

3/10

Facility: **Oconee**Scenario No.: **1**Op-Test No.: **1**

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

## Initial Conditions:

- 65% Reactor Power
- 1B1 RCP OOS

## Turnover:

- Place the 1A Main FDW Pump on Handjack

Event No.	Malf. No.	Event Type*	Event Description
0a	Pre-Insert AOR		Switch will not stop 1B2 RCP when directed by Rule 2
0b	Pre-Insert AOR		1HP-3 fails to close on ES
0c	Pre-Insert AOR		All turbine trips bypassed
1	Override	N, BOP, SRO	Place 1A Main Feedwater Pump on Handjack
2	MSS 200	C, BOP, SRO	Vacuum Leak
3	P8D58ZW	C, SRO	Safety shutdown of chiller (TS)
4	MPS 247	C, BOP, SRO	1B1 RCP lower seal fails (Requires pump shutdown)
5	MPI 281	I, OATC, SRO	ICS fails to re-ratio Feedwater
6	MPS 248 MPS 249	C, ALL	RCS Leak (1B1 RCP middle and upper seals fail) (TS)
7		R, OATC, SRO	Manual plant shutdown
8	Pre-Insert	C, OATC, SRO	Turbine fails to trip requiring EHC pumps lockout
9	MPS 400	M, ALL	SBLOCA (LOSCM to LOCA CD) 1HP-3 fails to close on ES Switch will NOT stop 1B2 RCP when directed by Rule 2
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

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Event Description: **Place 1A Main Feedwater Pump on Handjack: (N; BOP, SRO)**

Time	Position	Applicant's Actions or Behavior
	BOP	<p><b>Crew response:</b> OP/1/A/1106/002 B Enclosure 4.10 (Placing 1A FDWPT On Handjack)</p> <p>1. Ensure 1A MAIN FDW PUMP (ICS) in "HAND".</p> <p><b>NOTE:</b> Control of 1A FDWPT with 1A FDWPT Motor Speed Changer indicated when 1A FDWPT speed and/or suction flow decreases. Two successful decreases should be achieved to ensure control.</p> <p>2. Run 1A FDWPT Motor Speed Changer down to control 1A FDWPT.</p> <p><b>NOTE:</b> Handjack "ON" simulates Motor Gear Unit at high speed stop. When Handjack switch is placed to on FDWPT speed may increase ~40 rpm.</p> <p>3. Turn FDWPT 1A HANDJACK switch to "ON".</p> <p>4. 1A FDWPT speed now controlled with 1A FDWPT Motor Speed Changer.</p> <p>5. Record on Turnover Sheet control of 1A FDWPT on Motor Speed Changer.</p> <p>6. Place "T/O SHEET" CR tag on 1A MAIN FDW PUMP (ICS) station.</p>
		When the 1A Main FDW pump is on Handjack or when directed by the Lead Examiner this event is completed.

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Event Description: **Vacuum Leak: (C; BOP, SRO)**

Time	Position	Applicant's Actions or Behavior
	BOP SRO BOP	<p><b>Plant response:</b></p> <ul style="list-style-type: none"> <li>1SA-03/A-6, COND VACUUM LOW</li> <li>OAC alarm, Main Condenser Vacuum LOW</li> </ul> <p><b>Crew response:</b></p> <p>Refer to the ARG and AP/27, Loss of Condenser Vacuum.</p> <p>Refer to AP/27:</p> <ol style="list-style-type: none"> <li>Announce AP entry using PA system.</li> <li><b>IAAT</b> condenser vacuum is <math>\leq 22</math>" Hg, THEN trip RX.</li> <li>Dispatch operators to perform Encl. 5.1 (Main Vacuum Pump Alignment) and look for vacuum leaks.</li> </ol> <p><b>Cue: Notify CR that USING TIME COMPRESSION, Main Vacuum Pumps are aligned per Encl. 5.1.</b></p> <ol style="list-style-type: none"> <li>Start all Main Vacuum Pumps.</li> <li>Ensure 1V-186 is closed.</li> <li>Ensure Stm to Stm Air Eject A, B, C &gt; 255 psig.</li> <li>Verify Stm Seal Hdr Press &gt; 1.5 psig.</li> <li>Start 1D CCW pump to ensure all CCW pumps operating.</li> <li>Verify Condensate flow <math>\geq 2300</math> gpm.</li> <li><b>WHEN</b> condenser vacuum is stable, <b>AND</b> Encl 5.1 (Main Vacuum Pump Alignment) is complete, <b>THEN EXIT</b> this procedure.</li> </ol>
		When vacuum has been recovered or when directed by the Lead Examiner, the event is complete.

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Event Description: **Safety shutdown of Chiller: (TS, SRO)**

Time	Position	Applicant's Actions or Behavior
	BOP	<p><b>Plant response:</b></p> <ul style="list-style-type: none"> <li>1SA-06/E-10, AH CHILLER COMPRSSR PNL A/B TROUBLE, actuates.</li> </ul> <p><b>Crew response:</b></p> <ul style="list-style-type: none"> <li>1SA-06/E-10, AH CHILLER COMPRSSR PNL A/B TROUBLE, actuates. <ul style="list-style-type: none"> <li>Refer to AP/1-2/A/1700/036 (Degraded Control Room Area Cooling)</li> <li>Refer to Unit 2 OAC for computer alarm points and the following graphic displays: <ul style="list-style-type: none"> <li>➤ 2CHILA</li> <li>➤ 2CHILB</li> </ul> </li> </ul> </li> </ul> <p><b>Note: If asked Unit 2 will report that the “A” chiller has experienced a safety shutdown signal and has tripped on Low Evaporator Pressure.</b></p> <ul style="list-style-type: none"> <li>Contact Mechanical Maintenance HVAC Group, as required.</li> </ul>
	SRO/BOP	<p><b>Note: If asked Unit 2 will report that the “A” chiller has experienced a safety shutdown signal and has tripped on Low Evaporator Pressure.</b></p> <ul style="list-style-type: none"> <li>Contact Mechanical Maintenance HVAC Group, as required.</li> </ul>
	SRO	<ul style="list-style-type: none"> <li>AP/1-2/A/1700/036 <ul style="list-style-type: none"> <li>Notify HVAC to monitor and report status of Temporary Chiller designated for CRACS to CR SRO.</li> <li>Dispatch Operator to perform Encl 5.1 (Chiller Assessment and Restart).</li> </ul> </li> </ul> <p><b>Cue: USING TIME COMPRESSION you have found the “A” chiller tripped on a Safety Shutdown and have started the B chiller</b></p> <ul style="list-style-type: none"> <li>IAAT Control Room temperature exceeds 78°F, <b>THEN</b> initiate Encl 5.2 (Actions For High Control Room Temperature).</li> <li><b>WHEN</b> status of all Chillers is known, <b>THEN</b> continue procedure.</li> </ul> <p><b>Note: NEO will report that he found the “A” chiller tripped on a Safety Shutdown and has started the “B” chiller.</b></p> <ul style="list-style-type: none"> <li>Enter TS 3.7.16 (Control Room Area Cooling System) Condition B (Restore in 30 days)</li> </ul>
		<b>Event is complete when TS entry or when directed by the Lead Examiner.</b>

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Event Description: **1B1 RCP lower Seal Failure: (C, BOP, SRO)**

Time	Position	Applicant's Actions or Behavior
		<p><b>Plant response:</b></p> <ul style="list-style-type: none"> <li>• 1SA-06/C-5, RC PUMP 1B1 CAVITY PRESS HI/LOW</li> <li>• 1SA-06/C-6, RC PUMP 1B1 SEAL RETURN FLOW HI/LOW</li> </ul> <p><b>Crew response:</b></p> <p>Refer to the ARGs; Refer to AP/16</p> <p><u>Refer to AP/16</u> , Abnormal RCP Operations</p> <ul style="list-style-type: none"> <li>• Check if any Immediate Trip Criteria (ITC) met. RNO- (Go to step 4.12)</li> <li>• Announce AP entry on plant page</li> <li>• Notify OSM to request evaluation by RCP Component Engineer.</li> <li>• <b>IAAT</b> the failure is identified, <b>THEN GO TO</b> the applicable section: (GO TO Section <b>4A- Seal Failure</b>)</li> <li>• <b>IAAT</b> - Check for ITC. RNO- (Go to step 12 of Section 4A)</li> <li>• <b>IAAT</b> <u>any</u> of the following indicate external RCP seal leakage: <ul style="list-style-type: none"> <li>➤ RB RIAs increasing or in alarm (<b>RIA-4, 43 - 46</b>)</li> <li>➤ RCS Tave constant with LDST level decreasing more than normal</li> <li>➤ Quench Tank level rate increasing</li> <li>➤ RB Normal Sump rate increasing</li> </ul> </li> </ul> <p><b>THEN</b> initiate AP/02 (Excessive RCS Leakage).</p> <ul style="list-style-type: none"> <li>• Verify the following are open: <ul style="list-style-type: none"> <li>➤ 1HP-20</li> <li>➤ 1HP-21</li> </ul> </li> <li>• Verify 1HP-232 is open</li> <li>• <b>IAAT</b> Based on #1 seal delta P; <b>Go To</b> Step 16 to shutdown 1B1 RCP.</li> <li>• Verify Mode 1 or 2</li> <li>• Verify three RCPs will remain operating after affected RCP is tripped</li> </ul>
	BOP	
	SRO	
	SRO	
	BOP	

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Event Description: **1B1 RCP lower Seal Failure: (C, BOP/SRO)**

Time	Position	Applicant's Actions or Behavior
	BOP	<ul style="list-style-type: none"><li>• Verify Rx power is <math>\leq 70\%</math></li><li>• Verify <u>any</u> SG <u>not</u> on Low Level Limits</li><li>• Verify FDW masters in Auto</li><li>• <b>Stop 1B1 RCP</b></li><li>• Verify ICS re-ratios feedwater</li><li>• Initiate Encl 4.3 (Special Instructions for &lt; 4 RCP Operation) of OP/1/A/1102/004</li><li>• <b>IAAT</b> RCP has been shut down for &gt;30 minutes, THEN close the associated RCP motor cooler inlet/outlet valve (1LPSW-9 &amp; 10)</li></ul>
		<b>When the 1B1 RCP has been secured or when directed by the Lead Examiner, the event is complete.</b>

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Event Description: ICS fails to re-ratio Feedwater (I, OATC, SRO)

Time	Position	Applicant's Actions or Behavior
	OATC/SRO	<p><b>Plant response:</b></p> <p>When the 1B1 RCP is secured the <math>\Delta T_C</math> controller will fail at <math>\sim +3.8</math></p> <p>Feedwater flow will continue to increase to the 1A SG and decrease to the 1B SG causing the actual <math>\Delta T_C</math> to become increasingly negative.</p> <p><b>Crew response:</b></p> <p><u>AP/16</u> (Continued)</p> <ul style="list-style-type: none"> <li>Verify ICS re-ratios feedwater to establish <math>\approx 0^\circ F \Delta T_C</math>.</li> </ul> <p><b>NOTE: <math>\Delta T_C</math> controller will fail in auto and manual</b></p> <ul style="list-style-type: none"> <li>Place DELTA <math>T_C</math> station in HAND.</li> <li>Manually adjust DELTA <math>T_C</math> station to achieve <math>\approx 0^\circ \Delta T_C</math>.</li> </ul>
		<p style="text-align: center;"><b><u>CAUTION:</u></b></p> <p><u>Total</u> feedwater flow should be maintained constant to prevent changes in core reactivity.</p>
	SRO/OATC BOP	<ul style="list-style-type: none"> <li><b>IF</b> DELTA <math>T_C</math> station does <b>NOT</b> control, <b>THEN</b> perform the following: <ul style="list-style-type: none"> <li>Place the following in HAND: <ul style="list-style-type: none"> <li>➤ 1A FDW MASTER</li> <li>➤ 1B FDW MASTER</li> </ul> </li> </ul> </li> <li>Manually adjust FDW masters to achieve <math>\approx 0^\circ \Delta T_C</math>. <ul style="list-style-type: none"> <li>Initiate AP/28 (ICS Instrument Failure).</li> </ul> </li> <li>Initiate Encl 4.3 (Special Instructions for &lt; 4 RCP Operation) of OP/1/A/1102/004 (Operation at Power).</li> </ul> <p><u>AP/28</u></p> <ul style="list-style-type: none"> <li>Verify entry into AP/28: <ul style="list-style-type: none"> <li>Power &gt; 3%</li> <li>PTR actions taken <u>and</u> TPB <math>\leq</math> the pre-transient power level AND Delta TC has failed.</li> </ul> </li> </ul>
		When the plant is stable and SPOC has been notified, or when directed by the lead examiner this event is completed.

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Event Description: **ICS fails to re-ratio Feedwater (I, OATC, SRO)**

Time	Position	Applicant's Actions or Behavior
	OATC/SRO BOP	<p><b>Crew response:</b> <u>AP/28</u> (Continued)</p> <ul style="list-style-type: none"> <li>• Verify that current thermal power best is <math>\leq</math> pre-transient thermal power best and that the plant is stable.</li> <li>• Notify Rx Engineering to provide Control Room with a maneuvering plan.</li> <li>• <b>GO TO</b> the applicable section (4F – Delta Tc) per the following table: <b><u>4F - Delta Tc</u></b> <ul style="list-style-type: none"> <li>➤ Ensure the following in HAND: <ul style="list-style-type: none"> <li>• 1A FDW MASTER</li> <li>• 1B FDW MASTER</li> <li>• DELTA Tc</li> </ul> </li> <li>➤ Re-ratio feedwater flow, as required, to establish <math>\approx 0^{\circ}\text{F}</math> DELTA Tc while maintaining total feedwater flow constant.</li> <li>➤ Notify SPOC to perform the following: <ul style="list-style-type: none"> <li>• Investigate and repair the failed Delta Tc controller.</li> </ul> </li> <li>➤ <b>WHEN</b> notified by SPOC that Delta Tc controller has been repaired, <b>THEN GO TO</b> Encl 5.1 (Placing ICS in AUTO).</li> </ul> </li> </ul>
		<p><b>When the plant is stable and SPOC has been notified, or when directed by the Lead Examiner this event is completed.</b></p>



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Event Description: **RCS Leak - 1B1 RCP middle and upper seals fail, (C, All) (TS)**

Time	Position	Applicant's Actions or Behavior
	SRO/ OATC/ BOP	<p><b>Plant response:</b></p> <ul style="list-style-type: none"> <li>1B1 RCP lower pump cavity pressure will equal upper seal cavity pressure.</li> <li>LDST level will decrease as ~ 80 gpm will leak out of the RCS through the failed pump seals.</li> <li>Reactor Building Normal Sump level will increase.</li> </ul> <p><b>Crew response:</b></p> <p><u>AP16</u></p> <ul style="list-style-type: none"> <li>Per <b>IAAT</b> (Section 4A - Step 12), indication of external seal leakage, <b>THEN</b> initiate AP/2 (Excessive RCS Leakage).</li> </ul> <p><u>AP2</u></p> <ul style="list-style-type: none"> <li>Verify HPI operating.</li> <li><b>IAAT</b> RC makeup flow is &gt; 100 gpm, <b>AND</b> Pzr level is decreasing, <b>THEN</b> close 1HP-5.</li> <li><b>IAAT</b> RCS leakage &gt; NORMAL MAKEUP CAPABILITY with letdown isolated, <b>AND</b> Pzr level decreasing, <b>THEN</b> trip Rx.</li> <li>Initiate makeup to LDST using EOP Encl 5.5 (Pzr and LDST Level Control), as necessary</li> <li>Announce AP entry using the PA system.</li> <li>Make notifications to OSM, STA, &amp; RP</li> <li>Monitor OAC for leak trends/data</li> <li>Initiate <u>Encl 5.1</u> (Leak Rate Determination). Calculation of RCS Volume Loss: Leak Rate = <math>\frac{\text{MU}}{\text{MU}} + \frac{\text{SI}}{\text{SI}} - \frac{\text{LD}}{\text{LD}} - \frac{\text{TSR}}{\text{TSR}} = \underline{\hspace{2cm}}</math> Where: MU = Makeup Flow SI = Seal Inlet Hdr Flow LD = Letdown Flow TSR = Total Seal Return Flow</li> <li><b>Go To</b> Step 4.145 based on leakage from RCP seal failure</li> </ul>
		<b>When plant shutdown has been directed or when directed by the Lead Examiner this event is completed.</b>

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Event Description: **RCS Leak - 1B1 RCP middle and upper seals fail, (C, All) (TS)**

Time	Position	Applicant's Actions or Behavior
	BOP/SRO	<p><b>Crew response:</b></p> <p><u>AP2</u> (Continued)</p> <ul style="list-style-type: none"><li>• Discontinue pumping RBNS since leak &gt; 10 gpm</li><li>• <b>IAAT</b> leak rate &gt; TS, <b>THEN</b> initiate shut down by one of the following:<ul style="list-style-type: none"><li>• AP/29 (Rapid Unit Shutdown)</li><li>• OP/1/A/1102/004 (Operation At Power)</li><li>• OP/1/A/1102/010 (Controlling Procedure For Unit Shutdown).</li></ul></li></ul> <p><b>NOTE: Crew will use AP/29</b></p>
		<b>When plant shutdown has been directed or when directed by the Lead Examiner this event is completed.</b>

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Event Description: **Manual Reactor power decrease: (R, OATC, SRO)**

Time	Position	Applicant's Actions or Behavior
		<b>Crew response:</b> AP/29 (Rapid Unit Shutdown)
	SRO	<p style="text-align: center;"><b>NOTE</b></p> The CR SRO should read this procedure and it should NOT be used when EOP entry conditions exist.
	BOP	<ul style="list-style-type: none"> <li>Initiate Encl 5.1 (Support Actions During Rapid Unit Shutdown).</li> <li>Notify WCC SRO to initiate Encl 5.2 (WCC SRO Support During Rapid Unit Shutdown).</li> <li>Announce AP entry using the PA system.</li> <li>Verify ICS in AUTO.</li> </ul>
	OATC	<p><b>NOTE: ICS is in MANUAL. The OATC will use the Reactor Diamond and the FDW masters to reduce power.</b></p> <p><b>RNO: Initiate manual power reduction to desired power level.</b></p> <ul style="list-style-type: none"> <li>Verify both Main FDWPs operating.</li> <li>Verify 1B FDWP to be shut down first.</li> <li>Adjust the FWP bias counterclockwise to lower 1B FDWP suction flow ~ <math>1 \times 10^6</math> lb/hr &lt; 1A FDWP suction flow.</li> <li><b>IAAT</b> any of the following statalarms are received: <ul style="list-style-type: none"> <li>1SA-16/A-1 (FWP A FLOW MINIMUM)</li> <li>1SA-16/A-2 (FWP A FLOW BELOW MIN)</li> <li>1SA-16/A-3 (FWP B FLOW MINIMUM)</li> <li>1SA-16/A-4 (FWP B FLOW BELOW MIN),</li> </ul> </li> <li><b>AND</b> CTP &lt; 65% FP, <b>THEN</b> trip the associated FDWP.</li> <li>Maintain Pzr level between 220" - 250".</li> </ul>
		<b>When the OATC has reduced power ~ 10%, or when directed by the Lead Examiner this event is completed.</b>

**Note: Reactor will trip as a result of the SBLOCA in event 8.**

Time	Position	Applicant's Actions or Behavior
	<div>SRO</div> <div>OATC</div> <div>BOP</div>	<p><b>Plant response:</b></p> <ul style="list-style-type: none"> <li>• A SBLOCA will result in a reactor trip.</li> <li>• The Main Turbine should trip but does not. This will result in a reduction of steam pressure in both SGs until actions are taken to trip the turbine. This will result in RCS overcooling until the turbine is tripped.</li> </ul> <p><b>Crew response:</b></p> <ol style="list-style-type: none"> <li>1. SRO will enter the EOP.</li> <li>2. OATC will perform Immediate Manual Actions <ul style="list-style-type: none"> <li>• Depress REACTOR TRIP pushbutton</li> <li>• Verify reactor power &lt; 5% FP and decreasing</li> <li>• Depress turbine TRIP pushbutton.</li> <li>• Verify all turbine stop valves closed</li> </ul> </li> </ol> <p><b>Note: The OATC should diagnose that the turbine did not trip and then perform the RNO step which will stop and lock out both EHC pumps. This will cause the turbine to trip. (CT-18)</b></p> <ul style="list-style-type: none"> <li>• Verify RCP seal injection available.</li> </ul> <ol style="list-style-type: none"> <li>3. BOP will perform a symptom check and Rule 3 (Loss of Main or Emergency Feedwater) for a loss of Main Feedwater only.</li> </ol>
		<p><b>Event is complete when EHC pumps have been tripped or when directed by the Lead Examiner.</b></p>

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Event Description: **Small Break LOCA: (M, ALL)**

Time	Position	Applicant's Actions or Behavior
	SRO	<p><b>Plant response:</b></p> <ol style="list-style-type: none"> <li>1. Statalarms: <ul style="list-style-type: none"> <li>• 1SA-9/A-6, RB Reactor Bldg Norm Sump Level High/Low</li> <li>• 1SA-8/B-9, Process Radiation Monitor High</li> </ul> </li> <li>2. Control board indications: <ul style="list-style-type: none"> <li>• RBNS level increases</li> <li>• PZR level will decrease very slowly due to the leak and 1HP-5 being closed.</li> </ul> </li> </ol> <p><b>Crew response:</b></p> <p>The SRO will refer to EOP Subsequent Actions; Parallel Actions page.</p> <p>The SRO will receive Symptoms Check/Report from one of the ROs.</p> <p>The SRO will direct one of the ROs to perform EOP Encl. 5.1 (ES Actuation)</p> <p><b>Note: The RCS will eventually saturate with all HPI injecting.</b></p> <p>The SRO will provide concurrence to the other RO to perform Rule 2 – Loss of Subcooling Margin.</p> <ol style="list-style-type: none"> <li>1. Verify all control rods fully inserted.</li> <li>2. Verify Main FDW in operation.</li> <li>3. Verify Main FDW controlling properly.</li> <li>4. Verify TBVs controlling SG pressure <math>\approx</math> 1010 psig.</li> <li>5. Verify 1RIA-40 operable.</li> <li>6. Dispatch an operator with Encl 5.29 (MSRV Locations) to verify all MSRVs have reseated.</li> <li>7. Verify ES is required.</li> <li>8. Ensure ES 5.1 (ES Actuation) is in progress</li> </ol>

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Event Description: **Small Break LOCA: (M, ALL)**

Time	Position	Applicant's Actions or Behavior
	OATC/ BOP	1. When ES Channels 1 and 2 actuate, an operator should inform the SRO that ES Channels 1 and 2 have actuated.
	SRO	2. The SRO should direct initiation of EOP <b>Encl. 5.1, ES Actuation</b> per the Parallel Actions page of Subsequent Actions section or of the LOSCM Tab.
	OATC/ BOP	3. When running Encl. 5.1, the operator will: <ul style="list-style-type: none"> <li>Determine which ES channels should have actuated and verify all "Blue Lights" and "White Lights" are lighted for the appropriate channels.</li> <li>Place HPI in Manual.</li> <li>Verify Rule 2 in progress or complete.</li> <li>Determine NO RCPs operating and <b>GO TO</b> Step 8.</li> </ul> <p><b>Note: ES Channels 1-thru-6 may actuate due to High Reactor Building Pressure; therefore the ES Actuation Checklist may be performed in a staggered fashion as the various ES Channels are actuated.</b></p> <ul style="list-style-type: none"> <li>Place LPI pumps and 1LP-17/18 in manual control.</li> </ul>
		<p style="text-align: center;"><b><u>CAUTION</u></b></p> <p>LPI pump damage may occur if operated in excess of 30 minutes against a shutoff head.</p> <ul style="list-style-type: none"> <li><b>IAAT</b> <u>any</u> LPI pump is operating against a shutoff head, THEN at the CR SRO's discretion, stop <u>affected</u> LPI pumps</li> <li>Ensure A &amp; B and 3A &amp; 3B Outside Air Booster Fans are operating. <b>(CT-27)</b></li> <li>Verify 1CF-1/2 open.</li> <li>Verify 1HP-410 closed.</li> <li>Secure makeup to the LDST.</li> <li>Verify all ES Channel 1- 4 components are in the ES position.</li> </ul> <p><b>Note: 1HP-3 will not close. The operator should diagnose this and perform the RNO and close 1HP-1 located on 1UB1.</b></p> <ul style="list-style-type: none"> <li>Close 1LPSW-139</li> <li>Fail Open 1LPSW-251/252</li> <li>Open 1LPSW-4/5</li> <li>Dispatch an operator to perform Encl. 5.2 (Placing RB Hydrogen Analyzers In Service)</li> <li>Notify U2 CR SRO that SSF is inoperable due to OTS1-1 open.</li> <li>The operator must get SRO approval to exit this enclosure.</li> </ul>

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Event Description: **Small Break LOCA: (M, ALL)**

Time	Position	Applicant's Actions or Behavior
		<p><b>Plant response:</b></p> <ul style="list-style-type: none"> <li>RCS subcooling margin (<u>any</u>) will = 0°F.</li> </ul> <p><b>Crew response:</b></p> <ol style="list-style-type: none"> <li>The BOP/OATC should inform the SRO that the RCS has saturated and obtain SRO concurrence to perform <b>Rule #2, Loss of SCM</b>. <ul style="list-style-type: none"> <li>Verify that reactor power is &lt; 1%.</li> <li>Stop <u>all</u> RCPs (within 2 min of LOSCM) <b>(CT-1)</b></li> </ul> </li> </ol> <p><b>Note: 1B2 RCP will not trip from the switch. RNO will be performed to de-energize 1TA and 1TB (6.9KV switchgear).</b></p> <ul style="list-style-type: none"> <li>Notify CR SRO of RCP status.</li> <li>Verify that HPI is performing as required and notify CR SRO of HPI status.</li> <li>Verify that LPI flow in both headers is &lt; 3400 gpm.</li> <li>Verify that TBVs are available.</li> <li>Select OFF for both digital channels on AFIS HEADER A and B.</li> <li>Start both MD EFDW pumps and establish 300 gpm to each SG. Feed to LOSCM SP per Rule 7 (SG Feed Control). <b>(CT-10)</b></li> <li>Verify both MDEFDWP operating.</li> <li>Ensure TDEFDWP is in PULL TO LOCK.</li> <li>Trip both MFDWPs and close the FDW block valves (FDW-33, 31, 42, 40)</li> <li>Notify SRO of SG feed status.</li> <li>Maintain SG pressure &lt; RCS pressure using TBVs.</li> <li>Ensure <b>Rule 3</b> is in progress or complete.</li> </ul>
	SRO	
	BOP/ OATC	

Op-Test No.: \_\_\_\_\_

Scenario No.: 1

Event No.: 9

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Event Description: **Small Break LOCA: (M, ALL)**

Time	Position	Applicant's Actions or Behavior
	SRO	<p>3. The <b>SRO</b> should <b>GO TO</b> the <b>LOSCM Tab</b> per the <b>Parallel Actions</b> page of the EOP Subsequent Actions section. LOSCM Tab will:</p> <ul style="list-style-type: none"> <li>• Ensure that Rule #2 is in progress or complete.</li> <li>• Verify that station ASW is NOT feeding any SG.</li> <li>• Verify that the LOSCM is NOT caused by excessive heat transfer.</li> <li>• Verify transfer to LOCA CD tab not required due to no LPI flow.</li> <li>• Verify that the SSF is NOT activated.</li> <li>• Verify <u>all</u> the following conditions exist: <ul style="list-style-type: none"> <li>➤ NO RCPs are operating</li> <li>➤ HPI flow exists in both HPI headers</li> <li>➤ Adequate Total HPI flow per figure 1 (Total Required HPI Flow)</li> </ul> </li> <li>• Open 1AS-40 while closing 1MS-47.</li> <li>• Control steaming and feed rates on <u>all intact</u> SGs to maintain cooldown rate within Tech Spec limits: <ul style="list-style-type: none"> <li>➤ <math>T_c \geq 280^\circ\text{F}</math>    <math>\leq 50^\circ\text{F}/\frac{1}{2}</math> hour</li> <li>➤ <math>T_c &lt; 280^\circ\text{F}</math>    <math>\leq 25^\circ\text{F}/\frac{1}{2}</math> hour</li> </ul> </li> <li>• Utilize TBVs</li> <li>• <b>GO TO Step 92.</b></li> <li>• Close 1RC-4 (No HPI forced cooling in progress)</li> <li>• Close 1GWD-17, 1HP-1, 1HP-2, 1RC-3.</li> <li>• Maintain SG pressure &lt; RCS pressure utilizing either TBVs or ADVs (TBVs).</li> <li>• Verify primary to secondary heat transfer exists.</li> <li>• Initiate Encl 5.16 (SG Tube-to-Shell <math>\Delta T</math> Control).</li> <li>• Verify CETCs increasing.</li> <li>• Verify required RCS makeup flow NOT within normal makeup capability.</li> <li>• <b>GO TO LOCA CD tab.</b></li> </ul>



Op-Test No.: \_\_\_\_\_

Scenario No.: 1

Event No.: 9

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Event Description: **Small Break LOCA: (M, ALL)**

Time	Position	Applicant's Actions or Behavior
	SRO	<p><b>Crew response:</b></p> <p>LOCA CD tab:</p> <ol style="list-style-type: none"> <li>Ensure all RBCUs in low speed. <ul style="list-style-type: none"> <li>Open 1LPSW-18.</li> <li>Open 1LPSW-21.</li> <li>Open 1LPSW-24.</li> </ul> </li> <li>Initiate Encl 5.35 (Containment Isolation).</li> <li>Start all RB Aux fans.</li> <li>Initiate Encl 5.36 (Equipment Alignment For Plant Shutdown).</li> <li>Select OFF for both digital channels on AFIS HEADER A and B.</li> <li>Notify Chemistry to sample the RCS boron hourly</li> <li>Initiate determination of minimum required boron concentration for MODE 5 using either of the following: <ul style="list-style-type: none"> <li>Reactor Engineer</li> <li>PT/1/A/1103/015 (Reactivity Balance Procedure)</li> </ul> </li> <li>Initiate steaming all intact SGs to cooldown to cooldown plateau at <math>\leq 50^{\circ}\text{F}/\frac{1}{2}</math> hr using either of the following: <ul style="list-style-type: none"> <li>TBVs</li> <li>ADV's</li> </ul> </li> </ol>
		<b>Event and exam is complete when directed by the Lead Examiner.</b>

**CRITICAL TASKS**

1. CT-18, Turbine Trip
2. CT-1, Trip All RCPs
3. CT-10, Establish FW Flow and Feed SGs
4. CT-27, Implementation of Control Room Habitability Guidance



3/10

Facility: **Oconee**Scenario No.: **2**Op-Test No.: **1**

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Initial Conditions:

- 100% Reactor power

Turnover:

- SASS in Manual
- ICS in manual and ready to return to Auto

Event No.	Malf. No.	Event Type*	Event Description
0a	Pre-Insert		SASS in Manual
0b			ICS in Manual
1		N, OATC, SRO	Place ICS in Auto
2	Override Updater	C, BOP, SRO	Operating LPSW Pump trips and Standby fails to start (TS)
3	MPI021	C, BOP, SRO	Inadvertent ES Channels 1 and 2 actuation (TS)
4	MPS360	C, OATC, SRO	1HP-31 (RCP Seal Flow Control) fails OPEN in AUTO
5	Override MSS 460	C, BOP, SRO	1A CBP Trip and 1B CBP fails to Auto Start.
6	MCS 004	I, OATC, SRO	Controlling Tave fails high
7	MSS 010 MSS 020 MSS 260 MSS 270	M, ALL	Loss of Main and Emergency Feedwater LOHT Tab CBP feed
8	Override	ALL	CBPs trip / HPI Forced cooling 1HP-26 fails to open HPI CD Tab
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

DRAFT

Op-Test No.: 1

Scenario No.: 2

Event No.: 1

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Event Description: **Place ICS in AUTO: (C; OATC, SRO)**

Time	Position	Applicant's Actions or Behavior
	OATC/SRO	<p><b>Crew response:</b> OP/1/A/1102/004 A Encl. 4.4 will direct the OATC to:</p> <ol style="list-style-type: none"> <li>1. Ensure "RATE SET" thumbwheels at 0.0.</li> <li>2. <b>IF</b> TURBINE MASTER is in "HAND", perform Section 3 (Placing Turbine To Auto).  <b>3.1 IF</b> THP (O1E2088) is different from THP Setpoint (O1E2089) by more than <math>\pm 2</math> psig, perform the following: <ul style="list-style-type: none"> <li>• <u>Simultaneously</u> ensure 1A and 1B FDW MASTER in "HAND"</li> <li>• Ensure DIAMOND in "MANUAL".</li> <li>• Ensure TURBINE MASTER in "HAND"</li> <li>• Ensure 1A and 1B TURBINE BYPASS VALVES in "HAND"</li> <li>• On TURBINE MASTER adjust THP Setpoint (O1E2089) to <math>\approx</math> selected THP (O1E2088).</li> <li>• Place TURBINE MASTER in "AUTO".</li> <li>• Verify TURBINE MASTER controlling THP.</li> <li>• Return to Section 2 (Procedure).</li> </ul> </li> <li>3. <b>IF</b> either TBV is in "HAND", perform Section 4 (Placing TBV To Auto). <ul style="list-style-type: none"> <li>• TBVs are in AUTO</li> </ul> </li> <li>4. <b>IF</b> REACTOR MASTER <b>OR</b> DIAMOND is in manual, perform Section 5 (Placing Rx To Auto).  <b>IF</b> Rx Master is in "HAND", perform the following: <ul style="list-style-type: none"> <li>• Ensure DIAMOND is in "MANUAL".</li> <li>• Place REACTOR MASTER to "AUTO".</li> <li>• <b>IF</b> selected Tave (O1E2086) is different from Tave setpoint (O1E2087) by more than <math>\pm 0.3^{\circ}\text{F}</math>, perform the following: <ul style="list-style-type: none"> <li>• <u>Simultaneously</u> ensure 1A and 1B FDW MASTER in "HAND"</li> <li>• On REACTOR MASTER adjust Tave setpoint (O1E2087) towards selected Tave (O1E2086).</li> <li>• Verify selected Tave is within <math>\pm 0.3^{\circ}\text{F}</math> of Tave setpoint.</li> <li>• Place DIAMOND in "AUTO".</li> <li>• Return to Section 2 (Procedure).</li> </ul> </li> </ul> </li> <li>5. <b>IF</b> DELTA Tc is in "HAND", perform Section 6 (Placing DELTA Tc To Auto). <ul style="list-style-type: none"> <li>• DELTA Tc is in "AUTO"</li> </ul> </li> </ol>
		<b>When the ICS has been placed in AUTO, or when directed by the Lead Examiner this event is completed.</b>

Op-Test No.: 1

Scenario No.: 2

Event No.: 1

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Event Description: **Place ICS in AUTO: (C; OATC, SRO)**

Time	Position	Applicant's Actions or Behavior
	OATC/SRO	<p><b>Crew response:</b></p> <p>6. <b>IF</b> STM GENERATOR MASTER or either FDW MASTER is in "HAND", perform Section 7 (Placing FDW To Auto).  <b>IF</b> SG Master is in "HAND", perform the following:</p> <ul style="list-style-type: none"> <li>• SG Master is in AUTO.</li> </ul> <p><b>IF</b> either 1A <b>OR</b> 1B FDW Master is <b>NOT</b> in "AUTO", perform the following:</p> <ul style="list-style-type: none"> <li>• Select 1A <b>and</b> 1B FDW MASTER to "MEAS VAR"</li> <li>• <b>IF</b> both 1A <b>and</b> 1B FDW Master Measured Variables are on the caret:</li> <li>• Select 1A and 1B FDW MASTER to "POS"</li> <li>• Simultaneously ensure 1A and 1B FDW MASTER in "AUTO"</li> </ul> <p>7. <b>IF</b> any FDW valves are in "HAND", perform Section 8 (Placing FDW Valves To Auto).</p> <ul style="list-style-type: none"> <li>• All FDW valves are in AUTO</li> </ul> <p>8. <b>IF</b> either Main FDW Pump is in "HAND", perform Section 9 (Placing Main FDW Pumps To Auto).</p> <ul style="list-style-type: none"> <li>• Both FDW pumps are in AUTO.</li> </ul> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p><b>NOTE:</b> ICS must be in full auto before adjusting any setpoint to minimize possible CTP changes. (R.M.)</p> </div> <p>9. The <u>SRO</u> will verify ICS in full Auto.</p>
		When the ICS has been placed in AUTO, or when directed by the Lead Examiner this event is completed.

Op-Test No.: 1

Scenario No.: 2

Event No.: 2

Page 1 of 1

Event Description: **Operating LPSW pump trips, Standby fails to auto start:  
(C, BOP, SRO) (TS)**

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	<p><b>Plant response:</b></p> <ul style="list-style-type: none"> <li>1SA-9/A-9 (LPSW Header A Press Low)</li> <li>LPSW Header A/B Pressure Low - guage</li> </ul> <p><b>Crew response:</b></p> <ul style="list-style-type: none"> <li>Refer to ARG for 1SA-9/A-9 (LPSW Header A/B Press Low) <ul style="list-style-type: none"> <li>➤ Refer to AP/24 (Loss of LPSW)</li> </ul> </li> </ul> <p><b>AP/24 (Loss of LPSW)</b></p> <ul style="list-style-type: none"> <li>Verify Unit 1 is going to handle LPSW system operations.</li> <li>Determine no LPSW pump is cavitating</li> <li>Start available (NOT previously cavitating) LPSW pumps, as necessary, to raise LPSW header pressure.</li> <li>Verify normal LPSW System operation is restored.</li> </ul>
	SRO	<p><b>Note: The SRO should direct a call to SPOC to troubleshoot the reason for the LPSW pump tripping and the Auto Start failure.</b></p> <p>The SRO should refer to TS:</p> <ul style="list-style-type: none"> <li><b>TS 3.7.7</b> (Low Pressure Service Water System) Condition "A" applies. Restore required LPSW pump to operable status. 72 hours completion time.</li> <li><b>TS 3.3.28</b> (LPSW pump Auto-Start Circuitry) Condition "A". Restore Auto-Start Circuitry to operable. 7 day completion time.</li> </ul>
		<b>Event is complete when SRO has referred to TS or when directed by the Lead Examiner.</b>

Op-Test No.: 1

Scenario No.: 2

Event No.: 3

Page 1 of 3

Event Description: **Inadvertent ES Channels 1 and 2 actuation: (C, BOP/SRO)**

Time	Position	Applicant's Actions or Behavior
		<b>Plant response:</b>  Statalarms: <ul style="list-style-type: none"> <li>• 1SA-1/A-10, ES CHANNEL 1 TRIP</li> <li>• 1SA-1/B-10, ES CHANNEL 2 TRIP</li> </ul> Control Board indications: <ol style="list-style-type: none"> <li>1. ES Channel 1 and 2 actuate</li> <li>2. HPI Injection</li> <li>3. Letdown isolated</li> <li>4. Keowee emergency start</li> </ol> <b>Crew response:</b> <ol style="list-style-type: none"> <li>1. Determine that ES actuation was NOT valid and inform the SRO.</li> <li>2. Crew may perform Plant Transient Response.</li> <li>3. The SRO should enter AP/42 (Inadvertent ES Actuation)</li> <li>4. AP/1/A/1700/042 (Inadvertent ES Actuation) Actions:               <ul style="list-style-type: none"> <li>• Place HPI in MANUAL on RZ Modules</li> <li>• Throttle HPI</li> <li>• Secure the 1C HPI pump and close 1HP-26</li> <li>• Close 1HP-24 and 1HP-25</li> <li>• Direct the BOP to perform Encl. 5.1 (Side Board Action)</li> <li>• Notify the OSM and STA</li> <li>• Direct the OATC to perform Encl. 5.2 (Letdown Restoration)</li> </ul> </li> </ol>
	BOP	
	ALL	
	SRO	
	BOP	



Op-Test No.: 1

Scenario No.: 2

Event No.: 4

Page 2 of 3

Event Description: **Inadvertent ES Channels 1 and 2 actuation: (C, BOP/SRO)**

Time	Position	Applicant's Actions or Behavior
	BOP	<b>Crew response:</b> 5. BOP will perform Encl. 5.1 (Side Board Action) <ul style="list-style-type: none"> <li>• Open 1HP-20 and 1HP-21 (Seal Return)</li> <li>• Open 1HP-228, 226, 232, and 230 (Seal Return Stop)</li> <li>• Place the following in MANUAL on the RZ Module and OPEN:               <ul style="list-style-type: none"> <li>• 1PR-7, 1PR-9 (RB RIAs)</li> <li>• 1PR-8, 1PR-10 (RB RIAs)</li> </ul> </li> <li>• Start the 1RIA-47 RB RIA sample pump from the ENABLE CONTROLS screen on the RIA View Node.</li> </ul>
	OATC	6. Encl. 5.2 (Letdown Restoration) <ul style="list-style-type: none"> <li>• Verify CC pump operating</li> <li>• Verify letdown is isolated</li> <li>• Close 1HP-5 (LETDOWN ISOLATION)</li> <li>• Open 1HP-1, 1HP-2, 1HP-3, and 1HP-4 (1A and 1B Letdown Cooler Inlet and Outlet)</li> <li>• Close 1HP-6 (LETDOWN ORIFICE STOP)</li> <li>• Close 1HP-7 (LETDOWN CONTROL)</li> <li>• Open 1HP-5 (LETDOWN ISOLATION)</li> <li>• Adjust 1HP-7 for <math>\approx 20</math> gpm letdown</li> <li>• Open 1HP-6 (LETDOWN ORIFICE STOP)</li> <li>• Adjust 1HP-7 to control desired letdown flow (75 gpm)</li> </ul>

Op-Test No.: 1

Scenario No.: 2

Event No.: 4

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Event Description: **Inadvertent ES Channels 1 and 2 actuation: (C, BOP/SRO)**

Time	Position	Applicant's Actions or Behavior
	SRO	<p><b>Crew response:</b></p> <p>7. AP/42 (Inadvertent ES Actuation) Actions (Continued)</p> <ul style="list-style-type: none"> <li>• Verify ICS in AUTO</li> <li>• Initiate a power decrease to maintain control rods within the desired band by adjusting rate set as necessary and decrease CTP demand setpoint.</li> <li>• Notify Chemistry for RCS and LDST boron sample</li> <li>• Notify Rx Engineering to develop a maneuvering plan</li> <li>• Place LOAD SHED &amp; STBY BKR 1 and 2 in MANUAL on the RZ Module</li> <li>• Dispatch an operator to perform Encl. 5.3 (SSF Restoration)</li> <li>• Notify SPOC to investigate and repair the failed ES components</li> <li>• <b>IAAT</b> Rx power is stable THEN initiate evaluation of NI operability in accordance with OP/1/A/1102/004 (Operation At Power) Limits and Precautions.</li> <li>• Initiate logging TS/SLC Entry/Exit as applicable, IAW <b>Encl. 5.4 (TS/SLC Requirements) (TS)</b> <ul style="list-style-type: none"> <li>○ TS 3.3.7 – ESPS Digital Automatic Actuation Logic Channels</li> <li>○ TS 3.3.6 – ESPS Manual Instrumentation</li> <li>○ TS 3.4.15 – RCS Leakage Detection Instrumentation (can be exited once Encl. 5.1, Side Board Actions completed)</li> <li>○ TS 3.10 – SSF due to SSF power loss (ES Ch. 1)</li> </ul> </li> <li>• <b>WHEN</b> all the following exist: <ul style="list-style-type: none"> <li>○ Cause of inadvertent ES resolved</li> <li>○ ES Channel reset is desired</li> <li>○ OSM concurs</li> </ul> <p><b>THEN</b> continue.</p> </li> </ul>
		<b>When plant is stable and Letdown has been restored, or when directed by the Lead Examiner the event is completed.</b>

Op-Test No.: 1

Scenario No.: 2

Event No.: 4

Page 1 of 1

Event Description: **1HP-31 Fails Open: (C; OATC, SRO)**

Time	Position	Applicant's Actions or Behavior
	OATC/SRO	<p><b>Note: This event is run in parallel with <u>Event 4</u> after Letdown has been re-established.</b></p> <p><b>Plant response:</b> 1SA2/B-2 (HP RCP Seal Inlet Header Flow High/Low) (42 gpm)</p> <p><b>Crew response:</b> <u>ARG for 1SA2/B-2: High Alarm</u></p> <ul style="list-style-type: none"><li>• Verify high seal flow conditions with individual RCP seal indications</li><li>• 1HP-31 may have failed open/mid-position. <b>Take manual control of 1HP-31 and throttle to maintain 32 gpm.</b></li><li>• IF flow <u>CANNOT</u> be reduced in above manner, adjust 1HP-31 (RCP Seal Flow Control) per OP/1/A/1104/002 (HPI system)</li></ul>
		<b>When flow is reduced manually to ~ 32 gpm or when directed by the Lead Examiner this event is completed.</b>

Op-Test No.: 1

Scenario No.: 2

Event No.: 5

Page 1 of 1

Event Description:

**Seismic event****1A CBP Trip and 1B CBP fails to AUTO Start: (C, BOP/SRO)**

Time	Position	Applicant's Actions or Behavior
	BOP/SRO	<b>Plant Response:</b> <ul style="list-style-type: none"> <li>1SA-2/A-11 ICS RUNBACK</li> <li>1SA-8/A-1 FDW SUCTION PRESSURE LOW</li> <li>Unit runback at 20%/min due to C/FDW Suction Pressure Runback (should clear ~ 85% power)</li> <li>Powdex Bypasses at 360 psig FDWP Suction Pressure.</li> <li>1C-61 opens bypassing the Hydrogen Coolers @ 235 psig (on either FDWP/ 2 out of 3 logic) FDWP Suction Pressure</li> </ul>
	SRO/BOP /OATC	<b>Crew Response:</b> <ol style="list-style-type: none"> <li>Crew should perform Plant Transient Response (PTR)</li> <li>BOP should state: "Valid ICS runback is in progress for C/FDW suction pressure"</li> <li>When the plant is stable/controllable OR as directed by ARG 1SA-8/A-1 FDW SUCTION PRESSURE LOW the team should elect to <u>manually</u> start the '1B' CBP (standby).</li> <li>Manual Actions <ul style="list-style-type: none"> <li><u>IF</u> standby Condensate Booster Pump has NOT started, start any available CBP manually</li> </ul> </li> <li>Reset 1C-61 when FDWP suction pressure <math>\geq 235</math> psig (OP/1/A/1106/002 Condensate and Feedwater, Enclosure 4.22- Resetting 1C-61 Controller) as follows: <ul style="list-style-type: none"> <li>Ensure 1C-61 is in Manual</li> <li>Manually adjust 1C-61 controller demand to 85-95%</li> <li>Verify O1D1417 (Generator Water Cooler Condensate Diff) value "FALSE"</li> <li>Throttle closed 1C-61 to establish 5-16 ft H<sub>2</sub>O <math>\Delta P</math></li> <li>Ensure adjusted 1C-61 setpoint to match actual <math>\Delta P</math></li> <li>Ensure 1C-61 to "AUTO"</li> </ul> </li> <li>Restore Powdex to service per (OP/1/A/1106/002 Condensate and Feedwater; Enclosure 4.19- Placing Powdex In/Out of Service) <ul style="list-style-type: none"> <li>When FDWP suction pressure is <math>&gt; 360</math> psig place the Powdex In Service by slowly throttling closed on 1C-14/15 while maintaining CBP suction pressure <math>\geq 70</math> psig.</li> </ul> </li> </ol>
		<b>The event is complete when the plant stabilizes ~ 85% power or when determined by the Lead Examiner.</b>

Op-Test No.: 1

Scenario No.: 2

Event No.: 6

Page 1 of 1

Event Description: **Controlling Tave fails HIGH (I, OATC, SRO)**

Time	Position	Applicant's Actions or Behavior
	SRO/OATC	<p><b>Plant response:</b></p> <ul style="list-style-type: none"> <li>1SA-02/A-12, ICS Tracking, will actuate due to neutron and feedwater cross-limits.</li> <li>Controlling Tave will indicate <math>\approx 596.4^{\circ}</math> F. (Failed HIGH)</li> <li>Actual loop A &amp; B Tave will decrease until operator stops transient.</li> <li>RCS pressure and temperature will decrease.</li> </ul> <p><b>Crew response:</b></p> <ul style="list-style-type: none"> <li>Statalarms; candidates perform "Plant Transient Response" process to <b>stabilize</b> the plant. <ul style="list-style-type: none"> <li>➤ Verbalize to the SRO reactor power level and direction of movement.</li> <li>➤ Place the Diamond and both FDW Masters in manual and position as necessary to stabilize the plant.</li> </ul> </li> <li>The SRO should: <ul style="list-style-type: none"> <li>➤ Refer to AP/28, ICS Instrument Failures</li> <li>➤ Contact SPOC to repair controlling Tave.</li> </ul> </li> </ul> <p><b>Note: The ICS remains in manual for the rest of scenario.</b></p> <p><u>AP/28</u> (ICS Instrument Failures)</p> <ol style="list-style-type: none"> <li>Verify plant conditions are controlled <u>or</u> stable as indicated by the following: <ul style="list-style-type: none"> <li>NI power change &lt; 2% from current NI power indication <b>AND</b> thermal power best <math>\leq</math> pre-transient power level</li> <li>Tave change &lt; <math>2^{\circ}</math>F from current Tave indication</li> <li>THP/SG Outlet Press. change &lt; 30 psig from current THP/SG Outlet Press.</li> <li>RCS pressure change &lt; 150 psig from current RCS pressure</li> </ul> </li> <li>Provide control bands – see Placard (OMP 1-18)</li> <li>Make notifications (OSM, STA)</li> <li>Verify a power transient has occurred</li> <li>Notify Rx Engineering to discuss need for a power maneuvering plan</li> <li><b>GO TO</b> section <b>4A (RCS Temperature Failure)</b></li> <li>Notify SPOC to repair failed instrument</li> <li><b>PERFORM</b> an instrumentation surveillance using applicable table in Encl 5.3 (ICS Instrument Surveillances) for the failed instrument.</li> </ol>
	SRO OATC	
	BOP	
		<p><b>When the SRO reaches the WHEN Step (6) of Section 4A or when directed by the Lead Examiner this event is completed.</b></p>

Op-Test No.: 1

Scenario No.: 2

Event No.: 7

Page 1 of 3

Event Description: **Loss of Main and Emergency FDW, LOHT, CBP Feed (M, ALL)**

Time	Position	Applicant's Actions or Behavior
	SRO/OATC	<p><b>Plant Response:</b> When directed by the Lead Examiner, a Loss of Main and Emergency Feedwater will occur.</p> <p><b>Crew Response:</b></p> <ul style="list-style-type: none"> <li>• Perform Immediate Manual Actions (IMAs)</li> <li>• Depress REACTOR TRIP pushbutton.</li> <li>• Verify reactor power &lt; 5% FP and decreasing.</li> <li>• Depress turbine TRIP pushbutton.</li> <li>• Verify all turbine stop valves closed.</li> <li>• Verify RCP seal injection available.</li> </ul> <p>BOP will perform a Symptom Check and <b>initiate Rule 3</b> (Loss of Main and / or Emergency Feedwater)</p> <p>SRO will transfer to the Loss Of Heat Transfer Tab</p>
	BOP	<p><b>Rule 3</b></p> <ol style="list-style-type: none"> <li>1. <b>IAAT NO</b> SGs can be fed with FDW (Main/CBP/Emergency), <b>AND</b> any of the following exist:</li> <li>2. RCS pressure reaches 2300 psig <b>OR</b> NDT limit</li> <li>3. Pzr level reaches 375" [340" acc]</li> </ol> <p><b>THEN PERFORM</b> Rule 4 (Initiation of HPI Forced Cooling).</p> <ol style="list-style-type: none"> <li>4. Start EFDW pumps to feed all intact SGs.</li> <li>5. Place the following in MANUAL and close: <ul style="list-style-type: none"> <li>• 1FDW-315</li> <li>• 1FDW-316</li> </ul> </li> <li>6. Verify both of the following:</li> <li>7. Any CBP operating</li> <li>8. TBVs available on an intact SG</li> <li>9. Select OFF for both digital channels on AFIS HEADER A.</li> <li>10. Select OFF for both digital channels on AFIS HEADER B.</li> </ol>

Op-Test No.: 1

Scenario No.: 2

Event No.: 7

Page 2 of 3

Event Description: **Loss of Main and Emergency FDW, LOHT, CBP Feed (M, ALL)**

Time	Position	Applicant's Actions or Behavior
	BOP	<p><b>Crew Response:</b></p> <p><b>Rule 3</b> (Continued)</p> <ol style="list-style-type: none"> <li>11. Place 1FDW-33 and 1FDW-42 ) control switch SGs in OPEN:</li> <li>12. <u>Simultaneously</u> position Startup Control valves (1FDW-35 1FDW-44) 10 - 20% open on <u>all intact</u> SGs:</li> <li>13. Perform the following: <ul style="list-style-type: none"> <li>• Place 1FDW-31 switch in CLOSE.</li> <li>• Place 1FDW-40 switch in CLOSE.</li> <li>• Close 1FDW-32.</li> <li>• Close 1FDW-41.</li> </ul> </li> <li>14. Lower SG pressure in available SGs to <math>\approx</math> 500 psig.</li> <li>15. Control FDW flow to stabilize RCS P/T by throttling the Startup Control valves and TBVs as necessary: <b>(CT-10)</b> <ul style="list-style-type: none"> <li>• Place 1FDW-38 and 1FDW-47 switches to OPEN:</li> <li>• Place 1FDW-36 and 1FDW-45 switches to CLOSE:</li> </ul> </li> <li>16. Dispatch an operator to perform Encl 5.26 (Manual Start of TDEFDWP).</li> <li>17. Verify cross-tie with Unit 2 is desired.</li> <li>18. Dispatch an operator to open 2FDW-313 and 2FDW-314)</li> <li>19. Dispatch an operator to 1FDW-313 and have them notify the CR when in position.</li> <li>20. Notify Unit 2 to: 1) Manually Close 2FDW-315 &amp; 316. 2) Start their U2 TDEFWP</li> <li>21. <b>WHEN</b>, either of the following exists: 1FDW-313 Operator in position <b>OR</b> Unit 1 TDEFWP has been manually started; <b>THEN</b> continue.</li> </ol>

Op-Test No.: 1

Scenario No.: 2

Event No.: 7

Page 3 of 3

Event Description: **Loss of Main and Emergency FDW, LOHT, CBP Feed (M, ALL)**

Time	Position	Applicant's Actions or Behavior
	SRO	<p><b>Crew Response:</b></p> <p><u>Loss Of Heat Transfer Tab</u></p> <ul style="list-style-type: none"> <li>• <b>IAAT NO</b> SGs can be fed with FDW (Main/CBP/Emergency), <b>AND</b> <u>any</u> of the following exist: <ul style="list-style-type: none"> <li>○ RCS pressure reaches 2300 psig <b>OR</b> NDT limit</li> <li>○ Pzr level reaches 375" [340" acc]</li> </ul> <b>THEN PERFORM</b> Rule 4 (Initiation of HPI Forced Cooling).</li> </ul> <p><b>NOTE: 1A1 RCP provides the best Pzr spray.</b></p> <ul style="list-style-type: none"> <li>• Reduce operating RCPs to one pump/loop.</li> </ul>
	BOP	
		<p><b>When RCS temperature is stabilized on Condensate Booster Pump feed, or when directed by the Lead Examiner this event is completed.</b></p>



Op-Test No.: 1

Scenario No.: 2

Event No.: 8

Page 1 of 2

Event Description: **CBPs Trip, HPI Forced Cooling, Spray Valve Fails Closed (ALL)**

Time	Position	Applicant's Actions or Behavior
	SRO	<p><b>Plant Response:</b></p> <ul style="list-style-type: none"> <li>• CBPs trip</li> <li>• Feedwater flow decreases</li> <li>• RCS temperature increases</li> </ul> <p><b>Crew Response:</b></p> <p>SRO may direct RO to re-perform Rule 3</p> <p><u>At 2300 psig RCS pressure</u>, direct performance of <b>Rule 4</b> (HPI Forced Cooling).</p>
	BOP/OATC	<p><b>Rule 4 (CT-14) (Within 5 minutes of meeting criteria)</b></p> <ol style="list-style-type: none"> <li>1. Open 1HP-24 and 1HP-25.</li> <li>2. Start <u>all available</u> HPI pumps.</li> <li>3. Open 1HP-26 and 1HP-27</li> </ol> <p><b>Note: 1HP-26 will NOT open (1HP-410 must be opened; per Step below)</b></p> <ol style="list-style-type: none"> <li>4. Open 1RC-4.</li> <li>5. Verify flow exists in <u>any</u> HPI header.</li> <li>6. Open PORV. (<b>Switch to OPEN, depress OPEN permit</b>)</li> <li>7. Verify <u>at least</u> two HPI pumps operating.</li> <li>8. Verify flow in both HPI headers is in the acceptable region of Figure 1 <ul style="list-style-type: none"> <li>• <b>Open 1HP-410 (Flow is unacceptable in 1A HPI Header)</b></li> </ul> </li> <li>9. Stop <u>all but one</u> RCP (1A1 RCP provides the best Spray flow)</li> <li>10. De-energize all Pzr heaters.</li> <li>11. Close 1HP-5.</li> <li>12. Verify HPI Forced Cooling initiated due to a loss of CBP feed.</li> <li>13. Close TBVs, 1FDW-35 and 1FDW-44.</li> </ol>

Op-Test No.: 1

Scenario No.: 2

Event No.: 8

Page 2 of 2

Event Description: **CBPs trip, HPI Forced Cooling, Spray Valve Fails Closed (ALL)**

Time	Position	Applicant's Actions or Behavior
	SRO	<b>Crew Response:</b> <u>LOHT tab</u> <ol style="list-style-type: none"> <li><b>PERFORM</b> Rule 4 (Initiation of HPI Forced Cooling).</li> <li>Verify <u>all</u> the following: <ul style="list-style-type: none"> <li>At least two HPI pumps operating</li> <li>Acceptable HPI flow exists in both HPI headers per Rule 4</li> <li>PORV open</li> <li>1RC-4 open</li> </ul> </li> <li><b>GO TO</b> HPI CD tab.</li> </ol>
	SRO/OATC/ BOP	<u>HPI CD tab</u> <ol style="list-style-type: none"> <li>Verify <u>all</u> of the following exist: <ul style="list-style-type: none"> <li>PORV open</li> <li>1RC-4 open</li> <li>Two HPI trains injecting</li> <li>CETCs <math>\leq 640^{\circ}\text{F}</math></li> </ul> </li> <li>Ensure all RBCUs in low speed.</li> <li>Open 1LPSW-18, 1LPSW-21 and .1LPSW-24.</li> <li>Initiate Encl 5.35 (Containment Isolation)</li> <li>Start A &amp; B Outside Air Booster Fans (<b>CT-27</b>)</li> <li>Notify Unit 3 to start 3A and 3B Outside Air Booster Fans</li> </ol>
		<b>When SRO transfers to HPI CD tab, or when directed by the lead examiner this event is completed.</b>

## **CRITICAL TASKS**

1. CT-10, Establish FW Flow and Feed SGs
2. CT-14, Initiate HPI Cooling
3. CT-27, Implementation of Control Room Habitability Guidance



3/10

Facility: **Oconee**Scenario No.: **3**Op-Test No.: **1**

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

## Initial Conditions:

- Reactor Power = 100%

## Turnover:

- Intermittent LPSW leak in RB requires frequent RBNS pumping
- Keowee Unit 2 OOS for unplanned reasons
- Keowee Unit 1 Aligned to Underground
- Operability test of Keowee Unit 1 is to be performed per PT/620/009 (Keowee Hydro Operation) after turnover and before startup continues, ONS to perform remote Keowee start. Begin at Encl. 13.1 at Step 2.2

Event No.	Malf. No.	Event Type*	Event Description
0a	Pre-Insert		SASS in Manual
0b	Pre-Insert MEL180		Keowee Unit 2 Emergency Lockout
1		N, BOP, SRO	Operability Test Keowee Unit 1
2	Override	C, OATC, SRO	1HP-120 (RC Volume Control) fails Closed
3	Override	I, BOP, SRO	Pump RBNS and RBNS Pumps do not auto stop at 6"
4	Override	C, OATC, SRO	1A HPI Pump trips and standby HPI pump fails to start (TS)
5	Override	C, BOP, SRO	1A RBCU cooler rupture (TS)
6	Override	I, ALL	Turbine trips to hand for unknown reason
7	MCR021 MCR022	C, OATC, SRO	Dropped Control Rod and manual Power Reduction (TS)
8	MEL 120 MEL 180 Override	M, ALL	1TA Lockout - causes Rx trip due to loss of 2 RCP's CT-1 Lockout / Keowee Unit 1 ELO (Blackout) Regain power manually from CT-5.
9	MSS 380	All	SGTR requires transfer to SGTR tab to end scenario TDEFWP fails requiring Rule 3 to start MDEFWP's

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

DRAFT

Op-Test No.: \_\_\_\_\_

Scenario No.: 3

Event No.: 1

Page 1 of 3

Event Description: **Operability test Keowee Unit 1 (N, BOP/SRO)**

Time	Position	Applicant's Actions or Behavior
	SRO	Direct BOP to perform PT/620/009 (Keowee Hydro Operation) Encl. 13.1 (KHU-1 Operability Verification) Step 2.2 to operability test Unit 1 Keowee Underground.
	BOP	<ol style="list-style-type: none"> <li>1. Verify various Statalarms <b>NOT</b> in alarm (lockouts and SU inhibit)</li> <li>2. Ensure the following: <ul style="list-style-type: none"> <li>• PERMISSIVE AUTO START light on.</li> <li>• UNIT 1 MASTER SELECTOR switch in "AUTO".</li> <li>• EXCITER MANUAL/AUTO Red AUTO light ON, Green MANUAL light OFF.</li> <li>• EXCITER STOP/START Green STOP light ON, Red START light OFF.</li> </ul> </li> <li>3. Notify Keowee Operator to perform the following: <ul style="list-style-type: none"> <li>• On CB2, verify all required PREREQ lights are lit.</li> <li>• Position MASTER TRANSFER switch for KHU-1 to "REMOTE".</li> </ul> </li> <li>4. Ensure UNIT 1 SYNC 230 KV selector in "MAN".</li> <li>5. Place <b>AND</b> hold UNIT 1 LOCAL MASTER switch in "START" position for &gt; 10 seconds until KHU-1 starts.</li> <li>6. Verify EXCITER STOP/START Red START light ON, Green STOP light OFF.</li> <li>7. Perform the following:</li> <li>8. After 60 seconds steady operation, record the following: <ul style="list-style-type: none"> <li>• KHU-1 OUTPUT VOLTS ____ KV (Oconee Control Room Indication-2AB3)</li> <li>• KHU-1 digital speed ____ RPM (KHU-1 Control Room Indication - CB-3)</li> </ul> </li> </ol> <p><b>When requested, Simulator Operator will notify Oconee that: Keowee RPMs = 128.</b></p> <ol style="list-style-type: none"> <li>9. Verify CT4 energized by 13.8 KV Underground Power Path: <ul style="list-style-type: none"> <li>• Verify ACB-3 closed</li> <li>• Verify ~4.16 KV on CT4 Volts (2AB3).</li> </ul> </li> </ol>

Op-Test No.: \_\_\_\_\_

Scenario No.: 3

Event No.: 1

Page 2 of 3

Event Description: **Operability test Keowee Unit 1 (N, BOP/SRO)**

Time	Position	Applicant's Actions or Behavior
	BOP	<p>10. <b>Step 2.4.2</b> IF both Standby Buses are <b>NOT</b> energized, perform the following:</p> <ul style="list-style-type: none"> <li>• IF test is being performed to satisfy TS 3.8.1 one hour requirement, record time for later TSAIL entry: _____</li> </ul> <p>11. <b>Step 2.4.3</b> IF Standby Bus 1 <b>NOT</b> energized</p> <ul style="list-style-type: none"> <li>• Verify ~ 4.16 KV on CT4 Volts</li> <li>• Ensure CT5 BUS 1 AUTO/MAN transfer switch in MAN</li> <li>• Ensure CT4 BUS 1 AUTO/MAN transfer switch in MAN</li> <li>• Place STBY BUS 1 SYNCHRONIZING switch to ON</li> <li>• Close SK1 CT4 STBY BUS 1 FEEDER</li> <li>• Verify ~ 4.16 KV on Standby Bus 1 Volts</li> <li>• Open SK1 CT4 STBY BUS 1 FEEDER</li> <li>• Place STBY BUS 1 SYNCHRONIZING switch to OFF</li> <li>• Place CT4 BUS 1 AUTO/MAN transfer switch to AUTO</li> </ul> <p>12. <b>Step 2.4.4</b> IF Standby Bus 2 <b>NOT</b> energized</p> <ul style="list-style-type: none"> <li>• Verify ~ 4.16 KV on CT4 Volts</li> <li>• Ensure CT5 BUS 2 AUTO/MAN transfer switch in MAN</li> <li>• Ensure CT4 BUS 2 AUTO/MAN transfer switch in MAN</li> <li>• Place STBY BUS 2 SYNCHRONIZING switch to ON</li> <li>• Close SK2 CT4 STBY BUS 2 FEEDER</li> <li>• Verify ~ 4.16 KV on Standby Bus 2 Volts</li> <li>• Open SK2 CT4 STBY BUS 2 FEEDER</li> <li>• Place STBY BUS 2 SYNCHRONIZING switch to OFF</li> <li>• Place CT4 BUS 2 AUTO/MAN transfer switch to AUTO</li> </ul> <p>13. <b>Step 2.4.5</b> IF either Standby Bus is <b>NOT</b> energized and test is being performed to satisfy TS 3.8.1 one hour requirement perform the following:</p> <ul style="list-style-type: none"> <li>○ Ensure TS 3.8.1 Condition D has been entered for UG path at Time in Step 2.4.2.</li> <li>○ If Overhead Power Path is inoperable, ensure TS 3.8.1 Condition I has been entered at the time in Step 2.4.2.</li> </ul>

Op-Test No.: \_\_\_\_\_

Scenario No.: 3

Event No.: 1

Page 3 of 3

Event Description: **Operability test Keowee Unit 1 (N, BOP/SRO)**

Time	Position	Applicant's Actions or Behavior
	BOP	<p>14. <b>Step 2.4.6</b> IF CT4 Bus 1 <b>AND</b> Bus 2 AUTO/MAN transfer switches are in "AUTO", perform the following:</p> <ul style="list-style-type: none"> <li>Evaluate exiting TS 3.8.1 Condition D for Underground Power Path.</li> <li>IF Overhead Power Path is inoperable, evaluate exiting TS 3.8.1 Condition I.</li> </ul> <p>15. <b>Step 2.5.1</b> Synchronize KHU-1 to the switchyard; position Keowee UNIT 1 SYNC 230 KV switch to "AUTO". (Oconee Control Room)</p> <ul style="list-style-type: none"> <li>Verify ACB 1 KEOWEE 1 GENERATOR BKR closed.</li> <li>Perform one of the following: <ul style="list-style-type: none"> <li>Verify acceptance criteria met.</li> <li>IF acceptance criteria <b>NOT</b> met, ensure SRO notified.</li> </ul> </li> </ul> <p>16. <b>Step 2.7.1</b> IF KHU-1 was started from Oconee Control Room, perform the following:</p> <p><b>CAUTION:</b> Do <b>NOT</b> lower MVARs to less than zero (0) before taking the KHU off line. This will prevent excitation current from burning the contacts on the generator breakers when KHU-1 is shut down.</p> <ul style="list-style-type: none"> <li>Perform the following concurrently as required: <ul style="list-style-type: none"> <li>Adjust load to zero (0) MWs with UNIT 1 SPEED CHANGER MOTOR.</li> <li>Adjust MVARs to zero (0) with UNIT 1 AUTO VOLTAGE ADJUSTER.</li> </ul> </li> <li>Place UNIT 1 LOCAL MASTER switch to "STOP" <b>AND</b> hold in "STOP" position for &gt; 10 seconds.</li> </ul> <p><b>NOTE:</b> Placing UNIT 1 MASTER SELECTOR to "AUTO" shuts off the AC H.P. Lift Pump and closes the Generator Cooling Water valve. This action prevents KHU-1 from creeping.</p> <ul style="list-style-type: none"> <li>Ensure UNIT 1 MASTER SELECTOR to "AUTO".</li> <li>Verify TURBINE 1 GATE POSITION indicator is at zero (0).</li> <li>Notify Keowee to place KHU-1 MASTER TRANSFER switch in "LOCAL".</li> <li>Ensure UNIT 1 SYNC 230 KV selector in "AUTO".</li> </ul>
		Event is complete when operability test is finished, or when directed by the lead examiner.



Op-Test No.: \_\_\_\_\_

Scenario No.: 3

Event No.: 2

Page 1 of 1

Event Description: 1HP-120 (RC Volume Control) Fails closed (C, OATC/SRO)

Time	Position	Applicant's Actions or Behavior
	OATC	<p><b>Note: 1HP-120 fails closed during Keowee #1 Operability test. This will allow OATC diagnoses of failure.</b></p> <p><b>Plant response:</b></p> <ul style="list-style-type: none"> <li>• RCS makeup flow goes to ~10gpm (HP Inj Warming Flow)</li> <li>• PZR level begins to decrease.</li> <li>• LDST level begins to increase.</li> <li>• Valve position <u>demand</u> for 1HP-120 begins to increase to the 100% demand value and valve position indication will indicate closed (green light).</li> </ul> <p>The OATC should diagnose the failure and notify the SRO.</p>
	SRO OATC	<p><b>Crew response:</b></p> <p><b>Refer to <u>AP/14</u></b> (Loss of Normal Makeup and/or RCP Seal Injection.</p> <ol style="list-style-type: none"> <li>1. Determine Seal Injection is not lost</li> <li>2. Determine loss of suction to HPI pumps has not occurred.</li> <li>3. Announce AP entry using PA system.</li> <li>4. Verify <u>any</u> HPI pump operating</li> <li>5. Verify RCP RCP seal injection or HPI makeup line leak is <b>not</b> indicated.</li> <li>6. Verify RCP seal injection flow exists.</li> <li>7. Verify 1HP-120 has failed in AUTO and perform the RNO and determine it will also not work in MANUAL. <b>GO TO</b> Step 4.176.</li> <li>8. Perform the following as necessary to maintain Pzr level &gt; 200": <ul style="list-style-type: none"> <li>• Close 1HP-6 (Letdown Orifice Stop)</li> <li>• Throttle 1HP-7 (Letdown Control)</li> <li>• Throttle 1HP-26 (1A HP Injection)</li> </ul> </li> <li>9. Place 1HP-120 to HAND and closed</li> <li>10. Contact SPOC to repair 1HP-120.</li> </ol> <p><b>Note: 1HP-120 will remain failed for the duration of the scenario.</b></p>
		<p><b>When PZR level is being controlled manually or when directed by the Lead Examiner this event is completed.</b></p>

Op-Test No.: \_\_\_\_\_

Scenario No.: 3

Event No.: 3

Page 1 of 1

Event Description: **Pump RBNS and RBNS pumps do NOT auto stop at 6 inches (I, BOP, SRO)**

Time	Position	Applicant's Actions or Behavior
	BOP/SRO	<p><b>Plant response:</b></p> <p>Statalarms:</p> <ul style="list-style-type: none"> <li>1SA-9/A-6 (REACTOR BUILDING NORMAL SUMP LEVEL HIGH/LOW)</li> </ul> <p><b>Crew response:</b></p> <p>Refer to 1SA-9/A-6 ARG.</p> <ol style="list-style-type: none"> <li><b>High Level:</b> Align normal sump pump and lower level in sump per OP/1/A/1104/007 (Liquid Waste Disposal System), Encl. 4.1 (U1 RBNS Transfer Mode 1)</li> <li>Investigate possible RCS leakage per OP/0/B/1106/033 (Primary System Leak Identification) or PT/1/A/0600/010 (Reactor Coolant Leakage). (<b>Leakage is known from turnover-LPSW</b>)</li> <li>Monitor RB RIAs, CC Surge Tank level, CFT Level and LPSW flow to and from RB and sample RB Normal Sump to determine source.</li> <li>Calculate RB Normal Sump Rate from Digital Trend (Use 15 gal/inch conversion factor).</li> <li>Refer to AP/1/A/1700/002 (Excessive RCS Leakage). (<b>Not needed due to knowing the source of the leakage into the RB</b>).</li> <li><b>Low Level:</b> Verify sump pump(s) stopped, and realign valves per OP/1/A/1104/007 (Liquid Waste Disposal System), Encl. 4.1. (U1 RBNS Transfer Mode 1)</li> </ol> <p><b>Note: The RBNS pumps will not stop on the low level cutoff. The BOP should recognize this and stop the pumps per procedure.</b></p> <ol style="list-style-type: none"> <li>Contact SPOC to repair RBNS pump low level cutoff.</li> </ol>
		<b>When RBNS pumps have been stopped or when directed by the Lead Examiner this event is completed.</b>

Op-Test No.: _____	Scenario No.: 3	Event No.: 4	Page 1 of 2
Event Description: <b>"A" HPI Pump trips and the Standby HPI pump fails to auto start: (C, OATC, SRO) (TS)</b>			
Time	Position	Applicant's Actions or Behavior	
	BOP SRO  BOP	<p><b>Plant response:</b></p> <p>Statalarms:</p> <ul style="list-style-type: none"> <li>1SA-2/B-2 (HP RCP Seal Injection Flow High/Low)</li> <li>1SA-2/C-2 (HP Injection Pump Disch. Header Pressure High/Low)</li> </ul> <p>Board indications:</p> <ul style="list-style-type: none"> <li>RC Makeup Flow = 0 gpm</li> <li>1A HPI Pump OFF</li> <li>PZR level will begin to decrease and LDST level will begin to increase.</li> </ul> <p><b>Crew response:</b></p> <ol style="list-style-type: none"> <li>Refer to ARG for above Statalarms</li> <li>SRO should refer to <b>AP/14</b> (Loss of Normal Makeup and/or RCP Seal Injection) <ul style="list-style-type: none"> <li>Announce AP entry using PA system.</li> <li>Verify no HPI pump operating</li> <li>Close 1HP-5 (Letdown Isolation)</li> <li>Place 1HP-120 (RC Volume Control) in HAND and closed</li> <li>Place 1HP-31 (RCP Seal Flow Control) in HAND and closed</li> <li><b>Start standby HPI pump (1B HPI pump)</b></li> <li>Place in HAND and slowly open 1HP-31 in small increments until <math>\approx</math> 8 gpm/RCP is achieved.</li> <li>Re-establish normal makeup through 1HP-120.</li> <li>Ensure proper operation of the CC system.</li> <li>Reduce 1HP-7 demand to 0%.</li> <li>Close 1HP-6</li> <li>Ensure the following open: <ul style="list-style-type: none"> <li>➤ 1HP-1</li> <li>➤ 1HP-2</li> <li>➤ 1HP-3</li> <li>➤ 1HP-4</li> </ul> </li> </ul> </li> </ol>	

Op-Test No.: _____		Scenario No.: 3	Event No.: 4	Page 2 of 2
Event Description:		<b>"A" HPI Pump trips and the standby HPI pump fails to auto start: (C, OATC/SRO)</b>		
Time	Position	Applicant's Actions or Behavior		
	SRO	<ul style="list-style-type: none"> <li>• Open 1HP-5</li> <li>• Throttle open 1HP-7 for <math>\approx</math> 20 gpm letdown flow.</li> <li>• Open 1HP-6</li> <li>• Adjust 1HP-7 for desired letdown flow (75 gpm).</li> <li>• Open 1HP-228, 1HP-226, 1HP-32, 1HP-230.</li> <li>• Open 1HP-21</li> <li>• Place 1HP-31 in auto.</li> </ul> <p>3. Refer to Tech Spec 3.5.2 High Pressure Injection</p> <ul style="list-style-type: none"> <li>• Condition "A"</li> <li>• Required Action: Restore HPI pump to OPERABLE status</li> <li>• Completion Time: 72 hours</li> </ul> <p><b>Note: Due to sequence of events, SRO may not review the TS during the scenario. Follow-up questions may be required to ensure knowledge of this competency.</b></p>		
		Event is complete when normal makeup and letdown is established or when directed by the Lead Examiner.		

Op-Test No.: _____		Scenario No.: 3	Event No.: 5	Page 1 of 1
Event Description:		<b>1A RBCU rupture (C, BOP, SRO) (TS)</b>		
Time	Position	Applicant's Actions or Behavior		
	BOP	<p><b>Plant Response:</b></p> <ul style="list-style-type: none"> <li>• 1SA-9/B-9, LPSW RBCU A Cooler Rupture</li> <li>• 1SA-9/A-6, RB Normal Sump Level High/Low</li> <li>• RB normal sump level will increase</li> </ul> <p><b>Crew Response:</b></p> <p><u>ARG for 1SA-9/B-9</u></p> <ol style="list-style-type: none"> <li>1. Verify alarm is valid by checking RBCU 1A Inlet Flow and RBCU 1A delta flow (327 gpm Delta Flow).</li> <li>2. Verify 1LPSW-18 (RBCU 1A Outlet) open</li> <li>3. Verify adequate LPSW flow is available; check LPSW pump operation and 1LPSW-16 (1A RBCU INLET PENE) is open.</li> <li>4. Monitor RBNS Level for any unexplained increase</li> <li>5. Diagnose a Cooler Rupture is indicated and Isolate the 1A RBCU Cooler. <ul style="list-style-type: none"> <li>• Close 1LPSW-16 (1A RBCU INLET PENE).</li> <li>• Close 1LPSW-18 (RBCU 1A OUTLET).</li> </ul> </li> </ol>		
	SRO	<ol style="list-style-type: none"> <li>6. Perform <b>TS 3.6.3 Condition C</b> for closed containment system.</li> <li>7. Enter TS 3.6.5 for RBCU inoperable. (<b>TS 3.6.5 Condition B</b>).</li> <li>8. Refer to <b>SLC 16.9.12</b> (Additional LPSW and Siphon Seal Water System Operability Requirements)</li> </ol>		
		<p><b>When the RBCU has been isolated, or at the direction of the Lead Examiner this event is completed.</b></p>		

Op-Test No.: \_\_\_\_\_

Scenario No.: 3

Event No.: 6

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Event Description: **Turbine trips to HAND (I, ALL)**

Time	Position	Applicant's Actions or Behavior
	SRO	<b>Plant Response:</b> Statalarms: <ul style="list-style-type: none"> <li>• 1SA-2/A-12, ICS Tracking</li> <li>• 1SA-2/C-12, ICS H/A Station on Man</li> </ul>
	BOP	<b>Crew Response:</b> 1. Refer to ARG for above alarms. <ul style="list-style-type: none"> <li>• <b>IF</b> Turbine Master Trips to Hand for unknown reason, refer to AP/1/A/1700/028 (ICS Instrument Failure).</li> </ul>
	SRO	2. AP/28
	OATC	3. <b>GO TO Section 40</b> <ul style="list-style-type: none"> <li>• Simultaneously place the 1A and 1B FDW MASTERS to HAND:</li> <li>• Place the DIAMOND in MANUAL.</li> <li>• Notify SPOC to investigate the cause of the Turbine Master tripping to Hand.</li> </ul>
		<b>When FDW Masters and Diamond are in MANUAL, or when directed by the Lead Examiner this event is completed.</b>

Op-Test No.: \_\_\_\_\_

Scenario No.: 3

Event No.:7

Page 1 of 2

Event Description: **Dropped Control Rod, Manual Power Reduction (C, OATC, SRO) (TS)**

Time	Position	Applicant's Actions or Behavior
	SRO	<p><b>Plant Response:</b></p> <p>Stat alarm 1SA2/A10 (CRD GLOBAL TROUBLE)</p> <p>Stat alarm 1SA2/B10 (CRD ASYMMETRIC ROD ALARM)</p> <p>Stat alarm 1SA2/D9 (CRD OUT INHIBIT)</p> <p><b>Crew Response:</b></p> <p>SRO should enter <b>AP/1</b> (Unit Runback)</p> <p><b>AP/1 Section 4H</b></p> <ol style="list-style-type: none"> <li>1. <b>IAAT</b> more than one control rod is dropped or misaligned &gt;6% (&gt; 9") from the group average, <b>THEN</b> trip the Rx.</li> <li>2. Verify Rx is critical.</li> <li>3. Verify Rx runback to 55% FP in progress.</li> </ol> <p><b>Note: Runback will not be occurring due to ICS in MANUAL.</b></p> <ol style="list-style-type: none"> <li>4. <b>RNO: Initiate manual power reduction to 55% CTP at <math>\geq 1\%/min</math>.</b></li> <li>5. OATC will reduce power with FDW Masters, Diamond, and Turbine</li> <li>6. Initiate Encl 5.1 (Control of Plant Equipment During Shutdown).</li> <li>7. Notify SPOC to investigate cause of dropped or misaligned control rod and <u>prepare</u> to reduce the following trip setpoints: <ul style="list-style-type: none"> <li>o RPS Flux/Flow-Imbalance</li> <li>o RPS High Flux</li> </ul> </li> <li>8. Notify the OSM to ensure the requirements of the following Tech Specs are met: <ul style="list-style-type: none"> <li>o TS 3.1.4 (Control Rod Group Alignment Limits)</li> <li>o TS 3.1.5 (Safety Rod Position Limits)</li> <li>o TS 3.2.3 (Quadrant Power Tilt)</li> </ul> </li> </ol> <p><b>NOTE: OSM will be unavailable to make the TS determination and it will be the responsibility of the SRO</b></p>
	R,OATC	
	BOP	

Op-Test No.: \_\_\_\_\_

Scenario No.: 3

Event No.: 7

Page 2 of 2

Event Description: **Dropped Control Rod, Manual Power Reduction (C, OATC/SRO) (TS)**

Time	Position	Applicant's Actions or Behavior
	SRO	<p><b>Crew Response:</b></p> <p>SRO should refer to TS for the dropped control rod.</p> <ul style="list-style-type: none"> <li>Enter TS 3.1.4 (Control Rod Group Alignment Limits) Condition A: (One trippable CR inoperable or not aligned to within 6.5% of its group average height or both).</li> </ul> <p>1. Restore Control Rod Alignment</p> <p>OR</p> <p>2. Verify SDM <u>OR</u> Initiate Boron to restore SDM</p> <p><u>AND</u></p> <p>Reduce Thermal Power to <math>\leq 60\%</math> of allowable thermal power</p> <p><u>AND</u></p> <p>Reduce nuclear overpower trip setpoints (flux/flow/imb) to <math>\leq 65.5\%</math> of the allowable thermal power</p> <p><u>AND</u></p> <p>Verify the potential ejected rod worth is within assumptions of rod ejection analysis.</p> <p><b>NOTE: Tech Spec 3.1.4 requires verification of SDM &gt; 1% <math>\Delta k/k</math> or initiation of boration to achieve SDM within limits within an hour of the misaligned or dropped control rod.</b></p>
	BOP	<ul style="list-style-type: none"> <li>Verify &gt; 1% SDM with allowance for the inoperable control rod per PT/1/A/1103/015 (Reactivity Balance Calculation).</li> </ul> <p>USE COLR curve for 4 RCPs and 1 inoperable rod.</p> <ul style="list-style-type: none"> <li>Ensure requirements of TS 3.1.5 (Safety Rod Position Limits)</li> <li>Ensure requirements of TS 3.2.3 (Quadrant Power Tilt) are met.</li> <li>Reduce power and ensure &lt;55% on all NIs when the power decrease is complete.</li> </ul>
		<b>When TS have been addressed, or when directed by the lead examiner this event is completed.</b>



Op-Test No.: \_\_\_\_\_ Scenario No.: 3 Event No.: 8

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Event Description: 1TA Lockout and Unit Blackout: (M, ALL)

Time	Position	Applicant's Actions or Behavior
	OATC/SRO	<p><b>Plant response:</b></p> <ul style="list-style-type: none"> <li>• 1TA Lockout (6900 Volt Switchgear)</li> <li>• 1A1 and 1B1 RCPs trip causing a reactor trip</li> <li>• KHU #1 Emergency Lockout</li> <li>• CT-1 Lockout</li> <li>• MFBs will de-energize</li> </ul> <p><b>Crew response:</b></p> <p>Perform Immediate Manual Actions (IMAs)</p> <ol style="list-style-type: none"> <li>1. Depress REACTOR TRIP pushbutton.</li> <li>2. Verify reactor power &lt; 5% FP and decreasing.</li> <li>3. Depress turbine TRIP pushbutton.</li> <li>4. Verify all turbine stop valves closed.</li> <li>5. Verify RCP seal injection available.</li> <li>6. <b>IF</b> CC is unavailable, <b>THEN</b> immediately perform the following: <ul style="list-style-type: none"> <li>• Stop all RCPs.</li> <li>• Notify CR SRO to "initiate AP/25" (Standby Shutdown Facility Emergency Operating Procedure).</li> </ul> </li> </ol>
	BOP	<p><b>AP/25</b></p> <p>Obtain the Vital area access key ring, Flashlight and Proceed to the SSF.</p> <p><b>NOTE: BOP will be stopped before leaving the control room and informed that Unit 2 RO will perform SSF actions.</b></p>
	OATC/BOP	<p>Perform <u>Symptom Check</u></p> <ol style="list-style-type: none"> <li>1. Power Range NIs <u>ARE</u> &lt; 5% and decreasing</li> <li>2. <u>NO</u> SCMs &lt; 0°F</li> <li>3. Loss of Main and Emergency FDW (including unsuccessful manual initiation of EFDW) - <u>TDEFWP is operating</u></li> <li>4. Uncontrolled Main Steam line(s) pressure decrease is <u>NOT</u> occurring</li> <li>5. SGTR does <u>NOT</u> exist <ul style="list-style-type: none"> <li>• CSAE Offgas alarms</li> <li>• Process monitor alarms (RIA-40, 59, 60)</li> <li>• Area monitor alarms (RIA-16/17)</li> </ul> </li> </ol>

Op-Test No.: \_\_\_\_\_ Scenario No.: 3 Event No.: 8 Page 2 of 5

Event Description: **1TA Lockout and Unit Blackout: (M, ALL)**

Time	Position	Applicant's Actions or Behavior
	BOP/OATC	<p><b>Crew response:</b></p> <p><u>Rule 3</u> (Loss of Main or Emergency Feedwater)</p> <ol style="list-style-type: none"> <li><b>IAAT NO</b> SGs can be fed with FDW (Main/CBP/Emergency), <b>AND</b> any of the following exist: <ul style="list-style-type: none"> <li>RCS pressure reaches 2300 psig <b>OR</b></li> <li>NDT limit __ Pzr level reaches 375" [340" acc]</li> </ul> <b>THEN PERFORM</b> Rule 4 (Initiation of HPI Forced Cooling). </li> <li>Start EFDW pumps to feed all intact SGs. (<b>Only the TDEFDWP pump will be operating</b>)</li> <li>Verify any SCM <math>\leq 0^{\circ}\text{F}</math>. RNO – <b>IF</b> overcooling, <b>THEN</b> throttle EFDW as necessary.</li> <li><b>IAAT</b> Unit 1 EFDW is in operation, <b>THEN</b> initiate Encl 5.9 (Extended EFDW Operation).</li> </ol>
	BOP/OATC	<p><b>Encl 5.9 (Extended EFDW Operation)</b></p> <ol style="list-style-type: none"> <li>Monitor EFDW parameters on EFW graphic display.</li> <li>Perform the following as required to maintain UST level &gt; 7.5': <ul style="list-style-type: none"> <li>Makeup with demin water.</li> <li>Place CST pumps in AUTO.</li> </ul> </li> <li>Verify 1 TD EFDW PUMP operating and Start TD EFDWP BEARING OIL COOLING PUMP.</li> <li>Notify CR SRO to set priority based on the NOTE above and EOP activities.</li> </ol>
	SRO	SRO will transfer to the <b><u>BLACKOUT</u></b> tab.

Op-Test No.: \_\_\_\_\_ Scenario No.: 3 Event No.: 8

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Event Description: **1TA Lockout and Unit Blackout: (M, ALL)**

Time	Position	Applicant's Actions or Behavior
	SRO/BOP /OATC	<p><b>Crew response:</b></p> <p>SRO will transfer to the <u>BLACKOUT</u> tab.</p> <ol style="list-style-type: none"> <li>1. Direct an RO to announce plant conditions using the plant page and notify the OSM to reference EP and NSD 202 (reportability).</li> <li>2. Verify two ROs available to perform Control Room activities.</li> <li>3. SRO will direct an RO to perform Encl. 5.38 (Restoration of Power)</li> <li>4. Position the following to OFF: <ul style="list-style-type: none"> <li>• 1A MD EFDWP</li> <li>• 1B MD EFDWP</li> </ul> </li> <li>5. Feed and steam available SGs as necessary to stabilize RCS P/T.</li> </ol>
		<p style="text-align: center;"><b><u>NOTE:</u></b></p> <p>Feeding SGs with EFDW is desired above HPI Forced Cooling. Step 6 should be performed prior to re-performing Rule 3.</p>
	SRO	<ol style="list-style-type: none"> <li>6. <b>IAAT NO</b> SGs are being fed, <b>AND</b> any source of EFDW (Unit 1 or another unit) becomes available, <b>THEN</b> perform the following: <ul style="list-style-type: none"> <li>• Establish 100 gpm to each intact SG. (Feeding to 240" XSUR)</li> </ul> </li> <li>7. Perform one of the following: <ul style="list-style-type: none"> <li>• Tc &gt; 550°F- Initiate cool down to Tc 540°F - 550°F by feeding and steaming intact SGs at a rate that prevents RCS saturation.</li> </ul> </li> <li>8. <b>IAAT</b> EFDW from any source is insufficient to maintain stable RCS P/T, <b>THEN</b> notify SSF operator that feeding SGs with SSF ASW is required.</li> <li>9. <b>IAAT</b> power is restored to <u>any</u> of the following: <ul style="list-style-type: none"> <li>• 1TC</li> <li>• 1TD</li> <li>• 1TE</li> </ul> <p><b>THEN</b> Initiate AP/11 (Recovery from Loss of Power).  <b>GO TO</b> Subsequent Actions Tab</p> <p>NOTE: Once power is restored to any 4160V bus, the SRO will transfer to the Subsequent Actions tab per the above IAAT step.</p> </li> </ol>

Op-Test No.: \_\_\_\_\_ Scenario No.: 3 Event No.: 8

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Event Description: **1TA Lockout and Unit Blackout: (M, ALL)**

Time	Position	Applicant's Actions or Behavior
	OATC/BOP	<p><b>Crew response:</b></p> <p><u>AP/11 (Recovery from Loss of Power)</u>. – to be performed after completion of EOP Encl. 5.38 (Restoration Of Power; <i>from CT-5</i>)</p> <ol style="list-style-type: none"> <li>1. Announce AP entry using the PA system.</li> <li>2. Verify load shed has initiated</li> <li>3. Verify load shed is complete as indicated by LOAD SHED COMPLETE on any ES Module (Channel 1 or 2).</li> <li>4. Close the following breakers: <ul style="list-style-type: none"> <li>• 1TC INCOMING FDR BUS 1/2</li> <li>• 1TD INCOMING FDR BUS 1/2</li> <li>• 1TE INCOMING FDR BUS 1/2</li> </ul> </li> <li>5. Verify a 230KV Switchyard Isolation has occurred. (It has NOT)</li> <li>6. Verify ES has occurred. (It has NOT)</li> <li>7. Simultaneously press RESET on both of the following pushbuttons to reset Main Feeder Bus Monitor Panel Load Shed Circuitry:</li> <li>8. MFB UNDERVOLTAGE CHANNEL 1/2 RESET</li> <li>9. Verify all condensate flow has been lost for &lt; 25 minutes and condensate operation is desired.</li> <li>10. Place all HWP control switches to OFF.</li> <li>11. Place all CBP control switches to OFF.</li> <li>12. Place 1FDW-53/65 in MANUAL and close.</li> <li>13. Place 1C-10 FAIL SWITCH in MANUAL.</li> <li>14. Close 1C-10.</li> <li>15. Using a plant page, clear TB Basement and TB third floor of non-essential personnel.</li> <li>16. Start <u>one</u> HWP.</li> <li>17. Throttle 1C-10 controller 10% open to satisfy 25 minute restart criteria.</li> <li>18. <b>WHEN</b> FWP SUCT HDR PRESS is <math>\geq 100</math> psig, <b>THEN</b> open 1C-10.</li> </ol>

Op-Test No.: \_\_\_\_\_ Scenario No.: 3 Event No.: 8

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Event Description: **1TA Lockout and Unit Blackout: (M, ALL)**

Time	Position	Applicant's Actions or Behavior
	OATC/BOP	<p><b>Crew response:</b> RO will perform <u>Encl. 5.38</u> (Restoration of Power) <b>(CT-8) (Not met if Encl. 5.38 completed with power NOT restored.)</b></p> <ol style="list-style-type: none"> <li>1. Place 1HP-31 in HAND and reduce demand to 0.</li> <li>2. Close 1HP-21.</li> <li>3. Verify MFB1/2 energized <b>(NOT)</b></li> <li>4. Verify CT-1 indicates 4160v <b>(NO)</b></li> <li>5. Verify both Standby Bus #1 and Standby Bus #2 are de-energized.</li> <li>6. Emergency start Keowee units</li> <li>7. Notify Keowee Operator to place all operating Keowee units in Oconee Control.</li> <li>8. <b>IAAT</b> CT-5 indicates <math>\approx</math> 4160 volts, <b>THEN GO TO</b> Step 50. <b>(It does; from Central Swyd)</b></li> <li>9. Place the following switches in MAN: <ul style="list-style-type: none"> <li>• MFB1 and MFB2 AUTO/MAN</li> <li>• STANDBY 1 and STANDBY 2 AUTO/MAN</li> </ul> </li> <li>10. Open the following breakers: <ul style="list-style-type: none"> <li>• N1<sub>1</sub> and N2<sub>1</sub> MFB1 NORMAL FDR</li> <li>• E1<sub>1</sub> and E2<sub>1</sub> MFB1 STARTUP FDR</li> </ul> </li> <li>11. Place the following switches in MAN: <ul style="list-style-type: none"> <li>• CT4 BUS 1 and CT4 BUS 2 AUTO/MAN</li> <li>• CT5 BUS 1 and CT5 BUS 2 AUTO/MAN</li> </ul> </li> <li>12. Open the following breakers: <ul style="list-style-type: none"> <li>• SK1 and SK2 CT4 STBY BUS 1 FEEDER</li> </ul> </li> <li>13. Close SL1 and SL2 CT5 STBY BUS 1 FEEDER</li> <li>14. Place the following switches in AUTO: <ul style="list-style-type: none"> <li>• CT5 BUS 1 and CT5 BUS 2 AUTO/MAN</li> </ul> </li> <li>15. Verify Standby Bus #1 energized.</li> <li>16. Notify CR SRO in each unit where a blackout exists that Standby Bus #1 is energized.</li> <li>17. Close S1<sub>1</sub> and S2<sub>1</sub> STBY BUS 2 TO MFB2 <b>(power is restored)</b></li> <li>18. Verify 1TC, 1TD, or 1TE energized.</li> <li>19. Notify Unit 1 CR SRO of status of 4160V SWGR.</li> </ol>
		<b>When the SRO has transferred to Subsequent Actions tab, or when directed by the Lead Examiner this event is completed.</b>

Op-Test No.: \_\_\_\_\_ Scenario No.: 3 Event No.: 9

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Event Description: **SGTR: (M, ALL)**

Time	Position	Applicant's Actions or Behavior
	SRO	<p>After the SRO transfers to the Subsequent Actions tab and when directed by the Lead Examiner a <b>SG tube rupture</b> will occur in the <b>1B SG</b>.</p> <p><b>Plant Response:</b></p> <ul style="list-style-type: none"> <li>• 1SA-8/B-9 RM Process Monitor Radiation High</li> <li>• 1SA8/D10 (RM CSAE EXHAUST RADIATION HIGH)</li> <li>• PZR level decreasing</li> </ul> <p><b>Crew response:</b> The SRO should use the Parallel Actions page and transfer to the <b>SGTR</b> tab.</p> <p>SGTR tab will:</p> <ol style="list-style-type: none"> <li>1. Maintain PZR level 140"- 180" [175"- 215"acc] by initiating Encl 5.5 (PZR and LDST Level Control).</li> <li>2. Start A and B OUTSIDE AIR BOOSTER FAN (<b>CT-27</b>)</li> <li>3. Notify Unit 3 to start the 3A and 3B OUTSIDE AIR BOOSTER FAN</li> <li>4. Monitor RIAs 16 and 17 to identify all SGs with a tube rupture.</li> <li>5. Dispatch an operator to open A and B TURB BLDG SUMP PUMP BKR)</li> <li>6. Notify RP to survey <u>both</u> MS lines for radiation.</li> </ol> <p><b>Note: At step 6 the TD EFDW pump will trip; requiring either Rule 3 to be performed OR performing a symptoms check to start the MDEFWP's. (CT-10)</b></p> <ol style="list-style-type: none"> <li>7. Secure any unnecessary offsite release paths. (Main Vacuum Pumps, TDEFDWP, Emergency Steam Air Ejector, etc.).</li> <li>8. Verify Main FDW or EFDW controlling properly.</li> <li>9. Open 1HP-24 and 1HP-25</li> <li>10. Secure makeup to LDST.</li> <li>11. Maintain both SG pressures &lt; 950 psig using either of the following: <ul style="list-style-type: none"> <li>• TBVs</li> <li>• Dispatch two operators to perform Encl 5.24 (Operation of the ADVs)</li> </ul> </li> </ol>
	OATC/BOP	

Op-Test No.: \_\_\_\_\_ Scenario No.: 3 Event No.: 9

Page 2 of 2

Event Description: **SGTR: (M, ALL)**

Time	Position	Applicant's Actions or Behavior
	ALL	<p><b>Crew response:</b></p> <p><b>....SGTR tab continued:</b></p> <p>12. <b>IAAT</b> all the following exist:</p> <ul style="list-style-type: none"> <li>• All SCMs &gt; 0°F</li> <li>• ES Bypass Permit satisfied</li> <li>• RCS pressure controllable</li> </ul> <p><b>THEN</b> bypass ES as necessary.</p> <p>13. Verify any RCP operating. (<b>NOT</b>)</p> <p>14. Minimize core SCM using any/all of the following methods:</p> <ul style="list-style-type: none"> <li>• De-energize all Pzr heaters</li> <li>• Use Pzr spray</li> <li>• Maintain Pzr level 140" - 180" [175" - 215" acc]</li> </ul> <p><b>NOTE: With no RCP's operating, the above methods will be unsuccessful at reducing SCM.</b></p> <p>15. <b>IAAT</b> RCS de-pressurization methods are inadequate in minimizing core SCM, <b>THEN</b> perform Step 36 - 38. (<b>CT-7</b>)</p> <ol style="list-style-type: none"> <li>Verify Pzr spray nozzle <math>\Delta T \geq 410^\circ\text{F}</math>.</li> <li>Close 1LWD-1 and 1LWD-2</li> <li>Cycle PORV as necessary.</li> </ol>
		When crew takes action to minimize SCM or when directed by the Lead Examiner, the scenario is complete.

**CRITICAL TASKS**

1. CT-8, Electrical Power Alignment
2. CT-27, Implementation of Control Room Habitability Guidance
3. CT-7, Minimize SCM
4. CT-10, Establish FDW Flow and Feed Steam Generators





3/10

Facility: <b>Oconee</b>	Scenario No.: <b>4</b>	Op-Test No.: <b>1</b>
Examiners: _____ Operators: _____ _____ _____		
Initial Conditions: <ul style="list-style-type: none"> <li>Reactor power = 0.02%; below POAH</li> </ul>		
Turnover: <ul style="list-style-type: none"> <li>Unit 1 Startup in progress; BOL; not after refueling</li> <li>LDST pressure low, requires H<sub>2</sub> addition</li> <li>Startup procedure at step 3.29 (1102/02 Encl 4.7)</li> </ul>		

Event No.	Malf. No.	Event Type*	Event Description
0a	Override		STBY CC pump fails to Auto start
0b	Override		AFIS does not auto actuate
0c	Override		1FDW-316 failed closed
1	Override	N, BOP, SRO	Pressurize LDST with H2, H2 supply valve (1H-1) fails OPEN (TS)
2		R, OATC, SRO	Increase power to 3% and place ICS in AUTO
3	MPS 290 Override	C, BOP, SRO	1A CC pump trips and 1B CC pump fails to auto start
4	MPS 110	C, BOP, SRO	1HP-5 (Letdown Isolation) fails CLOSED (TS)
5	Override	C, OATC, SRO	1RC-1 (Pzr Spray Valve) fails open
6	MCS012	I, OATC, SRO	1A Turbine bypass valve and its block valve fail open due to instrument failure
7	Override	M, ALL	Excessive Heat Transfer 1FDW-316 failed closed requiring feed through the startup header Transfer to FCD tab
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

DRAFT

Op-Test No.: 1

Scenario No.: 4

Event No.: 1

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Event Description: **Pressurize LDST with H2, H2 supply valve (1H-1) fails OPEN (N, BOP, SRO) (TS)**

Time	Position	Applicant's Actions or Behavior
	SRO	<p><b>Crew response:</b></p> <ol style="list-style-type: none"> <li>1. Direct the BOP to add H2 to the LDST using OP/1/A/1106/017 (Hydrogen System) Enclosure 4.5 (Unit 1 LDST H2 Addition).</li> <li>2. Enclosure 4.5 (Unit 1 LDST H2 Addition) will: <ul style="list-style-type: none"> <li>• Notify Chemistry of hydrogen addition prior to adding hydrogen.</li> </ul> </li> </ol> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• OP/0/A/1108/001 (Curves And General Information) and computer may be referred to for LDST Pressure vs. Level curve.</li> <li>• LDST Maximum Pressure vs Indicated Level Curve should <b>NOT</b> be exceeded when pressurizing LDST.</li> </ul> <p>• Immediately prior to pressurization determine lowest reading of diverse LDST level indications: _____ inches.</p> <p>• For existing LDST level determine LDST Pressure allowable per LDST Pressure vs. Level curve: _____ psig.</p> <p>• Notify Operator at H2 Cage to pressurize primary hydrogen.</p> <p><b>NOTE:</b> Operator should be in constant communication with CR to close 1H-26 if 1H-1 fails open.</p> <ul style="list-style-type: none"> <li>• Direct Operator to open 1H-26 (LDST Block).</li> <li>• Direct Operator to monitor explosive detector.</li> <li>• Cycle 1H-1 (LDST SUPPLY) as required to pressurize LDST per LDST Pressure vs Level curve.</li> </ul> <p><b>Note: 1H-1 (LDST SUPPLY) will fail open.</b></p> <ul style="list-style-type: none"> <li>• <b>WHEN</b> Hydrogen addition complete, ensure closed 1H-1(LDST SUPPLY).</li> </ul>
	BOP	

Op-Test No.: 1

Scenario No.: 4

Event No.: 1

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Event Description: **Pressurize LDST with H2, H2 supply valve (1H-1) fails OPEN (N, BOP, SRO) (TS)**

Time	Position	Applicant's Actions or Behavior
		<p><b>Plant response:</b></p> <ul style="list-style-type: none"> <li>LDST pressure will continue to increase.</li> <li>1SA-02/D-2, HP Approaching LDST Operating Limits, actuates</li> </ul> <p><b>Crew response:</b></p> <ol style="list-style-type: none"> <li>BOP should determine that 1H-1 has failed open and direct the NLO to close 1H-26.</li> <li>Refer to the ARG. <ol style="list-style-type: none"> <li>Verify LDST pressure/level are within the acceptable operating region of the LDST PRESSURE vs. LEVEL enclosure in OP/0/A/1108/001 (Curves and General Information).</li> </ol> </li> </ol> <p><b>IF necessary</b>, vent LDST to GWD per OP/1/A/1104/002 (HPI System).</p> <ol style="list-style-type: none"> <li>LDST PRESSURE vs. LEVEL enclosure in OP/0/A/1108/001 (Curves and General Information) directs the following: <ul style="list-style-type: none"> <li>If LDST Pressure vs. Level is above and to the left of Curve 1, then declare <b>BOTH</b> trains of HPI INOPERABLE. <ul style="list-style-type: none"> <li>Immediately depressurize LDST below Curve 1.</li> <li>Refer to TS 3.0.3 for shutdown requirements.</li> <li>Make notifications as required by OMP 1-14 (Notifications).</li> </ul> </li> </ul> </li> </ol>
	BOP	
	SRO	
	BOP	<ol style="list-style-type: none"> <li>Direct the ROs to vent LDST to GWD per OP/1/A/1104/002 (HPI System), Encl. 4.16, (Lowering LDST Pressure) <ul style="list-style-type: none"> <li>Review Limits and Precautions</li> <li>Direct Operator to Close 1GWD-20 (LDST Vent Blk).</li> <li>Open 1GWD-19 (LDST VENT).</li> <li>Direct Operator to throttle open 1GWD-20 (LDST Vent Blk) until LDST pressure begins to slowly decrease <u>and</u> GWD system can maintain vent header.</li> <li><b>WHEN</b> desired LDST pressure obtained, close 1GWD-19 (LDST VENT)</li> </ul> </li> </ol>
		Event is complete when vent of LDST is complete or when directed by the Lead Examiner.

Op-Test No.: 1

Scenario No.: 4

Event No.: 2

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Event Description: **Increase reactor power to 3% and place ICS in AUTO: (R, OATC, SRO)**

Time	Position	Applicant's Actions or Behavior
		<p><b>Crew response:</b> OP/1/A/1102/001 (Controlling Procedure for Unit Startup)</p>
	SRO/OATC	<p><b>NOTE:</b> POAH is normally achieved from 0.05 to 0.15% power on Wide Range Indications.</p> <p>When POAH is achieved: TBVs will begin to open, 1HP-120 will begin to close, TAVE will increase, &amp; SUR will decrease with negative Moderator Temperature Coefficient.</p>
	BOP	<ol style="list-style-type: none"> <li>1. <u>Begin</u> reactor power increase to 0.5% - 1.0% at <math>\leq 0.5</math> DPM SUR.</li> <li>2. <b>WHEN</b> above POAH, <u>begin</u> reactor power increase to 2.5 -3.5%.</li> <li>3. <b>WHILE</b> power increases, <u>begin</u> increasing 1HP-120 (RC VOLUME CONTROL) setpoint to establish 215" to 225" PZR Level</li> <li>4. <b>WHEN</b> at 2.5% - 3.5% Power, perform the following: <ul style="list-style-type: none"> <li>• Place REACTOR MASTER to "AUTO".</li> <li>• Place DIAMOND to "AUTO".</li> <li>• Ensure TURBINE MASTER Setpoint to <math>\approx 880 - 890</math> psig.</li> </ul> </li> </ol>
		Event is complete when ICS is placed in AUTO or when directed by the Lead Examiner.

Op-Test No.: 1

Scenario No.: 4

Event No.: 3

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Event Description: **1A CC Pump trips, 1B CC Pump Fails to Auto Start: (C; BOP, SRO)**

Time	Position	Applicant's Actions or Behavior
		<p><b>Plant response:</b></p> <ul style="list-style-type: none"> <li>• 1SA-9/B-1, CC CRD RETURN FLOW LOW</li> <li>• 1SA-9/C-1, CC COMP COOLING RETURN FLOW LOW</li> <li>• 1SA-2/C-1, LETDOWN TEMPERATURE HIGH</li> <li>• 1HP-5 (Letdown Isolation) will close due to high letdown temperature</li> <li>• CC Total Flow Low</li> <li>• Component Cooling Pressure Low</li> </ul> <p><b>Crew Response:</b> Refer to ARG 1SA-9/B-1 <u>OR</u> 1SA-9/C-1</p> <p>1. Determine low flow is due to CC Pump failure AND Standby CC Pump did <b><u>NOT</u></b> start and perform the following:</p> <p>2. Verify CC Surge Tank level &gt; 12"</p> <p>3. Start Standby CC Pump</p> <p><b>Note: The SRO may not initiate AP/20 if the Standby Pump is started per the ARG.</b></p> <p>SRO Initiate AP/20 (Loss of Component Cooling)</p> <p>1. <b>IAAT</b> ≥ two CRD stator temperatures ≥ 180°F, a. <b>THEN</b> trip RX. (~ 4 minutes)</p> <p>BOP</p> <p>2. Open 1CC-7 and 1CC-8</p> <p>3. Verify CC Surge Tank level ≥ 12".</p> <p>4. Manually start the Standby CC Pump</p> <p>5. Verify CC TOTAL FLOW &gt; 575 gpm</p> <p>6. If Letdown &gt; 130 °F, THEN:</p> <ul style="list-style-type: none"> <li>• Close 1HP-5,</li> <li>• Initiate AP/032 (Loss of Letdown)</li> </ul>

Op-Test No.: 1

Scenario No.: 4

Event No.: 3

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Event Description: **1A CC Pump trips, 1B CC Pump Fails to Auto Start: (C; BOP, SRO)**

Time	Position	Applicant's Actions or Behavior
	SRO	<b>Crew Response:</b> SRO Directs AP/32 (Loss of Letdown) entry; AP/32 will:
	BOP/ OATC	1. Place 1HP-120 in HAND and reduce demand to zero. 2. Initiate makeup to LDST as required (Encl.5.5 or OP/1/A/1103/004. 3. Notify Chemistry of the following:
	BOP	4. Current RCS boron sample is needed for possible unit shutdown. 5. Normal letdown line is isolated. 6. <b>IAAT</b> Pzr level $\geq 260''$ , <b>AND</b> letdown <b>CANNOT</b> be established, <b>THEN</b> initiate unit shutdown at $\approx 20\%/min$ per AP/29 (Rapid Unit Shutdown). 7. <b>IAAT</b> Pzr level $\geq 375''$ , <b>THEN</b> trip Rx. 8. Position the standby HPI pump switch to OFF. 9. Throttle 1HP-31 to establish 12 - 15 gpm SEAL INLET HDR FLOW. 10. Verify HPI pump flow $\geq 65$ gpm. (30 gpm Recirc + ____ SI + ____ MU) 11. Verify loss of letdown is due to L/D temperature high and then <b>GO TO</b> Step 4.28. 12. Notify SPOC to initiate repairs on failed equipment. 13. <b>IAAT</b> letdown can be re-established, <b>THEN</b> perform Steps 4.30 – 4.45. 14. Place CC system in operation 15. Close 1HP-6 and 1HP-7. 16. Open the following: <ul style="list-style-type: none"> <li>• 1HP-1</li> <li>• 1HP-2</li> <li>• 1HP-3</li> <li>• 1HP-4</li> </ul>

Op-Test No.: 1

Scenario No.: 4

Event No.: 3

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Event Description: **1A CC Pump trips, 1B CC Pump Fails to Auto Start: (C; BOP, SRO)**

Time	Position	Applicant's Actions or Behavior
	SRO/ BOP	<p><b>Crew Response:</b></p> <p>17. Verify letdown temperature &lt; 135°F (<b>it is not</b>; RNO Step 4.34)</p> <p>18. Open 1HP-13.</p> <p>19. Close the following:</p> <ul style="list-style-type: none"> <li>• 1HP-8</li> <li>• 1HP-9&amp;11</li> </ul> <p>20. Select LETDOWN HI TEMP INTLK BYP switch to BYPASS.</p> <p>21. Open 1HP-5.</p> <p>22. Throttle open 1HP-7 to establish ≈ 20 gpm.</p> <p>23. <b>WHEN</b> letdown temperature &lt; 130°F,</p> <p style="padding-left: 40px;"><b>THEN</b> place LETDOWN HI TEMP INTLK BYP switch in NORMAL.</p> <p>24. Open 1HP-6.</p> <p>25. Adjust 1HP-7 to control desired (75 gpm) letdown flow.</p> <p>26. Re-establish normal makeup through 1HP-120.</p> <p>27. Re-establish normal RCP seal injection flow.</p> <p>28. Position the standby HPI pump switch to AUTO.</p>
		<b>This event is complete when Seal Flow is returned to normal (32 gpm) or when directed by the Lead Examiner.</b>



Op-Test No.: 1

Scenario No.: 4

Event No.: 4

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Event Description: **1HP-5 (Letdown Isolation) fails CLOSED (TS)**

Time	Position	Applicant's Actions or Behavior
	OATC	<b>Plant Response:</b> <ul style="list-style-type: none"> <li>• 1HP-5 green closed light is lit</li> <li>• Pzr Level slowly increases</li> <li>• LDST Level slowly decreases</li> </ul>
	OATC/S RO	<b>Crew Response:</b> <ul style="list-style-type: none"> <li>• Enters AP/32 , Loss of Letdown</li> <li>• Place 1HP-120 in HAND and reduce demand to zero.</li> <li>• Initiate makeup to LDST as required.</li> <li>• Position the standby HPI pump switch to OFF.</li> <li>• Throttle 1HP-31 to establish 12 - 15 gpm SEAL INLET HDR FLOW.</li> <li>• GO TO Step 4.10 per Table in AP/32</li> <li>• Close 1HP-6.</li> <li>• Close 1HP-7.</li> <li>• Open 1HP-5.</li> <li>• Open 1HP-5 RNO actions as follows: <ul style="list-style-type: none"> <li>○ Dispatch NEO in continuous communications with control room to manually open 1HP-5 <ul style="list-style-type: none"> <li>▪ NEO manually opens 1HP-5</li> </ul> </li> </ul> </li> </ul> <p><b>Cue: Using TIME COMPRESSION report that 1HP-5 is manually open.</b></p> <p><b>NOTE: Continuous communication can be accomplished using either plant radio or telephone</b></p> <ul style="list-style-type: none"> <li>○ Enter TS 3.6.3</li> <li>• When 1HP-5 is open, THEN continue.</li> <li>• Place CC system in operation.</li> <li>• Verify letdown temperature &lt; 135°F.</li> <li>• Throttle 1HP-7 to establish ~20 gpm</li> <li>• Open 1HP-6</li> </ul>

Op-Test No.: 1	Scenario No.: 4	Event No.: 4	Page 2 of 2
Event Description: 1HP-5 (Letdown Isolation) fails CLOSED (TS)			
Time	Position	Applicant's Actions or Behavior	
	OATC/SRO	<ul style="list-style-type: none"> <li>• Re-establish normal makeup through 1HP-120.</li> <li>• Notify SPOC to initiate repairs on 1HP-5.</li> <li>• Verify seal injection flow reduced in Step 4.7.</li> <li>• Re-establish normal RCP seal injection flow.</li> <li>• Position the standby HPI pump switch to AUTO.</li> <li>• <b>WHEN</b> repairs are complete on 1HP-5 (LETDOWN ISOLATION) (East Pen Rm), <b>THEN</b> perform the following: <ul style="list-style-type: none"> <li>A. ___ Locally turn 1HP-5 handwheel fully clockwise.</li> <li>B. ___ <b>EXIT</b> TS 3.6.3.</li> </ul> </li> </ul> <p><b>NOTE: 1HP-5 will not be repaired during this scenario</b></p>	
		When 1HP-5 is manually opened and NEO is stationed locally or when directed by Lead Examiner then this event is complete.	

Op-Test No.: 1

Scenario No.: 4

Event No.: 5

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Event Description: **PZR Spray Valve Fails OPEN: (C, OATC/SRO)****Note: This event will occur during Event 4.**

Time	Position	Applicant's Actions or Behavior
	SRO/OATC	<p><b>Cue: Call as Secondary Chemistry request SU (AS) steam flow to the "E" Heaters. (If needed to remove the BOP from the front board)</b></p> <p><b>Plant response:</b></p> <ul style="list-style-type: none"> <li>• RCS pressure will decrease</li> <li>• 1SA-2/D-3, RC PRESS HIGH/LOW</li> </ul> <p><b>Crew response:</b></p> <ol style="list-style-type: none"> <li>1. Refer to ARG <ul style="list-style-type: none"> <li>• Refer to 1AP/44, Abnormal Pzr Pressure Control</li> </ul> </li> </ol> <p><b>Note: If the block valve is not closed, the reactor will trip on variable low pressure and ES actuation will occur.</b></p> <ul style="list-style-type: none"> <li>• If the operator identifies 1RC-1 has failed open, he should immediately close the block valve (1RC-3) per IMAs of AP/44</li> <li>• Evaluate reducing or isolating letdown flow</li> <li>• Increase makeup flow as required</li> </ul> <ol style="list-style-type: none"> <li>2. SRO enters to 1AP/44, Abnormal Pzr Pressure Control</li> <li>3. <b>IAAT</b> all of the following conditions exist: <ul style="list-style-type: none"> <li>• RC pressure &lt; 2155 psig</li> <li>• RC pressure decreasing without a corresponding decrease in PZR level</li> <li>• PZR heaters are on</li> </ul> <p><b>THEN</b> close the following:</p> <ul style="list-style-type: none"> <li>• 1RC-1</li> <li>• 1RC-3</li> </ul> </li> <li>4. Verify Pzr heaters maintaining RCS pressure w/in bands</li> <li>5. Notify SPOC to repair failed 1RC-1</li> <li>6. Ensure TS requirements met</li> <li>7. <b>WHEN</b> repairs are complete, <b>THEN</b> place 1RC-1 and 1RC-3 in the desired positions.</li> </ol> <p><b>Note: The PZR spray valve will remain failed for the remainder of the scenario.</b></p>
		<p><b>When RCS pressure decrease has been stopped, or when directed by the Lead Examiner this event is completed.</b></p>

Op-Test No.: 1

Scenario No.: 4

Event No.: 6

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Event Description: **1A TBV fails OPEN (I: OATC, SRO)**

Time	Position	Applicant's Actions or Behavior
	SRO/OATC	<b>Plant response:</b> <ul style="list-style-type: none"> <li>• OAC alarm</li> <li>• 1A Turbine Bypass Valve fails open.</li> <li>• 1A Main Steam line pressure decreases</li> <li>• Reactor Coolant Temperature decreases causing reactor power to increase.</li> </ul>
	OATC	<b>Crew response</b> Crew will perform Low Power "Plant Transient Response". <ol style="list-style-type: none"> <li>1. Place ICS Diamond Panel to MAN</li> <li>2. Place ICS Feedwater Loop Masters 1A &amp; 1B to HAND</li> <li>3. Insert Control Rods to reduce power to below pre-transient level</li> <li>4. As "1A" SG pressure continues to decrease, the OATC should trip the reactor due to the anticipated affects of the excessive heat transfer.</li> </ol>
		<b>When the reactor is tripped or when directed by the Lead Examiner, this event is completed</b>

Op-Test No.: 1

Scenario No.: 4

Event No.: 7

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Event Description: **Excessive Heat Transfer (M, ALL)**

Time	Position	Applicant's Actions or Behavior
		<p><b>Plant response:</b></p> <ul style="list-style-type: none"> <li>Reactor is manually tripped</li> <li>1A SG pressure continues to decrease</li> <li>AFIS fails to initiate automatically</li> </ul> <p><b>Crew response:</b></p> <ol style="list-style-type: none"> <li>Perform Immediate Manual Actions (IMAs) <ul style="list-style-type: none"> <li>Depress REACTOR TRIP pushbutton.</li> <li>Verify reactor power &lt; 5% FP and decreasing.</li> <li>Depress turbine TRIP pushbutton.</li> <li>Verify all turbine stop valves closed.</li> <li>Verify RCP seal injection available.</li> </ul> </li> <li>Perform Symptom Check <ul style="list-style-type: none"> <li>Power Range NIs &lt; 5%</li> <li>Power Range NIs decreasing</li> <li>SCMs are <b>NOT</b> &lt; 0°F</li> <li><b>NO</b> Loss of Main and Emergency FDW (including unsuccessful manual initiation of EFDW) exists</li> <li><u>Uncontrolled Main steam line(s) pressure decrease</u></li> <li><b>NO</b> SGTR</li> <li>CSAE Offgas alarms</li> <li>Process monitor alarms (RIA-40, 59, 60)</li> <li>Area monitor alarms (RIA-16/17)</li> </ul> </li> </ol> <p>An RO will recognize indications of a steam line break on the 1A MS Line and initiate <u>Rule 5</u> (Excessive Heat Transfer).</p> <p><u>Rule 5 (CT-17)</u></p> <ul style="list-style-type: none"> <li>On AFIS HEADER A, depress CH. 1 INIT.</li> <li>On AFIS HEADER A, depress CH. 2 INIT.</li> </ul> <p><b>NOTE: AFIS will not work</b></p> <ul style="list-style-type: none"> <li>Select OFF for 1A MD EFDWP.</li> <li>Trip both Main FDWPTs.</li> <li>Close 1FDW-315.</li> <li>Place 1FDW-33 switch to CLOSE.</li> <li>Place 1FDW-31 switch to CLOSE.</li> </ul>

Op-Test No.: 1	Scenario No.: 4	Event No.: 7	Page 2 of 5
Event Description: <b>Excessive Heat Transfer (M, ALL)</b>			
Position	Applicant's Actions or Behavior		
BOP/OATC	<p><b>Crew response:</b></p> <p>3. <u>Rule 5</u> Continued.</p> <ul style="list-style-type: none"> <li>• Verify 1 TD EFDW PUMP operating.</li> <li>• Verify 1 TD EFDW PUMP is feeding <u>affected</u> SGs. (<b>NOT</b>)</li> <li>• Verify 1B SG is an <u>affected</u> SG. (<b>NOT</b>)</li> <li>• <b>WHEN</b> overcooling is stopped, <b>THEN</b> adjust steaming of unaffected SG to maintain CETCs constant using <u>either</u> of the following: <ul style="list-style-type: none"> <li>○ TBVs</li> <li>○ Dispatch two operators to perform Encl 5.24 (Operation of the ADVs).</li> </ul> </li> </ul>		
	<p style="text-align: center;"><b><u>CAUTION</u></b></p> <p>Thermal shock conditions may develop if HPI is <b>NOT</b> throttled and RCS pressure <b>NOT</b> controlled.</p>		
BOP/OATC	<ul style="list-style-type: none"> <li>• <b>WHEN</b> <u>all</u> the following exist: <ul style="list-style-type: none"> <li>➤ Core SCM &gt; 0 F</li> <li>➤ Rx power ≤ 1%</li> <li>➤ Pzr level</li> </ul> <b>THEN</b> perform the following to stabilize RCS P/T: <ul style="list-style-type: none"> <li>➤ Throttle HPI.</li> <li>➤ Reduce 1HP-120 setpoint to control at &gt;100" [180"acc].</li> <li>➤ Adjust steaming of <u>unaffected</u> SG as necessary to maintain CETCs constant.</li> </ul> </li> <li>• Ensure Rule 3 (Loss of Main or Emergency FDW) is in progress or complete.</li> </ul> <p>4. <u>Rule 3</u> (Loss of Main or Emergency Feedwater)</p> <ul style="list-style-type: none"> <li>• <b>IAAT NO</b> SGs can be fed with FDW (Main/CBP/Emergency), <b>AND</b> <u>any</u> of the following exist: <ul style="list-style-type: none"> <li>○ RCS pressure reaches 2300 psig <b>OR</b> NDT limit</li> <li>○ Pzr level reaches 375" [340" acc]</li> </ul> <b>THEN PERFORM</b> Rule 4 (Initiation of HPI Forced Cooling).</li> </ul>		

Op-Test No.: 1

Scenario No.: 4

Event No.: 7

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Event Description: **Excessive Heat Transfer (M, ALL)**

Time	Position	Applicant's Actions or Behavior
	BOP/OATC	<b>Crew response:</b> 4. Rule 3 continued <ul style="list-style-type: none"> <li>Start EFDW pumps to feed <u>all intact</u> SGs.</li> <li>Verify <u>any</u> EFDW pump operating.</li> <li>Verify any SCM <math>\leq 0^{\circ}\text{F}</math>.</li> <li><b>IAAT</b> <u>both</u> of the following exist:               <ul style="list-style-type: none"> <li>An EFDW valve will <b>NOT</b> control in AUTO</li> <li>The same EFDW control valve will NOT respond in MANUAL</li> </ul> <b>THEN</b> perform Steps 33 and 34.             </li> <li>Notify CR SRO that <b>Encl. 5,27 (Alternate Methods for Controlling EFDW Flow) is being initiated due to 1FDW-316 failed closed.</b></li> <li>Initiate Encl. 5.27, (Alternate Methods for Controlling EFDW Flow)</li> </ul> 3. Encl. 5.27 <ul style="list-style-type: none"> <li>Identify the failure: (CHART; 1FDW-316 – CLOSED) <b>Step 39</b></li> <li>Stop 1B MD EFDWP.</li> <li>Verify 1A MD EFWP is operating. (<b>RNO</b>)               <ul style="list-style-type: none"> <li>Close 1FDW-369; <b>GO TO</b> Step 43.</li> </ul> </li> <li>Place 1FDW-44 in HAND <u>and</u> set demand to 0%.</li> <li>Close 1FDW-42</li> <li>Verify 1B MD EFDWP will be used.</li> <li>Open 1FDW-384.</li> <li>Verify the following:               <ul style="list-style-type: none"> <li>1FDW-45 closed</li> <li>1FDW-47 open</li> </ul> </li> <li>Start 1B MD EFDWP.</li> <li>Throttle 1FDW-44 to establish 100 gpm.</li> <li>Throttle 1FDW-44 to obtain desired SG level per Rule 7 (SG Feed Control). (<b>CT-10</b>)</li> <li><b>IAAT</b> proper SG level is reached and level permits auto level control, <b>THEN</b> place 1FDW-44 in AUTO.</li> </ul>
	BOP/OATC	
	OATC/SRO	

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Scenario No.: 4

Event No.: 7

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Event Description: **Excessive Heat Transfer (M, ALL)**

Time	Position	Applicant's Actions or Behavior
	SRO	<b>Crew response:</b> Transfer to EOP <u>Subsequent Actions</u> tab then to the <u>Excessive Heat Transfer</u> tab per the Parallel Actions page of Subsequent Actions 1. Verify any SG pressure < 550 psig. 2. Ensure Rule 5 (Main Steam Line Break) in progress or complete. 3. Place the following in HAND and decrease demand to zero on <u>all affected</u> SGs: <ul style="list-style-type: none"> <li>• 1FDW-32</li> <li>• 1FDW-35</li> </ul>
	SRO/BOP /OATC	
	SRO/BOP /OATC	
		4. Close the following on <u>all affected</u> SGs: <ul style="list-style-type: none"> <li>• 1FDW-372</li> <li>• 1MS-17</li> <li>• 1MS-79</li> <li>• 1MS-35</li> <li>• 1MS-82</li> <li>• 1FDW-368</li> </ul> 5. Verify level in both SGs < 96% O.R. 6. IAAT core SCM is > 0°F, <ul style="list-style-type: none"> <li>• Throttle HPI per Rule 6 (HPI).</li> </ul> 7. Verify letdown in service. 8. Verify any SG has an intact secondary boundary (intact SG). 9. Open the following on all intact SGs: <ul style="list-style-type: none"> <li>• 1FDW-382</li> <li>• 1FDW-369</li> </ul> 10. Start 1B MDEFDWP 11. Feed and steam <u>all intact</u> SGs to stabilize RCS P/T using <u>either</u> of the following: <ul style="list-style-type: none"> <li>• TBVs</li> <li>• Dispatch two operators to perform Encl 5.24 (Operation of the ADVs).</li> </ul>



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Scenario No.: 4

Event No.: 7

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Event Description: **Excessive Heat Transfer (M, ALL)**

Time	Position	Applicant's Actions or Behavior
	OATC/SRO /BOP	<p><b>Crew response:</b></p> <p><b>Excessive Heat Transfer</b> tab of the EOP (Continued)</p> <p>12. Verify <u>any</u> of the following:</p> <ul style="list-style-type: none"> <li>• HPI has operated in the injection mode while NO RCPs were operating</li> <li>• A cooldown below 400 °F at &gt; 100 °F/hr has occurred</li> </ul> <p>13. Verify both of the following are closed:</p> <ul style="list-style-type: none"> <li>• 1MS-24</li> <li>• 1MS-33</li> </ul> <p>14. Open 1AS-8.</p> <p>15. Close the following 1SSH-9.</p> <p>16. Notify Chemistry to determine RCS boron concentration</p> <p>17. <b>IAAT</b> all the following exist:</p> <ul style="list-style-type: none"> <li>• ES Bypass Permit satisfied</li> <li>• All SCMs &gt; 0°F</li> <li>• RCS pressure controllable</li> </ul> <p><b>THEN</b> bypass ES as necessary.</p> <p>18. Verify any SG is dry.</p> <p>19. Minimize SCM using the following methods as necessary:</p> <ul style="list-style-type: none"> <li>• De-energize all Pzr heaters</li> <li>• Use Pzr spray</li> <li>• Throttle HPI to maintain Pzr level 100"[180"acc]</li> <li>• Use PORV</li> </ul> <p>20. Verify any RCP operating. Maintain RCP NPSH.</p> <ul style="list-style-type: none"> <li>• OAC</li> <li>• Encl 5.18 (P/T Curves)</li> </ul> <p>21. Initiate Encl 5.16 (SG Tube-to-Shell ΔT Control).</p> <p>22. <b>IAAT</b> all the following exist:</p> <p>23. RBS actuated</p> <ul style="list-style-type: none"> <li>• RB pressure &lt; 10 psig</li> <li>• 1RIA-57 <b>NOT</b> in alarm</li> <li>• 1RIA-58 <b>NOT</b> in alarm</li> </ul> <p><b>THEN</b> stop both RBS pumps.</p>

Op-Test No.: 1	Scenario No.: 4	Event No.: 7	Page 4 of 4
Event Description: <b>Excessive Heat Transfer (M, ALL)</b>			
Time	Position	Applicant's Actions or Behavior	
	OATC/SRO /BOP	<p><b>Crew response:</b></p> <p><b>Excessive Heat Transfer</b> tab of the EOP (Continued)</p> <p>24. Verify any RCP operating. Maintain RCP NPSH.</p> <ul style="list-style-type: none"> <li>• OAC</li> <li>• Encl 5.18 (P/T Curves)</li> </ul> <p>25. Initiate Encl 5.16 (SG Tube-to-Shell <math>\Delta T</math> Control).</p> <p>26. <b>IAAT</b> all the following exist:</p> <ul style="list-style-type: none"> <li>• RBS actuated</li> <li>• RB pressure &lt; 10 psig</li> <li>• 1RIA-57 <b>NOT</b> in alarm</li> <li>• 1RIA-58 <b>NOT</b> in alarm</li> </ul> <p><b>THEN</b> stop both RBS pumps.</p> <p>27. <b>IAAT</b> Tcold approaches 350°F,</p> <ul style="list-style-type: none"> <li>• <b>AND</b> all RCPs are operating,</li> <li>• <b>THEN</b> ensure &lt; four RCPs are operating.</li> <li>• <b>IAAT</b> BWST level is <math>\leq 19'</math>,</li> </ul> <p><b>THEN</b> initiate Encl 5.12 (ECCS Suction Swap to RBES).</p> <p>28. Verify all SCMs &gt; 0°F.</p> <p>29. Verify indications of SGTR exist.</p> <p>30. Verify required RCS makeup flow within normal makeup capability</p> <p>31. Verify either of the following:</p> <ul style="list-style-type: none"> <li>• Any SG isolated</li> <li>• Any SG has an unisolable steam leak</li> </ul> <p>32. <b>GO TO</b> FCD tab.</p>	
		<p><b>When transfer to the FCD tab is made or when directed by the Lead Examiner this event is completed</b></p>	

**CRITICAL TASKS**

1. CT-17, Isolate Overcooling
2. CT- 10, Establish FDW Flow and Feed SGs