

3/10

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

Examiners: _____ Operators: _____ **SRO**
 _____ **OATC**
 _____ **BOP**

Initial Conditions:

- 65% Reactor Power

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	MPS 247	C, BOP, SRO	1B1 RCP lower seal fails (Requires pump shutdown)
4	MPI 281	I, OATC, SRO	ICS fails to re-ratio Feedwater
5	MPS 248 MPS 249	C, ALL	RCS Leak (1B1 RCP middle and upper seals fail) (TS)
6		R, OATC, SRO	Manual plant shutdown
7	Pre-Insert	C, OATC, SRO	Turbine fails to trip requiring EHC pumps lockout
8	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>Crew response: OP/1/A/1106/002 B Enclosure 4.10 (Placing 1A FDWPT On Handjack)</p> <ul style="list-style-type: none"> • Ensure 1A MAIN FDW PUMP (ICS) in "HAND". <p>NOTE: 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> <ul style="list-style-type: none"> • Run 1A FDWPT Motor Speed Changer down to control 1A FDWPT. <p>NOTE: Handjack "ON" simulates Motor Gear Unit at high speed stop. When Handjack switch is placed to on FDWPT speed may increase ~40 rpm.</p> <ul style="list-style-type: none"> • Turn FDWPT 1A HANDJACK switch to "ON". • 1A FDWPT speed now controlled with 1A FDWPT Motor Speed Changer. • Record on Turnover Sheet control of 1A FDWPT on Motor Speed Changer. • 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.</p>

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Event Description:

Vacuum Leak: (C; BOP, SRO)

Time	Position	Applicant's Actions or Behavior
	BOP SRO BOP	<p>Plant response:</p> <ul style="list-style-type: none"> • 1SA-03/A-6, COND VACUUM LOW • OAC alarm, Main Condenser Vacuum LOW <p>Crew response:</p> <p>Refer to the ARG and AP/27, Loss of Condenser Vacuum.</p> <p>Refer to AP/27:</p> <ul style="list-style-type: none"> • Announce AP entry using PA system. • IAAT condenser vacuum is ≤ 22" Hg, THEN trip RX. • Dispatch operators to perform Encl. 5.1 (Main Vacuum Pump Alignment) and look for vacuum leaks. <p>Booth cue: Notify CR that USING TIME COMPRESSION, Main Vacuum Pumps are aligned per Encl. 5.1.</p> <ul style="list-style-type: none"> • Start all Main Vacuum Pumps. • Ensure 1V-186 is closed. • Ensure Stm to Stm Air Eject A, B, C > 255 psig. • Verify Stm Seal Hdr Press > 1.5 psig. • Start 1D CCW pump to ensure all CCW pumps operating. <p>Booth cue: Call Control Room as the NEO and report that a leak was found on the 1B Main FDW Pump pumping trap sight glass and has been isolated.</p> <ul style="list-style-type: none"> • Verify Condensate flow ≥ 2300 gpm. • WHEN condenser vacuum is stable, AND Encl 5.1 (Main Vacuum Pump Alignment) is complete, THEN EXIT this procedure.
		<p>When vacuum has been recovered or when directed by the Lead Examiner, the event is complete.</p>

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

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

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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"> • Verify Rx power is \leq 70% • Verify <u>any</u> SG <u>not</u> on Low Level Limits • Verify FDW masters in Auto • Stop 1B1 RCP • Verify ICS re-ratios feedwater • Initiate Encl 4.3 (Special Instructions for < 4 RCP Operation) of OP/1/A/1102/004 • IAAT RCP has been shut down for >30 minutes, THEN close the associated RCP motor cooler inlet/outlet valve (1LPSW-9 & 10)
		<p>When the 1B1 RCP has been secured or when directed by the Lead Examiner, the event is complete.</p>

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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>Plant response:</p> <p>When the 1B1 RCP is secured the ΔTc controller will fail at $\sim +3.5$</p> <p>Feedwater flow will continue to increase to the 1A SG and decrease to the 1B SG causing the actual ΔTc to become increasingly negative.</p> <p>Crew response:</p> <p><u>AP/16</u> (Continued)</p> <ul style="list-style-type: none"> • Verify ICS re-ratios feedwater to establish $\approx 0^\circ F \Delta Tc$. <p>NOTE: ΔTc controller will fail in auto and manual </p> <ul style="list-style-type: none"> • Place DELTA Tc station in HAND. • Manually adjust DELTA Tc station to achieve $\approx 0^\circ \Delta Tc$. <p style="text-align: center;">CAUTION:</p> <p><u>Total</u> feedwater flow should be maintained constant to prevent changes in core reactivity.</p> <ul style="list-style-type: none"> • IF DELTA Tc station does NOT control, THEN perform the following: <ul style="list-style-type: none"> ○ Place 1A and 1B FDW MASTERS in HAND: • Manually adjust FDW masters to achieve $\approx 0^\circ \Delta Tc$. <ul style="list-style-type: none"> ○ Initiate AP/28 (ICS Instrument Failure). <p>Note: FDW Master toggle switches will have to be used to adjust ΔTc. Decrease the 1A and Increase the 1B</p> <ul style="list-style-type: none"> • Initiate Encl 4.3 (Special Instructions for < 4 RCP Operation) of OP/1/A/1102/004 (Operation at Power). • IAAT any of the following indicate external RCP seal leakage: <ul style="list-style-type: none"> ○ RB RIAs increasing or in alarm ○ RCS Tave constant with LDST level decreasing more than normal ○ Quench Tank level rate increasing ○ RB Normal Sump rate increasing ○ Visual confirmation <p>THEN initiate AP/02 (Excessive RCS Leakage).</p> <ul style="list-style-type: none"> • Verify 1HP-20 and 1HP-21 are open: • Verify 1HP-232 is open.

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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>Crew response: (Continued) <u>AP/28</u></p> <ul style="list-style-type: none"> • Verify entry into AP/28: <ul style="list-style-type: none"> ○ Power > 3% ○ PTR actions taken <u>and</u> TPB ≤ the pre-transient power level AND Delta Tc has failed. • Verify that current thermal power best is ≤ pre-transient thermal power best and that the plant is stable. • Notify Rx Engineering to provide Control Room with a maneuvering plan. • GO TO the applicable section (4F – Delta Tc) per the following table: <p><u>4F - Delta Tc</u></p> <ul style="list-style-type: none"> ➤ Ensure the following in HAND: <ul style="list-style-type: none"> • 1A FDW MASTER • 1B FDW MASTER • DELTA Tc ➤ Re-ratio feedwater flow, as required, to establish ≈ 0°F DELTA Tc while maintaining total feedwater flow constant. ➤ Notify SPOC to perform the following: <ul style="list-style-type: none"> • Investigate and repair the failed Delta Tc controller. ➤ WHEN notified by SPOC that Delta Tc controller has been repaired, THEN GO TO Encl 5.1 (Placing ICS in AUTO).
		<p>When the plant is stable and SPOC has been notified, or when directed by the Lead Examiner this event is completed.</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
	BOP/SRO	<p>Crew response:</p> <p><u>AP2</u> (Continued)</p> <ul style="list-style-type: none"> • Announce AP entry using the PA system. • Make notifications to OSM, STA, & RP • Monitor OAC for leak trends/data • Initiate <u>Encl 5.1</u> (Leak Rate Determination). Calculation of RCS Volume Loss: Leak Rate = $\frac{\text{MU}}{\text{MU}} + \frac{\text{SI}}{\text{SI}} - \frac{\text{LD}}{\text{LD}} - \frac{\text{TSR}}{\text{TSR}} = \text{_____}$ <p>Where: MU = Makeup Flow SI = Seal Inlet Hdr Flow LD = Letdown Flow TSR = Total Seal Return Flow</p> <ul style="list-style-type: none"> • Go To Step 4.145 based on leakage from RCP seal failure • Discontinue pumping RBNS since leak > 10 gpm • IAAT leak rate > TS, THEN initiate shutdown by one of the following: <ul style="list-style-type: none"> • AP/29 (Rapid Unit Shutdown) • OP/1/A/1102/004 (Operation At Power) • OP/1/A/1102/010 (Controlling Procedure For Unit Shutdown). <p>NOTE: Crew will use AP/29</p> <p>NOTE: LCO 3.4.13 (RCS operational LEAKAGE) RCS operational LEAKAGE shall be limited to:</p> <ul style="list-style-type: none"> • No pressure boundary LEAKAGE; • 1 gpm unidentified LEAKAGE; • 10 gpm identified LEAKAGE; and • 150 gallons per day primary to secondary LEAKAGE
		<p>When plant shutdown has been directed or when directed by the Lead Examiner this event is completed.</p>

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

Time	Position	Applicant's Actions or Behavior						
		<p>Crew response: AP/29 (Rapid Unit Shutdown)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; text-align: center; vertical-align: middle;">SRO</td> <td style="padding: 5px;"> <p style="text-align: center;">NOTE</p> <p>The CR SRO should read this procedure and it should NOT be used when EOP entry conditions exist.</p> </td> </tr> <tr> <td style="width: 15%; text-align: center; vertical-align: middle;">BOP</td> <td style="padding: 5px;"> <ul style="list-style-type: none"> • Initiate Encl 5.1 (Support Actions During Rapid Unit Shutdown). • Announce AP entry using the PA system. • Verify ICS in AUTO. </td> </tr> <tr> <td style="width: 15%; text-align: center; vertical-align: middle;">OATC</td> <td style="padding: 5px;"> <p>NOTE: ICS is in MANUAL. The OATC will use the Reactor Diamond and the FDW masters to reduce power.</p> <p>RNO: Initiate manual power reduction to desired power level.</p> <ul style="list-style-type: none"> • Verify both Main FDWPs operating. • Verify 1B FDWP to be shut down first. • Adjust the FWP bias counterclockwise to lower 1B FDWP suction flow ~ 1×10^6 lb/hr < 1A FDWP suction flow. • WHEN core thermal power is < 65% FP, THEN continue. • IAAT any of the following statalarms are received: <ul style="list-style-type: none"> • 1SA-16/A-1 (FWP A FLOW MINIMUM) • 1SA-16/A-2 (FWP A FLOW BELOW MIN) • 1SA-16/A-3 (FWP B FLOW MINIMUM) • 1SA-16/A-4 (FWP B FLOW BELOW MIN), • THEN trip the 1B Main FDWP. • Verify Turbine-Generator shutdown is required. • Start the TURBINE TURNING GEAR OIL PUMP. • Start 1A through 1E TURBINE BRNG OIL LIFT PUMPS. • Start the TURBINE MOTOR SUCTION PUMP. • WHEN NI power \leq 18%, THEN depress turbine TRIP pushbutton. </td> </tr> </table>	SRO	<p style="text-align: center;">NOTE</p> <p>The CR SRO should read this procedure and it should NOT be used when EOP entry conditions exist.</p>	BOP	<ul style="list-style-type: none"> • Initiate Encl 5.1 (Support Actions During Rapid Unit Shutdown). • Announce AP entry using the PA system. • Verify ICS in AUTO. 	OATC	<p>NOTE: ICS is in MANUAL. The OATC will use the Reactor Diamond and the FDW masters to reduce power.</p> <p>RNO: Initiate manual power reduction to desired power level.</p> <ul style="list-style-type: none"> • Verify both Main FDWPs operating. • Verify 1B FDWP to be shut down first. • Adjust the FWP bias counterclockwise to lower 1B FDWP suction flow ~ 1×10^6 lb/hr < 1A FDWP suction flow. • WHEN core thermal power is < 65% FP, THEN continue. • IAAT any of the following statalarms are received: <ul style="list-style-type: none"> • 1SA-16/A-1 (FWP A FLOW MINIMUM) • 1SA-16/A-2 (FWP A FLOW BELOW MIN) • 1SA-16/A-3 (FWP B FLOW MINIMUM) • 1SA-16/A-4 (FWP B FLOW BELOW MIN), • THEN trip the 1B Main FDWP. • Verify Turbine-Generator shutdown is required. • Start the TURBINE TURNING GEAR OIL PUMP. • Start 1A through 1E TURBINE BRNG OIL LIFT PUMPS. • Start the TURBINE MOTOR SUCTION PUMP. • WHEN NI power \leq 18%, THEN depress turbine TRIP pushbutton.
SRO	<p style="text-align: center;">NOTE</p> <p>The CR SRO should read this procedure and it should NOT be used when EOP entry conditions exist.</p>							
BOP	<ul style="list-style-type: none"> • Initiate Encl 5.1 (Support Actions During Rapid Unit Shutdown). • Announce AP entry using the PA system. • Verify ICS in AUTO. 							
OATC	<p>NOTE: ICS is in MANUAL. The OATC will use the Reactor Diamond and the FDW masters to reduce power.</p> <p>RNO: Initiate manual power reduction to desired power level.</p> <ul style="list-style-type: none"> • Verify both Main FDWPs operating. • Verify 1B FDWP to be shut down first. • Adjust the FWP bias counterclockwise to lower 1B FDWP suction flow ~ 1×10^6 lb/hr < 1A FDWP suction flow. • WHEN core thermal power is < 65% FP, THEN continue. • IAAT any of the following statalarms are received: <ul style="list-style-type: none"> • 1SA-16/A-1 (FWP A FLOW MINIMUM) • 1SA-16/A-2 (FWP A FLOW BELOW MIN) • 1SA-16/A-3 (FWP B FLOW MINIMUM) • 1SA-16/A-4 (FWP B FLOW BELOW MIN), • THEN trip the 1B Main FDWP. • Verify Turbine-Generator shutdown is required. • Start the TURBINE TURNING GEAR OIL PUMP. • Start 1A through 1E TURBINE BRNG OIL LIFT PUMPS. • Start the TURBINE MOTOR SUCTION PUMP. • WHEN NI power \leq 18%, THEN depress turbine TRIP pushbutton. 							

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

Time	Position	Applicant's Actions or Behavior
	BOP	<p>Crew response: Encl 5.1 (Support Actions During Rapid Unit Shutdown).</p> <ul style="list-style-type: none"> • Notify WCC SRO to initiate Encl 5.2 (WCC SRO Support During Rapid Unit Shutdown). • Start the following pumps: <ul style="list-style-type: none"> • 1A and 1B FDWP SEAL INJECTION PUMP • 1A and 1B FDWP AUXILIARY OIL PUMP • Stop 1E1 and 1E2 HTR DRN PUMPS. (already off) • Verify Turbine-Generator shutdown is required. • Place the following transfer switches to MAN: <ul style="list-style-type: none"> • 1TA and 1TB AUTO/MAN • Close 1TA SU 6.9 KV FDR and verify 1TA NORMAL 6.9 KV FDR opens. • Close 1TB SU 6.9 KV FDR and verify 1TB NORMAL 6.9 KV FDR opens. • Place the following transfer switches to MAN: <ul style="list-style-type: none"> • MFB1 and MFB2 AUTO/MAN • Close E1₁ MFB1 STARTUP FDR and verify N1₁ MFB1 NORMAL FDR opens. • Close E2₁ MFB2 STARTUP FDR and verify N2₁ MFB2 NORMAL FDR opens. • Notify CR SRO that Unit auxiliaries have been transferred. • WHEN CTP \leq 65%, THEN place 1FDW-53 and 1FDW-65 in MANUAL and close: • Ensure 1A and 1B MSRH DRN PUMP is stopped. • Place 1HD-37 and 1HD-52 in DUMP. • WHEN CTP is \leq 60%, THEN ensure 1SSH-9 closed.
		<p>When the OATC has reduced power ~ 10%, or when directed by the Lead Examiner this event is completed.</p>

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Event Description: **Main Turbine Fails to trip (Lockout EHC Pumps) (C, OATC)**

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

Time	Position	Applicant's Actions or Behavior
	<p>SRO</p> <p>OATC</p> <p>BOP</p>	<p>Plant response:</p> <ul style="list-style-type: none"> • 1SA-9/A-6, RB Reactor Building Normal Sump Level High/Low • 1SA-1/A-1, B-1, C-1, D-1, RP Channel Trip • 1SA-2/D-3, RC Press High/Low • A SBLOCA will result in a reactor trip. • 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. <p>Crew response:</p> <ul style="list-style-type: none"> • SRO will enter the EOP. • OATC will perform Immediate Manual Actions <ul style="list-style-type: none"> • Depress REACTOR TRIP pushbutton • Verify reactor power < 5% FP and decreasing • Depress turbine TRIP pushbutton. • Verify all turbine stop valves closed <p>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)</p> <ul style="list-style-type: none"> • Verify RCP seal injection available. • BOP will perform a symptom check.
		<p>Event is complete when EHC pumps have been tripped or when directed by the Lead Examiner.</p>

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

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

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

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

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

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

Time	Position	Applicant's Actions or Behavior
	BOP/ OATC	<p>Crew response:</p> <p>Rule 3:</p> <ul style="list-style-type: none"> • IAAT NO SGs can be fed with FDW (Main/CBP/Emergency), AND any of the following exist: <ul style="list-style-type: none"> ○ RCS pressure reaches 2300 psig OR NDT limit ○ Pzr level reaches 375" [340" acc] <p>THEN PERFORM Rule 4</p> <ul style="list-style-type: none"> • Start EFDW pumps to feed all intact SGs. • Verify any EFDW pump operating. • IAAT Unit 1 EFDW is in operation, THEN initiate Encl 5.9 (Extended EFDW Operation). <p>Encl 5.9 (Extended EFDW Operation)</p> <ul style="list-style-type: none"> • Monitor EFDW parameters on EFW graphic display. • Perform the following as required to maintain UST level > 7.5': <ul style="list-style-type: none"> ○ Makeup with demin water. ○ Place CST pumps in AUTO. • IAAT all the following exist: <ul style="list-style-type: none"> ○ Rapid cooldown NOT in progress ○ MD EFDWP operating for each available SG ○ EFDW flow in each header < 600 gpm <p>THEN place 1 TD EFDW PUMP switch in PULL TO LOCK.</p> <ul style="list-style-type: none"> • Notify CR SRO to set priority based on the NOTE above and EOP activities.

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

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

Op-Test No.: _____

Scenario No.: 1

Event No.: 8

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

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

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

Simulator Brief/Turnover

SAFETY/PRA RISK (OSM)			
SAFETY: Take a Minute			
PRA Risk Status: GREEN			
UNIT 0 (OSM)			
SSF Operable: Yes	KHU's Operable: U1 - OH, U2 - UG	LCTs Operable: 2	Fuel Handling: None

UNIT STATUS (CR SRO)		
Unit 1 Simulator	Other Units	
Mode: 1	Unit 2	Unit 3
Reactor Power: 65%	Mode: 1	Mode: 1
Gross MWE: 586	100% Power	100% Power
RCS Leakage: .025 gpm	EFDW Backup: Yes	EFDW Backup: Yes

Technical Specifications/SLC Items (CR SRO)			
Component/Train	OOS Date/Time	Restoration Required Date/Time	TS/SLC #

Shift Turnover Items (CR SRO)
<i>Primary</i>
<ul style="list-style-type: none"> • 492 EFPD • Two hours ago power was decreased from 100% for possible work on the 1A Main FDW pump. • Rx Engineering is developing a maneuvering plan to maintain current power level.
<i>Secondary</i>
<ul style="list-style-type: none"> • 1SSH-1, 1SSH-3, 1SD-2, 1SD-5, 1SD-140, 1SD-303, 1SD-355, 1SD-356 and 1SD-358 are closed with power supply breakers open per the Startup Procedure for SSF Overcooling Event. 1PR-1, 1PR-6, 1LPSW-1, 1LPSW-2, 1LPSW-3, 1FDW-80, 1CF-5, 1CF-6, 1LP-1 and 1LP-2 breakers open per the appropriate system operating procedures. • Unit 3 has the Aux Steam Header • OP/1/A/1102/004 Operation at Power in progress. Enc. 4.2 is complete up through step 2.19. • After shift turnover, place the 1A Main FDW pump on Handjack per OP/1/A/1106/002 B Enclosure 4.10 (Placing 1A FDWPT On Handjack)

Reactivity Management (CR SRO)
RCS Boron: 30 ppmB Gp 7 Rod Position: 79% Batch additions as required for volume control.
Human Performance Emphasis (OSM)
Procedure Use and Adherence

3/10

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

Examiners: _____ Operators: _____ **SRO**
 _____ **OATC**
 _____ **BOP**

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, OATC, SRO	Inadvertent ES Channels 2 actuation (TS)
4	MCS 004	I, OATC, SRO	Controlling Tave fails high
5	Override MSS 460	C, BOP, SRO	1A CBP Trip and 1B CBP fails to Auto Start.
6	MSS 010 MSS 020 MSS 260 MSS 270	M, ALL	Loss of Main and Emergency Feedwater LOHT Tab CBP feed
7	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

Op-Test No.: 1

Scenario No.: 2

Event No.: 1

Page 1 of 2

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

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

Op-Test No.: 1

Scenario No.: 2

Event No.: 1

Page 2 of 2

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

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

Op-Test No.: 1

Scenario No.: 2

Event No.: 3

Page 1 of 3

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

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

Op-Test No.: 1

Scenario No.: 2

Event No.: 3

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

Time	Position	Applicant's Actions or Behavior
	SRO	<p>Crew response:</p> <ul style="list-style-type: none"> • AP/42 (Inadvertent ES Actuation) Actions (Continued) <ul style="list-style-type: none"> • Verify ICS in AUTO • Initiate a power decrease to maintain control rods within the desired band by adjusting rate set as necessary and decrease CTP demand setpoint. • Notify Chemistry for RCS and LDST boron sample • Notify Rx Engineering to develop a maneuvering plan • Place LOAD SHED & STBY BKR 1 and 2 in MANUAL on the RZ Module • Dispatch an operator to perform Encl. 5.3 (SSF Restoration) • Notify SPOC to investigate and repair the failed ES components • IAAT Rx power is stable THEN initiate evaluation of NI operability in accordance with OP/1/A/1102/004 (Operation At Power) Limits and Precautions. • Initiate logging TS/SLC Entry/Exit as applicable, IAW Encl. 5.4 (TS/SLC Requirements) (TS) <ul style="list-style-type: none"> ○ TS 3.3.7 – ESPS Digital Automatic Actuation Logic Channels Condition A; Place associated component(s) in ES configuration OR Declare the associated component(s) inoperable within 1 hour. ○ TS 3.3.6 – ESPS Manual Instrumentation Condition A; Restore channel to OPERABLE status within 72 hours ○ TS 3.4.15 – RCS Leakage Detection Instrumentation Condition B; Analyze grab samples of the containment atmosphere once per 24 hours. (can be exited once Encl. 5.1, Side Board Actions completed) ○ TS 3.4.9 – Pressurizer Condition A; Restore level within limit within 1 hour Note: Should enter ONLY if Pzr level exceeds 260 inches • WHEN all the following exist: <ul style="list-style-type: none"> ○ Cause of inadvertent ES resolved ○ ES Channel reset is desired ○ OSM concurs <p>THEN continue.</p>
		<p>When plant is stable and Letdown has been restored, or when directed by the Lead Examiner the event is completed.</p>

Op-Test No.: 1

Scenario No.: 2

Event No.: 5

Page 2 of 2

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

Time	Position	Applicant's Actions or Behavior
	SRO/BOP /OATC	<p>Crew Response:</p> <p>Note: If the plant does NOT trip, the crew may reset 1C-61 and restore the Powdex as described below.</p> <ul style="list-style-type: none"> • Reset 1C-61 when FDWP suction pressure ≥ 235 psig (OP/1/A/1106/002 Condensate and Feedwater, Enclosure 4.22- Resetting 1C-61 Controller) as follows: <ul style="list-style-type: none"> • Ensure 1C-61 is in Manual • Manually adjust 1C-61 controller demand to 85-95% • Verify O1D1417 (Generator Water Cooler Condensate Diff) value "FALSE" • Throttle closed 1C-61 to establish 5-16 ft H₂O ΔP • Ensure adjusted 1C-61 setpoint to match actual ΔP • Ensure 1C-61 to "AUTO" • 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"> • When FDWP suction pressure is > 360 psig place the Powdex In Service by slowly throttling closed on 1C-14/15 while maintaining CBP suction pressure ≥ 70 psig. <p>Note: If the unit trips initiate event 6.</p>
		<p>The event is complete when the reactor trips, the plant is stabilized at ~ 85% power, or when determined by the Lead Examiner.</p>

Op-Test No.: 1

Scenario No.: 2

Event No.: 6

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>Crew Response:</p> <p>Rule 3 (Continued)</p> <ul style="list-style-type: none"> • Place 1FDW-33 and 1FDW-42 control switches in OPEN: • <u>Simultaneously</u> position Startup Control valves (1FDW-35 1FDW-44) 10 - 20% open on <u>all intact</u> SGs: • Perform the following: <ul style="list-style-type: none"> • Place 1FDW-31 switch in CLOSE. • Place 1FDW-40 switch in CLOSE. • Close 1FDW-32. • Close 1FDW-41. • Lower SG pressure in available SGs to \approx 500 psig. • Control FDW flow to stabilize RCS P/T by throttling the Startup Control valves and TBVs as necessary: • Place 1FDW-38 and 1FDW-47 switches to OPEN • Place 1FDW-36 and 1FDW-45 switches to CLOSE • Dispatch an operator to perform Encl 5.26 (Manual Start of TDEFDWP). • Verify cross-tie with Unit 2 is desired. • Dispatch an operator to open 2FDW-313 and 2FDW-314 • Dispatch an operator to 1FDW-313 and have them notify the CR when in position. • Notify Unit 2 to: <ul style="list-style-type: none"> • Manually Close 2FDW-315 & 316. • Start their U2 TDEFWP • WHEN, either of the following exists: 1FDW-313 Operator in position OR Unit 1 TDEFWP has been manually started; THEN continue.

CRITICAL TASKS

1. CT-14, Initiate HPI Cooling
2. CT-27, Implementation of Control Room Habitability Guidance
(**Optional if crew progresses this far**)

Simulator Brief/Turnover

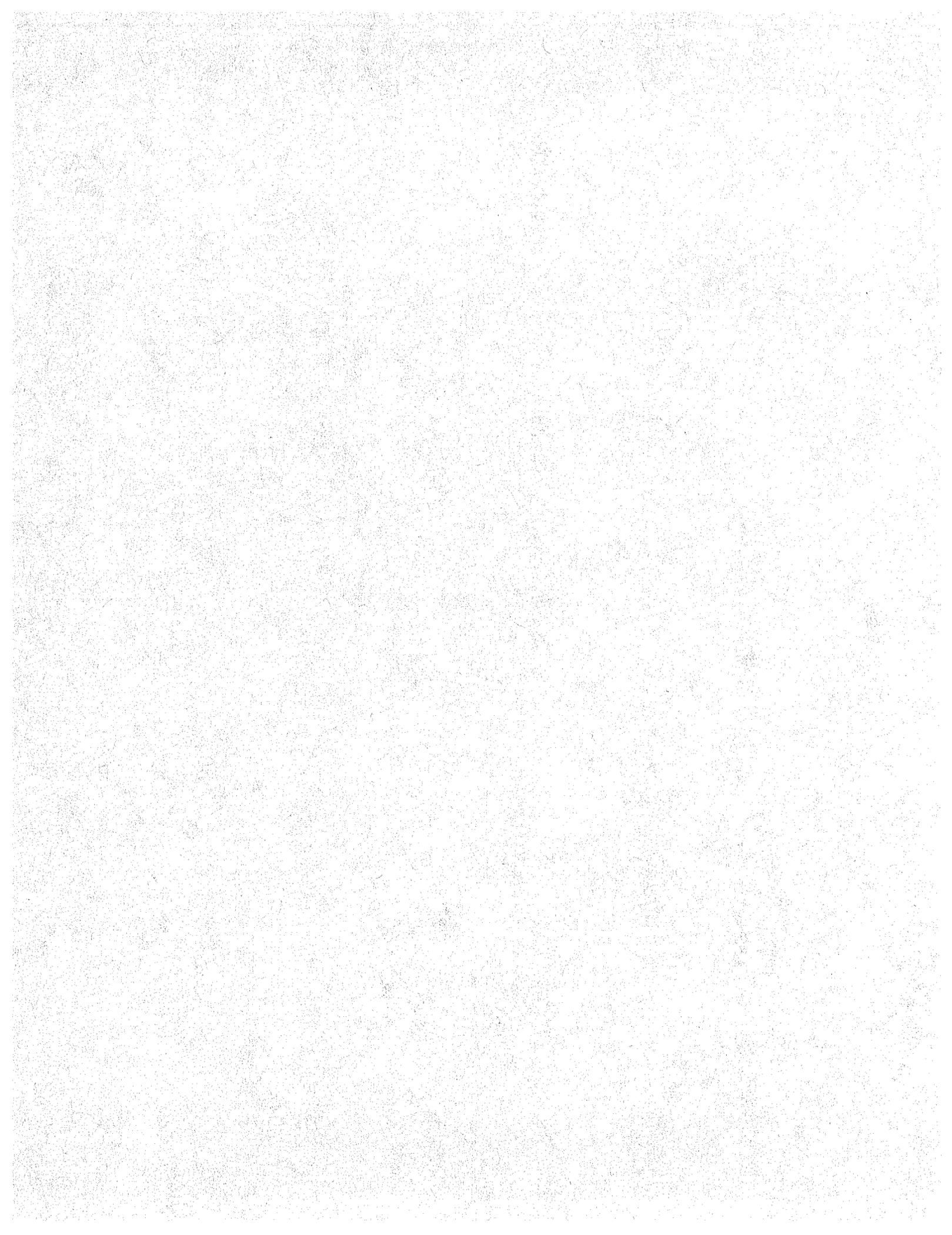
SAFETY/PRA RISK (OSM)			
SAFETY: Take a Minute			
PRA Risk Status: GREEN			
UNIT 0 (OSM)			
SSF Operable: Yes	KHU's Operable: U1 - OH, U2 - UG	LCTs Operable: 2	Fuel Handling: None

UNIT STATUS (CR SRO)		
Unit 1 Simulator	Other Units	
Mode: 1	Unit 2	Unit 3
Reactor Power: 100%	Mode: 1	Mode: 1
Gross MWE: 897	100% Power	100% Power
RCS Leakage: .01 gpm	EFDW Backup: Yes	EFDW Backup: Yes
RBNS Rate: 0 gpm		

Technical Specifications/SLC Items (CR SRO)			
Component/Train	OOS Date/Time	Restoration Required Date/Time	TS/SLC #

Shift Turnover Items (CR SRO)
Primary
<ul style="list-style-type: none"> • 420 EFPD • SASS in Manual
Secondary
<ul style="list-style-type: none"> • 1SSH-1, 1SSH-3, 1SD-2, 1SD-5, 1SD-140, 1SD-303, 1SD-355, 1SD-356 and 1SD-358 are closed with power supply breakers open per the Startup Procedure for SSF Overcooling Event. 1PR-1, 1PR-6, 1LPSW-1, 1LPSW-2, 1LPSW-3, 1FDW-80, 1CF-5, 1CF-6, 1LP-1 and 1LP-2 breakers open per the appropriate system operating procedures. • Unit 3 has the Aux Steam Header • Last shift ICS was placed in MANUAL for I&E testing • After shift turnover, place ICS in AUTO per OP/1/A/1102/004 A Encl. 4.4. <ul style="list-style-type: none"> ○ Initial Conditions are complete

Reactivity Management (CR SRO)		
RCS Boron: 30 ppmB	Gp 7 Rod Position: 87%	Batch additions as required for volume control.
Human Performance Emphasis (OSM)		
Procedure Use and Adherence		



3/10

Facility: Oconee	Scenario No.: 3	Op-Test No.: 1
Examiners: _____	Operators: _____	SRO
_____	_____	OATC
_____	_____	BOP
Initial Conditions:		
<ul style="list-style-type: none"> • Reactor power = 100% 		
Turnover:		
<ul style="list-style-type: none"> • Intermittent LPSW leak in RB requires frequent RBNS pumping 		

Event No.	Malf. No.	Event Type*	Event Description
0a	Pre-Insert		SASS in Manual
1	MPS 290 Override	C, BOP, SRO	1A CC pump trips and 1B CC pump fails to auto start
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 MDEFWP's
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Op-Test No.: 1		Scenario No.: 3	Event No.: 1	Page 1 of 3
Event Description: 1A CC Pump trips, 1B CC Pump Fails to Auto Start: (C; BOP, SRO)				
Time	Position	Applicant's Actions or Behavior		
		<p>Plant response:</p> <ul style="list-style-type: none"> • 1SA-9/B-1, CC CRD RETURN FLOW LOW • 1SA-9/C-1, CC COMP COOLING RETURN FLOW LOW • 1SA-2/C-1, LETDOWN TEMPERATURE HIGH • 1HP-5 (Letdown Isolation) will close due to high letdown temperature • CC Total Flow Low • Component Cooling Pressure Low <p>Crew Response: Refer to ARG 1SA-9/B-1 <u>OR</u> 1SA-9/C-1</p> <ul style="list-style-type: none"> • Determine low flow is due to CC Pump failure AND Standby CC Pump did NOT start and perform the following: • Verify CC Surge Tank level > 12" • Start Standby CC Pump <p>Note: The SRO may not initiate AP/20 if the Standby Pump is started per the ARG. Initiate AP/20 (Loss of Component Cooling)</p> <ul style="list-style-type: none"> • IAAT ≥ two CRD stator temperatures ≥ 180°F, THEN trip RX. (~ 4 minutes) • Open 1CC-7 and 1CC-8 • Verify CC Surge Tank level ≥ 12". • Manually start the Standby CC Pump • Verify CC TOTAL FLOW > 575 gpm • If Letdown > 130 °F, THEN: <ul style="list-style-type: none"> • Close 1HP-5, • Initiate AP/032 (Loss of Letdown) 		
	BOP			
	SRO			
	BOP			

Op-Test No.: 1 Scenario No.: 3

Event No.: 1

Page 2 of 3

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

Time	Position	Applicant's Actions or Behavior
	<p>SRO</p> <p>BOP/ OATC</p> <p>BOP</p>	<p>Crew Response: SRO Directs AP/32 (Loss of Letdown) entry; AP/32 will:</p> <ul style="list-style-type: none"> • Place 1HP-120 in HAND and reduce demand to zero. • Initiate makeup to LDST as required (Encl.5.5 or OP/1/A/1103/004. • Notify Chemistry of the following: <ul style="list-style-type: none"> • Current RCS boron sample is needed for possible unit shutdown. • Normal letdown line is isolated. • IAAT Pzr level $\geq 260''$, AND letdown CANNOT be established, THEN initiate unit shutdown at $\approx 20\%/min$ per AP/29 (Rapid Unit Shutdown). • IAAT Pzr level $\geq 375''$, THEN trip Rx. • Position the standby HPI pump switch to OFF. • Throttle 1HP-31 to establish 12 - 15 gpm SEAL INLET HDR FLOW. • Verify HPI pump flow ≥ 65 gpm. (<u>30</u> gpm Recirc + ___ SI + ___ MU) • Verify loss of letdown is due to L/D temperature high and then GO TO Step 4.29. • Notify SPOC to initiate repairs on failed equipment. • IAAT letdown can be re-established, THEN perform Steps 4.31 – 4.46. • Place CC system in operation • Close 1HP-6 and 1HP-7. • Open the following: <ul style="list-style-type: none"> • 1HP-1 • 1HP-2 • 1HP-3 • 1HP-4

Op-Test No.: 1 Scenario No.: 3

Event No.: 1

Page 3 of 3

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>Crew Response:</p> <ul style="list-style-type: none"> • Verify letdown temperature < 135°F (it is not; RNO Step 4.34) • Open 1HP-13. • Close the following: <ul style="list-style-type: none"> • 1HP-8 • 1HP-9&11 • Select LETDOWN HI TEMP INTLK BYP switch to BYPASS. • Open 1HP-5. • Throttle open 1HP-7 to establish ≈ 20 gpm. • WHEN letdown temperature < 130°F, THEN place LETDOWN HI TEMP INTLK BYP switch in NORMAL. • Open 1HP-6. • Adjust 1HP-7 to control desired (75 gpm) letdown flow. • Re-establish normal makeup through 1HP-120. • Re-establish normal RCP seal injection flow. • Position the standby HPI pump switch to AUTO. <p>NOTE: If pressurizer level exceeds 260 inches, TS 3.4.9 Condition A should be entered requiring level be restored within 1 hour</p>
		<p>This event is complete when Seal Flow is returned to normal (32 gpm) or when directed by the Lead Examiner.</p>

Op-Test No.: _____

Scenario No.: 3

Event No.: 2

Page 2 of 2

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

Time	Position	Applicant's Actions or Behavior
	BOP/OATC	<p>Crew response:</p> <p>Crew may use EOP Enclosure 5.5 (Pzr and LDST Level Control) for primary inventory control</p> <ul style="list-style-type: none"> • Utilize the following as necessary to maintain Pzr level >100" [180" acc]: <ul style="list-style-type: none"> • Standby HPI pump • 1HP-26 • 1HP-7 • 1HP-5 • 1HP-120 setpoint or valve demand • IAAT > 1 HPI pump is operating, AND additional HPI pumps are NO longer needed, THEN perform the following: Obtain SRO concurrence to reduce running HPI pumps. <ul style="list-style-type: none"> • Secure the desired HPI pumps. • Place secured HPI pump switch in AUTO, if desired. • IAAT LDST level CANNOT be maintained, <ul style="list-style-type: none"> • THEN Open 1HP-24 and Open 1HP-25; Close 1HP-16. • IAAT 1C HPI PUMP is required, THEN Open 1HP-24 and 1HP-25 Start 1C HPI Pump • Throttle 1HP-26 and 1HP-27 as required to maintain desired Pzr level: • IAAT makeup to the LDST is desired, THEN makeup from 1A BHUT. • IAAT additional makeup flow to LDST is desired, AND 1A BLEED TRANSFER PUMP is operating, THEN dispatch an operator to close 1CS-48 (1A BHUT RECIRC) • IAAT it is desired to secure makeup to LDST, THEN secure makeup from 1A BHUT.
		<p>When PZR level is being controlled manually or when directed by the Lead Examiner this event is completed.</p>

Op-Test No.: _____ Scenario No.: 3 Event No.: 3 Page 1 of 1

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

Time	Position	Applicant's Actions or Behavior
	BOP/SRO	<p>Plant response: Statalarms:</p> <ul style="list-style-type: none"> • 1SA-9/A-6 (REACTOR BUILDING NORMAL SUMP LEVEL HIGH/LOW) <p>Crew response: Refer to 1SA-9/A-6 ARG.</p> <ul style="list-style-type: none"> • High Level: 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) <ul style="list-style-type: none"> • Verify MWHUT level adequate to receive waste volume. <ul style="list-style-type: none"> • Open 1LWD-1 and 1LWD-2 (RB NORMAL SUMP ISOLATION) • Start one or both of the following: <ul style="list-style-type: none"> • 1A RB NORM SUMP PUMP. • 1B RB NORM SUMP PUMP. • Investigate possible RCS leakage per OP/0/B/1106/033 (Primary System Leak Identification) or PT/1/A/0600/010 (Reactor Coolant Leakage). (Leakage is known from turnover-LPSW) • Monitor RB RIAs, CC Surge Tank level, CFT Level and LPSW flow to and from RB and sample RB Normal Sump to determine source. • Calculate RB Normal Sump Rate from Digital Trend (Use 15 gal/inch conversion factor). • Refer to AP/1/A/1700/002 (Excessive RCS Leakage). (Not needed due to knowing the source of the leakage into the RB). • Low Level: 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) <p>Note: The RBNS pumps will not stop on the low level cutoff. The BOP should recognize this and stop the pumps per procedure.</p> <ul style="list-style-type: none"> • WHEN RBNS level is at desired level or at 6" (low level alarm), THEN ensure pump(s) stopped. <ul style="list-style-type: none"> • Close 1LWD-1 and 1LWD-2(RB NORMAL SUMP ISOLATION) • Contact SPOC to repair RBNS pump low level cutoff.
		<p>When RBNS pumps have been stopped or when directed by the Lead Examiner this event is completed.</p>

Op-Test No.: _____ Scenario No.: 3 Event No.: 4 Page 1 of 2

Event Description: **“A” HPI Pump trips and the Standby HPI pump fails to auto start: (C, OATC, SRO) (TS)**

Time	Position	Applicant's Actions or Behavior
	<p>BOP</p> <p>SRO</p> <p>BOP</p>	<p>Plant response:</p> <p>Statalarms:</p> <ul style="list-style-type: none"> • 1SA-2/B-2 (HP RCP Seal Injection Flow High/Low) • 1SA-2/C-2 (HP Injection Pump Disch. Header Pressure High/Low) <p>Board indications:</p> <ul style="list-style-type: none"> • RC Makeup Flow = 0 gpm • 1A HPI Pump OFF • PZR level will begin to decrease and LDST level will begin to increase. <p>Crew response:</p> <ul style="list-style-type: none"> • Refer to ARG for above Statalarms • SRO should refer to AP/14 (Loss of Normal Makeup and/or RCP Seal Injection) <ul style="list-style-type: none"> • IAAT RCP seal injection flow is lost... • IAAT loss of suction to operating HPI pumps is indicated... • Announce AP entry using PA system. • Verify NO HPI pump operating • Close 1HP-5 (Letdown Isolation) • Place 1HP-120 (RC Volume Control) in HAND and closed • Place 1HP-31 (RCP Seal Flow Control) in HAND and closed • Start standby HPI pump (1B HPI pump) • Place in HAND and slowly open 1HP-31 in small increments until ≈ 8 gpm/RCP is achieved. • Re-establish normal makeup through 1HP-120. (failed closed) • Ensure proper operation of the CC system. • Reduce 1HP-7 demand to 0%. • Close 1HP-6 • Ensure the following open: <ul style="list-style-type: none"> ➢ 1HP-1, 1HP-2, 1HP-3, 1HP-4

Op-Test No.: _____	Scenario No.: 3	Event No.: 4	Page 2 of 2
Event Description: “A” HPI Pump trips and the standby HPI pump fails to auto start: (C, OATC/SRO)			
Time	Position	Applicant's Actions or Behavior	
	SRO	<ul style="list-style-type: none"> • Open 1HP-5 • Throttle open 1HP-7 for ≈ 20 gpm letdown flow. • Open 1HP-6 • Adjust 1HP-7 for desired letdown flow (75 gpm). • Open 1HP-228, 1HP-226, 1HP-232, 1HP-230. • Open 1HP-21 • Place 1HP-31 in auto. • Refer to Tech Spec 3.5.2 High Pressure Injection <ul style="list-style-type: none"> • Condition “A” • Required Action: Restore HPI pump to OPERABLE status • Completion Time: 72 hours <p>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.</p>	
		<p>Event is complete when normal makeup and letdown is established or when directed by the Lead Examiner.</p>	

Op-Test No.: _____		Scenario No.: 3	Event No.: 5	Page 1 of 1
Event Description: 1A RBCU rupture (C, BOP, SRO) (TS)				
Time	Position	Applicant's Actions or Behavior		
	BOP	<p>Plant Response:</p> <ul style="list-style-type: none"> 1SA-9/B-9, LPSW RBCU A Cooler Rupture 1SA-9/A-6, RB Normal Sump Level High/Low RB normal sump level will increase <p>Crew Response:</p> <p><u>ARG for 1SA-9/B-9</u></p> <ul style="list-style-type: none"> Verify alarm is valid by checking RBCU 1A Inlet Flow and RBCU 1A delta flow (327 gpm Delta Flow). Verify 1LPSW-18 (RBCU 1A Outlet) open Verify adequate LPSW flow is available; check LPSW pump operation and 1LPSW-16 (1A RBCU INLET PENE) is open. Monitor RBNS Level for any unexplained increase Diagnose a Cooler Rupture is indicated and Isolate the 1A RBCU Cooler. <ul style="list-style-type: none"> Close 1LPSW-16 (1A RBCU INLET PENE). Close 1LPSW-18 (RBCU 1A OUTLET). 		
	SRO	<ul style="list-style-type: none"> Perform TS 3.6.3 Condition C for closed containment system. <ul style="list-style-type: none"> Requires isolating penetration within 4 hours Enter TS 3.6.5 for RBCU inoperable. (TS 3.6.5 Condition B). <ul style="list-style-type: none"> Requires restoring RBCU to OPERABLE within 7 days Refer to SLC 16.9.12 (Additional LPSW and Siphon Seal Water System Operability Requirements) (Not applicable after 1LPSW-16 is closed) 		
		<p>When the RBCU has been isolated, or at the direction of the Lead Examiner this event is completed.</p>		

Op-Test No.: _____		Scenario No.: 3	Event No.: 6	Page 1 of 1
Event Description: Turbine trips to HAND (I, ALL)				
Time	Position	Applicant's Actions or Behavior		
	SRO	<p>Plant Response:</p> <p>Statalarms:</p> <ul style="list-style-type: none"> • 1SA-2/A-12, ICS Tracking • 1SA-2/C-12, ICS H/A Station on Man 		
	BOP	<p>Crew Response:</p> <ul style="list-style-type: none"> • Refer to ARG for above alarms. • IF Turbine Master Trips to Hand for unknown reason, refer to AP/1/A/1700/028 (ICS Instrument Failure). 		
	SRO	<ul style="list-style-type: none"> • AP/28 • GO TO Section 40 		
	OATC	<ul style="list-style-type: none"> • Simultaneously place the 1A and 1B FDW MASTERS to HAND: • Place the DIAMOND in MANUAL. • Notify SPOC to investigate the cause of the Turbine Master tripping to Hand. 		
		<p>When FDW Masters and Diamond are in MANUAL, or when directed by the Lead Examiner this event is completed.</p>		

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>Crew Response:</p> <p>SRO should refer to TS for the dropped control rod.</p> <p>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).</p> <ol style="list-style-type: none"> 1. Restore Control Rod Alignment within 1 hour <p>OR</p> <ol style="list-style-type: none"> 2. Verify SDM within 1 hour <p><u>OR</u></p> <p>Initiate Boron to restore SDM within 1 hour</p> <p><u>AND</u></p> <p>Reduce Thermal Power to $\leq 60\%$ of allowable thermal power within 2 hours</p> <p><u>AND</u></p> <p>Reduce nuclear overpower trip setpoints (flux/flow/imb) to $\leq 65.5\%$ of the allowable thermal power within 10 hours</p> <p><u>AND</u></p> <p>Verify the potential ejected rod worth is within assumptions of rod ejection analysis within 72 hours</p>
	BOP	<ul style="list-style-type: none"> • Verify $> 1\%$ SDM with allowance for the inoperable control rod per PT/1/A/1103/015 (Reactivity Balance Calculation). <p>USE COLR curve for 4 RCPs and 1 inoperable rod.</p> <ul style="list-style-type: none"> • Ensure requirements of TS 3.1.5 (Safety Rod Position Limits) • Ensure requirements of TS 3.2.3 (Quadrant Power Tilt) are met. • Reduce power and ensure $<55\%$ on all NIs when the power decrease is complete.
		<p>When TS have been addressed, or when directed by the lead examiner this event is completed.</p>

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

Op-Test No.: _____ Scenario No.: 3 Event No.: 8

Page 3 of 5

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

Time	Position	Applicant's Actions or Behavior
	SRO/BOP /OATC	<p>Crew response:</p> <p>SRO will transfer to the <u>BLACKOUT</u> tab.</p> <ul style="list-style-type: none"> • Direct an RO to announce plant conditions using the plant page and notify the OSM to reference EP and NSD 202 (reportability). • Verify two ROs available to perform Control Room activities. • SRO will direct an RO to perform Encl. 5.38 (Restoration of Power) • Position the following to OFF: <ul style="list-style-type: none"> • 1A MD EFDWP • 1B MD EFDWP • Feed and steam available SGs as necessary to stabilize RCS P/T. <p style="text-align: center;">NOTE:</p> <p>Feeding SGs with EFDW is desired above HPI Forced Cooling. Step 6 should be performed prior to re-performing Rule 3.</p> <ul style="list-style-type: none"> • IAAT NO SGs are being fed, AND any source of EFDW (Unit 1 or another unit) becomes available, THEN perform the following: <ul style="list-style-type: none"> • Establish 100 gpm to each intact SG. (Feeding to 240" XSUR) • Perform one of the following: <ul style="list-style-type: none"> • $T_c > 550^\circ\text{F}$- Initiate cool down to $T_c 540^\circ\text{F} - 550^\circ\text{F}$ by feeding and steaming intact SGs at a rate that prevents RCS saturation. • $T_c \leq 550^\circ\text{F}$ – Feed and Steam intact SG's to stabilize $T_c \leq 550^\circ\text{F}$ • IAAT EFDW from any source is insufficient to maintain stable RCS P/T, THEN notify SSF operator that feeding SGs with SSF ASW is required. • IAAT power is restored to <u>any</u> of the following: <ul style="list-style-type: none"> • 1TC, 1TD, 1TE <p>THEN Initiate AP/11 (Recovery from Loss of Power). GO TO 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> <ul style="list-style-type: none"> • Verify all control rods fully inserted. • Verify Main FDW in operation. • Verify Main FDW controlling properly. • IAAT Main FDW is operating... • Verify TBVs controlling SG pressure at desired setpoint. • Verify 1RIA-40 operable with CSAE OFF-GAS BLOWER operating.
	SRO	

Op-Test No.: _____ Scenario No.: 3 Event No.: 8

Page 4 of 5

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

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

Op-Test No.: _____ Scenario No.: **3** Event No.: **8**
 Event Description: **1TA Lockout and Unit Blackout: (M, ALL)**

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Time	Position	Applicant's Actions or Behavior
	OATC/BOP	<p>Crew response: RO will perform <u>Encl. 5.38</u> (Restoration of Power) (CT-8) (Not met if Encl. 5.38 completed with power NOT restored.)</p> <ul style="list-style-type: none"> • Place 1HP-31 in HAND and reduce demand to 0. • Close 1HP-21. • Verify MFB1/2 energized (NOT) • Verify CT-1 indicates 4160v (NO) • Verify both Standby Bus #1 and Standby Bus #2 are de-energized. • Emergency start Keowee units • Notify Keowee Operator to place all operating Keowee units in Ocone Control. • IAAT CT-5 indicates ≈ 4160 volts, THEN GO TO Step 50. (It does; from Central Swyd) • Place the following switches in MAN: <ul style="list-style-type: none"> • MFB1 and MFB2 AUTO/MAN • STANDBY 1 and STANDBY 2 AUTO/MAN • Open the following breakers: <ul style="list-style-type: none"> • N1₁ and N2₁ MFB1 NORMAL FDR • E1₁ and E2₁ MFB1 STARTUP FDR • Place the following switches in MAN: <ul style="list-style-type: none"> • CT4 BUS 1 and CT4 BUS 2 AUTO/MAN • CT5 BUS 1 and CT5 BUS 2 AUTO/MAN • Open the following breakers: <ul style="list-style-type: none"> • SK1 and SK2 CT4 STBY BUS 1 FEEDER • Close SL1 and SL2 CT5 STBY BUS 1 FEEDER • Place the following switches in AUTO: <ul style="list-style-type: none"> • CT5 BUS 1 and CT5 BUS 2 AUTO/MAN • Verify Standby Bus #1 energized. • Notify CR SRO in each unit where a blackout exists that Standby Bus #1 is energized. • Close S1₁ and S2₁ STBY BUS 2 TO MFB2 (power is restored) • Verify 1TC, 1TD, or 1TE energized. • Notify Unit 1 CR SRO of status of 4160V SWGR.
		<p>When the SRO has transferred to Subsequent Actions tab, or when directed by the Lead Examiner this event is completed.</p>

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

CRITICAL TASKS

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

Simulator Brief/Turnover

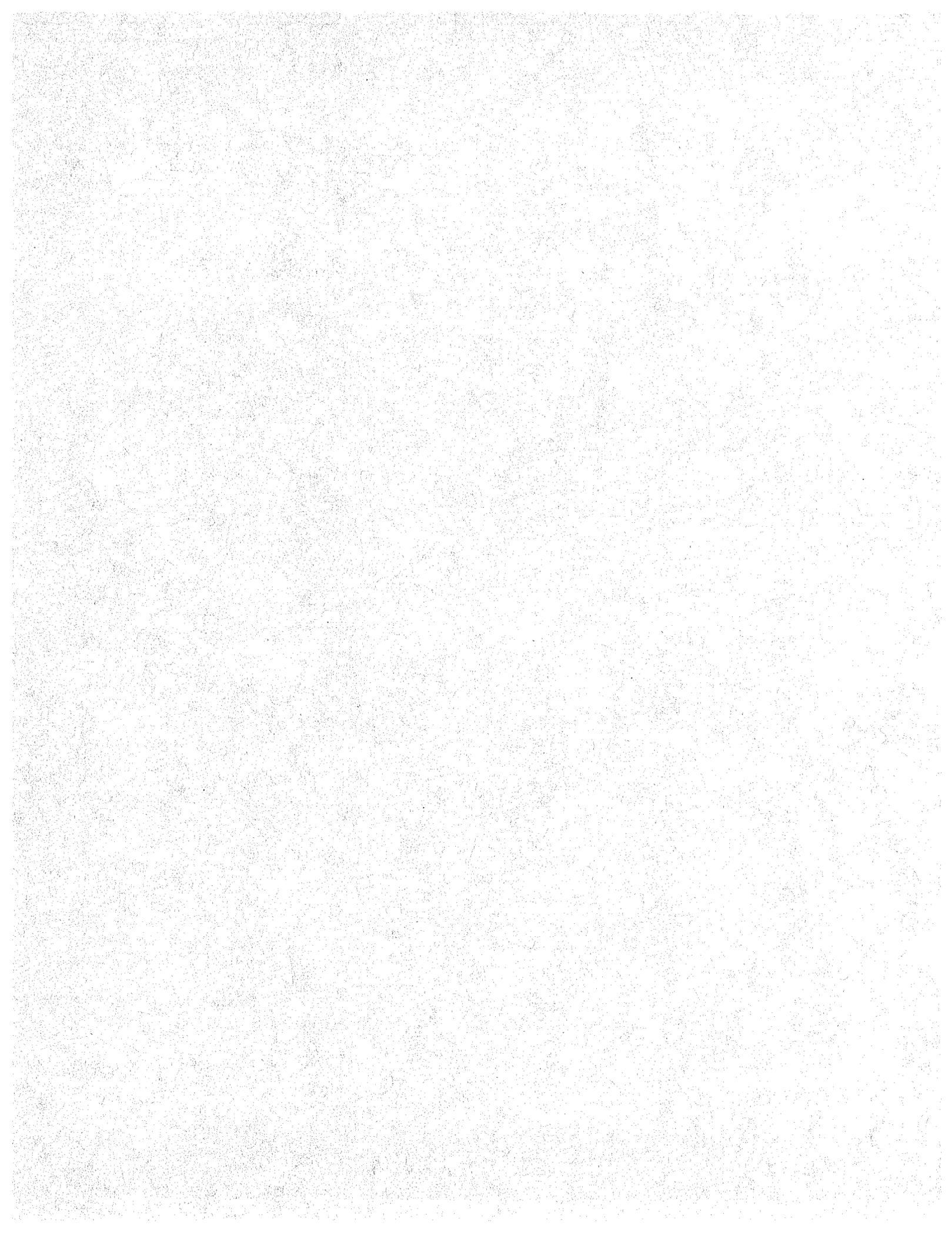
SAFETY/PRA RISK (OSM)			
SAFETY: Take a Minute			
PRA Risk Status: GREEN			
UNIT 0 (OSM)			
SSF Operable: Yes	KHU's Operable: U1 - OH, U2 - UG	LCTs Operable: 2	Fuel Handling: None

UNIT STATUS (CR SRO)		
Unit 1 Simulator	Other Units	
Mode: 1	Unit 2	Unit 3
Reactor Power: 100%	Mode: 1	Mode: 1
Gross MWE: 897	100% Power	100% Power
RCS Leakage: .01 gpm	EFDW Backup: Yes	EFDW Backup: Yes
RBNS Rate: 0 gpm		

Technical Specifications/SLC Items (CR SRO)			
Component/Train	OOS Date/Time	Restoration Required Date/Time	TS/SLC #

Shift Turnover Items (CR SRO)
Primary
<ul style="list-style-type: none"> • 492 EFPD • Intermittent LPSW leak in RB requires frequent RBNS pumping
Secondary
<ul style="list-style-type: none"> • 1SSH-1, 1SSH-3, 1SD-2, 1SD-5, 1SD-140, 1SD-303, 1SD-355, 1SD-356 and 1SD-358 are closed with power supply breakers open per the Startup Procedure for SSF Overcooling Event. 1PR-1, 1PR-6, 1LPSW-1, 1LPSW-2, 1LPSW-3, 1FDW-80, 1CF-5, 1CF-6, 1LP-1 and 1LP-2 breakers open per the appropriate system operating procedures. • Unit 3 has the Aux Steam Header

Reactivity Management (CR SRO)		
RCS Boron: 30 ppmB	Gp 7 Rod Position: 91%	Batch additions as required for volume control. Two
Human Performance Emphasis (OSM)		
Procedure Use and Adherence		



3/10

Facility: **Oconee**Scenario No.: **4**Op-Test No.: **1**

Examiners: _____ Operators: _____

Initial Conditions:

- Reactor power = 0.02%; below POAH

Turnover:

- Unit 1 Startup in progress; BOL; not after refueling
- LDST pressure low, requires H₂ addition
- Startup procedure at step 3.29 (1102/02 Encl 4.7)

Event No.	Malf. No.	Event Type*	Event Description
0a	Override		AFIS does not auto actuate
0b	Override		1FDW-316 failed closed
1	Override	N, BOP, SRO	Pressurize LDST with H ₂ , H ₂ supply valve (1H-1) fails OPEN (TS)
2		R, OATC, SRO	Increase power to 3% and place ICS in AUTO
3	MPS 110	C, BOP, SRO	1HP-5 (Letdown Isolation) fails CLOSED (TS)
4	Override	C, OATC, SRO	1RC-1 (Pzr Spray Valve) fails open
5	MCS012	M, ALL	1A Turbine bypass valve and its block valve fail open due to instrument failure 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			

Time	Position	Applicant's Actions or Behavior
Op-Test No.: 1	Scenario No.: 4	Event No.: 1
Page 1 of 2		
Event Description: Pressurize LDST with H2, H2 supply valve (1H-1) fails OPEN (N, BOP, SRO) (TS)		
	<p>SRO</p> <p>BOP</p>	<p>Crew response:</p> <ul style="list-style-type: none"> • 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). • Enclosure 4.5 (Unit 1 LDST H2 Addition) will: <ul style="list-style-type: none"> • Notify Chemistry of hydrogen addition prior to adding hydrogen. <p>NOTE:</p> <ul style="list-style-type: none"> • OP/0/A/1108/001 (Curves And General Information) and computer may be referred to for LDST Pressure vs. Level curve. • LDST Maximum Pressure vs Indicated Level Curve should NOT be exceeded when pressurizing LDST. <ul style="list-style-type: none"> • Immediately prior to pressurization determine lowest reading of diverse LDST level indications: _____ inches. • For existing LDST level determine LDST Pressure allowable per LDST Pressure vs. Level curve: _____ psig. • Notify Operator at H2 Cage to pressurize primary hydrogen. <p>NOTE: Operator should be in constant communication with CR to close 1H-26 if 1H-1 fails open.</p> <ul style="list-style-type: none"> • Direct Operator to open 1H-26 (LDST Block). • Direct Operator to monitor explosive detector. • Cycle 1H-1 (LDST SUPPLY) as required to pressurize LDST per LDST Pressure vs Level curve. <p>Note: 1H-1 (LDST SUPPLY) will fail open.</p> <ul style="list-style-type: none"> • WHEN Hydrogen addition complete, ensure closed 1H-1(LDST SUPPLY).

Op-Test No.: 1	Scenario No.: 4	Event No.: 2	Page 1 of 1
Event Description: Increase reactor power to 3% and place ICS in AUTO: (R, OATC, SRO)			
Time	Position	Applicant's Actions or Behavior	
	SRO/OATC BOP	<p>Crew response: OP/1/A/1102/001 (Controlling Procedure for Unit Startup)</p> <p>NOTE: 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, & SUR will decrease with negative Moderator Temperature Coefficient.</p> <ul style="list-style-type: none"> • <u>Begin</u> reactor power increase to 0.5% - 1.0% at ≤ 0.5 DPM SUR. • WHEN above POAH, <u>begin</u> reactor power increase to 2.5 -3.5%. • WHILE power increases, <u>begin</u> increasing 1HP-120 (RC VOLUME CONTROL) setpoint to establish 215" to 225" PZR Level • WHEN at 2.5% - 3.5% Power, perform the following: <ul style="list-style-type: none"> • Place REACTOR MASTER to "AUTO". • Place DIAMOND to "AUTO". • Ensure TURBINE MASTER Setpoint to $\approx 880 - 890$ psig. 	
		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	Page 2 of 2
Event Description: 1HP-5 (Letdown Isolation) fails CLOSED (TS) (C, BOP, SRO)			
Time	Position	Applicant's Actions or Behavior	
	BOP/SRO	<ul style="list-style-type: none"> • Open 1HP-5 RNO actions as follows: <ul style="list-style-type: none"> ○ Dispatch NEO in continuous communications with control room to manually open 1HP-5 <p>Booth cue: Using TIME COMPRESSION report that 1HP-5 is manually open.</p> <p>Note: Continuous communication can be accomplished using either plant radio or telephone</p> <ul style="list-style-type: none"> ○ IF 1HP-5 is manually open, THEN enter TS 3.6.3 (Condition A, 4 hour completion time) <p style="padding-left: 40px;">Note: 1HP-5 is allowed to be manually opened by Note 1.</p> <ul style="list-style-type: none"> • WHEN 1HP-5 is open, THEN continue. • Place CC system in operation. • Verify letdown temperature < 135°F. • Throttle 1HP-7 to establish ~20 gpm • WHEN letdown temperature < 130°F, THEN place LETDOWN HI TEMP INTLK BYP switch in NORMAL. • Open 1HP-6 • Adjust 1HP-7 to control desired letdown flow. • Re-establish normal makeup through 1HP-120. • Notify SPOC to initiate repairs on 1HP-5. • Verify seal injection flow reduced in Step 4.8. • Re-establish normal RCP seal injection flow. • Position the standby HPI pump switch to AUTO. • WHEN repairs are complete on 1HP-5 (LETDOWN ISOLATION) THEN perform the following: <ul style="list-style-type: none"> ○ Locally turn 1HP-5 handwheel fully clockwise. ○ EXIT TS 3.6.3. <p>Note: 1HP-5 will not be repaired during this scenario</p> <p>Note: If Pzr level exceeds 260 inches, TS 3.4.9 Conditions A should be entered requiring level to be restored within 1 hour.</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.: 4
 Event Description: **PZR Spray Valve Fails OPEN: (C, OATC/SRO)**

Page 1 of 1

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

Op-Test No.: 1

Scenario No.: 4

Event No.: 5

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

Time	Position	Applicant's Actions or Behavior
	<p data-bbox="261 632 420 663">SRO/OATC</p> <p data-bbox="298 827 383 858">OATC</p>	<p data-bbox="461 363 683 394">Plant response:</p> <ul data-bbox="461 405 1370 594" style="list-style-type: none"> • OAC alarm • 1A Turbine Bypass Valve fails open. • 1A Main Steam line pressure decreases • Reactor Coolant Temperature decreases causing reactor power to increase. <p data-bbox="461 642 675 674">Crew response</p> <p data-bbox="461 680 1214 711">Crew will perform Low Power “Plant Transient Response”.</p> <ul data-bbox="461 737 1414 978" style="list-style-type: none"> • Place ICS Diamond Panel to MAN • Place ICS Feedwater Loop Masters 1A &1B to HAND • Insert Control Rods to reduce power to below pre-transient level • As “1A” SG pressure continues to decrease, the OATC should trip the reactor due to the anticipated affects of the excessive heat transfer.
		<p data-bbox="461 1759 1406 1822">When the reactor is tripped or when directed by the Lead Examiner, this event is completed</p>

Op-Test No.: 1

Scenario No.: 4

Event No.: 5

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

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

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

Op-Test No.: 1

Scenario No.: 4

Event No.: 5

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

Time	Position	Applicant's Actions or Behavior
	BOP/OATC	<p>Crew response:</p> <ul style="list-style-type: none"> • Rule 3 continued • Start EFDW pumps to feed <u>all intact</u> SGs. • Verify <u>any</u> EFDW pump operating. • IAAT <u>both</u> of the following exist: <ul style="list-style-type: none"> ➤ An EFDW valve will NOT control in AUTO ➤ The same EFDW control valve will NOT respond in MANUAL THEN perform Steps 33 and 34. • Notify CR SRO that Encl. 5.27 (Alternate Methods for Controlling EFDW Flow) is being initiated due to 1FDW-316 failed closed. • Initiate Encl. 5.27, (Alternate Methods for Controlling EFDW Flow)
	BOP/OATC	<ul style="list-style-type: none"> • Encl. 5.27 <ul style="list-style-type: none"> • Identify the failure: (CHART; 1FDW-316 – CLOSED) Step 39 • Stop 1B MD EFDWP. • Verify 1A MD EFWP is operating. (RNO) <ul style="list-style-type: none"> ➤ Close 1FDW-369; GO TO Step 43.
	OATC/SRO	<ul style="list-style-type: none"> • Place 1FDW-44 in HAND <u>and</u> set demand to 0%. • Close 1FDW-42 • Verify 1B MD EFDWP will be used. • Open 1FDW-384. • Verify the following: <ul style="list-style-type: none"> ➤ 1FDW-45 closed ➤ 1FDW-47 open • Start 1B MD EFDWP. • Throttle 1FDW-44 to establish 100 gpm. (100 gpm is the Rule 7 limit for initial feeding a dry SG. After heat transfer is established the limit is 600 gpm per rule 7). • Throttle 1FDW-44 to obtain desired SG level per Rule 7 (SG Feed Control). (CT-10) • IAAT proper SG level is reached (25") and level permits auto level control, THEN place 1FDW-44 in AUTO.

Op-Test No.: 1	Scenario No.: 4	Event No.: 5	Page 5 of 7
Event Description: Excessive Heat Transfer (M, ALL)			
Time	Position	Applicant's Actions or Behavior	
	<p>SRO</p> <p>SRO/BOP /OATC</p> <p>SRO/BOP /OATC</p>	<p>Crew response:</p> <p>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</p> <ul style="list-style-type: none"> • Verify any SG pressure < 550 psig. • Ensure Rule 5 (Main Steam Line Break) in progress or complete. • Place the following in HAND and decrease demand to zero on <u>all affected</u> SGs: <ul style="list-style-type: none"> • 1FDW-32 • 1FDW-35 • Close the following on <u>all affected</u> SGs: <ul style="list-style-type: none"> • 1FDW-372 • 1MS-17 • 1MS-79 • 1MS-35 • 1MS-82 • 1FDW-368 • Verify level in both SGs < 96% O.R. • IAAT core SCM is > 0°F, <ul style="list-style-type: none"> • Throttle HPI per Rule 6 (HPI). • Verify letdown in service. • Verify any SG has an intact secondary boundary (intact SG). • Open the following on all intact SGs: <ul style="list-style-type: none"> • 1FDW-382 • 1FDW-369 • Start 1B MDEFDWP • 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"> • TBVs • Dispatch two operators to perform Encl 5.24 (Operation of the ADVs). 	

Op-Test No.: 1

Scenario No.: 4

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

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

Op-Test No.: 1	Scenario No.: 4	Event No.: 5	Page 7 of 7
Event Description: Excessive Heat Transfer (M, ALL)			
Time	Position	Applicant's Actions or Behavior	
	OATC/SRO /BOP	<p>Crew response:</p> <p>Excessive Heat Transfer tab of the EOP (Continued)</p> <ul style="list-style-type: none"> • Verify any RCP operating. Maintain RCP NPSH. <ul style="list-style-type: none"> • OAC • Encl 5.18 (P/T Curves) • Initiate Encl 5.16 (SG Tube-to-Shell ΔT Control). • IAAT all the following exist: <ul style="list-style-type: none"> • RBS actuated • RB pressure < 10 psig • 1RIA-57 NOT in alarm • 1RIA-58 NOT in alarm <p>THEN stop both RBS pumps.</p> • IAAT Tcold approaches 350°F, <ul style="list-style-type: none"> • AND all RCPs are operating, • THEN ensure < four RCPs are operating. • IAAT BWST level is $\leq 19'$, <p>THEN initiate Encl 5.12 (ECCS Suction Swap to RBES).</p> • Verify all SCMs > 0°F. • Verify indications of SGTR exist. • Verify required RCS makeup flow within normal makeup capability • Verify either of the following: <ul style="list-style-type: none"> • Any SG isolated • Any SG has an unisolable steam leak • GO TO FCD tab. 	
		When transfer to the FCD tab is made or when directed by the Lead Examiner this event is completed	

CRITICAL TASKS

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

Simulator Brief/Turnover

SAFETY/PRA RISK (OSM)			
SAFETY: Take a Minute			
PRA Risk Status: GREEN			
UNIT 0 (OSM)			
SSF Operable: Yes	KHU's Operable: U1 - OH, U2 - UG	LCTs Operable: 2	Fuel Handling: None
UNIT STATUS (CR SRO)			
Unit 1 Simulator		Other Units	
Mode: 2	Unit 2		Unit 3
Reactor Power: .02%	Mode: 1	Mode: 1	
Gross MWE: 0	100% Power	100% Power	
RCS Leakage: 0.1 gpm	EFDW Backup: Yes	EFDW Backup: Yes	
RBNS Rate: 0 gpm			

Technical Specifications/SLC Items (CR SRO)			
Component/Train	OOS Date/Time	Restoration Required Date/Time	TS/SLC #
Shift Turnover Items (CR SRO)			
Primary			
<ul style="list-style-type: none"> Unit 1 was started up following a RFO and operated at power for 1 week. Turbine vibration problems required the unit to be shutdown. Turbine vibration problems have been fixed. LDST pressure is low and requires H2 make up. After turnover is complete, perform a H2 make up to the LDST using OP/1/A/1106/017, Encl. 4.5. Unit 1 Startup procedure in progress. OP/1/A/1102/001 Enclosure 4.7 (Unit Startup From 532°F and 2155 psig) is complete up through step 3.28. OP/1/A/1105/019 (Control Rod Drive) in progress. Initial Conditions completed Rx power = 0.01%; below the POAH. After turnover is complete continue with the startup at step 3.29. 			
Secondary			
<ul style="list-style-type: none"> 1SSH-1, 1SSH-3, 1SD-2, 1SD-5, 1SD-140, 1SD-303, 1SD-355, 1SD-356 and 1SD-358 are closed with power supply breakers open per the Startup Procedure for SSF Overcooling Event. 1PR-1, 1PR-6, 1LPSW-1, 1LPSW-2, 1LPSW-3, 1FDW-80, 1CF-5, 1CF-6, 1LP-1 and 1LP-2 breakers open per the appropriate system operating procedures. 			
Reactivity Management (CR SRO)			
RCS Boron: 1164ppmB	Gp 6 Rod Position: 48%	Batch additions as required for volume control.	
Human Performance Emphasis (OSM)			
Procedure Use and Adherence			