of 47

Event Description: Steam line break inside containment.

Time	Position	Applicant's Actions or Behavior
		<p>7. ENSURE cntmt hydrogen analyzers in service:</p> <ul style="list-style-type: none"> • PLACE 1-HS-43-200A in ANALYZE [M-10]. • PLACE 1-HS-43-210A in ANALYZE [M-10]. • CHECK low flow lights not lit [M-10]. • Locally CHECK low analyzer temp lights NOT lit [North wall of Train A 480V SD Bd rm].
		<p>8. MONITOR pZR PORVs and block valves:</p> <ul style="list-style-type: none"> a. PZR PORVs CLOSED. b. At least one block valve OPEN.
		<p>9. DETERMINE if cntmt spray should be stopped:</p> <ul style="list-style-type: none"> a. MONITOR cntmt pressure less than 2.0 psig. b. CHECK at least one cntmt spray pump RUNNING. c. RESET cntmt spray signal. d. STOP cntmt spray pumps, and PLACE in A-AUTO. e. CLOSE cntmt spray discharge valves 1-FCV-72-2 and 1-FCV-72-39.
		<p>10. ENSURE both pocket sump pumps STOPPED [M-15]:</p> <ul style="list-style-type: none"> • 1-HS-77-410. • 1-HS-77-411.
		<p>11. CHECK SI termination criteria:</p> <ul style="list-style-type: none"> a. CHECK RCS subcooling greater than 65°F [85°F ADV]. b. CHECK secondary heat sink available with either: <ul style="list-style-type: none"> • Total feed flow to Intact S/Gs greater than 410 gpm, OR • At least one Intact S/G NR level greater than 29% [39% ADV]. c. CHECK RCS pressure stable or rising. d. CHECK pZR level greater than 15% [33% ADV]. e. ** GO TO ES-1.1, SI Termination.
<p>EXAMINER: When the transition is made to ES-1.1, "SI Termination," inform the crew that a relief crew will continue from this point.</p>		
<p align="center">END OF SCENARIO</p>		

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A
(E-0)

Page 1 of 10

EQUIPMENT VERIFICATION

1. **ENSURE** PCBs OPEN: **OPEN** manually.
 - PCB 5084.
 - PCB 5088.

2. **ENSURE** AFW pump operation: **ESTABLISH** at least one train AFW operation.
 - Both MD AFW pumps RUNNING.
 - TD AFW pump RUNNING.
 - LCVs in AUTO, or controlled in MANUAL.

3. **ENSURE** MFW isolation: Manually **CLOSE** valves and **STOP** pumps, as necessary.
 - MFW isolation and bypass isolation valves CLOSED.
 - MFW reg and bypass reg valves CLOSED.
 - MFP A and B TRIPPED.
 - Standby MFP STOPPED.
 - Cond demin pumps TRIPPED.
 - Cond booster pumps TRIPPED.

IF any valves can **NOT** be closed, **THEN** **CLOSE** #1 hoater outlet valves.

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A
(E-0)

Page 2 of 10

EQUIPMENT VERIFICATION

4. **MONITOR ECCS operation:**
- | | |
|---|--|
| a. Charging pumps RUNNING. | a. Manually START charging pumps. |
| b. Charging pump alignment: <ul style="list-style-type: none"> • RWST outlets 1-LCV-62-135 and 1-LCV-62-136 OPEN. • VCT outlets 1-LCV-62-132 and 1-LCV-62-133 CLOSED. • Charging 1-FCV-62-90 and 1-FCV-62-91 CLOSED. | b. ENSURE at least one valve in each set aligned. |
| c. RHR pumps RUNNING. | c. Manually START RHR pumps. |
| d. SI pumps RUNNING. | d. Manually START SI pumps. |
| e. BIT alignment: <ul style="list-style-type: none"> • Outlets 1-FCV-63-25 and 1-FCV-63-26 OPEN. • Flow thru BIT. | e. ENSURE at least one valve aligned, and flow thru BIT. |
| f. RCS pressure greater than 1650 psig. | f. ENSURE SI pump flow.

IF RCS press drops to less than 150 psig,
THEN
ENSURE RHR pump flow. |

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A
(E-0)

Page 3 of 10

EQUIPMENT VERIFICATION

- 5 **CHECK** cntmt isolation:
- a. Phase A isolation:
- Train A GREEN.
 - Train B GREEN.
- b. Cntmt vent isolation:
- Train A GREEN.
 - Train B GREEN.
- ACTUATE** Phase A and Cntmt Vent Isolation signal,
 OR
 Manually **CLOSE** valves and dampers as necessary.

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A (E-0)

Page 4 of 10

EQUIPMENT VERIFICATION

- | | |
|--|---|
| <p>6. CHECK cntmt pressure:</p> <ul style="list-style-type: none"> • Phase B DARK [MISSP]. • Cntmt Spray DARK [MISSP]. • Cntmt press less than 2.8 psig. | <p>PERFORM the following:</p> <ol style="list-style-type: none"> 1) ENSURE Phase B actuated. 2) ENSURE Cntmt Spray actuated. 3) ENSURE cntmt spray pumps running. 4) ENSURE cntmt spray flow. 5) ENSURE Phase B isolation: <ul style="list-style-type: none"> • Train A GREEN. • Train B GREEN • Manually CLOSE valves and dampers as necessary. 6) STOP all RCPs. 7) ENSURE MSIVs and bypasses CLOSED. 8) PLACE steam dump controls OFF. 9) WHEN 10 minutes has elapsed since Phase B actuated,
THEN
ENSURE air return fans start. 10) USE adverse cntmt [ADV] setpoints where provided. |
|--|---|

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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**APPENDIX A
(E-0)**

Page 5 of 10

EQUIPMENT VERIFICATION

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|---|---|
| <p>7. CHECK plant radiation NORMAL:</p> <ul style="list-style-type: none"> • S/G blowdown rad recorder 1-RR-90-120 NORMAL prior to isolation [M-12]. • Condenser vacuum exhaust rad recorder 1-RR-90-119 NORMAL prior to trip [M-12]. • 1-RR-90-106 and 1-RR-90-112 radiation recorders NORMAL prior to isolation [M-12]. • S/G main steamline discharge monitors NORMAL [M-30]. • Upper and Lower containment high range monitors NORMAL [M-30]. • NOTIFY Unit Supervisor conditions NORMAL. | <p>NOTIFY Unit Supervisor IMMEDIATELY.</p> |
| <p>8 ENSURE all D/Gs RUNNING.</p> | <p>EMERGENCY START D/Gs</p> |

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A
(E-0)

Page 6 of 10

EQUIPMENT VERIFICATION

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|---|---|
| <p>9. ENSURE ABGTS operation:</p> <p>a. ABGTS fans RUNNING.</p> <p>b. ABGTS dampers OPEN:</p> <ul style="list-style-type: none"> • FCO-30-146A. • FCO-30-146B. • FCO-30-157A. • FCO-30-157B. | <p>a. Manually START fans.</p> <p>b. Locally OPEN dampers.</p> |
| <p>10. ENSURE at least four ERCW pumps RUNNING, one on each shutdown board preferred.</p> | <p>Manually START pumps as necessary.</p> |
| <p>11. ENSURE ERCW supply valves OPEN to running D/Gs.</p> | <p>IF ERCW can NOT be aligned to running D/G,
THEN
EMERGENCY STOP affected D/G.</p> |
| <p>12. ENSURE CCS HX C ALT DISCH TO HDR B, 0-FCV-67-152, is open to position A.</p> | <p>Manually OPEN 0-FCV-67-152 to position A.</p> |

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A (E-0)

Page 7 of 10

EQUIPMENT VERIFICATION

13. **CLOSE** CCS HX C
DISCH TO HDR A,
0-FCV-67-144.

14. **MONITOR** EGTS operation:
 - ECTS fans RUNNING.
 - **ENSURE** dampers OPEN
VERIFY filter bank dp between
5 and 9 inches of water.

Manually **START** fans **OPEN**
dampers.

15. **ENSURE** CCS pumps RUNNING:
 - 1A-A CCS pump.
 - 1B-B CCS pump.
 - C-S OR 2B-B CCS pump.

Manually **START** pumps as
necessary.

- NOTE**
 - The Upper and Lower Cntmt rad monitors sampling pumps should be shutdown if the sample flowpath is isolated.
 - The following equipment is located on 1-M-9.

16. **CHECK** CNTMT PURGE fans
STOPPED:

STOP fans and
PLACE handswitch in
PULL-TO-LOCK.

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A
(E-0)

Page 8 of 10

EQUIPMENT VERIFICATION

17. **CHECK** FUEL HANDLING EXH fans STOPPED, Fuel and Cask loading dampers CLOSED: **STOP** fans and **PLACE** handswitch in FULL-TO-LOCK, manually **CLOSE** dampers.

18. **ENSURE** AB GEN SUPPLY and EXH fans STOPPED. **STOP** fans and **PLACE** handswitch in PULL-TO-LOCK.

NOTE • Dampers 1-HS-30-158 and 2-HS-30-270 remain open during ABL.

19. **ENSURE** AB GEN SUP & EXH dampers CLOSED. Manually **CLOSE** dampers.

20. **ENSURE** MCR & SPREAD RM FRESH AIR dampers CLOSED: Manually **CLOSE** dampers.
- FCV-31-3.
 - FCV-31-4.

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A
(E-0)

Page 9 of 10

EQUIPMENT VERIFICATION

21. **ENSURE** at least one CB EMER CLEANUP fan RUNNING and associated damper OPEN:
- CB EMERG CLEANUP FAN A-A,
OR
Fan B-B RUNNING.
 - FCO-31-8, OPEN.
OR
FCO-31-7, OPEN.
- Manually **START** fan.
- NOTIFY** TSC if at least one damper NOT OPEN.
-
22. **ENSURE** at least one CB EMER PRESS fan RUNNING and associated damper OPEN:
- CB EMERG PRESS FAN A-A,
OR
FAN B-B RUNNING.
 - FCO-31-6, OPEN.
OR
FCO-31-5, OPEN.
- Manually **START** fan.
- NOTIFY** TSC if at least one damper NOT OPEN.

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A
(E-0)

Page 10 of 10

EQUIPMENT VERIFICATION

23. **ENSURE** Control Building fans
STOPPED and dampers CLOSED:
- SPREADING ROOM SUPPLY and
EXH FANS AND dampers.
 - TOILET & LKR RM EXHAUST FAN
AND dampers.
- Manually **STOP** fans.
- NOTIFY** TSC if any
damper NOT CLOSED.
24. **INITIATE** Appendix B.

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX B

(E-0)

Page 1 of 1

PHASE B PIPE BREAK CONTINGENCIES

- | | |
|---|--|
| 1. CHECK PHASE B actuated.
(MISSP - 1-XX-55-6C, -6D) | WHEN PHASE B actuation occurs;
THEN
GO TO step 2. |
| 2. ENSURE 1-FCV-32-110 CLOSED.
(CISP - 1-XX-55-6E)
[A-train, window 13] | DISPATCH AUO to perform
ATTACHMENT B1. |
| 3. ENSURE 1-FCV-67-107 CLOSED.
(CISP - 1-XX-55-6E)
[A -train, window 43] | DISPATCH AUO to perform
ATTACHMENT B2. |
| 4. ENSURE 1-FCV-70-92 CLOSED.
(CISP - 1-XX-55-6E)
[A -train, window 73] | DISPATCH AUO to perform
ATTACHMENT B3. |
| 5. ENSURE 1-FCV-70-140 CLOSED.
(CISP - 1-XX-55-6F)
[B -train, window 74] | DISPATCH AUO to perform
ATTACHMENT B4. |

WEN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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ATTACHMENT B1

(E 0)

Page 1 of 1

CONTROL AIR ISOLATION

1. **CLOSE** 0-ISV-32-1013 - CONTROL AIR EL 713 AB HDR ISOL
[A6/S EL. 713] (chain operated - behind Fuel and Waste Handling Bd. A).
2. **IF** 0-ISV-32-1013 CANNOT BE CLOSED,
THEN

OPEN and DISCONNECT C&SS air compressor breakers:
 - a) 0-BKR-32-25 - 480V SD ED 1A2-A, C/3D
 - b) 0-BKR-32-26 - 480V SD ED 1B1-B, C/3D
 - c) 0-BKR-32-27 - 480V AUX BLDG COM BD, C/6C
 - d) 0-BKR-32-1900A - 480V TURB BLDG COM BD, C/6C

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rcv 28
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ATTACHMENT B2

(E-0)

Page 1 of 1

ERCW ISOLATION

1. **UNLOCK AND CLOSE** 1-ISV-67-523B - LOWER CNTMT VENT CLR 1D &1D
ERCW SUP ISOL [A2U/692] (U-1 penetration room - North of AB Pipe Chase
Cooler 1B-B in overhead)

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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ATTACHMENT B3

(E-0)

Page 1 of 1

CCS RETURN ISOLATION

1. **CLOSE** 1-ISV-70-700 RCP OIL COOLER CCS RETURN ISOLATION
[A4/V EL. 710 U-1 Penetration Room] (approximately 10 ft. North of Penetration
Room Cooler 1B-B on mezzanine above RHR Sump Valve Room)

ATTACHMENT B4

(E-0)

Page 1 of 1

CCS SUPPLY ISOLATION

1. **CLOSE** 1-ISV-70-516 REACTOR BUILDING CCS SUPPLY ISOLATION
[A6/T EL. 737] (Behind Elevator approximately 2 ft. west on mezzanine above
"A" CCS Heat Exchanger)

SHIFT TURNOVER CHECKLIST

Page 1 of 2

SHIFT TURNOVER CHECKLIST			
		Page _____ of _____	
<input type="checkbox"/> SM <input checked="" type="checkbox"/> US/MCR <input type="checkbox"/> UO <input type="checkbox"/> AUO <input type="checkbox"/> STA (STA Function)	Unit _____ Unit _____ Station _____		Off-going - Name _____ On-coming - Name _____
Part 1 - Completed by off-going shift/Reviewed by on-coming shift:			
<ul style="list-style-type: none"> • Abnormal equipment lineup/conditions: 1B MD AFW pump out-of-service for pump bearing replacement. Expected return to service in 18 hours. Tech Spec LCO 3.7.5 Action B was entered 6 hours ago. _____ _____ • SI/Test in progress/planned: (including need for new brief) _____ _____ _____ _____ • Major Activities/Procedures in progress/planned: 100% power, MOL. RCS boron is 747 ppm. Control Bank D is at 220 steps. Train B/Channel II Work Week. 1B MFP turbine and pump vibration alarms 53-D and 54-D are currently lit and Operations Management has directed a plant shutdown to 75% using AOI-39 at 2%/minute to remove the MFP from service. Operations Management has established threshold values of 10 mils vibration on either the pump or turbine as 1B MFP trip criteria. _____ _____ • Radiological changes in plant during shift: None planned _____ _____ _____ 			
Part 2 - Performed by on-coming shift			
<div style="display: flex; flex-wrap: wrap;"> <div style="width: 50%;"> <input type="checkbox"/> A review of the Operating Log since last held shift or 3 days, whichever is less. </div> <div style="width: 50%;"> <input type="checkbox"/> A review of the Rounds sheets/Abnormal readings (AUOs only) </div> </div> <p>Review the following for changes since last shift turnover:</p> <div style="display: flex; flex-wrap: wrap;"> <div style="width: 33%;"> <input type="checkbox"/> Standing Orders </div> <div style="width: 33%;"> <input type="checkbox"/> LCO(s) in actions (N/A for AUOs) </div> <div style="width: 33%;"> <input type="checkbox"/> PER review (N/A for AUOs) </div> <div style="width: 33%;"> <input type="checkbox"/> TACFs (N/A for AUOs) </div> <div style="width: 33%;"> <input type="checkbox"/> Operator workarounds, burdens </div> <div style="width: 33%;"> <input type="checkbox"/> Immediate required reading. </div> </div> <p style="text-align: center;">and other challenges</p>			
Part 3 - Performed by both off-going and on-coming shift			
<input type="checkbox"/> A walkdown of the MCR control boards (N/A for AUOs)			
Relief Time: _____		Relief Date: _____	

SHIFT TURNOVER CHECKLIST

Page 2 of 2

SHIFT TURNOVER CHECKLIST			
<input type="checkbox"/> SM <input type="checkbox"/> US/MCR Unit _____ <input checked="" type="checkbox"/> UO Unit _____ <input type="checkbox"/> AUO Station _____ <input type="checkbox"/> STA (STA Function) _____		Page ____ of ____ Off-going - Name _____ On-coming - Name _____	
Part 1 - Completed by off-going shift/Reviewed by on-coming shift:			
<ul style="list-style-type: none"> • Abnormal equipment lineup/conditions: 1B MD AFW pump out-of-service for pump bearing replacement. Expected return to service in 18 hours. Tech Spec LCO 3.7.5 Action B was entered 6 hours ago. _____ _____ _____ • SI/Test in progress/planned: (including need for new brief) _____ _____ _____ • Major Activities/Procedures in progress/planned: 100% power, MOL. RCS boron is 747 ppm. Control Bank D is at 220 steps. Train B/Channel II Work Week. 1B MFP turbine and pump vibration alarms 53-D and 54-D are currently lit and Operations Management has directed a plant shutdown to 75% using AOI-39 at 2%/minute to remove the MFP from service. Operations Management has established threshold values of 10 mils vibration on either the pump or turbine as 1B MFP trip criteria. _____ _____ • Radiological changes in plant during shift: _____ _____ _____ 			
Part 2 - Performed by on-coming shift			
<input type="checkbox"/> A review of the Operating Log since last held shift or 3 days, whichever is less. <input type="checkbox"/> A review of the Rounds sheets/Abnormal readings (AUOs only) Review the following for changes since last shift turnover: <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div> <input type="checkbox"/> Standing Orders <input type="checkbox"/> LCO(s) in actions (N/A for AUOs) </div> <div> <input type="checkbox"/> PER review (N/A for AUOs) </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div> <input type="checkbox"/> TACFs (N/A for AUOs) <input type="checkbox"/> Operator workarounds, burdens and other challenges </div> <div> <input type="checkbox"/> Immediate required reading. </div> </div>			
Part 3 - Performed by both off-going and on-coming shift			
<input type="checkbox"/> A walkdown of the MCR control boards (N/A for AUOs) <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div>Relief Time: _____</div> <div>Relief Date: _____</div> </div>			

Facility:	Watts Bar NRC Exam 1 August 2010	Scenario No.: 3	Op Test No.: 1
Examiners:	_____	Operators:	SRO
	_____		RO
	_____		BOP
Initial Conditions: Power is stable at 1.66 x 10 ⁻⁴ % power Source range channels have been blocked (P-6). RCS boron concentration is 1620 ppm; Control Bank D is at 100 Steps.			
Turnover: Continue with reactor startup using GO-2, "Reactor Startup," to 1-2% power and then start the 1A main feedwater pump. Train A/Channel I Work Week.			
Event No.	Malf. No.	Event Type*	Event Description
1	n/a	N-BOP R-RO	Raise power to 1-2%, stabilize power and start 1A main feedwater pump.
2	cc10a cc11c	C-BOP	Component Cooling System 1A leak, 1-LCV-70-63, Surge Tank Makeup valve fails to open. Requires entry into AOI-15, "Loss of Component Cooling (CCS)."
3	lic-3-146csp	C-BOP TS-SRO	1-LIC-3-164 setpoint fails high, causing 1-LCV-3-164 to open, and SG 1 level to rise. Requires manual control 1-LCV-3-164. Requires a Tech Spec evaluation.
4	ni04b 0	I-RO TS-SRO	Intermediate range channel N136 fails low. Requires entry into AOI-4, "Nuclear Instrumentation Malfunctions." Requires Tech Spec evaluation.
5	lic-68-339	C-RO	1-LIC-68-339, CHARG FLOW/PZR LEVEL CONTROL, output signal fails. Requires manual control of 1-FCV-62-93. Requires entry into AOI-20, "Malfunction of Pressurizer Level Control System."
6	th03c 15	C-RO	RCS leak occurs, requiring entry into AOI-6, "Small Reactor Coolant System Leak." Leak progresses, requiring reactor trip and safety injection.
7	th02c 80	M-All	Large loss-of-coolant-accident occurs. Requires entry into E-0, E-1, and a transition to ES-1.3.
8	si08c si08d	C-BOP	1A-A and 1B-B safety injection pumps fail to start automatically on the safety injection signal.
9	rh02 hs-63-72 close hs-63-73 close	I-RO	Automatic sump swapover fails to actuate. Attempts to manually position RHR pump suction valves from the containment sump are unsuccessful. Requires entry into ECA-1.1
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Scenario 3 - Summary

Initial Condition Power is stable at 1.66 x 10⁻⁴% power. Source range channels have been blocked (P-6). RCS boron concentration is 1620 ppm; Control Bank D is at 100 Steps.

Turnover Continue with reactor startup using GO-2, "Reactor Startup," to 1-2% power and then start the 1A main feedwater pump. Train A/Channel I Work Week.

- Event 1** Raise power to 1-2%, stabilize power and start 1A main feedwater pump.
- Event 2** After power is stabilized at 1 x 10⁻² % to log critical data, a drain valve is found leaking through on Component Cooling System 1A header causing CCS surge tank level to drop. 1-LCV-70-63, Surge Tank Makeup valve fails to open at the appropriate level. The BOP responds by reporting the level loss, and manually opening 1-LCV-70-63. The SRO enters and directs actions of AOI-15, "Loss of Component Cooling (CCS)."
- Event 3** 1-LIC-3-164 setpoint fails high, causing 1-LCV-3-164 to open, and SG 1 level to rise. BOP responds to 63-F, SG LEVEL DEVIATION, places 1-LCV-3-164 in manual and controls SG 1 level manually.
- Event 4** Intermediate range channel N136 fails low. The RO announces the failure to the crew. The SRO enters and directs actions of AOI-4, "Nuclear Instrumentation Malfunctions." The SRO enters Tech Spec LCO 3.3.1, Reactor Trip System (RTS) Instrumentation, Function 4, Condition F; 3.3.3, Post Accident Monitoring (PAM) Instrumentation, Function 1, Condition A.
- Event 5** 1-LIC-68-339, CHARG FLOW/PZR LEVEL CONTROL, output signal fails. The output signal failure causes 1-HIC-62-93A to close. The RO must take manual control of 1-FCV-62-93 to restore charging and seal injection flows to normal. The SRO enters and directs actions of AOI-20, "Malfunction of Pressurizer Level Control System."
- Event 6** A leak develops on the reactor coolant system. The RO diagnoses the RCS leak and announces it to the crew. RO may increase charging flow in response to PZR level dropping. The SRO enters and directs the actions of AOI-6, "Small Reactor Coolant System Leak." The SRO enters Tech Spec LCO 3.4.13, RCS Operational Leakage, Condition A. After letdown and charging are isolated by AOI-6, the leak progresses, requiring reactor trip and safety injection.
- Event 7** Large loss-of-coolant-accident occurs. The SRO enters and directs the actions of E-0, "Reactor Trip or Safety Injection," transitions to E-1, "Loss of Reactor or Secondary Coolant and then transitions to ES-1.3, "Transfer to Containment Sump."
- Event 8** 1A-A and 1B-B safety injection pumps fail to start automatically on the safety injection signal. Requires manual start of both pumps.
- Event 9** Automatic sump swapover fails to actuate. Attempts to manually position RHR pump suction valves from the containment sump are unsuccessful. The SRO enters and directs the actions of ECA-1.1, "Loss of RHR Sump Recirculation."

Scenario 3 - Critical Task Summary

<i>Critical Task 1 From WOG Critical Task List for E-0, Item J.</i>	<i>Establish flow from at least one intermediate head ECCS pump before transition out of E-0, "Reactor Trip or Safety Injection."</i> <i>SI provides makeup inventory to the RCS for cooling of the core during accident conditions. Since SI is actuated, all SI pumps have a start signal and the operator should verify that they are running.</i>
<i>Critical Task 2 From WOG Critical Task List for ECA-1.1, Item B.</i>	<i>Make up to the RWST and minimize RWST outflow.</i> <i>Makeup is added to the RWST to extend the time the SI pumps and containment spray pumps (if operating) can take suction from the RWST and provide core cooling to the RCS.</i> <ul style="list-style-type: none">• <i>Containment spray will initially be reduced to conserve RWST level (ECA-1.1 Step 4).</i>• <i>Containment spray will be aligned to recirculate the Containment Sump to the RWST.</i>

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 3
Simulator Console Operators Instructions

SIMULATOR SETUP INFORMATION

1. ENSURE NRC Examination Security has been established.
2. RESET to Initial Condition 343 by performing the following actions:
 - a. Select ICManager on the THUNDERBAR menu (right hand side of Instructor Console Screen).
 - b. Locate IC# 343.
 - c. Right "click" on IC# 343.
 - d. Select Reset on the drop down menu.
 - e. Right "click" on RESET.
 - f. Enter the password for IC 343.
 - g. Select "Yes" on the INITIAL CONDITION RESET pop-up window.
 - h. Perform SWITCH CHECK.
3. SELECT Director on the THUNDERBAR menu (right hand side of Instructor Console Screen).
4. ENSURE the following information appears on the Director Screen:

Key	Description	Type	Event	Delay	Inserted	Ramp	Initial	Final	Value
hs-63-73a	hs-63-73a rhr pump b-b suction from control sump s	O		00:00:00		00:00:00		close	00:00:00
si08c	failure of auto si and blackout signals sip 1a-a	M		00:00:00		00:00:00		Active	Active
si08d	failure of auto si and blackout signals sip 1b-b	M		00:00:00		00:00:00		Active	Active
hs-63-72a	hs-63-72a rhr pump a-a suction from control sump s	O		00:00:00		00:00:00		close	00:00:00
rh02	failure of auto transfer to containment sump	M		00:00:00		00:00:00		Active	InActive
cc19	failure of auto open signal for fcv-70-63	O		00:00:00		00:00:00		Active	Active

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 3
Simulator Console Operators Instructions

SIMULATOR SETUP INFORMATION

Key	Description	Type	Event	Delay	Inserted	Ramp	Initial	Final	Value
cc10a	ccs pump 1a-a disch hdr line break	M	2	00:00:00		00:00:00		3.75	0
lic-3-164csp	03950 sg 1 remote level cntlr	O	3	00:00:00		00:00:00		0	31.55857
ni04b	ir channel failure ir chnl 2	M	4	00:00:00		00:00:00		0	0.000185..
lic-68-339	lic-68-339 pressurizer level controller lic-68-339	O	6	00:00:00		00:00:00		1	3
th03c	loca – small leak loop 3	M	7	00:00:00		00:00:00		1.75	0
th02c	loca – cold leg loop 3	M	8	00:00:00		00:00:00		80	0

6. Place simulator in RUN and acknowledge any alarms.
7. ENSURE the “Train A Week - Channel I” sign is placed on 1-M-30.
8. Place simulator in FREEZE.
9. ENSURE Reactivity Plan for the continuation of the startup is available to the crew.

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 3
Simulator Console Operators Instructions

Exam Event No.	Simulator Event No.	Description/Role Play
1	n/a	Raise power to 1-2%, stabilize power and start 1A main feedwater pump. ROLE PLAY: If contacted as Reactor Engineer, state that Mode 2 physics testing is NOT required.
2	2	Drain valve leak on the suction of the 1B CCS pump, causing CCS surge tank level to drop. 1-LCV-70-63, Surge Tank Makeup valve fails to open at the appropriate level. ROLE PLAY: When dispatched as the Auxiliary Building AUO, acknowledge request. Wait 10 minutes and report that there is leakage from a drain valve on the suction of the 1B-B CCS pump. The drain valve is now isolated. ROLE PLAY: When requested, report that there is no apparent cause for 1-LCV-70-63 failing to open on low level. ROLE PLAY: As Work Control, acknowledge report, and state that a package will be prepared to troubleshoot and repair the leaking drain valve and 1-LCV-70-63 instrument loop. ROLE PLAY: When contacted as the Auxiliary Building AUO, report that the Demin Water Storage Tank level has dropped. If requested, state that makeup to the Demin Water Storage Tank will be started as soon as a copy of SOI-59.01 is located.
3	3	1-LIC-3-164 setpoint fails high, causing 1-LCV-3-164 to open, and SG 1 level to rise. ROLE PLAY: As Work Control, acknowledge report, and state that a package will be prepared to troubleshoot and repair 1-LCV-3-164 automatic control loop.
4	4	Intermediate range channel N136 fails low. ROLE PLAY: As Work Control, acknowledge report, and state that a package to troubleshoot and repair the Intermediate Range Channel N136 will be prepared. ROLE PLAY: As the Shift Manager, state that you will contact the Operations Duty Manager and Reactor Engineering concerning the failure of Intermediate Range N136.
5	5	1-LIC-68-339, CHRG FLOW/PZR LEVEL CONTROL output fails, causing a close signal to 1-HIC-62-93A ROLE PLAY: As Work Control, acknowledge report, and state that a package to troubleshoot and repair 1-LIC-68-339.

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 3
Simulator Console Operators Instructions

Exam Event No.	Simulator Event No.	Description/Role Play
6	6	RCS leak occurs, requiring entry into AOI-6, "Small Reactor Coolant System Leak." ROLE PLAY: None.
7	19	<p>Large loss-of-coolant-accident occurs after the reactor is tripped.</p> <p>ROLE PLAY: <i>When requested, acknowledge the request to shutdown the Upper and Lower Containment Radiation monitors sampling pumps.</i></p> <p>ROLE PLAY: <i>When requested, acknowledge the need to perform E-1 Appendix A, B, C and D. Use remote function sir01 to complete E-1 Appendix A (place power on CLA outlet valves). Use remote sir14 to complete E-1 Appendix C (place power on 1-FCV-63-1. Use remote function sir06 to complete E-1 Appendix D (place power on 1-FCV-63-22). After remote functions are entered, report that the Appendices are complete.</i></p> <p>ROLE PLAY: <i>When contacted as Chemistry, acknowledge request to sample steam generators for activity.</i></p> <p>ROLE PLAY: <i>When contacted as Radiation Protection, acknowledge request to survey steam lines and blowdown lines.</i></p> <p>ROLE PLAY: <i>When contacted as the Auxiliary Building AUO, acknowledge the request to check low analyzer temperature lights. Report back that the lights are NOT LIT.</i></p>
8	none	<p>1A-A and 1B-B safety injection pumps fail to start automatically on the safety injection signal.</p> <p>ROLE PLAY: <i>If contacted as the Control Building AUO, report that there are no relays made up for either of the SI pumps.</i></p>

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 3
Simulator Console Operators Instructions

Exam Event No.	Simulator Event No.	Description/Role Play
9	none	<p>Automatic sump swapover fails to actuate and 1-FCV-63-72 and 1-FCV-63-73 fail to open manually.</p> <p>ROLE PLAY: As Work Control, acknowledge report, and state that a package to troubleshoot and repair the automatic sump swapover circuit is being prepared.</p> <p>ROLE PLAY: When dispatched to open 1-FCV-63-72, as the Auxiliary Building AUO, report that Radiation Protection is with you and the vault covers have been removed. 1-FCV-63-72 will not open.</p> <p>ROLE PLAY: When dispatched to open 1-FCV-63-73, as the Auxiliary Building AUO, report that Radiation Protection is with you and the vault covers have been removed. 1-FCV-63-73 will not open.</p> <p>ROLE PLAY: Inform the crew that the TSC has been manned when RWST level reaches 34%. When contacted as the Technical Support Center (TSC) report that the method for transferring water to the RWST will require alignment of the containment spray to the RWST via the recirculation lines. Perform ECA-1.1, Appendix C for Train A of the containment spray system. When requested use remote csr07 to open 1-ISV-72-502, and remote csr02 to open 1-ISV-72-503.</p>

WBN	LOSS OF RHR SUMP RECIRCULATION	ECA-1.1 Rev 11
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APPENDIX C
(ECA-1.1)
Page 1 of 2

CNTMT SPRAY RECIRC TO RWST ALIGNMENT
(TRAIN A)

1. IF Train A cntmt spray is to be aligned to recirc to RWST,
THEN
PERFORM the following:
 - a. NOTIFY RADPROT of RWST alignment.
 - b. RESET Cntmt Spray signal.
 - c. PLACE cntmt spray pump A in PULL-TO-LOCK.
 - d. CLOSE 1-FCV-72-22, RWST TO CS PMP A SUCTION.
 - e. CLOSE 1-FCV-72-39, CNTMT SPRAY HDR A TO CNTMT.
 - f. PLACE ERCW on Train A CS Heat Exchanger per Appendix B.
 - g. OPEN 1-ISV-72-502, CNTMT SPRAY TEST LINE ISOLATION
[A5U715 BIT rm].
 - h. OPEN 1-ISV-72-503, CNTMT SPRAY HDR A TEST LINE ISOLATION
[A5W712 BIT rm].
 - i. OPEN 1-FCV-72-44, CNTMT SUMP TO CS PMP A SUCT.
 - j. START cntmt spray pump A.
 - k. ENSURE flow to RWST on 1-FI-72-34, CS PMP A FLOW.

Op Test No.: NRC Scenario # 3 Event # 1 Page 1 of 45

Event Description: Raise power to 1-2%, stabilize power and start 1A main feedwater pump.

Time	Position	Applicant's Actions or Behavior
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EXAMINER: Reactor power is stable at 1.66×10^{-4} % power, after blocking the Source Range Monitors at P-6. The startup continues from this point.

	SRO	[24] IF TAVG is less than 561°F AND Alarm 94 A, TAVG-TREF DEVIATION, is LIT, THEN INITIATE 1-SI-68-34 (SR 3.4.2.1).
	RO	[25] ADJUST Control Rods and/or boron concentration to RAISE Reactor power, at a rate of less than 1 dpm, to 1×10^{-2} %.
	RO	[26] STABILIZE Reactor power at 1×10^{-2} %.
	RO	[27] RECORD CRITICAL DATA: Power Level: <u>1 NI 92 135A</u> % <u>1 NI 92 136A</u> % Rod Position: <u>Bank</u> <u>Steps</u> <u>RCS C_B</u> <u>PPM</u> Loop T _{AVG} <u>1 TI 68 2E</u> °F <u>1 TI 68 25E</u> °F <u>1 TI 68 44E</u> °F <u>1 TI 68 67E</u> °F
	SRO	[28] IF Actual Critical Rod Position is between 500 and 750 pcm from ECP, THEN ENSURE Reactor Engineering evaluates AND initiates a PER.
	SRO	[29] IF Mode 2 physics testing required, THEN... <i>If contacted the Simulator Operator will report as the Reactor Engineer that Mode 2 physics testing is NOT required.</i>

NOTE

If AFW is in service, Reactor power must be maintained within the capability of AFW to maintain SG levels.

	BOP	[30] EVALUATE closing AFW Pumps Recirc Valves (refer to SOI-3.02, Section 8.9).
	RO	[31] ADJUST Control Rods or RCS CB to RAISE Reactor power, at a rate of less than 1 dpm, to between 1 and 4%.

EXAMINER: Cue Simulator Operator to insert Event 2 after the power change has been adequately demonstrated.

NOTE

TAVG will vary as a function of reactor power until the unit is greater than 15% turbine load (C5) and the Tavg program is maintained by AUTO or manual rod control. The TAVG-TREF deviation alarm is expected to be initiated as reactor power approaches 7% RTP.

CAUTION

IF AFW is controlling levels in one or more SGs, THEN Reactor power must be maintained within AFW capability (less than 4% power).

	RO	[32] STABILIZE Reactor power between 1 and 4%:
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Op Test No.: NRC Scenario # 3 Event # 1 Page 2 of 45

Event Description: Raise power to 1-2%, stabilize power and start 1A main feedwater pump.

Time	Position	Applicant's Actions or Behavior
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	BOP	[32.1] MAINTAIN RCS Steam Dumps in Pressure Mode, set at 84% (1092 psig.), or SG PORVs set at 84%.
	RO	[32.2] FOLLOW Xenon by Rod movement or Boration to maintain control banks ABOVE the LO INSERTION LIMIT.

Op Test No.: NRC Scenario # 3 Event # 2 Page 3 of 45

Event Description: Component Cooling System 1A leak, 1-LCV-70-63, Surge Tank Makeup valve fails to open.

Time	Position	Applicant's Actions or Behavior
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249-A U1 SURGE TANK LEVEL HI/LO

249-B UI SURGE TANK LEVEL LO MAKEUP

129-E DEMIN WATER & CASK DECON SYS ABNORMAL

	BOP	Diagnoses and announces the CCS Surge tank level drop.
	BOP	May open 1-LCV-70-63, UI SURGE TANK MAKEUP LCV, since level is less than 60% and valve should have automatically opened.
	BOP	May dispatch an operator to perform a system walkdown to look for leakage from CCS.
	SRO	Enters and directs actions of AOI-15, "Loss of Component Cooling Water (CCS)."

EXAMINER: The following actions are taken from ARI 249-B, U1 SURGE TANK LEVEL LO MAKEUP.

		[1] ENSURE 1-LCV-70-63, U1 SURGE TANK MAKEUP LCV, OPEN.
		[2] ENSURE Demin Water Storage Tank has level.
		[3] IF Surge Tank level continues to lower, THEN GO TO Window 249-A.

EXAMINER: The following actions are taken from ARI 249-A, U1 SURGE TANK LEVEL HI/LO.

		[1] MONITOR Surge Tank level.
		[2] IF Lo, THEN [a] ENSURE 1-LCV-70-63, U1 SURGE TANK MAKEUP LCV, OPEN. [b] IF Surge Tank level lowers below 52% OR 1-FCV-70-183, SAMPLE HX CCS OUTLET is CLOSED, THEN NOTIFY Chemistry to suspend sampling. [c] IF Surge Tank loss imminent, THEN GO TO AOI-15, Loss Of Component Cooling Water (CCS). [d] IF level is NOT maintained due to loss of makeup, THEN CONSIDER installing ERCW spoolpiece for emergency source. [e] IF level is NOT maintained due to loss of air to makeup valve, THEN CONSIDER installing bottled gas on 1-LCV-70-63.
		[3] IF Hi, THEN [a] ENSURE 1-LCV-70-63, U1 SURGE TANK MAKEUP LCV, CLOSED. [b] CHECK CCS Radiation Monitor for rise. [c] CHECK 1-TI-70-161, CCS HX A OUTLET TEMP [0-M-27B].

Op Test No.: NRC Scenario # 3 Event # 2 Page 4 of 45
 Event Description: Component Cooling System 1A leak, 1-LCV-70-63, Surge Tank Makeup valve fails to open.

Time	Position	Applicant's Actions or Behavior
------	----------	---------------------------------

[4] IF Surge Tank level rising UNCONTROLLED **OR** CCS Radiation Monitors rising, **THEN GO TO** AOI-15, Loss Of Component Cooling Water (CCS).

EXAMINER: The following actions are taken from AOI-15, "Loss of Component Cooling Water (CCS)."

BOP

1. **CHECK** CCS pumps status:
 - a. **CHECK** any CCS pump TRIPPED or running pump NOT pumping forward:
 - ERCW/CCS Motor tripout alarm,
 - Low header pressure (train A or B),
 - Multiple low flow alarms.

BOP

1. **RESPONSE NOT OBTAINED:**
 - a. **** GO TO** Caution prior to Step 2.

CAUTION A closed surge tank vent valve may cause a positive or negative tank pressure, giving an erroneous level indication.

BOP

2. **CHECK** 1-FCV-70-66, U1 Surge Tank Vent, OPEN.

BOP

3. **IF** surge tank level less than 57%, **THEN ENSURE** 1-LCV-70-63, U1 Surge Tank Makeup LCV, OPEN (Refer to SOI-70.01 as required if makeup not available).
BOP must manually open 1-LCV-70-63, due to level switch failure. When the makeup valve is opened, the rate of level decrease slows, allowing for more time to address leak location.

BOP

4. **MONITOR** A and B side surge tank levels greater than 10%.

SRO

5. **IF** RHR Shutdown Cooling is in service, **THEN ** GO TO** AOI-14, Loss Of RHR Shutdown Cooling.

CAUTION CCP may survive for only 10 to 12 minutes after loss of CCS to lube oil cooler.

EXAMINER: When dispatched to perform a system walkdown or to look for leaks, after 10 minutes, the AUO reports that the drain valve on the suction of the 1B-B CCS pump was leaking and is now isolated.

SRO

6. **MONITOR** the following for Unit 1 CCS Train A:
 - U-1 CCS Train A level
 - ERCW flow to CCS Hx A**IF** loss of either is imminent, **THEN PERFORM** the following:
SRO determines that level is dropping, but level loss is NOT imminent and goes to the RNO column.

Op Test No.: NRC Scenario # 3 Event # 2 Page 5 of 45
 Event Description: Component Cooling System 1A leak, 1-LCV-70-63, Surge Tank Makeup valve fails to open.

Time	Position	Applicant's Actions or Behavior
	SRO	6. RESPONSE NOT OBTAINED: ** GO TO Step 7.
	SRO	7. MONITOR the following for Unit 1 CCS Train B: <ul style="list-style-type: none"> • U-1 CCS Train B level • ERCW flow to CCS Hx C IF loss of either is imminent, THEN STOP and LOCKOUT the following Train B equipment: SRO determines that level is dropping, but level loss is NOT imminent and continues to Step 8.
	BOP	8. CHECK all RCP upper and lower oil cooler flows NORMAL: <ul style="list-style-type: none"> • Upper Cooler flow: 150-220 gpm • Lower Cooler flow: 5-10 gpm
CAUTION Seal injection water must be maintained to all RCPs following isolation of thermal barriers.		
	BOP	9. CHECK Thermal Barrier Hx flows NORMAL. <ul style="list-style-type: none"> • Thermal Barrier flow 40-50 gpm
	BOP	10. CHECK 1A ESF Supply Header flow NORMAL, 1-FI-70-159A. <ul style="list-style-type: none"> • Normal ~100 gpm with RHR out of service.
	BOP	11. CHECK 1B ESF Supply Header flow NORMAL, 1-FI-70-165A. <ul style="list-style-type: none"> • Normal 5000-6000 gpm with RHR in service.
	BOP	12. CHECK SFP Hx A flow NORMAL, 0-FI-70-20. <ul style="list-style-type: none"> • Normal 2700-3500 gpm with SFP Hx A in service.
	BOP	13. CHECK SFP Hx B flow NORMAL, 0-FI-70-6. <ul style="list-style-type: none"> • Normal top of scale with SFP Hx B in service (may require local observation to determine if leak exists).
	SRO	14. IF leak location can be isolated, THEN RETURN CCS surge tank to normal level (refer to SOI-70.01). AUO reports that the leak is now stopped.
EXAMINER: The BOP must periodically monitor CCS surge tank level since the initial failure of 1-LCV-70-63A, UI SURGE TANK MAKEUP LCV has not been repaired.		
	SRO	15. EVALUATE affected equipment operation USING Appendix A.
	SRO	16. WHEN CCS returned normal, THEN <ul style="list-style-type: none"> • CHECK only one CCS pump per Train. • CHECK one TBBP running.

Op Test No.: NRC Scenario # 3 Event # 2 Page 6 of 45

Event Description: Component Cooling System 1A leak, 1-LCV-70-63, Surge Tank Makeup valve fails to open.

Time	Position	Applicant's Actions or Behavior
	SRO	17. REFER TO Tech Specs 3.7.7, Component Cooling Water System (CCS). <i>SRO determines that the leak has been stopped and that Tech Specs do NOT have to be entered.</i>
	SRO	18. INITIATE repairs.
	SRO	19. WHEN repairs are complete, THEN :
	SRO	20. RETURN TO Instruction in effect.
	SRO	Crew Brief would typically be conducted for this event as time allows prior to the next event.
	SRO	Notifications should be addressed as applicable if not specifically addressed by the procedure or in the crew brief. <u>Operations Management</u> - Typically Shift Manager. <u>Maintenance Personnel</u> - Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
Cue Simulator Operator to insert Event 3.		

Op Test No.: NRC Scenario # 3 Event # 3 Page 7 of 45

Event Description: 1-LIC-3-164 setpoint fails high, causing 1-LCV-3-164 to open, and SG 1 level to rise.

Time	Position	Applicant's Actions or Behavior
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63-F SG LEVEL DEVIATION**60-B SG 1 LEVEL HI**

1-FI-3-163A AFW TO SG1 FLOW indicates high flow

1-FI-3-163B AFW TO SG 1 FLOW indicates high flow.

	BOP	Diagnoses and announces failure of 1-LCV-3-164.
	BOP	May shift 1-LCV-3-164A SG 1 SUPPLY FRM PMP A-A from AUTO to MANUAL and open 1-LCV-3-164 to recover SG 1 level to program.
	SRO	Enters and directs actions contained in ARI 63-F.

EXAMINER: The following actions are taken from ARI 63-F "SG LEVEL DEVIATION"

	BOP	[1] DETERMINE which S/G has abnormal level. <i>Determines SG 1 has abnormal level.</i>
	BOP	[2] CHECK steam flow/feed flow instrumentation to VERIFY level controls are restoring S/G levels to NORMAL .
	BOP	[3] IF level controls have malfunctioned, THEN [a] PLACE FW controls in manual. [b] RESTORE S/G level to normal and GO TO AOI-16, LOSS OF NORMAL FEEDWATER. <i>SRO determines that there are no actions contained in AOI-16 to address the AFW control problem and continues to the next step.</i>
	SRO	[4] IF MFPT speed controls have malfunctioned, THEN [a] PLACE MFPT speed controls in manual. [b] RESTORE MFW/MS ΔP to program AND GO TO AOI-16, LOSS OF NORMAL FEEDWATER. <i>SRO determines that this step is not applicable to the current failure and continues to the next step.</i>
	BOP	[5] INITIATE WO for corrective action, if necessary. <i>SRO contacts Work Control to troubleshoot and repair 1-LCV-3-164 automatic circuit.</i>

EXAMINER: The following actions are taken from ARI 60-B, "SG 1 LEVEL HIGH."

Op Test No.: NRC Scenario # 3 Event # 3 Page 8 of 45

Event Description: 1-LIC-3-164 setpoint fails high, causing 1-LCV-3-164 to open, and SG 1 level to rise.

Time	Position	Applicant's Actions or Behavior
	BOP	<p>[1] If AFW system is in service, THEN CHECK AFW operation AND CONTROL level manually if necessary per SOI-3.02, AUXILIARY FEEDWATER SYSTEM.</p> <p><i>BOP depresses the MAN pushbutton on 1-LIC-3-164A, SG 1 SUPPLY FRM PMP A-A, and operates the "slider" portion of the controller to control 1-LCV-3-164 and restore level in SG 1 to normal.</i></p>
	SRO	[2] PLACE 1-FC-3-35 and/or 1-FC-3-35A in MANUAL AND RESTORE S/G level to program.
	SRO	[3] REFER TO AOI-16, LOSS OF NORMAL FEEDWATER.
	BOP	[4] DETERMINE cause of Hi Level AND INITIATE corrective action, if necessary.
	SRO	<p>Evaluate Tech Specs</p> <p><i>Evaluates effect of the failure on Train A AFW, and determines that LCO 3.7.5, Auxiliary Feedwater (AFW) System, Condition B must be entered. Requires that the AFW train be restored to OPERABLE status within 72 hours.</i></p>
	SRO	Crew Brief - conduct for this event as time allows prior to the next event.
	SRO	Notifications should be addressed as applicable if not specifically addressed by the procedure or in the crew brief.
	SRO	<p><u>Operations Management</u> - Shift Manager.</p> <p><u>Maintenance Personnel</u> – Maintenance Shift Supervisor (MSS).</p> <p>(Note: Maintenance notification may be delegated to the Shift Manager).</p>
Simulator operator enters Event 6		

Op Test No.: NRC Scenario # 3 Event # 4 Page 9 of 45

Event Description: Intermediate range channel N136 fails low.

Time	Position	Applicant's Actions or Behavior
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1-NR-92-145 NEUTRON FLUX LEVEL RECORDER indication of N136 fails LOW.

1-NI-92-136A CH II NEUTRON MON % PWR indication off scale LOW.

There are no audible alarms associated with this failure.

	RO	Diagnoses and announces failure of Intermediate Range Monitor N136
	SRO	Enters and directs actions of AOI-4, "Nuclear Instrumentation Malfunctions" Section 3.3
EXAMINER: The following actions are taken from AOI-4, "Nuclear Instrumentation Malfunctions" Section 3.3. "Intermediate Range Monitor malfunction."		
	SRO	1. IF greater than P-6 and less than P-10 with BOTH IRM channels failed, THEN STOP positive reactivity changes.
NOTE Placing the affected channel in bypass will cause either window 64B or 65B to alarm.		
	RO	2. PLACE failed channel LEVEL TRIP switch to BYPASS [1-M-13].
	RO	3. ENSURE 1-NR-92-145 recording an operable IRM.
	SRO	4. REFER TO Tech Specs 3.3.1, Rx Trip System Instrumentation Function 4. (Applicable in Mode 1 below the P-10 interlocks, and in Mode 2 Above the P-6 Interlocks) Intermediate Range Neutron Flux, Condition F: THERMAL POWER > P-6 and < P-10, one Intermediate Range Neutron Flux channel inoperable. F.1 Reduce THERMAL POWER to < P-6. Within 2 hours OR F.2 Increase THERMAL POWER to > P-10 within 2 hours. 3.3.3, PAM Instruments. Function 1 Intermediate Range Neutron Flux, Condition A: One or more Functions with one required channel inoperable restore required channel to OPERABLE status within 30 days.
	SRO	5. NOTIFY Operations Duty Manager and Rx Engineering of any failed channel.
	SRO	6. INITIATE repair of IRM.
	SRO	7. DO NOT CONTINUE UNTIL repairs are complete.
	SRO	Crew Brief would typically be conducted for this event as time allows prior to the next event.

Op Test No.: NRC Scenario # 3 Event # 4 Page 10 of 45

Event Description: Intermediate range channel N136 fails low.

Time	Position	Applicant's Actions or Behavior
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	SRO	Notifications should be addressed as applicable if not specifically addressed by the procedure or in the crew brief. <u>Operations Management</u> - Typically Shift Manager. <u>Maintenance Personnel</u> - Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
Cue Simulator Operator to insert Event 5.		

Op Test No.: NRC Scenario # 3 Event # 5 Page 11 of 45

Event Description: 1-LIC-68-339, CHARG FLOW/PZR LEVEL CONTROL, output signal fails.

Time	Position	Applicant's Actions or Behavior
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Indications

108-A, CHARGING FLOW HI/LO

101-E, RCP SEAL SUPPLY FLOW LO

1-FI-62-93A, CHARGING FLOW indicates dropping charging flow.

RCP SEAL SUP FLOW indicators for all RCPs indicate dropping seal supply flow.

	RO	Diagnoses and announces the drop in charging flow and RCP seal injection flows.
	RO	May place 1-HIC-62-93A in MANUAL and open to restore charging and seal supply flows.
	SRO	May enter and direct actions of ARI 108-A, CHARGING FLOW HI/LO.
	SRO	Enters and directs actions of AOI-20, "Malfunction of Pressurizer Level Control System."

EXAMINER: The following actions are taken from ARI 108-A, CHARGING FLOW HI/LO.

	RO	[1] IF ALL the following conditions exist: <ul style="list-style-type: none"> Any RCP Thermal Barrier Out-Of-Service, In-Service Charging pump trips, RCP seal injection flow required, THEN IMMEDIATELY START available charging pump to restore seal flow.
	RO	[2] CHECK 1-FI-62-93A [1-M-5] to determine if flow is high or low.
	RO	[3] CHECK PZR level indication on 1-M-4.
	SRO	[4] IF PZR level control system malfunction, THEN GO TO AOI-20, MALFUNCTION OF PRESSURIZER LEVEL CONTROL CHANNEL.
	SRO	[5] IF charging flow is low, THEN CHECK letdown temperature and CONSIDER increasing charging flow, or ISOLATE letdown.
	RO	[6] IF charging is lost, THEN IMMEDIATELY ISOLATE letdown.
	SRO	[7] DETERMINE cause of problem and INITIATE corrective action.
	SRO	[8] REFER TO SOI-62.01, CVCS - CHARGING AND LETDOWN.

EXAMINER: The following actions are taken from AOI-20, "Malfunction of Pressurizer Level Control System."**CAUTION** Charging and letdown must be in service together. If letdown isolates or charging is lost, the other must be isolated.

	RO	1. CHECK pwr level program signal NORMAL: <ul style="list-style-type: none"> 1-LR-68-339 (green pen).
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Op Test No.: NRC Scenario # 3 Event # 5 Page 12 of 45

Event Description: 1-LIC-68-339, CHARG FLOW/PZR LEVEL CONTROL, output signal fails.

Time	Position	Applicant's Actions or Behavior
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NOTE 1-XS-68-339E selects one channel to control level to program and one backup channel for control interlocks

	RO	2. CHECK if 1-XS-68-339E is selected to FAILED channel (control or backup): <ul style="list-style-type: none"> • LI-68-339, OR • LI-68-320, OR • LI-68-335.
	SRO	2. RESPONSE NOT OBTAINED: IF pzs level is low OR dropping, THEN GO TO Step 12. SRO determines from the initial failure that PZR level would be dropping and goes to Step 12.
	RO	12. CHECK any charging pump RUNNING.
	RO	13. PLACE 1-HIC-62-93A, CHARGING FLOW PZR LEVEL CONTROL, in MANUAL, and RESTORE pzs level to program USING 1-FCV-62-93 and/or 1-FCV-62-89. RO may have already taken 1-HIC-62-93A to MANUAL and stabilized level.
	RO	14. CHECK letdown IN SERVICE: <ul style="list-style-type: none"> • 1-FCV-62-69 OPEN. • 1-FCV-62-70 OPEN. • 1-FCV-62-77 OPEN. • Letdown orifice OPEN.
	RO	15. CHECK pzs level RETURNING to program.
	SRO	16. ** GO TO Step 18.
	SRO	18. NOTIFY Work Control to initiate corrective action, if necessary.
	SRO	19. EVALUATE system alignment/status: <ul style="list-style-type: none"> • REVIEW actions performed in this Instruction. • REFER TO SOI-62.01, CVCS - Charging and Letdown.
	SRO	Evaluates Tech Specs and determines that none are applicable to this failure.
	SRO	20. RETURN TO instruction in effect.
	SRO	Crew Brief would typically be conducted for this event as time allows prior to the next event.

Op Test No.: NRC Scenario # 3 Event # 5 Page 13 of 45

Event Description: 1-LIC-68-339, CHARG FLOW/PZR LEVEL CONTROL, output signal fails.

Time	Position	Applicant's Actions or Behavior
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	SRO	Notifications should be addressed as applicable if not specifically addressed by the procedure or in the crew brief. Operations Management - Typically Shift Manager. Maintenance Personnel – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
Cue Simulator Operator to insert Event 6.		

Op Test No.: NRC Scenario # 3 Event # 6 Page 14 of 45Event Description: RCS leak occurs, requiring entry into AOI-6, "Small Reactor Coolant System Leak."
Leak progresses, requiring reactor trip and safety injection.

Time	Position	Applicant's Actions or Behavior
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90-B PZR PRESS LO-DEVN BACKUP HTRS ON

92-A PZR LEVEL HI/LO

144-A ICE COND INLET DOOR OPEN

VCT level dropping.

PZR level dropping slowly.

	RO	Diagnoses and announces RCS leak.
	SRO	Enters and directs actions of AOI-6, "Small Reactor Coolant System Leak."

EXAMINER: The following actions are taken from ARI 92-A, "PZR LEVEL HI/LO."

	RO	[1] CHECK PZR level indication on 1-M-4: <ul style="list-style-type: none"> • 1-LI-68-320 • 1-LI-68-335A • 1-LI-68-339
	RO	[2] CHECK PZR level and reference level on 1-LR-68-339 [1-M-5].
	SRO	[3] IF Malfunction Of Pressurizer Level Control System, THEN GO TO AOI-20, MALFUNCTION OF PRESSURIZER LEVEL CONTROL SYSTEM.
	SRO	[4] IF level is high, THEN ENSURE letdown in service.
	SRO	[5] IF level is low AND PZR level control system is attempting to increase level to program THEN REFER TO AOI-6, SMALL REACTOR COOLANT SYSTEM LEAK.
	SRO	[6] REFER TO Tech Specs.

EXAMINER: The following actions are taken from AOI-6, "Small Reactor Coolant System Leak."**NOTE** During performance of this instruction the need for a rapid load reduction or Unit trip should be continuously evaluated.

	RO	1. CHECK pzs level DROPPING.
NOTES <ul style="list-style-type: none"> • VCT makeup may have to be manually initiated or makeup rate raised to maintain VCT level. • Pzs level must be allowed time to change following changes in charging flow. 		
	RO	2. CHECK CCP in service.

Op Test No.: NRC Scenario # 3 Event # 6 Page 15 of 45
 Event Description: RCS leak occurs, requiring entry into AOI-6, "Small Reactor Coolant System Leak." Leak progresses, requiring reactor trip and safety injection.

Time	Position	Applicant's Actions or Behavior
	RO	3. MAXIMIZE charging flow: a. Fully OPEN 1-FCV-62-93. b. Fully OPEN 1-FCV-62-89. c. IF letdown at 120 gpm THEN PLACE 1-HIC-62-81A, in MANUAL, AND CLOSE 1-FCV-62-72, (45 gpm). d. ADJUST 1-HIC-62-81A as required AND PLACE in AUTO.
	SRO	4. IF RHR Shutdown Cooling mode in service, THEN ** GO TO AOI-14, Loss of RHR Shutdown Cooling.
	SRO	5. MAKE plant announcement via PA: "Attention plant personnel. A primary system leak has developed. Any personnel located either inside containment or in the Auxiliary Building should exit the area immediately." (Repeat)
	RO	6. MONITOR pwr level STABLE or RISING.
	SRO	6. <u>RESPONSE NOT OBTAINED:</u> IF loss of pwr level is IMMINENT; THEN: a. TRIP Rx. b. INITIATE SI. c. ** GO TO E-0, Rx Trip or Safety Injection.
CAUTION Attempts to quantify leak rate should not delay performance of the remaining steps.		
	RO	7. IF pwr level STABLE or RISING and time permits, THEN STABILIZE the plant to quantify the leak rate: • STOP pwr heater/spray operation. • STOP any heatup/cooldown in progress
	BOP	8. CHECK secondary plant radiation normal: • Condenser exhaust monitors. • S/G blowdown monitors. • Main steam line monitors.
	RO	9. CHECK safety valves CLOSED: • EVALUATE tailpipe temp and acoustic monitors.
	RO	10. CHECK PORVs CLOSED: • EVALUATE tailpipe temp and acoustic monitors.
NOTE Relief valves (pwr PORVs, pwr safeties, CVCS letdown, RHR suction, and SI lines), and Rx head vent isolation valves could be leaking to the PRT. Further investigation will have to be made if PRT conditions become abnormal and leakage path is not readily identifiable.		

Op Test No.: NRC Scenario # 3 Event # 6 Page 16 of 45Event Description: RCS leak occurs, requiring entry into AOI-6, "Small Reactor Coolant System Leak."
Leak progresses, requiring reactor trip and safety injection.

Time	Position	Applicant's Actions or Behavior
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	RO	11. MONITOR PRT conditions NORMAL: <ul style="list-style-type: none"> • Level. • Temperature. • Press.
NOTE Pzr level must be allowed time to stabilize following changes in charging or letdown flow.		
	RO	12. ISOLATE letdown: <ul style="list-style-type: none"> • CLOSE 1-FCV-62-72, (45 gpm). • CLOSE 1-FCV-62-73, (75 gpm). • CLOSE 1-FCV-62-74, (75 gpm). • CLOSE 1-FCV-62-76, (5 gpm). • CLOSE 1-FCV-62-69. • CLOSE 1-FCV-62-70.
	RO	13. ISOLATE charging: <ul style="list-style-type: none"> • CLOSE 1-FCV-62-85. • CLOSE 1-FCV-62-86. • CLOSE 1-FCV-62-90. • CLOSE 1-FCV-62-91.
NOTE Normal range of seal injection flow is between 8 and 13 gpm per RCP with a minimum allowed flow of 6 gpm.		
	RO	14. MINIMIZE RCP seal injection flow (greater than 6 gpm per pump), and EVALUATE pzr level trend.
NOTE If leak is on CVCS, pzr level will recover with charging and letdown isolated.		
	RO	15. CHECK pzr level DROPPING or STABLE.
EXAMINER: Cue Simulator Operator to increase leakage rate, in order for the evaluation of "imminent loss of PZR level" to be made, and a reactor trip and safety injection signal to be initiated.		

Op Test No.:	<u>NRC</u>	Scenario #	<u>3</u>	Event #	<u>7, 8, 9 and 10</u>	Page	<u>17</u>	of	<u>45</u>
Event Description:		Large loss-of-coolant-accident occurs. Requires entry into E-0, E-1, and a transition to ES-1.3. 1A-A and 1B-B safety injection pumps fail to start automatically on the safety injection signal. Automatic sump swapover fails to actuate. Attempts to manually position valves are unsuccessful.							
Time	Position	Applicant's Actions or Behavior							

EXAMINER: The following actions are taken from E-0, Reactor Trip or Safety Injection."

NOTE 1 Steps 1 thru 4 are IMMEDIATE ACTION STEPS.

NOTE 2 Status Trees / SPDS should be monitored when transitioned to another instruction.

	RO	1. ENSURE reactor trip: • Reactor trip and bypass breakers OPEN. • RPIs at bottom of scale. • Neutron flux DROPPING.
	RO	2. ENSURE Turbine Trip: • All turbine stop valves CLOSED.
	RO	3. CHECK 6.9 kV shutdown boards: a. At least one board energized from: CSST (offsite), OR D/G (blackout).
	RO	4. CHECK SI actuated: a. Any SI annunciator LIT. b. Both trains SI ACTUATED . • 1-XX-55-6C • 1-XX-55-6D
Critical Task 1 WOG Critical Task List for E-0, J. Establish flow from at least one intermediate head ECCS pump before transition out of E-0, "Reactor Trip or Safety Injection." SI provides makeup inventory to the RCS for cooling of the core during accident conditions. Since SI is actuated, all SI pumps have a start signal and the operator should verify that they are running.		
Critical Task 1	BOP	5. EVALUATE support systems: • REFER TO Appendixes A and B (E-0), Equipment Verification pages 15-28. BOP discovers that the 1A and 1B safety injection pumps failed to automatically start when the safety injection was actuated. BOP manually starts the safety injection pumps.
	SRO	6. ANNOUNCE reactor trip and safety injection over PA system.
	RO	7. ENSURE secondary heat sink available with either: • Total AFW flow greater than 410 gpm, OR • At least one S/G NR level greater than 29% [39% ADV].

Op Test No.: NRC Scenario # 3 Event # 7, 8, 9 and 10 Page 18 of 45

Event Description: Large loss-of-coolant-accident occurs. Requires entry into E-0, E-1, and a transition to ES-1.3. 1A-A and 1B-B safety injection pumps fail to start automatically on the safety injection signal. Automatic sump swapover fails to actuate. Attempts to manually position valves are unsuccessful.

Time	Position	Applicant's Actions or Behavior
	RO	<p>8. MONITOR RCS temp stable at or trending to 557°F:</p> <ul style="list-style-type: none"> • IF any RCP running, THEN MONITOR RCS Loop T-avg trending to 557°F. <p>OR</p> <ul style="list-style-type: none"> • IF NO RCP running, THEN MONITOR RCS Loop T-cold trending to 557°F.
	RO	<p>9. ENSURE excess letdown valves CLOSED:</p> <ul style="list-style-type: none"> • 1-FCV-62-54 • 1-FCV-62-55
	RO	<p>10. CHECK pZR PORVs and block valves:</p> <ul style="list-style-type: none"> a. PZR PORVs CLOSED. b. At least one block valve OPEN.
	RO	<p>11. CHECK pZR safety valves CLOSED:</p> <ul style="list-style-type: none"> • EVALUATE tailpipe temperatures and acoustic monitors.
	RO	12. CHECK pZR sprays CLOSED.
NOTE Seal injection flow should be maintained to all RCPs.		
EXAMINER: The Reactor Coolant Pumps may have been stopped by the BOP during performance of E-0, Appendix A, prior to reaching this step in E-0.		
	RO	<p>13. CHECK if RCPs should remain in service:</p> <ul style="list-style-type: none"> a. Phase B signals DARK [MISSP]. b. RCS pressure greater than 1500 psig.
	RO	<p>13. RESPONSE NOT OBTAINED:</p> <ul style="list-style-type: none"> a. STOP all RCPs. ** GO TO Step 14.
	RO	<p>14. CHECK S/G pressures:</p> <ul style="list-style-type: none"> • All S/G pressures controlled or rising. • All S/G pressures greater than 120 psig.
	RO	<p>15. CHECK for RUPTURED S/G</p> <ul style="list-style-type: none"> • All S/Gs narrow range levels CONTROLLED or DROPPING. • Secondary side radiation NORMAL from Appendix A.
	RO	<p>16. CHECK cntmt conditions:</p> <ul style="list-style-type: none"> • Cntmt pressure NORMAL. • Radiation NORMAL from Appendix A. • Cntmt sump level NORMAL. • Cntmt temp ann window DARK [104-B].

Op Test No.: NRC Scenario # 3 Event # 7, 8, 9 and 10 Page 19 of 45

Event Description: Large loss-of-coolant-accident occurs. Requires entry into E-0, E-1, and a transition to ES-1.3. 1A-A and 1B-B safety injection pumps fail to start automatically on the safety injection signal. Automatic sump swapover fails to actuate. Attempts to manually position valves are unsuccessful.

Time	Position	Applicant's Actions or Behavior
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	SRO	16. <u>RESPONSE NOT OBTAINED:</u> ** GO TO E-1, Loss of Reactor or Secondary Coolant.
EXAMINER: When the transition is made for E-0 to E-1, the STA will monitor CSF Status Trees. The STA will report that there is a REP PATH condition associated with FR-P.1, "Pressurized Thermal Shock," and the SRO will implement FR-P.1 actions.		
	RO	1. CHECK RCS pressure greater than 150 psig.
	SRO	1. <u>RESPONSE NOT OBTAINED:</u> IF RHR pump injecting greater than 1350 gpm to RCS, THEN RETURN TO Instruction in effect.
EXAMINER: The following actions are taken from E-1,"Loss of Reactor or Secondary Coolant."		
NOTE Seal injection flow should be maintained to all RCPs.		
EXAMINER: The Reactor Coolant Pumps may have been stopped by the BOP during performance of E-0, Appendix A, prior to reaching this step in E-1.		
	RO	1. CHECK if RCPs should remain in service: a. Phase B signals DARK [MISSP]. b. RCS pressure greater than 1500 psig.
	SRO	2. REFER TO EPIP-1, Emergency Plan Classification Flowchart.
NOTE Time since initiation of event is defined by performance of Step 3.		
	SRO	3. RECORD current time to mark initiation of LOCA and determination of time for hot leg recirc.
	BOP	4. CHECK S/G pressures: • All S/G pressures controlled or rising. • All S/Gs pressures greater than 120 psig.
	BOP	5. MAINTAIN Intact S/G NR levels: a. MONITOR levels greater than 29% [39% ADV]. b. CONTROL intact S/G levels between 29% and 50% [39% and 50% ADV].
	BOP	6. CHECK secondary radiation: • S/G discharge monitors NORMAL. • Condenser vacuum exhaust rad monitors NORMAL. • S/G blowdown rad monitor recorders NORMAL trend prior to isolation.

Op Test No.: NRC Scenario # 3 Event # 7, 8, 9 and 10 Page 20 of 45

Event Description: Large loss-of-coolant-accident occurs. Requires entry into E-0, E-1, and a transition to ES-1.3. 1A-A and 1B-B safety injection pumps fail to start automatically on the safety injection signal. Automatic sump swapover fails to actuate. Attempts to manually position valves are unsuccessful.

Time	Position	Applicant's Actions or Behavior
	BOP	<p>7. ENSURE cntmt hydrogen analyzers in service:</p> <ul style="list-style-type: none"> • PLACE 1-HS-43-200A in ANALYZE [M-10]. • PLACE 1-HS-43-210A in ANALYZE [M-10]. • CHECK low flow lights not lit [M-10]. • Locally CHECK low analyzer temp lights NOT lit [North wall of Train A 480V SD Bd rm]. <p><i>When dispatched, the AUO will report back that the low analyzer temp lights are NOT LIT.</i></p>
	RO	<p>8. MONITOR pzz PORVs and block valves:</p> <ul style="list-style-type: none"> a. Pzz PORVs CLOSED. b. At least one block valve OPEN.
	RO	<p>8. <u>RESPONSE NOT OBTAINED:</u></p> <p>IF temp less than 557°F, THEN ENSURE steam dumps and S/G PORVs CLOSED.</p> <p>IF cooldown continues, THEN:</p> <ul style="list-style-type: none"> • PLACE steam dump controls OFF. • CONTROL total AFW flow to maintain greater than 410 gpm UNTIL NR level in at least one S/G greater than 29% [39% ADV]. <p>IF cooldown continues after AFW flow is controlled, THEN</p> <ul style="list-style-type: none"> • CLOSE MSIVs. • ENSURE MSIV bypasses CLOSED. <p>IF RCS temp greater than 564°F, THEN ENSURE either steam dumps or S/G PORVs OPEN.</p>
	RO	<p>9. DETERMINE if cntmt spray should be stopped:</p> <ul style="list-style-type: none"> a. MONITOR cntmt pressure less than 2.0 psig. b. CHECK at least one cntmt spray pump RUNNING. c. RESET cntmt spray signal. d. STOP cntmt spray pumps, and PLACE in A-AUTO. e. CLOSE cntmt spray discharge valves 1-FCV-72-2 and 1-FCV-72-39.
-+	BOP	<p>10. ENSURE both pocket sump pumps STOPPED [M-15]:</p> <ul style="list-style-type: none"> • 1-HS-77-410. • 1-HS-77-411.
	RO	<p>11. CHECK SI termination criteria:</p> <ul style="list-style-type: none"> a. CHECK RCS subcooling greater than 65°F [85°F ADV].

Op Test No.:	<u>NRC</u>	Scenario #	<u>3</u>	Event #	<u>7, 8, 9 and 10</u>	Page	<u>21</u>	of	<u>45</u>
Event Description:		Large loss-of-coolant-accident occurs. Requires entry into E-0, E-1, and a transition to ES-1.3. 1A-A and 1B-B safety injection pumps fail to start automatically on the safety injection signal. Automatic sump swapover fails to actuate. Attempts to manually position valves are unsuccessful.							
Time	Position	Applicant's Actions or Behavior							

	SRO	11. RESPONSE NOT OBTAINED: a. ** GO TO Caution prior to Step 12.
CAUTION If offsite power is lost after SI reset, manual action will be required to restart the SI pumps and RHR pumps due to loss of SI start signal.		
	RO	12. RESET SI and CHECK the following: • SI ACTUATED permissive DARK. • AUTO SI BLOCKED permissive LIT.
	RO	13. DETERMINE if RHR pumps should be stopped: a. CHECK RCS pressure greater than 150 psig.
	SRO	13. RESPONSE NOT OBTAINED: a. ENSURE RHR pumps RUNNING. ** GO TO Step 16.
	BOP	14. CHECK pressure in all S/Gs controlled or rising.
	RO	15. CHECK RCS pressure stable or dropping.
	BOP	16. MONITOR electrical board status: a. CHECK offsite power available. b. CHECK all shutdown boards ENERGIZED by offsite power. c. PLACE any unloaded D/G in standby USING SOI-82 Diesel Generators.
	BOP	17. INITIATE BOP realignment: • REFER TO AOI-17, Turbine Trip.
	BOP	18. INITIATE 480V board room breaker alignments USING the following: • Appendix A (E-1), CLA Breaker Operation. • Appendix B (E-1), Ice Condenser AHU Breaker Operation. • Appendix C (E-1), 1-FCV-63-1 Breaker Operation. • Appendix D (E-1), 1-FCV-63-22 Breaker Operation.
	BOP	19. DETERMINE if hydrogen igniters should be energized: a. CHECK hydrogen analyzers in service. b. CHECK cntmt hydrogen less than 5% [M-10]. c. ENERGIZE hydrogen igniters [M-10]: • 1-HS-268-73 ON. • 1-HS-268-74 ON.

Op Test No.:	<u>NRC</u>	Scenario #	<u>3</u>	Event #	<u>7, 8, 9 and 10</u>	Page	<u>22</u>	of	<u>45</u>
Event Description: Large loss-of-coolant-accident occurs. Requires entry into E-0, E-1, and a transition to ES-1.3. 1A-A and 1B-B safety injection pumps fail to start automatically on the safety injection signal. Automatic sump swapover fails to actuate. Attempts to manually position valves are unsuccessful.									
Time	Position	Applicant's Actions or Behavior							

	SRO	20. ENSURE RHR available for cntmt sump recirculation: <ul style="list-style-type: none"> • Power to at least one operable RHR pump AVAILABLE. • Cntmt sump valve 1-FCV-63-72 or 1-FCV-63-73 to operable RHR pump AVAILABLE.
	SRO	21. EVALUATE plant equipment status: <ul style="list-style-type: none"> • REFER TO Appendix E (E-1), Equipment Evaluation.
	BOP	22. CHECK Aux Bldg radiation for loss of RCS inventory outside cntmt: <ul style="list-style-type: none"> a. Area monitor recorders 1-RR-90-1 and 0-RR-90-12A Aux Bldg points NORMAL. b. Vent monitor recorder 0-RR-90-101 NORMAL trend prior to isolation.
	SRO	23. NOTIFY Chemistry of event status and plant conditions.
	SRO	24. DETERMINE if RCS cooldown and depressurization is required: <ul style="list-style-type: none"> a. CHECK RCS pressure greater than 150 psig.
	SRO	24. RESPONSE NOT OBTAINED: <ul style="list-style-type: none"> a. IF RHR pump injecting to RCS, THEN ** GO TO Step 25.
	SRO	25. PREPARE for switchover to RHR cntmt sump: <ul style="list-style-type: none"> a. ENSURE power restored to 1-FCV-63-1 USING Appendix C (E-1), 1-FCV-63-1 Breaker Operation. b. CHECK RWST level less than 34%. c. ** GO TO ES-1.3, Transfer to Containment Sump.
EXAMINER: The following actions are taken from ES-1.3,"Transfer to Containment Sump."		
CAUTION • ECCS flow to RCS must be maintained at all times to ensure adequate core cooling. <ul style="list-style-type: none"> • Transfer to recirculation mode may cause high radiation in the Auxiliary Building. 		
NOTE • Performance of this Instruction is a higher priority than performance of the FRs because it maintains ECCS pump suction. <ul style="list-style-type: none"> • The transfer sequence should be performed without delay. Implementation of FRs is delayed UNTIL transfer sequence is completed or transitioned from. 		
	RO	1. ENSURE both RHR pumps RUNNING.

Op Test No.: NRC Scenario # 3 Event # 7, 8, 9 and 10 Page 23 of 45

Event Description: Large loss-of-coolant-accident occurs. Requires entry into E-0, E-1, and a transition to ES-1.3. 1A-A and 1B-B safety injection pumps fail to start automatically on the safety injection signal. Automatic sump swapover fails to actuate. Attempts to manually position valves are unsuccessful.

Time	Position	Applicant's Actions or Behavior
	BOP	<p>2. ESTABLISH CCS to RHR heat exchangers [M-27B]:</p> <ol style="list-style-type: none"> ENSURE RHR heat exchanger outlet valves 1-FCV-70-153 and 1-FCV-70-156 OPEN. CLOSE SFP heat exchanger A CCS supply 0-FCV-70-197. ENSURE CCS flow to ESF supply header and greater than 5000 gpm. <ul style="list-style-type: none"> Train A: 1-FI-70-159 Train B: 1-FI-70-165 MONITOR level in CCS surge tanks.
	RO	3. CHECK RWST level less than 34%.
	RO	4. CHECK cntmt sump level greater than or equal to 16.1 %.
	RO	<p>5. ENSURE automatic switchover complete:</p> <ol style="list-style-type: none"> ENSURE cntmt sump valves 1-FCV-63-72 and 1-FCV-63-73 OPEN. <p>Report from the field is that 1-FCV-63-72 and 1-FCV-63-73 cannot be opened manually.</p>
	SRO	<p>5. RESPONSE NOT OBTAINED:</p> <p>IF at least one flow path from cntmt sump to the RCS can NOT be established or maintained, THEN ** GO TO ECA-1.1, Loss of RHR Sump Recirculation.</p>
EXAMINER: The following actions are taken from ECA-1.1,"Loss of RHR Sump Recirculation."		
CAUTION IF RWST level drops to 8%, then any ECCS or cntmt spray pump taking suction from the RWST must be stopped.		
	SRO	<p>1. CHECK cntmt sump recirculation equipment AVAILABLE:</p> <ul style="list-style-type: none"> Power to RHR pumps AVAILABLE. RHR pumps AVAILABLE. Cntmt sump valves AVAILABLE.
	SRO	2. IF RHR sump recirculation restored during performance of this Instruction, THEN RETURN TO Instruction in effect.
	RO	3. MONITOR RWST level greater than 8%.
EXAMINER: Containment pressure is expected to be less than 2.0 psig when this step is reached.		

Op Test No.: NRC Scenario # 3 Event # 7, 8, 9 and 10 Page 24 of 45

Event Description: Large loss-of-coolant-accident occurs. Requires entry into E-0, E-1, and a transition to ES-1.3. 1A-A and 1B-B safety injection pumps fail to start automatically on the safety injection signal. Automatic sump swapover fails to actuate. Attempts to manually position valves are unsuccessful.

Time	Position	Applicant's Actions or Behavior
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Critical Task 2

WOG Critical Task List for ECA-1.1, B.

Make up to the RWST and minimize RWST outflow.

Makeup is added to the RWST to extend the time the SI pumps and containment spray pumps (if operating) can take suction from the RWST and provide core cooling to the RCS.

- Containment spray will initially be reduced to conserve RWST level (ECA-1.1 Step 4).
- Containment spray will be aligned to recirculate the Containment Sump to the RWST.

Critical Task 2

RO

4. **DETERMINE** cntmt spray pump alignment and operation:

- CHECK** cntmt spray pump suction aligned to RWST.
- MONITOR** cntmt press, and **DETERMINE** number of spray pumps required:

CONTAINMENT PRESS	SPRAY PUMPS REQUIRED
Greater than 13.5 psig	2
2.0 psig to 13.5 psig	1
Less than 2.0 psig	0

- CHECK** number of spray pumps running equal to number required.
- RESPONSE NOT OBTAINED:**
STOP and **PULL TO LOCK** any cntmt spray pump NOT required, AND **CLOSE** discharge valve(s) 1-FCV-72-2 and/or 1-FCV-72-39 for pump(s) stopped.
 Manually **OPERATE** spray pumps as required.
- DO NOT OPERATE** cntmt spray pumps as required by FR-Z.1, High Containment Pressure, UNTIL either of the following:
 - Cntmt spray pump suction aligned to cntmt sump.
 OR
 - RWST makeup sufficient to support cntmt spray pump operation.

Op Test No.: NRC Scenario # 3 Event # 7, 8, 9 and 10 Page 25 of 45

Event Description: Large loss-of-coolant-accident occurs. Requires entry into E-0, E-1, and a transition to ES-1.3. 1A-A and 1B-B safety injection pumps fail to start automatically on the safety injection signal. Automatic sump swapover fails to actuate. Attempts to manually position valves are unsuccessful.

Time	Position	Applicant's Actions or Behavior
	RO	<p>5. DETERMINE if cntmt spray should be aligned to cntmt sump:</p> <p>a. CHECK spray pumps RUNNING.</p> <p>b. ENSURE ERCW system operating requirements met:</p> <ul style="list-style-type: none"> • REFER TO Appendix B (ECA-1.1), ERCW Operation. <p>c. WHEN cntmt sump level greater than 28% [36% ADV], THEN ALIGN suction to cntmt sump:</p> <p>1) STOP both spray pumps, and PLACE in PULL TO LOCK.</p> <p>2) CLOSE suction from RWST 1-FCV-72-21 and 1-FCV-72-22.</p> <p>3) OPEN cntmt spray suction from sump 1-FCV-72-44.</p> <p>4) OPEN cntmt spray suction from sump 1-FCV-72-45.</p>
	RO	6. MONITOR cntmt press less than 2.0 psig.
	RO	7. ENSURE cntmt spray pumps in A-AUTO.
CAUTION If offsite power is lost after SI reset, manual action may be required to restore ECCS equipment.		
	RO	<p>8. RESET SI, and CHECK the following:</p> <ul style="list-style-type: none"> • SI ACTUATED permissive DARK. • AUTO SI BLOCKED permissive LIT.
	RO	<p>9. RESET SI interlock to RHR sump suction AUTO-swapover:</p> <ul style="list-style-type: none"> • 1-HS-63-72D. • 1-HS-63-73D.
<p>Critical Task 2</p> <p>WOG Critical Task List for ECA-1.1, B.</p> <p>Make up to the RWST and minimize RWST outflow.</p> <p>Makeup is added to the RWST to extend the time the SI pumps and containment spray pumps (if operating) can take suction from the RWST and provide core cooling to the RCS.</p> <ul style="list-style-type: none"> • Containment spray will initially be reduced to conserve RWST level (ECA-1.1 Step 4). • Containment spray will be aligned to recirculate the Containment Sump to the RWST. 		

Op Test No.: NRC Scenario # 3 Event # 7, 8, 9 and 10 Page 26 of 45

Event Description: Large loss-of-coolant-accident occurs. Requires entry into E-0, E-1, and a transition to ES-1.3. 1A-A and 1B-B safety injection pumps fail to start automatically on the safety injection signal. Automatic sump swapover fails to actuate. Attempts to manually position valves are unsuccessful.

Time	Position	Applicant's Actions or Behavior
Critical Task 2	SRO	<p>10. INITIATE makeup to RWST:</p> <ol style="list-style-type: none"> NOTIFY Radprot/Chemistry to evaluate radiation level of water in cntmt sump for potential transfer to RWST. NOTIFY TSC to evaluate transferring water to RWST from one of the following: <ul style="list-style-type: none"> • Appendix C (ECA-1.1), Cntmt Spray Recirc to RWST Alignment. • Spent fuel pit. • Holdup tank. • Normal RWST fill USING SOI-62.02, Boron Concentration Control <p><i>The TSC will report that ECA-1.1, Appendix C will be used to transfer water from the sump to the RWST using Train A containment spray.</i></p>
EXAMINER: The following actions are taken from ECA-1.1,"Loss of RHR Sump Recirculation" Appendix C, "CNTMT SPRAY RECIRC TO RWST ALIGNMENT."		
Critical Task	RO	<ol style="list-style-type: none"> IF Train A cntmt spray is to be aligned to recirc to RWST, THEN PERFORM the following: <ol style="list-style-type: none"> NOTIFY RADPROT of RWST alignment. RESET Cntmt Spray signal. PLACE cntmt spray pump A in PULL-TO-LOCK. CLOSE 1-FCV-72-22, RWST TO CS PMP A SUCTION. CLOSE 1-FCV-72-39, CNTMT SPRAY HDR A TO CNTMT. PLACE ERCW on Train A CS Heat Exchanger per Appendix B.
EXAMINER: The following actions are taken from ECA-1.1,"Loss of RHR Sump Recirculation" Appendix B, "ERCW OPERATION."		
	BOP	1. ENSURE at least two ERCW pumps running on each train.
	BOP	<p>2. ALIGN ERCW to Train A cntmt spray:</p> <ul style="list-style-type: none"> • OPEN 1-FCV-67-125 CNTMT SPRAY HX 1A INLET. • OPEN 1-FCV-67-126 CNTMT SPRAY HX 1A RETURN.
	BOP	<p>3. ALIGN ERCW to Train B cntmt spray:</p> <ul style="list-style-type: none"> • OPEN 1-FCV-67-123 CNTMT SPRAY HX 1B INLET. • OPEN 1-FCV-67-124 CNTMT SPRAY HX 1B RETURN.
	SRO	4. IF supply flow less than 5200 gpm on 1-FI-67-136 CS HX 1A SUP FLOW and 1-FI-67-122 CS HX 1B SUP FLOW THEN ADJUST CCS heat exchanger outlet valves as necessary, and CONSULT TSC.

Op Test No.:	<u>NRC</u>	Scenario #	<u>3</u>	Event #	<u>7, 8, 9 and 10</u>	Page	<u>27</u>	of	<u>45</u>
Event Description:		Large loss-of-coolant-accident occurs. Requires entry into E-0, E-1, and a transition to ES-1.3. 1A-A and 1B-B safety injection pumps fail to start automatically on the safety injection signal. Automatic sump swapover fails to actuate. Attempts to manually position valves are unsuccessful.							
Time	Position	Applicant's Actions or Behavior							

EXAMINER: The following actions are taken from ECA-1.1,"Loss of RHR Sump Recirculation" Appendix C, "CNTMT SPRAY RECIRC TO RWST ALIGNMENT" and complete the alignment of the containment spray to the RWST alignment.

	RO	g. OPEN 1-ISV-72-502, CNTMT SPRAY TEST LINE ISOLATION [A5U/715 BIT rm]. h. OPEN 1-ISV-72-503, CNTMT SPRAY HDR A TEST LINE ISOLATION [A5V/719 BIT rm]. i. OPEN 1-FCV-72-44, CNTMT SUMP TO CS PMP A SUCT. j. START cntmt spray pump A. k. ENSURE flow to RWST on 1-FI-72-34, CS PMP A FLOW.
EXAMINER: The following actions are taken from ECA-1.1,"Loss of RHR Sump Recirculation" beginning at Step 11, where actions were suspended while Appendix B and C were completed.		
	BOP	11. MONITOR CST volume greater than 200,000 gal.
	BOP	12. MAINTAIN Intact S/G NR levels: a. MONITOR Intact S/G NR levels greater than 29% [39% ADV]. b. CONTROL intact S/G levels between 29% and 50% [39% and 50% ADV].
		13. MONITOR shutdown margin during RCS cooldown: • REFER TO 1-SI-0-10, Shutdown Margin OR REACTINW Computer Program.

Op Test No.: NRC Scenario # 3 Event # 7, 8, 9 and 10 Page 28 of 45

Event Description: Large loss-of-coolant-accident occurs. Requires entry into E-0, E-1, and a transition to ES-1.3. 1A-A and 1B-B safety injection pumps fail to start automatically on the safety injection signal. Automatic sump swapover fails to actuate. Attempts to manually position valves are unsuccessful.

Time	Position	Applicant's Actions or Behavior
	BOP	<p>14. INITIATE RCS cooldown to cold shutdown:</p> <p>a. WHEN RCS pressure is less than 1962 psig (P-11), THEN</p> <ul style="list-style-type: none"> • BLOCK low pwr pressure SI. • BLOCK low steam pressure SI. <p>b. MAINTAIN T-cold cooldown less than 100°F in any 1 hour.</p> <p>c. DUMP steam to condenser from Intact S/Gs.</p> <p>c. <u>RESPONSE NOT OBTAINED:</u></p> <p>c. IF condenser NOT available, THEN Manually or locally DUMP steam from Intact S/G:</p> <ul style="list-style-type: none"> • USE Intact S/G PORV, OR • USE TD AFW pump supply from Intact S/G. OR • RESET Phase A, AND USE Intact S/G blowdown. <p>IF Intact S/G NOT available, THEN USE Faulted S/G.</p> <p><i>Main steam isolation valves are closed due to high containment pressure, so steam dumps are unavailable. The crew will use the SG PORVs for the cooldown.</i></p>
		<p>15. CHECK ECCS in service:</p> <ul style="list-style-type: none"> • Any SI pump RUNNING, OR • Flow thru BIT, OR • Any RHR pump RUNNING in ECCS mode.
		<p>15. <u>RESPONSE NOT OBTAINED:</u></p> <p>IF ECCS NOT in service, THEN ** GO TO Step 25.</p>
		<p>25. CHECK makeup flow adequate to maintain RCS:</p> <p>a. RVLIS greater than 60% with NO RCP running,</p> <p>OR</p> <p>RVLIS greater than 63% with ANY RCP running.</p> <p>b. Incore T/Cs stable or dropping.</p>
<p>EXAMINER: When Step 25 is addressed, inform crew that another crew will continue from this point, and terminate the scenario.</p>		
<p>END OF SCENARIO</p>		

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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**APPENDIX A
(E-0)**

Page 1 of 10

EQUIPMENT VERIFICATION

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|---|--|
| <p>1. ENSURE PCBs OPEN:</p> <ul style="list-style-type: none"> • PCB 5084. • PCB 5088. | <p>OPEN manually.</p> |
| <p>2. ENSURE AFW pump operation:</p> <ul style="list-style-type: none"> • Both MD AFW pumps RUNNING. • TD AFW pump RUNNING. • LCVs in AUTO, or controlled in MANUAL. | <p>ESTABLISH at least one train AFW operation.</p> |
| <p>3. ENSURE MFW isolation:</p> <ul style="list-style-type: none"> • MFW isolation and bypass isolation valves CLOSED. • MFW reg and bypass reg valves CLOSED. • MFP A and B TRIPPED. • Standby MFP STOPPED. • Cond demin pumps TRIPPED. • Cond booster pumps TRIPPED. | <p>Manually CLOSE valves and STOP pumps, as necessary.</p> <p>IF any valves can NOT be closed, THEN CLOSE #1 hoator outlet valves.</p> |

WBN

REACTOR TRIP OR SAFETY INJECTION

E-0
Rev 28

Step

Action/Expected Response

Response Not Obtained

APPENDIX A
(E-0)

Page 2 of 10

EQUIPMENT VERIFICATION

4. **MONITOR** ECCS operation:

- | | |
|---|--|
| a. Charging pumps RUNNING. | a. Manually START charging pumps. |
| b. Charging pump alignment: <ul style="list-style-type: none"> • RWST outlets 1-LCV-62-135 and 1-LCV-62-136 OPEN. • VCT outlets 1-LCV-62-132 and 1-LCV-62-133 CLOSED. • Charging 1-FCV-62-90 and 1-FCV-62-91 CLOSED. | b. ENSURE at least one valve in each set aligned. |
| c. RHR pumps RUNNING. | c. Manually START RHR pumps. |
| d. SI pumps RUNNING. | d. Manually START SI pumps. |
| e. BIT alignment: <ul style="list-style-type: none"> • Outlets 1-FCV-63-25 and 1-FCV-63-26 OPEN. • Flow thru BIT. | e. ENSURE at least one valve aligned, and flow thru BIT. |
| f. RCS pressure greater than 1650 psig. | f. ENSURE SI pump flow.

IF RCS press drops to less than 150 psig,
THEN
ENSURE RHR pump flow. |

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A
(E-0)

Page 3 of 10

EQUIPMENT VERIFICATION

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|---|---|---|
| 5 | <p>CHECK cntmt isolation:</p> <p>a. Phase A isolation:</p> <ul style="list-style-type: none"> • Train A GREEN. • Train B GREEN. <p>b. Cntmt vent isolation:</p> <ul style="list-style-type: none"> • Train A GREEN. • Train B GREEN. | <p>ACTUATE Phase A and Cntmt Vent Isolation signal,
OR
Manually CLOSE valves and dampers as necessary.</p> |
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WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A
(E-0)
Page 4 of 10
EQUIPMENT VERIFICATION

6. **CHECK** cntmt pressure:

- Phase B DARK [MISSP].
- Cntmt Spray DARK [MISSP].
- Cntmt press less than 2.8 psig.

PERFORM the following:

- 1) **ENSURE** Phase B actuated.
- 2) **ENSURE** Cntmt Spray actuated.
- 3) **ENSURE** cntmt spray pumps running.
- 4) **ENSURE** cntmt spray flow.
- 5) **ENSURE** Phase B isolation:
 - Train A GREEN.
 - Train B GREEN
 - Manually **CLOSE** valves and dampers as necessary.
- 6) **STOP** all RCPs.
- 7) **ENSURE** MSIVs and bypasses CLOSED.
- 8) **PLACE** steam dump controls OFF.
- 9) **WHEN** 10 minutes has elapsed since Phase B actuated,
THEN
ENSURE air return fans start.
- 10) **USE** adverse cntmt [ADV] setpoints where provided.

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A
(E-0)

Page 5 of 10

EQUIPMENT VERIFICATION

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|---|---|
| <p>7. CHECK plant radiation NORMAL:</p> <ul style="list-style-type: none"> • S/G blowdown rad recorder 1-RR-90-120 NORMAL prior to isolation [M-12]. • Condenser vacuum exhaust rad recorder 1-RR-90-119 NORMAL prior to trip [M-12]. • 1-RR-90-106 and 1-RR-90-112 radiation recorders NORMAL prior to isolation [M-12]. • S/G main steamline discharge monitors NORMAL [M-30]. • Upper and Lower containment high range monitors NORMAL [M-30]. • NOTIFY Unit Supervisor conditions NORMAL. | <p>NOTIFY Unit Supervisor IMMEDIATELY.</p> |
| <p>8. ENSURE all D/Gs RUNNING.</p> | <p>EMERGENCY START D/Gs</p> |

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A
(E-0)

Page 6 of 10

EQUIPMENT VERIFICATION

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|---|---|
| <p>9. ENSURE ABGTS operation:</p> <p>a. ABGTS fans RUNNING.</p> <p>b. ABGTS dampers OPEN:</p> <ul style="list-style-type: none"> • FCO-30-146A. • FCO-30-146B. • FCO-30-157A. • FCO-30-157B. | <p>a. Manually START fans.</p> <p>b. Locally OPEN dampers.</p> |
| <p>10. ENSURE at least four ERCW pumps RUNNING, one on each shutdown board preferred.</p> | <p>Manually START pumps as necessary.</p> |
| <p>11. ENSURE ERCW supply valves OPEN to running D/Gs.</p> | <p>IF ERCW can NOT be aligned to running D/G,
THEN
EMERGENCY STOP affected D/G.</p> |
| <p>12. ENSURE CCS HX C ALT DISCH TO HDR B, 0-FCV-67-152, is open to position A.</p> | <p>Manually OPEN 0-FCV-67-152 to position A.</p> |

WBN

REACTOR TRIP OR SAFETY INJECTION

E-0

Rev 28

Step

Action/Expected Response

Response Not Obtained

APPENDIX A (E-0)

Page 7 of 10

EQUIPMENT VERIFICATION

13. **CLOSE** CCS HX C
DISCH TO HDR A,
0-FCV-67-144.

14. **MONITOR** EGTS operation:
- EGTs fans RUNNING.
 - **ENSURE** dampers OPEN
VERIFY filter bank dp between
5 and 9 inches of water.

Manually **START** fans **OPEN**
dampers.

15. **ENSURE** CCS pumps RUNNING:
- 1A-A CCS pump.
 - 1B-B CCS pump.
 - C-S OR 2B-B CCS pump.

Manually **START** pumps as
necessary.

- NOTE**
- The Upper and Lower Cntmt rad monitors sampling pumps should be shutdown if the sample flowpath is isolated.
 - The following equipment is located on 1-M-9.

16. **CHECK** CNTMT PURGE fans
STOPPED:

STOP fans and
PLACE handswitch in
PULL-TO-LOCK.

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A
(E-0)

Page 8 of 10

EQUIPMENT VERIFICATION

- | | |
|--|--|
| 17. CHECK FUEL HANDLING EXH fans STOPPED, Fuel and Cask loading dampers CLOSED: | STOP fans and PLACE handswitch in PULL-TO-LOCK, manually CLOSE dampers. |
|--|--|

- | | |
|---|---|
| 18. ENSURE AB GEN SUPPLY and EXH fans STOPPED. | STOP fans and PLACE handswitch in PULL-TO-LOCK. |
|---|---|

NOTE • Dampers 1-HS-30-158 and 2-HS-30-270 remain open during ABL.

- | | |
|--|--------------------------------|
| 19. ENSURE AB GEN SUP & EXH dampers CLOSED. | Manually CLOSE dampers. |
|--|--------------------------------|

- | | |
|--|--------------------------------|
| 20. ENSURE MCR & SPREAD RM FRESH AIR dampers CLOSED: | Manually CLOSE dampers. |
| <ul style="list-style-type: none"> • FCV-31-3. • FCV-31-4. | |

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A
(E-0)

Page 9 of 10

EQUIPMENT VERIFICATION

21. **ENSURE** at least one CB EMER CLEANUP fan RUNNING and associated damper OPEN: Manually **START** fan.
- CB EMERG CLEANUP FAN A-A,
OR
Fan B-B RUNNING.
 - FCO-31-8, OPEN.
OR
FCO-31-7, OPEN.
- NOTIFY** TSC if at least one damper NOT OPEN.
22. **ENSURE** at least one CB EMER PRESS fan RUNNING and associated damper OPEN: Manually **START** fan.
- CB EMERG PRESS FAN A-A,
OR
FAN B-B RUNNING.
 - FCO-31-6, OPEN.
OR
FCO-31-5, OPEN.
- NOTIFY** TSC if at least one damper NOT OPEN.

WBN

REACTOR TRIP OR SAFETY INJECTION

E-0
Rev 28

Step

Action/Expected Response

Response Not Obtained

APPENDIX A
(E-0)

Page 10 of 10

EQUIPMENT VERIFICATION

23. **ENSURE** Control Building fans
STOPPED and dampers CLOSED:

- SPREADING ROOM SUPPLY and
EXH FANS AND dampers.
- TOILET & LKR RM EXHAUST FAN
AND dampers.

Manually **STOP** fans.**NOTIFY** TSC if any
damper NOT CLOSED.

24. **INITIATE** Appendix B.

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX B
(E-0)

Page 1 of 1

PHASE B PIPE BREAK CONTINGENCIES

- | | |
|---|--|
| 1. CHECK PHASE B actuated.
(MISSP - 1-XX-55-6C, -6D) | WHEN PHASE B actuation occurs;
THEN
GO TO step 2. |
| 2. ENSURE 1-FCV-32-110 CLOSED.
(CISP - 1-XX-55-6E)
[A-train, window 13] | DISPATCH AUO to perform
ATTACHMENT B1. |
| 3. ENSURE 1-FCV-67-107 CLOSED.
(CISP - 1-XX-55-6E)
[A -train, window 43] | DISPATCH AUO to perform
ATTACHMENT B2. |
| 4. ENSURE 1-FCV-70-92 CLOSED.
(CISP - 1-XX-55-6E)
[A -train, window 73] | DISPATCH AUO to perform
ATTACHMENT B3. |
| 5. ENSURE 1-FCV-70-140 CLOSED.
(CISP - 1-XX-55-6F)
[B -train, window 74] | DISPATCH AUO to perform
ATTACHMENT B4. |

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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ATTACHMENT B1

(E 0)

Page 1 of 1

CONTROL AIR ISOLATION

1. **CLOSE** 0-SV-32-1013 - CONTROL AIR EL 713 AB HDR ISOL
[A6/S EL. 713] (chain operated - behind Fuel and Waste Handling Bd. A).
2. IF 0-ISV-32-1013 CANNOT BE CLOSED,
THEN:

OPEN and **DISCONNECT** C&SS air compressor breakers:

- a) 0-BKR-32-25 - 480V SD BD 1A2-A, C/3D
- b) 0-BKR-32-26 - 480V SD BD 1B1-B, C/3D
- c) 0-BKR-32-27 - 480V AUX BLDG COM BD, C/6C
- d) 0-BKR-32-1300A - 480V TURB BLDG COM BD, C/6C

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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ATTACHMENT B2

(E-0)

Page 1 of 1

ERCW ISOLATION

1. **UNLOCK AND CLOSE** 1-ISV-67-523D - LOWER CNTMT VENT CLR 1D & 1D
ERCW SUP ISOL [A2U/692] (U-1 penetration room - North of AB Pipe Chase
Cooler 1B-B in overhead)

WBN

REACTOR TRIP OR SAFETY INJECTION

E-0

Rev 28

ATTACHMENT B3

(E-0)

Page 1 of 1

CCS RETURN ISOLATION

1. **CLOSE** 1-ISV-70-700 RCP OIL COOLER CCS RETURN ISOLATION
[A4/V EL. 710 U-1 Penetration Room] (approximately 10 ft. North of Penetration
Room Cooler 1B-B on mezzanine above RHR Sump Valve Room)

ATTACHMENT B4

(E-0)

Page 1 of 1

CCS SUPPLY ISOLATION

1. **CLOSE** 1-SV-70-516 REACTOR BUILDING CCS SUPPLY ISOLATION
[A6/T EL. 737] (Behind Elevator approximately 2 ft. west on mezzanine above
"A" CCS Heat Exchanger)

WBN	LOSS OF RHR SUMP RECIRCULATION	ECA-1.1 Rev 11
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APPENDIX B

(ECA-1.1)

Page 1 of 1

ERCW OPERATION

1. ENSURE at least two ERCW pumps running on each train.
2. ALIGN ERCW to Train A cntmt spray:
 - OPEN 1-FCV-87-125 CNTMT SPRAY HX 1A INLET.
 - OPEN 1-FCV-87-126 CNTMT SPRAY HX 1A RETURN.
3. ALIGN ERCW to Train B cntmt spray:
 - OPEN 1-FCV-87-123 CNTMT SPRAY HX 1B INLET.
 - OPEN 1-FCV-87-124 CNTMT SPRAY HX 1B RETURN.
4. IF supply flow less than 5200 gpm on 1-FI-87-136 CS HX 1A SUP FLOW and 1-FI-87-122 CS HX 1B SUP FLOW
THEN
ADJUST CCS heat exchanger outlet valves as necessary, and
CONSULT TSC.

WBN	LOSS OF RHR SUMP RECIRCULATION	ECA-1.1 Rev 11
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APPENDIX C
(ECA-1.1)
Page 1 of 2

CNTMT SPRAY RECIRC TO RWST ALIGNMENT
(TRAIN A)

1. IF Train A cntmt spray is to be aligned to recirc to RWST,
THEN
PERFORM the following.
 - a. NOTIFY RADPROT of RWST alignment.
 - b. RESET Cntmt Spray signal.
 - c. PI ACF cntmt spray pump A in PULL-TO-LOCK.
 - d. CLOSE 1-FCV-72-22, RWST TO CS PMP A SUCTION.
 - e. CLOSE 1-FCV-72-39, CNTMT SPRAY HDR A TO CNTMT.
 - f. PLACE ERCW on Train A CS Heat Exchanger per Appendix B.
 - g. OPEN 1-ISV-72-502, CNTMT SPRAY TEST LINE ISOLATION
(A5U715 BIT rm).
 - h. OPEN 1-ISV-72-503, CNTMT SPRAY HDR A TEST LINE ISOLATION
(A5W719 BIT rm).
 - i. OPEN 1-FCV-72-44, CNTMT SUMP TO CS PMP A SJCT.
 - j. START cntmt spray pump A.
 - k. ENSURE flow to RWST on 1-FI-72-34, CS PMP A FLOW.

SHIFT TURNOVER CHECKLIST

Page 1 of 2

SHIFT TURNOVER CHECKLIST 3			
Page _____ of _____			
<input type="checkbox"/> SM <input checked="" type="checkbox"/> US/MCR <input type="checkbox"/> UO <input type="checkbox"/> AUO <input type="checkbox"/> STA (STA Function)	Unit _____ Unit _____ Station _____		_____ <u>Off-going - Name</u> _____ <u>On-coming - Name</u>
Part 1 - Completed by off-going shift/Reviewed by on-coming shift:			
<ul style="list-style-type: none"> • Abnormal equipment lineup/conditions: None _____ _____ • SI/Test in progress/planned: (including need for new brief) 1-SI-68-34 _____ _____ _____ • Major Activities/Procedures in progress/planned: Power is stable at 1.66 x 10-4% power, Mode 2. Source range channels have been blocked (P-6). Continue with reactor startup using GO-2, "Reactor Startup," to 1-2% power and then start the 1A main feedwater pump. Currently at Step 24 of GO-2, "Reactor Startup," Section 5.3, "Reactor Startup. " Rod withdrawal is being conducted per SOI-85.01, "Control Rod Drive and Indication System." SOI-2&3.01. Condensate and Feedwater System," Section 5.10, "MFP 1A Operation," is signed off through step 41.7. ECP was 100 steps on Bank D. RCS boron concentration is currently 1620 ppm. _____ _____ • Radiological changes in plant during shift: None planned _____ _____ _____ 			
Part 2 - Performed by on-coming shift			
<input type="checkbox"/> A review of the Operating Log since last held shift or 3 days, whichever is less. <input type="checkbox"/> A review of the Rounds sheets/Abnormal readings (AUOs only) Review the following for changes since last shift turnover: <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div> <input type="checkbox"/> Standing Orders </div> <div> <input type="checkbox"/> LCO(s) in actions (N/A for AUOs) </div> <div> <input type="checkbox"/> PER review (N/A for AUOs) </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div> <input type="checkbox"/> TACFs (N/A for AUOs) </div> <div> <input type="checkbox"/> Operator workarounds, burdens </div> <div> <input type="checkbox"/> Immediate required reading. </div> </div> <p style="text-align: center; margin-top: 5px;">and other challenges</p>			
Part 3 - Performed by both off-going and on-coming shift			
<input type="checkbox"/> A walkdown of the MCR control boards (N/A for AUOs) <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div>Relief Time: _____</div> <div>Relief Date: _____</div> </div>			

SHIFT TURNOVER CHECKLIST

Page 2 of 2

SHIFT TURNOVER CHECKLIST 3			
Page _____ of _____			
<input type="checkbox"/> SM <input type="checkbox"/> US/MCR <input checked="" type="checkbox"/> UO <input type="checkbox"/> AUO <input type="checkbox"/> STA (STA Function)	Unit _____ Unit _____ Station _____		<div style="border-bottom: 1px solid black; margin-bottom: 5px;">Off-going - Name</div> <div style="border-bottom: 1px solid black; margin-bottom: 5px;">On-coming - Name</div>
Part 1 - Completed by off-going shift/Reviewed by on-coming shift:			
<ul style="list-style-type: none"> • Abnormal equipment lineup/conditions: <div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div> <div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div> <div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div> • SI/Test in progress/planned: (including need for new brief) 1-SI-68-34 <div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div> <div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div> • Major Activities/Procedures in progress/planned: Power is stable at 1.66 x 10-4% power, Mode 2. Source range channels have been blocked (P-6). Continue with reactor startup using GO-2, "Reactor Startup," to 1-2% power and then start the 1A main feedwater pump. Currently at Step 24 of GO-2, "Reactor Startup," Section 5.3, "Reactor Startup. " Rod withdrawal is being conducted per SOI-85.01, "Control Rod Drive and Indication System." SOI-2&3.01. Condensate and Feedwater System," Section 5.10, "MFP 1A Operation," is signed off through step 41.7. ECP was 100 steps on Bank D. RCS boron concentration is currently 1620 ppm. <div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div> • Radiological changes in plant during shift: <div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div> <div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div> 			
Part 2 - Performed by on-coming shift			
<div style="display: flex; flex-wrap: wrap;"> <div style="width: 50%;"> <input type="checkbox"/> A review of the Operating Log since last held shift or 3 days, whichever is less. </div> <div style="width: 50%;"> <input type="checkbox"/> A review of the Rounds sheets/Abnormal readings (AUOs only) </div> </div> <p>Review the following for changes since last shift turnover:</p> <div style="display: flex; flex-wrap: wrap;"> <div style="width: 33%;"> <input type="checkbox"/> Standing Orders </div> <div style="width: 33%;"> <input type="checkbox"/> LCO(s) in actions (N/A for AUOs) </div> <div style="width: 33%;"> <input type="checkbox"/> PER review (N/A for AUOs) </div> <div style="width: 33%;"> <input type="checkbox"/> TACFs (N/A for AUOs) </div> <div style="width: 33%;"> <input type="checkbox"/> Operator workarounds, burdens </div> <div style="width: 33%;"> <input type="checkbox"/> Immediate required reading. </div> </div> <p style="text-align: center;">and other challenges</p>			
Part 3 - Performed by both off-going and on-coming shift			
<input type="checkbox"/> A walkdown of the MCR control boards (N/A for AUOs)			
Relief Time: _____		Relief Date: _____	

Facility:	Watts Bar NRC Exam 1 August 2010	Scenario No.:	4	Op Test No.:	1
Examiners:	_____	Operators:	_____	SRO	
	_____		_____	RO	
	_____		_____	BOP	
Initial Conditions: 100% power, MOL. RCS boron is 747 ppm. Control Bank D is at 220 steps.					
Turnover: Train A/Channel I Work Week. Reduce power to 95%, to support removing the 1A CBP from service after assuming shift. 1A DG is out-of-service for planned maintenance on the air start system. Expected return to service in 8 hours. LCO 3.8.1.B was entered 2 hours ago. SR 3.8.1.1 was performed 45 minutes after LCO entry. The air start system problem has been isolated to the 1A DG. The National Weather Service has issued a Severe Thunderstorm Warning for Meigs, McMinn and Rhea Counties for the next 6 hours.					
Event No.	Malfunction No.	Event Type*	Event Description		
1	n/a	N-BOP R-RO	Reduce power using GO-4, "Normal Power Operations," to support shutdown 1A Condensate Booster Pump.		
2	rx05a 33	I-RO TS-SRO	PZR level transmitter, 1-LT-68-339 fails to approximately 33%, requiring entry into AOI-20, "Malfunction of Pressurizer Level Control System," and a Tech Spec evaluation.		
3	rx11a 0	I-RO TS-SRO	Turbine impulse pressure, 1-PT-1-73, fails low, requiring entry into AOI-2, "Malfunction of Reactor Control System," and a Tech Spec evaluation.		
4	rx09b	I-BOP	Steam flow transmitter, 1-FT-1-10a fails low, requiring entry into AOI-16, "Loss of Normal Feedwater."		
5	cc07a cc03b	C-BOP	1A CCS pump shaft shears and 1B CCS pump fails to auto start. AOI-15, "Loss of Component Cooling Water (CCS)," entry is required.		
6	th05c	M-All	SG 3 tube leak, requiring entry into AOI-33, "Steam Generator Tube Leak," and a rapid plant shutdown using AOI-39, "Rapid Load Reduction." SG 3 tube ruptures, requiring a reactor trip and safety injection initiation. Requires entry into E-0, "Reactor Trip or Safety Injection" and E-3, "Steam Generator Tube Rupture."		
7	ed06a	C-BOP	1A-A 6.9 KV Shutdown Board trips due to differential lockout relay operation at the time of the reactor trip. Requires performance of AOI-43.01, "Loss of Unit 1 Train A Shutdown Boards," during performance of EOPs.		
8	ms04c	C-BOP	#3 MSIV fails to close.		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

DRAFT

Scenario 4 - Summary

Initial Condition 100% power, MOL. RCS boron is 747 ppm. Control Bank D is at 220 steps.

Turnover Train A/Channel I Work Week. Reduce power to 95%, to support removing the 1A CBP from service after assuming shift. 1A DG is out-of-service for planned maintenance on the air start system. Expected return to service in 8 hours. LCO 3.8.1.B was entered 2 hours ago. SR 3.8.1.1 was performed 45 minutes after LCO entry. The air start system problem has been isolated to the 1A DG. The National Weather Service has issued a Severe Thunderstorm Warning for Meigs, McMinn and Rhea Counties for the next 6 hours.

- Event 1** Reduce power using GO-4, "Normal Power Operations," to support shutdown 1A Condensate Booster Pump.
- Event 2** The pressurizer level transmitter selected for level control, 1-LT-68-339, slowly lowers to approximately 33%. The SRO enters and directs the actions of AOI-20, "Malfunction of Pressurizer Level Control System." (Letdown isolation will NOT occur, since level remains above the 17% setpoint.) The SRO evaluates conditions and enters Tech Spec LCO 3.3.1, Reactor Trip System (RTS) Instrumentation, Condition X, LCO 3.3.3, Post Accident Monitoring (PAM) Instrumentation Function 13, Condition A.
- Event 3** Turbine impulse pressure, 1-PT-1-73, fails low, causing the T-reference input to the Rod Control System to indicate a power mismatch between reactor and turbine power. Rods will insert requiring the operator to place rod control in manual. AOI-2, "Malfunction of Reactor Control System," Section 3.2, "Continuous Rod Withdrawal/Insertion." The SRO evaluates conditions and enters Tech Spec LCO 3.3.1, Reactor Trip System (RTS) Instrumentation, Function 16.f, Condition S.
- Event 4** Steam flow transmitter, 1-FT-1-10A fails low, resulting in a steam flow-feed flow mismatch signal which throttles closed SG 2 main feedwater regulating, resulting in a SG 2 level drop. The operator must place SG 2 main feedwater regulating valve 1-FIC-3-48 in manual to recover from the level drop. The SRO enters and directs the actions of AOI-16, "Loss of Normal Feedwater," Section 3.6, "Main FW Reg or Bypass Reg Valve Control Failure." SG 2 main feedwater regulating valve will be returned to automatic.
- Event 5** 1A CCS pump shaft shears and 1B CCS pump fails to auto start on low header pressure. The SRO enters and directs the actions of AOI-15, "Loss of Component Cooling Water (CCS)." The SRO evaluates conditions and enters Tech Spec LCO 3.7.7 Component Cooling System (CCS) Condition A.
- Event 6** SG 3 tube leak develops, requiring entry into AOI-33, "Steam Generator Tube Leak," and AOI-39, "Rapid Load Reduction." SG 3 tube ruptures, requiring a reactor trip and safety injection initiation. Requires entry into E-0, "Reactor Trip or Safety Injection" and E-3, "Steam Generator Tube Rupture."
- Event 6** 1A-A 6.9 KV Shutdown Board trips due to differential relay operation at the time of the reactor trip. The board failure requires performance of AOI-43.01, "Loss of Unit 1 Train A Shutdown Boards," during the performance of the EOPs.
- Event 7** #3 MSIV fails to close. All attempts to close the MSIV will be unsuccessful. This will require specific E-3, RESPONSE NOT OBTAINED actions to be performed to address steam generator isolation.

Scenario 4 - Critical Task Summary

<i>Critical Task 1 from WOG Critical Task List for E-3 A.</i>	<i>Isolate feedwater flow into and steam flow from the ruptured SG before a transition to ECA-3.1 occurs. Once an affected steam generator has been identified, it is isolated from the intact steam generators to limit radiological releases and as a necessary step toward stopping primary-to-secondary leakage. Feedwater flow is also terminated to the affected steam generator after level has returned into the narrow range. This minimizes the possibility of steam generator overfill.</i>
<i>Critical Task 2</i>	<i>Isolate secondary pathways to limit depressurization and contamination by initiating Attachment 2 (E-3), Steamline Isolation (MCR), and Attachment 3 (E-3), Steamline Isolation (Local) prior to initiating RCS cooldown. Isolation is performed to maintain ruptured SG pressurized during the cooldown in order to allow subsequent RCS depressurization to ruptured SG pressure while maintaining RCS subcooling.</i>
<i>Critical Task 3 from WOG Critical Task List for E-3 B.</i>	<i>Establish/maintain an RCS temperature so that transition from E-3 does not unnecessarily occur. Properly identifies, establishes cooldown, and maintains temperature at target temperature in accordance with E-3, Steps 17 and 18.</i>
<i>Critical Task 4 from WOG Critical Task List for E-3 D.</i>	<i>Depressurize RCS to meet SI termination criteria before E-3, "Steam Generator Tube Rupture," Step 31 criteria are exceeded. RCS pressure is decreased to stop primary-to-secondary leakage and establish indicated pressurizer level greater than 15%.</i>

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 4
Simulator Console Operators Instructions

SIMULATOR SETUP INFORMATION

1. ENSURE NRC Examination Security has been established.
2. RESET to Initial Condition 344 by performing the following actions:
 - a. Select ICManger on the THUNDERBAR menu (right hand side of Instructor Console Screen).
 - b. Locate IC# 344.
 - c. Right "click" on IC# 344.
 - d. Select Reset on the drop down menu.
 - e. Right "click" on RESET.
 - f. Enter the password for IC 344.
 - g. Select "Yes" on the INITIAL CONDITION RESET pop-up window.
 - h. Perform SWITCH CHECK.
3. SELECT Director on the THUNDERBAR menu (right hand side of Instructor Console Screen).
4. ENSURE the following information appears on the Director Screen:

Key		Type	Event	Delay	Inserted	Ramp	Initial	Final	Value
mux_07c028	197-a dg 1a-a mode selector in maintenance	M		00:00:00	00:00:00	00:00:00		Alarm	Alarm
eg3a	diesel generator failure to start dg 1a-a	M		00:00:00	00:00:00	00:00:00		Active	Active
mux_07c031	200-a dg 1a-a controls disconnected	M		00:00:00	00:00:00	00:00:00		Alarm	Alarm
ms04c	msiv fails to close fcv-1-22	M		00:00:00	00:00:00	00:00:00		Active	Active
mux_07c040	195-c dg 1a-a start air press lo [ps-82-162]	M		00:00:00	00:00:00	00:00:00		Alarm	Alarm
cc03b	ccs pump 1b-b auto start inhibit	M		00:00:00	00:00:00	00:00:00		Active	Active

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 4
Simulator Console Operators Instructions

SIMULATOR SETUP INFORMATION

Key		Type	Event	Delay	Inserted	Ramp	Initial	Final	Value
hs-57-46a-1	dsl gen 1a-a to sd-bd 1 a-a bkr (green)	O		00:00:00	00:00:00	00:00:00		Off	00:00:00
hs-46-1	dsl gen 1a-a to sd-bd 1 a-a bkr (green)	O		00:00:00	00:00:00	00:00:00		Off	00:00:00
ed06a	loss of 6.9 kv shutdown board bus 1a-a	M	19	00:00:10		00:00:00		Active	InActive
rx05a	pzr level transmitter fails to position chnl 1-68-339	M	2	00:00:00		00:00:00		33	60.5077
rx11a	impulse pressure transmitter 1-73 fail to position	M	3	00:00:00		00:00:00		5	91.0115
rx09b	main steam flow transmitter failure ft-1-10a	M	4	00:00:00		00:00:00		20	86.0676
cc07a	ccs pump 1a-a shaft break	M	5	00:00:00		00:00:00		Active	InActive
th05c	steam generator tube failure sg #3	M	6	00:00:00		00:00:00		1.5	0

5. Place simulator in RUN and acknowledge any alarms.
6. Place RED HOLD NOTICE tags on 1A-A Diesel Generator.
7. Ensure the indicating lights on 1A-A Diesel Generator.
8. ENSURE 1A-A Diesel Generator.
9. ENSURE the "Train A Week - Channel I" sign is placed on 1-M-30.
10. Place simulator in FREEZE.

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 4
Simulator Console Operators Instructions

SIMULATOR SETUP INFORMATION

11. **ENSURE** Watts Bar Nuclear Plant Unit 1 Reactivity Briefing Book (Simulator Copy) MOL (Middle of Life) is updated and on the desk, and that the MOL placards are on 1-M-6, below the Boric Acid and Primary Water Integrators.

Item 3	•AFD	-11.8	%	-2.3	%	5.8	%
		Lower Band		Target		Upper Band	
				-2.7			
		Actual					
		Manual					
•Control Rods	<input checked="" type="checkbox"/> Auto	<input type="checkbox"/>		220		steps	
		Control Bank D1/D2					
Item 4		<input type="checkbox"/> Negative		<input type="checkbox"/> Positive		<input checked="" type="checkbox"/> None	
		<input type="checkbox"/> 1-CCP A		<input checked="" type="checkbox"/> 1-CCP B		C _B 748 ppm	
Item 5		748		ppm			
Current RCS C _B :		748		ppm			
Current fluid inside the blender is:		<input type="checkbox"/> Acid		<input type="checkbox"/> Water		<input checked="" type="checkbox"/> Blended	
PW flow rate		70 gpm		35%		8 gpm	
1-FC-62-142, dial setting		35%		8 gpm		21%	
BA flow rate		8 gpm		21%			
1-FC-62-139 dial setting		21%		373 gal PW		46 gal BA	
6. Boric Acid (BA) and Primary Water (PW) volumes for the following changes:		373 gal PW		46 gal BA		145 gal BA	
1°F Tav _g increase		46 gal BA		145 gal BA		440 gal BA	
1°F Tav _g decrease		145 gal BA		440 gal BA		179 gal BA	
10% Downpower @ 5%/hr		440 gal BA		179 gal BA		262 gal BA	
50% Downpower @ 5%/hr		179 gal BA		262 gal BA		341 gal BA	
1000 MW (85%) Runback		262 gal BA		341 gal BA		487 gal PW	
950 MW (80%) Runback		341 gal BA		487 gal PW			
900 MW (75%) Runback		487 gal PW					
790 MW or 800 MW Runback							

12. **WHEN prompted by the Chief Examiner, place the Simulator in RUN.**

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 4
Simulator Console Operators Instructions

Exam Event No.	Simulator Event No.	Description/Role Play
1	n/a	Shutdown of 1A Condensate Booster Pump.- ROLE PLAY: Refer to SOI-2&3.01, "Condensate and Feedwater System," Section 7.2, "Shutdown Condensate Booster Pumps," (attached as Pages 8 through 10) and perform local actions as requested.
2	2	PZR level transmitter, 1-LT-68-339 fails to approximately 33%, requiring entry into AOI-20. ROLE PLAY: When contacted as Work Control, acknowledge report and state that a package will be prepared to troubleshoot and repair the failed level transmitter. When requested, state that the IMs will be informed that IMI-160.001 needs to be performed to trip the associated bistables.
3	3	Turbine impulse pressure, 1-PT-1-73, fails low, requiring entry into AOI-2. ROLE PLAY: When contacted as Work Control, acknowledge report and state that a package will be prepared to troubleshoot and repair the failed pressure transmitter. When requested, state that the IMs will be informed that IMI-160.001 needs to be performed bypass the pressure transmitter inputs.
4	4	Steam flow transmitter, 1-FT-1-10a fails low, requiring entry into AOI-16 ROLE PLAY: When contacted as Work Control, acknowledge report and state that a package will be prepared to troubleshoot and repair the failed flow transmitter.

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 4
Simulator Console Operators Instructions

Exam Event No.	Simulator Event No.	Description/Role Play
5	5	<p>1A CCS pump shaft shears and 1B CCS pump fails to auto start. AOI-15 entry is required.</p> <p>ROLE PLAY: <i>When contacted as the Auxiliary Building AUO, acknowledge request to investigate cause of 1A-A CCS pump trip. Report back that the pump motor has signs of an electrical fault (scorch marks, odor of burnt insulation in the area.)</i></p> <p>ROLE PLAY: <i>When contacted as the Control Building AUO, acknowledge request to look for relay operation on the supply breaker for the 1A-A CCS pump. Report back that the pump breaker has tripped on instantaneous overcurrent.</i></p> <p>ROLE PLAY: <i>When contacted as Work Control, acknowledge report and state that a package will be prepared to troubleshoot and repair the 1A-A CCS pump. An additional package will be prepared to determine why the 1B-B CCS pump failed to automatically start on low header pressure.</i></p>

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 4
Simulator Console Operators Instructions

Exam Event No.	Simulator Event No.	Description/Role Play
6		<p>SG 3 tube leak, requiring entry into AOI-33, and a rapid plant shutdown using AOI-39. SG 3 tube ruptures, requiring a reactor trip and safety injection initiation.</p> <p>ROLE PLAY: When contacted as Chemistry, acknowledge the request for samples to be drawn and analyzed for all steam generators. Wait 10 minutes, then call back and report that the #3 SG has higher activity than the other steam generators.</p> <p>ROLE PLAY: When contacted as Radiation Protection, acknowledge the request for surveys to be performed on the steam lines and main steam lines. Wait 10 minutes, then call back and report that the areas around #3 SG have higher activity than the other steam generators.</p> <p>ROLE PLAY: When contacted as the Turbine Building AUO repeat back the request to perform E-3, Attachment 3, STEAMLINE ISOLATION (LOCAL). Report back after 5 minutes that Attachment 3 local actions are complete.</p> <p>ROLE PLAY: When contacted as the Turbine Building AUO repeat back the request to check that the HP warming valves are closed locally (due to loss of power condition. Wait 5 minutes and report back that the warming valves are closed.</p> <p>ROLE PLAY: When contacted as the Outside Routine AUO repeat back the request to perform E-3, Appendix D, MINIMIZE SECONDARY SYSTEM CONTAMINATION. Report back after 10 minutes that Attachment 3 local actions are complete.</p>
7	10 seconds after reactor trip	<p>1A-A 6.9 KV Shutdown Board trips on differential lockout relay operation.</p> <p>ROLE PLAY: When contacted as the Control Building AUO, repeat back request to investigate the 1A-A 6.9 KV Shutdown Board, report that the differential lockout relay has operated, and that there is extensive damage to the board. There is no fire.</p> <p>ROLE PLAY: When Contacted as the Auxiliary Building AUO, repeat back request to align BAT A to the B BA Pump.</p> <p>ROLE PLAY: When contacted as Work Control, acknowledge the request to have a maintenance team go to the 1A-A 6.9 KV Shutdown Board to assess the damage, and to plan repairs.</p>

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 4
Simulator Console Operators Instructions

Exam Event No.	Simulator Event No.	Description/Role Play
6	19	<p>#3 MSIV fails to close.</p> <p>ROLE PLAY: When contacted as the Control Building AUO, repeat back request to perform Attachment 1 of E-3 to close the #3 MSIV. Enter override msr26c to place the aux control room switch in the AUX position. Report to the crew that Attachment 1 of E-3 is complete. (MSIV will remain open for the remainder of the exam scenario.)</p>

**Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 4
Simulator Console Operators Instructions**

WBN Unit 1	Condensate And Feedwater System	SOI-2&3.01 Rev. 0109 Page 117 of 233
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Date _____

INITIALS _____

7.2 Shutdown Condensate Booster Pumps

CAUTION

Prior to shutdown of Condensate Booster Pumps, if 1 PCV 3-40 is in operation, it should be **MOMENTARILY CLOSED** by raising the setpoint of 1-PIC-3-40 to 1200 psia until after pumps are stopped and flow stabilized, and then returned to its previous setting (900 - 1200 psia) as needed.

NOTE

Precaution 3.0F.2 should be reviewed prior to removing a CBP from service.

[1] ENSURE selected CBP AUX OIL PUMP in P-AUTO:

- A. 1-HS-2-105A, AUX OIL PMP CNDS BSTR PMP A _____
- B. 1-HS-2-107A, AUX OIL PMP CNDS BSTR PMP B _____
- C. 1-HS-2-109A, AUX OIL PMP CNDS BSTR PMP C _____

[2] PLACE selected CBP(s) handswitch to STOP, AND

HOLD UNTIL respective suction valve starts to CLOSE
[1-M-3]:

- A. 1-HS-2-97A, CNDS BSTR PMP A _____
- B. 1-HS-2-91A, CNDS BSTR PMP B _____
- C. 1-HS-2-84A, CNDS BSTR PMP C _____

**Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 4
Simulator Console Operators Instructions**

WBN Unit 1	Condensate And Feedwater System	SOI-2&3.01 Rev. 0109 Page 118 of 233
---------------	---------------------------------	--

Date _____

INITIALS

7.2 Shutdown Condensate Booster Pumps (continued)

[3] ENSURE suction valve CLOSED [1-M-3]:

- A. 1-FCV-2-84 [1-HS-2-84A], CNDS BSTR PMP A
SUCTION VLV _____
- B. 1-FCV-2-87 [1-HS-2-87A], CNDS BSTR PMP B
SUCTION VLV _____
- C. 1-FCV-2-81 [1-HS-2-81A], CNDS BSTR PMP C
SUCTION VLV _____

[4] LOCALLY OBSERVE pump rotation stops. _____

[5] IF pump reverse rotation occurs, THEN _____

CLOSE selected Condensate Booster Pump discharge valve:

- A. 1-ISV-2-807, CONDENSATE BSTR PUMP 1A
DISCHARGE ISOL [T7G/685]. _____
- B. 1-ISV-2-808, CONDENSATE BSTR PUMP 1B
DISCHARGE ISOL [T7F/685]. _____
- C. 1-ISV-2-809, CONDENSATE BSTR PUMP 1C
DISCHARGE ISOL [T7F/685]. _____

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 4
Simulator Console Operators Instructions

WBN Unit 1	Condensate And Feedwater System	SOI-2&3.01 Rev. 0109 Page 119 of 233
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Date _____

INITIALS _____

7.2 Shutdown Condensate Booster Pumps (continued)

- [6] CLOSE respective CBP Oil Hx RCW Supply (N/A valves not used):

Condensate Booster Pump 1A				
NOMENCLATURE	LOCATION	POSITION	UNID	PERF INITIAL
CBP OIL COOLER 1A RCW INLET ISOL	T7G/655	CLOSED	1-HSV-24-711	

Condensate Booster Pump 1B				
NOMENCLATURE	LOCATION	POSITION	UNID	PERF INITIAL
CBP OIL COOLER 1B RCW INLET ISOL	T7F/655	CLOSED	1-HSV-24-710	

Condensate Booster Pump 1C				
NOMENCLATURE	LOCATION	POSITION	UNID	PERF INITIAL
CBP OIL COOLER 1C RCW INLET ISOL	T7F/655	CLOSED	1-HSV-24-709	

- [7] REPEAT Steps 7.2[1] thru 7.2[6] as necessary to shutdown remaining CBP(s).

- [8] IF stopping the AUX OIL PUMP THEN

PLACE selected CBP AUX OIL PUMP in STOP
PULL-TO-LOCK:

A. 1-HS-2-105A, AUX OIL PMP CNDS BSTR PMP A _____

B. 1-HS-2-107A, AUX OIL PMP CNDS BSTR PMP B _____

C. 1-HS-2-109A, AUX OIL PMP CNDS BSTR PMP C _____

- [9] Section 7.2, Shutdown Condensate Booster Pumps complete. _____

Op Test No.: NRC Scenario # 4 Event # 1 Page 1 of 57

Event Description: Reduce power using GO-4, "Normal Power Operations," to support shutdown 1A Condensate Booster Pump.

Time	Position	Applicant's Actions or Behavior
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NOTE

Controlling load reductions, Rod position and boron concentration will ensure Axial Flux remains within allowed limits. (For example, Boric acid addition can be set up to control rate of Rod insertion during a down power to control ΔI within the required limits)

	BOP	[12] IF desired to operate in IMP IN, THEN OBTAIN Unit SRO concurrence to operate in IMP IN AND PLACE Turbine in IMP IN
--	-----	--

Evaluator Note: The following actions are taken from SOI-62.02, "Boron Concentration Control," Section 6.7, "Minor Boration."

NOTES

- 1) Section 6.7, may be reproduced, laminated, displayed, reused, etc. as desired.
 2) Minor Boration is defined as the addition of Boric Acid done several times each shift early in core life, to compensate for burnable poison burn-up, and maintain Tav_g on program.

	RO	[1] ENSURE 1-HS-68-341H, BACKUP HEATER C [1-M-4], is ON, to equalize RCS-Pzr CB.																											
	RO	[2] ADJUST 1-FC-62-139, BA TO BLENDER [1-M-6], for desired flow rate.																											
	RO	[3] ADJUST 1-FQ-62-139, BA BATCH COUNTER [1-M-6], for required quantity.																											
	RO	[4] PLACE 1-HS-62-140B, VCT MAKEUP MODE [1-M-6], in BOR.																											
	RO	[5] TURN 1-HS-62-140A, VCT MAKEUP CONTROL [1-M-6], to START. [5.1] CHECK Red light is LIT.																											
	RO	[6] MONITOR the following parameters: <table border="1"> <thead> <tr> <th>Instrument</th><th>Location</th><th>Parameters</th></tr> </thead> <tbody> <tr> <td>1-PI-62-122</td><td>1-M-6</td><td>VCT PRESS</td></tr> <tr> <td>1-LI-62-129A</td><td>1-M-6</td><td>VCT LEVEL</td></tr> <tr> <td>1-FI-62-139</td><td>1-M-6</td><td>BA TO BLENDER FLOW</td></tr> <tr> <td>1-FQ-62-139</td><td>1-M-6</td><td>BA BATCH COUNTER</td></tr> <tr> <td>1-FI-62-142</td><td>1-M-6</td><td>PW TO BLENDER FLOW</td></tr> <tr> <td>1-FQ-62-142</td><td>1-M-6</td><td>PW BATCH COUNTER</td></tr> <tr> <td>1-LI-62-238</td><td>1-M-6</td><td>BAT A LEVEL</td></tr> <tr> <td>1-LI-62-242</td><td>1-M-6</td><td>BAT C LEVEL</td></tr> </tbody> </table>	Instrument	Location	Parameters	1-PI-62-122	1-M-6	VCT PRESS	1-LI-62-129A	1-M-6	VCT LEVEL	1-FI-62-139	1-M-6	BA TO BLENDER FLOW	1-FQ-62-139	1-M-6	BA BATCH COUNTER	1-FI-62-142	1-M-6	PW TO BLENDER FLOW	1-FQ-62-142	1-M-6	PW BATCH COUNTER	1-LI-62-238	1-M-6	BAT A LEVEL	1-LI-62-242	1-M-6	BAT C LEVEL
Instrument	Location	Parameters																											
1-PI-62-122	1-M-6	VCT PRESS																											
1-LI-62-129A	1-M-6	VCT LEVEL																											
1-FI-62-139	1-M-6	BA TO BLENDER FLOW																											
1-FQ-62-139	1-M-6	BA BATCH COUNTER																											
1-FI-62-142	1-M-6	PW TO BLENDER FLOW																											
1-FQ-62-142	1-M-6	PW BATCH COUNTER																											
1-LI-62-238	1-M-6	BAT A LEVEL																											
1-LI-62-242	1-M-6	BAT C LEVEL																											
	RO	[7] WHEN Boration is COMPLETE, THEN PLACE 1-HS-62-140B, VCT MAKEUP MODE, in AUTO.																											
	RO	[8] TURN 1-HS-62-140A, VCT MAKEUP CONTROL, to START. [8.1] CHECK Red light is LIT.																											
	RO	[9] RETURN 1-FC-62-139, BA TO BLENDER [1-M-6], to desired flow rate.																											

Op Test No.: NRC Scenario # 4 Event # 1 Page 2 of 57

Event Description: Reduce power using GO-4, "Normal Power Operations," to support shutdown 1A Condensate Booster Pump.

Time	Position	Applicant's Actions or Behavior
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NOTES

1) Turbine maybe operated in IMP IN above 30% turbine load as long as IMP IN does NOT cause unit instability IMP IN will control turbine load as a percentage of impulse pressure that correlates to % load vs. % of valve opening in IMP OUT. This will allow for a more linear load ascension

2) Turbine load change may be stopped by depressing the HOLD push button, using VPL, or by depressing the MANUAL push button

	BOP	<p>[13] INITIATE load reduction by PERFORMING the following on the Turbine EHC panel:</p> <p>[13.1] IF during any of the following steps the REFERENCE changes in an undesired manner THEN ADJUST VPL to stop turbine load rise.</p> <p>OR</p> <p>PUSH TURBINE MANUAL to place the turbine control mode in manual mode and proceed to section 5.6.</p> <p>[13.2] PUSH REFERENCE CONTROL ▽ (lower) button to set desired load in SETTER display.</p> <p>[13.3] SET LOAD RATE as required.</p> <p>[13.4] PUSH GO button.</p> <p>[13.5] MONITOR Generator Megawatts DROPPING.</p> <p>[13.6] CHECK that load change has STOPPED when reference display equals setter</p> <p>OR</p> <p>IF desired to stop the load change, THEN STOP the load change by DEPRESSING the HOLD pushbutton</p> <p>[13.7] WHEN desired to resume the load change, THEN PRESS the GO push button and continue to monitor load.</p> <p>[13.8] ADJUST VALVE POSITION LIMIT to $\leq 5\%$ above the Gov Control Indication or as needed.</p> <p>[13.9] REPEAT Steps 5.3[13.2] to 5.3[13.5] to achieve desired load.</p>
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CAUTION

Do not exceed load rate of 5%/minute, or 10% step change

	RO	<p>[14] MONITOR the following during the load reduction:</p> <p>[14.1] TAVG following TREF program.</p> <p>[14.2] All RPIs, Step Counters, Loop ΔT, and NIS for correct power distribution, quadrant power tilts, rod insertion, rod misalignment, inoperable RPIs, and inoperable rods.</p>
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Op Test No.: NRC Scenario # 4 Event # 1 Page 3 of 57

Event Description: Reduce power using GO-4, "Normal Power Operations," to support shutdown 1A Condensate Booster Pump.

Time	Position	Applicant's Actions or Behavior
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	SRO	Crew Brief would typically be conducted for this event as time allows prior to the next event.
	SRO	Notifications should be addressed as applicable if not specifically addressed by the procedure or in the crew brief. <u>Operations Management</u> - Typically Shift Manager. <u>Maintenance Personnel</u> – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
Cue Simulator Operator to insert Event 2.		

Op Test No.: NRC Scenario # 4 Event # 2 Page 4 of 57

Event Description: PZR level transmitter, 1-LT-68-339 fails to approximately 33%, requiring entry into AOI-20 and a Tech Spec evaluation.

Time	Position	Applicant's Actions or Behavior
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Indications:

92-A "PZR LEVEL HI/LO

Pressurizer level transmitter, 1-LT-68-339, indicates approximately 33% level.

Letdown remains in service.

	RO	Diagnoses and announces failure of 1-LT-68-339. Reports that letdown isolation is NOT required.
	RO	May enter and take actions of ARI- 92-A PZR LEVEL HI/LO.
	RO	May place 1-HIC-62-93, CHARGING FLOW PZR LEVEL CONTROL to MANUAL and increase charging flow/RCP seal flow.
	SRO	Enters and directs actions of AOI-20, "Malfunction of Pressurizer Level Control System."

Evaluator Note: The following actions are taken from ARI 92-A, "PZR LEVEL HI/LO."

	RO	[1] CHECK PZR level indication on 1-M-4: <ul style="list-style-type: none"> • 1-LI-68-320 • 1-LI-68-335A • 1-LI-68-339
	RO	[2] CHECK PZR level and reference level on 1-LR-68-339 [1-M-5].
	SRO	[3] IF Malfunction Of Pressurizer Level Control System, THEN GO TO AOI-20, MALFUNCTION OF PRESSURIZER LEVEL CONTROL SYSTEM.
	RO	[4] IF level is high, THEN ENSURE letdown in service.
	RO	[5] IF level is low AND PZR level control system is attempting to increase level to program THEN REFER TO AOI-6, SMALL REACTOR COOLANT SYSTEM LEAK.
	SRO	[6] REFER TO Tech Specs.

Evaluator Note: The following actions are taken from AOI-20, "Malfunction of Pressurizer Level Control System."**CAUTION** Charging and letdown must be in service together. If letdown isolates or charging is lost, the other must be isolated.

	RO	1. CHECK pzs level program signal NORMAL: <ul style="list-style-type: none"> • 1-LR-68-339 (green pen).
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Op Test No.: NRC Scenario # 4 Event # 2 Page 5 of 57

Event Description: PZR level transmitter, 1-LT-68-339 fails to approximately 33%, requiring entry into AOI-20 and a Tech Spec evaluation.

Time	Position	Applicant's Actions or Behavior
	RO	2. CHECK if 1-XS-68-339E is selected to FAILED channel (control or backup): <ul style="list-style-type: none"> • LI-68-339, OR • LI-68-320, OR • LI-68-335.
	RO	3. CHECK failure HIGH.
	SRO	3. RESPONSE NOT OBTAINED: IF letdown in service, THEN ** GO TO Step 4.
	RO	4. IF controlling channel failed, THEN PLACE charging valve controller 1-HIC-62-93A in MAN, and RESTORE level to program.
	RO	5. SELECT operable pZR level channels for control and indication [1-M-5]: <ul style="list-style-type: none"> a. SELECT operable channels for control and backup with 1-XS-68-339E. <p>Since 1-LI-68-339 has failed, the RO will select LI-68-335 B 320 position on 1-XS-68-339E.</p> <ul style="list-style-type: none"> b. ENSURE operable channel selected for recording with 1-XS-68-339B. <p>The RO confirms that LT-68-335 is selected on 1-XS-68-339B.</p> <ul style="list-style-type: none"> c. IF backup channel failed high and Letdown still in service, THEN **GO TO Step 8.
	RO	6. CHECK letdown IN SERVICE: <ul style="list-style-type: none"> • 1-FCV-62-69 OPEN. • 1-FCV-62-70 OPEN. • 1-FCV-62-77 OPEN. • Letdown orifice OPEN.
	RO	7. RESTORE pZR level control to normal: <ul style="list-style-type: none"> a. MAINTAIN regen hx letdown temp < 380 °F. b. CONTROL charging and letdown to return pZR level to program. c. ENSURE pZR control heater bank D red light LIT. d. Momentarily PLACE 1-HS-68-341H, pZR backup heater bank C, to OFF. e. CHECK pZR program level NORMAL. <ul style="list-style-type: none"> • 1-LR-68-339 (green pen) f. RETURN charging valve controller 1-HIC-62-93A to AUTO.

Op Test No.: NRC Scenario # 4 Event # 2 Page 6 of 57

Event Description: PZR level transmitter, 1-LT-68-339 fails to approximately 33%, requiring entry into AOI-20 and a Tech Spec evaluation.

Time	Position	Applicant's Actions or Behavior
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	SRO	8. NOTIFY Work Control to remove failed channel from service.
	SRO	9. REFER TO the following Tech Specs: <ul style="list-style-type: none"> 3.3.1, Reactor Trip System (RTS) Instrumentation. Function 9. Pressurizer Water Level –High, Condition X: With one channel inoperable, place the channel in trip within 72 hours, OR reduce THERMAL POWER to <P-7 within 78 hours. 3.3.3, Post Accident Monitoring (PAM) Instrumentation. Function 13. RCS Pressurizer Level, Condition A: With one or more functions with one required channel inoperable, restore the required channel to operable status within 30 days. 3.4.9, Pressurizer. No action required.
	SRO	10. INITIATE repairs to failed instrument/circuitry.
	SRO	11. RETURN TO instruction in effect.
	SRO	Crew Brief would typically be conducted for this event as time allows prior to the next event.
	SRO	Notifications should be addressed as applicable if not specifically addressed by the procedure or in the crew brief. <u>Operations Management</u> - Typically Shift Manager. <u>Maintenance Personnel</u> – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
Cue Simulator Operator to insert Event 3.		

Op Test No.: NRC Scenario # 4 Event # 3 Page 7 of 57

Event Description: Turbine impulse pressure, 1-PT-1-73, fails low, requiring entry into AOI-2, and a Tech Spec evaluation.

Time	Position	Applicant's Actions or Behavior
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Indications:

94-A, "TAVG-TREF DEVIATION"

66-A, "C-5 LO TURB IMPULSE PRESS ROD BLOCK"

64-F, "C-11 BANK D AUTO WITHDRAWAL BLOCKED" cleared.

Control Rods inserting at 72 steps per minute.

Maximum demand on 1-XI-1-33 Steam Dump Demand.

	RO	Diagnoses and announces the failure of 1-PT-1-73, Turbine Impulse Pressure transmitter low.
	RO	May place rod control in MANUAL to stop the unwarranted motion.
	SRO	Enters and directs actions of AOI-2, "Malfunction of Reactor Control System."

Evaluator Note: The following actions are taken from AOI-2, "Malfunction of Reactor Control System."

	RO	1. PLACE control rods in MAN.
	RO	2. CHECK control rod movement STOPPED.
	RO	3. MAINTAIN T-avg on PROGRAM. (Reference Attachment 1) USE control rods. OR ADJUST turbine load.
	RO	4. CHECK loop T-avg channels NORMAL.
	RO	5. CHECK Auct Tavg NORMAL on 1-TR-68-2B.
	RO	6. CHECK NIS power range channels NORMAL.
	RO	7. CHECK the following: <ul style="list-style-type: none"> Turbine impulse pressure channel 1-PI-1-73, NORMAL. Tref and Auct Tavg NORMAL on 1-TR-68-2B (Reference Attachment 1)
	RO	7. RESPONSE NOT OBTAINED: PLACE steam dumps in pressure mode as follows: <ol style="list-style-type: none"> PLACE steam dumps to OFF. PLACE mode selector HS to STEAM PRESS. ADJUST steam dump demand to zero. PLACE steam dumps to ON. ENSURE controller set at 84% (1092 psig). WHEN conditions allow, THEN REFER TO SOI-1.02 and PLACE steam dumps in TAVG Mode.

Op Test No.: NRC Scenario # 4 Event # 3 Page 8 of 57

Event Description: Turbine impulse pressure, 1-PT-1-73, fails low, requiring entry into AOI-2, and a Tech Spec evaluation.

Time	Position	Applicant's Actions or Behavior
	RO	8. MONITOR core power distribution parameters: <ul style="list-style-type: none"> • Power range channels. • ΔFlux Indicators. • T-avg. • Loop ΔT. • Incore TCs. • Feed flow/Steam flow.
	SRO	9. INITIATE repairs to failed equipment.
	SRO	10. REFER TO Tech Specs: <ul style="list-style-type: none"> • 3.3.1, Reactor Trip System (RTS) Instrumentation. <p><i>Function 16.f. Turbine Impulse Pressure, P-13, Condition S: With one channel inoperable, verify interlock in required state for existing unit conditions within one hour or be in Mode 2 within 7 hours.</i></p>
CAUTION Allowing at least 5 minutes between any rod control input (i.e., T-avg, T-ref, or NIS) change and placing rods in AUTO, will help prevent undesired control rod movement.		
	SRO	11. NOTIFY Chemistry of any reactor power changes greater than 15% in one hour.
EXAMINER: With 1-PT-1-73 failed low, the rod control system must remain in MANUAL. The actions contained in steps 12-14 of AOI-22, "Malfunction of Reactor Control System," are not applicable.		
	SRO	12. IF loop Δ T and loop Tavg channels were defeated due to Tavg channel failure, and Tavg channel has been repaired, THEN PUSH IN 1-XS-68-2D, Δ T CHANNEL DEFEAT, and 1-XS-68-2M, TAVG CHANNEL DEFEAT, and select away from all Δ T and Tavg channels.
	SRO	13. WHEN conditions allow auto rod control, THEN: <ol style="list-style-type: none"> ENSURE T-avg and T-ref within 1°F. ENSURE zero demand on control rod position indication [1-M-4]. PLACE rods in AUTO.
	SRO	14. WHEN conditions allow auto pwr level control, THEN ENSURE pwr level returned to normal program, AND PLACE 1-FCV-62-93 in AUTO
	SRO	15. RETURN TO Instruction in effect.
	SRO	Crew Brief would typically be conducted for this event as time allows prior to the next event.

Op Test No.: NRC Scenario # 4 Event # 3 Page 9 of 57

Event Description: Turbine impulse pressure, 1-PT-1-73, fails low, requiring entry into AOI-2, and a Tech Spec evaluation.

Time	Position	Applicant's Actions or Behavior
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	SRO	Notifications should be addressed as applicable if not specifically addressed by the procedure or in the crew brief. <u>Operations Management</u> - Typically Shift Manager. <u>Maintenance Personnel</u> - Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
Cue Simulator Operator to insert Event 4.		

Op Test No.: NRC Scenario # 4 Event # 4 Page 10 of 57

Event Description: Steam flow transmitter, 1-FT-1-10a fails low, requiring entry into AOI-16.

Time	Position	Applicant's Actions or Behavior
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Indications:

58-B, "SG FEEDWATER FLOW HI"

63-F, "SG LEVEL DEVIATION"

Feed flow decreasing on SG 2 to match failed steam flow.

SG 2 level decreasing.

	BOP	Diagnose and announce the failure of 1-FI-1-10A, SG 2 Steam Flow.
	BOP	May place SG 2 main feedwater regulating valve, 1-FIC-3-48, in MANUAL and raise feedwater flow.
	BOP	May place 1-PC-46-20, MFP Master Controller in MANUAL and raise MFP speed.
	SRO	Enters and directs actions of AOI-16, Loss of Normal Feedwater," Sub Section 3.6, "MFW reg or reg bypass valve control failure."

Evaluator Note: The following actions are taken from AOI-16, Loss of Normal Feedwater," Sub Section 3.6, "MFW reg or reg bypass valve control failure."

	BOP	1. CONTROL failed MFW reg or bypass reg valve in MANUAL.
	RO	2. EVALUATE placing control rods in MANUAL. <i>Since 1-PT-1-73 is failed, the rod control system is already in MANUAL.</i>
	BOP	3. CHECK MFW pumps recirc valves CLOSED.

NOTE

- 1.) If the main reg. valve is malfunctioning, the bypass reg. valve for the affected loop may be manually positioned as necessary up to 0.85 x 106 lb/hr flow to dampen oscillations in feedwater flow.
- 2.) A power tilt in the affected core quadrant may occur due to a rise in bypass flow. Flows above 84,500 lbm/hr in the bypass line will invalidate the value of computer point U1118.

	SRO	4. CHECK SG levels on bypass reg valve control.
	BOP	4. RESPONSE NOT OBTAINED: ** GO TO Step 6.
	BOP	6. CHECK S/G levels returning to PROGRAM.
	BOP	7. MONITOR TDMFW Pump speed normal for current power level.
	BOP	7. RESPONSE NOT OBTAINED: PLACE TDMFW Pump Master Speed Control to MANUAL, THEN ADJUST speed as necessary.

NOTE

A LO FW FLOW WTR HAMMER annunciation [59-C] will be received when any main feedwater flow drops to less than 0.75 x 106 lb/hr.

Op Test No.:	<u>NRC</u>	Scenario #	<u>4</u>	Event #	<u>4</u>	Page	<u>11</u>	of	<u>57</u>
Event Description: Steam flow transmitter, 1-FT-1-10a fails low, requiring entry into AOI-16.									
Time	Position	Applicant's Actions or Behavior							

	BOP	8. WHEN any S/G MFW flow drops to less than 0.55×10^6 lb/hr, THEN INITIATE manual anti-water hammer actions:
CAUTION		
Power range N41 controls S/G 1 and S/G 4 MFW reg valves. N42 controls S/G 2 and S/G 3 MFW reg valves.		
NOTE		
All power range monitors input to auctioneered high anticipatory circuit for bypass FW reg valves.		
	RO	9. CHECK power range N41 through N44 NORMAL.
NOTE Steps 7 & 8 should end up having the same channel (A or B) selected for steam flow and feed flow on each S/G to ensure a loss of voltage to any one channel will have minimal effect on the affected S/G level.		
	BOP	10. CHECK controlling steam flow Channels NORMAL.
	BOP	10. RESPONSE NOT OBTAINED: a. SELECT operable channel. b. EVALUATE effect of the failed channel on the MFPs Speed Control and ADJUST in MANUAL as necessary while continuing this section.
	BOP	11. CHECK controlling FW flow channels NORMAL.
	BOP	12. CHECK press compensation channel(s) NORMAL.
	BOP	13. ENSURE same channel (A or B) selected for steam flow and feed flow on each S/G
	BOP	14. IF affected S/G controlling channel and level NORMAL, THEN a. RETURN MFW reg valve to AUTO. b. RETURN TDMFWP Speed Control to AUTO (if in MANUAL).
	BOP	15. WHEN conditions allow auto rod control, THEN , a. ENSURE T-avg and T-ref within 1°F. b. ENSURE zero demand on control rod position indication [1-M-4]. c. PLACE rods in AUTO. Since 1-PT-1-73 is failed, the rod control system must remain in MANUAL.
	BOP	16. INITIATE repairs to failed equipment.
	BOP	17. RETURN TO Instruction in effect.
	SRO	Crew Brief would typically be conducted for this event as time allows prior to the next event.

Op Test No.: NRC Scenario # 4 Event # 4 Page 12 of 57

Event Description: Steam flow transmitter, 1-FT-1-10a fails low, requiring entry into AOI-16.

Time	Position	Applicant's Actions or Behavior
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	SRO	Notifications should be addressed as applicable if not specifically addressed by the procedure or in the crew brief. <u>Operations Management</u> - Typically Shift Manager. <u>Maintenance Personnel</u> - Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
Cue Simulator Operator to insert Event 5.		

Op Test No.: NRC Scenario # 4 Event # 5 Page 13 of 57

Event Description: 1A CCS pump shaft shears and 1B CCS pump fails to auto start. AOI-15 entry is required.

Time	Position	Applicant's Actions or Behavior
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Indications:

Numerous low flow alarms associated with 1A CCS header.

1A CCS pump running with no discharge pressure and low amps.

1B CCS pump stopped, with CCS header pressure less than 40 psig.

	BOP	Diagnose and announce failure of 1A CCS pump.
	BOP	May start 1B CCS pump, since the AUTO start feature failed to start the pump on low header pressure.
	SRO	Enter and direct actions of AOI-15, "Loss of Component Cooling Water (CCS)," Sub Section 3.2 "Loss of CCS Flow or Surge Tank Level less than 60% or dropping uncontrolled."
Evaluator Note: The following actions are taken from AOI-15, "Loss of Component Cooling Water (CCS)," Sub Section 3.2 "Loss of CCS Flow or Surge Tank Level less than 60% or dropping uncontrolled."		
	BOP	1. CHECK CCS pumps status:
	BOP	a. CHECK any CCS pump TRIPPED or running pump NOT pumping forward: <ul style="list-style-type: none"> • ERCW/CCS Motor tripout alarm, • Low header pressure (train A or B), • Multiple low flow alarms.
	BOP	b. CHECK at least one U-1 Train A header supply pump RUNNING AND pumping forward: <ul style="list-style-type: none"> • 1A-A • 1B-B
	BOP	b. RESPONSE NOT OBTAINED: START available U-1 Train A CCS Pump.
	BOP	c. CHECK any Train B header supply pump RUNNING AND pumping forward: <ul style="list-style-type: none"> • C-S • 2B-B
	BOP	d. PLACE any non-operable or tripped CCS pump in STOP/PULL-TO-LOCK.
	BOP	e. CHECK TWO U-1 Train A header supply pumps RUNNING: <ul style="list-style-type: none"> • 1A-A • 1B-B

Op Test No.: NRC Scenario # 4 Event # 5 Page 14 of 57

Event Description: 1A CCS pump shaft shears and 1B CCS pump fails to auto start. AOI-15 entry is required.

Time	Position	Applicant's Actions or Behavior
		e. RESPONSE NOT OBTAINED: ENSURE at least one of the following CLOSED to avoid excessive flow: • RHR htx A, 1-FCV-70-156, OR • SFP htx A, 0-FCV-70-197.
	BOP	f. CHECK flows returned to NORMAL.
	BOP	g. CHECK A and B side surge tank levels between 57% and 85%.
	SRO	h. ** GO TO Step 15.
	SRO	15. EVALUATE affected equipment operation USING Appendix A.
	SRO	16. WHEN CCS returned normal, THEN • CHECK only one CCS pump per Train. • CHECK one TBBP running.
	SRO	17. REFER TO Tech Specs 3.7.7, Component Cooling Water System (CCS). LCO 3.7.7, Condition A. With one CCS train inoperable, restore the CCS train to OPERABLE status within 72 hours.
	SRO	18. INITIATE repairs. SRO should report both the trip of the 1A CCS pump and the failure of the 1B CCS pump to start on low header pressure.
	SRO	19. WHEN repairs are complete, THEN: a. ENSURE 1-HS-70-63A, U1 SURGE TANK MAKEUP LCV in P-AUTO. b. ENSURE CCS, CVCS, CS pumps, RHR pumps & SI pumps are in normal alignment: • REFER to SOI-70.01 Component Cooling Water (CCS). • REFER to SOI 62.01, CVCS-Charging and letdown. • REFER to SOI 72.01, Containment Spray System. • REFER to SOI 74.01, Residual Heat Removal System. • REFER to SOI 63.01, Safety Injection System.
	SRO	20. RETURN TO Instruction in effect.
	SRO	Crew Brief would typically be conducted for this event as time allows prior to the next event.

Op Test No.: NRC Scenario # 4 Event # 5 Page 15 of 57

Event Description: 1A CCS pump shaft shears and 1B CCS pump fails to auto start. AOI-15 entry is required.

Time	Position	Applicant's Actions or Behavior
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	SRO	Notifications should be addressed as applicable if not specifically addressed by the procedure or in the crew brief. <u>Operations Management</u> - Typically Shift Manager. <u>Maintenance Personnel</u> - Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
Cue Simulator Operator to insert Event 6.		

Op Test No.:	<u>NRC</u>	Scenario #	<u>4</u>	Event #	<u>6</u>	Page	<u>16</u>	of	<u>57</u>
Event Description: SG 3 tube leak, requiring entry into AOI-33.									
Time	Position	Applicant's Actions or Behavior							

Indications:		
175-B, "VAC PMP EXH 1-RM-119 RAD HI"		
	BOP	Diagnoses and announces steam generator tube leak.
	SRO	Enters and directs actions of AOI-33, "Steam Generator Tube Leak."
EXAMINER: The following actions are taken from ARI 175-B, "VAC PMP EXH 1-RM-119 RAD HI."		
NOTES		
1) If switching in the switchyard causes this window to annunciate, the system engineer should be notified.		
2) 1-RM-90-119 has associated ICS computer point R0001A.		
3) ICS computer points in parentheses ().		
	BOP	[1] REFER TO AOI-33, Steam Generator Tube Leak.
	BOP	[2] CHECK 1-RM-90-120 (R1020A) and 1-RM-90-121 (R1021A).
	BOP	[3] CHECK Post Accident monitors 1-RM-90-421 (R9055A), 1-RM-90-422 (R9056A), 1-RM-90-423 (R9057A), and 1-RM-90-424 (R9058A).
	BOP	[4] IF Alarm is valid, THEN REQUEST Chemistry to evaluate appropriate SG Blowdown routing when monitor alarms (i.e., CTBD or hotwell), based on ODCM limitations.
NOTE		
1-HS-15-44 is key operated. Obtain key from Unit SRO.		
	BOP	[5] IF Step [4] Chemistry evaluation determines that SG Blowdown routing should divert to the hotwell on alarm, THEN DISPATCH AUO to VERIFY 1-HS-15-44, SG BLOWDOWN DISCH TO CTBD [T5I/708] NOT in OPEN.
NOTE		
ICS screen CHEM7 provides calculated instantaneous primary to secondary leak rate value.		
	BOP	[6] NOTIFY Chemistry to perform CM-9.09 "Effluent Radiation Monitor Alarm Guidelines".
	BOP	[7] NOTIFY Radiological Protection to investigate alarm.
	SRO	[8] IF monitor declared inoperable, THEN NOTIFY Chemistry Count room to initiate compensatory sampling.
	SRO	[9] REFER TO AOI-31, Abnormal Release Of Radioactive Material.
EXAMINER: The flowing actions are taken from AOI-33, "Steam Generator Leak."		

Op Test No.: NRC Scenario # 4 Event # 6 Page 17 of 57

Event Description: SG 3 tube leak, requiring entry into AOI-33.

Time	Position	Applicant's Actions or Behavior
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NOTE

Sufficient time must be allowed for level to respond following changes in charging flow, in order to determine if PZR level can be maintained.

	RO	1. CHECK If PZR Level Can Be Maintained:
	RO	a. CONTROL charging flow as necessary. 1. OPEN 1-FCV-62-93 as required. 2. OPEN 1-FCV-62-89 as required. 3. IF letdown at 120 gpm THEN PLACE 1-HIC-62-81A, in MANUAL, AND CLOSE 1-FCV-62-72, (45 gpm). 4. IF required, ADJUST 1-HIC-62-81A, AND ENSURE in AUTO.

NOTE Sufficient time must be allowed for level to respond following changes in charging flow, in order to determine if PZR level can be maintained.

	RO	b. MONITOR pZR level STABLE or INCREASING.
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NOTE Condenser Vacuum Exhaust and SG blowdown Radiation Monitors should be monitored at approximately 15 minute intervals for indications of rising leak rate.

	RO	2. IDENTIFY Leaking SG(s); a. EVALUATE the following: <ul style="list-style-type: none"> • Unexpected rise in any SG narrow range level, • Feedwater flow mismatches, • High radiation from any Chemistry SG sample results, • High radiation on any SG main steamline radiation monitor, • RADCON survey of main steamlines and SG blowdown lines. b. MONITOR Condenser Vacuum Exhaust and SG Blowdown Radiation Monitors
	RO	3. CHECK If VCT Level Can Be Maintained: a. MAINTAIN VCT level greater than 13%, using automatic OR manual makeup.

NOTE:

Sufficient time must be allowed for level to respond following changes in charging flow, in order to determine if PZR level can be maintained.

	SRO	4. DETERMINE If Plant Shutdown Is Required: <ul style="list-style-type: none"> • High Secondary Radiation, AND • PZR level continues to decrease, OR • Charging flow continues to rise.
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Op Test No.: NRC Scenario # 4 Event # 6 Page 18 of 57

Event Description: SG 3 tube leak, requiring entry into AOI-33.

Time	Position	Applicant's Actions or Behavior
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	SRO	4. <u>RESPONSE NOT OBTAINED:</u> GO TO APPENDIX A to monitor SG leakage.
<p align="center">NOTE:</p> <p>This appendix provides steps to monitor primary to secondary leakage and directs unit shutdown if leakage limits are exceeded.</p>		
<p>EXAMINER: The following actions are taken from AOI-33, Appendix A. After the crew enters Appendix A, cue the Console Operator to modify Event 6 from a severity of 1.5 to a severity of 15.</p>		
	RO	1. MONITOR PZR level STABLE.
	RO	1. <u>RESPONSE NOT OBTAINED:</u> RETURN TO Section 3.0, Operator Actions, Step 4.
<p>EXAMINER: The following actions are taken from AOI-33, Section 3.0.</p>		
<p align="center">NOTE</p> <p>Sufficient time must be allowed for level to respond following changes in charging flow, in order to determine if PZR level can be maintained.</p>		
		<p>1. CHECK If PZR Level Can Be Maintained:</p> <p>a. CONTROL charging flow as necessary.</p> <p>1. OPEN 1-FCV-62-93 as required.</p> <p>2. OPEN 1-FCV-62-89 as required.</p> <p>3. IF letdown at 120 gpm THEN PLACE 1-HIC-62-81A, in MANUAL, AND CLOSE 1-FCV-62-72, (45 gpm).</p> <p>4. IF required, ADJUST 1-HIC-62-81A, AND ENSURE in AUTO.</p>
<p align="center">NOTE</p> <p>Sufficient time must be allowed for level to respond following changes in charging flow, in order to determine if PZR level can be maintained.</p>		
		b. MONITOR pZR level STABLE or INCREASING.
		<p>b. <u>RESPONSE NOT OBTAINED:</u></p> <p>PERFORM the following;</p> <p>1. ISOLATE letdown as necessary.</p> <p>2. INCREASE chg flow, and start additional chg pmp as needed.</p> <p>3. IF loss of PZR level is imminent, THEN</p> <p>a) TRIP the reactor.</p> <p>b) WHEN reactor trip is verified, THEN INITIATE Safety Injection.</p> <p>c) GO TO E-0, Reactor Trip or Safety Injection, Step 1.</p>

Op Test No.: NRC Scenario # 4 Event # 7, 8 Page 19 of 57

Event Description: SG 3 tube ruptures, requiring a reactor trip and safety injection initiation. Requires entry into E-0, "Reactor Trip or Safety Injection" and E-3, "Steam Generator Tube Rupture."
#3 MSIV fails to close.

Time	Position	Applicant's Actions or Behavior
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EXAMINER: If the SG tube leakage rises to a point where the crew determines that pressurizer level loss is imminent, and the SRO will order a reactor trip and Safety injection actuation.

EXAMINER: The 1A-A 6.9 kv Shutdown Board will trip 10 seconds after the reactor trip. AOI-43.01, "Loss of Unit 1 Train A Shutdown Boards will be performed in conjunction with the EOPs on a "not to interfere" basis. AOI-43.-1 actions are provided beginning on Page 30.

EXAMINER: The following actions are taken from E-0, "Reactor Trip or Safety Injection."

NOTE 1 Steps 1 thru 4 are **IMMEDIATE ACTION STEPS**.

NOTE 2 Status Trees / SPDS should be monitored when transitioned to another instruction.

	RO	1. ENSURE reactor trip: <ul style="list-style-type: none"> • Reactor trip and bypass breakers OPEN. • RPIs at bottom of scale. • Neutron flux DROPPING.
	RO	2. ENSURE Turbine Trip: <ul style="list-style-type: none"> • All turbine stop valves CLOSED.
	RO	3. CHECK 6.9 kV shutdown boards: <ul style="list-style-type: none"> a. At least one board energized from: CSST (offsite), OR D/G (blackout).
	RO	4. CHECK SI actuated: <ul style="list-style-type: none"> a. Any SI annunciator LIT. b. Both trains SI ACTUATED. <ul style="list-style-type: none"> • 1-XX-55-6C • 1-XX-55-6D

EXAMINER: The tube leak progresses from a leak to a rupture prior to the reactor trip, and a manual safety injection will be required based on imminent loss of PZR level.

Op Test No.: NRC Scenario # 4 Event # 7, 8 Page 20 of 57

Event Description: SG 3 tube ruptures, requiring a reactor trip and safety injection initiation. Requires entry into E-0, "Reactor Trip or Safety Injection" and E-3, "Steam Generator Tube Rupture."
#3 MSIV fails to close.

Time	Position	Applicant's Actions or Behavior
	SRO/RO	<p>4. <u>RESPONSE NOT OBTAINED:</u> DETERMINE if SI required: a. IF ANY of the following exists: <ul style="list-style-type: none"> • S/G press less than 675 psig, OR • RCS press less than 1870 psig, OR • Cntmt press greater than 1.5 psig THEN ACTUATE SI manually.</p> <p>IF SI NOT required, THEN ** GO TO ES-0.1, b. ACTUATE SI manually.</p>
EXAMINER: Appendices A and B (E-0) are provided on pages 19 through 33.		
	BOP	<p>5. EVALUATE support systems: • REFER TO Appendices A and B (E-0), Equipment Verification pages 15-28.</p>
	SRO	6. ANNOUNCE reactor trip and safety injection over PA system.
	RO	<p>7. ENSURE secondary heat sink available with either: <ul style="list-style-type: none"> • Total AFW flow greater than 410 gpm, OR • At least one S/G NR level greater than 29% [39% ADV]. </p>
	RO	<p>8. MONITOR RCS temp stable at or trending to 557°F: <ul style="list-style-type: none"> • IF any RCP running, THEN MONITOR RCS Loop T-avg trending to 557°F. OR • IF NO RCP running, THEN MONITOR RCS Loop T-cold trending to 557°F. </p>

Op Test No.: NRC Scenario # 4 Event # 7, 8 Page 21 of 57

Event Description: SG 3 tube ruptures, requiring a reactor trip and safety injection initiation. Requires entry into E-0, "Reactor Trip or Safety Injection" and E-3, "Steam Generator Tube Rupture."
#3 MSIV fails to close.

Time	Position	Applicant's Actions or Behavior
	RO	<p>8. <u>RESPONSE NOT OBTAINED:</u> IF temp less than 557°F, THEN ENSURE steam dumps and S/G PORVs CLOSED. IF cooldown continues, THEN:</p> <ul style="list-style-type: none"> • PLACE steam dump controls OFF. • CONTROL total AFW flow to maintain greater than 410 gpm UNTIL NR level in at least one S/G greater than 29% [39% ADV]. <p>IF cooldown continues after AFW flow is controlled, THEN</p> <ul style="list-style-type: none"> • CLOSE MSIVs. • ENSURE MSIV bypasses CLOSED. <p>IF RCS temp greater than 564°F, THEN ENSURE either steam dumps or S/G PORVs OPEN.</p>
	RO	<p>9. ENSURE excess letdown valves CLOSED:</p> <ul style="list-style-type: none"> • 1-FCV-62-54 • 1-FCV-62-55
	RO	<p>10. CHECK pwr PORVs and block valves:</p> <ol style="list-style-type: none"> Pwr PORVs CLOSED. At least one block valve OPEN.
	RO	<p>11. CHECK pwr safety valves CLOSED:</p> <ul style="list-style-type: none"> • EVALUATE tailpipe temperatures and acoustic monitors.
	RO	12. CHECK pwr sprays CLOSED.
NOTE Seal injection flow should be maintained to all RCPs.		
	RO	<p>13. CHECK if RCPs should remain in service:</p> <ol style="list-style-type: none"> Phase B signals DARK [MISSP]. RCS pressure greater than 1500 psig.
	RO	<p>14. CHECK S/G pressures:</p> <ul style="list-style-type: none"> • All S/G pressures controlled or rising. • All S/G pressures greater than 120 psig.
	RO	<p>15. CHECK for RUPTURED S/G</p> <ul style="list-style-type: none"> • All S/Gs narrow range levels CONTROLLED or DROPPING. • Secondary side radiation NORMAL from Appendix A.
	SRO	<p>15. <u>RESPONSE NOT OBTAINED:</u> IF any S/G has level rising in an uncontrolled manner or has high radiation, THEN ** GO TO E-3, "Steam Generator Tube Rupture."</p>
EXAMINER: The following actions are taken from E-3, "Steam Generator Tube Rupture."		

Op Test No.:	<u>NRC</u>	Scenario #	<u>4</u>	Event #	<u>7, 8</u>	Page	<u>22</u>	of	<u>57</u>
Event Description: SG 3 tube ruptures, requiring a reactor trip and safety injection initiation. Requires entry into E-0, "Reactor Trip or Safety Injection" and E-3, "Steam Generator Tube Rupture." #3 MSIV fails to close.									
Time	Position	Applicant's Actions or Behavior							

NOTE Early notification of RADPROT and Chemistry could expedite subsequent sampling efforts if needed.

	SRO	1. REFER TO EPIP-1, Emergency Plan Classification Flowchart.
NOTE Seal injection flow should be maintained to all RCPs.		
	SRO	2. CHECK if RCPs should remain in service: a. Phase B DARK [MISSP]. b. RCS pressure greater than 1500 psig.
	RO	3. IDENTIFY Ruptured S/G based on ANY of the following: • Unexpected rise in S/G NR level OR • S/G discharge monitor high radiation OR • RADPROT Survey OR • Chemistry sample.
	RO	4. ENSURE Ruptured S/G PORV aligned: a. ENSURE controller in AUTO set at 90%. b. ENSURE HS in P-AUTO.
CAUTION If turbine-driven AFW pump is only available source of feed flow, then steam supply to the turbine-driven AFW pump must be maintained.		
	SRO	5. ENSURE TD AFW pump being supplied from Intact S/G.
	RO	6. ENSURE Ruptured S/G blowdown isolated.
Critical Task 1 WOG Critical Task List for E-3 A. Isolate feedwater flow into and steam flow from the ruptured SG before a transition to ECA-3.1 occurs. Once an affected steam generator has been identified, it is isolated from the intact steam generators to limit radiological releases and as a necessary step toward stopping primary-to-secondary leakage. Feedwater flow is also terminated to the affected steam generator after level has returned into the narrow range. This minimizes the possibility of steam generator overfill.		
Critical Task 1	SRO	7. CLOSE Ruptured S/G MSIV and bypass valve.

Op Test No.: NRC Scenario # 4 Event # 7, 8 Page 23 of 57

Event Description: SG 3 tube ruptures, requiring a reactor trip and safety injection initiation. Requires entry into E-0, "Reactor Trip or Safety Injection" and E-3, "Steam Generator Tube Rupture."
#3 MSIV fails to close.

Time	Position	Applicant's Actions or Behavior
Critical Task 1	BOP	<p>7. RESPONSE NOT OBTAINED: Manually CLOSE valves. IF valves can NOT be closed, THEN Locally REMOVE power to valves: DISPATCH NAUO to perform Attachment 1 (E-3), THEN:</p> <ol style="list-style-type: none"> 1) CLOSE Intact S/G MSIVs and bypass valves to isolate Ruptured S/G from intact S/Gs. 2) ISOLATE secondary pathways to limit depressurization and contamination by USING Attachment 2 (E-3), Steamline Isolation (MCR), AND Attachment 3 (E-3), Steamline Isolation (Local). 3) USE Intact S/G PORVs for dumping steam when required. IF at least one Intact S/G can NOT be isolated from Ruptured S/G, THEN ** GO TO ECA-3.1, SGTR and LOCA - Subcooled Recovery. <p>CAUTION If any Ruptured S/G is also faulted, feed flow should remain isolated in subsequent steps UNLESS needed for RCS cooldown.</p>
Critical Task 1	RO	<p>8. CONTROL Ruptured S/G level:</p> <ol style="list-style-type: none"> CHECK Ruptured S/G NR level greater than 29% [39% ADV]. ISOLATE AFW flow to Ruptured S/G. ENSURE MFW ISOLATED to Ruptured S/G: <ul style="list-style-type: none"> MFW isolation valves CLOSED. MFW bypass isolations CLOSED. MFW reg and bypass reg valves CLOSED. MFW pumps TRIPPED. CONTROL Ruptured S/G NR level greater than 29% [39% ADV].
	RO	9. PLACE dump back valve to CST, 1-LIC-2-3, in MANUAL , and CLOSE valve.
	RO	10. MAINTAIN condenser level 1-LR-2-12 on-scale [M-3].
	SRO	11. DISPATCH operator to OPEN 1-FCV-14-3 to bypass condensate DI.
	RO	12. ENSURE RADPROT dispatched to survey secondary plant.
	SRO	13. NOTIFY Chemistry to obtain samples as necessary for confirming Ruptured S/G.
	SRO	14. NOTIFY plant personnel of potential contaminated release.

Op Test No.: NRC Scenario # 4 Event # 7, 8 Page 24 of 57

Event Description: SG 3 tube ruptures, requiring a reactor trip and safety injection initiation. Requires entry into E-0, "Reactor Trip or Safety Injection" and E-3, "Steam Generator Tube Rupture."
#3 MSIV fails to close.

Time	Position	Applicant's Actions or Behavior
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Critical Task 2

Isolate secondary pathways to limit depressurization and contamination by initiating Attachment 2 (E-3), Steamline Isolation (MCR), and Attachment 3 (E-3), Steamline Isolation (Local) prior to initiating RCS cooldown.

Isolation is performed to maintain ruptured SG pressurized during the cooldown in order to allow subsequent RCS depressurization to ruptured SG pressure while maintaining RCS subcooling.

Critical Task 2	RO	15. ENSURE major steam flowpaths from the ruptured S/G isolated: a. TD AFW pump steam supply from Ruptured S/G CLOSED (if applicable). b. Ruptured S/G MSIV and bypass valve CLOSED, OR Intact S/G MSIVs and bypass valves CLOSED.
Critical Task 2	RO	15: RESPONSE NOT OBTAINED: ISOLATE secondary pathways to limit depressurization and contamination by INITIATING Attachment 2 (E-3), Steamline Isolation (MCR), AND Attachment 3 (E-3), Steamline Isolation (Local).
	RO	16. CHECK Ruptured S/G pressure greater than 690 psig.

Critical Task 3

WOG Critical Task List for E-3 B.

Establish/maintain an RCS temperature so that transition from E-3 does not unnecessarily occur. Properly identifies, establishes cooldown, and maintains temperature at target temperature in accordance with E-3, Steps 17 and 18.

Critical Task 3	RO	17. DETERMINE target incore temp for RCS cooldown: • IF Ruptured S/G pressure is between listed values, THEN USE lower value:												
		<table><tr><th>RUPTURED S/G PRESSURE (PSIG)</th><th>TARGET INCORE TEMP (°F)</th></tr><tr><td>1100</td><td>491°F [471°F ADV]</td></tr><tr><td>1000</td><td>479°F [459°F ADV]</td></tr><tr><td>900</td><td>466°F [446°F ADV]</td></tr><tr><td>800</td><td>451°F [431°F ADV]</td></tr><tr><td>700</td><td>434°F [414°F ADV]</td></tr><tr><td>690</td><td>433°F [413°F ADV]</td></tr></table>	RUPTURED S/G PRESSURE (PSIG)	TARGET INCORE TEMP (°F)	1100	491°F [471°F ADV]	1000	479°F [459°F ADV]	900	466°F [446°F ADV]	800	451°F [431°F ADV]	700	434°F [414°F ADV]
RUPTURED S/G PRESSURE (PSIG)	TARGET INCORE TEMP (°F)													
1100	491°F [471°F ADV]													
1000	479°F [459°F ADV]													
900	466°F [446°F ADV]													
800	451°F [431°F ADV]													
700	434°F [414°F ADV]													
690	433°F [413°F ADV]													

Op Test No.: NRC Scenario # 4 Event # 7, 8 Page 25 of 57

Event Description: SG 3 tube ruptures, requiring a reactor trip and safety injection initiation. Requires entry into E-0, "Reactor Trip or Safety Injection" and E-3, "Steam Generator Tube Rupture."
#3 MSIV fails to close.

Time	Position	Applicant's Actions or Behavior
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CAUTION

- The 1500 psig RCP trip criteria is NOT applicable during or after a controlled RCS cooldown and depressurization.
- If total feed flow CAPABILITY of 410 gpm is AVAILABLE, FR-H.1, Loss of Secondary Heat Sink, should NOT be implemented.
- Excessive steam dump cooldown rate will cause MSIV isolation due to the rate sensitive signal.
- If RCPs are not running, a false red or orange path may be indicated for FR-P.1 during the following steps. T-cold in the ruptured loop should be disregarded until Step 43.

Critical Task 3	BOP	18. INITIATE RCS cooldown to target incore temp, determined from Step 17. a. DUMP steam to condenser from Intact S/G(s) at maximum achievable rate:
		IF dumps are in Tavg mode, THEN 1) PLACE steam dump controls OFF. 2) PLACE steam dump mode switch in STEAM PRESSURE. 3) ENSURE steam dump demand indicator 1-XI-1-33 reading zero. 4) PLACE steam dump controls ON. 5) PLACE steam dump controller in MAN, AND FULLY OPEN three cooldown valves ($\leq 25\%$ demand).
Critical Task 3	BOP	18. a. RESPONSE NOT OBTAINED: a. IF condenser steam dumps NOT available, THEN USE Intact S/G PORVs at maximum achievable cooldown rate IF an Intact S/G is NOT available, THEN PERFORM one BUT NOT BOTH of the following: • USE Faulted S/G, OR • ** GO TO ECA-3.1, SGTR LOCA - Subcooled Recovery. b. WHEN RCS pressure is less than 1962 psig (P-11), THEN • BLOCK low pwr pressure SI. • BLOCK low steam pressure SI. c. WHEN Tavg is less than 550°F (P-12), THEN BYPASS Lo-Lo Tavg interlock. d. WHEN incore temp is less than target temp, THEN STOP RCS cooldown, AND MAINTAIN incore temperature less than or equal to target. e. CONTINUE with Step 19 of this Instruction.

Op Test No.: NRC Scenario # 4 Event # 7, 8 Page 26 of 57

Event Description: SG 3 tube ruptures, requiring a reactor trip and safety injection initiation. Requires entry into E-0, "Reactor Trip or Safety Injection" and E-3, "Steam Generator Tube Rupture."
#3 MSIV fails to close.

Time	Position	Applicant's Actions or Behavior
		19. MONITOR Intact S/G levels: a. At least one S/G NR level greater than 29% [39% ADV]. b. S/G NR levels less than 50% and controlled.
		20. CONTROL Intact S/G NR levels between 29% and 50% [39% and 50% ADV].
		21. MONITOR pZR PORVs and block valves: a. PZR PORVs CLOSED. b. At least one block valve OPEN.
	RO	22. CHECK pZR safety valves CLOSED: • EVALUATE tailpipe temperatures and acoustic monitors.
CAUTION If offsite power is lost after SI reset, manual action will be required to restart the SI pumps and RHR pumps due to loss of SI start signal.		
	RO	23. RESET SI, and CHECK the following: • SI ACTUATED permissive DARK. • AUTO SI BLOCKED permissive LIT.
	RO	24. RESET Phase A and Phase B.
	BOP	25. ENSURE cntmt air in service: a. Aux air pressure greater than 75 psig [M-15]. b. Cntmt air supply valves OPEN [M-15]: • 1-FCV-32-80. • 1-FCV-32-102. • 1-FCV-32-110.
	RO	26. DETERMINE if RHR pumps should be stopped: a. CHECK RHR suction aligned from RWST. b. CHECK RCS pressure greater than 150 psig. c. CHECK RCS pressure stable or rising. d. STOP RHR pumps and PLACE in A-AUTO. e. MONITOR RCS pressure greater than 150 psig.
	SRO	27. CHECK target incore temperature: a. VERIFY incore temperature less than target temperature. b. STOP RCS cooldown. c. MAINTAIN incore temperature less than target temperature.
	RO	28. MONITOR Ruptured S/G pressure stable or rising.

Op Test No.:	<u>NRC</u>	Scenario #	<u>4</u>	Event #	<u>7, 8</u>	Page	<u>27</u>	of	<u>57</u>
Event Description: SG 3 tube ruptures, requiring a reactor trip and safety injection initiation. Requires entry into E-0, "Reactor Trip or Safety Injection" and E-3, "Steam Generator Tube Rupture." #3 MSIV fails to close.									
Time	Position	Applicant's Actions or Behavior							

		28. RESPONSE NOT OBTAINED: MAINTAIN Ruptured S/G at least 250 psig greater than the pressure of the S/G(s) used for cooldown: • Slowly DUMP steam from S/G(s) used for cooldown. • MAINTAIN RCS cooldown rate less than 100° F in one hour. IF the Ruptured S/G depressurizes to less than 250 psig above the pressure of the S/G(s) used for cooldown, THEN ** GO TO ECA-3.1, SGTR and LOCA – Subcooled Recovery.
	RO	29. CHECK RCS subcooling greater than 85°F [105°F ADV].
	RO	29. RESPONSE NOT OBTAINED: IF subcooling is less than 65°F [85°F ADV], THEN ** GO TO ECA-3.1, SGTR and LOCA - Subcooled Recovery. IF subcooling is STABLE OR DROPPING, THEN ** GO TO ECA-3.1, SGTR and LOCA - Subcooled Recovery. DO NOT CONTINUE this instruction UNTIL subcooling is greater than 85°F [105°F ADV].
CAUTION Cycling of the pzz PORV should be minimized to improve PORV reliability.		
NOTE • If RCPs are not running, the upper head region may void during RCS depressurization. This will result in a rapidly rising pzz level. • Either Loop 1 or 2 pzz spray valve is effective for Loop 2 RCP in service or for Loops 1, 3, & 4 RCPs in service.		
Critical Task 4 WOG Critical Task List for E-3 D. Depressurize RCS to meet SI termination criteria before E-3, "Steam Generator Tube Rupture," Step 31 criteria are exceeded. RCS pressure is decreased to stop primary-to-secondary leakage and establish indicated pressurizer level greater than 15%.		
Critical Task 4	RO	30. INITIATE RCS depressurization to minimize break flow, and REFILL pzz to greater than 15% [33% ADV]. a. CHECK pzz level less than 63% [58% ADV]. b. MAINTAIN subcooling greater than 65°F [85°F ADV]. c. DEPRESSURIZE RCS with normal sprays at maximum rate.

Op Test No.: NRC Scenario # 4 Event # 7, 8 Page 28 of 57

Event Description: SG 3 tube ruptures, requiring a reactor trip and safety injection initiation. Requires entry into E-0, "Reactor Trip or Safety Injection" and E-3, "Steam Generator Tube Rupture."
#3 MSIV fails to close.

Time	Position	Applicant's Actions or Behavior
Critical Task 4	SRO	<p>31. DETERMINE if RCS depressurization should be stopped:</p> <p>a. CONTINUE RCS depressurization UNTIL one of the following:</p> <ul style="list-style-type: none"> • Pzr level rises to greater than 63% [58% ADV]. OR • RCS subcooling drops to less than 65°F [85°F ADV]. OR • BOTH of the following: <ol style="list-style-type: none"> 1) RCS pressure is less than Ruptured S/G pressure. AND 2) Pzr level is greater than 15% [33% ADV]. <p>b. WHEN depressurization criteria satisfied, THEN ENSURE the following:</p> <ol style="list-style-type: none"> 1) Normal pzr spray valves CLOSED. 2) Pzr PORVs CLOSED. 3) Aux spray valve CLOSED.
<p style="text-align: center;">CAUTION</p> <ul style="list-style-type: none"> • SI should be terminated as quickly as possible after termination criteria are met to prevent Ruptured S/G overfill. • If total feed flow CAPABILITY of 410 gpm is AVAILABLE, FR-H.1, Loss of Secondary Heat Sink, should NOT be implemented. 		
	SRO	<p>32. CHECK SI termination criteria:</p> <p>a. CHECK RCS subcooling greater than 65°F [85°F ADV].</p> <p>b. CHECK secondary heat sink with either:</p> <ul style="list-style-type: none"> • Total available feed flow greater than 410 gpm, OR • At least one S/G NR level greater than 29% [39% ADV]. <p>c. CHECK RCS pressure stable or rising.</p> <p>d. CHECK pzr level greater than 15% [33% ADV].</p>
	RO	<p>33. IF RHR suction aligned from RWST, THEN STOP ECCS pumps, and PLACE in A-Auto:</p> <ul style="list-style-type: none"> • RHR pumps. • SI pumps. • All BUT one charging pump.

Op Test No.: NRC Scenario # 4 Event # 7, 8 Page 29 of 57

Event Description: SG 3 tube ruptures, requiring a reactor trip and safety injection initiation. Requires entry into E-0, "Reactor Trip or Safety Injection" and E-3, "Steam Generator Tube Rupture."
#3 MSIV fails to close.

Time	Position	Applicant's Actions or Behavior
	RO	34. ALIGN charging: a. CLOSE RCP seal flow control 1-FCV-62-89. b. OPEN charging isolation valves 1-FCV-62-90 and 1-FCV-62-91. c. ENSURE charging valve 1-FCV-62-85 OR 1-FCV-62-86 OPEN. d. CHECK RHR Suction aligned from RWST. e. OPEN seal return valves 1-FCV-62-61 and 1-FCV-62-63.
	RO	35. CLOSE BIT outlets 1-FCV-63-25 and 1-FCV-63-26.
	RO	36. CONTROL charging flow: a. ADJUST 1-FCV-62-89 and 1-FCV-62-93 to establish: • Seal injection flow between 8 and 13 gpm for each RCP. • Pzr level stable or rising.
	RO	37. ENSURE ECCS flow NOT required: a. CHECK RCS subcooling greater than 65°F [85°F ADV]. b. CHECK pzr level greater than 15% [33% ADV].
END OF SCENARIO		

Op Test No.: NRC Scenario # 4 Event # 7, 8 Page 30 of 57Event Description: 1A-A 6.9 KV Shutdown Board trips on differential lockout relay operation.
AOI-43.01, "Loss of Unit 1 Train A Shutdown Boards," actions.

Time	Position	Applicant's Actions or Behavior
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Indications:

12-C B 6.9 SD BD 1A-A VOLTAGE DEGRADED

101-C PRI WTR HDR PRESS LO

86-B CONTROL ROD NON-URGENT FAILURE

50-A MFPT 1A ABNORMAL

101-E RCP SEAL SUPPLY FLOW LO

108-A CHARGING FLOW HI/LO

Multiple Radiation Monitor Instrument Failure alarms.

	BOP	Diagnoses and announces the loss of the 1A 6.9 KV Shutdown Board.
	SRO	Assigns performance of AOI-43.01, "Loss of Unit 1 Train A Shutdown Boards," to the BOP, to be accomplished on a not to interfere basis while the EOPs are performed.

EXAMINER: The following actions are taken from AOI-43.01, "Loss of Unit 1 Train A Shutdown Boards."**NOTE 1** CCP 1A-A, SIP 1A-A, RHR Pump 1A-A, CS Pump 1A-A, AFW Pump 1A-A, ERCW Pumps A-A and B-A, Pressurizer Heaters Backup Group 1A, and Pressurizer Heaters Control Group 1D will be unavailable on a loss of 6.9KV Shutdown Board 1A-A.**NOTE 2** Operability of remaining AC power sources must be determined within one hour per LCO 3.8.1.**NOTE 3** Steps to energize 6.9KV Shutdown Board 1A-A (or intermediate supply paths) may be repeated based on completed repair(s), protective relay reset, or direction from TSC.**NOTE 4** RCP's can be operated for up to 10 minutes after loss of CCS flow.

	BOP	1. MONITOR 1B-B 6.9KV Shutdown Board ENERGIZED.
	BOP	2. ENSURE Diesel Generators running: <ul style="list-style-type: none"> • DG 1A-A • DG 1B-B • DG 2A-A • DG 2B-B
	RO	3. MONITOR RCP seal cooling available: <ul style="list-style-type: none"> • Seal injection flow OR <ul style="list-style-type: none"> • CCS flow through Thermal Barrier Heat Exchangers <i>RO determines that the CCS system has returned to normal after the start of the 1B CCS pump due to low header pressure.</i>

Op Test No.: NRC Scenario # 4 Event # 7, 8 Page 31 of 57Event Description: 1A-A 6.9 KV Shutdown Board trips on differential lockout relay operation.
AOI-43.01, "Loss of Unit 1 Train A Shutdown Boards," actions.

Time	Position	Applicant's Actions or Behavior									
	BOP	<p>4. DISPATCH personnel to Auxiliary Bldg to UNLOCK and RACK UP the following breakers:</p> <table border="1"> <thead> <tr> <th>NOMENCLATURE</th><th>LOCATION</th><th>UNID</th></tr> </thead> <tbody> <tr> <td>MAINT SUPPLY FROM 6.9KV UNIT BD 1B</td><td>6.9KV SDB 1A-A, C11</td><td>1-BKR-211-1718/11</td></tr> <tr> <td>MAINT SUPPLY FROM 6.9KV UNIT BD 2B</td><td>6.9KV SDB 2A-A, C11</td><td>2-BKR-211-1818/11</td></tr> </tbody> </table> <p><i>These actions will not be taken due to the report of damage on the board.</i></p>	NOMENCLATURE	LOCATION	UNID	MAINT SUPPLY FROM 6.9KV UNIT BD 1B	6.9KV SDB 1A-A, C11	1-BKR-211-1718/11	MAINT SUPPLY FROM 6.9KV UNIT BD 2B	6.9KV SDB 2A-A, C11	2-BKR-211-1818/11
NOMENCLATURE	LOCATION	UNID									
MAINT SUPPLY FROM 6.9KV UNIT BD 1B	6.9KV SDB 1A-A, C11	1-BKR-211-1718/11									
MAINT SUPPLY FROM 6.9KV UNIT BD 2B	6.9KV SDB 2A-A, C11	2-BKR-211-1818/11									
	BOP	<p>5. DISPATCH personnel to Turbine Bldg to CLOSE the following breakers:</p> <table border="1"> <thead> <tr> <th>NOMENCLATURE</th><th>LOCATION</th><th>UNID</th></tr> </thead> <tbody> <tr> <td>MAINT FEEDER TO 6.9 KV SHUTDOWN BD 1A-A</td><td>6.9KV UNIT BD 1B</td><td>1-BKR-201-B/B</td></tr> <tr> <td>MAINT FEEDER TO 6.9 KV SHUTDOWN BD 2A-A</td><td>6.9KV UNIT BD 2B</td><td>2-BKR-201-B/B</td></tr> </tbody> </table> <p><i>These actions will not be taken due to the report of damage on the board.</i></p>	NOMENCLATURE	LOCATION	UNID	MAINT FEEDER TO 6.9 KV SHUTDOWN BD 1A-A	6.9KV UNIT BD 1B	1-BKR-201-B/B	MAINT FEEDER TO 6.9 KV SHUTDOWN BD 2A-A	6.9KV UNIT BD 2B	2-BKR-201-B/B
NOMENCLATURE	LOCATION	UNID									
MAINT FEEDER TO 6.9 KV SHUTDOWN BD 1A-A	6.9KV UNIT BD 1B	1-BKR-201-B/B									
MAINT FEEDER TO 6.9 KV SHUTDOWN BD 2A-A	6.9KV UNIT BD 2B	2-BKR-201-B/B									
	BOP	6. CHECK both 1A-A and 2A-A 6.9 KV Shutdown bds DEENERGIZED.									
	SRO	6. RESPONSE NOT OBTAINED: ** GO TO Step [9].									
	BOP	<p>9. DISPATCH personnel to the following locations to inspect for equipment damage:</p> <ul style="list-style-type: none"> • 6.9KV Shutdown Board • 480V Shutdown Boards • Diesel Generator Building 									
	SRO	10. NOTIFY MAINTENANCE personnel of failure of Shutdown Board.									
	BOP	<p>11. ENSURE Unit 1 Instrument Power A Rack selected to ENERGIZED feeder (amber light ON) [1-M-7] (SOI-237.01). BOP operator transfers Unit 1 Instrument Power A Rack to its Alternate feed.</p>									

Op Test No.:	<u>NRC</u>	Scenario #	<u>4</u>	Event #	<u>7, 8</u>	Page	<u>32</u>	of	<u>57</u>
Event Description: 1A-A 6.9 KV Shutdown Board trips on differential lockout relay operation. AOI-43.01, "Loss of Unit 1 Train A Shutdown Boards," actions.									
Time	Position	Applicant's Actions or Behavior							

	RO	12. ALIGN BAT A for operation via BA Pump 1B USING SOI-62.05. BOP contacts the Auxiliary Building AUO to have alignment accomplished.
	SRO	13. MONITOR Board Protective Relays NOT ACTUATED (local reports) Report received from the AUO that the 1A 6.9 KV Shutdown Board tripped due to differential relay operation. The bus work appears to be severely damaged.
	SRO	13. RESPONSE NOT OBTAINED: GO TO Step [38].
	RO/BOP	38. ENSURE affected equipment placed in STOP PULL TO LOCK/OFF: <ul style="list-style-type: none"> • 1A-A CCP. • Pressurizer Heaters Group 1A-A. • 1A-A Motor Driven AFW Pump. • 1A-A Component Cooling Water Pump. • 1A-A Thermal Barrier Booster Pump. • A-A ERCW Pump. • B-A ERCW Pump. • MCR Chiller A-A. • EBR Chiller A-A. • SD Bd Rm Chiller A-A. BOP informs the SRO prior to placing equipment in pull-to-lock.
	BOP	39. DISPATCH AUO to D/G Bldg to monitor D/G conditions USING SOI-82 series, Appendix A, for operating parameters
	BOP	40. ENSURE Train A ERCW pumps in service as required to maintain pressure and flows (SOI-67.01): <ul style="list-style-type: none"> • C-A ERCW Pump. • D-A ERCW Pump.
	RO	41. CHECK any charging pump RUNNING

Op Test No.: NRC Scenario # 4 Event # 7, 8 Page 33 of 57Event Description: 1A-A 6.9 KV Shutdown Board trips on differential lockout relay operation.
AOI-43.01, "Loss of Unit 1 Train A Shutdown Boards," actions.

Time	Position	Applicant's Actions or Behavior
	RO	<p>41. RESPONSE NOT OBTAINED: PERFORM the following:</p> <p>a. ISOLATE letdown:</p> <ul style="list-style-type: none"> • CLOSE letdown orifice(s). • CLOSE 1-FCV-62-69A. • CLOSE 1-FCV-62-70A. <p>b. RESTORE charging and letdown:</p> <ul style="list-style-type: none"> • REFER TO Attachment 1 ALIGNMENT OF CHARGING AND LETDOWN.
<p>NOTE 1 CCS Pump 1A-A, Aux Bldg General Sup Fan 1A-A, CRDM Cooler 1A-A, Lower Cntmt Cooler 1A-A, EBR Air Handling Unit A-A, and Cntmt Air Return Fan 1A-A will be unavailable on a loss of 480V SD BD 1A1-A.</p> <p>NOTE 2 Aux Bldg General Exh Fan 1A-A, CRDM Cooler 1C-A, Lower Cntmt Cooler 1C-A, MCR Chlr A-A Compressor, 480V SDBR AHU A-A, Station Air Compr A, and HP Fire Pump 1A-A will be unavailable on a loss of 480V SD BD 1A2-A.</p>		
	BOP	42. ENSURE 1B-B CCS Pump Supplying A Train (SOI-70.01).
	BOP	43. ENSURE Thermal Barrier Booster Pump 1B-B in service(SOI-70.01).
	SRO	44. EVALUATE starting additional Control Rod Drive Mech Cooler Fans, Lower Compartment Cooler Fans, and Upper Compartment Cooler Fans (SOI-30.03).
	BOP	45. ENSURE Aux Bldg General Supply and Exhaust Fans in service as required to maintain ventilation and pressure (SOI-30.05).
	BOP	46. ENSURE EBR Air Conditioning Unit B-B and MCR Air Conditioning Unit B-B in service (SOI-31.01).
<p>NOTE Radiation Monitors powered from 480V C & A Vent Board 1A1-A or Radiation Monitor & Sampling & Fire Protection 1-BD-242-1 will be inoperable on a loss of 480V C & A Vent Board 1A1-A.</p>		
	BOP	47. RESET Radiation Monitor modules and alarms on 0-M-12.
<p>NOTE 1 Unit 1 A Train ESF Room Coolers, Area Coolers, and Space Coolers will be unavailable on a loss of 480V C & A Vent Board 1A1-A.</p> <p>NOTE 2 Emergency Gas Treatment System Fan A-A will be unavailable on a loss of 480V C & A Vent Board 1A1-A.</p>		
	RO	48. ENSURE 1B Primary Water Pump in service as required (When in bypass mode, ensure Primary Water System aligned per SOI-81.01).
	BOP	49. ENSURE 1B Annulus Vacuum Fan in service (SOI-65.01).

Op Test No.:	<u>NRC</u>	Scenario #	<u>4</u>	Event #	<u>7, 8</u>	Page	<u>34</u>	of	<u>57</u>
Event Description: 1A-A 6.9 KV Shutdown Board trips on differential lockout relay operation. AOI-43.01, "Loss of Unit 1 Train A Shutdown Boards," actions.									
Time	Position	Applicant's Actions or Behavior							

	BOP	50. ENSURE A Train or B Train 480V and Shutdown Board Room Ventilation in service (SOI-30.07).
CAUTION LCO 3.8.1 is expected to require performance of S/R 3.8.1.1 (0-SI-82-2). Performers are NOT to take ANY actions which would interrupt power supplies in service by this AOI.		
	SRO	51. REFER TO Tech Specs: <ul style="list-style-type: none"> • 3.5.2, ECCS-Operating. • 3.5.3, ECCS-Shutdown. • 3.8.1, AC Sources-Operating. • 3.8.2, AC Sources-Shutdown. • 3.8.4, DC Sources-Operating. • 3.8.5, DC Sources-Shutdown. • 3.8.9, Distribution Systems-Operating. • 3.8.10, Distribution Systems-Shutdown.
	SRO	52. REFER TO EPIP-1, Emergency Plan Classification Flowchart.
	SRO	53. EVALUATE transferring 125V Batt BD I to Battery Charger 6-S (SOI-236.01) or transferring 120V AC Vital Inverter 1-I from Normal To Alternate 480V power supply (SOI-235-series).
	SRO	54. EVALUATE transferring 24V CAP Battery Charger 1 from Normal to Alternate (SOI-252).
	BOP	55. CHECK Unit 1 A Train Shutdown Board(s) ready to be ENERGIZED.
	SRO	55. <u>RESPONSE NOT OBTAINED:</u> GO TO Step [13].

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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**APPENDIX A
(E-0)**

Page 1 of 10

EQUIPMENT VERIFICATION

- | | |
|---|--|
| <p>1. ENSURE PCBs OPEN:</p> <ul style="list-style-type: none"> • PCB 5084. • PCB 5088. | <p>OPEN manually.</p> |
| <p>2. ENSURE AFW pump operation:</p> <ul style="list-style-type: none"> • Both MD AFW pumps RUNNING. • TD AFW pump RUNNING. • LCVs in AUTO, or controlled in MANUAL. | <p>ESTABLISH at least one train AFW operation.</p> |
| <p>3. ENSURE MFW isolation:</p> <ul style="list-style-type: none"> • MFW isolation and bypass isolation valves CLOSED. • MFW reg and bypass reg valves CLOSED. • MFP A and B TRIPPED. • Standby MFP STOPPED. • Cond demin pumps TRIPPED. • Cond booster pumps TRIPPED. | <p>Manually CLOSE valves and STOP pumps, as necessary.</p> <p>IF any valves can NOT be closed, THEN CLOSE #1 heater outlet valves.</p> |

WBN

REACTOR TRIP OR SAFETY INJECTION

E-0
Rev 28

Step

Action/Expected Response

Response Not Obtained

APPENDIX A
(E-0)

Page 2 of 10

EQUIPMENT VERIFICATION4. **MONITOR** ECCS operation:

- | | |
|---|--|
| a. Charging pumps RUNNING. | a. Manually START charging pumps. |
| b. Charging pump alignment: <ul style="list-style-type: none"> • RWST outlets 1-LCV-62-135 and 1-LCV-62-136 OPEN. • VCT outlets 1-LCV-62-132 and 1-LCV-62-133 CLOSED. • Charging 1-FCV-62-90 and 1-FCV-62-91 CLOSED. | b. ENSURE at least one valve in each set aligned. |
| c. RHR pumps RUNNING. | c. Manually START RHR pumps. |
| d. SI pumps RUNNING. | d. Manually START SI pumps. |
| e. BIT alignment: <ul style="list-style-type: none"> • Outlets 1-FCV-63-25 and 1-FCV-63-26 OPEN. • Flow thru BIT. | e. ENSURE at least one valve aligned, and flow thru BIT. |
| f. RCS pressure greater than 1650 psig. | f. ENSURE SI pump flow.

IF RCS press drops to less than 150 psig,
THEN
ENSURE RHR pump flow. |

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A
(E-0)

Page 3 of 10

EQUIPMENT VERIFICATION

- 5 **CHECK** cntmt isolation:
- a. Phase A isolation:
- Train A GREEN.
 - Train B GREEN.
- b. Cntmt vent isolation:
- Train A GREEN.
 - Train B GREEN.
- ACTUATE** Phase A and Cntmt Vent Isolation signal,
 OR
 Manually **CLOSE** valves and dampers as necessary.

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A
(E-0)

Page 4 of 10

EQUIPMENT VERIFICATION

6. **CHECK** cntmt pressure:

- Phase B DARK [MISSP].
- Cntmt Spray DARK [MISSP].
- Cntmt press less than 2.8 psig.

PERFORM the following:

- 1) **ENSURE** Phase B actuated.
- 2) **ENSURE** Cntmt Spray actuated.
- 3) **ENSURE** cntmt spray pumps running.
- 4) **ENSURE** cntmt spray flow.
- 5) **ENSURE** Phase B isolation:
 - Train A GREEN.
 - Train B GREEN
 - Manually **CLOSE** valves and dampers as necessary.
- 6) **STOP** all RCPs.
- 7) **ENSURE** MSIVs and bypasses CLOSED.
- 8) **PLACE** steam dump controls OFF.
- 9) **WHEN** 10 minutes has elapsed since Phase B actuated,
THEN
ENSURE air return fans start.
- 10) **USE** adverse cntmt [ADV] setpoints where provided.

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A
(E-0)

Page 5 of 10

EQUIPMENT VERIFICATION

- | | |
|---|---|
| <p>7. CHECK plant radiation NORMAL:</p> <ul style="list-style-type: none"> • S/G blowdown rad recorder 1-RR-90-120 NORMAL prior to isolation [M-12]. • Condenser vacuum exhaust rad recorder 1-RR-90-119 NORMAL prior to trip [M-12]. • 1-RR-90-106 and 1-RR-90-112 radiation recorders NORMAL prior to isolation [M-12]. • S/G main steamline discharge monitors NORMAL [M-30]. • Upper and Lower containment high range monitors NORMAL [M-30]. • NOTIFY Unit Supervisor conditions NORMAL. | <p>NOTIFY Unit Supervisor IMMEDIATELY.</p> |
| <p>8 ENSURE all D/Gs RUNNING.</p> | <p>EMERGENCY START D/Gs</p> |

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A
(E-0)

Page 6 of 10

EQUIPMENT VERIFICATION

- | | |
|---|---|
| <p>9. ENSURE ABGTS operation:</p> <p>a. ABGTS fans RUNNING.</p> <p>b. ABGTS dampers OPEN:</p> <ul style="list-style-type: none"> • FCO-30-146A. • FCO-30-146B. • FCO-30-157A. • FCO-30-157B. | <p>a. Manually START fans.</p> <p>b. Locally OPEN dampers.</p> |
| <p>10. ENSURE at least four ERCW pumps RUNNING, one on each shutdown board preferred.</p> | <p>Manually START pumps as necessary.</p> |
| <p>11. ENSURE ERCW supply valves OPEN to running D/Gs.</p> | <p>IF ERCW can NOT be aligned to running D/G,
THEN
EMERGENCY STOP affected D/G.</p> |
| <p>12. ENSURE CCS HX C ALT DISCH TO HDR B, 0-FCV-67-152, is open to position A.</p> | <p>Manually OPEN 0-FCV-67-152 to position A.</p> |

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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**APPENDIX A
(E-0)**

Page 7 of 10

EQUIPMENT VERIFICATION

13. **CLOSE** CCS HX C
DISCH TO HDR A,
0-FCV-67-144.

14. **MONITOR** EGTS operation:
- ECTS fans RUNNING.
 - **ENSURE** dampers OPEN
VERIFY filter bank dp between
5 and 9 inches of water.

Manually **START** fans **OPEN**
dampers.

15. **ENSURE** CCS pumps RUNNING:
- 1A-A CCS pump.
 - 1B-B CCS pump.
 - C-S OR 2B-B CCS pump.

Manually **START** pumps as
necessary.

- NOTE**
- The Upper and Lower Cntmt rad monitors sampling pumps should be shutdown if the sample flowpath is isolated.
 - The following equipment is located on 1-M-9.

16. **CHECK** CNTMT PURGE fans
STOPPED:

STOP fans and
PLACE handswitch in
PULL-TO-LOCK.

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A
(E-0)

Page 8 of 10

EQUIPMENT VERIFICATION

17. **CHECK** FUEL HANDLING EXH fans STOPPED, Fuel and Cask loading dampers CLOSED: **STOP** fans and **PLACE** handswitch in FULL-TO-LOCK, manually **CLOSE** dampers.

18. **ENSURE** AB GEN SUPPLY and EXH fans STOPPED. **STOP** fans and **PLACE** handswitch in PULL-TO-LOCK.

NOTE • Dampers 1-HS-30-158 and 2-HS-30-270 remain open during ABI.

19. **ENSURE** AB GEN SUP & EXH dampers CLOSED. Manually **CLOSE** dampers.

20. **ENSURE** MCR & SPREAD RM FRESH AIR dampers CLOSED: Manually **CLOSE** dampers.
- FCV-31-3.
 - FCV-31-4.

Step	Action/Expected Response	Response Not Obtained
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NOTIFY TSC if at least one damper NOT OPEN.

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A
(E-0)

Page 10 of 10

EQUIPMENT VERIFICATION

23. **ENSURE** Control Building fans STOPPED and dampers CLOSED:
- SPREADING ROOM SUPPLY and EXH FANS AND dampers.
 - TOILET & LKR RM EXHAUST FAN AND dampers.
- Manually **STOP** fans.
- NOTIFY** TSC if any damper NOT CLOSED.
24. **INITIATE** Appendix B.

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX B
(E-0)

Page 1 of 1

PHASE B PIPE BREAK CONTINGENCIES

- | | |
|---|--|
| 1. CHECK PHASE B actuated.
(MISSP - 1-XX-55-6C, -6D) | WHEN PHASE B actuation occurs;
THEN
GO TO step 2. |
| 2. ENSURE 1-FCV-32-110 CLOSED.
(CISP - 1-XX-55-6E)
[A-train, window 13] | DISPATCH AUO to perform
ATTACHMENT B1. |
| 3. ENSURE 1-FCV-67-107 CLOSED.
(CISP - 1-XX-55-6E)
[A -train, window 43] | DISPATCH AUO to perform
ATTACHMENT B2. |
| 4. ENSURE 1-FCV-70-92 CLOSED.
(CISP - 1-XX-55-6E)
[A -train, window 73] | DISPATCH AUO to perform
ATTACHMENT B3. |
| 5. ENSURE 1-FCV-70-140 CLOSED.
(CISP - 1-XX-55-6F)
[B -train, window 74] | DISPATCH AUO to perform
ATTACHMENT B4. |

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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ATTACHMENT B1

(E D)

Page 1 of 1

CONTROL AIR ISOLATION

1. **CLOSE** 0-ISV-32-1013 - CONTROL AIR EL 713 AB HDR ISOL
[A6/S EL. 713] (chain operated - behind Fuel and Waste Handling Bd. A).
2. IF 0-ISV-32-1013 CANNOT BE CLOSED,
THEN:

OPEN and **DISCONNECT** C&SG air compressor breakers:

- a) 0-BKR-32-25 - 480V SD BD 1A2-A, C/3D
- b) 0-BKR-32-26 - 480V SD BD 1B1-B, C/3D
- c) 0-BKR-32-27 - 480V AUX BLDG COM BD, C/6C
- d) 0-BKR-32-4900A - 480V TURB BLDG COM BD, C/6C

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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ATTACHMENT B2

(E-0)

Page 1 of 1

ERCW ISOLATION

1. **UNLOCK AND CLOSE** 1-ISV-67-523E - LOWER CNTMT VENT CLR 1B & 1D
ERCW SUP ISOL [AZU/692] (U-1 penetration room - North of AB Pipe Chase
Cooler 1B-B in overhead)

WBN

REACTOR TRIP OR SAFETY INJECTION

E-0
Rev 28

ATTACHMENT B3

(E-0)

Page 1 of 1

CCS RETURN ISOLATION

1. **CLOSE** 1-ISV-70-700 RCP OIL COOLER CCS RETURN ISOLATION
[A4/V EL. 710 U-1 Penetration Room] (approximately 10 ft. North of Penetration
Room Cooler 1B-B on mezzanine above RHR Sump Valve Room)

ATTACHMENT B4

(E-0)

Page 1 of 1

CCS SUPPLY ISOLATION

1. **CLOSE** 1-SV-70-516 REACTOR BUILDING CCS SUPPLY ISOLATION
[A6/T EL. 737] (Behind Elevator approximately 2 ft. west on mezzanine above
"A" CCS Heat Exchanger)

WBN	STEAM GENERATOR TUBE RUPTURE	E-3 Rev 22
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ATTACHMENT 1

(E-3)

Page 1 of 4

1.0 INSTRUCTIONS

- [1] IF any MSIV will **NOT** close,
THEN
GO TO Section 1.1 (Attachment 1).

- [2] IF any MSIV bypass valve will **NOT** close,
THEN
GO TO Section 1.2 (Attachment 1).

WBN	STEAM GENERATOR TUBE RUPTURE	E-3 Rev 22
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ATTACHMENT 1

(E-3)

Page 2 of 4

1.1 MSIV Isolation

- [1] **PLACE** affected MSIV transfer control switch in AUX position:
[Auxiliary Control Room, Panels 1-L-11A and 1-L-11B]

S/G (Circle affected S/G)	EQUIPMENT	AUX TRANSFER SWITCH	AUX POSITION √
1	MSIV Loop 1, Train A, 1-FCV-1-4	1-XS-1-4A	<input type="checkbox"/>
	MSIV Loop 1, Train B, 1-FCV-1-4	1-XS-1-4B	<input type="checkbox"/>
2	MSIV Loop 2, Train A, 1-FCV-1-11	1-XS-1-11A	<input type="checkbox"/>
	MSIV Loop 2, Train B, 1-FCV-1-11	1-XS-1-11B	<input type="checkbox"/>
3	MSIV Loop 3, Train A, 1-FCV-1-22	1-XS-1-22A	<input type="checkbox"/>
	MSIV Loop 3, Train B, 1-FCV-1-22	1-XS-1-22B	<input type="checkbox"/>
4	MSIV Loop 4, Train A, 1-FCV-1-29	1-XS-1-29A	<input type="checkbox"/>
	MSIV Loop 4, Train B, 1-FCV-1-29	1-XS-1-29B	<input type="checkbox"/>

- [2] **CONSULT** UO to verify affected MSIV closed.

WBN	STEAM GENERATOR TUBE RUPTURE	E-3 Rev 22
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ATTACHMENT 1

(E-3)

Page 3 of 4

1.1 MSIV Isolation (Continued)

[3] IF affected MSIV still open **OR** control power fuse removal desired, **THEN**

REMOVE MSIV fuses:

S/G (Circle affected S/G)	EQUIPMENT	FUSE LOCATION (Two per circuit)	FUSES REMOVED √
1	MSIV Loop 1, Train A, 1-FCV-1-4	125V Vital Battery Bd I Circuit A-46 Circuit B-46	<input type="checkbox"/> <input type="checkbox"/>
	MSIV Loop 1, Train B, 1-FCV-1-4	125V Vital Battery Bd II Circuit A-46 Circuit B-46	<input type="checkbox"/> <input type="checkbox"/>
2	MSIV Loop 2, Train A, 1-FCV-1-11	125V Vital Battery Bd I Circuit A-47 Circuit B-47	<input type="checkbox"/> <input type="checkbox"/>
	MSIV Loop 2, Train B, 1-FCV-1-11	125V Vital Battery Bd II Circuit A-47 Circuit B-47	<input type="checkbox"/> <input type="checkbox"/>
3	MSIV Loop 3, Train A, 1-FCV-1-22	125V Vital Battery Bd I Circuit A-48 Circuit B-48	<input type="checkbox"/> <input type="checkbox"/>
	MSIV Loop 3, Train B, 1-FCV-1-22	125V Vital Battery Bd II Circuit A-48 Circuit B-48	<input type="checkbox"/> <input type="checkbox"/>
4	MSIV Loop 4, Train A, 1-FCV-1-29	125V Vital Battery Bd I Circuit A-49 Circuit B-49	<input type="checkbox"/> <input type="checkbox"/>
	MSIV Loop 4, Train B, 1-FCV-1-29	125V Vital Battery Bd II Circuit A-49 Circuit B-49	<input type="checkbox"/> <input type="checkbox"/>

[4] **NOTIFY** UO upon completion.

WBN	STEAM GENERATOR TUBE RUPTURE	E-3 Rev 22
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ATTACHMENT 1

(E-3)

Page 4 of 4

1.2 MSIV Bypass Isolation

- [1] PLACE** HS in OFF for MSIV bypass valves that will NOT close:

S/G (Circle affected S/G)	NOMENCLATURE	LOCATION	POSITION	UNID	HS OFF ✓
1	MAIN STEAM ISOL VLV LOOP 1 BYP WARMING VLV	A3U/737	OFF	1-HS-1-147B	<input type="checkbox"/>
2	MAIN STEAM ISOL VLV LOOP 2 BYP WARMING VLV	A4U/757	OFF	1-HS-1-148B	<input type="checkbox"/>
3	MAIN STEAM ISOL VLV LOOP 3 BYP WARMING VLV	A5U/757	OFF	1-HS-1-149B	<input type="checkbox"/>
4	MAIN STEAM ISOL VLV LOOP 4 BYP WARMING VLV	A3U/737	OFF	1-HS-1-150B	<input type="checkbox"/>

- [2] NOTIFY** UO upon completion.

WBN	STEAM GENERATOR TUBE RUPTURE	E-3 Rev 22
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ATTACHMENT 2

(E-3)

Page 1 of 1

STEAMLINE ISOLATION (MCR)

1. **CLOSE** the following HP steam and bypass isolation valves:

MSR A2 HP STM ISOL	1-M-2	1-HS-1-135A	<input type="checkbox"/>
MSR B2 HP STM ISOL	1-M-2	1-HS-1-137A	<input type="checkbox"/>
MSR C2 HP STM ISOL	1-M-2	1-HS-1-139A	<input type="checkbox"/>
MSR A1 HP STM ISOL	1-M-2	1-HS-1-141A	<input type="checkbox"/>
MSR B1 HP STM ISOL	1-M-2	1-HS-1-143A	<input type="checkbox"/>
MSR C1 HP STM ISOL	1-M-2	1-HS-1-145A	<input type="checkbox"/>
MSR A2 HP STM BYPASS ISOL	1-M-2	1-HS-1-235A	<input type="checkbox"/>
MSR B2 HP STM BYPASS ISOL	1-M-2	1-HS-1-237A	<input type="checkbox"/>
MSR C2 HP STM BYPASS ISOL	1-M-2	1-HS-1-239A	<input type="checkbox"/>
MSR A1 HP STM BYPASS ISOL	1-M-2	1-HS-1-241A	<input type="checkbox"/>
MSR B1 HP STM BYPASS ISOL	1-M-2	1-HS-1-243A	<input type="checkbox"/>
MSR C1 HP STM BYPASS ISOL	1-M-2	1-HS-1-245A	<input type="checkbox"/>

2. **CLOSE** the following HP steam warming valves:

MSR A1 WARMING LINE	1-M-2	1-HS-1-142	<input type="checkbox"/>
MSR A2 WARMING LINE	1-M-2	1-HS-1-136	<input type="checkbox"/>
MSR B1 WARMING LINE	1-M-2	1-HS-1-144	<input type="checkbox"/>
MSR B2 WARMING LINE	1-M-2	1-HS-1-138	<input type="checkbox"/>
MSR C1 WARMING LINE	1-M-2	1-HS-1-146	<input type="checkbox"/>
MSR C2 WARMING LINE	1-M-2	1-HS-1-140	<input type="checkbox"/>

3. **ENSURE** BOTH Steam Seal Supply valves in CLOSED position:

- 1-HS-47-180A, HP SEAL STEAM SUPPLY ISOL [1-M-2] ☐
- 1-HS-47-181A, HP SEAL STEAM SUPPLY BYPASS [1-M-2] ☐

4. **ENSURE** BOTH Steam Dump Control hand switches is in OFF RESET position:

- 1-HS-1-103A, STEAM DUMP FSV "A" [1-M-4] ☐
- 1-HS-1-103B, STEAM DUMP FSV "B" [1-M-4] ☐

WBN	STEAM GENERATOR TUBE RUPTURE	E-3 Rev 22
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ATTACHMENT 3

(E-3)

Page 1 of 2

STEAMLINE ISOLATION (LOCAL)

1. **COORDINATE** steam isolation with RADPROT.
2. **CLOSE** at least one valve listed for each steam moisture trap manifold:

MSTR TRAP LEVEL SWITCH	MSTR TRAP STR ISOL	MSTR TRAP DRAIN ISOL	LOCATION
MAIN STEAM LINES			
200	1-ISV-1-916 <input type="checkbox"/>	OR 1-ISV-1-922 <input type="checkbox"/>	T1M/708
201	1-ISV-1-926 <input type="checkbox"/>	OR 1-ISV-1-932 <input type="checkbox"/>	T1M/708
202	1-ISV-1-936 <input type="checkbox"/>	OR 1-ISV-1-942 <input type="checkbox"/>	T1M/708
203	1-ISV-1-946 <input type="checkbox"/>	OR 1-ISV-1-952 <input type="checkbox"/>	T1M/708
COMMON STEAM HEADER			
204	1-ISV-1-956 <input type="checkbox"/>	OR 1-ISV-1-962 <input type="checkbox"/>	T4J/708
206	1-ISV-1-966 <input type="checkbox"/>	OR 1-ISV-1-972 <input type="checkbox"/>	T6J/708
STEAM DUMP HEADER			
207	1-ISV-1-976 <input type="checkbox"/>	OR 1-ISV-1-982 <input type="checkbox"/>	T7H/708
208	1-ISV-1-986 <input type="checkbox"/>	OR 1-ISV-1-992 <input type="checkbox"/>	T7G/708
209	1-ISV-1-996 <input type="checkbox"/>	OR 1-ISV-1-1002 <input type="checkbox"/>	T7F/708

3. **CLOSE** steam supply isolation and bypass for each MFPT:

MFPT	NOMENCLATURE	LOCATION	POSITION	UNID	✓
1A	MFPT 1A HP STEAM SUPPLY ISOL	T2J/729	CLOSED	1-ISV-1-611	<input type="checkbox"/>
1A	MFPT 1A HP STEAM SUPPLY ISOL BYPASS	T2J/729	CLOSED	1-IBV-1-613	<input type="checkbox"/>
1B	MFPT 1B HP STEAM SUPPLY ISOL	T2H/729	CLOSED	1-ISV-1-612	<input type="checkbox"/>
1B	MFPT 1B HP STEAM SUPPLY ISOL BYPASS	T2H/729	CLOSED	1-IBV-1-614	<input type="checkbox"/>

WBN	STEAM GENERATOR TUBE RUPTURE	E-3 Rev 22
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ATTACHMENT 3

(E-3)

Page 2 of 2

STEAMLINE ISOLATION (LOCAL)

4. **IF** steamline warming is in progress,
THEN

CLOSE the following valves:

UNID	NOMENCLATURE	LOCATION	√
1-DRV-1-532	MAIN STEAM LOOP 3 WARMING VALVE DRAIN	NVR/729	<input type="checkbox"/>
1-ISV-1-540	MAIN STEAM LOOP 3 MSTR TRAP ISOL	NVR/729	<input type="checkbox"/>
1-DRV-1-534	MAIN STEAM LOOP 2 WARMING VALVE DRAIN	NVR/729	<input type="checkbox"/>
1-ISV-1-541	MAIN STEAM LOOP 2 MSTR TRAP ISOL	NVR/729	<input type="checkbox"/>
1-DRV-1-536	MAIN STEAM LOOP 1 WARMING VALVE DRAIN	SVR/729	<input type="checkbox"/>
1-ISV-1-542	MAIN STEAM LOOP 1 MSTR TRAP ISOL	SVR/729	<input type="checkbox"/>
1-DRV-1-538	MAIN STEAM LOOP 4 WARMING VALVE DRAIN	SVR/729	<input type="checkbox"/>
1-ISV-1-543	MAIN STEAM LOOP 4 MSTR TRAP ISOL	SVR/729	<input type="checkbox"/>

WBN	STEAM GENERATOR TUBE RUPTURE	E-3 Rev 22
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APPENDIX D

(E-3)

Page 1 of 1

MINIMIZE SECONDARY SYSTEM CONTAMINATION

1. **PLACE** station sump pump handswitches to STOP [T9H/685].
2. **CLOSE** O-ISV-40-1283, UNLINED HOLDING POND DISCHARGE TO YARD HOLDING POND [on dam between ponds].
3. **ALIGN** station sump discharge to unlined holding pond:
 - a) **CLOSE** O-ISV-40-970, CHEM CLEANING HDR TO LVWHP [north of LVWH pond].
 - b) **CLOSE** O-ISV-40-1281, CHEM HEADER ISOL TO LINED POND [north of lined pond].
 - c) **OPEN** O-ISV-40-1282, CHEM HEADER ISOL TO UNLINED POND [north of unlined pond].
4. **PLACE** station sump pump handswitches to AUTO.
5. **MINIMIZE** leakage or drainage into station sump:
 - Condensate and feedwater.
 - Cond DI effluent.
 - RCW or HPFP flushes.

SHIFT TURNOVER CHECKLIST

Page 1 of 2

SHIFT TURNOVER CHECKLIST 4			
		Page _____ of _____	
<input type="checkbox"/> SM <input checked="" type="checkbox"/> US/MCR Unit _____ <input type="checkbox"/> UO Unit _____ <input type="checkbox"/> AUO Station _____ <input type="checkbox"/> STA (STA Function)	<div style="text-align: right;">Off-going - Name _____</div> <div style="text-align: right;">On-coming - Name _____</div>		
Part 1 - Completed by off-going shift/Reviewed by on-coming shift:			
<ul style="list-style-type: none"> • Abnormal equipment lineup/conditions: 1A DG is out-of-service for planned maintenance on the air start system. Expected return to service in 8 hours. LCO 3.8.1.B was entered 2 hours ago. SR 3.8.1.1 was performed 45 minutes after LCO entry. The air start system problem has been isolated to the 1A DG. The National Weather Service has issued a Severe Thunderstorm Warning for Meigs, McMinn and Rhea Counties for the next 6 hours. _____ _____ • SI/Test in progress/planned: (including need for new brief) _____ _____ _____ _____ • Major Activities/Procedures in progress/planned: 100% power, MOL. RCS boron is 747 ppm. Control Bank D is at 220 steps. Train A/Channel I Work Week. Reduce power to 95%, to remove the 1A CBP from service for scheduled maintenance on the lube oil system. Maintenance is scheduled to begin in 1 hour. Perform shutdown using GO-4, Section 5.3, "Unit Shutdown from 100% to 30% Reactor Power." GO-4 complete through Step 11. _____ _____ • Radiological changes in plant during shift: None planned _____ _____ _____ 			
Part 2 - Performed by on-coming shift			
<input type="checkbox"/> A review of the Operating Log since last held shift or 3 days, whichever is less (N/A for AUOs) <input type="checkbox"/> A review of the Rounds sheets/Abnormal readings (AUOs only) Review the following programs for changes since last shift turnover: <div style="display: flex; justify-content: space-between;"> <div> <input type="checkbox"/> Standing Orders <input type="checkbox"/> Immediate required reading </div> <div> <input type="checkbox"/> LCO(s) in actions (N/A for AUOs) <input type="checkbox"/> TACF (N/A for AUOs) </div> <div> <input type="checkbox"/> PER review (N/A for AUOs) </div> </div>			
Part 3 - Performed by both off-going and on-coming shift			
<input type="checkbox"/> A walkdown of the MCR control boards (N/A for AUOs) <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div>Relief Time: _____</div> <div>Relief Date: _____</div> </div>			

SHIFT TURNOVER CHECKLIST

Page 2 of 2

SHIFT TURNOVER CHECKLIST			
		Page _____ of _____	
<input type="checkbox"/>	SM		
<input type="checkbox"/>	US/MCR	Unit _____	
<input checked="" type="checkbox"/>	UO	Unit _____	Off-going - Name _____
<input type="checkbox"/>	AUO	Station _____	
<input type="checkbox"/>	STA (STA Function)		On-coming - Name _____
Part 1 - Completed by off-going shift/Reviewed by on-coming shift:			
<ul style="list-style-type: none"> • Abnormal equipment lineup/conditions: <div style="border: 1px solid black; padding: 2px; margin: 2px 0;"> 1A DG is out-of-service for planned maintenance on the air start system. Expected return to service in 8 hours. LCO 3.8.1.B was entered 2 hours ago. SR 3.8.1.1 was performed 45 minutes after LCO entry. The air start system problem has been isolated to the 1A DG. The National Weather Service has issued a Severe Thunderstorm Warning for Meigs, McMinn and Rhea Counties for the next 6 hours. </div> • SI/Test in progress/planned: (including need for new brief) <div style="border: 1px solid black; height: 40px; margin: 2px 0;"></div> • Major Activities/Procedures in progress/planned: <div style="border: 1px solid black; padding: 2px; margin: 2px 0;"> 100% power, MOL. RCS boron is 747 ppm. Control Bank D is at 220 steps. Train A/Channel I Work Week. Reduce power to 95%, to remove the 1A CBP from service for scheduled maintenance on the lube oil system. Maintenance is scheduled to begin in 1 hour. Perform shutdown using GO-4, Section 5.3, "Unit Shutdown from 100% to 30% Reactor Power." GO-4 complete through Step 11. </div> • Radiological changes in plant during shift: <div style="border: 1px solid black; height: 40px; margin: 2px 0;"></div> 			
Part 2 - Performed by on-coming shift			
<input type="checkbox"/> A review of the Operating Log since last held shift or 3 days, whichever is less (N/A for AUOs) <input type="checkbox"/> A review of the Rounds sheets/Abnormal readings (AUOs only) Review the following programs for changes since last shift turnover: <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div> <input type="checkbox"/> Standing Orders <input type="checkbox"/> Immediate required reading </div> <div> <input type="checkbox"/> LCO(s) in actions (N/A for AUOs) <input type="checkbox"/> TACF (N/A for AUOs) </div> <div> <input type="checkbox"/> PER review (N/A for AUOs) </div> </div>			
Part 3 - Performed by both off-going and on-coming shift			
<input type="checkbox"/> A walkdown of the MCR control boards (N/A for AUOs) <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div>Relief Time: _____</div> <div>Relief Date: _____</div> </div>			

Facility:	Watts Bar NRC Exam 1 August 2010	Scenario No.:	5	Op Test No.:	1
Examiners:	_____	Operators:	_____	SRO	
	_____		_____	RO	
	_____		_____	BOP	
Initial Conditions: 100% power, MOL. RCS boron concentration is 747 ppm. Control Bank D is at 220 steps.					
<p>Turnover: Window 23-A, TURB/GEN VIBRATION HI/HI-HI is lit. Bearing 9 indicates 10.1 mils, and Bearing 10 indicates 9.0 mils. Operations Management and System Engineering have met, and directed that a power reduction to 90% at 2% per minute using AOI-39, "Rapid Load Reduction" be conducted as soon as shift relief and turnover is complete. 1A Containment Spray Pump is out of service for motor bearing replacement. Pump has been out of service for 4 hours. Expected to be returned to service in 16 hours.</p>					
Event No.	Malf. No.	Event Type*	Event Description		
1	n/a	N-BOP R-RO	Power reduction to reduce main turbine vibration.		
2	ni07b	I-RO TS-SRO	Power Range Monitor N42 fails high, requiring entry into AOI-4, Nuclear Instrumentation Malfunctions," and a Tech Spec evaluation.		
3	fw03c rd09 rp03	C-RO C-BOP	#3 heater drain pump 1C trips on instantaneous overcurrent. Turbine runback fails and rods fail to move in auto, Requires the RO to take manual control of rod control, and the BOP to manually drop load, Requires entry into AOI-2, "Malfunction of Reactor Control System."		
4	rw16b	C-BOP TS-SRO	2A ERCW supply header breaks in the Yard. Requires entry into AOI-13, "Loss of Essential Raw Cooling Water (ERCW)." Requires Tech Spec evaluation of ERCW system.		
5	ch27c	C-BOP TS-SRO	C-A Lower Compartment Cooler trips. Requires entry into ARI 138-E, Panel M-9 Motor Tripout. Requires Tech Requirement evaluation.		
6	ms02d	M-All	Main Steam Line Break outside containment.		
7	ms04a, ms04b, ms04c, ms04d	C-BOP	#1, 2, and 3 Main Steam isolation valves fail to close in AUTO. After operator is dispatched to perform E-2, "Faulted Steam Generator Isolation," Attachment 1, MSIVs will close. Closure will not occur until ECA-2.1 is entered. #4 Main Steam isolation valve fails to close in AUTO. Manual isolation of #4 MSIV is not successful throughout the scenario.		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

DRAFT

Scenario 5 - Summary

Initial Condition Train A/Channel III Work Week. 100% power, MOL. RCS boron concentration is 747 ppm. Control Bank D is at 220 steps.

Turnover Window 23-A, TURB/GEN VIBRATION HI/HI-HI is lit. Bearing 9 indicates 10.1 mils, and Bearing 10 indicates 9.0 mils. Operations Management and System Engineering have met, and directed that a power reduction to 90% at 2% per minute using AOI-39, "Rapid Load Reduction" be conducted as soon as shift relief and turnover is complete. 1A Containment Spray Pump is out of service for motor bearing replacement. Pump has been out of service for 4 hours. Expected to be returned to service in 16 hours.

Event 1 Power reduction to reduce main turbine vibration. During power reduction, vibrations are reduced.

Event 2 Power Range Monitor N42 fails high. The RO responds by placing rod control in manual and stabilizing the plant. The SRO enters and directs actions using AOI-4, "Nuclear Instrumentation Malfunctions." The SRO evaluates Tech Specs and enters LCO 3.3.1, Reactor Trip System (RTS) Instrumentation, Conditions D, E, W, R, and S. Determines LCO 3.2.4 Quadrant Power Tilt Ratio (QPTR) Surveillance 3.2.4.2 is applicable.

Event 3 #3 heater drain pump 1C trips on instantaneous overcurrent. Turbine runback fails and rods fail to move in auto, Requires the RO to take manual control of rod control, and the BOP to manually drop load, Requires entry into AOI-2, "Malfunction of Reactor Control System."

Event 4 2A ERCW supply header breaks in the Yard. The BOP responds to multiple alarms on panel 0-M-27. The SRO enters AOI-13, "Loss of Essential Raw Cooling Water (ERCW)," and cross-connects the A and B ERCW headers to supply cooling water to equipment. The SRO evaluates Tech Specs and enters LCO 3.0.3.

Event 5 C-A Lower Compartment Cooler trips. The operator will enter into ARI 138-E, Panel M-9 Motor Tripout. The SRO will direct the BOP to start another lower compartment cooler to stop the rise in containment temperature. The SRO evaluates Tech Requirements and enters TR 3.6.3, Lower Compartment Cooling (LCC) System, Condition A.

Event 6 Main steam line break occurs on Loop 2 steam line outside containment. The SRO enters AOI-38, "Main Steam or Feedwater Line Leak." Reports from outside the control room state that there is a large steam leak outside the roll-up doors at the Service Bay. The SRO orders a reactor trip and MSIV closure. E-0, "Reactor Trip or Safety Injection is entered.

Event 7 #1, 2, and 3 Main Steam isolation valves fail to close in AUTO. After operator is dispatched to perform E-2, "Faulted Steam Generator Isolation," Attachment 1, MSIVs will close. **Closure will not occur until ECA-2.1 Step 5 is performed.** #4 Main Steam isolation valve fails to close in AUTO. Manual isolation of #4 MSIV **is not successful** throughout the scenario.

Scenario 5 - Critical Task Summary

<i>Critical Task 1 from WOG Critical Task List, ECA- 2.1, A.</i>	<p><i>Control the AFW flow rate to minimum detectable flow to each SG in order to minimize the RCS cooldown rate before FR-P.1, "Pressurized Thermal Shock," Critical Safety Function Status Tree develops an ORANGE PATH condition.</i></p> <p><i>If feed flow to a SG is isolated and the SG is allowed to dry out, subsequent reinitiation of feed flow to the SG could create significant thermal stress conditions on SG components. Maintaining a minimum verifiable feed flow to the SG allows the components to remain in a "wet" condition, thereby minimizing any thermal shock effects if feed flow is later increased.</i></p>
<i>Critical Task 2 From WOG Critical Task List for E-2, A</i>	<p><i>Isolate the faulted SG before transition out of E-2.</i></p> <p><i>Isolation of the feedwater to the faulted SG maximizes the cooldown capability of the non-faulted loops following a feedline break and minimizes the RCS cooldown and mass and energy release following a steamline break. Isolation of steam paths from the faulted SG also minimizes the RCS cooldown and mass and energy release to containment. In addition, isolation of these steam paths could isolate the break.</i></p> <p><i>Transition is made from ECA-2.1 back to E-2 when MSIVs are closed for three of four SGs.</i></p>
<i>Critical Task 3</i>	<p><i>Establish secondary heat sink (return AFW flow to intact SGs greater than 410 gpm) to meet SI termination criteria prior to entering FR-H.1.</i></p> <p><i>During performance of ECA-2.1, flow had been reduced to "minimum detectable flow" to minimize the RCS cooldown. Flow must be manually reestablished in order meet secondary heat sink requirements and allow SI termination.</i></p>

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 5
Simulator Console Operators Instructions

SIMULATOR SETUP INFORMATION

1. ENSURE NRC Examination Security has been established.
2. RESET to Initial Condition 345 by performing the following actions:
 - a. Select ICManager on the THUNDERBAR menu (right hand side of Instructor Console Screen).
 - b. Locate IC# 345.
 - c. Right "click" on IC# 345.
 - d. Select Reset on the drop down menu.
 - e. Right "click" on RESET.
 - f. Enter the password for IC 345.
 - g. Select "Yes" on the INITIAL CONDITION RESET pop-up window.
 - h. Perform SWITCH CHECK.
3. SELECT Director on the THUNDERBAR menu (right hand side of Instructor Console Screen).
4. ENSURE the following information appears on the Director Screen:

Key	Description	Type	Event	Delay	Inserted	Ramp	Initial	Final	Value
hs-72-44a-1	05040 cntmt sump hdr a fcv(green)	O		00:00:00	00:00:00	00:00:00		Off	Off
ms04a	msiv fails to close fcv-1-4	M		00:00:00	00:00:00	00:00:00		Active	Active
hs-72-22a-1	05020 nwst spray hdr a (green)	O		00:00:00	00:00:00	00:00:00		Off	Off
rp03	turbine runback signal failure (defeat)	M		00:00:00	00:00:00	00:00:00		Active	InActive
tu02j	main turbine high vibes exciter brg #10	M		00:00:00	00:00:00	00:00:00		60	60
hs-72-27a-1	06020 cntmt spray pump a mtr sw (green)	O		00:00:00	00:00:00	00:00:00		Off	Off

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 5
Simulator Console Operators Instructions

SIMULATOR SETUP INFORMATION

Key	Description	Type	Event	Delay	Inserted	Ramp	Initial	Final	Value
ms04d	msiv fails to close fcv-1-29	M		00:00:00	00:00:00	00:00:00		Active	Active
ms04c	msiv fails to close fcv-1-22	M		00:00:00	00:00:00	00:00:00		Active	Active
ms04b	msiv fails to close fcv-1-11	M		00:00:00	00:00:00	00:00:00		Active	Active
tu02i	main turbine high vibes gen brg #9	M		00:00:00	00:00:00	00:00:00		67.5	67.5
hs-72-34a-1	05060 cs pump a recirc fcv(green)	O		00:00:00	00:00:00	00:00:00		Off	Off
csr03	containment spray pump a power	R		00:00:00	00:00:00	00:00:00		off	off
hs-72-39a-1	05080 cs hdr a isol vlv sw (green)	O		00:00:00	00:00:00	00:00:00		Off	Off
ni07b	pr channel output signal failure pr chnl 1	M	2	00:00:00		00:00:00		120	100.761
fwr15	#3 htr dr tank pump low delta-p reset switch	R	20	00:00:00		00:00:00		reset	normal
rwr22	power to appendix r valve 1-fcv-67-458		21	00:00:00		00:00:00		on	00:00:00
rwr29	power to 2-fcv-67-22 strainer 2a-a inlet		22	00:00:00		00:00:00		on	off
rwr30	power to 2-fcv-67-81 aux building supply header 2a		23	00:00:00		00:00:00		on	off
msr26a	msiv 1-4 aux transfer switch		24	00:00:00		00:00:00		aux	normal
fw03c	#3 heater drain pump c trip	M	3	00:00:00		00:00:00		Active	InActive
rd09	rods fail to move in auto	M	3	00:00:00		00:00:00		Active	InActive
rw16b	ercw supply header 2-a break in yard	M	4	00:00:00		00:01:00		70	0
ch27c	oc trip lower compartment cooler c-a	M	5	00:00:00		00:00:00		Active	InActive
ms02b	main steam line break outside containment sg #2	M	6	00:00:00		00:00:00		5	0

5. Place simulator in RUN and acknowledge any alarms.

6. ENSURE 1-HS-72-27A, CNTMT SPRAY PMP A is in the STOP, PULL-TO-LOCK position. Place RED HOLD NOTICE tags on 1-HS-72-27A, CNTMT SPRAY PMP A, 1-HS-72-22A, 1-HS-72-34A, 1-HS-72-34A, 1-HS-72-39A, and 1-HS-74-77A handswitches. Ensure the indicating lights on 1-HS-72-27A, CNTMT SPRAY PMP A, 1-HS-72-22A, 1-HS-72-34A, 1-HS-72-34A, 1-HS-72-39A, and 1-HS-74-77A handswitches are DARK.

7. Place pink "Protected Equipment" tag on 1-HS-72-10A, CNTMT SPRAY PMP B handswitch.

8. ENSURE the "Train A Week - Channel III" sign is placed on 1-M-30.

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 5
Simulator Console Operators Instructions

SIMULATOR SETUP INFORMATION

9. Place simulator in FREEZE.

10. ENSURE Watts Bar Nuclear Plant Unit 1 Reactivity Briefing Book (Simulator Copy) MOL (Middle of Life) is updated and on the desk, and that the MOL placards are on 1-M-6, below the Boric Acid and Primary Water Integrators.

Item 3	•AFD	-11.8	%	-2.3	%	5.8	%
		Lower Band		Target	Upper Band		
				-2.7			
		Actual					
				Manual		220	steps
						Control Bank D1/D2	

Item 4	•Control Rods	<input checked="" type="checkbox"/> Auto	<input type="checkbox"/> Manual	<input type="checkbox"/> Negative	<input type="checkbox"/> Positive	<input checked="" type="checkbox"/> None

Item 5	Current RCS C _B :	748	ppm	<input type="checkbox"/> Acid	<input type="checkbox"/> Water	<input checked="" type="checkbox"/> Blended
	Current fluid inside the blender is:					

PW flow rate	70 gpm				
1-FC-62-142, dial setting	35%				
BA flow rate	8 gpm				
1-FC-62-139 dial setting	21%				

6. Boric Acid (BA) and Primary Water (PW) volumes for the following changes:

1°F Tav _g increase	373	gal	PW
1°F Tav _g decrease	46	gal	BA
10% Downpower @ 5%/hr	145	gal	BA
50% Downpower @ 5%/hr	440	gal	BA
1000 MW (85%) Runback	179	gal	BA
950 MW (80%) Runback	262	gal	BA
900 MW (75%) Runback	341	gal	BA
790 MW or 800 MW Runback	487	gal	PW

11. WHEN prompted by the Chief Examiner, place the Simulator in RUN.

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 5
Simulator Console Operators Instructions

Exam Event No.	Simulator Event No.	Description/Role Play
1	none	Power reduction to reduce main turbine vibration. As power is reduced, REDUCE the severity malfunctions of tu02i and tu02j from 67.5 to 62.5 over a 6 minute ramp and 60 to 55 over a 6 minute ramp.
2	2	Power Range Monitor N42 fails high, requiring entry into AOI-4. ROLE PLAY: When contacted as Work Control, acknowledge report and state that a package will be prepared to troubleshoot and repair PR N42. If contacted to perform IMI-160.002, state that the control room will be contacted prior to tripping any bistables. ROLE PLAY: When contacted as Reactor Engineering, acknowledge the report and state that the incore flux mapping will begin in approximately 1 hour.
3	3	#3 heater drain pump 1C trips on instantaneous overcurrent. During load reduction/turbine runback, the automatic turbine runback fails to occur, and rods fail to move in auto, requiring the RO to take manual control." ROLE PLAY: When contacted as Turbine Building AUO, report that the 1C #3 heater drain tank pump motor leads are burned off, and there is the smell of burnt insulation in the area. When requested to report #3 Heater drain tank levels, use ThunderView Page fw6 for local level and trend information. ROLE PLAY: When contacted as the Support AUO, report that the 1C #3 heater drain tank pump tripped on instantaneous overcurrent. ROLE PLAY: When contacted as Work Control, acknowledge report that the rods failed to move in automatic during the runback. State that a package will be prepared to troubleshoot and repair the rod control circuit. ROLE PLAY: When contacted as Turbine Building AUO to perform SOI-2&3.01, "Extraction Steam, Heater Drains and Vent System," Section 8.3, "Manual "Reset: of 1-LCV-6-106A, #3 HEATER DRAIN TANK LEVEL CONTROL repeat back request. Pages 74 and 75 of SOI-5&6.01 are attached as Pages 8 and 9 of the Simulator Console Operators Instructions. Use ThunderView Page fw6 for valve and reset switch manipulations.

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 5
Simulator Console Operators Instructions

Exam Event No.	Simulator Event No.	Description/Role Play
4	5	<p>2A ERCW supply header breaks in the Yard.</p> <p>ROLE PLAY: <i>When contacted as the Outside Routine AUO, report a large amount of water in the yard near the Intake Pumping Station. After valve realignments are completed, report that the water flow has stopped.</i></p> <p>ROLE PLAY: <i>When contacted as the Control Building AUO, acknowledge being dispatched to the reactor MOV boards. Restore power to 1-FCV-67-458 using Event 21 (remote function rwr22 to "on"). Restore power to 2-FCV-67-22 using Event 22 (remote function rwr29 to "on"). Restore power to 2-FCV-67-81 using Event 23 (remote function rwr30 to "on").</i></p> <p>ROLE PLAY: <i>When contacted as the Outside Routine AUO, report that you are on the way to the DG Buildings to get local readings.</i></p>
5	4	<p>C-A Lower Compartment Cooler trips. Requires entry into ARI 138-E, Panel M-9 Motor Tripout.</p> <p>ROLE PLAY: <i>When contacted as Control Building AUO, report that the C-A lower compartment cooler tripped on instantaneous overcurrent.</i></p> <p>ROLE PLAY: <i>When contacted as Work Control, acknowledge report that the C-A lower compartment cooler tripped. State that a package will be prepared to troubleshoot the C-A lower compartment cooler.</i></p>
6	6	<p>Main Steam Line Break outside containment.</p> <p>ROLE PLAY: <i>When contacted as the Turbine Building AUO or Outside Routine AUO, report a large amount of steam is visible outside the Service Bay roll-up door.</i></p>

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 5
Simulator Console Operators Instructions

Exam Event No.	Simulator Event No.	Description/Role Play
7	none	<p>#1, 2, and 3 Main Steam isolation valves fail to close in AUTO. After operator is dispatched to perform E-2, "Faulted Steam Generator Isolation," Attachment 1, and when cued by the Chief Examiner these MSIVs will close. Closure will not occur until ECA-2.1 is entered.</p> <p>NOTE: Remove malfunctions ms04a, ms04b, and ms04c after the crew enters ECA-2.1 and has completed the first 5 steps.</p> <p>ROLE PLAY: <i>As Control Building AUO, acknowledge request to perform Appendix 1 of E-2. Insert Event 20, to transfer one switch to AUX, and provide the alarms for that action. Report back that the transfer switches are in the AUX position for the MSIVs. When the operator realizes that the transfer to AUX did not close the MSIVs, perform Step 3 of the attachment. Report back after the first MSIV is closed that step 3 of the Attachment 1 is complete.</i></p>
8	none	<p>#4 MSIV fails to close. Manual isolation is unsuccessful for the duration of the scenario.</p> <p>ENSURE ms04d remains active for the scenario. Exercise care when removing ms04a, ms04b and ms04c.</p>

WBN Unit 1	Extraction Steam, Heater Drains and Vent System	SOI-5&6.01 Rev. 0059 Page 74 of 262
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Date _____

INITIALS _____

8.3 Manual "Reset" of 1-LCV-6-106A, #3 HEATER DRAIN TANK
LEVEL CONTROL³

NOTES

- 1) The following section allows a controlled recovery of 1-LCV-6-106A after a #3 HDTF trip with unit above 85% power.
- 2) Blue light lit above RESET button on local panel indicates 1-LCV-6-106A is being controlled by Hand Indicating Controller 1-HIC-6-106 in the 56.2% position due to pump trip with unit above 85% power.

[1] **ENSURE** blue light lit on local panel [Above RESET button
1-HS-6-106]. _____

[2] **ENSURE** unit is below 85% power, **OR** _____

ALL #3 Heater Drain Tank Pumps are in service. _____

[3] **ENSURE** 1-LIC-3-106 is in AUTO mode (MANUAL button
NOT LIT). _____

[4] **ENSURE** 1-LIC-3-106 display is selected to indicate controller
output. _____

[5] **ENSURE** 1-LIC-3-105 is in AUTO mode and is controlling
level. _____

NOTE

The following steps should provide a smooth transfer of #3 HDT level control from 1-HIC-6-106A back to 1-LIC-6-106. As the output of 1-HIC-6-106A is raised from its design setpoint of 56.2%, and 1-LCV-6-106A opens, level should drop in the #3 HDT. As level drops, the 1-LCV-6-105 valves should close. As level continues to drop, the output of 1-LIC-6-106 should also begin to drop. When the output of 1-LIC-6-106 approximates that of 1-HIC-6-106A, then the #3 HDT PUMP CAVITATION CNTL circuit can be reset. Valve 1-LCV-6-106A should be opened only enough to establish a slowly dropping level trend in the #3 HDT

[6] **SLOWLY OPEN** 1-LCV-6-106A using 1-HIC-6-106A and
establish a slowly dropping level trend in the #3 HDT. _____

[7] **ENSURE** 1-LCVs-6-105A and 105B CLOSE. _____

WBN Unit 1	Extraction Steam, Heater Drains and Vent System	SOI-5&6.01 Rev. 0059 Page 75 of 262
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Date _____

INITIALS

8.3 Manual "Reset" of 1-LCV-6-106A, #3 HEATER DRAIN TANK
LEVEL CONTROL³ (continued)

[8] WHEN the outputs of 1-LIC-6-106 and 1-HIC-6-106A
approximately agree, THEN

PUSH local RESET button 1-HS-6-106A, #3 HDT PUMP
CAVITATION CNTL RESET, AND

CHECK blue light goes out.

[9] CHECK 1-LIC-6-106 controlling level in a stable manner.

[10] RETURN 1-HIC-6-106A setpoint to its design value of 56.2%.

CV

WBN Unit 1	Loss of Essential Raw Cooling Water AOI-13 Rev. 0038
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Step	Action/Expected Response	Response Not Obtained
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3.4 Supply Header Rupture in Yard or Plugged Strainer (continued)

7. CHECK Supply Header 2A flow at expected value for existing plant conditions.

PERFORM the following:

- a. **UNLOCK**, and **CLOSE** bkr on Rx MOV Bd 1A2-A or 15E, 1-FCV-67-455.
- b. **UNLOCK**, and **CLOSE** bkr on Rx MOV Bd 2A2-A or 7B, 2-FCV-67-22.
- c. **UNLOCK**, and **CLOSE** bkr on Rx MOV Bd 2A2-A or 8A, 2-FCV-67-81.
- d. **ENSURE** 1-FCV-67-223, ERCW Hdr 1B To 2A Xtie, **OPEN**.
- e. **ENSURE** 2-FCV-67-223, ERCW Hdr 2A To 1B Xtie, **OPEN**.
- f. **OPEN** 1-FCV-67-455, CDS Hx A Sup From Hdr 1B.
- g. **CLOSE** 2-FCV-67-22, Strainer 2A-A Inlet.
- h. **CLOSE** 2-FCV-67-81, A3 Supply Hdr 2A.
- i. * **GO TO** Step 10.

ATTACHMENT 1

(E-2)

Page 1 of 4

1.0 INSTRUCTIONS

- [1] IF any MSIV will NOT close,
THEN
GO TO Section 1.1 (Attachment 1).

- [2] IF any MSIV bypass valve will NOT close,
THEN
GO TO Section 1.2 (Attachment 1).

WBN	FAULTED STEAM GENERATOR ISOLATION	E-2 Rev 11
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ATTACHMENT 1

(E-2)

Page 2 of 4

1.1 MSIV Isolation

- [1] PLACE affected MSIV transfer control switch in AUX position:
[Auxiliary Control Room, Panels 1-L-11A and 1-L-11B]

S/S (Circle affected S/S)	EQUIPMENT	AUX TRANSFER SWITCH	AUX POSITION ✓
1	MSIV Loop 1, Train A, 1-PCV-1-4	1-XS-1-4A	<input type="checkbox"/>
	MSIV Loop 1, Train B, 1-PCV-1-4	1-XS-1-4B	<input type="checkbox"/>
2	MSIV Loop 2, Train A, 1-PCV-1-11	1-XS-1-11A	<input type="checkbox"/>
	MSIV Loop 2, Train B, 1-PCV-1-11	1-XS-1-11B	<input type="checkbox"/>
3	MSIV Loop 3, Train A, 1-PCV-1-22	1-XS-1-22A	<input type="checkbox"/>
	MSIV Loop 3, Train B, 1-PCV-1-22	1-XS-1-22B	<input type="checkbox"/>
4	MSIV Loop 4, Train A, 1-PCV-1-25	1-XS-1-25A	<input type="checkbox"/>
	MSIV Loop 4, Train B, 1-PCV-1-25	1-XS-1-25B	<input type="checkbox"/>

- [2] CONSULT UC to verify affected MSIV closed.

WBN	FAULTED STEAM GENERATOR ISOLATION	E-2 Rev 11
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ATTACHMENT 1

(E-2)

Page 3 of 4

1.1 MSIV Isolation (Continued)

- [3] IF affected MSIV st~~ill~~ open OR control power fuse removal desired,
THEN
REMOVE MSIV fuses:

S/G (Circle affected S/G)	EQUIPMENT	FUSE LOCATION (Two per circuit)	FUSES REMOVED ✓
1	MSIV Loop 1, Train A, 1-FCV-1-4	125V VHSI Battery Bd I Circuit A-46 Circuit B-46	<input type="checkbox"/> <input type="checkbox"/>
	MSIV Loop 1, Train B, 1-FCV-1-4	125V VHSI Battery Bd II Circuit A-46 Circuit B-46	<input type="checkbox"/> <input type="checkbox"/>
2	MSIV Loop 2, Train A, 1-FCV-1-11	125V VHSI Battery Bd I Circuit A-47 Circuit B-47	<input type="checkbox"/> <input type="checkbox"/>
	MSIV Loop 2, Train B, 1-FCV-1-11	125V VHSI Battery Bd II Circuit A-47 Circuit B-47	<input type="checkbox"/> <input type="checkbox"/>
3	MSIV Loop 3, Train A, 1-FCV-1-22	125V VHSI Battery Bd I Circuit A-48 Circuit B-48	<input type="checkbox"/> <input type="checkbox"/>
	MSIV Loop 3, Train B, 1-FCV-1-22	125V VHSI Battery Bd II Circuit A-48 Circuit B-48	<input type="checkbox"/> <input type="checkbox"/>
4	MSIV Loop 4, Train A, 1-FCV-1-29	125V VHSI Battery Bd I Circuit A-49 Circuit B-49	<input type="checkbox"/> <input type="checkbox"/>
	MSIV Loop 4, Train B, 1-FCV-1-29	125V VHSI Battery Bd II Circuit A-49 Circuit B-49	<input type="checkbox"/> <input type="checkbox"/>

- [4] NOTIFY UC upon completion.

WBN	FAULTED STEAM GENERATOR ISOLATION	E-2 Rev 11
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ATTACHMENT 1

(E-2)

Page 4 of 4

1.2 MSIV Bypass Isolation

- [1] PLACE HS in OFF for MSIV bypass valves that will NOT close:

S/O (Circle affected S/O)	NOMENCLATURE	LOCATION	POSITION	UNID	HS OFF 
1	MAIN STEAM ISOL VLV LOOP 1 BYP WARMING VLV	A3U/737	OFF	1-HS-1-147E	
2	MAIN STEAM ISOL VLV LOOP 2 BYP WARMING VLV	A4U/757	OFF	1-HS-1-148E	
3	MAIN STEAM ISOL VLV LOOP 3 BYP WARMING VLV	A5U/757	OFF	1-HS-1-149E	
4	MAIN STEAM ISOL VLV LOOP 4 BYP WARMING VLV	A3U/737	OFF	1-HS-1-150E	

- [2] NOTIFY UG upon completion.

Op Test No.:	<u>NRC</u>	Scenario #	<u>5</u>	Event #	<u>1</u>	Page	<u>1</u>	of	<u>51</u>
Event Description: Power reduction to reduce main turbine vibration. During power reduction, vibrations are reduced.									
Time	Position	Applicant's Actions or Behavior							

EXAMINER: The following actions are from AOI-39, "Rapid Load Reduction," Section 3.2, "Power Reduction From Greater than 50% Power."

CAUTION Condenser Backpressure limits are on previous page.

CAUTION TURBINE MANUAL Operation requires continuous operator monitoring and control.

CAUTION LOSS OF CONDENSER VACUUM may be made worse if steam dumps are actuated. AOI-11 requires T-ave and T-ref be maintained within 3°F.

NOTE If the initiating condition is corrected, the power reduction may be terminated.

	SRO RO	<p>1. ESTABLISH a turbine load reduction rate less than or equal to 5%/min:</p> <p>a. PLACE turbine in IMP IN</p> <p>b. SET a desired load in the SETTER with the REFERENCE CONTROL.</p> <p>c. SET the LOAD RATE at less than or equal to 5%/min.</p> <p>d. DEPRESS GO pushbutton.</p>
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EXAMINER: AS load is reduced, the turbine vibrations will improve (drop from their initial values.)

CAUTION Over boration may result in excessive rod withdrawal or Tavg lower than desired for at power conditions.

NOTE

- Rod Control should remain in automatic for Tavg Control
- Reactivity Briefing Sheet, "Thumb Rules" (page 3), lists boration flows and volumes for different reduction rates.
- Effect of boration will lag behind turbine load reduction and can be compensated for by temporarily increasing boric acid flow rate above recommended rate.

	RO	<p>2. INITIATE a manual boration:</p> <p>a. DETERMINE recommended boration flow rate and volume from Reactivity Briefing Sheet:</p> <p>b. INITIATE normal boration:</p> <p>1) ADJUST BA flow controller, 1-FC-62-139, to desired flow rate.</p> <p>2) ADJUST BA batch counter 1-FQ-62-139 to required quantity.</p> <p>3) PLACE mode selector 1-HS-62-140B to BOR.</p> <p>4) PLACE VCT makeup control 1-HS-62-140A, to START.</p> <p>5) VERIFY desired boric acid flow indicated on 1-FI-62-139.</p>
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EXAMINER: The following actions are taken from SOI-62.02, "Boron Concentration Control," Section 6.7, "Minor Boration."

Op Test No.: NRC Scenario # 5 Event # 1 Page 2 of 51

Event Description: Power reduction to reduce main turbine vibration. During power reduction, vibrations are reduced.

Time	Position	Applicant's Actions or Behavior
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NOTES

1) Section 6.7, may be reproduced, laminated, displayed, reused, etc. as desired.

2) Minor Boration is defined as the addition of Boric Acid done several times each shift early in core life, to compensate for burnable poison burn-up, and maintain Tav_g on program.

	RO	[1] ENSURE 1-HS-68-341H, BACKUP HEATER C [1-M-4], is ON to equalize RCS-Pzr CB.																											
	RO	[2] ADJUST 1-FC-62-139, BA TO BLENDER [1-M-6], for desired flow rate.																											
	RO	[3] ADJUST 1-FQ-62-139, BA BATCH COUNTER [1-M-6], for required quantity.																											
	RO	[4] PLACE 1-HS-62-140B, VCT MAKEUP MODE [1-M-6], in BOR.																											
	RO	[5] TURN 1-HS-62-140A, VCT MAKEUP CONTROL [1-M-6], to START. [5.1] CHECK Red light is LIT.																											
	RO	[6] MONITOR the following parameters: <table border="1"> <thead> <tr> <th>Instrument</th><th>Location</th><th>Parameters</th></tr> </thead> <tbody> <tr> <td>1-PI-62-122</td><td>1-M-6</td><td>VCT PRESS</td></tr> <tr> <td>1-LI-62-129A</td><td>1-M-6</td><td>VCT LEVEL</td></tr> <tr> <td>1-FI-62-139</td><td>1-M-6</td><td>BA TO BLENDER FLOW</td></tr> <tr> <td>1-FQ-62-139</td><td>1-M-6</td><td>BA BATCH COUNTER</td></tr> <tr> <td>1-FI-62-142</td><td>1-M-6</td><td>PW TO BLENDER FLOW</td></tr> <tr> <td>1-FQ-62-142</td><td>1-M-6</td><td>PW BATCH COUNTER</td></tr> <tr> <td>1-LI-62-238</td><td>1-M-6</td><td>BAT A LEVEL</td></tr> <tr> <td>1-LI-62-242</td><td>1-M-6</td><td>BAT C LEVEL</td></tr> </tbody> </table>	Instrument	Location	Parameters	1-PI-62-122	1-M-6	VCT PRESS	1-LI-62-129A	1-M-6	VCT LEVEL	1-FI-62-139	1-M-6	BA TO BLENDER FLOW	1-FQ-62-139	1-M-6	BA BATCH COUNTER	1-FI-62-142	1-M-6	PW TO BLENDER FLOW	1-FQ-62-142	1-M-6	PW BATCH COUNTER	1-LI-62-238	1-M-6	BAT A LEVEL	1-LI-62-242	1-M-6	BAT C LEVEL
Instrument	Location	Parameters																											
1-PI-62-122	1-M-6	VCT PRESS																											
1-LI-62-129A	1-M-6	VCT LEVEL																											
1-FI-62-139	1-M-6	BA TO BLENDER FLOW																											
1-FQ-62-139	1-M-6	BA BATCH COUNTER																											
1-FI-62-142	1-M-6	PW TO BLENDER FLOW																											
1-FQ-62-142	1-M-6	PW BATCH COUNTER																											
1-LI-62-238	1-M-6	BAT A LEVEL																											
1-LI-62-242	1-M-6	BAT C LEVEL																											
	RO	[7] WHEN Boration is COMPLETE, THEN PLACE 1-HS-62-140B, VCT MAKEUP MODE, in AUTO.																											
	RO	[8] TURN 1-HS-62-140A, VCT MAKEUP CONTROL, to START. [8.1] CHECK Red light is LIT.																											
	RO	[9] RETURN 1-FC-62-139, BA TO BLENDER [1-M-6], to desired flow rate.																											

EXAMINER: The following actions are from AOI-39, "Rapid Load Reduction," Section 3.2, "Power Reduction From Greater than 50% Power."**NOTE AFD** green target band can be monitored using ICS Turn On code DOGHOUSE.

	RO	3. MONITOR rod position: <ul style="list-style-type: none"> • Rods above Lo-Lo insertion limit • AFD within Target Band
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Op Test No.: NRC Scenario # 5 Event # 1 Page 3 of 51

Event Description: Power reduction to reduce main turbine vibration. During power reduction, vibrations are reduced.

Time	Position	Applicant's Actions or Behavior
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	SRO	4. REFER to EPIP-1, Emergency Plan Classification Flowchart. <u>EXAMINER:</u> Step is N/A for given conditions.
	SRO	5. NOTIFY the Load Coordinator of the required load reduction and expected ramp rate.
NOTE If reactor power is stabilized at a lower level a drop in Tavg will occur due to Xenon build up. Dilution may be required to maintain power level.		
	SRO RO	6. MONITOR Tavg and Tref: <ul style="list-style-type: none"> ▪ Tavg trending to Tref. ▪ Mismatch less than 5°F.
	SRO	7. CHECK rate of power reduction is rapid enough for existing plant conditions.
	SRO	8. NOTIFY Cnds Demin AUO of impending pmp shutdowns.
	SRO	9. WHEN rated thermal power change exceeds 15% in one hour, NOTIFY Chemistry to initiate 1-SI-68-128.
<u>EXAMINER:</u> Further steps of AOI-39, "Rapid Power Reduction" are not included, since the crew will only reduce power to 85%, and the remainder of AOI-39 steps are power level dependent. Simulator Operator enters Event 2.		
	SRO	Crew Brief would typically be conducted for this event as time allows prior to the next event.
	SRO	Notifications should be addressed as applicable if not specifically addressed by the procedure or in the crew brief. <u>Operations Management</u> - Typically Shift Manager. <u>Maintenance Personnel</u> - Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
Cue Simulator Operator to insert Event 2		

Op Test No.: NRC Scenario # 5 Event # 2 Page 4 of 51

Event Description: Power Range Monitor N42 fails high

Time	Position	Applicant's Actions or Behavior
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Indications:

83-A POWER RANGE OPERPOWER ROD WD STOP

83-D PLANT COMPUTER GENERATED ALARM (SEE ICS)

83-E POWER RANGE CHANNEL DEVIATION

90-B PZR PRESS LO-DEVN BACKUP HTRS ON

115-C POWER RANGE FLUX HI

115-E POWER RANGE FLUX RATE HI

Control rods inserting at 72 steps per minute.

	RO	Diagnoses and announces Power Range N42 Failure.
	RO	May place rods in MANUAL after determining that there is no secondary runback in progress.
	BOP	May place SG 2 and 3 feedwater regulating valves in MANUAL.
	SRO	Enter and direct actions of AOI-4, "Nuclear Instrumentation Malfunctions," Section 3.4, "Power Range Monitor Malfunction."

EXAMINER: The following actions are taken from AOI-4, "Nuclear Instrumentation Malfunctions," Section 3.4, "Power Range Monitor Malfunction."

	RO	1. PLACE control rods in MANUAL.
	RO	2. CHECK rod motion STOPPED.
	RO	3. CHECK N41 Normal
	RO	4. CHECK N42 Normal
	BOP	4. RESPONSE NOT OBTAINED: PLACE S/G 2 and S/G 3 Main FW reg valves in MANUAL. PLACE all Bypass FW reg valves in MANUAL. ADJUST FW as required to maintain S/G levels on program. PLACE S/G 1 and S/G 4 LEVEL – NIS BIAS controllers in MANUAL. MATCH bias controllers to demand output on S/Gs 1 and 4.
	RO	5. CHECK N43 and N44 NORMAL
	BOP	6. IF Main FW reg valves controlling S/G level, THEN: a. ENSURE S/G Main FW reg valve level demand and level are matched. b. PLACE affected S/G Main FW reg valves in AUTO.

NOTE Control rod withdrawal may not be possible if a PRM has failed high due to the 103% Rod Withdrawal Stop (C-2) (Annunciator window 83-A).

	RO	7. MAINTAIN T-avg and T-ref within 3°.
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Op Test No.: NRC Scenario # 5 Event # 2 Page 5 of 51

Event Description: Power Range Monitor N42 fails high

Time	Position	Applicant's Actions or Behavior
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	RO	8. ENSURE 1-NR-92-145 recording an operable power range channel.
NOTE Inputs to 1-TR-68-2A include power range monitor, pressurizer pressure, ΔT and Tavg. Selection of an operable channel should consider other failures in addition to the failed power range monitor channel.		
	RO	9. ENSURE 1-TR-68-2A placed to operable ΔT /OT ΔT /OP ΔT channel using 1-XS-68-2B, ΔT RCDR TR-68-2A LOOP SELECT [1-M-5].
	SRO	10. DEFEAT affected PRM functions: • REFER TO Attachment 1, PRM Function At NIS Rack.
EXAMINER: The following actions are taken from AOI-4, Nuclear Instrumentation Malfunctions," Attachment 1, "PRM Function At NIS Rack."		
<p style="text-align: center;">NOTE</p> <p>The following annunciators may be affected by defeating a PRM channel:</p> <ul style="list-style-type: none"> • [66-C, 67-C, 68-C, 69-C] N-(#) OVERPOWER ROD STOP BYPASSED. • [82-E] NIS CHANNEL IN TEST. • [83-A] POWER RANGE OVERPOWER ROD WD STOP. • [83-E] POWER RANGE CHANNEL DEVIATION. • [115-C] POWER RANGE FLUX HI. • [115-E] POWER RANGE FLUX RATE HI. 		
	RO	A. PERFORM the following steps for the affected PRM: 1. PLACE DETECTOR CURRENT COMPARATOR switch for UPPER SECTION to failed channel. (N42) 2. PLACE DETECTOR CURRENT COMPARATOR switch for LOWER SECTION to failed channel. (N42)
<p style="text-align: center;">NOTE</p> <p>On the following step, annunciator window 83-A, POWER RANGE OVERPOWER ROD WD STOP will clear (if channel failure was high) and window 66-C, 67-C, 68-C OR 69-C, N-(#) OVERPOWER ROD STOP BYPASSED, will come into alarm depending on which channel is bypassed.</p>		
	RO	3. PLACE ROD STOP BYPASS switch to failed channel. (N42)
	RO	4. PLACE POWER MISMATCH BYPASS switch to failed channel. (N42)
<p style="text-align: center;">NOTE</p> <p>On the following step, annunciator window 83-E, POWER RANGE CHANNEL DEVIATION, will clear and annunciator window 82-E, NIS CHANNEL IN TEST, will come into alarm.</p>		
	RO	5. PLACE COMPARATOR CHANNEL DEFEAT switch to failed channel. (N42)

Op Test No.: NRC Scenario # 5 Event # 2 Page 6 of 51

Event Description: Power Range Monitor N42 fails high

Time	Position	Applicant's Actions or Behavior
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NOTE

On the following step, annunciator window 115-E, POWER RANGE FLUX RATE HI, will clear if the positive rate trip light is LIT.

	RO	6. IF POSITIVE RATE TRIP is LIT, THEN RESET RATE MODE switch.
EXAMINER: The following actions are taken from AOI-4, "Nuclear Instrumentation Malfunctions," Section 3.4, "Power Range Monitor malfunction," at Step 11.		
	SRO	11. IF Bypass FW reg. valves are in MANUAL AND controlling S/G level, THEN: <i>Determines that the step is not applicable, and continues to the next step.</i>
	SRO	12. WHEN failed PRM defeated AND AUTO rod control desired, THEN: a. ENSURE T-avg and T-ref within 1°. b. ENSURE zero demand on control rod position indication [1-M-4]. c. PLACE control rods in AUTO.
	SRO	13. INITIATE repairs on failed channel.
	SRO	14. NOTIFY Work Control to have IM trip failed channel bistables.
CAUTION Power fuses should not be removed during the performance of IMI-160 until affected S/G level controls are in manual at either the SG LEVEL - NIS BIAS controller(s) or the Main FW reg valve controllers.		
	SRO	15. WHEN notified bistables are tripped, THEN CHECK lights and alarms referenced in Appendix A are LIT. <i>Determines that conditions of the step are not met and continues to the next step.</i>

Op Test No.: NRC Scenario # 5 Event # 2 Page 7 of 51

Event Description: Power Range Monitor N42 fails high

Time	Position	Applicant's Actions or Behavior
	SRO	<p>16. REFER TO Tech Specs:</p> <p>3.3.1-1, "Rx Trip System (RTS)"</p> <p>2.a. Power Range Neutron Flux - High Condition D. One Power Range Neutron Flux-High channel inoperable. Place channel in trip within 72 hours AND Reduce THERMAL POWER to \leq 75% RTP within 78 hours; OR Place channel in trip within 72 hours AND Perform SR 3.2.4.2 every 12 hours OR be in Mode 3 within 78 hours.</p> <p>3.a. Power Range Neutron Flux Rate - High Positive Rate Condition E. With one channel inoperable, place the channel in trip within 72 hours OR be in Mode 3 in 78 hours.</p> <p>6. Overtemperature ΔT Condition W. Place channel in trip within 72 hours OR be in Mode 3 within 78 hours.</p> <p><u>EXAMINER:</u> P-7 remains operable.</p> <p>16.c. Power Range Neutron Flux, P-8 Condition S. With ONE channel inoperable, verify the interlock is in required state for existing unit conditions within 1 hour OR be in Mode 2 within 7 hours.</p> <p>16.d. Power Range Neutron Flux, P-9 Condition S. With ONE channel inoperable, verify the interlock is in required state for existing unit conditions within 1 hour OR be in Mode 2 within 7 hours.</p> <p>16.e. Power Range Neutron Flux, P-10 Condition R. With ONE channel inoperable, verify the interlock is in required state for existing unit conditions within 1 hour OR be in Mode 3 within 7 hours.</p> <p>3.2.4 Quadrant Power Tilt Ratio (QPTR). SR 3.2.4.2 Verify QPTR is within limit using the movable incore detectors, once within 12 hours AND 12 hours thereafter.</p>
	SRO	17. NOTIFY Operations Duty Manager and Rx Engineering of failed channel.
	SRO	18. DO NOT CONTINUE with this Instruction UNTIL failed PRM repair is completed.
	SRO	Crew Brief would typically be conducted for this event as time allows prior to the next event.

Op Test No.: NRC Scenario # 5 Event # 2 Page 8 of 51

Event Description: Power Range Monitor N42 fails high

Time	Position	Applicant's Actions or Behavior
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	SRO	Notifications should be addressed as applicable if not specifically addressed by the procedure or in the crew brief. <u>Operations Management</u> - Typically Shift Manager. <u>Maintenance Personnel</u> – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
Cue Simulator Operator to insert Event 3.		

Op Test No.: NRC Scenario # 5 Event # 3 Page 9 of 51

Event Description: #3 heater drain pump 1C trips on instantaneous overcurrent. During load reduction/turbine runback, turbine runback fails to occur and rods fail to move in auto,

Time	Position	Applicant's Actions or Behavior
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Indications:

14-E 1-M-1 THRU 1-M-6 MOTOR TRIPOUT

29-E #3 HD TANK LEVEL HI/LO

30-E #3 HD TANK BYP TO CONDENSER OPEN

	BOP	Diagnoses and announces 1C #3 heater drain tank pump trip.
	SRO	May enter and direct actions of AOI-39, "Rapid Load Reduction," to reduce load to within secondary pump capabilities.
	SRO	May enter and direct actions of AOI-37, "Rapid Load Reduction," if actions taken to reduce load are delayed.

EXAMINER: The following actions are taken from ARI 14-E, "

	BOP	[1] DETERMINE what equipment tripped.
	BOP	[2] PLACE control switch for tripped equipment in OFF.
	BOP	[3] START spare equipment as needed.
	SRO	[4] ADJUST plant conditions as necessary to compensate for equipment affected.
	SRO	[5] REFER TO Tech Specs for operability requirements of affected equipment.

EXAMINER: The following actions are taken from 29-E, "#3 HD TANK LEVEL HI/LO."

	BOP	[1] DISPATCH Operator to determine tank level by sightglass/indicator.
	BOP	[2] IF greater than 85% turbine load and all of the following exist, THEN GO TO AOI-37, Turbine Runback Response. <ul style="list-style-type: none"> • 1-LIS-6-26 indicates > 79% level • Low #3HDT pump flow (10,000 gpm)
	BOP	[3] If HI/LO tank level alarm due to level control failure, THEN PLACE 1-LIC-6-105 and/or 1-LIC-6-106 in MANUAL AND RESTORE level to normal using sightglass/level indicator.

NOTE Any #3 HDT pump NOT running with turbine load 85% will place 1-HIC-6-106 in service to position 1-LCV-6-106A at approximately 56% open, indicated by a blue light which will illuminate on the local panel above the 1-LCV-6-106A RESET button. The RESET button must be pushed to allow normal valve control prior to raising load when all pumps are available. The blue light should go out when the circuit is reset. SOI-5&6.01 may be referenced for instructions on resetting LCV 6-106A, and transferring control from 1-HIC-6-1-106A back to 1-LIC-6-106.

Op Test No.:	<u>NRC</u>	Scenario #	<u>5</u>	Event #	<u>3</u>	Page	<u>10</u>	of	<u>51</u>
Event Description: #3 heater drain pump 1C trips on instantaneous overcurrent. During load reduction/turbine runback, turbine runback fails to occur and rods fail to move in auto,									
Time	Position	Applicant's Actions or Behavior							

	BOP	<p>[4] IF level is high, THEN</p> <p>[a] VERIFY 1-LCV-6-106A OPEN.</p> <p>[b] IF 1-LCV-6-106A is throttled, THEN RESET 1-LCV-6-106A per SOI-5 & 6.01, Extraction Steam, Heater Drains And Vent System.</p> <p>[c] VERIFY 1-LCV-6-105A and -105B OPEN.</p> <p>[d] CHECK #3 Heater Drain Pumps operation.</p> <p>[e] IF #3 Heater Drain Pump (s) tripped, THEN REFER TO SOI-5 & 6.01, Extraction Steam, Heater Drains And Vent System for pump restart and system restoration.</p>
	BOP	<p>[5] IF level is low, THEN</p> <p>[a] VERIFY 1-LCV-6-106A CLOSED.</p> <p>[b] VERIFY 1-LCV-6-105A and -105B CLOSED.</p>
	SRO	[6] NOTIFY Work Control to initiate corrective action, if necessary.
EXAMINER: The following action are taken from ARI 30-E, "#3 HD TANK BYP TO CONDENSER OPEN."		
	BOP	[1] VERIFY either 1-LCV-6-105A or -105B open by indicating lights on 1-XX-6-1 [1-M-2].
	BOP	[2] IF Turbine load greater than 85% and 1-LCV-6-105B full open, THEN GO TO AOI-37, Turbine Runback Response.
	SRO	<p>[3] IF Turbine load less than 85%, THEN PERFORM the following,</p> <p>[a] IF system alignment normal (i.e. pumping forward) THEN DISPATCH Operator to determine cause of problem, and PERFORM the following:</p> <p>[1] VERIFY 1-LCV -6-106A OPEN.</p> <p>[2] IF 1-LCV-6-106A is throttled, THEN RESET 1-LCV-6-106A per SOI-5 & 6.01, Extraction Steam, Heater Drains And Vent System.</p> <p>[b] CHECK #3 Heater Drain Pumps operation.</p> <p>[c] IF #3 Heater Drain Pump(s) tripped, THEN REFER TO SOI-5 & 6.01, Extraction Steam, Heater Drains And Vent System, for pump restart and system restoration.</p>
	SRO	[4] NOTIFY Work Control to initiate corrective action, if necessary.
EXAMINER: Since a load reduction was in progress using AOI-39, "Rapid Load Reduction," the SRO may direct the BOP to continue to drop load by repeating AOI-39, Step 1.		
CAUTION Condenser Backpressure limits are on previous page.		

Op Test No.:	<u>NRC</u>	Scenario #	<u>5</u>	Event #	<u>3</u>	Page	<u>11</u>	of	<u>51</u>
Event Description: #3 heater drain pump 1C trips on instantaneous overcurrent. During load reduction/turbine runback, turbine runback fails to occur and rods fail to move in auto,									
Time	Position	Applicant's Actions or Behavior							

CAUTION TURBINE MANUAL Operation requires continuous operator monitoring and control.

CAUTION LOSS OF CONDENSER VACUUM may be made worse if steam dumps are actuated. AOI-11 requires T-ave and T-ref be maintained within 3°F.

NOTE If the initiating condition is corrected, the power reduction may be terminated.

	SRO RO	<p>1. ESTABLISH a turbine load reduction rate less than or equal to 5%/min:</p> <p>a. PLACE turbine in IMP IN</p> <p>b. SET a desired load in the SETTER with the REFERENCE CONTROL.</p> <p>c. SET the LOAD RATE at less than or equal to 5%/min.</p> <p>d. DEPRESS GO pushbutton.</p>
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CAUTION Over boration may result in excessive rod withdrawal or Tav_g lower than desired for at power conditions.

NOTE

- Rod Control should remain in automatic for Tav_g Control
- Reactivity Briefing Sheet, "Thumb Rules" (page 3), lists boration flows and volumes for different reduction rates.
- Effect of boration will lag behind turbine load reduction and can be compensated for by temporarily increasing boric acid flow rate above recommended rate.

	RO	<p>2. INITIATE a manual boration:</p> <p>a. DETERMINE recommended boration flow rate and volume from Reactivity Briefing Sheet:</p> <p>b. INITIATE normal boration:</p> <p>1) ADJUST BA flow controller, 1-FC-62-139, to desired flow rate.</p> <p>2) ADJUST BA batch counter 1-FQ-62-139 to required quantity.</p> <p>3) PLACE mode selector 1-HS-62-140B to BOR.</p> <p>4) PLACE VCT makeup control 1-HS-62-140A, to START.</p> <p>5) VERIFY desired boric acid flow indicated on 1-FI-62-139.</p>
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NOTE AFD green target band can be monitored using ICS Turn On code DOGHOUSE.

	RO	<p>3. MONITOR rod position:</p> <ul style="list-style-type: none"> • Rods above Lo-Lo insertion limit • AFD within Target Band
	SRO	<p>4. REFER to EPIP-1, Emergency Plan Classification Flowchart.</p> <p>Step is N/A for given conditions.</p>
	SRO	<p>5. NOTIFY the Load Coordinator of the required load reduction and expected ramp rate.</p>

Op Test No.: NRC Scenario # 5 Event # 3 Page 12 of 51

Event Description: #3 heater drain pump 1C trips on instantaneous overcurrent. During load reduction/turbine runback, turbine runback fails to occur and rods fail to move in auto,

Time	Position	Applicant's Actions or Behavior
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NOTE If reactor power is stabilized at a lower level a drop in Tavg will occur due to Xenon build up. Dilution may be required to maintain power level.

	SRO RO	6. MONITOR Tavg and Tref: <ul style="list-style-type: none"> Tavg trending to Tref. Mismatch less than 5°F.
	SRO	7. CHECK rate of power reduction is rapid enough for existing plant conditions.
	SRO	8. NOTIFY Cnds Demin AUO of impending pmp shutdowns.
	SRO	9. WHEN rated thermal power change exceeds 15% in one hour, NOTIFY Chemistry to initiate 1-SI-68-128.
EXAMINER: The following actions are taken from AOI-37, "Turbine Runback Response," which will be implemented if the load reduction is not successful in stabilizing the secondary plant prior to the runback logic being satisfied.		
	BOP	1. ENSURE BOP runback to less than or equal to 1000 MW (85%) turbine load. <i>Automatic runback fails to occur, requiring the BOP to use the Valve Position Limit pushbutton to drop turbine load.</i>
	RO	2. ENSURE T-avg and T-ref within 3°F. <i>Since the rod control system is not responding in automatic, the RO must manually insert control rods during the load reduction.</i>
	BOP	3. ENSURE at least two #3 HDT pumps RUNNING WITH ADEQUATE flow to maintain S/G levels.
	BOP	4. MONITOR the following to determine if main turbine free of water induction: <ul style="list-style-type: none"> HTR level alarms. Turbine vibration. Turbine Metal Temperature ICS points T2609A-T2611A and T2060A-T2062A.
	RO	5. MONITOR AFD within the limits of LCO 3.2.3.
	BOP	6. ENSURE S/G levels return to program.

Op Test No.: NRC Scenario # 5 Event # 3 Page 13 of 51

Event Description: #3 heater drain pump 1C trips on instantaneous overcurrent. During load reduction/turbine runback, turbine runback fails to occur and rods fail to move in auto,

Time	Position	Applicant's Actions or Behavior
	BOP	<p>7. DISPATCH personnel to check the following to determine cause of #3 HDT high level:</p> <ul style="list-style-type: none"> • #3 HDT level, flow & controls. • #2 FW heater level. • 1-LCV-6-106A, #3 HDT level control [T2D/708 in valve pit]. • #3 HDT pump cavitation control 1-HS-6-106A, NOT reset [T1D/708 on west wall].
	SRO	<p>8. ENSURE condensate system pumps in service as unit load requires:</p> <ul style="list-style-type: none"> • REFER TO GO-4, Normal Power Operation.
	SRO	<p>9. IF reactor power dropped by greater than or equal to 15% in one hour, THEN NOTIFY Chemistry to initiate power change sampling requirements.</p>
	SRO	<p>10. REFER TO SOI-5 & 6.01, Extraction Steam, Heater Drains, and Vent System to adjust #3 HDT LEVEL and reset pump cavitation control 1-HS-6-106A as necessary.</p>
	BOP	<p>11. CHECK VALVE POS LIMIT light LIT</p>
	BOP	<p>12. RETURN valve position limiter to normal</p> <ol style="list-style-type: none"> ENSURE turbine in IMP OUT REDUCE turbine load using REFERENCE CONTROL ▽ (lower) AND GO button until VALVE POS LIMIT light not LIT, RETURN valve position limiter to normal.
	BOP	<p>13. IF C-7 LOSS OF LOAD STM DUMP INTERLOCK annunciator LIT [66E], THEN</p> <ol style="list-style-type: none"> VERIFY steam dump valves have zero demand. RESET loss-of-load interlock with steam dump mode switch (1-HS-1-103D)
	SRO	<p>14. INITIATE repairs to failed equipment.</p>
	SRO	<p>15. RETURN TO Instruction in effect.</p>

Op Test No.:	<u>NRC</u>	Scenario #	<u>5</u>	Event #	<u>3</u>	Page	<u>14</u>	of	<u>51</u>
Event Description: #3 heater drain pump 1C trips on instantaneous overcurrent. During load reduction/turbine runback, turbine runback fails to occur and rods fail to move in auto,									
Time	Position	Applicant's Actions or Behavior							

Indications:		
Control rods fail to insert in AUTO during the load reduction.		
	RO	Diagnoses and announces failure of control rods to insert in AUTO. May take manual control of rods and insert rods in response to the load reduction for the loss of the 1C #3 heater drain tank pump.
	SRO	May enter and direct actions of AOI-2, "Malfunction of Reactor Control System."
EXAMINER: The following actions are taken from AOI-2, "Malfunction of Reactor Control System," Section 3.6, "Failure of Control Rods to Move on Demand."		
	RO	1. CHECK CONTROL ROD URGENT alarm LIT [86-A].
	SRO	1. <u>RESPONSE NOT OBTAINED:</u> IF CONTROL ROD URGENT FAILURE alarm DARK, THEN PLACE control rods in MAN, AND ** GO TO NOTE prior to Step 16. <i>The control rods may have been placed in MANUAL upon recognition of the failure of the AUTO function.</i>
NOTE Steps 16, 17 and 18 are to be performed for control rod problems other than Urgent Failures.		
	RO	16. CHECK for the C-5 LOW TURB IMPULSE PRESS ROD BLOCK [66-A] Alarm window DARK.
	RO	17. CHECK for the following rod stop alarm windows DARK: <ul style="list-style-type: none"> • INTERMED RANGE HI FLUX ROD WD STOP [82-B]. • POWER RANGE OVERPOWER ROD WD STOP [83-A]. • C-11 BANK D AUTO WITHDRAWAL BLOCKED [64-F]. • OVERPOWER ΔT TURB RUNBACK & C-4 ROD BLOCK [122-D]. • OVERTEMP ΔT TURB RUNBACK & C-3 ROD BLOCK [123-D].
	SRO	18. IF rod stop alarms are clear AND control rods will move in manual, THEN: <ol style="list-style-type: none"> ENSURE T-avg and T-ref within 3°F. INITIATE repairs to auto rod control system.
CAUTION Allowing at least 5 minutes between any rod control input (i.e., T-avg, T-ref, or NIS) change and placing rods in AUTO, will help prevent undesired control rod movement.		

Op Test No.: NRC Scenario # 5 Event # 3 Page 15 of 51

Event Description: #3 heater drain pump 1C trips on instantaneous overcurrent. During load reduction/turbine runback, turbine runback fails to occur and rods fail to move in auto,

Time	Position	Applicant's Actions or Behavior
	SRO	19. WHEN conditions allow auto rod control, THEN : a. ENSURE T-avg and T-ref within 1°F. b. ENSURE zero demand on control rod position indication [1-M-4]. c. PLACE rods in AUTO.
	SRO	20. NOTIFY Chemistry of any reactor power changes greater than 15% in one hour.
	SRO	21. RETURN TO Instruction in effect.
	SRO	Crew Brief would typically be conducted for this event as time allows prior to the next event.
	SRO	Notifications should be addressed as applicable if not specifically addressed by the procedure or in the crew brief. <u>Operations Management</u> - Typically Shift Manager. <u>Maintenance Personnel</u> - Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
Cue Simulator Operator to insert Event 4.		

Op Test No.: NRC Scenario # 5 Event # 4 Page 16 of 51

Event Description: 2A ERCW supply header breaks in the Yard.

Time	Position	Applicant's Actions or Behavior
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Indications:

223-A ERCW HDR A SUP PRESS LO

223-B ERCW PMP A-A DISCH PRESS LO

226-B ERCW PMP D-A DISCH PRESS LO

227-C ERCW HDR 2A STRAINER Δ P HI

Train A ERCW Header pressure dropping below 50 psig.

	BOP	Announces alarms received on the ERCW system, and evaluates alarm response instructions.
	SRO	Enters and directs actions of AOI-13, "Loss of Essential Raw Cooling Water."

EXAMINER: The following actions are taken from ARI 223-A ERCW HDR A SUP PRESS LO.

	BOP	[1] CHECK 0-PI-67-18A, A ERCW SUP HDR PRESS [0-M-27A].
	BOP	[2] DISPATCH Operator to check ERCW Train A pumps.
	SRO	[3] CHECK valve alignment to ERCW Hdr A per SOI-67.01, <i>ESSENTIAL RAW COOLING WATER SYSTEM</i> .
	SRO	[4] REFER TO AOI-13, LOSS OF ESSENTIAL RAW COOLING WATER.

EXAMINER: The following actions are taken from ARI 227-C, ERCW HDR 2A STRAINER Δ P HI.

	BOP	[1] CHECK 2-FI-67-61, 2A ERCW SUP HDR FLOW [0-M-27A].
	BOP	[2] DISPATCH Operator to evaluate problem locally.
	BOP	[3] BACKWASH strainer(s) as required per SOI-67.01, <i>ESSENTIAL RAW COOLING WATER SYSTEM</i> .
	SRO	[4] REFER TO AOI-13, LOSS OF ESSENTIAL RAW COOLING WATER.

EXAMINER: The following actions are taken from AOI-13, "Loss of Essential Raw Cooling Water," Section 3.4, "Supply Header Rupture in Yard; Strainer DP alarm LIT, AND low flow with low pressure on supply header."

	BOP	1. CHECK supply header pressure high with any strainer DP alarm LIT.
	SRO	2. INITIATE strainer backwash for appropriate strainer(s) in alarm.
	BOP	3. CHECK hdr press LO alarm, DARK: ERCW HDR A SUP PRESS LO [223-A] ERCW HDR B SUP PRESS LO [229-A]

Op Test No.: NRC Scenario # 5 Event # 4 Page 17 of 51

Event Description: 2A ERCW supply header breaks in the Yard.

Time	Position	Applicant's Actions or Behavior
	BOP	3. <u>RESPONSE NOT OBTAINED:</u> START additional pumps as required, AND, DISPATCH personnel to determine location of rupture, AND, ENSURE at least one strainer discharge header Cross-Tie isolation valve closed on affected train: A Train: 1-ISV-67-1117 OR 2-ISV-67-1119 B Train: 1-ISV-67-1118 OR 2-ISV-67-1120
	BOP	4. <u>DISPATCH</u> AUO, with radio, to the Rx MOV Bds.
NOTE 1 All supply headers may return normal if supply header pressure was initially high with strainer backwash being successful in reducing supply header pressure and restoring affected supply header flow.		
NOTE 2 Both Train A Supply Headers may indicate below normal pressure, visual verification may be required.		
NOTE 3 MOVs with power normally removed may not travel to full closed position under high flow conditions; local verification of isolation may be required.		
	BOP	5. <u>CHECK</u> Supply Header 1A flow at expected value for existing plant conditions.
NOTE Both Train B Supply Headers may indicate below normal pressure, visual verification may be required.		
	BOP	6. <u>CHECK</u> Supply Header 1B flow at expected value for existing plant conditions.
	BOP	7. <u>CHECK</u> Supply Header 2A flow at expected value for existing plant conditions.
	BOP	7. <u>RESPONSE NOT OBTAINED:</u> PERFORM the following: a. UNLOCK , and CLOSE bkr on Rx MOV Bd 1A2-A c/15E, 1-FCV-67-458. b. UNLOCK , and CLOSE bkr on Rx MOV Bd 2A2-A c/7B, 2-FCV-67-22. c. UNLOCK , and CLOSE bkr on Rx MOV Bd 2A2-A c/8A, 2-FCV-67-81. d. ENSURE 1-FCV-67-223, ERCW Hdr 1B To 2A Xtie, OPEN. e. ENSURE 2-FCV-67-223, ERCW Hdr 2A To 1B Xtie, OPEN. f. OPEN 1-FCV-67-458, CCS Hx A Sup From Hdr 1B. g. CLOSE 2-FCV-67-22, Strainer 2A-A Inlet. h. CLOSE 2-FCV-67-81, AB Supply Hdr 2A. i. ** GO TO Step 10.

Op Test No.: NRC Scenario # 5 Event # 4 Page 18 of 51

Event Description: 2A ERCW supply header breaks in the Yard.

Time	Position	Applicant's Actions or Behavior
	BOP	10. CHECK in-service ERCW header pressures and flows return to expected values for existing plant conditions.
	BOP	11. CHECK pump amps NORMAL.
	SRO	<p>12. REFER TO Tech Specs: <i>Since the ERCW headers are cross-connected, entry into LCO 3.0.3 is required.</i></p> <ul style="list-style-type: none"> • 3.4.6, RCS Loops-Mode 4 - Not applicable. • 3.7.8, Essential Raw Cooling Water System (ERCW) Entered, but LCO 3.0.3 is most limiting. <p>Condition A. One ERCW train inoperable, other than for Condition C, 1. Enter applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources-Operating," for emergency diesel generator made inoperable by ERCW. Restore ERCW train to OPERABLE status within 72 hours</p> <ul style="list-style-type: none"> • 3.8.1, AC Sources-Operating <p>Diesel Generators (DGs) remain aligned to their normal supply. LCO 3.8.1 is not directly applicable. An engineering evaluation may be addressed due to the Train B ERCW supply being cross-tied to the 2A ERCW header.</p>
	SRO	13. INITIATE repair.
	SRO	14. EVALUATE placing strainer discharge Cross-Tie in service for a clogged strainer, IAW SOI-67.01, Section 8.4 (A Train), OR Section 8.5 (B Train).
	SRO	15. IF ERCW to in-service CCS heat exchanger was interrupted, THEN NOTIFY Duty System Engineer to initiate evaluation for effect on CCS equipment and piping.
	SRO	16. REFER TO SOI-67.01, Essential Raw Cooling Water System, for system realignment.
	SRO	17. RETURN to instruction in effect.
	SRO	Crew Brief would typically be conducted for this event as time allows prior to the next event.
	SRO	<p>Notifications should be addressed as applicable if not specifically addressed by the procedure or in the crew brief.</p> <p><u>Operations Management</u> - Typically Shift Manager.</p> <p><u>Maintenance Personnel</u> - Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).</p>
Cue Simulator Operator to insert Event 5.		

Op Test No.: NRC Scenario # 5 Event # 5 Page 19 of 51

Event Description: C-A Lower Compartment Cooler trips.

Time	Position	Applicant's Actions or Behavior
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Indications:

138-E PANEL M-9 MOTOR TRIPOUT

104-B LWR CNTMT TEMP HI

	RO	Announces alarm 138-E, "M-9 MOTOR TRIPOUT."
	BOP	Goes to Panel 1-M-9 to determine which component(s) have tripped. Announces that C-A Lower Compartment Fan has tripped.
	SRO	Enters and directs actions of ARI 138-E, "M-9 MOTOR TRIPOUT."

EXAMINER: The following actions are taken from ARI 138-E, "PANEL M-9 MOTOR TRIPOUT."

	BOP	[1] DETERMINE from panel 1-M-9 which motor has tripped.
	BOP	[2] DISPATCH Operator to determine cause of alarm and initiate corrective action.

EXAMINER: With containment temperatures rising, the SRO may direct the BOP to start the 1B-B Lower CNTMT Cooler. The following steps are taken from SOI-30.03, Containment HVAC and Pressure Control," Section 5.4, "Startup/Reserve Alignment of Lower CNTMT Coolers."

	BOP	[1] ENSURE ERCW aligned to Lower CNTMT Coolers per Section 5.3.
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EXAMINER: The following steps are taken from SOI-30.03, Containment HVAC and Pressure Control," 5.3, "Lower CNTMT Cooler ERCW Alignment."

		[1] IF Lower CNTMT Cooler 1A-A is to be started or placed in reserve, THEN ENSURE the following [0-M-27A]: Step is marked N/A.
		[2] IF Lower CNTMT Cooler 1B-B is to be started or placed in reserve, THEN ENSURE the following [0-M-27A]: A. 1-FCV-67-99, LWR CNTMT B CLRS SUP CIV, OPEN. B. 1-FCV-67-105, LWR CNTMT B CLRS SUP CIV, OPEN. C. 1-FCV-67-103, LWR CNTMT B CLRS RET CIV, OPEN. D. 1-FCV-67-104, LWR CNTMT B CLRS RET CIV, OPEN. E. 1-HS-67-100A, LWR CNTMT CLR B OUTLET TCV, in P-AUTO.
		[3] IF Lower CNTMT Cooler 1C-A is to be started or placed in reserve, THEN ENSURE the following [0-M-27A]: Step is marked N/A.
		[4] IF Lower CNTMT Cooler 1D-B is to be started or placed in reserve, THEN ENSURE the following [0-M-27A]: Step is marked N/A.

Op Test No.: NRC Scenario # 5 Event # 5 Page 20 of 51

Event Description: C-A Lower Compartment Cooler trips.

Time	Position	Applicant's Actions or Behavior
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EXAMINER: The following steps are taken from SOI-30.03, Containment HVAC and Pressure Control," Section 5.4, "Startup/Reserve Alignment of Lower CNTMT Coolers."

NOTE

Lower CNTMT Cooler 1A-A drains to the Pocket Sump. Condensate from the drain may cause a plant computer alarm on Pocket Sump rate of rise. If a valid alarm occurs, the Pocket Sump level monitor should be declared inoperable and the actions of LCO 3.4.15 performed.

		[2] REFER TO Section 3.0, Precaution 3.0H before starting or placing Lower CNTMT Coolers in reserve alignment.
		[3] IF Lower CNTMT Cooler 1A-A is to be started, THEN Step is marked N/A.
		[4] IF Lower CNTMT Cooler 1B-B is to be started, THEN A. ENSURE 1-HS-30-75A, LWR CNTMT CLR B-B, in A-AUTO, AND START Cooler with 1-HS-30-75A. B. ENSURE LWR CNTMT CLR B-B, RUNNING.
		[5] IF Lower CNTMT Cooler 1C-A is to be started, THEN Step is marked N/A.
		[6] IF Lower CNTMT Cooler 1D-B is to be started, THEN Step is marked N/A.
	SRO	[8] REFER TO Tech Specs. <i>There are no Technical Specifications to be entered for the loss of the C-A Lower Compartment Fan. The SRO must evaluate Technical Requirements, and enter TR 3.6.3 Lower Compartment Cooling (LCC) System, Condition A. One LCC fan inoperable, restore LCC fan to OPERABLE status within 7 days.</i>
	SRO	Crew Brief would typically be conducted for this event as time allows prior to the next event.
	SRO	Notifications should be addressed as applicable if not specifically addressed by the procedure or in the crew brief. <u>Operations Management</u> - Typically Shift Manager. <u>Maintenance Personnel</u> - Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
Cue Simulator Operator to insert Event 6.		

Op Test No.: NRC Scenario # 5 Event # 6 and 7 Page 21 of 51

Event Description: Main Steam Line Break outside containment. No MSIVs close initially. After entry into ECA-2.1, "Uncontrolled Depressurization of All Steam Generators," #1, 2 and 3 MSIVs are closed manually. #4 MSIV remains open for the duration of the scenario.

Time	Position	Applicant's Actions or Behavior
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Indications:

Reactor power rising as indicated on 1-NR-92-145.

Main generator megawatts dropping.

Reactor coolant system pressure dropping.

Tavg dropping.

	RO	Diagnoses and announces rising reactor power and decreasing RCS Tavg.
	BOP	Diagnoses and announces generator megawatts decreasing, steam flows rising. Determines that containment pressure is not rising. May dispatch personnel to assist in locating the source of the steam leak.
	SRO	May enter and direct actions of AOI-38, "Main Steam or Feedwater Line Leak."

EXAMINER: The following steps are taken from AOI-38, "Main Steam or Feedwater Line Leak."

	SRO	<p>1. IF leak threatens personnel safety, THEN:</p> <p>a. TRIP Rx.</p> <p>b. CLOSE the following:</p> <ul style="list-style-type: none"> • MSIVs. • MSIV bypass valves. <p>c. ** GO TO E-0, Reactor Trip or Safety Injection.</p> <p>Until reports are received from personnel outside the control room, the SRO may continue with AOI-38 performance.</p>
	BOP	2. CHECK S/G PORVs CLOSED.
	BOP	3. CHECK steam dump valves CLOSED.
	RO	<p>4. CHECK reactor power less than or equal to 100%:</p> <ul style="list-style-type: none"> • Loop ΔT. • NIS power range monitors.
	BOP/RO	<p>4. RESPONSE NOT OBTAINED:</p> <p>REDUCE turbine load to 90% with valve position limiter.</p> <p>IF Rx power returns to 100%, THEN</p> <p>a. TRIP Rx.</p> <p>b. CLOSE all MSIVs and bypass valves.</p> <p>c. ** GO TO E-0, Reactor Trip or Safety Injection.</p>
	RO	5. ENSURE T-avg and T-ref. within 3°F.

Op Test No.:	<u>NRC</u>	Scenario #	<u>5</u>	Event #	<u>6 and 7</u>	Page	<u>22</u>	of	<u>51</u>
Event Description:		Main Steam Line Break outside containment. No MSIVs close initially. After entry into ECA-2.1, "Uncontrolled Depressurization of All Steam Generators," #1, 2 and 3 MSIVs are closed manually. #4 MSIV remains open for the duration of the scenario.							
Time	Position	Applicant's Actions or Behavior							

NOTE

- It is a normal condition for Turbine load and Rx power to exhibit a nominal mismatch for loads less than 50%.
- Hotwell makeup will rise following a rapid runback. The makeup flow should be allowed to stabilize before making any determination of leak size.

	BOP	6. MONITOR leak less than 3% of required steam or FW flow: <ul style="list-style-type: none"> • IF power greater than 50%, THEN COMPARE turbine load to reactor power and ΔT. • OBSERVE steam and FW flow recorders. • OBSERVE hotwell level makeup less than 950 gpm.
EXAMINER: It is expected that the steam leak will be large enough for the SRO to determine that a reactor trip and MSIV closure is required.		
	BOP/RO	6. <u>RESPONSE NOT OBTAINED:</u> PERFORM the following: <ol style="list-style-type: none"> TRIP Rx. CLOSE all MSIVs and bypass valves. ** GO TO E-0, Reactor Trip or Safety Injection.
EXAMINER: Since the MSIVs failed to close when the handswitches were placed in CLOSE, the BOP may dispatch an AUO to the Auxiliary Control Room to place the MSIV transfer switches in the AUS position to attempt to close the valves.		
EXAMINER: The following steps are taken from E-0, "Reactor Trip or Safety Injection."		
NOTE 1 Steps 1 thru 4 are IMMEDIATE ACTION STEPS .		
NOTE 2 Status Trees / SPDS should be monitored when transitioned to another instruction.		
	RO	1. ENSURE reactor trip: <ul style="list-style-type: none"> • Reactor trip and bypass breakers OPEN. • RPIs at bottom of scale. • Neutron flux DROPPING.
	RO	2. ENSURE Turbine Trip: <ul style="list-style-type: none"> • All turbine stop valves CLOSED.
	RO	3. CHECK 6.9 kV shutdown boards: <ol style="list-style-type: none"> At least one board energized from: <ul style="list-style-type: none"> • CSST (offsite), OR <ul style="list-style-type: none"> • D/G (blackout).

Op Test No.: NRC Scenario # 5 Event # 6 and 7 Page 23 of 51

Event Description: Main Steam Line Break outside containment. No MSIVs close initially. After entry into ECA-2.1, "Uncontrolled Depressurization of All Steam Generators," #1, 2 and 3 MSIVs are closed manually. #4 MSIV remains open for the duration of the scenario.

Time	Position	Applicant's Actions or Behavior
	RO	<p>4. CHECK SI actuated:</p> <ul style="list-style-type: none"> a. Any SI annunciator LIT. b. Both trains SI ACTUATED. <ul style="list-style-type: none"> • 1-XX-55-6C • 1-XX-55-6D
	BOP	<p>5. EVALUATE support systems:</p> <ul style="list-style-type: none"> • REFER TO Appendixes A and B (E-0), Equipment Verification pages 15-28.
	SRO	6. ANNOUNCE reactor trip and safety injection over PA system.
	RO	<p>7. ENSURE secondary heat sink available with either:</p> <ul style="list-style-type: none"> • Total AFW flow greater than 410 gpm, <p>OR</p> <ul style="list-style-type: none"> • At least one S/G NR level greater than 29% [39% ADV].
	RO	<p>8. MONITOR RCS temp stable at or trending to 557°F:</p> <ul style="list-style-type: none"> • IF any RCP running, THEN MONITOR RCS Loop T-avg trending to 557°F. <p>OR</p> <ul style="list-style-type: none"> • IF NO RCP running, THEN MONITOR RCS Loop T-cold trending to 557°F.
	RO	<p>8. <u>RESPONSE NOT OBTAINED:</u></p> <p>IF temp less than 557°F, THEN ENSURE steam dumps and S/G PORVs CLOSED.</p> <p>IF cooldown continues, THEN:</p> <ul style="list-style-type: none"> • PLACE steam dump controls OFF. • CONTROL total AFW flow to maintain greater than 410 gpm UNTIL NR level in at least one S/G greater than 29% [39% ADV]. <p>IF cooldown continues after AFW flow is controlled, THEN</p> <ul style="list-style-type: none"> • CLOSE MSIVs. • ENSURE MSIV bypasses CLOSED. <p>IF RCS temp greater than 564°F, THEN ENSURE either steam dumps or S/G PORVs OPEN.</p>
	RO	<p>9. ENSURE excess letdown valves CLOSED:</p> <ul style="list-style-type: none"> • 1-FCV-62-54 • 1-FCV-62-55

Op Test No.: NRC Scenario # 5 Event # 6 and 7 Page 24 of 51

Event Description: Main Steam Line Break outside containment. No MSIVs close initially. After entry into ECA-2.1, "Uncontrolled Depressurization of All Steam Generators," #1, 2 and 3 MSIVs are closed manually. #4 MSIV remains open for the duration of the scenario.

Time	Position	Applicant's Actions or Behavior
	RO	10. CHECK pZR PORVs and block valves: a. PZR PORVs CLOSED. b. At least one block valve OPEN.
	RO	11. CHECK pZR safety valves CLOSED: • EVALUATE tailpipe temperatures and acoustic monitors.
	RO	12. CHECK pZR sprays CLOSED.
NOTE Seal injection flow should be maintained to all RCPs.		
	RO	13. CHECK if RCPs should remain in service: a. Phase B signals DARK [MISSP]. b. RCS pressure greater than 1500 psig.
	RO	14. CHECK S/G pressures: • All S/G pressures controlled or rising. • All S/G pressures greater than 120 psig.
	SRO	14. RESPONSE NOT OBTAINED: IF S/G pressure low OR dropping uncontrolled, THEN GO TO E-2, Faulted Steam Generator Isolation.
EXAMINER: The following actions are taken from E-2, "Faulted Steam Generator Isolation."		
CAUTION If a faulted S/G is NOT needed for RCS cooldown, it should remain isolated during subsequent recovery actions.		
	BOP	1. ENSURE all MSIVs and MSIV bypasses CLOSED.
	BOP	1. RESPONSE NOT OBTAINED: Manually CLOSE valves. IF valves can NOT be closed, THEN Locally REMOVE power to valves: • DISPATCH NAUO to perform Attachment 1 (E-2).
NOTE If it is known that a steam leak exists in the Turbine building, the following step should not be performed until the affected steam header is depressurized.		
	BOP	2. PLACE steam dump controls OFF: • 1-HS-1-103A, STEAM DUMP FSV "A". • 1-HS-1-103B, STEAM DUMP FSV "B".
	SRO	3. CHECK for at least one Intact S/G: • Any S/G pressure controlled or rising, OR • Any S/G pressure greater than P-sat for RCS incore temperature.

Op Test No.: NRC Scenario # 5 Event # 6 and 7 Page 25 of 51

Event Description: Main Steam Line Break outside containment. No MSIVs close initially. After entry into ECA-2.1, "Uncontrolled Depressurization of All Steam Generators," #1, 2 and 3 MSIVs are closed manually. #4 MSIV remains open for the duration of the scenario.

Time	Position	Applicant's Actions or Behavior
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	SRO	3. RESPONSE NOT OBTAINED: IF pressure in all four S/Gs dropping uncontrolled, THEN GO TO ECA-2.1, Uncontrolled Depressurization of All Steam Generators.
EXAMINER: The following actions are taken from ECA-2.1, "Uncontrolled Depressurization of All Steam Generators."		
CAUTION If, at any time, except during SI termination steps 14 through 24, any Intact S/G can be isolated from the break and re-pressurized, then recovery actions should continue with E-2, Faulted Steam Generator Isolation.		
	SRO	1. REFER TO EPIP-1, Emergency Plan Classification Flowchart.
CAUTION If the TD AFW pump is the only available source of feed flow to ANY S/G, the steam supply must be maintained available.		
	BOP	2. ENSURE secondary pressure boundary isolated: <ul style="list-style-type: none"> • ENSURE all MSIVs and MSIV bypasses CLOSED. • PLACE steam dump controls OFF. • ENSURE MFW reg and bypass reg valves CLOSED. • ENSURE MFW isolation and bypass isolation valves CLOSED. • IF both MD AFW pumps available, THEN ENSURE steam supply valves to TD AFW pump CLOSED.
	BOP	2. RESPONSE NOT OBTAINED: Manually CLOSE valves to restore pressure boundary on at least one S/G. IF valves CANNOT be closed, THEN DISPATCH personnel to close valves locally, one loop at a time: <ul style="list-style-type: none"> • CLOSE MSIV and bypass valve as necessary USING Attachment 1 (ECA-2.1). • ISOLATE S/G atmospheric relief valve as necessary. • CLOSE additional feedwater or condensate MOVs as necessary. • ISOLATE blowdown locally as necessary.
CAUTION If total feed flow CAPABILITY of 410 gpm is available, FR-H.1, Loss of Secondary Heat Sink, should NOT be implemented.		
NOTE Minimum detectable flow is assured by observing flow indicator response to valve movement.		

Op Test No.:	<u>NRC</u>	Scenario #	<u>5</u>	Event #	<u>6 and 7</u>	Page	<u>26</u>	of	<u>51</u>
Event Description: Main Steam Line Break outside containment. No MSIVs close initially. After entry into ECA-2.1, "Uncontrolled Depressurization of All Steam Generators," #1, 2 and 3 MSIVs are closed manually. #4 MSIV remains open for the duration of the scenario.									
Time	Position	Applicant's Actions or Behavior							

Critical Task 1

WOG Critical Task List, ECA-2.1, A.

Control the AFW flow rate to minimum detectable flow to each SG in order to minimize the RCS cooldown rate before FR-P.1, "Pressurized Thermal Shock," Critical Safety Function Status Tree develops an ORANGE PATH condition.

If feed flow to a SG is isolated and the SG is allowed to dry out, subsequent reinitiation of feed flow to the SG could create significant thermal stress conditions on SG components. Maintaining a minimum verifiable feed flow to the SG allows the components to remain in a "wet" condition, thereby minimizing any thermal shock effects if feed flow is later increased.

Critical Task 1	BOP	3. CONTROL feed flow to minimize RCS cooldown and prevent S/G dryout: a. CHECK T-cold cooldown rate less than 100°F in the last one hour. a. RESPONSE NOT OBTAINED: REDUCE feed flow to each S/G to minimum detectable to minimize cooldown. ** GO TO Substep 3c. c. IF any S/G NR level drops to 29% [39% ADV], THEN MAINTAIN at least minimum detectable flow to each S/G with low level.
	SRO	4. MONITOR shutdown margin during RCS cooldown: • REFER TO 1-SI-0-10, Shutdown Margin OR REACTINW Computer Program.
	RO	5. MONITOR T-hot stable or dropping.
EXAMINER: At this point in the scenario, the #1, #2 and #3 MSIVs will close. The crew will transition back to E-2, "Faulted Steam Generator Isolation" for additional actions.		
	BOP	1. ENSURE all MSIVs and MSIV bypasses CLOSED.
NOTE If it is known that a steam leak exists in the Turbine building, the following step should not be performed until the affected steam header is depressurized.		
	BOP	2. PLACE steam dump controls OFF: • 1-HS-1-103A, STEAM DUMP FSV "A". • 1-HS-1-103B, STEAM DUMP FSV "B".
	SRO	3. CHECK for at least one Intact S/G: • Any S/G pressure controlled or rising, OR • Any S/G pressure greater than P-sat for RCS incore temperature.

Op Test No.:	<u>NRC</u>	Scenario #	<u>5</u>	Event #	<u>6 and 7</u>	Page	<u>27</u>	of	<u>51</u>
Event Description:		Main Steam Line Break outside containment. No MSIVs close initially. After entry into ECA-2.1, "Uncontrolled Depressurization of All Steam Generators," #1, 2 and 3 MSIVs are closed manually. #4 MSIV remains open for the duration of the scenario.							
Time	Position	Applicant's Actions or Behavior							

	BOP	<p>4. IDENTIFY Faulted S/G based on ANY of the following:</p> <ul style="list-style-type: none"> • Any S/G pressure dropping in an uncontrolled manner, OR • Any S/G pressure less than 120 psig, OR • S/G enclosure temps high: <ol style="list-style-type: none"> 1) T1002A for 2 and 3, 2) T1003A for 1 and 4. OR • Local indication of break in any of the following: <ol style="list-style-type: none"> 1) Main steam lines, 2) Main feedwater lines,
<p>CAUTION</p> <ul style="list-style-type: none"> • If the turbine-driven AFW pump is the only available source of feed flow, steam supply to the turbine-driven AFW pump must be maintained from one SG. • RCS cooldown requires the availability of at least one S/G. 		
<p>Critical Task 2 WOG Critical Task List for E-2, A Isolate the faulted SG before transition out of E-2. Isolation of the feedwater to the faulted SG maximizes the cooldown capability of the non-faulted loops following a feedline break and minimizes the RCS cooldown and mass and energy release following a steamline break. Isolation of steam paths from the faulted SG also minimizes the RCS cooldown and mass and energy release to containment. In addition, isolation of these steam paths could isolate the break. Transition is made from ECA-2.1 back to E-2 when MSIVs are closed for three of four SGs</p>		
Critical Task 2	BOP	<p>5. ISOLATE Faulted S/G:</p> <ol style="list-style-type: none"> a. ISOLATE AFW flow to Faulted S/G. b. ENSURE MFW ISOLATED to Faulted S/G: <ul style="list-style-type: none"> • MFW isolation and bypass isolation valves CLOSED. • MFW reg and bypass reg valves CLOSED. • MFPs TRIPPED. c. ENSURE Faulted S/G PORV CLOSED. d. ENSURE Faulted S/G blowdown ISOLATED.
<p>NOTE TD AFW pump steam supply should NOT be aligned from an S/G with a known primary to secondary leak if other AFW sources are available.</p>		
	BOP	6. ENSURE TD AFW pump being supplied from Intact S/G.
	BOP	7. MONITOR CST volume greater than 200,000 gal.

Op Test No.:	<u>NRC</u>	Scenario #	<u>5</u>	Event #	<u>6 and 7</u>	Page	<u>28</u>	of	<u>51</u>
Event Description:		Main Steam Line Break outside containment. No MSIVs close initially. After entry into ECA-2.1, "Uncontrolled Depressurization of All Steam Generators," #1, 2 and 3 MSIVs are closed manually. #4 MSIV remains open for the duration of the scenario.							
Time	Position	Applicant's Actions or Behavior							

	BOP	<p>8. WHEN RCS temperature is stable or rising following Faulted S/G blowdown, THEN ADJUST Intact S/G PORV controllers in AUTO to:</p> <p>P-sat for the highest RCS temp (one or more RCPs running)</p> <p>OR</p> <p>P-sat for the highest T-cold temp (no RCPs running)</p>
	BOP	<p>9. CHECK secondary side radiation:</p> <ul style="list-style-type: none"> • S/G discharge monitors NORMAL. • Condenser vacuum exhaust rad monitors NORMAL. • S/G blowdown rad monitor recorders NORMAL trend prior to isolation. • S/G sample results by Chemistry.
<p>Critical Task 3</p> <p><i>Establish secondary heat sink (return AFW flow to intact SGs greater than 410 gpm) to meet SI termination criteria prior to entering FR-H.1.</i></p> <p><i>During performance of ECA-2.1, flow had been reduced to "minimum detectable flow" to minimize the RCS cooldown. Flow must be manually reestablished in order meet secondary heat sink requirements and allow SI termination.</i></p>		
Critical Task 3		<p>10. CHECK SI termination criteria:</p> <p>a. CHECK RCS subcooling greater than 65°F [85°F ADV].</p> <p>b. CHECK secondary heat sink available with either:</p> <ul style="list-style-type: none"> • Total feed flow to Intact S/Gs greater than 410 gpm, <p>OR</p> <ul style="list-style-type: none"> • At least one Intact S/G NR level greater than 29% [39% ADV]. <p>c. CHECK RCS pressure stable or rising.</p> <p>d. CHECK pwr level greater than 15% [33% ADV].</p> <p>e. ** GO TO ES-1.1, SI Termination.</p>
<p>EXAMINER: Terminate the scenario when the decision is made to transition to ES-1.1, SI Termination," and inform crew that another crew will continue from this point, and terminate the scenario.</p>		
<p>END OF SCENARIO</p>		

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A
(E-0)

Page 1 of 10

EQUIPMENT VERIFICATION

- | | |
|---|--|
| <p>1. ENSURE PCBs OPEN:</p> <ul style="list-style-type: none"> • PCB 5084. • PCB 5088. | <p>OPEN manually.</p> |
| <p>2. ENSURE AFW pump operation:</p> <ul style="list-style-type: none"> • Both MD AFW pumps RUNNING. • TD AFW pump RUNNING. • LCVs in AUTO, or controlled in MANUAL. | <p>ESTABLISH at least one train AFW operation.</p> |
| <p>3. ENSURE MFW isolation:</p> <ul style="list-style-type: none"> • MFW isolation and bypass isolation valves CLOSED. • MFW reg and bypass reg valves CLOSED. • MFP A and B TRIPPED. • Standby MFP STOPPED. • Cond demin pumps TRIPPED. • Cond booster pumps TRIPPED. | <p>Manually CLOSE valves and STOP pumps, as necessary.</p> <p>IF any valves can NOT be closed, THEN CLOSE #1 hoater outlet valves.</p> |

WBN

REACTOR TRIP OR SAFETY INJECTION

E-0
Rev 28

Step

Action/Expected Response

Response Not Obtained

APPENDIX A
(E-0)

Page 2 of 10

EQUIPMENT VERIFICATION4. **MONITOR** ECCS operation:

- | | |
|---|--|
| a. Charging pumps RUNNING. | a. Manually START charging pumps. |
| b. Charging pump alignment: <ul style="list-style-type: none"> • RWST outlets 1-LCV-62-135 and 1-LCV-62-136 OPEN. • VCT outlets 1-LCV-62-132 and 1-LCV-62-133 CLOSED. • Charging 1-FCV-62-90 and 1-FCV-62-91 CLOSED. | b. ENSURE at least one valve in each set aligned. |
| c. RHR pumps RUNNING. | c. Manually START RHR pumps. |
| d. SI pumps RUNNING. | d. Manually START SI pumps. |
| e. BIT alignment: <ul style="list-style-type: none"> • Outlets 1-FCV-63-25 and 1-FCV-63-26 OPEN. • Flow thru BIT. | e. ENSURE at least one valve aligned, and flow thru BIT. |
| f. RCS pressure greater than 1650 psig. | f. ENSURE SI pump flow.

IF RCS press drops to less than 150 psig,
THEN
ENSURE RHR pump flow. |

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A
(E-0)

Page 3 of 10

EQUIPMENT VERIFICATION

- | | |
|---|---|
| <p>5 CHECK cntmt isolation:</p> <p>a. Phase A isolation:</p> <ul style="list-style-type: none"> • Train A GREEN. • Train B GREEN. <p>b. Cntmt vent isolation:</p> <ul style="list-style-type: none"> • Train A GREEN. • Train B GREEN. | <p>ACTUATE Phase A and Cntmt Vent Isolation signal,</p> <p>OR</p> <p>Manually CLOSE valves and dampers as necessary.</p> |
|---|---|

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A
(E-0)

Page 4 of 10

EQUIPMENT VERIFICATION

6. **CHECK** cntmt pressure:

- Phase B DARK [MISSP].
- Cntmt Spray DARK [MISSP].
- Cntmt press less than 2.8 psig.

PERFORM the following:

- 1) **ENSURE** Phase B actuated.
- 2) **ENSURE** Cntmt Spray actuated.
- 3) **ENSURE** cntmt spray pumps running.
- 4) **ENSURE** cntmt spray flow.
- 5) **ENSURE** Phase B isolation:
 - Train A GREEN.
 - Train B GREEN
 - Manually **CLOSE** valves and dampers as necessary.
- 6) **STOP** all RCPs.
- 7) **ENSURE** MSIVs and bypasses CLOSED.
- 8) **PLACE** steam dump controls OFF.
- 9) **WHEN** 10 minutes has elapsed since Phase B actuated,
THEN
ENSURE air return fans start.
- 10) **USE** adverse cntmt [ADV] setpoints where provided.

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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**APPENDIX A
(E-0)**

Page 5 of 10

EQUIPMENT VERIFICATION

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|----|--|---|
| 7. | <p>CHECK plant radiation NORMAL:</p> <ul style="list-style-type: none"> • S/G blowdown rad recorder 1-RR-90-120 NORMAL prior to isolation [M-12]. • Condenser vacuum exhaust rad recorder 1-RR-90-119 NORMAL prior to trip [M-12]. • 1-RR-90-106 and 1-RR-90-112 radiation recorders NORMAL prior to isolation [M-12]. • S/G main steamline discharge monitors NORMAL [M-30]. • Upper and Lower containment high range monitors NORMAL [M-30]. • NOTIFY Unit Supervisor conditions NORMAL. | <p>NOTIFY Unit Supervisor IMMEDIATELY.</p> |
| 8 | <p>ENSURE all D/Gs RUNNING.</p> | <p>EMERGENCY START D/Gs</p> |

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A
(E-0)

Page 6 of 10

EQUIPMENT VERIFICATION

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|---|---|
| <p>9. ENSURE ABGTS operation:</p> <p>a. ABGTS fans RUNNING.</p> <p>b. ABGTS dampers OPEN:</p> <ul style="list-style-type: none"> • FCO-30-146A. • FCO-30-146B. • FCO-30-157A. • FCO-30-157B. | <p>a. Manually START fans.</p> <p>b. Locally OPEN dampers.</p> |
| <p>10. ENSURE at least four ERCW pumps RUNNING, one on each shutdown board preferred.</p> | <p>Manually START pumps as necessary.</p> |
| <p>11. ENSURE ERCW supply valves OPEN to running D/Gs.</p> | <p>IF ERCW can NOT be aligned to running D/G,
THEN
EMERGENCY STOP affected D/G.</p> |
| <p>12. ENSURE CCS HX C ALT DISCH TO HDR B, 0-FCV-67-152, is open to position A.</p> | <p>Manually OPEN 0-FCV-67-152 to position A.</p> |

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A
(E-0)

Page 7 of 10

EQUIPMENT VERIFICATION

13. **CLOSE** CCS HX C
DISCH TO HDR A,
0-FCV-67-144.

14. **MONITOR** EGTS operation:
- ECTS fans RUNNING.
 - **ENSURE** dampers OPEN
VERIFY filter bank dp between
5 and 9 inches of water.

Manually **START** fans **OPEN**
dampers.

15. **ENSURE** CCS pumps RUNNING:
- 1A-A CCS pump.
 - 1B-B CCS pump.
 - C-S OR 2B-B CCS pump.

Manually **START** pumps as
necessary.

- NOTE**
- The Upper and Lower Cntmt rad monitors sampling pumps should be shutdown if the sample flowpath is isolated.
 - The following equipment is located on 1-M-9.

16. **CHECK** CNTMT PURGE fans
STOPPED:

STOP fans and
PLACE handswitch in
PULL-TO-LOCK.

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A
(E-0)

Page 8 of 10

EQUIPMENT VERIFICATION

17. **CHECK** FUEL HANDLING EXH fans STOPPED, Fuel and Cask loading dampers CLOSED: **STOP** fans and **PLACE** handswitch in PULL-TO-LOCK, manually **CLOSE** dampers.

18. **ENSURE** AB GEN SUPPLY and EXH fans STOPPED. **STOP** fans and **PLACE** handswitch in PULL-TO-LOCK.

NOTE • Dampers 1-HS-30-158 and 2-HS-30-270 remain open during ABI.

19. **ENSURE** AB GEN SUP & EXH dampers CLOSED. Manually **CLOSE** dampers.

20. **ENSURE** MCR & SPREAD RM FRESH AIR dampers CLOSED: Manually **CLOSE** dampers.
- FCV-31-3.
 - FCV-31-4.

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A
(E-0)

Page 9 of 10

EQUIPMENT VERIFICATION

- | | | |
|-----|--|--|
| 21. | <p>ENSURE at least one CB EMER CLEANUP fan RUNNING and associated damper OPEN:</p> <ul style="list-style-type: none">• CB EMERG CLEANUP FAN A-A,
OR
Fan B-B RUNNING.• FCO-31-8, OPEN.
OR
FCO-31-7, OPEN. | <p>Manually START fan.</p>

<p>NOTIFY TSC if at least one damper NOT OPEN.</p> |
| 22. | <p>ENSURE at least one CB EMER PRESS fan RUNNING and associated damper OPEN:</p> <ul style="list-style-type: none">• CB EMERG PRESS FAN A-A,
OR
FAN B-B RUNNING.• FCO-31-6, OPEN.
OR
FCO-31-5, OPEN. | <p>Manually START fan.</p>

<p>NOTIFY TSC if at least one damper NOT OPEN.</p> |

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX A
(E-0)

Page 10 of 10

EQUIPMENT VERIFICATION

23. **ENSURE** Control Building fans STOPPED and dampers CLOSED:
- SPREADING ROOM SUPPLY and EXH FANS AND dampers.
 - TOILET & LKR RM EXHAUST FAN AND dampers.
24. **INITIATE** Appendix B.
- Manually **STOP** fans.
- NOTIFY** TSC if any damper NOT CLOSED.

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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Step	Action/Expected Response	Response Not Obtained
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APPENDIX B
(E-0)

Page 1 of 1

PHASE B PIPE BREAK CONTINGENCIES

- | | | |
|----|--|--|
| 1. | CHECK PHASE B actuated.
(MISSP - 1-XX-55-6C, -6D) | WHEN PHASE B actuation occurs;
THEN
GO TO step 2. |
| 2. | ENSURE 1-FCV-32-110 CLOSED.
(CISP - 1-XX-55-6E)
[A-train, window 13] | DISPATCH AUO to perform
ATTACHMENT B1. |
| 3. | ENSURE 1-FCV-67-107 CLOSED.
(CISP - 1-XX-55-6E)
[A -train, window 43] | DISPATCH AUO to perform
ATTACHMENT B2. |
| 4. | ENSURE 1-FCV-70-92 CLOSED.
(CISP - 1-XX-55-6E)
[A -train, window 73] | DISPATCH AUO to perform
ATTACHMENT B3. |
| 5. | ENSURE 1-FCV-70-140 CLOSED.
(CISP - 1-XX-55-6F)
[B -train, window 74] | DISPATCH AUO to perform
ATTACHMENT B4. |

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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ATTACHMENT B1

(E 0)

Page 1 of 1

CONTROL AIR ISOLATION

1. **CLOSE** 0-ISV-32-1013 - CONTROL AIR EL 713 AB HDR ISOL
[A6/S EL. 713] (chain operated - behind Fuel and Waste Handling Bd. A).
2. IF 0-ISV-32-1013 CANNOT BE CLOSED,
THEN:

OPEN and **DISCONNECT** C&SS air compressor breakers:

- a) 0-BKR-32-25 - 480V SD BD 1A2-A, C/3D
- b) 0-BKR-32-26 - 480V SD BD 1B1-B, C/3D
- c) 0-BKR-32-27 - 430V AUX BLDG COM BD, C/6C
- d) 0-BKR-32-1900A - 480V TURB BLDG COM BD, C/6C

WBN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev 28
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ATTACHMENT B2

(E-0)

Page 1 of 1

ERCW ISOLATION

1. **UNLOCK AND CLOSE** 1-ISV-67-523D - LOWER CNTMT VENT CLR 1D & 1D
ERCW SUP ISOL [A2U/692] (U-1 penetration room - North of AB Pipe Chase
Cooler 1B-B in overhead)

WBN

REACTOR TRIP OR SAFETY INJECTION

E-0
Rev 28

ATTACHMENT B3

(E-0)

Page 1 of 1

CCS RETURN ISOLATION

1. **CLOSE** 1-ISV-70-700 RCP OIL COOLER CCS RETURN ISOLATION
[A4/V EL. 710 U-1 Penetration Room] (approximately 10 ft. North of Penetration
Room Cooler 1B-B on mezzanine above RHR Sump Valve Room)

ATTACHMENT B4
(E-0)

Page 1 of 1

CCS SUPPLY ISOLATION

1. **CLOSE** 1-SV-70-516 REACTOR BUILDING CCS SUPPLY ISOLATION
[A6/T EL. 737] (Behind Elevator approximately 2 ft. west on mezzanine above
"A" CCS Heat Exchanger)

WBN	TURBINE TRIP	AOI-17 Revision 43 Page 11 of 26
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3.3 BOP Realignment

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION Performance of this instruction should not be allowed to delay or interfere with actions required by applicable emergency procedures or abnormal operating procedures.

NOTE 1 Control room operators may initiate shutdown of pumps and equipment from the benchboard immediately after a trip. Performance of this instruction will subsequently verify proper secondary equipment alignment.

NOTE 2 Steps in this section and items in Attachment 1 may be performed out of sequence.

1. **DISPATCH** turbine building NAUO to perform Attachment 1.
2. **NOTIFY** condensate demineralizer NAUO prior to Operator initiated press changes in condensate.
3. **REMOVE** generator excitation from service:
 - a. **PLACE** voltage regulator to TEST.
 - b. **ZERO** exciter base adjuster.
 - c. **OPEN** exciter field breaker.
 - d. **PLACE** exciter regulator control to OFF.

WBN	TURBINE TRIP	AOI-17 Revision 43 Page 12 of 26
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3.3 BOP Realignment (Continued)

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

4. MONITOR main turbine:

- a. **WHEN** less than 1500 rpm,
THEN:
 - **ENSURE** seal oil backup pump RUNNING.
 - **ENSURE** turning gear oil pump RUNNING.
- b. **WHEN** less than 600 rpm,
THEN
ENSURE bearing lift oil pump RUNNING.
- c. **WHEN** turbine is at ZERO RPM,
THEN
ENSURE turbine on turning gear.
- d. **MAINTAIN** MTOT lube oil temp between 95° and 100°F (may require RCW isolation if TCV has excessive leakage).
- e. **MAINTAIN** GENERATOR H2 (Cold Gas) temp 95°F (may require RCW isolation if TCV has excessive leakage).
- f. **ENSURE** Gland Steam Spillover Bypass valve is CLOSED using 1-HS-47-191A.

WBN	TURBINE TRIP	AOI-17 Revision 43 Page 13 of 26
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3.3 BOP Realignment (Continued)**ACTION/EXPECTED RESPONSE****RESPONSE NOT OBTAINED****5. ALIGN MSRs:**

- a. **PUSH** RESET on MSR control panel.
- b. **CLOSE** MSR HP steam and bypass isol.
- c. **ENSURE** MSR warming valves CLOSED.
- d. **OPEN** MSR startup vents.
- e. **CLOSE** MSR operating vents.

6. CHECK MSIVs OPEN.

IF vacuum is to be maintained,
THEN
ENSURE auxiliary boiler is
aligned for steam seals.

WBN	TURBINE TRIP	AOI-17 Revision 43 Page 14 of 26
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3.3 BOP Realignment (Continued)**ACTION/EXPECTED RESPONSE****RESPONSE NOT OBTAINED****7. ENSURE** adequate FW press:

- a. **ENSURE** two hotwell pumps
RUNNING.
- b. **IF** FW isolation reset,
THEN
ENSURE one condensate booster
pump RUNNING if needed for unit
conditions.
- c. **ENSURE** CNDS demin pumps OFF.
- d. **STOP** #3 HDT pumps, and
CLOSE the discharge valves to
condensate heater strings. Notify
NAUO performing Attachment 1
that #3 HDT pumps are stopped.
- e. **STOP** #7 HDT pumps, and
CLOSE the discharge valves to
condensate heater strings.

8. SHUTDOWN any MFW pump NOT
required.**9. SHUTDOWN** any RCW pumps NOT
required.**10. SHUTDOWN** any CCW pumps NOT
required.

WBN	TURBINE TRIP	AOI-17 Revision 43 Page 15 of 26
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3.3 BOP Realignment (Continued)

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

11. **ALIGN** extraction steam valves and drain valves:

- a. **CLOSE** #1 and #2 Heater extraction steam valves.
- b. **ENSURE** turbine drain valves OPEN.
- c. **OPEN** MFW pump turbine drain valves.

12. **PERFORM** as required:

- a. **OBTAIN** switching instructions from NEAD, and **OPEN** main generator PCB(s) MODs.
- b. **PULL-TO-LOCK** bus duct cooling fans.
- c. **VERIFY** MTOT and seal oil temps **STABLE** and trending to 95°F.

13. **IF** MFW isolated to steam generators,
THEN
REQUEST Chem Lab sample condensate and feedwater prior to re-admitting water to S/Gs from condensate-feedwater system.

WBN	TURBINE TRIP	AOI-17 Revision 43 Page 16 of 26
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3.3 BOP Realignment (Continued)

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

14. IF EGTS started,
THEN
SHUTDOWN one train after 30 minutes and place in P-AUTO:

- REFER TO SOI-65.02, Emergency Gas Treatment System, section on Auto EGTS Actuation.

15. IF ABGTS started,
THEN
SHUTDOWN one train after 30 minutes and place in P-AUTO:

- REFER TO SOI-30.06, Auxiliary Building Gas Treatment System, section on Auto Start of ABGTS.

CAUTION Rx trip bkrs must be cycled to allow reset of MFW when isolated by SI, HI-HI S/G level, or flood level in MS valve vault room. If any SI signal is present with Auto SI blocked, cycling Rx trip bkrs will initiate SI actuation.

16. IF MFW NOT in service,
THEN
ESTABLISH MFW:
- REFER TO Attachment 2, Establishing MFW Following Reactor Trip.

WBN	TURBINE TRIP	AOI-17 Revision 43 Page 17 of 26
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3.3 BOP Realignment (Continued)**ACTION/EXPECTED RESPONSE****RESPONSE NOT OBTAINED**

17. **CHECK** S/G NR levels between 38% and 50%.

IF S/G level can **NOT** be maintained,
THEN
START M-D AFW pumps.

18. **RETURN TO** applicable Instruction.

- END OF SUBSECTION -

WBN	LOSS OF REACTOR OR SECONDARY COOLANT	E-1 Rev 15
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APPENDIX E

(E-1)

Page 1 of 1

EQUIPMENT EVALUATION

1. **EVALUATE** plant equipment and systems needed to support long term cooling and recovery actions, as time and personnel availability permits:
 - a. Contmt Isolation Status.
 - b. Emergency Gas Treatment System:
One train in operation, **REFER TO** SOI-65.02.
 - c. Auxiliary Building Gas Treatment:
One train in operation, **REFER TO** SOI-30.06.
 - d. Auxiliary Building Isolation alignment:
REFER TO SOI-30.06.
 - e. Main Control Room Isolation alignment:
REFER TO SOI-31.01.
 - f. ERCW System:
Both trains in operation.
 - g. Component Cooling Water System:
Both trains in operation.

SHIFT TURNOVER CHECKLIST

Page 1 of 2

SHIFT TURNOVER CHECKLIST 5									
Page _____ of _____									
<input type="checkbox"/> SM <input checked="" type="checkbox"/> US/MCR <input type="checkbox"/> UO <input type="checkbox"/> AUO <input type="checkbox"/> STA (STA Function)	Unit _____ Unit _____ Station _____		_____ <u>Off-going - Name</u> _____ <u>On-coming - Name</u>						
Part 1 - Completed by off-going shift/Reviewed by on-coming shift:									
<ul style="list-style-type: none"> • Abnormal equipment lineup/conditions: 1A Containment Spray Pump is out of service for motor bearing replacement. Pump has been out of service for 4 hours. LCO 3.6.6.A was entered 4 hours ago. Expected to be returned to service in 16 hours. _____ _____ • SI/Test in progress/planned: (including need for new brief) _____ _____ _____ _____ • Major Activities/Procedures in progress/planned: 100% power, MOL. RCS boron concentration is 747 ppm. Control Bank D is at 220 steps Window 23-A, TURB/GEN VIBRATION HI/HI-HI is lit. Bearing 9 indicates 10.1 mils, and Bearing 10 indicates 9.0 mils. Operations Management and System Engineering have met, and directed that a power reduction to 90% at 2% per minute using AOI-39, "Rapid Load Reduction" be conducted as soon as shift relief and turnover is complete. _____ _____ • Radiological changes in plant during shift: None planned _____ _____ _____ 									
Part 2 - Performed by on-coming shift									
<input type="checkbox"/> A review of the Operating Log since last held shift or 3 days, whichever is less. <input type="checkbox"/> A review of the Rounds sheets/Abnormal readings (AUOs only) Review the following for changes since last shift turnover: <table style="width: 100%; border: none;"> <tr> <td style="width: 33%;"><input type="checkbox"/> Standing Orders</td> <td style="width: 33%;"><input type="checkbox"/> LCO(s) in actions (N/A for AUOs)</td> <td style="width: 33%;"><input type="checkbox"/> PER review (N/A for AUOs)</td> </tr> <tr> <td><input type="checkbox"/> TACFs (N/A for AUOs)</td> <td><input type="checkbox"/> Operator workarounds, burdens</td> <td><input type="checkbox"/> Immediate required reading.</td> </tr> </table> <p style="text-align: center;">and other challenges</p>				<input type="checkbox"/> Standing Orders	<input type="checkbox"/> LCO(s) in actions (N/A for AUOs)	<input type="checkbox"/> PER review (N/A for AUOs)	<input type="checkbox"/> TACFs (N/A for AUOs)	<input type="checkbox"/> Operator workarounds, burdens	<input type="checkbox"/> Immediate required reading.
<input type="checkbox"/> Standing Orders	<input type="checkbox"/> LCO(s) in actions (N/A for AUOs)	<input type="checkbox"/> PER review (N/A for AUOs)							
<input type="checkbox"/> TACFs (N/A for AUOs)	<input type="checkbox"/> Operator workarounds, burdens	<input type="checkbox"/> Immediate required reading.							
Part 3 - Performed by both off-going and on-coming shift									
<input type="checkbox"/> A walkdown of the MCR control boards (N/A for AUOs) Relief Time: _____ Relief Date: _____									

SHIFT TURNOVER CHECKLIST

Page 2 of 2

SHIFT TURNOVER CHECKLIST			
		Page _____ of _____	
<input type="checkbox"/>	SM		
<input type="checkbox"/>	US/MCR	Unit _____	
<input checked="" type="checkbox"/>	UO	Unit _____	Off-going - Name _____
<input type="checkbox"/>	AUO	Station _____	
<input type="checkbox"/>	STA (STA Function)		On-coming - Name _____
Part 1 - Completed by off-going shift/Reviewed by on-coming shift:			
<ul style="list-style-type: none"> • Abnormal equipment lineup/conditions: <div style="border: 1px solid black; padding: 2px; margin: 2px 0;">1A Containment Spray Pump is out of service for motor bearing replacement. Pump has been out of service for 4 hours. LCO 3.6.6.A was entered 4 hours ago. Expected to be returned to service in 16 hours.</div> <div style="border: 1px solid black; height: 15px; margin: 2px 0;"></div> <div style="border: 1px solid black; height: 15px; margin: 2px 0;"></div> • SI/Test in progress/planned: (including need for new brief) <div style="border: 1px solid black; height: 15px; margin: 2px 0;"></div> <div style="border: 1px solid black; height: 15px; margin: 2px 0;"></div> <div style="border: 1px solid black; height: 15px; margin: 2px 0;"></div> • Major Activities/Procedures in progress/planned: <div style="border: 1px solid black; padding: 2px; margin: 2px 0;">100% power, MOL. RCS boron concentration is 747 ppm. Control Bank D is at 220 steps</div> <div style="border: 1px solid black; padding: 2px; margin: 2px 0;">Window 23-A, TURB/GEN VIBRATION HI/HI-HI is lit. Bearing 9 indicates 10.1 mils, and Bearing 10 indicates 9.0 mils. Operations Management and System Engineering have met, and directed that a power reduction to 90% at 2% per minute using AOI-39, "Rapid Load Reduction" be conducted as soon as shift relief and turnover is complete.</div> • Radiological changes in plant during shift: <div style="border: 1px solid black; height: 15px; margin: 2px 0;"></div> <div style="border: 1px solid black; height: 15px; margin: 2px 0;"></div> 			
Part 2 - Performed by on-coming shift			
<div style="display: flex; flex-wrap: wrap;"> <div style="width: 50%;"><input type="checkbox"/> A review of the Operating Log since last held shift or 3 days, whichever is less.</div> <div style="width: 50%;"><input type="checkbox"/> A review of the Rounds sheets/Abnormal readings (AUOs only)</div> </div> <p>Review the following for changes since last shift turnover:</p> <div style="display: flex; flex-wrap: wrap;"> <div style="width: 33%;"><input type="checkbox"/> Standing Orders</div> <div style="width: 33%;"><input type="checkbox"/> LCO(s) in actions (N/A for AUOs)</div> <div style="width: 33%;"><input type="checkbox"/> PER review (N/A for AUOs)</div> <div style="width: 33%;"><input type="checkbox"/> TACFs (N/A for AUOs)</div> <div style="width: 33%;"><input type="checkbox"/> Operator workarounds, burdens</div> <div style="width: 33%;"><input type="checkbox"/> Immediate required reading.</div> </div> <p style="text-align: center;">and other challenges</p>			
Part 3 - Performed by both off-going and on-coming shift			
<input type="checkbox"/> A walkdown of the MCR control boards (N/A for AUOs)			
Relief Time: _____		Relief Date: _____	

Facility:	Watts Bar NRC Exam 1 August 2010	Scenario No.:	6	Op Test No.:	1
Examiners:	_____	Operators:	_____	SRO	
	_____		_____	RO	
	_____		_____	BOP	
Initial Conditions: 75% power, BOL. RCS boron concentration is 1128 ppm. Control Rod Bank D at 184 steps.					
<p>Turnover: Unit 1 is at 75% power. A power escalation to the preconditioned power level of 96% is to be conducted using GOI-4, "Normal Power Operations." 1D CCW pump was shutdown in order to perform maintenance on the motor. Repairs have been completed and the pump is now available. 0-SI-30-8-A, "Auxiliary Building Gas Treatment System Train A 10-hour Operation" has been in progress for 9 hours. TD AFWP is out of service to replace the trip-and-throttle valve and associated linkage. Tech Spec 3.7.5.B was entered for the TD AFWP 5 hours ago. Expected return to service is 9 hours. Train A/Channel I Work Week.</p>					
Event No.	Malf. No.	Event Type*	Event Description		
1	n/a	R-RO N-BOP	Raise power after repairs to 1D CCW pump are complete.		
2	mux_03c066	C-BOP TS-SRO	ABGTS Fan belt fails during 0-SI-30-8-A, "Auxiliary Building Gas Treatment System Train A 10-hour Operation" surveillance performance. Requires a Tech Spec evaluation.		
3	hic-62-78a	C-RO	TIC-62-78 letdown temp controller fails high. ARI 110-D, LTDN TO DEMINS TEMP HI and ARI 247-A, LTDN HX RET FLOW LO, entry		
4	rx07a	I-RO TS-SRO	1-PT-68-340, PZR PRESS fails low. Requires manual control of 1-PIC-68-340A, PZR PRESS MASTER CONTROL. Requires entry into AOI-18, "Malfunction of Pressurizer Pressure Control System." Requires a Tech Spec evaluation.		
5	ed11b	C-BOP TS-SRO	Loss of 120 Vac Instrument Power Rack B (1-M-7). Requires entry into ARI 15-E, PNL 1-M-7 BREAKER TRIP, and SOI-237.02, "120v AC Instrument Power 1B," to transfer the rack to its alternate power source. BOP must respond to multiple alarms.		
6	sic-46-20a	I-BOP	1A MFP speed controller fails low. Requires trip of the 1A MFP and entry into AOI-16, "Loss of Normal Feedwater."		
7	fw20	M-ALL	Main feedwater header breaks in the Turbine Building, on the common header downstream of the Number 1 (high pressure) feedwater heaters.		
8	rp01b rpt1	C-RO	Automatic reactor trip fails to actuate. Requires the RO to manually trip the reactor. Trip switch RT-1 on 1-M-4 fails to actuate. RO trips the reactor using trip switch RT-2 on 1-M-6.		
9	fw07a fw22c	M-ALL	1 A-A motor driven auxiliary feedwater pump trips on instantaneous overcurrent. 1B-B motor driven auxiliary feedwater pump develops a break on its discharge line. Requires entry into FR-H.1, "Loss of Secondary Heat Sink," and establishment of "bleed-and-feed."		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

DRAFT

Scenario 6 (Spare) - Summary

Initial Condition 75% power, BOL. RCS boron concentration is 1128 ppm. Control Rod Bank D at 184 steps.

Turnover Unit 1 is at 75% power. A power escalation to the preconditioned power level of 96% is to be conducted using GOI-4, "Normal Power Operations." 1D CCW pump was shutdown in order to perform maintenance on the motor. Repairs have been completed and the pump is now available. TD AFWP is out of service to replace the trip-and-throttle valve and associated linkage. Tech Spec 3.7.5.A was entered for the TD AFWP 5 hours ago. Expected return to service is 9 hours. Train A/Channel I Work Week.

- Event 1** Power escalation is conducted using GO-4, "Normal Power Operations."
- Event 2** ABGTS Fan belt fails during 0-SI-30-8-A surveillance performance. Operator responds to ARI 139-A, ABGTS FAN A-A/B-B FLOW LO alarm, and shuts down the A-A ABGTS fan. SRO evaluates Tech Specs and enters LCO 3.7.12, Auxiliary Building Gas Treatment System Condition A.
- Event 3** TIC-62-78 letdown temp controller fails. RO responds to ARI 110-D LTDN TO DEMINS TEMP HI and takes manual control of temperature controller for the duration of the scenario.
- Event 4** 1-PT-68-340, PZR PRESS fails low. Requires Tech Spec Evaluation. SRO enters AOI-18, "Malfunction of Pressurizer Pressure Control System" and directs compensatory actions. SRO evaluates Tech Specs and enters Tech Spec LCO 3.3.1, Reactor Trip System (RTS) Instrumentation, Conditions W and X; LCO 3.3.2, ESFAS Instrumentation, Conditions D and L.
- Event 5** Loss of 120 Vac Instrument Power Rack B (M-7). The BOP enters into ARI 15-E, PNL 1-M-7 BREAKER TRIP, and SOI-237.02, "120v AC Instrument Power 1B," to transfer the rack to its alternate power source.
- Event 6** 1A MFP speed controller fails low. Requires trip of the 1A MFP and entry into AOI-16, "Loss of Normal Feedwater."
- Event 7** Main feedwater header breaks in the Turbine Building, on the common header downstream of the Number 1 (high pressure) feedwater heaters.
- Event 8** Automatic reactor trip fails to actuate. Requires the RO to manually trip the reactor. Trip switch RT-1 on 1-M-4 fails to actuate. RO trips the reactor using trip switch RT-2 on 1-M-6.
- Event 9** 1 A-A motor driven auxiliary feedwater pump trips on instantaneous overcurrent. 1B-B motor driven auxiliary feedwater pump develops a break on its discharge line. Requires entry into FR-H.1, "Loss of Secondary Heat Sink," and "feed-and-bleed" actions to be taken.

Scenario 6 (Spare) - Critical Task Summary

<i>Critical Task 1 from WOG Critical Task List, E-0, A</i>	<i>Manually trip the reactor from the control room before manually tripping the turbine. Manually tripping the turbine before the reactor is tripped will cause an unnecessary challenge to the steam generator PORV and Safety valves unless the reactor is tripped. Reactor trip must be verified to ensure that the only heat being added to the RCS is from decay heat and reactor coolant pump heat. The safeguards systems that protect the plant during accidents are designed assuming that only decay heat and pump heat are being added to the RCS.</i>
<i>Critical Task 2 from WOG Critical Task List, FR-H.1 F.</i>	<i>Initiate RCS bleed and feed so that the RCS depressurizes sufficiently for intermediate head injection to occur. Once the operator detects that secondary heat sink has degraded (SG wide range levels are less than or equal to 26%), RCS bleed and feed must be established to prevent or minimize core uncover due to inadequate core cooling.</i>

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 6
Simulator Console Operators Instructions

SIMULATOR SETUP INFORMATION

1. ENSURE NRC Examination Security has been established.
2. RESET to Initial Condition 348 by performing the following actions:
 - a. Select ICMANAGER on the THUNDERBAR menu (right hand side of Instructor Console Screen).
 - b. Locate IC# 348.
 - c. Right "click" on IC# 348.
 - d. Select Reset on the drop down menu.
 - e. Right "click" on RESET.
 - f. Enter the password for IC 348.
 - g. Select "Yes" on the INITIAL CONDITION RESET pop-up window.
 - h. Perform SWITCH CHECK.
3. SELECT Director on the THUNDERBAR menu (right hand side of Instructor Console Screen).
4. ENSURE the following information appears on the Director Screen:

Key	Description	Type	Event	Delay	Inserted	Ramp	Initial	Final	Value
hs-1-18a-1	13060 stm flow to afpt isolation(green)	O		00:00:00	00:00:00	00:00:00		Off	Off
hs-1-15a	hs-1-15a auxiliary feedwater pump turbine steam s	O		00:00:00	00:00:00	00:00:00		close	close
hs-1-18a	hs-1-18a steam flow to auxiliary feed pump turbine	O		00:00:00	00:00:00	00:00:00		close	close
hs-1-16a-1	13050 aux fw pmp turb stm supp(green)	O		00:00:00	00:00:00	00:00:00		Off	On
hs-46-56a-1	05010 afwt a-s t&t position(green)	O		00:00:00	00:00:00	00:00:00		Off	On
hs-1-16a	hs-1-16a auxiliary feedwater pump turbine steam s	O		00:00:00	00:00:00	00:00:00		close	close
hs-1-15a-1	13050 aux fw pmp turb stm supp(green)	O		00:00:00	00:00:00	00:00:00		Off	On
hs-46-56a	hs-46-56a mfpt a-s t&t position sw	O		00:00:00	00:00:00	00:00:00		close	close
hs-1-17a-1	13060 stm flow to afpt isolation(green)	O		00:00:00	00:00:00	00:00:00		Off	Off
hs-1-17a	hs-1-17a steam flow to auxiliary feed pump turbin	O		00:00:00	00:00:00	00:00:00		close	close

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 6
Simulator Console Operators Instructions

SIMULATOR SETUP INFORMATION

Key	Description	Type	Event	Delay	Inserted	Ramp	Initial	Final	Value
fwr27	overspeed trip linkage on turb afw pmp.	R		00:00:00	00:00:00	00:00:00		tripped	tripped
rprt1	rprt1 manual reactor trip close-trip sw)		00:00:00	00:00:00	00:00:00		close	close
fw07a	electric afw pump a trip	M		00:00:00		00:00:00		Active	InActive
fw21b	afw discharge line break afw pump 1b-b	M	19	00:00:00		00:00:00		81	0
mux_03c066	139-a abgts fan a-a/b-b flow lo	M	2	00:00:00		00:00:00		On	Off
hic-62-78a	26050 letdown htx outlet temp	O	3	00:00:00		00:00:00		100	42.9382
rx07a	pzt pressure transmitter fails to position chnl 1 68-340	M	4	00:00:00		00:00:00		0	66.3382
ed11b	loss of 120 vac inst power rack m-7 panel b	M	5	00:00:00		00:00:00		Active	InActive
sic-46-20a	sic-46-20a main feed pump turbine a speed controller	O	6	00:00:00		00:00:00		close	auto
fw20	feed water line break	M	7	00:00:00		00:01:00		80	0

5. Place simulator in RUN and acknowledge any alarms.
6. Place RED HOLD NOTICE tags on 1-HS-1-15A, SG 1 STEAM SUPPLY TO T-D AFW PMP; 1-HS-1-16A, SG 4 STEAM SUPPLY TO T-D AFW PMP; 1-HS-1-17A STEAM HDR TO T-D AFW PMP; 1-HS-1-18A STEAM HDR TO T-D AFW PMP; 1-HS-46-56A-S T-D AFWP T&T VLV.
7. Ensure the indicating lights (RED and GREEN) on 1-HS-1-15A, SG 1 STEAM SUPPLY TO T-D AFW PMP; 1-HS-1-16A, SG 4 STEAM SUPPLY TO T-D AFW PMP; 1-HS-1-17A STEAM HDR TO T-D AFW PMP; 1-HS-1-18A STEAM HDR TO T-D AFW PMP; 1-HS-46-56A-S T-D AFWP T&T VLV are DARK.
8. ENSURE annunciators 60-A, AFW PMP A-S ELEC OVERSPEED TRIP and 61-A, AFW PMP A-S MECH OVERSPEED TRIP are LIT.
9. ENSURE pink "Protected Equipment" tags are hung on the 1A-A and 1B-B MD AFW pump handswitches.
10. ENSURE the "Train A Week - Channel I" sign is placed on 1-M-30.
11. Place simulator in FREEZE.

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 6
Simulator Console Operators Instructions

SIMULATOR SETUP INFORMATION

11. **ENSURE Watts Bar Nuclear Plant Unit 1 Reactivity Briefing Book (Simulator Copy) BOL (Beginning Of Life) is updated and on the desk, and that the BOL placards are on 1-M-6, below the Boric Acid and Primary Water Integrators.**

Item 3						
•AFD	-20	%	0.2	%	13.0	%
	Lower Band		Target		Upper Band	
			-1.9			
•Control Rods	<input checked="" type="checkbox"/> Auto	<input type="checkbox"/>	Manual			
				184	steps	
Item 4						
	<input type="checkbox"/> Negative	<input type="checkbox"/> Positive	<input checked="" type="checkbox"/> None			
	<input type="checkbox"/> 1-CCP A	<input checked="" type="checkbox"/> 1-CCP B	C _B	1150	ppm	
Item 5						
Current RCS C _B :	1128		ppm			
Current fluid inside the blender is:	<input type="checkbox"/> Acid	<input type="checkbox"/> Water	<input checked="" type="checkbox"/> Blended			

PW flow rate **70 gpm**

1-FC-62-142, dial setting **35%**

BA flow rate **13.6 gpm**

1-FC-62-139 dial setting **34%**

6. Boric Acid (BA) and Primary Water (PW) volumes for the following changes:

1°F Tav _g increase	175 gal PW
1°F Tav _g decrease	32 gal BA
10% Downpower @ 5%/hr	130 gal BA
50% Downpower @ 5%/hr	800 gal BA
1000 MW (85%) Runback	200 gal BA
950 MW (80%) Runback	285 gal BA
900 MW (75%) Runback	369 gal BA
790 MW or 800 MW Runback	535 gal PW

12. **WHEN prompted by the Chief Examiner, place the Simulator in RUN.**

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 6
Simulator Console Operators Instructions

Exam Event No.	Simulator Event No.	Description/Role Play
1	none	Raise power after repairs to 1C #3 HDT pump are complete. ROLE PLAY: None
2	2	ABGTS Fan trips during 0-SI-30-8-A surveillance performance. ROLE PLAY: When contacted as the Auxiliary Building AUO, report that A ABGTS Fan has tripped. There is damage to the fan motor due to the drive belt failure.
3	3	TIC-62-78 letdown temp controller fails high ROLE PLAY: When contacted as the Auxiliary Building AUO, report that Letdown 1-TCV-70-192 is responding to manual signals.
4	4	PZR press 1-PT-68-340 fails high ROLE PLAY: When contacted as Work Control, acknowledge the report of the failure of 1-PT-68-340. If requested, state that a package to troubleshoot the failed circuit will be prepared. If requested to trip bistable, state that IMI-160.002 will be prepared and that personnel will contact the control room prior to tripping any bistables.
5	5	Loss of 120 Vac Instrument Power Rack B (1-M-7). ROLE PLAY: Call the Control Room as a Unit 2 electrician and report that work was performed on the Unit 1 instrument power distribution panel instead of the Unit 2 instrument power distribution panel. The work in the panel resulted in the panel resulted in an inadvertent trip of the normal feeder breaker.
6	6	1A speed controller fail low, requiring 1A MFP to be tripped. ROLE PLAY: When contacted as the Turbine Building AUO, report that there is no sign of any problems with the MFP turbine speed changers or speed control circuit.

Watts Bar Nuclear Plant
2010-08 NRC Examination Scenario 6
Simulator Console Operators Instructions

Exam Event No.	Simulator Event No.	Description/Role Play
7	7	<p>Main feedwater header breaks in the turbine building.</p> <p>ROLE PLAY: <i>When contacted as the Turbine Building AUO, report that there a large amount of steam in the Turbine Building and that you are ensuring that no one enters the Turbine Building.</i></p> <p>ROLE PLAY: <i>After the high pressure feedwater heater isolation valves are closed, report as the Turbine Building AUO that the noise has stopped, and that the steam is clearing from the Turbine Building.</i></p>
8	none	<p>Automatic reactor trip fails to actuate. Requires the RO to manually trip the reactor. Trip switch RT-1 on 1-M-4 fails to actuate. RO trips the reactor using trip switch RT-2 on 1-M-6.</p> <p>ROLE PLAY: <i>None.</i></p>
9	none	<p>1 A-A motor driven auxiliary feedwater pump trips on instantaneous overcurrent. 1B-B motor driven auxiliary feedwater pump develops a break on its discharge line.</p> <p>ROLE PLAY: <i>When contacted as the Auxiliary building AUO, report that there is no apparent cause visible for the 1A MD AFW pump trip.</i></p> <p>ROLE PLAY: <i>When contacted as the Control Building AUO, report that the 1A MD AFW pump breaker tripped on instantaneous overcurrent.</i></p> <p>ROLE PLAY: <i>When contacted as the Auxiliary Building AUO, report that there is a pipe rupture on the piping associated with the 1B-B MD AFW pump, pipe failure, downstream of back pressure regulating valve, and upstream of the level control valve on elev. 757 ft.</i></p>

Op Test No.: NRC Scenario # 6 Event # 1 Page 1 of 25

Event Description: Raise power after repairs to 1D CCW pump are complete.

Time	Position	Applicant's Actions or Behavior
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EXAMINER: The following actions are taken from GO-4, "Normal Power Operation." Section 5.2, "Unit Startup from 30% to 100% Reactor Power," with Step 24 being repeated to raise power. The crew begins at Step 38.

	BOP	<p>[24] CONTINUE ascension to 90% power (70 to 74% if following refueling) by performing the following:</p> <p>[24.1] IF during any of the following steps the REFERENCE changes in an undesired manner, THEN ADJUST VPL to stop turbine load rise OR PUSH TURBINE MANUAL to place the turbine control mode in manual mode and PROCEED to section 5.6.</p> <p>[24.2] ADJUST VALVE POSITION LIMIT to 90% or \leq to 5% above the Gov Control Indication.</p> <p>[24.3] SET LOAD RATE at predetermined value.</p> <p>[24.4] PUSH REFERENCE CONTROL Δ (raise) button to set desired load in SETTER display.</p>
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NOTE

RCS should be diluted to raise TAVG, then Turbine load raised along with TAVG. Control rods will be used along with dilution to maintain ΔI and, if needed, for temperature.

EXAMINER: The following actions are taken from SOI-62.02, "Boron Concentration Control," Section 6.6, "Minor Dilution."

NOTES

- 1) Section 6.6, Minor Dilution, may be reproduced, laminated, displayed, reused, etc. as desired.
- 2) Minor Dilution is defined as the addition of Primary Water done several times each shift to compensate for fuel burn-up, and maintain Tavg on program.

		[1] ENSURE 1-HS-68-341H, BACKUP HEATER C, is ON, to equalize Pzr-RCS CB.
		[2] ADJUST 1-FQ-62-142, PW BATCH COUNTER, for required quantity.
		[3] PLACE 1-HS-62-140B, VCT MAKEUP MODE in DIL.
		[4] TURN 1-HS-62-140A, VCT MAKEUP CONTROL, to START. [4.1] CHECK Red light is LIT.

Op Test No.: NRC Scenario # 6 Event # 1 Page 2 of 25

Event Description: Raise power after repairs to 1D CCW pump are complete.

Time	Position	Applicant's Actions or Behavior
------	----------	---------------------------------

		<p>[5] MONITOR the following parameters:</p> <table border="1"> <thead> <tr> <th>Instrument</th><th>Location</th><th>Parameters</th></tr> </thead> <tbody> <tr> <td>1-PI-62-122</td><td>1-M-6</td><td>VCT PRESS</td></tr> <tr> <td>1-LI-62-129A</td><td>1-M-6</td><td>VCT LEVEL</td></tr> <tr> <td>1-FI-62-142</td><td>1-M-6</td><td>PW TO BLENDER FLOW</td></tr> <tr> <td>1-FQ-62-142</td><td>1-M-6</td><td>PW BATCH COUNTER</td></tr> <tr> <td>1-FQ-62-139</td><td>1-M-6</td><td>BA BATCH COUNTER</td></tr> </tbody> </table>	Instrument	Location	Parameters	1-PI-62-122	1-M-6	VCT PRESS	1-LI-62-129A	1-M-6	VCT LEVEL	1-FI-62-142	1-M-6	PW TO BLENDER FLOW	1-FQ-62-142	1-M-6	PW BATCH COUNTER	1-FQ-62-139	1-M-6	BA BATCH COUNTER
Instrument	Location	Parameters																		
1-PI-62-122	1-M-6	VCT PRESS																		
1-LI-62-129A	1-M-6	VCT LEVEL																		
1-FI-62-142	1-M-6	PW TO BLENDER FLOW																		
1-FQ-62-142	1-M-6	PW BATCH COUNTER																		
1-FQ-62-139	1-M-6	BA BATCH COUNTER																		
		[6] WHEN dilution is COMPLETE, AND 1-FCV-62-128 is closed, THEN PLACE 1-HS-62-140B, VCT MAKEUP MODE, in AUTO.																		
		[7] TURN 1-HS-62-140A, VCT MAKEUP CONTROL, to START. [7.1] CHECK Red light is LIT.																		
		[8] IF desired to reduce VCT level, THEN GO TO Section 8.5, VCT Level Reduction.																		
EXAMINER: The following actions are taken from GO-4, "Normal Power Operation."																				
	BOP	<p>[24.5] PUSH GO button.</p> <p>[24.6] MONITOR Generator Megawatts RISING.</p> <p>[24.7] CHECK that load rise has STOPPED when reference display equals setter OR IF desired to stop the load change THEN STOP the load change by DEPRESSING the HOLD pushbutton.</p> <p>[24.8] WHEN desired to resume the load change, THEN PRESS the GO push button and continue to monitor load.</p>																		
	BOP	[38] ENSURE both Stator Water Heat Exchangers are in service prior to exceeding 75% power.																		
<p align="center">NOTE</p> <p>The numbers below the pressure indication for 1-PIS-47-13 correspond to four relays (LEDs) that enable the runback logic. The numbers 1, 2, 3, 4 should be illuminated indicating all four relays are enabled.</p>																				
	BOP	[39] CHECK HP Turbine Impulse Pressure / Turbine Runback LEDs (1, 2, 3, 4) lit on panel L-262A, 1-PIS-47-13, TB 729 column T3/J.																		
	SRO	<p>[40] IF startup is following refueling, THEN CONTINUE ascension to 90% RTP by performing the following:</p> <p>Step is marked as N/A</p>																		

Op Test No.: NRC Scenario # 6 Event # 1 Page 3 of 25

Event Description: Raise power after repairs to 1D CCW pump are complete.

Time	Position	Applicant's Actions or Behavior
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		<p>[41] BEFORE raising above 80% power, THEN ENSURE the following:</p> <p>[41.1] 1-LCV-6-106A controlling properly.</p> <p>[41.2] 1-LCV-6-105A and 105B are NOT open.</p>
<p style="text-align: center;">NOTES</p> <p>1) After operations less than 85% Reactor power for more than 2 weeks, Reactor Engineering evaluation of Hot Channel Factors per 1-SI-0-20 is required, before exceeding 90% power.</p> <p>2) Performing NIS check and adjustment relatively close to 100% power may eliminate the need to RE-PERFORM these actions upon reaching 100% power.</p>		
		<p>[42] WHEN power is at or above 95%, THEN PERFORM the following</p> <p>[42.1] ADJUST PR NIS per 1-SI-92-1, NIS Daily Comparison.</p> <p>[42.2] IF evaluation of Hot Channel Factors is required, THEN ENSURE 1-SI-0-20, COMPLETE.</p> <p>[42.3] ENSURE MIG performs 1-SI-68-30 within 24 hours after power stabilizes at 90% or above (N/A if NOT applicable).</p> <p>[42.4] ENSURE the following level controllers maintaining levels within normal ranges:</p> <p>A. Feedwater heaters.</p> <p>B. MSR drain tanks</p>
<p style="text-align: center;">NOTE</p> <p>Turbine is normally operated in IMP OUT control below 30% turbine load. IMP IN operation above 30% turbine load is permissible as long as the unit remains stable (e.g. no instabilities due to IMP IN operation.)</p>		
		<p>[42.5] IF desired to limit instabilities due to IMP IN operation at loads greater than 95%, THEN OBTAIN Unit SRO concurrence to operate in IMP OUT AND PLACE Turbine in IMP OUT.</p>
		<p>[43] IF this a startup following a refueling, THEN HOLD power between 94 and 98% to complete post-refueling testing.</p>
		<p>[44] IF startup is following refueling, THEN ENSURE applicable portions of the PETs are COMPLETE for full power operation.</p>
		<p>[45] CONTINUE ascension to 100% power by performing the following:</p>

Op Test No.: NRC Scenario # 6 Event # 1 Page 4 of 25

Event Description: Raise power after repairs to 1D CCW pump are complete.

Time	Position	Applicant's Actions or Behavior
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NOTES

- 1) TI-45, Determination of Preconditioned Reactor Power, identifies ramp rates, specific power levels where **HOLD** times are required, and control rod withdrawal limits.
- 2) Power escalation ramp rates and hold times should be per the most conservative of either the fuel pre-conditioning guidelines of TI-45 or the Turbine loading recommendations of SOI-47.02
- 3) Turbine load change may be stopped by depressing the HOLD push button, using VPL, or by depressing the MANUAL push button

[45.1] **IF** during any of the following steps the REFERENCE changes in an undesired manner **THEN ADJUST** VPL. to stop turbine load rise **OR PUSH** TURBINE MANUAL to place the turbine control mode in manual mode and **PROCEED** to section 5.6

[45.2] **CHECK** VALVE POS LIMIT light is **NOT** LIT.

[45.3] **SET** VALVE POSITION LIMIT at 100% or \leq to 5% above the Gov Control Indication.

[45.4] **SET** LOAD RATE at predetermined value.

[45.5] **PUSH** REFERENCE CONTROL Δ (raise) button to set desired load in SETTER display.

Cue Simulator Operator to insert Event 2.

Op Test No.: NRC Scenario # 6 Event # 2 Page 5 of 25

Event Description: ABGTS Fan drive failure during 0-SI-30-8-A surveillance performance. Requires Tech Spec Evaluation.

Time	Position	Applicant's Actions or Behavior
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Indications:

139-A ABGTS FAN A-A/B-B FLOW LO

	RO	Announces Window 139-A, ABGTS FAN A-A/B-B FLOW LO alarm when received.
	BOP	Determines that A-A ABGTS fan motor is running based on RED indicating light LIT on panel 0-M-25.
	SRO	Enters and directs actions of ARI 139-A ABGTS FAN A-A/B-B FLOW LO.
	SRO	May direct the BOP to shutdown the A-A ABGTS Fan using 0-SI-30-8-A, "Auxiliary Building Gas Treatment System Train A 10-hour Operation."

EXAMINER: The following actions are taken from ARI 139-A ABGTS FAN A-A/B-B FLOW LO.

	BOP	[1] IF selected for P-AUTO, THEN ENSURE standby ABGTS starts. <i>B-B ABGTS fan is in the A-AUTO position, so step is N/A.</i>
	SRO	[2] DETERMINE cause of failure, and INITIATE repairs if needed. <i>Report from the Auxiliary Building AUO is that the drive belt for the A-A ABGTS fan is broken. SRO should direct the BOP to stop the A-A ABGTS fan, using 0-SI-30-8 steps.</i>
	SRO	[3] REFER TO SOI-30.06, AUXILIARY BUILDING GAS TREATMENT SYSTEM (ABGTS).
	SRO	[4] REFER TO Tech Specs. <i>3.7.12 Auxiliary Building Gas Treatment System (ABGTS), Condition A: With one ABGTS train inoperable, restore the ABGTS train to OPERABLE status within 7 days.</i>

EXAMINER: The following actions are taken from 0-SI-30-8-A, "Auxiliary Building Gas Treatment System Train A 10-hour Operation," beginning at Step 15.

		[15] WHEN ABGTS Train A has operated continuously for at least 10 hours (600 min), THEN PERFORM the following: A. IF using Stop Watch, THEN PLACE 1-HS-30-146A, ABGTS FAN A-A [0-M-25], in STOP, simultaneous with stopping the Stop Watch. B. IF using meter, THEN PLACE 1-HS-30-146A, ABGTS FAN A-A [0-M-25], in STOP . C. ENSURE Suction and Discharge dampers, FCO-30-146A and FCO-30-146B, CLOSE.
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Op Test No.:	<u>NRC</u>	Scenario #	<u>6</u>	Event #	<u>2</u>	Page	<u>6</u>	of	<u>25</u>
Event Description:		ABGTS Fan drive failure during 0-SI-30-8-A surveillance performance. Requires Tech Spec Evaluation.							
Time	Position	Applicant's Actions or Behavior							

		[16] ENSURE 1-HS-30-146A, ABGTS Fan A-A in A AUTO.
	SRO	Crew Brief would typically be conducted for this event as time allows prior to the next event.
	SRO	Notifications should be addressed as applicable if not specifically addressed by the procedure or in the crew brief. <u>Operations Management</u> - Typically Shift Manager. <u>Maintenance Personnel</u> – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
Cue Simulator Operator to insert Event 3.		

Op Test No.: NRC Scenario # 6 Event # 3 Page 7 of 25

Event Description: TIC-62-78 letdown temp controller fails high. Requires ARI entry.

Time	Position	Applicant's Actions or Behavior
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Indications:

110-D LTDN TO DEMINS TEMP HI

247-B LTDN HX RET TEMP HI

	RO	Diagnoses and announces failure of 1-HIC-62-78, Letdown temperature controller.
	RO	May place 1-TIC-62-78 in MANUAL and control temperature.
	RO	May place 1-HS-62-79A, LTDN HI TEMP DIVERT, to the VCT position.
	BOP	Responds to ARI 247-B LTDN HX RET TEMP HI alarm
	SRO	Enters and directs actions of ARI 110-D, LTDN TO DEMINS TEMP HI.

EXAMINER: The following actions are taken from ARI 110-D, LTDN TO DEMINS TEMP HI.

	RO	[1] IF letdown temperature is greater than 137.5 °F on 1-TI-62-78 [1-M-6], THEN ENSURE CVCS demineralizers bypassed (lights above 1-HS-62-79 [1-M-6]).
	RO	[2] ENSURE letdown flow is 45 gpm to 120 gpm on 1-FI-62-82 [1-M-6].
	RO	[3] ENSURE charging flow is 57 gpm to 132 gpm on 1-FI-62-93A [1-M-5].
	RO	[4] ADJUST 1-HIC-62-78A to maintain letdown temperature less than 127 °F on 1-TI-62-78.
	SRO	[5] IF problem is due to loss of CCS, THEN REFER TO AOI-15, LOSS OF COMPONENT COOLING WATER (CCS).
	SRO	[6] NOTIFY Work Control to initiate corrective action, if necessary.
	RO	[7] WHEN ready to return to normal, THEN PLACE 1-HS-62-79A, LTDN HI TEMP DIVERT, in DEMIN position, and HOLD until 1-TCV-62-79 is fully open.

EXAMINER: The following actions are taken from ARI 247-B LTDN HX RET TEMP HI.

	BOP	[1] CHECK 1-TI-70-191, LTDN HX RET TEMP [0-M-27B]. BOP will request that the RO check 1-HIC-62-78A, LETDOWN HX OUTLET TEMP TCV-70-192 CNTL for proper operation.
	RO	[2] CHECK letdown flow and pressure and REDUCE letdown flow as necessary.

Op Test No.: NRC Scenario # 6 Event # 3 Page 8 of 25

Event Description: TIC-62-78 letdown temp controller fails high. Requires ARI entry.

Time	Position	Applicant's Actions or Behavior
	BOP	[3] CHECK 1-TCV-70-192 maintaining letdown temp at setpoint. <i>If not done previously, BOP will request that the RO check 1-HIC-62-78A, LETDOWN HX OUTLET TEMP TCV-70-192 CNTL for proper operation.</i>
	SRO	[4] START CCS Pump, or REDUCE CCS loads to maintain press between 40 and 108 psi on 1-PI-70-24A, CCS HX A SUP PRESS [0-M-27B].
	SRO	[5] ENSURE proper valve lineup through Ltdn Hx per SOI-70.01, Component Cooling Water (CCS).
	SRO	Crew Brief would typically be conducted for this event as time allows prior to the next event.
	SRO	Notifications should be addressed as applicable if not specifically addressed by the procedure or in the crew brief. <u>Operations Management</u> - Typically Shift Manager. <u>Maintenance Personnel</u> - Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
Cue Simulator Operator to insert Event 4.		

Op Test No.: NRC Scenario # 6 Event # 4 Page 9 25

Event Description: PZR press 1-PT-68-340 fails low. Requires Tech Spec Evaluation.

Time	Position	Applicant's Actions or Behavior
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Indications:

90-B PZR PRESS LO-DEVN BACKUP HTRS ON

124-C PZR PRESS LO

124-D PZR LO PRESS SI

	RO	Diagnose and announces failure of 1-PI-68-340, PZR PRESS downscale.
	RO	May refer to ARI 90-B PZR PRESS LO-DEVN BACKUP HTRS ON for actions.
	RO	May refer to ARI 124-C PZR PRESS LO for actions.
	SRO	Enters and directs actions of AOI-18, "Malfunction of Pressurizer Pressure Control System."

EXAMINER: The following actions are taken from ARI 90-B PZR PRESS LO-DEVN BACKUP HTRS ON.

		[1] CHECK PZR pressure on 1-PI-68-334 and -340 [1-M-5].
		[2] IF a PZR pressure channel has failed, THEN [a] PLACE PZR master controller 1-PIC-68-340A in manual control and stabilize pressure. [b] GO TO AOI-18, <i>MALFUNCTION OF PRESSURIZER PRESSURE CONTROL SYSTEM.</i>

EXAMINER: The following actions are taken from ARI 124-B PZR PRESS HI.

		[1] IF plant cooldown in progress, THEN ENSURE PZR low pressure SI is blocked (Window 69-B lit).
		[2] IF PZR pressure control system failure, THEN GO TO AOI-18, <i>MALFUNCTION OF PRESSURIZER PRESSURE CONTROL SYSTEM.</i>

EXAMINER: The following actions are taken from AOI-18, "Malfunction of Pressurizer Pressure Control System."**NOTE**

120 AC VITAL PWR BD 1-IV [breaker 2] supplies the plugmold power strip associated with both PZR spray valves and several other instruments required to respond to this event.

	RO	1. CHECK pressurizer pressure stable or trending to desired pressure: • 1-PI-68-340A, • 1-PI-68-334, • 1-PI-68-323, • 1-PI-68-322.
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Op Test No.: NRC Scenario # 6 Event # 4 Page 10 25

Event Description: PZR press 1-PT-68-340 fails low. Requires Tech Spec Evaluation.

Time	Position	Applicant's Actions or Behavior
		1. RESPONSE NOT OBTAINED: PLACE pZR master controller 1-PIC-68-340A in MANUAL and RESTORE press to normal.
	RO	2. CHECK 1-XS-68-340D selected to a failed controlling or backup channel.
	RO	3. RESTORE press control to normal: a. SELECT operable channels for control and backup with 1-XS-68-340D. b. ENSURE operable channel selected for recording with 1-XS-68-340B. c. ENSURE TR-68-2A placed to operable channel using 1-XS-68-2B, ΔT RCDR TR-68-2A LOOP SELECT [1-M-5]. d. WHEN Pressurizer pressure on program, THEN RETURN PZR master controller 1-PIC-68-340A to AUTO.
	SRO	4. NOTIFY Work Control to remove failed channel from service.
	SRO	5. **GO TO Step 17.
	SRO	17. REFER TO the following Tech Specs: 3.3.1 <i>Function 6. Overtemperature ΔT, Condition W, With one channel inoperable, place the channel in trip within 72 hours OR Be in Mode 3 within 78 hours.</i> <i>Function 8a. Pressurizer Pressure - Low, Condition X, With one channel inoperable, place the channel in trip within 72 hours, OR reduce THERMAL POWER to <P-7 within 78 hours.</i> <i>Function 8b. Pressurizer Pressure - High, Condition W, With one channel inoperable, place the channel in trip within 72 hours OR Be in Mode 3 within 78 hours.</i> 3.3.2 <i>Function 1.d, Pressurizer Pressure - Low, Condition D, With one channel inoperable, place the channel in trip within 72 hours OR be in Mode 3 within 78 hours AND be in Mode 4 within 84 hours.</i> <i>Function 8.b Pressurizer Pressure, P-11, Condition L, With one P-11 interlock channel inoperable, verify interlock is in required state for existing unit conditions within 1 hour OR be in Mode 3 within 7 hours AND be in Mode 4 within 13 hours.</i>
	SRO	Crew Brief would typically be conducted for this event as time allows prior to the next event.

Op Test No.: NRC Scenario # 6 Event # 4 Page 11 25

Event Description: PZR press 1-PT-68-340 fails low. Requires Tech Spec Evaluation.

Time	Position	Applicant's Actions or Behavior
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	SRO	Notifications should be addressed as applicable if not specifically addressed by the procedure or in the crew brief. <u>Operations Management</u> - Typically Shift Manager. <u>Maintenance Personnel</u> – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
Cue Simulator Operator to insert Event 5.		

Op Test No.: NRC Scenario # 6 Event # 5 Page 12 of 25

Event Description: Loss of 120 Vac Instrument Power Rack B (1-M-7).

Time	Position	Applicant's Actions or Behavior
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Indications:

15-E PNL 1-M-7 BREAKER TRIP.

Multiple related system alarms.

22-E GENERATOR AUX PNL ALARM (PNL-1-L-39)

50-B MFPT 1B ABNORMAL

52-C MFPT B AC CONTROL BUS UNDERVOLTAGE

166-F SEISMIC INSTRUMENTATION LOSS OF POWER

174-E 1-RR-90-1 AREA MONITORS INSTR Malf

175-E VAC PMP EXH 1-RM-119 INSTR Malf

179-D CCS HX A OUTLET 1-RM-123 INSTR Malf

185-D 0-RR-90-12 PARTICULATE MONITOR INSTR Malf

183-D AB VENT 0-RM-101 INSTR Malf

185-C SERV BLDG VENT 0-RM-132 INSTR Malf

180-C CCS HX C OUTLET 0-RM-123 INSTR Malf

	BOP	Diagnoses and announces the instrument power rack breaker trip.
	BOP	May dispatch the Turbine Building AUO to 1-L-39 to determine which alarms are in.
	BOP	May go to panel 1-M-7 to transfer Instrument Power Rack B from its normal to alternate supply.
	SRO	Enters and directs actions of ARI 15-E, PNL 1-M-7 BREAKER TRIP.

EXAMINER: The following actions are taken from ARI 15-E. "PNL 1-M-7 BREAKER TRIP."**EXAMINER: The report from the field will inform the crew that the cause of the loss of the normal supply was a "wrong unit" human error.**

		[1] CHECK panels and racks for tripped breaker.
		[2] IF normal supply is lost to a panel, THEN TRANSFER to alternate supply per: SOI-237.01, 120V ac Instrument Power 1A, SOI-237.02, 120V ac Instrument Power 1B, or SOI-238.01, 120V ac Preferred Power Systems as required.
		[3] NOTIFY Work Control to initiate corrective action, if necessary.

EXAMINER: The following actions are taken from SOI-237.02, "120V AC Instrument Power 1B," Section 8.1, "Transfer Instrument Power B Rack from Normal to Alternate Supply."

		[1] OBTAIN SRO approval.
		[2] VERIFY ALTERNATE FEEDER AVAILABLE Amber light LIT [Instrument Power B Rack Transfer Switch, 1-M-7].

NOTE

Instrument Power Rack Transfer Switch is break-before-make, and may cause a brief loss of potential during transfer.

Op Test No.: NRC Scenario # 6 Event # 5 Page 13 of 25

Event Description: Loss of 120 Vac Instrument Power Rack B (1-M-7).

Time	Position	Applicant's Actions or Behavior
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		<p>[3] REFER TO TABLE 8-1 for possible affects of temporary loss of potential to 120V Instrument Power B Rack:</p> <table><tr><th colspan="2">TABLE 8-1</th></tr><tr><th>FEEDS</th><th>POSSIBLE AFFECT</th></tr><tr><td>Aux Boilers</td><td>TRIP</td></tr><tr><td>Incore Monitoring</td><td>LOSS OF CIRCUIT</td></tr><tr><td>SGBD Release Path</td><td>LOSS OF CIRCUIT</td></tr></table>	TABLE 8-1		FEEDS	POSSIBLE AFFECT	Aux Boilers	TRIP	Incore Monitoring	LOSS OF CIRCUIT	SGBD Release Path	LOSS OF CIRCUIT
TABLE 8-1												
FEEDS	POSSIBLE AFFECT											
Aux Boilers	TRIP											
Incore Monitoring	LOSS OF CIRCUIT											
SGBD Release Path	LOSS OF CIRCUIT											
		[4] PLACE INSTRUMENT POWER B RACK TRANSFER SWITCH, in ALTERNATE FEEDER.										
	SRO	Crew Brief would typically be conducted for this event as time allows prior to the next event.										
	SRO	Notifications should be addressed as applicable if not specifically addressed by the procedure or in the crew brief. <u>Operations Management</u> - Typically Shift Manager. <u>Maintenance Personnel</u> – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).										
Cue Simulator Operator to insert Event 5. Additional events will occur after Event 5 is entered by the Console Operator.												

Op Test No.: NRC Scenario # 6 Event # 6 Page 14 of 25

Event Description: 1A MFP speed controller fails low. Requires trip of the 1A MFP and entry into AOI-16, "Loss of Normal Feedwater."

Time	Position	Applicant's Actions or Behavior
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Indications:

63-F SG LEVEL DEVIATION

Speed (rpm) indication for the 1A MFP pump dropping as indicated on 1-SI-46-20A MFPT A SPEED.

Pressure indication for 1A MFP dropping as indicated on 1-PI-3-66A MFWP A DISCH PRESS.

	BOP	Diagnoses and announces the reduction in speed on the 1A MFP.
	BOP	May place 1-SC-46-20A, MFPT A - SPEED CONTROL in MANUAL and attempt to increase 1A MFPT speed.
	SRO	Enters and directs actions of AOI-16, "Loss of Normal Feedwater," Section 3.7, "MFW pump speed control circuit failure."
EXAMINER: The following actions are taken from ARI 63-F SG LEVEL DEVIATION.		
	BOP	[1] DETERMINE which S/G has abnormal level. BOP determines ALL SG levels are abnormal.
	BOP	[2] CHECK steam flow/feed flow instrumentation to VERIFY level controls are restoring S/G levels to NORMAL .
	BOP	[3] IF level controls have malfunctioned, THEN [a] PLACE FW controls in manual. [b] RESTORE S/G level to normal and GO TO AOI-16, LOSS OF NORMAL FEEDWATER . SRO determines step is N/A.
	BOP	[4] IF MFPT speed controls have malfunctioned, THEN [a] PLACE MFPT speed controls in manual. [b] RESTORE MFW/MS ΔP to program AND GO TO AOI-16, LOSS OF NORMAL FEEDWATER . SRO directs the BOP to place the 1A MFPT speed control in MANUAL, and to raise pump speed.
	SRO	[5] INITIATE WO for corrective action, if necessary.
EXAMINER: The following actions are taken from AOI-16, "Loss of Normal Feedwater," Section 3.7, "MFW pump speed control circuit failure."		
	BOP	1. CHECK MFWPT speed controller(s) NORMAL .

Op Test No.: NRC Scenario # 6 Event # 6 Page 15 of 25

Event Description: 1A MFP speed controller fails low. Requires trip of the 1A MFP and entry into AOI-16, "Loss of Normal Feedwater."

Time	Position	Applicant's Actions or Behavior
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	BOP	<p>1. <u>RESPONSE NOT OBTAINED:</u></p> <p>CONTROL MFP speed using MANUAL control of master controller or individual controller(s) as required.</p> <p>(p) IF MANUAL control of individual MFWPT controller is ineffective, THEN TRIP affected MFWPT, and ** GO TO Section 3.4 or 3.5 as applicable.</p> <p><i>SRO will direct the BOP to manually trip the 1A MFP since it is not responding to changes made via 1-SC-46-20A, MFPT A - SPEED CONTROL</i></p>
EXAMINER: The following actions are taken from AOI-16, "Loss of Normal Feedwater," Section 3.5, "Loss of MFWP Greater Than or Equal To 800 MWe (67% Turbine Load)."		
		1. (p) IF loss of S/G level is imminent, THEN TRIP reactor, and ** GO TO E-0, Reactor Trip or Safety Injection.
		2. CHECK turbine load less than or equal to 1000 MWe (85%).
		3. PLACE tripped MFP recirc valve controller in MANUAL, and CLOSE recirc valve.
		4. CHECK turbine load less than 800 MWe (67%).
		<p>4. <u>RESPONSE NOT OBTAINED:</u></p> <p>ENSURE Standby MFWP running.</p> <p>(p) IF Standby MFWP NOT available, THEN REDUCE turbine load to less than 800 MWe with valve position limiter.</p>
		5. ENSURE MFWP speed rising to control S/G Δ -P and levels on program.
		<p>5. <u>RESPONSE NOT OBTAINED:</u></p> <p>Manually CONTROL MFWPT speed.</p>
EXAMINER: During the performance of AOI-16, "Loss of Normal Feedwater," the feedwater line in the common header downstream of the high pressure heaters will develop. The crew will initiate a manual reactor trip and close the #1 (High Pressure) feedwater isolation valves.		

Op Test No.: NRC Scenario # 6 Event # 7, 8 and 9 Page 16 of 25

Event Description: Feedwater line rupture downstream of the high pressure feedwater heaters. Automatic reactor trip does not occur. The RO attempts to initiate the reactor trip using handswitch RT-1 on 1-M-4. The RO must go to handswitch RT-2 on 1-M-6 to initiate the manual reactor trip.

Time	Position	Applicant's Actions or Behavior
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Indications:

Reactor power increasing on all Power Range indications.

RCS temperature dropping.

PZR level dropping.

PZR pressure dropping.

NO radiation changes on either the primary or secondary radiation monitors.

168-B TURB FDN SUMP LEVEL HI.

	BOP	Diagnoses and announces the feedwater line break.
	SRO	May direct the RO to trip the reactor, based on imminent loss of SG level.
	RO	Recognizes that the reactor did not trip automatically and initiates a manual reactor trip. Trips the reactor from handswitch RT-2 on 1-M-6, after handswitch RT-1 fails to operate.
	RO	Performs Immediate Operator Actions following the reactor trip.
	BOP	Performs Immediate Operator Actions following the reactor trip.
	SRO	Enters and directs actions of E-0, "Reactor Trip or Safety Injection."

EXAMINER: The following actions are taken from E-0, "Reactor Trip or Safety Injection."

NOTE 1 Steps 1 thru 4 are IMMEDIATE ACTION STEPS.

NOTE 2 Status Trees / SPDS should be monitored when transitioned to another instruction.

Critical Task 1

from WOG Critical Task List, E-0, A

Manually trip the reactor from the control room before manually tripping the turbine.

Manually tripping the turbine before the reactor is tripped will cause an unnecessary challenge to the steam generator PORV and Safety valves unless the reactor is tripped.

Critical Task 1	RO	1. ENSURE reactor trip: <ul style="list-style-type: none"> • Reactor trip and bypass breakers OPEN. • RPIs at bottom of scale. • Neutron flux DROPPING.
	RO	2. ENSURE Turbine Trip: <ul style="list-style-type: none"> • All turbine stop valves CLOSED.
	RO	3. CHECK 6.9 kV shutdown boards: <ol style="list-style-type: none"> At least one board energized from: <ul style="list-style-type: none"> CSST (offsite), OR D/G (blackout).

Op Test No.: NRC Scenario # 6 Event # 7, 8 and 9 Page 17 of 25

Event Description: Feedwater line rupture downstream of the high pressure feedwater heaters. Automatic reactor trip does not occur. The RO attempts to initiate the reactor trip using handswitch RT-1 on 1-M-4. The RO must go to handswitch RT-2 on 1-M-6 to initiate the manual reactor trip.

Time	Position	Applicant's Actions or Behavior
	RO	<p>4. CHECK SI actuated:</p> <p>a. Any SI annunciator LIT.</p> <p>b. Both trains SI ACTUATED.</p> <ul style="list-style-type: none"> • 1-XX-55-6C • 1-XX-55-6D
	SRO/RO	<p>4. RESPONSE NOT OBTAINED:</p> <p>DETERMINE if SI required:</p> <p>a. IF ANY of the following exists:</p> <ul style="list-style-type: none"> • S/G press less than 675 psig, OR • RCS press less than 1870 psig, OR • Cntmt press greater than 1.5 psig <p>THEN ACTUATE SI manually.</p> <p>IF SI NOT required, THEN ** GO TO ES-0.1,</p> <p>b. ACTUATE SI manually.</p>
<p>EXAMINER: The following actions are taken from ES-0.1, "Reactor Trip Response."</p>		
<p align="center">CAUTION</p> <p>Plant conditions, AFW pump start signals and flow requirements should be evaluated as time allows.</p>		
	RO	<p>1. MONITOR SI actuation criteria:</p> <ul style="list-style-type: none"> • IF SI actuation occurs during the performance of this Instruction, THEN ** GO TO E-0, Reactor Trip or Safety Injection.
	BOP	<p>2. CHECK Generator PCBs OPEN.</p>
	RO	<p>3. MONITOR RCS temperature stable at or trending to 557°F using:</p> <ul style="list-style-type: none"> • RCS Loop T-avg with any RCP running. OR • RCS Loop T-cold with RCPs out-of-service.

Op Test No.: NRC Scenario # 6 Event # 7, 8 and 9 Page 18 of 25

Event Description: Feedwater line rupture downstream of the high pressure feedwater heaters. Automatic reactor trip does not occur. The RO attempts to initiate the reactor trip using handswitch RT-1 on 1-M-4. The RO must go to handswitch RT-2 on 1-M-6 to initiate the manual reactor trip.

Time	Position	Applicant's Actions or Behavior
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	RO	<p>3. RESPONSE NOT OBTAINED:</p> <p>IF temperature is less than 557°F, THEN ENSURE steam dumps, S/G PORVs, and blowdown isolation valves CLOSED.</p> <p>IF cooldown continues, THEN ENSURE total feed flow is less than or equal to 500 gpm:</p> <ul style="list-style-type: none"> • REFER TO SOI-3.02, Auxiliary Feedwater System, for manual control of TDAFWP. • MAINTAIN at least one S/G NR level greater than 29%, or total feed flow between 410 and 500 gpm for heat sink. <p>IF cooldown continues after AFW flow is controlled, THEN:</p> <ul style="list-style-type: none"> • CLOSE MSIVs. • ENSURE MSIV bypasses CLOSED. • PLACE steam dump controls OFF. <p>IF temperature is less than 547°F after AFW is controlled, THEN INITIATE boration:</p> <ul style="list-style-type: none"> • REFER TO AOI-34, Immediate Boration. <p>IF temperature is greater than 564°F, THEN ENSURE either steam dumps, or S/G PORVs OPEN.</p> <p>WHEN cooldown is controlled, THEN RETURN AFW to AUTO as desired.</p>
	BOP	<p>4. ENSURE AFW operation:</p> <p>a. AFW established:</p> <ul style="list-style-type: none"> • Both MD AFW pumps RUNNING. • TD AFW pump RUNNING. • LCVs in AUTO or controlled in MANUAL. <p>b. Heat sink available:</p> <ul style="list-style-type: none"> • Total feed flow greater than 410 gpm, OR • At least one S/G NR level greater than 29%.
	BOP	<p>4. RESPONSE NOT OBTAINED:</p> <p>b. IF heat sink can NOT be established, THEN ** GO TO FR-H.1, Loss Of Secondary Heat Sink.</p>
<p>EXAMINER: The following actions are taken from FR-H.1, "Loss of Secondary Heat Sink."</p>		
<p style="text-align: center;">CAUTION</p> <ul style="list-style-type: none"> • If total feed flow CAPABILITY of 410 gpm is available, this Instruction should NOT be performed. • If an Intact S/G is available, feed flow should NOT be reestablished to any faulted S/G. 		
	RO	<p>1. CHECK if secondary heat sink is required:</p> <p>a. RCS pressure greater than any Intact S/G pressure.</p> <p>b. RCS temperature greater than 375°F [360°F ADV].</p>

Op Test No.: NRC Scenario # 6 Event # 7, 8 and 9 Page 19 of 25

Event Description: Feedwater line rupture downstream of the high pressure feedwater heaters. Automatic reactor trip does not occur. The RO attempts to initiate the reactor trip using handswitch RT-1 on 1-M-4. The RO must go to handswitch RT-2 on 1-M-6 to initiate the manual reactor trip.

Time	Position	Applicant's Actions or Behavior
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	RO	2. ENSURE at least one charging pump RUNNING.
<p style="text-align: center;">CAUTION</p> <p>RCS bleed and feed criteria must be monitored for immediate response if the criteria is exceeded.</p>		
	RO	<p>3. DETERMINE if RCS bleed and feed required:</p> <p>a. CHECK RCS bleed and feed required:</p> <ul style="list-style-type: none"> • Any THREE S/G WR levels less than or equal to 26% [36% ADV]. OR • RCS pressure greater than or equal to 2335 psig. <p>b. STOP all RCPs, and ** GO TO Cautions prior to Step 18 to initiate RCS bleed and feed.</p>
	RO	<p>3. RESPONSE NOT OBTAINED:</p> <p>a. MONITOR RCS bleed and feed criteria:</p> <p>WHEN criteria are met, THEN PERFORM Substep 3b.</p> <p>** GO TO step 4.</p>
	BOP	4. ENSURE S/G blowdown ISOLATED.
	BOP	5. MONITOR CST volume greater than 200,000 gal.
<p style="text-align: center;">NOTE</p> <p>If the use of condensate flow is anticipated, then a higher pZR level will better accommodate the level shrink from S/G cooldown and depressurization.</p>		
	RO	6. CONTROL pZR level between 29% and 63% [47% and 58% ADV].
<p>EXAMINER: Reports from the field are that the 1A-A MD AFW tripped on instantaneous overcurrent and the motor has suffered damage. There is a break on the discharge piping of the 1B-B MD AFW pump, which prevents flow to #3 and #4 SGs. The TD AFW pump will require a minimum of 4 hours to reassemble the trip and throttle valve and linkage. The feedwater line break prevents use of secondary pumps as a supply to the SGs.</p>		
	BOP	<p>7. ESTABLISH MD AFW pump flow:</p> <p>a. CHECK MD AFW pump AVAILABLE.</p> <p>b. ENSURE both MD AFW pumps RUNNING.</p> <p>c. ENSURE MD AFW LCVs OPEN.</p> <p>d. CHECK MD AFW pump flow greater than 410 gpm.</p> <p>e. CHECK NR level in at least one S/G greater than 29% [39% ADV].</p> <p>f. RETURN TO Instruction in effect.</p>
	BOP	<p>8. ESTABLISH TD AFW pump flow:</p> <p>a. CHECK TD AFW pump AVAILABLE.</p>

Op Test No.: NRC Scenario # 6 Event # 7, 8 and 9 Page 20 of 25

Event Description: Feedwater line rupture downstream of the high pressure feedwater heaters. Automatic reactor trip does not occur. The RO attempts to initiate the reactor trip using handswitch RT-1 on 1-M-4. The RO must go to handswitch RT-2 on 1-M-6 to initiate the manual reactor trip.

Time	Position	Applicant's Actions or Behavior
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	SRO	8. RESPONSE NOT OBTAINED: a. ** GO TO Step 9.
	RO	9. STOP all four RCPs.
	BOP	10. IF Secondary pumps will be used to feed S/Gs, THEN REFER TO Appendix A (FR-H.1), Establishing MFW following Reactor Trip, while continuing this Instruction. <i>Based on the location of the feedwater break, secondary pumps will NOT be used to fill the SGs.</i>
<p style="text-align: center;">CAUTION</p> <ul style="list-style-type: none"> • If offsite power is lost after SI reset, manual action will be required to restart the SI pumps and RHR pumps due to loss of SI start signal. • If plant conditions degrade after automatic SI is blocked, manual actuation may be required. 		
<p style="text-align: center;">NOTE</p> <p>After the low steamline pressure SI signal is blocked, main steamline isolation will occur if the high steam pressure rate setpoint is exceeded.</p>		
	RO	11. BLOCK SI signals: a. INITIATE RCS depressurization to less than 1912 psig: IF letdown in service, THEN ALIGN aux spray USING Appendix B (FR-H.1), ALIGN AUX SPRAY .
EXAMINER: The following actions are taken from Appendix B (FR-H.1), "ALIGN AUX SPRAY."		
	RO	1. ENSURE at least one charging pump running.
	RO	2. IF charging is not aligned, THEN ALIGN charging: a) CLOSE RCP seal flow control 1-FCV-62-89. b) OPEN charging isolation 1-FCV-62-90 and 1-FCV-62-91. c) ENSURE charging 1-FCV-62-85 or 1-FCV-62-86 OPEN.
<p style="text-align: center;">CAUTION</p> <p>If RCS is on cold leg recirc, seal return isolation valves should not be opened (prevents sump inventory from diverting to VCT).</p>		
	RO	d) OPEN seal return 1-FCV-62-61 and 1-FCV-62-63.
	RO	3. ENSURE BIT outlet valves 1-FCV-63-25 AND 1-FCV-63-26 CLOSED.
NOTE Aux spray flow can be maximized by closing the normal pwr spray valve(s).		

Op Test No.: NRC Scenario # 6 Event # 7, 8 and 9 Page 21 of 25

Event Description: Feedwater line rupture downstream of the high pressure feedwater heaters. Automatic reactor trip does not occur. The RO attempts to initiate the reactor trip using handswitch RT-1 on 1-M-4. The RO must go to handswitch RT-2 on 1-M-6 to initiate the manual reactor trip.

Time	Position	Applicant's Actions or Behavior
	RO	<p>4. CONTROL aux spray flow:</p> <p>a) OPEN aux spray 1-FCV-62-84.</p> <p>b) CLOSE charging 1-FCV-62-85 and 1-FCV-62-86.</p> <p>c) MODULATE Pzr Spray valves as needed to control Pzr pressure.</p> <p>d) ADJUST aux spray flow rate with 1-FCV-62-93 and 1-FCV-62-89 as needed.</p>
<p>EXAMINER: The following actions are the continuation of FR-H.1, Step 11</p>		
	RO	<p>b. BLOCK auto SI actuation signals [68-B], and [69-B]:</p> <p>1) NOTIFY IMs to block auto SI USING IMI-99.040, AUTO SI Block.</p> <p>2) WHEN RCS pressure is less than 1962 psig (P-11), THEN</p> <ul style="list-style-type: none"> • BLOCK low pzr pressure SI. • BLOCK low steam pressure SI. <p>c. ENSURE high cntmt pressure SI signal CLEARED [78-G].</p> <p>d. CHECK SI actuated.</p> <p>d. <u>RESPONSE NOT OBTAINED:</u></p> <p style="padding-left: 20px;">** GO TO Substep 11f.</p> <p>f. MAINTAIN RCS pressure less than 1912 psig.</p>
<p style="text-align: center;">NOTE</p> <ul style="list-style-type: none"> • Cycling reactor trip breakers to allow MFW Isolation reset is only required if SI or HI-HI S/G level has occurred. • If any valid SI signal has occurred since SI reset, cycling reactor trip breakers will initiate SI. 		
	BOP	<p>12. PREPARE for MFW startup:</p> <p>a. PLACE MFW pump controllers in MANUAL, and SET to zero.</p> <p>b. PLACE MFW reg valve controllers in MANUAL, and SET to zero.</p> <p>c. PLACE MFW reg bypass valve controllers in MANUAL, and SET to zero.</p> <p>d. CHECK FW bypass isolation valves OPEN.</p> <p><i>Based on the location of the feedwater break, MFPs will NOT be used to fill the SGs.</i></p>
<p style="text-align: center;">NOTE</p> <p>If the standby feed pump will be used, only the hotwell pumps should be started to prevent an overpressure condition.</p>		

Op Test No.: NRC Scenario # 6 Event # 7, 8 and 9 Page 22 of 25

Event Description: Feedwater line rupture downstream of the high pressure feedwater heaters. Automatic reactor trip does not occur. The RO attempts to initiate the reactor trip using handswitch RT-1 on 1-M-4. The RO must go to handswitch RT-2 on 1-M-6 to initiate the manual reactor trip.

Time	Position	Applicant's Actions or Behavior
	BOP	<p>13. ESTABLISH feedwater flow:</p> <p>a. START secondary plant pumps as necessary:</p> <ol style="list-style-type: none"> 1) Hotwell pumps. 2) Condensate booster pumps. 3) Cond DI booster pumps. <p>Based on the location of the feedwater break, secondary pumps will NOT be used to fill the SGs.</p>
	SRO	<p>13. a. <u>RESPONSE NOT OBTAINED:</u></p> <p>IF secondary plant pumps are NOT available, THEN ** GO TO Step 17.</p>
	RO	<p>17. DETERMINE if RCS bleed and feed required:</p> <p>a. MONITOR RCS bleed and feed criteria:</p> <ul style="list-style-type: none"> • Any THREE S/G WR levels less than or equal to 26% [36% ADV]. OR • RCS pressure greater than or equal to 2335 psig.
	SRO	<p>17. a. <u>RESPONSE NOT OBTAINED:</u></p> <p>RETURN TO Cautions prior to Step 1.</p> <p>The crew may return to the Cautions prior to Step 1, if SG wide range level has not dropped to the point where "Bleed-and-feed" criteria have not been met.</p>
<p>EXAMINER: When bleed and feed criteria are met, then the following steps will be performed.</p>		
<p style="text-align: center;">CAUTION</p> <ul style="list-style-type: none"> • Step 18 Through 20 must be performed quickly in order to establish RCS heat removal by RCS bleed and feed. • Termination of bleed and feed is required prior to transitioning out of FR-H.1 when heat sink is restored. 		
<p>Critical Task 2</p> <p>from WOG Critical Task List, FR-H.1 F.</p> <p>Initiate RCS bleed and feed so that the RCS depressurizes sufficiently for intermediate head injection to occur.</p> <p>Once the operator detects that secondary heat sink has degraded (SG wide range levels are less than or equal to 26%), RCS bleed and feed must be established to prevent or minimize core uncover due to inadequate core cooling.</p>		
Critical Task 2	RO	18. ACTUATE SI.
Critical Task 2	RO	<p>19. ENSURE at least one of the following RCS feed paths:</p> <ul style="list-style-type: none"> • At least one charging pump injecting thru BIT, OR • At least one SI Pump running with its injection valves open.

Op Test No.: NRC Scenario # 6 Event # 7, 8 and 9 Page 23 of 25

Event Description: Feedwater line rupture downstream of the high pressure feedwater heaters. Automatic reactor trip does not occur. The RO attempts to initiate the reactor trip using handswitch RT-1 on 1-M-4. The RO must go to handswitch RT-2 on 1-M-6 to initiate the manual reactor trip.

Time	Position	Applicant's Actions or Behavior
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CAUTION

- When the reactor vessel head vent block valve is opened, the throttle valve will cycle open and closed.
- Slowly opening (5 seconds stroke time) the head vent valve will prevent water hammer and pipe damage.

Critical Task 2

RO

20. **ENSURE** adequate RCS bleed path:
- a. **ENSURE** all pzs PORVs and pzs PORV block valves OPEN.

CAUTION

WHEN feedwater source is **AVAILABLE**, **THEN** feed rate will be controlled by Steps 30 and 31.

NOTE

The details of Steps 4 through 15 may be referred to as necessary to establish feed flow in the following step but procedure performance must continue to terminate RCS bleed and feed.

RO

21. **RESET** SI, and **CHECK** the following:
- SI ACTUATED permissive DARK.
 - AUTO SI BLOCKED permissive LIT.

RO

22. **RESET** Containment Isolation Phase A and Phase B.

BOP

23. **ENSURE** cntmt air in service:
- a. Aux air press greater than 75 psig [M-15].
 - b. Cntmt air supply valves OPEN [M-15]:
 - 1-FCV-32-80.
 - 1-FCV-32-102.
 - 1-FCV-32-110.

SRO

24. **PERFORM** Steps 1 through 6 of E-0, REACTOR TRIP OR SAFETY INJECTION, while continuing with this Instruction.

RO

25. **MAINTAIN** RCS bleed and feed paths:
- **MAINTAIN** charging pump injection thru BIT.
 - **MAINTAIN** SI pump flow.
 - **MAINTAIN** both pzs PORVs and block valves OPEN.

CAUTION

If containment pressure rises to greater than 2.8 psig, containment spray should be verified.

Op Test No.: NRC Scenario # 6 Event # 7, 8 and 9 Page 24 of 25

Event Description: Feedwater line rupture downstream of the high pressure feedwater heaters. Automatic reactor trip does not occur. The RO attempts to initiate the reactor trip using handswitch RT-1 on 1-M-4. The RO must go to handswitch RT-2 on 1-M-6 to initiate the manual reactor trip.

Time	Position	Applicant's Actions or Behavior
	RO	<p>26. DETERMINE if cntmt spray should be stopped:</p> <ul style="list-style-type: none"> a. Spray pumps running. b. MONITOR cntmt pressure less than 2.0 psig. c. RESET containment spray signal. d. STOP cntmt spray pumps and PLACE in A-AUTO. e. CLOSE cntmt spray discharge valves 1-FCV-72-2 and 1-FCV-72-39.
	RO	<p>26.a. RESPONSE NOT OBTAINED:</p> <ul style="list-style-type: none"> a. IF both spray pumps stopped, THEN ** GO TO Step 27.
	SRO	<p>27. WHEN RWST level is less than 34% THEN ** GO TO ES-1.3, TRANSFER TO RHR CONTAINMENT SUMP.</p>
	BOP	<p>28. ENSURE CCS alignment for RHR operation:</p> <ul style="list-style-type: none"> a. RHR heat exchanger B outlet 1-FCV-70-153 OPEN. b. RHR heat exchanger A outlet 1-FCV-70-156 OPEN. c. SFP heat exchanger A supply 0-FCV-70-197 CLOSED.
<p style="text-align: center;">NOTE</p> <p>The details of Steps 4 through 15 may be referred to as necessary to establish feed flow in the following step but procedure performance must continue to terminate RCS bleed and feed.</p>		
	SRO	<p>29. EVALUATE the following to restore level in at least one S/G:</p> <ul style="list-style-type: none"> a. AFW pumps. b. MFW pumps. c. Condensate pumps. d. ERCW valves to AFW suction. e. HPFP spool piece (AOI-7.06).
<p style="text-align: center;">CAUTION</p> <p>Feedwater flow rates should be controlled to prevent excessive RCS cooldown.</p>		
<p style="text-align: center;">NOTE</p> <p>If possible, a S/G should be selected to feed which has WR level greater than 15% [25% ADV] and RCS Loop WR hot leg temperature less than 550°F.</p>		
	BOP	<p>30. ESTABLISH feedflow to one Selected S/G:</p> <ul style="list-style-type: none"> a. Feed source – AVAILABLE
	SRO	<p>30.a. RESPONSE NOT OBTAINED:</p> <p>GO TO Step 33.</p>

Op Test No.: NRC Scenario # 6 Event # 7, 8 and 9 Page 25 of 25

Event Description: Feedwater line rupture downstream of the high pressure feedwater heaters. Automatic reactor trip does not occur. The RO attempts to initiate the reactor trip using handswitch RT-1 on 1-M-4. The RO must go to handswitch RT-2 on 1-M-6 to initiate the manual reactor trip.

Time	Position	Applicant's Actions or Behavior
	SRO	33. CHECK all RCS bleed and feed termination criteria met: <ul style="list-style-type: none">• At least one S/G NR level greater than 29% [39% ADV].• Incore T/C dropping.• T-hot dropping.
	SRO	33. <u>RESPONSE NOT OBTAINED:</u> CONTINUE RCS bleed and feed UNTIL all criteria met. CONTINUE actions to restore secondary heat sink. ** GO TO Note prior to Step 29.
EXAMINER: When the crew has addressed Step 33 RNO and determines that a return to Step 29 is required, inform them that another crew will continue from here.		
END OF SCENARIO		

SHIFT TURNOVER CHECKLIST

Page 1 of 2

SHIFT TURNOVER CHECKLIST 6									
Page _____ of _____									
<input type="checkbox"/> SM <input checked="" type="checkbox"/> US/MCR <input type="checkbox"/> UO <input type="checkbox"/> AUO <input type="checkbox"/> STA (STA Function)	Unit _____ Unit _____ Station _____		_____ <u>Off-going - Name</u> _____ <u>On-coming - Name</u>						
Part 1 - Completed by off-going shift/Reviewed by on-coming shift:									
<ul style="list-style-type: none"> • Abnormal equipment lineup/conditions: <u>TD AFWP is out of service to replace the trip-and -throttle valve and associated linkage. Tech Spec 3.7.5.B was entered for the TD AFWP 5 hours ago. Expected return to service is 9 hours. 1D CCW pump was shutdown in order to perform maintenance on the motor. Repairs have been completed and the pump is now available.</u> • SI/Test in progress/planned: (including need for new brief) <u>0-SI-30-8-A, "Auxiliary Building Gas Treatment System Train A 10-hour Operation" has been in progress for 9 hours.</u> • Major Activities/Procedures in progress/planned: <u>Unit 1 is at 75% power, BOL conditions, following the completion of repairs to the 1D CCW pump. A power escalation to the preconditioned power level of 96% is to be conducted using GOI-4, "Normal Power Operations." RCS boron concentration is 1128 ppm. Control Rod Bank D at 184 steps. Train A/Channel I Work Week.</u> • Radiological changes in plant during shift: <u>None planned</u> 									
Part 2 - Performed by on-coming shift									
<input type="checkbox"/> A review of the Operating Log since last held shift or 3 days, whichever is less. <input type="checkbox"/> A review of the Rounds sheets/Abnormal readings (AUOs only) Review the following for changes since last shift turnover: <table style="width: 100%; margin-top: 5px;"> <tr> <td><input type="checkbox"/> Standing Orders</td> <td><input type="checkbox"/> LCO(s) in actions (N/A for AUOs)</td> <td><input type="checkbox"/> PER review (N/A for AUOs)</td> </tr> <tr> <td><input type="checkbox"/> TACFs (N/A for AUOs)</td> <td><input type="checkbox"/> Operator workarounds, burdens</td> <td><input type="checkbox"/> Immediate required reading.</td> </tr> </table> <p style="text-align: center;">and other challenges</p>				<input type="checkbox"/> Standing Orders	<input type="checkbox"/> LCO(s) in actions (N/A for AUOs)	<input type="checkbox"/> PER review (N/A for AUOs)	<input type="checkbox"/> TACFs (N/A for AUOs)	<input type="checkbox"/> Operator workarounds, burdens	<input type="checkbox"/> Immediate required reading.
<input type="checkbox"/> Standing Orders	<input type="checkbox"/> LCO(s) in actions (N/A for AUOs)	<input type="checkbox"/> PER review (N/A for AUOs)							
<input type="checkbox"/> TACFs (N/A for AUOs)	<input type="checkbox"/> Operator workarounds, burdens	<input type="checkbox"/> Immediate required reading.							
Part 3 - Performed by both off-going and on-coming shift									
<input type="checkbox"/> A walkdown of the MCR control boards (N/A for AUOs) Relief Time: _____ Relief Date: _____									

SHIFT TURNOVER CHECKLIST

Page 2 of 2

SHIFT TURNOVER CHECKLIST			
<input type="checkbox"/> SM <input type="checkbox"/> US/MCR Unit _____ <input checked="" type="checkbox"/> UO Unit _____ <input type="checkbox"/> AUO Station _____ <input type="checkbox"/> STA (STA Function) _____		Page _____ of _____	_____ <u>Off-going - Name</u> _____ <u>On-coming - Name</u>
Part 1 - Completed by off-going shift/Reviewed by on-coming shift:			
<ul style="list-style-type: none"> • Abnormal equipment lineup/conditions: TD AFWP is out of service to replace the trip-and -throttle valve and associated linkage. Tech Spec 3.7.5.B was entered for the TD AFWP 5 hours ago. Expected return to service is 9 hours. 1D CCW pump was shutdown in order to perform maintenance on the motor. Repairs have been completed and the pump is now available. _____ _____ • SI/Test in progress/planned: (including need for new brief) 0-SI-30-8-A, "Auxiliary Building Gas Treatment System Train A 10-hour Operation" has been in progress for 9 hours. _____ _____ _____ • Major Activities/Procedures in progress/planned: Unit 1 is at 75% power, BOL conditions, following the completion of repairs to the 1D CCW pump. A power escalation to the preconditioned power level of 96% is to be conducted using GOI-4, "Normal Power Operations." RCS boron concentration is 1128 ppm. Control Rod Bank D at 184 steps. Train A/Channel I Work Week. _____ _____ • Radiological changes in plant during shift: _____ _____ _____ 			
Part 2 - Performed by on-coming shift			
<input type="checkbox"/> A review of the Operating Log since last held shift or 3 days, whichever is less. <input type="checkbox"/> A review of the Rounds sheets/Abnormal readings (AUOs only) Review the following for changes since last shift turnover: <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div> <input type="checkbox"/> Standing Orders <input type="checkbox"/> LCO(s) in actions (N/A for AUOs) </div> <div> <input type="checkbox"/> PER review (N/A for AUOs) </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div> <input type="checkbox"/> TACFs (N/A for AUOs) <input type="checkbox"/> Operator workarounds, burdens and other challenges </div> <div> <input type="checkbox"/> Immediate required reading. </div> </div>			
Part 3 - Performed by both off-going and on-coming shift			
<input type="checkbox"/> A walkdown of the MCR control boards (N/A for AUOs) <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div>Relief Time: _____</div> <div>Relief Date: _____</div> </div>			