

Facility: Point Beach Scenario No.: 1 Op-Test No.: 2021

Examiners: _____ Operators: _____

Initial Conditions: Reactor power is 28% for flux mapping. G03, EDG is out of service due to
to maintenance with G04, EDG aligned. 1LT-426, PZR Level transmitter (Red) removed from
service.

Turnover: Raise power to 50% at 15% per hour per OP 1C, Startup to Power Operations.

Critical Tasks: CT-24, Energize At Least One Emergency Bus
CT-25, Manually Start SW Pump For EDG Cooling

Event No.	Malf. No.	Event Type*	Event Description
1		R-RO N-BOP N-SRO	Normal Up Power
2		R-BOP C-RO C-SRO TS-SRO	Single Dropped Rod 2019 Repeat
3		C-BOP C-SRO TS-SRO	1HC-478, SG B Atmospheric Steam Dump controller fails in auto, valve fully opens, in manual will only close to 50%, requiring local manual isolation valve operation New
4		M-ALL	Loss of AC Power to All Safeguards Buses 'A' Train EDG success path
5		C-BOP C-SRO	P-32A/B SW Pumps do not Auto Start after Restoration of 'A' Train EDG New
6		C-RO C-SRO	Multiple (4) Stuck Rods Post Trip, requires boration 2017 Repeat

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

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SIMULATOR EXERCISE GUIDE REQUIREMENTS

Terminal Objective:	Given the site simulator and specific plant conditions, the students will be able to respond to various plant abnormal and emergency events, in accordance with site procedures and technical Specifications.
Enabling Objectives:	1. None
Prerequisites:	<ol style="list-style-type: none"> 1. Simulator available 2. Students enrolled in Initial License Program
Training Resources:	<ol style="list-style-type: none"> 1. Floor Instructor as Shift Manager / Shift Technical Advisor 2. Simulator Booth Operator 3. Communicator 4. NRC Evaluators
References:	<ol style="list-style-type: none"> 1. OP 1C, Startup to Power Operation 2. AOP-1D, CVCS Malfunction 3. AOP-2A, Secondary Coolant Leak 4. AOP-6A, Dropped 5. AOP-24, response to Instrument Malfunction 6. EOP-0, Reactor Trip or Safety Injection 7. EOP-0.1, Reactor Trip Response 8. EOP-1.1, SI Termination 9. ECA-0.0, Loss of All AC Power 10. OM 3.7, AOP And EOP Procedure Usage For Response To Plant Transients 11. Technical Specifications Manual 12. Technical Requirements Manual
Protected Content:	None
Evaluation Method:	Simulator performance will be evaluated in accordance with NUREG 1021
Operating Experience:	None
Risk Significant Operator Actions:	<p><u>Initiating Event with Core Damage Frequency:</u></p> <p>INIT-TSW – Loss of SW (1.45E-07 CDF) (8.87E-11 LERF)</p> <p>LOOP – Loss of Offsite Power (2.51E-06 CDF)</p> <p>HEP-SW-START – OPERATOR STARTS SW PUMP FROM CONTROL</p>

ROOM (AFTER AC POWER RESTORATION)

UPDATE LOG: Indicate in the following table any minor changes or major revisions made to the material after initial approval.

#	DESCRIPTION OF CHANGE	REASON FOR CHANGE	AR/TWR#	PREPARER	DATE
				REVIEWER	DATE
0	Developed for the 2021 ILT NRC Exam				

OVERVIEW / SEQUENCE OF EVENTS

OVERVIEW

Initial conditions for the scenario are: Reactor power is stable at approximately 28%, Emergency Diesel Generator (EDG) G03 is out of service for maintenance with G04 aligned to 1A-06 and 2A-06, and 1LT-426 Pressurizer Level channel is removed from service.

Examinees will initiate a power ascension per OP-1C. The crew will then be required to respond to a dropped rod and an instrument failure per AOPs. The crew will also respond to a loss of all AC safeguards power, Service Water pump failures, and stuck control rods using emergency procedures.

The scenario will be terminated when the crew completes through Step 6 of EOP-0.1, Reactor Trip Response.

SEQUENCE OF EVENTS

Event #	Description
1.	<p>OP 1C Power Ascension</p> <ul style="list-style-type: none"> The crew will raise reactor power approximately 3% to 5% utilizing the provided reactivity plan.
2.	<p>Dropped Rod – K9</p> <ul style="list-style-type: none"> Rod K9 will drop to the bottom of the core, causing automatic outward rod motion. The crew will respond per AOP-6A, Dropped Rod, to stop outward rod motion and stabilize the plant. The SRO will address Technical Specifications
3.	<p>1HC-478, Loop B ADV Hand Controller, Fails High</p> <ul style="list-style-type: none"> The S/G B ADV Controller fails high causing the associated atmospheric steam dump valve (ADV) to open. The crew will respond per AOP-2A, Secondary Leak, and AOP-24, Response to Instrument Malfunction to isolate the 'B' S/G ADV and stabilize the plant. The SRO will address Technical Specifications.
4.	<p>Loss of AC Power to All Safeguards Buses</p> <ul style="list-style-type: none"> The loss of Station Transformer 1X-04 and the failures of Emergency Diesel Generators to automatically restore safeguards power results in a loss of all AC safeguards power to Unit 1. The crew will respond per ECA-0.0 to trip Unit 1 reactor and restore power to a safeguards bus.

5.	<p>'A' Train Service Water Pumps Fail to Start</p> <ul style="list-style-type: none"> • Upon power restoration, 'A' Train Service Water pumps will fail to automatically start. • The crew will start Service Water pumps to ensure adequate Service Water cooling flow per ECA-0.0.
6.	<p>Stuck Rods (4)</p> <ul style="list-style-type: none"> • When the reactor is tripped, rods B6, B8, C5, and E11 will be stuck at their initial fully withdrawn positions. • The crew will respond by borating the RCS to ensure adequate shutdown margin per EOP-0.1, Reactor Trip Response.
	<p>Terminate the scenario when crew has completed Step 6 of EOP-0.1, Reactor Trip Response, or per Lead Evaluator.</p>

SIMULATOR SET-UP INSTRUCTIONS

Perform simulator set up per the site specific Simulator Setup Checklist.

Check	Action
1.	Reset to IC-30
2.	Perform Simulator Setup Checklist
3.	Open schedule file. Z:\2021 ILT NRC Exam Simulator Files\ILT NRC Scenario 1
4.	To record SBT data: <ol style="list-style-type: none"> 1. Launch "SBT Report" from Thunderbar 2. Open "Scenario Validation Checklist.sbt" (TRex_PB\Lightning)
5.	Take schedule(s) to run
6.	Verify required event file(s) open if required
7.	Take sim to run
8.	Place turnover sheets on RO desk
9.	Place reactivity sheets on RO desk
10.	Guard the following: <ul style="list-style-type: none"> • G01, G02, G04 EDG's Place the following OOS: <ul style="list-style-type: none"> • G03 EDG • 1LT-426 Pressurizer Level Place red dots on the G03 alarm and PZR Level: <ul style="list-style-type: none"> • C02 E 2-1 • C02 E 2-2 • 1C04 1C 3-3
11.	<ul style="list-style-type: none"> • Conduct simulator crew pre-scenario brief using TR-AA-230-1007-F06, Simulator Instructor Pre-Exercise Checklist. • Brief the scenario evaluators • Brief surrogates using TR-AA-230-1007-F11, Surrogate Brief Checklist, if necessary
12.	Run Scenario
13.	To save SBT Data: <ol style="list-style-type: none"> 1. In the SBT Report program click the Generate Report icon (green arrow) 2. In Test Title enter a unique test title, to be same as file name 3. In report name enter the location the test files are to be saved, use same file name as Test Title 4. Click "Generate" (generates and saves two files in the selected folder) 5. Verify files saved in the selected folder 6. The generated report and SBT Report program may now be closed 7. Collect procedure markups for SBT 8. Save any InSight, Alarm, Event, Schedule Files to the secure drive that were in use
14.	Reset simulator to appropriate IC.

BOOTH OPERATOR BRIEFING:

Review the scenario sequence, event triggers and expected field communications.

Z:/2021 ILT NRC Exam Simulator Files/NRC Scenario 1.sch

At Time	On Event	Action	Description
		Preloads / Initial Conditions	
00:00:00		Insert malfunction MAL1DSG001B	DIESEL G03 FAILURE TO START
00:00:00		Insert malfunction XMT1RCS007C to -15	1-LT426 PRZR NARROW RANGE LEVEL FIXED BIAS
		Event 2: Dropped Rod	
	1	Insert malfunction MAL1CRF002-K9 on event 1	ROD DROP K9
		Event 3: SG B ADV Controller (HC-478) fails High	
	3	Insert malfunction CNH1PCS013E to 100.00000 on event 3	1-HC478 LOOP B ATM SD HAND CONTROLLER FIXED AUTO ONLY
	4	Insert malfunction VLV1SGN009D to 0.10000 on event 4	1-MS-2015 SG B ATMOSPHERIC STM DMP CONTROL FAIL POSITION
		Insert remote LOA1SGN026 to 0 in 10	1MS-244 SG B ATMOS STM DMP INLET
		Event 4: Loss of AC	
	5	Insert malfunction MAL1EPS002 on event 5	LOSS OF LOW VOLTAGE STATION AUX TRANSFORMER X04
00:00:00		Insert malfunction BKR1DSG001 to Failasis	1-A5260 DIESEL GEN NO. G01 TO BUS 1-A05
00:00:00		Insert malfunction MAL1DSG007A	EDG G01 FAILURE TO AUTOSTART
00:00:00		Insert malfunction BKR1DSG004 to Failasis	1-A5286 G04 TO 1A06 BRK 86
		Event 5: SW Pumps DO not Auto Start	
00:00:00		Insert malfunction BKR1SWS001 to Fail_Auto_CI	1-B5210C P-32A SERVICE WATER PUMP CKTBKR
00:00:00		Insert malfunction BKR1SWS002 to Fail_Auto_CI	1-B5211C P-32B SERVICE WATER PUMP CKTBKR
00:00:00		Insert malfunction BKR1SWS006 to Fail_Auto_CI	2-B5234B P-32F SERVICE WATER PUMP CKTBKR
		Event 6: Stuck Rods Post-Trip	
00:00:00		Insert malfunction MAL1CRF001-B6 to Non-Trippable	STUCK ROD B6
00:00:00		Insert malfunction MAL1CRF001-B8 to Non-Trippable	STUCK ROD B8
00:00:00		Insert malfunction MAL1CRF001-C5 to Non-Trippable	STUCK ROD C5
00:00:00		Insert malfunction MAL1CRF001-E11 to Non-Trippable	STUCK ROD E11
		Insert remote LOA1CVC054 to 1.0000 in 5	1CV-350 BA TO CHG PP SUCT MOV 1-350
00:00:00		Event Z:/2021 ILT NRC Exam Simulator Files/NRC 1.evt	

Event file: Trigger 4 inserts when 1HC-478 is in MANUAL (x13i263m == 1)

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

Bolded steps are Verifiable Actions taken by the Operators.

(IA) actions are those allowed to be taken from memory, before referencing the procedure, as allowed by OM 3.7, Attachment F, AOP Actions Allowed From Memory.

Event # 1	OP 1C Power Ascension															
ACTION	Booth: None															
STUDENT RESPONSE	<p>BOP/RO</p> <ul style="list-style-type: none"> Perform actions as directed. <p>SRO</p> <ul style="list-style-type: none"> Implements OP 1C starting at Step 5.37. <p>Crew</p> <p>5.37 <u>Commence Load Escalation</u> (Per the crew's reactivity plan.)</p> <p>5.37.1 ESTIMATE the amount of dilution/rod motion needed for desired load change, and REFER to PPCS Xenon program for timing estimates. (SRO directs; RO performs)</p> <p>5.37.2 IF rate of load escalation is to be greater than or equal to 15% per hour, THEN CONTACT Chemistry for primary sampling requirements. (no actions needed)</p> <p>5.37.3 PERFORM the following to begin raising load: (SRO directs, BOP performs)</p> <ol style="list-style-type: none"> ENSURE EH Control in OPER AUTO, 1st Stage IN. ENSURE the Valve Position Limiter (VPL) is set to the desired position. SET Turbine Controls for desired ramp rate per table below: <table border="1" data-bbox="479 1243 919 1451"> <thead> <tr> <th>% per Hour</th> <th>Thumbwheel Setting</th> <th>INITIAL or N/A</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>6</td> <td></td> </tr> <tr> <td>12</td> <td>8</td> <td></td> </tr> <tr> <td>15</td> <td>10</td> <td></td> </tr> <tr> <td>30</td> <td>15</td> <td></td> </tr> </tbody> </table> <p><i>(The setting depends on the decision of the crew)</i></p> <ol style="list-style-type: none"> ADJUST Turbine Setter to desired turbine load AND DEPRESS GO pushbutton. (BOP uses the up/down arrow buttons, in the Reference Control section of Turbine Control, to set the desired end point.) <p>5.38 <u>Continuous Action During Power Increase</u></p> <p>5.38.1 MAINTAIN controls in AUTO as practicable:</p> <ul style="list-style-type: none"> Blender controls (RO) Turbine controls (BOP) <p>5.38.2 MAINTAIN Control Banks within the insertion, sequence, and overlap limits specified in the COLOR. LCO 3.1.6 (RO)</p> <p>5.38.3 MAINTAIN Tavg within 1.5°F of Tref. (RO)</p> <p>SET desired quantity on 1YIC-11A, Dilution Flow Counter SET desired flow rate on 1HC-111, Reactor Makeup Water Flow Controller</p>	% per Hour	Thumbwheel Setting	INITIAL or N/A	3	6		12	8		15	10		30	15	
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	<p>PLACE Reactor Makeup Mode Selector Switch in DILUTE ENSURE SHUT CV-110A, BA to Z-1 Blender Flow Control Valve PLACE Reactor Makeup Control Switch to START ENSURE Dilution Flow Counter functions properly upon start MONITOR system for proper response</p>
<p>ROLE PLAY</p>	<p><u>Booth Communications:</u></p> <ul style="list-style-type: none"> Respond to reports or direction to field operators as necessary. <p><u>SM Communications:</u></p> <ul style="list-style-type: none"> Brief the crew to maintain rod control in AUTO. Rod control may be taken to MANUAL to make adjustment to Tavg or AFD, but should be returned to AUTO following rod motion. Direct the crew to proceed with power ascension as briefed.
<p>NOTES</p>	<p>Continuation Criteria: After a power increase of approximately 3% to 5%, or at the discretion of the Lead Examiner, continue with the next event.</p>

Event # 2	Dropped Rod – K9
ACTION	Booth: Insert TRIGGER 1 per Lead Evaluator
STUDENT RESPONSE	<p>Symptoms and Indications:</p> <ul style="list-style-type: none"> • Rod Bottom Light control rod K-9, Control Bank A • Control rod K-9 IRPI at approximately 0 • POWER RANGE CHANNEL DEVIATION (1C04 1A 3-3) • POWER RANGE ROD DROP (1C04 1A 4-5) • ROD BOTTOM ROD DROP (1C04 1A 1-4) • Power Range NIs drop to between 19% and 24% <p>BOP/RO</p> <ul style="list-style-type: none"> • Diagnoses the dropped rod and takes manual control of rods. (RO) • Suspends the load ramp if in progress. (SRO directs, BOP perform) <p>SRO</p> <ul style="list-style-type: none"> • Implements AOP-6A, Dropped Rod <p>Crew (SRO directs)</p> <ol style="list-style-type: none"> 1. Check Only One Rod Dropped (RO) 2. Check Main Turbine – ON LINE (BOP) 3. (IA) Place Control Rod Bank Selector Switch in – MANUAL (RO) 4. (IA) Check Tav_g – TRENDING TO PROGRAM VALUE; RNO: Restore Tav_g to program value by adjusting turbine load. (BOP) <i>This may be completed by either of b or c (as determined by the SRO):</i> <ol style="list-style-type: none"> a. Determine the amount of load reduction needed. b. Select TURBINE MANUAL and use GV down pushbutton c. In OPER AUTO, set the reference setter to the desired value by using the Reference Control down and up buttons; then press GO. 5. Maintain RCS Tav_g: (Continuous Action Step [C.A.S.] for RO to monitor throughout the procedure) 6. Notify the following personnel: (SRO directs SM to make notifications) <ul style="list-style-type: none"> o Reactor Engineering o I&C Supervisor o Maintenance Supervisor 7. Place Lift Coil Disconnect Switch For Dropped Rod In – DISCONNECT (BOP or RO) 8. Check Axial Flux Difference – IN OPERATING BAND (RO) 9. Perform PBF-2513, Shutdown Margin For an Operating Reactor WITHIN 1 HOUR (Shift Manager discuss with SRO to hand off to U2 to perform) 10. Check Quadrant Power Tilt – LESS THAN 2%; RNO: Perform AOP-6H, Quadrant Power Tilt, while continuing with this procedure. (RO. AOP-6H may be handed off to Unit 2 to perform, but no actions due to initial power level) 11. Reset Dropped Rod Alarms on NIS Power Range Cabinets (BOP) 12. Reduce Reactor Power – TO LESS THAN OR EQUAL TO 75% WITHIN 2 HOURS OF DROPPED ROD (No actions required due to initial power level)

Event # 2	Dropped Rod – K9															
	<p>13. Check Changes in Reactor Power - LESS THAN 15% IN ANY 1 HOUR (RO)</p> <p>14. Confirm Dropped Rod (RO)</p> <p>15. Check Dropped Rod Confirmed (RO)</p> <p>16. Direct Maintenance to Make Necessary Repairs (SRO directs SM to call)</p> <p>Note: The temperature transient caused by the dropped rod may result in an automatic letdown isolation. Letdown restoration per AOP-1D, CVCS Malfunction, is not required to meet the objectives of this scenario.</p> <ul style="list-style-type: none"> Assess Technical Specifications: (SRO performs) <table border="1" data-bbox="402 722 1419 1192"> <thead> <tr> <th>CONDITION</th> <th>REQUIRED ACTION</th> <th>COMPLETION TIME</th> </tr> </thead> <tbody> <tr> <td colspan="3">TS 3.1.4 Rod Group Alignment Limits</td> </tr> <tr> <td>B. One rod not within limits</td> <td>B.1.1 Verify SDM to be within limits provided in COLR</td> <td>1 hour</td> </tr> <tr> <td colspan="3">TS 3.4.1 RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits (PZR Press ≥ 2205 psig)</td> </tr> <tr> <td>A. One or more RCS DNB parameters not within limits.</td> <td>A.1 Restore RCS DNB parameter(s) to within limit.</td> <td>2 hours</td> </tr> </tbody> </table>	CONDITION	REQUIRED ACTION	COMPLETION TIME	TS 3.1.4 Rod Group Alignment Limits			B. One rod not within limits	B.1.1 Verify SDM to be within limits provided in COLR	1 hour	TS 3.4.1 RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits (PZR Press ≥ 2205 psig)			A. One or more RCS DNB parameters not within limits.	A.1 Restore RCS DNB parameter(s) to within limit.	2 hours
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A. One or more RCS DNB parameters not within limits.	A.1 Restore RCS DNB parameter(s) to within limit.	2 hours														
ROLE PLAY	<p><u>Booth Communications:</u></p> <ul style="list-style-type: none"> Respond to reports or direction to field operators as necessary. <p><u>SM Communications:</u></p> <ul style="list-style-type: none"> Respond to reports from crew members as required. When SDM calculation called for, discuss with OS to pass it off to Unit 2 so Unit 1 can focus on the event. 															
NOTES	<p>Continuation Criteria:</p> <p>After the crew has restored Tavgt to program and address Technical Specifications, or at the discretion of the Lead Examiner, continue with the next event.</p>															

Event # 3	1HC-478, Loop B ADV Hand Controller, Fails High
ACTION	Booth: Insert TRIGGER 3 per Lead Evaluator
STUDENT RESPONSE	<p>Symptoms and Indications:</p> <ul style="list-style-type: none"> • 1MS-2015, B ADV, indicating lights – red on, green off • PPCS alarms • Rising reactor power • Lowering Tavg • Lowering Pzr Level and Pressure <p>BOP</p> <ul style="list-style-type: none"> • (IA) Diagnoses controller failure and attempt to shut 1MS-2015, Atmospheric Dump Valve, from the control room. <p>SRO</p> <ul style="list-style-type: none"> • Implements AOP-2A, Secondary Coolant Leak <p>Crew (SRO directs)</p> <p>AOP-2A, Secondary Coolant Leak</p> <ol style="list-style-type: none"> 1. Determine Secondary Leakage Not Hazardous to Personnel or Equipment (BOP monitors) <ul style="list-style-type: none"> • Plant habitability • Containment Pressure < 2 psig • Safeguards bus fault • Equipment Operability 2. Maintain Plant Within Limits (C.A.S. for RO and BOP to monitor throughout the procedure) <ul style="list-style-type: none"> • Rx power ≤ 100% per NIs (RO) • SG levels stable of trending to 64% (BOP) • Feed pump suction pressure > 180 psig (BOP) • Condensate Pump motor current < 185 amps (BOP) 3. Maintain RCS Tavg (C.A.S. for RO to monitor throughout the procedure) Note: Steps 4, and 6 through 10 are diagnostic steps to determine the source of the leak. These steps may be performed in any order. <i>No actions</i> 5. Check No Secondary Leakage to Atmosphere <ol style="list-style-type: none"> a. Steam Generator Safety Valves Shut (BOP may contact Security or the PAB AO) b. Steam Generator atmospheric steam dump valves shut <ol style="list-style-type: none"> i. 1MS-2015 for S/G B (BOP) <p>RNO: Perform the following: (SRO directs)</p> <ol style="list-style-type: none"> 1) Manually shut valve(s) (BOP) Place 1HC-478 to Manual Take manual potentiometer to full close Note valve position lights do not indicate fully closed 2) IF valve(s) will NOT shut, THEN locally shut associated isolation valve: <ul style="list-style-type: none"> ○ 1MS-244 for 1MS-2015 (BOP directs AO) <p>Note: Steps 11 through 14 do not require any operator action.</p>

Event # 3	1HC-478, Loop B ADV Hand Controller, Fails High									
	<p>15. Check Plant Shutdown and Cooldown Required (SRO) RNO: Return to Procedure and Step in Effect</p> <ul style="list-style-type: none"> Assess Technical Specifications: (SRO) <table border="1" data-bbox="402 541 1419 842"> <thead> <tr> <th data-bbox="402 541 701 615">CONDITION</th> <th data-bbox="701 541 1000 615">REQUIRED ACTION</th> <th data-bbox="1000 541 1419 615">COMPLETION TIME</th> </tr> </thead> <tbody> <tr> <td colspan="3" data-bbox="402 615 1419 669">TS 3.7.4 Atmospheric Dump Valve (ADV) Flowpath</td> </tr> <tr> <td data-bbox="402 669 701 842">A. One required ADV flowpath inoperable</td> <td data-bbox="701 669 1000 842">A. 1 Restore required ADV flowpath to OPERABLE status.</td> <td data-bbox="1000 669 1419 842">7 days</td> </tr> </tbody> </table>	CONDITION	REQUIRED ACTION	COMPLETION TIME	TS 3.7.4 Atmospheric Dump Valve (ADV) Flowpath			A. One required ADV flowpath inoperable	A. 1 Restore required ADV flowpath to OPERABLE status.	7 days
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TS 3.7.4 Atmospheric Dump Valve (ADV) Flowpath										
A. One required ADV flowpath inoperable	A. 1 Restore required ADV flowpath to OPERABLE status.	7 days								
ROLE PLAY	<p><u>Booth Communications:</u></p> <ul style="list-style-type: none"> PAB AO: 5 minutes after inserting trigger 3, or 2 minutes after being directed to investigate, report flow noise at the Unit 1 'B' Atmospheric Dump Valve. PAB AO: If asked, after the crew attempts to shut the 'B' ADV from the CR, report that 1MS-2015 is 10% OPEN and not moving. PAB AO: When directed, use LOA1SGN026 to SHUT 1MS-244, Isolation for 1MS-2015, as directed by the crew. Report that flow noise has stopped when 1MS-244 is shut. PAB AO: If asked, report that all S/G Safety Valves are shut. Respond to other reports or direction to field operators as necessary. <p><u>SM Communications:</u></p> <ul style="list-style-type: none"> Respond to reports from crew members as required. If requested, obtain Main Steam P&ID for the crew. (#51) 									
NOTES	<p>Continuation Criteria: After the crew isolates the 'B' ADV and assesses Technical Specifications, or at the discretion of the Lead Examiner, continue with the next event.</p>									

Event # 4	Loss of AC Power to All Safeguards Buses
ACTION	Booth: Insert TRIGGER 5 per Lead Evaluator
<p>STUDENT RESPONSE</p> <p>Conditions for CT-24 event start here</p>	<p>Symptoms and Indications:</p> <ul style="list-style-type: none"> • Dimming of lights in the Control Room • UNIT 1 4.16 KV BUS UNDER VOLTAGE (C02D 1-4) • UNIT 1 480 V BUS UNDER VOLTAGE (C02D 2-1) • 13.8 KV MAIN OR TIE BREAKER TRIP (C02E 2-8) <p>BOP</p> <ul style="list-style-type: none"> • Diagnoses loss of AC power to both trains of safeguards busses and performs immediate actions of ECA-0.0, Loss of All AC Power. <p>SRO</p> <ul style="list-style-type: none"> • Implements ECA-0.0, Loss of All AC Power <p>Crew (ECA-0.0) (SRO directs)</p> <ol style="list-style-type: none"> 1. Verify Reactor Trip (RO) <ul style="list-style-type: none"> • Reactor Trip and By-Pass Breakers – OPEN RNO: Manually trip reactor (RO) 2. Verify Turbine Trip (RO) 3. Secure RCPs (RO) <ol style="list-style-type: none"> a. Ensure both RCPs – STOPPED (RO) <i>Places 1P-1A and 1P-1B handswitches in STOP.</i> b. Place steam dump mode control – MANUAL (BOP) 4. Check if RCS is Isolated (RO) <ol style="list-style-type: none"> a. PZR PORVs – BOTH SHUT b. Letdown orifice outlet valves – SHUT c. Letdown containment isolation valves – SHUT (RO) <ul style="list-style-type: none"> • 1CV-371A • 1CV-371 d. RCP Seal return isolation valves – SHUT (RO) <ul style="list-style-type: none"> • 1CV-313A e. RCS Sample valves – SHUT (BOP) <ul style="list-style-type: none"> • 1SC-966A, PZR Steam Space sample containment isolation valve • 1SC-966B, PZR liquid space sample containment isolation valve • 1SC-966C, RCS hot leg sample containment isolation valve. f. Head vent system – ENERGIZED; RNO: Go to Step 5 (RO) 5. Verify AFW Flow – GREATER THAN OR EQUAL TO 275 GPM; RNO: Perform the following: (BOP) <ol style="list-style-type: none"> a. Ensure TDAFW Pump steam supply MOV's OPEN <ul style="list-style-type: none"> • 1MS-2020 • 1MS-2019 b. Ensure TDAFW Pump discharge MOV's OPEN

Event # 4	Loss of AC Power to All Safeguards Buses
<p>CT-24 action. Conditions for CT-25 event start here</p>	<p>6. TRY TO RESTORE POWER TO ANY SAFEGUARDS BUS (BOP) BOP or RO may call TH AOs to investigate EDGs <i>(G01 fails to start, can be manually started but will not close onto bus 1A-05; G02 is running; G03 is OOS; G04 is running but fails to close onto bus 1A-06)</i></p> <ul style="list-style-type: none"> a. Emergency Diesel Generators – ALL RUNNING a. RNO: Try to start non-running EDGs <ul style="list-style-type: none"> 1) Ensure diesel mode selector switch in AUTO 2) Place control switch to START (G-01) 3) Ensure generator field flash occurs 4) Ensure green READY TO LOAD light is energized 5) IF No diesel is running, THEN Go to Step 10 b. AC Safeguards buses – AT LEAST ONE TRAIN ENERGIZED b. RNO: IF NO 4160v SAFEGUARDS BUS is energized, THEN Go to Step 7 <p>7. Restore Power to 'A' Safeguards Bus: (BOP)</p> <ul style="list-style-type: none"> a. Check G-01 – RUNNING <ul style="list-style-type: none"> 1) IF G-01 is running AND breaker 1A52-60, G-01 to Bus 1A-05 Breaker, is NOT closed, THEN perform the following: <ul style="list-style-type: none"> a) Ensure 1A52-57, 1A-03 to 1A-05 Bus Tie Breaker, is open. b) Try to auto close breaker by placing control switch to trip position then release. c) IF breaker will NOT auto close, THEN perform the following: <ul style="list-style-type: none"> 1. Place Mode Selector switch in EXERCISE. 2. Turn sync switch ON 3. At C-02, manually CLOSE breaker control switch. 4. Turn sync switch OFF. d) IF 1A-05 and 1B-03 are energized, THEN Go to Step 9. a. RNO: Check G-02 – RUNNING <ul style="list-style-type: none"> 2) IF G-02 is running AND 1A-05 is still NOT energized, THEN perform the following: <ul style="list-style-type: none"> a) Ensure 1A52-57, 1A-03 to 1A-05 bus tie breaker is OPEN. b) Ensure 1A52-60, G-01 to 1A-05 breaker, is OPEN and in PULLOUT. c) (CT) Unlock (Key 43) and place 1A52-66, G-02 to 1A-05 breaker control switch in auto. (Energizes 1A-05) e) IF 1A-05 and 1B-03 are energized, THEN Go to Step 9. <p>9. (or Step 46 per FOP) Verify One Train of Safeguards Bus Energized <i>(subsequent steps listed below in Event #5)</i> (BOP)</p>

Event # 4	Loss of AC Power to All Safeguards Buses
<p>ROLE PLAY</p>	<p><u>Booth Communications:</u></p> <ul style="list-style-type: none"> • TH AO: If directed to investigate G-01 failure to start, wait 2 minutes and report all conditions appear normal for G-01. • TH AO: If directed to investigate output breakers for G-01 and/or G-04 failure to close, wait 2 minutes and report that conditions appear normal locally. • TH AO: If directed to investigate the 1X-04 lockout, wait 3 minutes and report there is no apparent cause locally. • Respond to other reports or direction to field operators as necessary. <p><u>SM Communications:</u></p> <ul style="list-style-type: none"> • Respond to reports from crew members as required.
<p>NOTES</p>	

Event # 5	'A' Train Service Water Pumps Fail to Start
ACTION	Booth: None
STUDENT RESPONSE	<p>Symptoms and Indications:</p> <ul style="list-style-type: none"> • SW Header pressure, north and south, approximately 30 psig • NORTH OR SOUTH SERVICE WATER HEADER PRESSURE LOW (C01A 3-5) • 1P-30A OR B (2P-30A OR B) CIRC PUMPS COOLING WATER FLOW LOW (C01A 3-7 and 4-7) • G-01 (G-02) EMER DIESEL COOLER LOW FLOW (C02D 3-6 and C02F 3-1) <p>BOP</p> <ul style="list-style-type: none"> • Starts Service Water pumps to restore SW system pressure. <p>SRO</p> <ul style="list-style-type: none"> • Implements ECA-0.0, Loss of ALL AC Power <p>Crew</p> <p>9. (or Step 46 per FOP) Verify One Train of Safeguards Bus Energized (BOP)</p> <p>BOP or RO may call TH AOs to investigate SW Pumps and their breakers (1B-03, 1B-04, 2B-04, and 2B-03)</p> <ul style="list-style-type: none"> a. AC Safeguards buses – AT LEAST ONE TRAIN ENERGIZED b. Monitor running EDG status c. Service Water header pressure – GREATER THAN OR EQUAL TO 50 psig. c. (CT) RNO: Manually start pumps and align valves as necessary to establish service water header pressure greater than or equal to 50 psig. Place control switch for P-32A, P-32B, and/or P-32F to start to raise pressure greater than 50 psig. Starting one pump should be adequate to restore header pressure. (<i>P-32C has no power.</i>) d. Trip and close contactor(s) for tripped battery chargers aligned to supply DC buses <ul style="list-style-type: none"> • D-07 e. Return to procedure and step in effect and implement CSPs as necessary. <p>c. CT-25 action</p>
ROLE PLAY	<p><u>Booth Communications:</u></p> <ul style="list-style-type: none"> • Respond to reports or direction to field operators as necessary. • If asked, all pumps are ready for start. Also, all pumps started are sat. <p><u>SM Communications:</u></p> <ul style="list-style-type: none"> • Respond to reports from crew members as required.

Event # 5	'A' Train Service Water Pumps Fail to Start
NOTES	

Event # 6	Stuck Rods (4)
ACTION	Booth: None
STUDENT RESPONSE	<p>Symptoms and Indications:</p> <ul style="list-style-type: none"> • Control Rods B6 and B8, in Shutdown Bank A, and C5 and E11, in Control Bank A at 225 steps on IRPIs • B6, B8, C5, and E11 rod bottom lights NOT LIT <p>RO</p> <ul style="list-style-type: none"> • Recognize not all rods fully inserted, uses backup indications to verify the reactor is tripped. <p>SRO</p> <ul style="list-style-type: none"> • Implements EOP-0, Reactor Trip or Safety Injection and EOP-0.1, Reactor Trip Response <p>Crew <u>EOP-0, Reactor Trip or Safety Injection (SRO directs)</u></p> <ol style="list-style-type: none"> 1. Verify Reactor Tripped; RNO: Manually trip reactor. (RO performs since not all rods on the bottom) 2. Verify Turbine Trip (RO) 3. Verify power to AC Safeguards Buses (RO) <ol style="list-style-type: none"> a. Check safeguards buses – At least one train ENERGIZED b. Check safeguards buses – All ENERGIZED; RNO: Try to restore power to de-energized buses while continuing with this procedure. (Shift Manager will discuss with SRO having Unit 2 restore power to B Train using the AOP-18 and 19 procedures.) 4. Check If SI actuated (RO) <ol style="list-style-type: none"> a. Any SI annunciators – LIT <i>No lights lit</i> b. RNO: Check if SI is required: <i>SI not required (Pzr Pressure, Containment Pressure, SG Pressures)</i> IF SI is not required, THEN perform the following: <ol style="list-style-type: none"> 1) Notify STA to MONITOR and IMPLEMENT CSP Status per CSP-ST.0 Unit 1, CSF Status trees. (SRO) 2) Go to EOP-0.1, Reactor Trip Response. <p>Note: The crew may manually actuate SI/CI based on plant conditions. The steps for this alternate flow-path are listed below as Event 6a.</p> <p><u>EOP-0.1, Reactor Trip Response (SRO directs)</u></p> <ol style="list-style-type: none"> 1. Check RCS Temperature Place Steam Dump Mode Selector in MANUAL (BOP) With NO RCPs running, Check RCS WR Cold Leg temp stable at or trending to 547°F (RO) 2. Check feedwater status <ol style="list-style-type: none"> a. Main feedwater regulating control valves – BOTH SHUT (BOP) b. Transfer feedwater control to bypass regulating valves: (BOP) <ul style="list-style-type: none"> o Check main feedwater pumps – AT LEAST ONE RUNNING

Event # 6	Stuck Rods (4)
	<ul style="list-style-type: none"> ○ Control feedwater flow using regulating bypass valves: ○ Maintain both S/G levels – BETWEEN 33% and 63%. ○ Reset Loss of Feedwater Turbine Trip ○ Stop any running AFW pumps. <p>3. Verify all control rods – FULLY INSERTED (RO) RNO: IF two or more control rods are NOT fully inserted, THEN initiate emergency boration:</p> <ul style="list-style-type: none"> a. Record initial level for in service BAST (RO or BOP) b. Perform the following to adjust charging flow: (RO) <ul style="list-style-type: none"> 1) Control charging pump speed as necessary to maintain flow GREATER THAN OR EQUAL TO 60 gpm. Places AUTO Charging Pump in MANUAL and dials manual pot to achieve 60 gpm 2) Control charging flow as necessary to maintain labyrinth seal ΔP GREATER THAN 20 inches. Manipulates 1HC-142 dial to maintain > 20 inches on Lab Seal DP. c. Start one boric acid transfer pump (RO) d. Open emergency borate valve: 1CV-350. <i>(No power to open valve)</i> <i>Evaluator's note: If the crew decides to have the PAB AO locally open 1CV-350, steps e. and f. apply. If the crew does not locally open the valve and continues with the RNO column, steps e. and f. have no actions.</i> e. Borate 2825 gallons for each control rod not fully inserted. <i>(11,300 gallons)</i> f. WHEN emergency boration is complete, THEN control charging as necessary to establish desired charging flow. g. IF emergency boration can NOT be established, THEN perform boration per OP-5B while continuing with this procedure. (RO) <i>RO may direct the PAB AO to locally open 1CV-350</i> <ul style="list-style-type: none"> a. Determine desired output concentration. b. Set 1HC-111, RMUW Flow Control, to desired flowrate and in AUTO c. Set 1HC-110, Boric Acid Flow Control to desired flowrate and in AUTO d. Verify valves in AUTO: 1CV-111, 1CV-110A, 1CV-110B, 1CV-110C e. Place Makeup Mode Selector to AUTO f. Place Makeup Control Switch to START g. Monitor VCT level and ensure automatic operation. <p>4. Check PZR level control</p> <ul style="list-style-type: none"> a. PZR Level – GREATER THAN 12%. (RO verifies) b. Charging – IN SERVICE; RNO: Place charging in service. (RO) <ul style="list-style-type: none"> ○ Ensure RCS cold leg normal charging isolation valve is open: 1CV-1298. <i>(valve is open but with no power for indication)</i> ○ IF no charging pumps are running AND component cooling water flow to any RCP thermal barrier is lost, THEN locally

Event # 6	Stuck Rods (4)
	<p>shut affected RCP seal injection throttle valve before starting charging pumps.</p> <ul style="list-style-type: none"> ○ Start charging pumps to establish at least one running. <i>Place handswitch to START and hold, or START and release then START again (for the VFD logic)</i> ○ Start additional charging pumps as necessary to establish desired charging flow. <i>Dials manual pot to achieve desired flow</i> ○ Maintain labyrinth seal ΔP greater than 20 inches. 1HC-142 Manipulates 1HC-142 dial to maintain > 20 inches on Lab Seal DP. <p>c. Letdown – IN SERVICE; RNO WHEN PZR level is greater than 12%, THEN place letdown in service: (RO)</p> <ul style="list-style-type: none"> ○ Open letdown line containment isolation valves 1CV-371 and 1CV-371A ○ Open RCS cold leg letdown isolation valve. 1RC-427 ○ Ensure component cooling flow to non-regenerative heat exchanger is established. 1HC-130 ○ Ensure charging flow is at least 21 gpm ○ Adjust backpressure as necessary and open letdown isolation valves to establish desired letdown flow. <i>Manipulates 1CV-135 to achieve desired backpressure</i> <i>Opens one of the Letdown Orifice Valves, 1CV 200A/B/C</i> <p>d. PZR Level – TRENDING TO 20% (RO)</p>
ROLE PLAY	<p><u>Booth Communications:</u></p> <ul style="list-style-type: none"> • PAB AO: If directed to locally open 1CV-350, wait 2 minutes, use LOA1CVC054 to open 1CV-350, report when complete. • Respond to reports or direction to field operators as necessary. <p><u>SM Communications:</u></p> <ul style="list-style-type: none"> • Respond to reports from crew members as required. • When EOP-0 directs trying to restore power to deenergized buses, discuss with the SRO having Unit 2 restore power with the AOP-18 and AOP-19 procedures.
NOTES	

Event # 6a	Stuck Rods (4) – Alternate Procedure Path
ACTION	Booth: None
STUDENT RESPONSE	<p>Symptoms and Indications:</p> <ul style="list-style-type: none"> • B6, B8, C5, and E11 rod bottom lights NOT LIT <p>RO</p> <ul style="list-style-type: none"> • Recognize not all rods fully inserted, uses backup indications to verify the reactor is tripped. <p>SRO</p> <ul style="list-style-type: none"> • Implements EOP-0, Reactor Trip or Safety Injection and EOP-1.1, SI Termination <p>Crew <u>EOP-0, Reactor Trip or Safety Injection (SRO directs)</u></p> <ol style="list-style-type: none"> 5. Perform Attachment A, Automatic Action Verification, while continuing with this procedure. (BOP) 6. Verify AFW Pumps – RUNNING (RO) 7. Check RCP Seal Cooling (RO) 8. Check RCS Temperatures (RO) 9. Check PZR PORVs and spray valves (RO) 10. Check if RCPs Should be stopped RNO: Go to Step 11 (RO) 11. Check if S/G are NOT faulted (RO) 12. Check if S/G tubes are NOT ruptured (RO) 13. Check if RCS is intact; RNO: (RO) 14. Check if ECCS Flow Should be Terminated (RO) <ol style="list-style-type: none"> a. RCS Subcooling based on core exit thermocouples – GREATER THAN 37°F b. Secondary Heat Sink: <ul style="list-style-type: none"> ○ Level in at least one S/G – GREATER THAN 33% <u>OR</u> ○ Total feed flow to S/G's – GREATER THAN OR EQUAL TO 275 gpm c. RCS Pressure: <ul style="list-style-type: none"> • Pressure – GREATER THAN 1725 psig <u>AND</u> • Pressure – STABLE OR RISING b. PZR Level – GREATER THAN 11% c. Go to EOP-1.1, SI Termination
	<p><u>EOP-0, Attachment A, Automatic Action Verification (BOP)</u></p> <p>A1 – Verify feedwater isolation A2 – Verify containment isolation A3 – Verify ECCS Pumps RUNNING</p> <ol style="list-style-type: none"> a. SI pumps – BOTH RUNNING b. RHR Pumps – BOTH RUNNING;

Event # 6a	Stuck Rods (4) – Alternate Procedure Path
	<p>A4 – Verify service water pumps running A5 – Verify containment accident cooling units RUNNING A6 – Verify component cooling water pumps – ONLY ONE RUNNING A7 – Check if main steam lines can remain open A8 – Verify containment spray not required: A9 – Verify ECCS Flow A10 – verify AFW valve alignment – PROPPER EMERGENCY ALIGNMENT A11 – Verify proper ECCS valve alignment A12 – Check containment spray NOT ACTUATED A13 – Stop any boration via the blender in progress A14 – Ensure the Auxiliary building filter/exhaust fans – OPERATING A15 – Notify the STA to IMPLEMENT Status trees, Notify the SM of any equipment malfunctions previously noted. A16 – Verify Service Water system alignment A17 – Check miscellaneous valves – SHUT A18 – Check Control Room ventilation A19 – Check cable spreading room ventilation system – OPERATING A20 – Check Computer Room ventilation system – OPERATING A21 – Check AFW recirc fans – ONE RUNNING A22 – Check Circ Water Pump House temperature less than 105°F A23 – Check G03/G04 switchgear room temperature less than 95°F A24 – Periodically check status of spent fuel cooling.</p>
	<p><u>EOP-1.1, SI Termination (SRO Directs)</u></p> <ol style="list-style-type: none"> 1. Reset SI (BOP) 2. Reset isolation and lockout signals (BOP) <ul style="list-style-type: none"> • Containment isolation • 1B03 and 1B04 non-safeguards equipment lockouts 3. Establish Instrument Air to containment (BOP) <ol style="list-style-type: none"> a. Check instrument air header pressure – GREATER THAN 80 PSIG b. Open instrument air containment isolation valves one at a time: <ul style="list-style-type: none"> • IA 3047 • IA-3048 4. Check if charging flow has been established (RO) 5. Stop ECCS pumps and place in standby: (BOP) <ol style="list-style-type: none"> a. Stop both SI pumps and place in auto b. RHR pumps – ANY RUNNING WITH SUCTION ALIGNED TO RWST c. Stop both RHR pumps and place in auto 6. Verify SI flow not required (RO) 7. Check if containment spray should be stopped (BOP) <ol style="list-style-type: none"> a. Containment spray pumps – ANY RUNNING; RNO: Go to Step 8 8. Verify All Control Rods - FULLY INSERTED (RO) RNO: IF two or more control rods are NOT fully inserted, THEN initiate emergency boration: <ol style="list-style-type: none"> a. Record initial level for in service BAST (RO or BOP) b. Establish maximum charging flow: (RO)

Event # 6a	Stuck Rods (4) – Alternate Procedure Path
	<ol style="list-style-type: none"> 1) Ensure all available charging pumps are operating. 2) Manually control charging pump speed, limit charging flow to <140 gpm. 3) Maintain labyrinth seal ΔP GREATER THAN 20 inches. 4) Fully open charging flow control valve - 1HC-142. <ol style="list-style-type: none"> c. Start one boric acid transfer pump (RO) d. Open emergency borate valve: 1CV-350. (No power to open valve) <i>Evaluator's note: If the crew decides to have the PAB AO locally open 1CV-350, steps e. and f. apply. If the crew does not locally open the valve and continues with the RNO column, steps e. and f. have no actions.</i> e. Borate 2825 gallons for each control rod not fully inserted. (11,300 gallons) f. WHEN emergency boration is complete, THEN control charging as necessary to establish desired charging flow. g. IF emergency boration can NOT be established, THEN perform boration per OP-5B while continuing with this procedure. (RO) <i>RO may direct the PAB AO to locally open 1CV-350</i> <ol style="list-style-type: none"> a. Determine desired output concentration. b. Set 1HC-111, RMUW Flow Control, to desired flowrate and in AUTO c. Set 1HC-110, Boric Acid Flow Control to desired flowrate and in AUTO d. Verify valves in AUTO: 1CV-111, 1CV-110A, 1CV-110B, 1CV-110C e. Place Makeup Mode Selector to AUTO f. Place Makeup Control Switch to START g. Monitor VCT level and ensure automatic operation.

Event # 6a	Stuck Rods (4) – Alternate Procedure Path
<p>ROLE PLAY</p>	<p><u>Booth Communications:</u></p> <ul style="list-style-type: none"> • EOP-0, Att A communications: <ul style="list-style-type: none"> ○ PAB AO: When directed to check rad waste service water valves SHUT at C-180, report the TV-LW61 and TV-LW62 are both SHUT ○ TH AO: When directed to check Circ Water Pump House temperature, wait 1 minute and report 76°F and stable. ○ TH AO: When directed to check G03/G04 switchgear room temperature, wait 1 minute and report 80°F and stable. • PAB AO: If directed to locally open 1CV-350, wait 2 minutes, use LOA1CVC054 to open 1CV-350, report when complete. • Respond to reports or direction to field operators as necessary. <p><u>SM Communications:</u></p> <ul style="list-style-type: none"> • Respond to reports from crew members as required. • When EOP-0 directs trying to restore power to deenergized buses, discuss with the SRO having Unit 2 restore power with the AOP-18 and AOP-19 procedures.
<p>NOTES</p>	

	Scenario Termination
	<p>Terminate the scenario when the crew has completed Step 4 of EOP-0.1, (alternate path: Step 8 of EOP-1.1), or per Lead Evaluator.</p>
<p>NOTES</p>	<ul style="list-style-type: none"> • Freeze the simulator • Determine if the NRC has any follow up questions • Save SBT Data (see sim setup instructions)

QUANTITATIVE ATTRIBUTES

Malfunctions:

Before EOP Entry:

- Dropped rod (K9)
- 1HC-478 Loop 'B' ADV controller fails high

After EOP Entry:

- 'A' train Service Water pumps fail to auto start
- 4 stuck rods

Abnormal Events:

- Dropped Rod
- Secondary Coolant leak to atmosphere via ADV

Major Transients:

- Loss of All AC to Safeguards Buses

Critical Tasks:

1.	CT-24	Energize at least one emergency bus
2.	CT-25	Manually start service water pumps for EDG cooling

Major Procedures:

AOP-6A ⇒ AOP-1D (potential) ⇒ AOP-2A ⇒ AOP-24 (potential) ⇒ ECA-0.0 ⇒ EOP-0 ⇒ EOP-0.1

CT-24

Energize at least one AC emergency bus

Critical Task:

Energize at least one AC emergency bus **prior to placing safeguards equipment switches in pull-out.**

Plant Conditions:

- Reactor trip
- Station blackout
- At least one EDG can be connected to an AC emergency bus

Cues:

Indication and/or annunciation that all AC emergency buses are de-energized

- Bus energized lamps extinguished
- Circuit breaker position
- Bus voltage
- EDG status

Performance Indicator:

Manipulation of controls as required to energize at least one ac emergency bus

- Bus energized lamp(s) illuminated
- Circuit breaker position lamps indicate closed
- Bus voltage indication shows nominal voltage present

Feedback:

Indication that at least one ac emergency bus is energized

- Safeguards equipment sequences onto the energized bus
- EDG status

Basis:

SAFETY SIGNIFICANCE -- Failure to energize an ac emergency bus constitutes misoperation or incorrect crew performance in which the crew does not prevent “degraded ... emergency power capacity.” Failure to perform the critical task also results in needless “degradation of any barrier to fission product release,” specifically of the RCS barrier at the point of the RCP seals. In this case, at least one ac emergency bus can be energized from the control room. Failure to perform the critical task means that RCS inventory lost through the RCP seals cannot be replaced. It also means that the RCP seals remain without cooling and gradually deteriorate. As the seals deteriorate the rate of RCS inventory loss increases.

CT-25

Manually start Service Water pump for EDG cooling

Critical Task:

Manually start service water pump(s) **such that the EDG does not fail due to damage from overheating.**

Plant Conditions:

- Station blackout with subsequent restoration of ac power from one EDG
- SW pumps aligned to provide cooling for the running EDG fail to start automatically when the associated ac emergency bus is reenergized by the EDG
- An SW pump aligned to provide cooling for the running EDG can be started, provided that manual action is taken as necessary
- All other EDGs inoperable

Cues:

- Indication and/or annunciation that one ac emergency bus is energized by an EDG
 - Circuit breaker position lamps indicate breaker closed
 - Bus voltage indication shows nominal voltage present
 - EDG status

AND

- Indication and/or annunciation that no SW pump is running
 - Control switch indication that the circuit breakers or contactors for all SW pumps are open
 - SW header pressure indicator reads < 50 psig

Performance Indicator:

Manipulation of controls as required to start the SW pump(s) powered from the ac emergency bus energized by the EDG

- Control switch indication that the circuit breaker or contactor for a SW pump aligned to supply cooling water to the running EDG is closed

Feedback:

Indication and/or annunciation that a SW pump is running, aligned to supply cooling water to the running EDG

- SW low flow condition clear (G-02 Emerg Diesel Cooler Low Flow alarm clear)
- SW low pressure condition clear (SW Header Pressure Low alarm clear)

Basis:

SAFETY SIGNIFICANCE -- Failure to manually start the SW pump under the postulated plant conditions means that the EDG is running without SW cooling. Running the EDG without SW cooling leads to a high-temperature condition that can result in EDG failure due to damage caused by engine overheating. Under the postulated plant conditions, the running EDG is the only operable EDG. Thus, failure to perform the critical task constitutes misoperation or incorrect crew performance in which the crew does not prevent “degraded... emergency power capacity.”

Booth Summary

Event #1	OP-1C Power Ascension
Action	Booth: None
Role Play	<ul style="list-style-type: none"> Respond to reports or direction to field operators as necessary.

Event #2	Dropped Rod
Action	Booth: Insert TRIGGER 1 per Lead Evaluator
Role Play	<ul style="list-style-type: none"> Respond to reports or direction to field operators as necessary.

Event #3	'B' ADV Stuck Open
Action	<p>Booth: Insert TRIGGER 3 per Lead Evaluator</p> <p>Trigger 4 inserts when 1HC-478 is placed in MANUAL.</p>
Role Play	<ul style="list-style-type: none"> PAB AO: 5 minutes after inserting trigger 3, or 2 minutes after being directed to investigate, report flow noise at the Unit 1 'B' Atmospheric Dump Valve. PAB AO: If asked, after the crew attempts to shut the 'B' ADV from the CR, report that 1MS-2015 is 10% OPEN and not moving. PAB AO: When directed, use LOA1SGN026 to SHUT 1MS-244, Isolation for 1MS-2015, as directed by the crew. Report that flow noise has stopped when 1MS-244 is shut. PAB AO: If asked, report that all S/G Safety Valves are shut. Respond to other reports or direction to field operators as necessary.

Event #4	Loss of All AC Safeguards Power
Action	Booth: Insert TRIGGER 5 per Lead Evaluator
Role Play	<ul style="list-style-type: none"> TH AO: If directed to investigate G-01 failure to start, wait 2 minutes and report all conditions appear normal for G-01. TH AO: If directed to investigate output breakers for G-01 and/or G-04 failure to close, wait 2 minutes and report that conditions appear normal locally. TH AO: If directed to investigate the 1X-04 lockout, wait 3 minutes and report there is no apparent cause locally. Respond to other reports or direction to field operators as necessary.

Event #5	'A' Train Service Water Pumps Fail to Auto Start
Action	Booth: None
Role Play	<ul style="list-style-type: none"> Respond to reports or direction to field operators as necessary.

Event #6	Stuck Rods (4)
Action	Booth: None
Role Play	<ul style="list-style-type: none"> PAB AO: If directed to locally open 1CV-350, wait 2 minutes, use LOA1CVC054 to open 1CV-350, report when complete. Respond to reports or direction to field operators as necessary.

SHIFT TURNOVER INFORMATION

PLANT CONDITIONS:

	UNIT 1
Time in core life (MWD/MTU):	1500
Reactor power (%):	28%
Boron concentration (ppm):	1786 ppm
Rod height, CBD @:	141

TECHNICAL SPECIFICATION ACTION CONDITIONS IN EFFECT:

<u>TSAC</u>	<u>Description</u>	<u>Required Action & Completion Time</u>
U1 3.3.1.A/K	RPS one channel inoperable	Place channel in trip – 1 hour

EQUIPMENT OUT OF SERVICE:

- G03 Emergency Diesel Generator for maintenance.
- 1LT-426 Pressurizer Level Transmitter.

PLANNED EVOLUTIONS:

- Power ascension per OP 1C, Startup to Power Operation. Startup is following a short forced outage. The crew has been maintaining the current power for about two hours for flux mapping.

TURNOVER INFORMATION:

- G04 Emergency Diesel Generator is aligned to both 1A06 and 2A06 4160 Safeguards Busses.
- On line risk is GREEN.
- Today is Tuesday, day shift.

Pre-Scenario Procedure Checks

Procedure	SRO	
	1 st Check	2 nd Check
P&ID #51		
AOP-1D		
AOP 2A		
AOP 6A		
AOP 6H		
AOP 24		
EOP 0		
EOP-0.1		
EOP-1.1		
ECA-0.0		
Specific ARP/ARBs to be second checked – All Others first checked		
	1 st Check	2 nd Check
1C04 1A 1-5		
1C04 1A 1-7		
1C04 1A 3-3		
1C04 1A 4-5		
1C03 1E2 1-2		
1C03 1E2 1-5		

Post-Scenario Procedure Checks

Procedure	SRO	
	1 st Check	2 nd Check
AOP-1D		
AOP 2A		
AOP 6A		
AOP 6H		
AOP 24		
EOP 0		
EOP-0.1		
EOP-1.1		
ECA-0.0		
	1 st Check	2 nd Check
1C04 1A 1-5		
1C04 1A 1-7		
1C04 1A 3-3		
1C04 1A 4-5		
1C03 1E2 1-2		
1C03 1E2 1-5		
RESET IC		N/A
Booth Cleared Exam Material		
Magnets Replaced		
Alarm window "dots" removed.		
P&ID's cleaned and replaced		

Facility: Point Beach Scenario No.: 2 Op-Test No.: 2021

Examiners: _____ Operators: _____

Initial Conditions: 0% power Mode 2. G02, EDG is OOS with G01, EDG is aligned, 1W-3A,
Containment Shroud Fan OOS, 1PT-949, Containment Pressure transmitter removed from service.

Turnover: A plant up power to the POAH is planned per OP 1B, Reactor Startup

Critical Tasks: CT-5, Manually Start At Least One Low-Head ECCS Pump

CT-36, Transfer to Cold Leg Recirculation

Event No.	Malf. No.	Event Type*	Event Description
1		TS-SRO	Diesel High particulate reported NEW
2		R-RO N-SRO	Raise Power to POAH
3		C-BOP C-SRO TS-SRO	P-32A, Service Water Pump Trips, crew manually starts a standby service water pump to restore system pressure. 2017 Repeat
4		C-RO C-SRO	1P-1B RCP thrust bearing failure/vibrations requiring manual reactor trip (degradation of flow or a trip of the pump) NEW
5		C-RO C-SRO	Reactor Trip breakers fail to auto open and buttons on 1C04 are unsuccessful (C01 still works) 2017 Repeat
6		M-ALL	LBLOCA
7		C-RO C-SRO	RHR Pump Failures. 1P-10B RHR pump trips, 1P-10A RHR pump fails to auto start. 2017 Repeat

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



SIMULATOR EXERCISE GUIDE

SEG

SITE: PBNP **Revision #: 0**

LMS ID: PBN LOI NRC 23E **LMS Rev. Date:**

SEG TITLE: 2021 NRC Exam Scenario 2

SEG TYPE: Training Evaluation

PROGRAM: LOCT LOIT Other:

DURATION: 90 minutes

Developed by: John Rogers _____
Instructor/Developer Date

Reviewed by: Jeff Hinze _____
Instructor (Instructional Review) Date

Validated by: John Rogers _____
SME (Technical Review) Date

Approved by: Adam Moore _____
Training Supervision Date

Approved by: Joe Krear _____
Training Program Owner (Line) Date

Facility: Point Beach Scenario No.: 2 Op-Test No.: 2021

Examiners: _____ Operators: _____

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

SIMULATOR EXERCISE GUIDE REQUIREMENTS

Terminal Objective:	Given the site simulator and specific plant conditions, the students will be able to respond to various plant abnormal and emergency events, in accordance with site procedures and technical Specifications.
Enabling Objectives:	1. None
Prerequisites:	<ol style="list-style-type: none"> 1. Simulator available 2. Students enrolled in Initial License Program
Training Resources:	<ol style="list-style-type: none"> 1. Floor Instructor as Shift Manager / Shift Technical Advisor 2. Simulator Booth Operator 3. Communicator 4. NRC Evaluators
References:	<ol style="list-style-type: none"> 1. OP 1B, Reactor Startup 2. OP 1C, Startup to Power Operation Unit 1 3. OP 5E, Establishing and Securing Excess Letdown, Bypass of CV-135, or Head Vent Letdown 4. AOP-1B, Reactor Coolant Pump Malfunction 5. AOP-9A, Service Water System Malfunction 6. EOP-0, Reactor Trip or Safety Injection 7. EOP-1, Loss of Reactor or Secondary Coolant 8. EOP-1.3, Transfer to Containment Sump Recirculation – Low Head Injection 9. CSP-P.1, Response to Imminent Pressurized Thermal Shock Condition 10. OM 3.7, AOP and EOP Procedure Usage for Response to Plant Transients 11. Technical Specifications Manual 12. Technical Requirements Manual
Protected Content:	None
Evaluation Method:	Simulator performance will be evaluated in accordance with NUREG 1021.
Operating Experience:	None

**Risk Significant
Operator Actions:**

Initiating Event with Core Damage Frequency:

Large LOCA (3.25E-08 CDF) (6.22E-11 LERF)
HEP-RHR-EOP13-LL - OPS FAIL TO ALIGN SI FOR LOW CONT
SUMP RECIRC (LLOCA/MLOCA) (2.70E-02)

UPDATE LOG: Indicate in the following table any minor changes or major revisions made to the material after initial approval.

#	DESCRIPTION OF CHANGE	REASON FOR CHANGE	AR/TWR#	PREPARER	DATE
				REVIEWER	DATE
0	Developed for the 2021 ILT NRC Exam				

OVERVIEW / SEQUENCE OF EVENTS

OVERVIEW

Initial conditions for the scenario are: unit 1 is in MODE 2 with reactor power below the POAH, 1W-3A, Containment Shroud Fan is OOS, Emergency Diesel Generator G-02 is OOS with EDG G-01 aligned to 1A-05 and 2A-05, and 1PT-949, Containment Pressure instrument has been removed from service.

Examinees will start the scenario by raising reactor power to the POAH. Then the crew will respond to a loss of one running Service Water pump and Reactor Coolant Pump high vibrations. RCP vibrations will exceed criteria requiring the crew to manually trip the reactor. Coincident with the reactor trip, a LB LOCA will occur. The crew will respond per EOPs to establish containment sump recirculation.

The scenario will be terminated when the crew has established one train of containment sump recirculation.

SEQUENCE OF EVENTS

Event #	Description
1.	<p>Diesel High Particulate Reported</p> <ul style="list-style-type: none"> The SM will receive communications from chemistry concerning the diesel fuel oil sample SRO addresses a report of high particulate in a diesel fuel oil sample.
2.	<p>Raise Reactor Power to POAH</p> <ul style="list-style-type: none"> The crew will raise power to the POAH per OP-1B, Reactor Startup
3.	<p>P-32A, Service Water Pump Trips</p> <ul style="list-style-type: none"> P-32A, Service Water pump will trip due to a winding ground. The crew will implement AOP-9A, Service Water System Malfunction, to start a standby service water pump and restore system pressure. The SRO will assess Technical Specifications
4.	<p>High Reactor Coolant Pump Vibration – 1P-1B</p> <ul style="list-style-type: none"> High vibration levels will occur on 1P-1B, Reactor Coolant Pump due to a bearing failure. The Crew will respond to the high vibrations per AOP-1B, Reactor Coolant Pump Malfunction. Conditions with the RCP will degrade, requiring the crew to trip the reactor and trip the RCP.
5.	<p>Reactor Trip – Trip Pushbuttons Fail</p> <ul style="list-style-type: none"> When the crew attempts to manually trip the reactor, the first set of trip pushbuttons will not work. The second set of pushbuttons will trip the reactor. Coincident with the reactor trip, a LBLOCA will occur.

6.	<p>LBLOCA – RHR Pump Failures</p> <ul style="list-style-type: none"> • A LBLOCA occurs coincident with the reactor trip. • Safety Injection will automatically actuate due to the LOCA. • 1P-10A RHR Pump will fail to auto start, may be manually started. • 1P-10B RHR Pump will auto start, but trip and be unavailable for the remainder of the scenario.
7.	<p>Containment Sump Recirculation</p> <ul style="list-style-type: none"> • The crew will implement EOP-1.3, Transfer to Containment Sump Recirculation – Low Head Injection, and establish one train of sump recirculation.
	<p>Terminate the scenario when crew has established one train of containment sump recirculation, or per Lead Evaluator.</p>

SIMULATOR SET-UP INSTRUCTIONS

Perform simulator set up per the site specific Simulator Setup Checklist.

Check	Action
1.	Reset to IC-31
2.	Perform Simulator Setup Checklist
3.	Open schedule file. Z:/2021 NRC Exam Simulator Files/NRC Scenario 2.sch
4.	To record SBT data: <ol style="list-style-type: none"> 1. Launch "SBT Report" from Thunderbar 2. Open "Scenario Validation Checklist.sbt" (TRex_PBLightning)
5.	Take schedule(s) to run
6.	Verify required event file(s) open if required
7.	Take sim to run
8.	Place turnover sheets on CO1 desk
9.	Place reactivity sheets on CO1 desk
10.	Guard the following: <ul style="list-style-type: none"> • G01, G03, G04 EDG's • 1W-3B Shroud Fan Place the following OOS: <ul style="list-style-type: none"> • G02 EDG • 1W-3A, Shroud Fan • 1PT-949, Containment Pressure Place red dots on the G02 alarms and Containment Pressure Channel Alert: <ul style="list-style-type: none"> • C02 F 2-1 • C02 F 2-2 • C01 B 1-5 Set recorder NR 45 to Low Power page at 30 sec/div
11.	<ul style="list-style-type: none"> • Conduct simulator crew pre-scenario brief using TR-AA-230-1007-F06, Simulator Instructor Pre-Exercise Checklist. • Brief the scenario evaluators • Brief surrogates using TR-AA-230-1007-F11, Surrogate Brief Checklist, if necessary
12.	Run Scenario
13.	To save SBT Data: <ol style="list-style-type: none"> 1. In the SBT Report program click the Generate Report icon (green arrow) 2. In Test Title enter a unique test title, to be same as file name 3. In report name enter the location the test files are to be saved, use same file name as Test Title 4. Click "Generate" (generates and saves two files in the selected folder) 5. Verify files saved in the selected folder 6. The generated report and SBT Report program may now be closed

	<ol style="list-style-type: none">7. Collect procedure markups for SBT8. Save any InSight, Alarm, Event, Schedule Files to the secure drive that were in use
14.	Reset simulator to appropriate IC.

BOOTH OPERATOR BRIEFING:

Review the scenario sequence, event triggers and expected field communications.

Z:/2021 NRC Exam Simulator Files/NRC Scenario 2.sch

At Time	On Event	Action	Description
		Preloads / Initial Conditions	
00:00:00		Insert malfunction MAL2DSG001A	DIESEL G02 FAILURE TO START
00:00:00		Insert malfunction BKR1CNM017 to Fail_Cntrl_Fuse	1-B523A W-3A CTL ROD SHROUD FAN CKTBKR
00:00:00		Insert malfunction XMT1CNM016A to -6	1-PT949 LOOP B CONT PRESSURE XMTR FIXED OUTPUT
00:00:00		Event Z:/2021 ILT NRC Exam Simulator Files/NRC 2.evt	
		Event 3: P-32A SW pump trip	
00:00:00		Insert malfunction PMP1SWS002C to 75.00000	0-P32B SERVICE WATER PUMP B HEAD CAPACITY
00:00:00		Insert malfunction PMP1SWS004C to 75.00000	0-P32D SERVICE WATER PUMP D HEAD CAPACITY
	1	Insert malfunction MOT1SWS001 to Winding_Ground on event 1	P32A SERVICE WATER PUMP MOTOR
	19	Insert remote LOA1SWS001 to 0 in 5 on event 19	SW-10 P32A SW PUMP DISCH
	20	Insert remote LOA1CWS023 to TRUE on event 20 delete in 5	1C-068A/C-068B LOCAL PANEL ALARM RESET
	21	Insert remote LOA2CWS023 to TRUE on event 21 delete in 5	2C-069A/C-069B LOCAL PANEL ALARM RESET
		Event 4: RCP High Vibration	
	3	Insert malfunction MAL1RCP007B to 89.7 in 600 on event 3	RCP MOTOR THRUST BEARING FAILURE PUMP B
	3	Insert malfunction XMT1RCP015A to 2.3 in 600 on event 3	1-YVPNBFH RCP B FRAME HORIZ VIBRATION FIXED OUTPUT
	3	Insert malfunction XMT1RCP016A to 2.4 in 600 on event 3	1-YVPNBFV RCP B FRAME VERT VIBRATION FIXED OUTPUT
	3	Insert malfunction XMT1RCP017A to 17.2 in 600 on event 3	1-YVPNBSh RCP B SHAFT HORIZ VIBRATION FIXED OUTPUT
	3	Insert malfunction XMT1RCP018A to 17.3 in 600 on event 3	1-YVPNBsv RCP B SHAFT VERT VIBRATION FIXED OUTPUT
		After pump trip	
	7	Insert malfunction MAL1RCP007B to 48.79930 in 100 on event 7	RCP MOTOR THRUST BEARING FAILURE PUMP B

	7	Insert malfunction XMT1RCP015A to 0.49829 in 10 on event 7	1-YVPNBFH RCP B FRAME HORIZ VIBRATION FIXED OUTPUT
	7	Insert malfunction XMT1RCP016A to 0.49829 in 10 on event 7	1-YVPNBFV RCP B FRAME VERT VIBRATION FIXED OUTPUT
	7	Insert malfunction XMT1RCP017A to 3.98335 in 10 on event 7	1-YVPNBSH RCP B SHAFT HORIZ VIBRATION FIXED OUTPUT
	7	Insert malfunction XMT1RCP018A to 3.98335 in 10 on event 7	1-YVPNBSV RCP B SHAFT VERT VIBRATION FIXED OUTPUT
		Event 5: DBA LOCA	
	5	Insert malfunction MAL1RCS001 to Hot_Leg_A on event 5	DBA LOCA
		Event 6: Trip pushbutton Failure	
00:00:00		Insert malfunction MAL1PPL001A to Fails_To_Open	REACTOR TRIP BREAKER 52/RTA FAILURE
00:00:00		Insert malfunction MAL1PPL001B to Fails_To_Open	REACTOR TRIP BREAKER 52/RTB FAILURE
	15	Insert malfunction MAL1PPL001B to Trip on event 15	REACTOR TRIP BREAKER 52/RTB FAILURE
	15	Insert malfunction MAL1PPL001A to Trip on event 15	REACTOR TRIP BREAKER 52/RTA FAILURE
		Event 7: RHR Pump Fail to Start	
00:00:00		Insert malfunction BKR1RHR001 to Fail_Auto_Cl	1-B5212A P-10A RH REMOVAL PUMP CKTBKR
	5	Insert malfunction MOT1RHR002 after 30 to Winding_Ground on event 5	1-P10B RESIDUAL HEAT REMOVAL PUMP MOTOR
		EOP-1.3 LOAs	
	9	Insert remote LOA1SWS048 after 60 to 0.38000 in 30	SW-322 1HX-12A CC HTEXCH OUTLET
	9	Insert remote LOA1SWS051 after 180 to 0.10000 in 30	SW-360 HX-12B CCW SW OUTLET
	9	Insert remote LOA1CCW018 after 270 to 0 in 30	1CC-744B CCW BYPASS/TEST LOOP OUTLET STOP VALVE
	9	Insert remote LOA1CCW016 after 420 to 0 in 30	1CC-740A NON-REGEN HX-3A&B INLET VALVE
	9	Insert remote LOA1CCW021 after 450 to 0 in 30	1CC-750A SEAL STR HX-5 INLET VALVE
	11	Insert remote LOA1SIS030 after 60 to 0 in 30	1SI-897A HANDWHEEL GAG
	11	Insert remote LOA1SIS031 after 180 to 0 in 30	1SI-897B HANDWHEEL GAG

Event file:

Trigger 5 and 7 Unit 1 Reactor Trip (JCRFTR)

Trigger 15: trigger 16 AND trigger 17 (et_array(16) & et_array(17))

Trigger 16: 1C04 Trip Pushbuttons (x14i057a == 1 | x14i055a == 1)

Trigger 17: C01 Trip Pushbuttons (x01i142a == 1 | x01i141a == 1)

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

Bolded steps are Verifiable Actions taken by the Operators.

(IA) actions are those allowed to be taken from memory, before referencing the procedure, as allowed by OM 3.7, Attachment F, AOP Actions Allowed From Memory.

Event 1	Diesel High Particulate Report											
ACTION	Booth: None											
STUDENT RESPONSE	<p>SRO</p> <ul style="list-style-type: none"> SRO reviews Technical Specifications and determines LCO 3.8.3 Diesel Fuel Oil and Starting Air is not met. TSAC 3.8.3.B must be entered for G01 and G02 (7 days both units). <table border="1" data-bbox="404 764 1421 1064"> <thead> <tr> <th data-bbox="404 764 810 837">CONDITION</th> <th data-bbox="810 764 1157 837">REQUIRED ACTION</th> <th data-bbox="1157 764 1421 837">COMPLETION TIME</th> </tr> </thead> <tbody> <tr> <td colspan="3" data-bbox="404 837 1421 894">TS 3.8.3, Diesel Fuel Oil and Starting Air</td> </tr> <tr> <td data-bbox="404 894 810 1064">B. One or more standby emergency power sources with stored fuel oil total particulates not within limits.</td> <td data-bbox="810 894 1157 1064">B.1 Restore fuel oil total particulates within limits.</td> <td data-bbox="1157 894 1421 1064">7 days</td> </tr> </tbody> </table> <ul style="list-style-type: none"> TRM 4.12, Diesel Fuel Oil, provides limits. The EDGs are not declared OOS unless the RA 3.8.3.B cannot be met. 			CONDITION	REQUIRED ACTION	COMPLETION TIME	TS 3.8.3, Diesel Fuel Oil and Starting Air			B. One or more standby emergency power sources with stored fuel oil total particulates not within limits.	B.1 Restore fuel oil total particulates within limits.	7 days
CONDITION	REQUIRED ACTION	COMPLETION TIME										
TS 3.8.3, Diesel Fuel Oil and Starting Air												
B. One or more standby emergency power sources with stored fuel oil total particulates not within limits.	B.1 Restore fuel oil total particulates within limits.	7 days										
ROLE PLAY	<p><u>Booth Communications:</u></p> <ul style="list-style-type: none"> Calls SM <p><u>SM communications:</u></p> <ul style="list-style-type: none"> SM receives a call from Work Control Center which stated Chemistry called with Fuel Oil results taken during the performance of IT 14 G-01, Inservice Test of Fuel Oil Transfer System Pumps and Valves G-01. T-175A, G-01/G-02 EDG Fuel Oil Storage Tank particulate was 17mg/L. The sample results were confirmed by Chemistry to be accurate. 											
NOTES	<p>Continuation Criteria:</p> <p>After completion of TS review, or at the discretion of the Lead Examiner, continue with the next event.</p>											

Event # 2	Raise Reactor Power to POAH
ACTION	Booth: None
STUDENT RESPONSE	<p>BOP/RO</p> <ul style="list-style-type: none"> Perform OP 1B actions as directed. <p>SRO</p> <ul style="list-style-type: none"> Implements OP 1B, Reactor Startup to raise power to POAH starting from Step 5.16.48.d. <p>Crew (SRO direct and oversight of reactivity change. RO perform. BOP peer check) (RO or BOP may inform AOs of continuation of startup.) 5.16.48.d. RAISE neutron flux to point of adding heat (POAH) [using rods] as indicated by any of the following: (MARK as N/A indications NOT used.)</p> <ul style="list-style-type: none"> Lowering startup rate on SUR meter. Lowering slope of trace on recorder NR-45. Reactor Engineering Reactivity Computer indicates point of adding heat has been reached. <i>(Not modeled in simulator)</i> <p>5.16.49 ALLOW flux level to rise further to CONFIRM onset of nuclear heating reactivity effect and remain below 2% power.</p> <p>5.16.50 LOWER flux level to point of adding heat (POAH) as determined in Step 5.16.48.d.</p> <p>5.16.51 RECORD flux level and DIRECT Reactor Engineering to set POAH on reactivity computer (Options - Flux-Nuclear Heat Determination-Set-Accept). N-35 _____ amps N-36 _____ amps (SRO direct SM to notify RE to set POAH on reactivity computer)</p>
ROLE PLAY	<p><u>Booth Communications:</u></p> <ul style="list-style-type: none"> Respond to reports or direction to field operators as necessary. <p><u>SM communications:</u></p> <ul style="list-style-type: none"> Brief the crew on current plant conditions and planned reactor startup tasks. Provide direction to the crew to raise power to POAH, using control rods, (approximately 4.0 E-6 amps). Acknowledge direction from SRO to have RE set POAH.
NOTES	<p>Continuation Criteria: After power has been raised to POAH, or at the discretion of the Lead Examiner, continue with the next event.</p>

Event # 3	P-32A, Service Water Pump Trips
<p>ACTION</p>	<p>Booth:</p> <p>Insert TRIGGER 1 per Lead Evaluator</p> <p>Insert Trigger 19 when directed by the crew</p> <p>Note: RCP high vibration alarm (Event #4) occurs approximately 8 minutes after the trigger is entered.</p> <p>Booth: Insert TRIGGER 3 per Lead Evaluator</p>
<p>STUDENT RESPONSE</p>	<p>Symptoms and Indications:</p> <ul style="list-style-type: none"> • Annunciators <ul style="list-style-type: none"> ○ C02 D 3-2, 1B-03 480 V Bus Ground Fault ○ C01 B 3-4, Unit 1 Motor Breaker Trip ○ C01 A 3-5, North or South Service Water Header Pressure Low ○ C02 D 3-6, G-01 Emer Diesel Cooler Low Flow ○ C02 F 3-1, G-02 Emer Diesel Cooler Low Flow • C01 indications: <ul style="list-style-type: none"> ○ P-32A Service Water, white light ○ North and South SW header pressure lowers <p>BOP/SRO</p> <ul style="list-style-type: none"> • Diagnoses loss of P-32A Service Water pump. (BOP) • Starts a standby service water pump to restore service water header pressure to greater than 50 psig. (BOP) <p>SRO</p> <ul style="list-style-type: none"> • Implements AOP-9A, Service Water System Malfunction. <p><u>AOP-9A, Service Water System Malfunction</u></p> <ol style="list-style-type: none"> 1. Check forebay level greater than -11.5 feet (BOP) 2. Check pump bay level greater than -11.5 feet (BOP) 3. Check annunciator travelling screen differential level high alarm clear (BOP) 4. Check north or south service water header pressure low alarm clear; RNO: Perform the following: <ol style="list-style-type: none"> a. Start service water pumps – Maintain pressure between 50 psig and 90 psig. <i>(starts one pump to restore pressure to >50 psig)</i> (BOP) <ul style="list-style-type: none"> ○ P-32C ○ P-32E ○ P-32F e. If any service water pump tripped or recently stopped, then ensure affected pump in pullout and locally shut associated pump discharge valve. (BOP) <ul style="list-style-type: none"> ○ SW-10 for P-32A f. Go to Step 9. (SRO) 9. Notify duty station manager and enter applicable TSACs. (SRO)

Event # 3	P-32A, Service Water Pump Trips															
	<p>10. Check if Emergency Plan should be implemented per EPIP-1.2, Emergency Classification</p> <p>11. Check supply header integrity (BOP)</p> <p>12. Check zurn strainer normal (BOP)</p> <p>13. Ensure service water header valves are open (BOP)</p> <p>14. Check component alarms clear (BOP)</p> <p>15. Observe note prior to Step 1 and return to Step 1. (SRO)</p> <p>1. Check forebay level greater than -11.5 feet (BOP)</p> <p>2. Check pump bay level greater than -11.5 feet (BOP)</p> <p>3. Check annunciator travelling screen differential level high alarm clear (BOP)</p> <p>4. Check north or south service water header pressure low alarm clear (BOP)</p> <p>5. Check zurn strainer – NORMAL (BOP)</p> <p>6. Check component alarms clear (BOP)</p> <p>7. Check service water system intact (BOP)</p> <p>8. Return to procedure and step in effect. (SRO)</p> <p>• Assess Technical Specifications: (SRO)</p> <table border="1" data-bbox="402 926 1421 1417"> <thead> <tr> <th data-bbox="402 926 810 997">CONDITION</th> <th data-bbox="810 926 1096 997">REQUIRED ACTION</th> <th data-bbox="1096 926 1421 997">COMPLETION TIME</th> </tr> </thead> <tbody> <tr> <td colspan="3" data-bbox="402 997 1421 1052">TS 3.7.8, Service Water System</td> </tr> <tr> <td data-bbox="402 1052 810 1224">A. One SW pump inoperable <u>AND</u> Both Units in MODE 1, 2, 3, or 4</td> <td data-bbox="810 1052 1096 1224">A.1 Restore SW pump to OPERABLE status.</td> <td data-bbox="1096 1052 1421 1224">7 days <u>AND</u> 14 days from discovery of failure to meet the LCO</td> </tr> <tr> <td colspan="3" data-bbox="402 1224 1421 1278">TRM 3.7.7, Service Water System</td> </tr> <tr> <td data-bbox="402 1278 810 1417">D. One SW pump inoperable <u>AND</u> Requirements of TRM Table 3.7.7-2 not met</td> <td data-bbox="810 1278 1096 1417">D.1 Declare LCO 3.7.8, Required action A.1 not met.</td> <td data-bbox="1096 1278 1421 1417">Within the completion time of LCO 3.7.8, Required action A.1</td> </tr> </tbody> </table>	CONDITION	REQUIRED ACTION	COMPLETION TIME	TS 3.7.8, Service Water System			A. One SW pump inoperable <u>AND</u> Both Units in MODE 1, 2, 3, or 4	A.1 Restore SW pump to OPERABLE status.	7 days <u>AND</u> 14 days from discovery of failure to meet the LCO	TRM 3.7.7, Service Water System			D. One SW pump inoperable <u>AND</u> Requirements of TRM Table 3.7.7-2 not met	D.1 Declare LCO 3.7.8, Required action A.1 not met.	Within the completion time of LCO 3.7.8, Required action A.1
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Event # 3	P-32A, Service Water Pump Trips
<p>ROLE PLAY</p>	<p><u>Booth Communications:</u></p> <ul style="list-style-type: none"> • TH AO: If directed to investigate the loss of P-32A, Wait 2 minutes and report that P-32A is not running, and otherwise appears normal. • TH AO: If directed to shut SW-10, P-32A Discharge Isolation valve, wait 1 minute, Insert Trigger 19, and report when complete. • TH AO: If directed to service water system conditions / check zurn strainer normal, wait 1 minute and report that service water strainers are operating normally, power available, and strainer ΔP is normal, and the system is intact. • Reset circulating water pump cooling low flow alarms. • Respond to reports or direction to field operators as necessary. <p><u>SM Communications:</u></p> <ul style="list-style-type: none"> • Respond to reports from crew members as required.
<p>NOTES</p>	<p><u>Continuation Criteria:</u> After Service Water header pressure has been restored and Technical Specifications have been addressed, or at the discretion of the Lead Examiner, continue with the next event.</p> <p>Note: It is recommended that the next event trigger be inserted after Service Water Pump(s) started to restore pressure, due to the lag time before the alarm comes in.</p> <p>Note: RCP high vibration alarm occurs approximately 8 minutes after the trigger 3 is entered.</p>

Event # 4	High Reactor Coolant Pump Vibration – 1P-1B
<p>ACTION</p>	<p>Booth: Insert TRIGGER 3 per Lead Evaluator</p> <p>Note: RCP high vibration alarm occurs approximately 8 minutes after the trigger is entered.</p> <p>Trigger 7 deletes malfunctions when the reactor is tripped.</p>
<p>STUDENT RESPONSE</p>	<p>Symptoms and Indications:</p> <ul style="list-style-type: none"> • 1P-1A & B RCP VIBRATION ALARM (1C04 1C 1-5) • 1TR-2001 TEMPERATURE MONITOR (1C04 1C 3-10) • PPCS Indications: <ul style="list-style-type: none"> ○ 1P-1B Shaft vibration, Horizontal and Vertical, up to 17 mils ○ 1P-1B Frame vibrations elevated at just over 2 mils ○ 1P-1B Seal Injection temperature 212.7°F ○ PPCS Alarms for Shaft vibrations for RCP B • TR-2001 1P-1B Upper and Lower Thrust Bearing temperatures 89.7°C <p>BOP/RO</p> <ul style="list-style-type: none"> • Acknowledge alarms and reference ARBs (RO) • Review PPCS screen (RCPs/ 2155) for vibration readings (RO or BOP) <i>May direct an AO to 1C-76 to get local readings (in the Rod Drive Room)</i> <p>SRO</p> <ul style="list-style-type: none"> • Implements AOP-1B, Reactor Coolant Pump Malfunction <p>Crew</p> <ol style="list-style-type: none"> 1. Check annunciator P-1A&B RCP Vibration Alarm – CLEAR; RNO: check if RCP shutdown is required (RO) <ol style="list-style-type: none"> a. Vibration readings on PPCS page RCPS or locally at 1C-76 <ul style="list-style-type: none"> ○ Shaft vibration greater than or equal to 20 mils. ○ Shaft vibration greater than or equal to 15 mils and rising at 1 mil/hr ○ Frame vibration greater than or equal to 5 mils ○ Frame vibration greater than or equal to 3 mils and rising at 0.2 mil/hr b. IF RCP shutdown required, THEN go to Step 19. 2. Check annunciator 1TR-2001 temperature monitor alarm – CLEAR (RO) 3. Check annunciator 1P-1A or 1P-1B RCP Upper or Lower Sump Oil Level High or Low – CLEAR (RO) 4. Check RCP No. 1 Seal Leakage – GREATER THAN 0.8 gpm (RO) 5. Check RCP No. 1 Seal Leakage – LESS THAN 6 gpm (RO) <p>Note: Crew identifies FO1 RCP Trip Criteria is met, then performs step 19.</p> <ul style="list-style-type: none"> ○ RCP Shaft Vibration: <ul style="list-style-type: none"> ○ Greater than or equal to 15 mils and rising at 1 mil/hr. <p>19. Secure Affected RCP (RO)</p> <ol style="list-style-type: none"> a. Trip reactor <i>Evaluator Note: RO should carry out immediate actions of EOP-0 at</i>

Event # 4	High Reactor Coolant Pump Vibration – 1P-1B
	<p><i>this time.</i></p> <ul style="list-style-type: none"> b. Stabilize plant using EOPs while continuing with this procedure c. Trip affected RCP d. Check at least one RCP running e. Shut associated PZR normal spray valve f. Check affected RCP has been tripped for 3 minutes g. Shut affected RCP No. 1 seal water return MOV; 1CV-270B h. Check RCP seal water bypass control valve shut: 1CV-386
ROLE PLAY	<p><u>Booth Communications:</u></p> <ul style="list-style-type: none"> • TH AO: If directed to check RCP vibration reading on 1C-76 in rod drive room, wait 2 minutes and report vibration readings as read from RCPs PPCS page. • Respond to reports or direction to field operators as necessary. <p><u>SM Communications:</u></p> <ul style="list-style-type: none"> • Respond to reports from crew members as required.
NOTES	<p>Continuation Criteria:</p> <p>Once AOP-1B Step 19 actions have been completed, or at the discretion of the Lead Examiner, continue with the next event.</p>

Event # 5	Reactor Trip – Trip Pushbuttons Fail
ACTION	Booth: None
STUDENT RESPONSE	<p>Symptoms and Indications:</p> <ul style="list-style-type: none"> • First set of Reactor Trip Pushbuttons depressed with no system response <p>BOP/RO</p> <ul style="list-style-type: none"> • Attempts to manually trip the reactor, when first set of pushbuttons fail, uses alternate pushbuttons to trip the reactor. Performs EOP-0 Immediate Actions. <i>The BOP may be directed by the RO to depress the second set of pushbuttons; or the RO may do it themselves.</i> <p>SRO</p> <ul style="list-style-type: none"> • Implements EOP-0, Reactor Trip or Safety Injection <p>Crew</p> <ol style="list-style-type: none"> 1. Verify Reactor Trip; RNO: manually trip reactor (RO) 2. Verify turbine trip (RO) 3. Verify power to AC Safeguards buses (RO) 4. Check if SI Actuated. RNO: IF SI is not required, THEN perform the following: (RO) <ol style="list-style-type: none"> 1) Notify STA to monitor and implement CSP Status per CSP-ST.0, CSF Status Trees. (SRO) 2) Go to EOP-0.1, Reactor Trip Response. (SRO)
ROLE PLAY	<p><u>Booth Communications:</u></p> <ul style="list-style-type: none"> • Respond to reports or direction to field operators as necessary. <p><u>SM Communications:</u></p> <ul style="list-style-type: none"> • Respond to reports from crew members as required.
NOTES	<p>Note: Once EOP-0 immediate actions have been completed, the crew will complete the actions of AOP-1B, Step 19.</p>

Events #6 and #7	LBLOCA – RHR Pump Failures – Containment Sump Recirc
ACTION	Booth: Insert Trigger 5 per Lead Evaluator.
STUDENT RESPONSE	<p>Symptoms and Indications:</p> <ul style="list-style-type: none"> • Rapid loss of Pressurizer level and pressure • Containment high pressure • Numerous alarms on 1C04 and C01 • RMS Server alarms for radiation in Containment • 1P-10A RHR Pump not running following the SI sequence <p>Crew <u>EOP-0 continued:</u> (returns to EOP-0 Step 4 from EOP-0.1 when SI actuates)</p> <p>4. Check if SI actuated (RO)</p> <ol style="list-style-type: none"> a. Any SI annunciators – LIT b. Both trains of SI – ACTUATED; RNO: Manually actuate both trains of SI and Containment Isolation <i>Recognizes that 1P-10A failed to start and 1P-10B tripped. After Step 4 is complete RO or BOP may request, or SRO may direct, 1P-10A be manually started at this point. *Otherwise this will happen in Attachment A step A3. (CT-5) manually start 1P-10A (RO or BOP) May direct the AOs to check out 1P-10B and its breaker.</i> <p>Foldout Page #1 RCP Trip Criteria: If both conditions listed below occur, THEN trip both RCPs (RO)</p> <ul style="list-style-type: none"> • RCS subcooling – LESS THAN [40°F] 31°F • SI Pumps – AT LEAST ONE RUNNING AND CAPABLE OF DELIVERING FLOW <p>5. Perform Attachment A, Automatic Action Verification, while continuing with this procedure. (BOP)</p> <p>6. Verify AFW Pumps – RUNNING (RO)</p> <p>7. Check RCP Seal Cooling (RO)</p> <p>8. Check RCS Temperatures (RO)</p> <p>9. Check PZR PORVs and spray valves (RO)</p> <p>10. Check if RCPs Should be stopped RNO: Go to Step 11 (RO) <i>Evaluator Note: Already stopped per foldout page</i></p> <p>11. Check if S/G are NOT faulted (RO)</p> <p>12. Check if S/G tubes are NOT ruptured (RO)</p> <p>13. Check if RCS is intact; RNO: (RO)</p> <ol style="list-style-type: none"> a. Notify STA to MONITOR CSP Status per CSP-ST.0, CSF Status Trees (SRO) b. Go to EOP-1, Loss of Reactor or Secondary Coolant (SRO)

CT-5 event starts here

CT-5 action*

Events #6 and #7	LBLOCA – RHR Pump Failures – Containment Sump Recirc
<p>CT-36 event starts here</p>	<p><u>EOP-1, Loss of Reactor or Secondary Coolant</u> Foldout Page #6 Containment Sump Recirculation Switchover Criteria IF either condition below is satisfied, THEN go to EOP-1.3, Transfer to Containment Sump Recirculation – Low Head Injection:</p> <ul style="list-style-type: none"> o RWST Level – LESS THAN 60% o RCS Pressure less than [450 psig] 325 psig AND RHR flow greater than 550 gpm
<p>CT-5 action* see previous page for note.</p>	<p><u>EOP-0, Attachment A, Automatic Action Verification (BOP)</u></p> <p>A1 – Verify feedwater isolation A2 – Verify containment isolation A3 – Verify ECCS Pumps RUNNING</p> <ul style="list-style-type: none"> a. SI pumps – BOTH RUNNING b. RHR Pumps – BOTH RUNNING; RNO: WHEN SI sequence is complete (CT-5) THEN manually start RHR Pumps. <i>If not already performed, this is where the BOP starts 1P-10A.</i> <p>A4 – Verify service water pumps running A5 – Verify containment accident cooling units RUNNING A6 – Verify component cooling water pumps – ONLY ONE RUNNING A7 – Check if main steam lines can remain open A8 – Verify containment spray not required: A9 – Verify ECCS Flow A10 – verify AFW valve alignment – PROPPER EMERGENCY ALIGNMENT A11 – Verify proper ECCS valve alignment A12 – Check containment spray NOT ACTUATED; RNO: Check containment spray alignment</p> <ol style="list-style-type: none"> 1. Ensure all containment spray pump discharge MOVs are open. 2. Ensure at least one containment spray pump is running. 3. IF two containment spray pumps are running, THEN place one containment spray pump in pull-out. 4. WHEN containment spray has been actuated for greater than two minutes, THEN ensure spray additive eductor suction valve is open on the running train. <p>A13 – Stop any boration via the blender in progress A14 – Ensure the Auxiliary building filter/exhaust fans – OPERATING A15 – Notify the STA to IMPLEMENT Status trees, Notify the SM of any equipment malfunctions previously noted. A16 – Verify Service Water system alignment A17 – Check miscellaneous valves – SHUT A18 – Check Control Room ventilation A19 – Check cable spreading room ventilation system – OPERATING A20 – Check Computer Room ventilation system – OPERATING A21 – Check AFW recirc fans – ONE RUNNING</p>

Events #6 and #7	LBLOCA – RHR Pump Failures – Containment Sump Recirc
	<p>A22 – Check Circ Water Pump House temperature less than 105°F A23 – Check G03/G04 switchgear room temperature less than 95°F A24 – Periodically check status of spent fuel cooling.</p>
<p>ROLE PLAY</p>	<p><u>Booth Communications:</u></p> <ul style="list-style-type: none"> • PAB AO: If directed to investigate 1P-10B trip, wait 2 minutes and report the motor is stopped and hot to the touch. • TH AO: If directed to check the breaker for 1P-10B at 1B04, wait 2 minutes and report the breaker has tripped on overcurrent. • EOP-0, Att A communications: <ul style="list-style-type: none"> ○ PAB AO: When directed to check rad waste service water valves SHUT at C-180, report the TV-LW61 and TV-LW62 are both SHUT ○ TH AO: When directed to check Circ Water Pump House temperature, wait 1 minute and report 76°F and stable. ○ TH AO: When directed to check G03/G04 switchgear room temperature, wait 1 minute and report 80°F and stable. • Respond to reports or direction to field operators as necessary. <p><u>SM Communications:</u></p> <ul style="list-style-type: none"> • Respond to reports from crew members as required.
<p>NOTES</p>	

Events #6 and # 7	Containment Sump Recirculation
ACTION	<p>Booth:</p> <p>Insert TRIGGER 9 when directed by crew for EOP-1.3, Att A alignment.</p> <p>Insert TRIGGER 11 when directed by crew to isolate SI test lines.</p>
STUDENT RESPONSE	<p>Symptoms and Indications</p> <ul style="list-style-type: none"> • RCS pressure near Containment pressure • ECCS Flow (RHR) approximately 1500 gpm • RWST level lowering <p>Crew</p> <ul style="list-style-type: none"> • Implements EOP-1.3, Transfer to Containment Sump Recirculation – Low Head Injection <ol style="list-style-type: none"> 1. Reset SI (BOP) 2. Check RCS break size. (RO) <i>Using RHR Flow and RCS Pressure indications, SRO determine to continue in EOP-1.3</i> 3. Align CCW per Attachment A, local Alignment of Component Colling Water, while continuing with this procedure. (BOP or RO) <i>Will direct PAB AO to perform Attachment A of EOP-1.3.</i> 4. Direct unnecessary personnel to evacuate the PAB (BOP or RO) <i>Use the plant evacuation alarm and Gaitronics for the announcement</i> 5. Check if containment sump pH must be adjusted; (BOP) RNO Go to Step 6 6. Check if Train 'A' SI Flow should be stopped; RNO: Go to Step 7 (BOP) 7. Check if Train 'B' SI flow should be stopped <ol style="list-style-type: none"> a. Check train 'A' RHR injection flow – GREATER THAN 550 gpm (RO) b. (CT-36) Stop train 'B' SI pump and place in pull-out (BOP) c. Stop Train 'B' RHR pump and place in pull-out <i>Pump tripped on ground fault</i> 8. Monitor core cooling (RO) 9. Evaluate Control Room conditions (BOP or RO) 10. (CT-36) Isolate component cooling flow to containment <ol style="list-style-type: none"> a. Check RCPs – BOTH STOPPED (RO) b. Shut containment equipment CC supply header isolation valve: 1CC-719 (BOP) 11. (CT-36) Isolate component cooling flow to non-regenerative heat exchanger <ol style="list-style-type: none"> a. Check normal letdown – ISOLATED (RO) b. Place non-regen heat exchanger outlet temperature controller in manual and shut valve: 1HC-130 (RO) 12. Check Service Water pumps – SIX RUNNING (BOP) 13. Check service water supply ring header – CONTINUOUS FLOWPATH ESTABLISHED (BOP) 14. Establish component cooling flow to RHR heat exchangers: <ol style="list-style-type: none"> a. Ensure component cooling pumps – AT LEAST ONE RUNNING

Events #6 and # 7	Containment Sump Recirculation
	<p>(BOP)</p> <ul style="list-style-type: none"> b. (CT-36) Open only one RHR heat exchanger shell side inlet valve (BOP) <ul style="list-style-type: none"> • 1CC-738A • 1CC-738B c. (CT-36) Start second component cooling pump (BOP) <ul style="list-style-type: none"> • 1P-11A • 1P-11B d. (CT-36) Open second RHR heat exchanger shell side inlet valve (BOP) <ul style="list-style-type: none"> • 1CC-738A • 1CC-738B <p>15. Ensure RV Injection MOV's – BOTH OPEN (BOP)</p> <p>16. Align SI test lines for recirculation</p> <ul style="list-style-type: none"> a. Check containment spray discharge valves – AT LEAST ONE OPEN IN EACH TRAIN (BOP) b. (CT-36) Locally shut both SI test line return isolation valves: (BOP or RO directs PAB AO) <ul style="list-style-type: none"> • 1SI-897A • 1SI-897B <p>17. (CT-36) Align RHR Suction Valves (BOP)</p> <ul style="list-style-type: none"> a. Open train 'A' RHR pump suction from containment sump 'B' isolation valve: 1SI-850A b. Open train 'B' RHR pump suction from containment sump 'B' isolation valve: 1SI-850B <p>18. Check Train 'A' Ready for Recirculation (BOP)</p> <p>19. Check Train 'B' Ready for Recirculation; (SRO) RNO: Try to prepare train 'B' for recirculation while continuing with this procedure. <i>This train is unavailable due to pump tripped</i></p> <p>20. Check battery chargers supplying DC buses – ENERGIZED (BOP)</p> <p>21. Check RHR trains – AT LEAST ONE READY FOR RECIRCULATION (BOP)</p> <p>22. Check RWST level – LESS THAN OR EQUAL TO 34%; RNO: Perform the following: (BOP)</p> <ul style="list-style-type: none"> a. WHEN RWST level is less than or equal to 34%, THEN immediately return to this procedure and continue with Step 23. b. Implement Critical Safety Procedures and continue with procedure and step in effect. <p><u>Note:</u> The crew should address CSP-P.1, Response to Imminent Pressurized Thermal Shock Condition, and implement EOP-1, Loss of Reactor or Secondary Coolant until RWST level reaches 34%.</p> <p><u>Note:</u> Time compression may be used here to SNAP forward to 34% RWST level at the discretion of the lead examiner. No significant actions will take place in EOP-1 or CSP-P.1. IC 39 is snapped to 36% RWST, before the low level alarm actuates.</p>

Events #6 and # 7	Containment Sump Recirculation
<p>CT-36 actions complete</p>	<p>IC 41 is snapped at 34%, after the low level alarm was acknowledged.</p> <p><i>CSP-P.1 is exited during the first step due to low RCS pressure and high RHR flow.</i></p> <p><i>EOP-1, the following steps are expected to be performed while waiting for RWST level:</i></p> <ol style="list-style-type: none"> 1. Check if RCPs Should be stopped; (No actions needed) RNO Go to step 2 2. Check if S/Gs are NOT faulted (No actions needed) 3. Check intact S/G level (BOP) Will control level and total flow with AFW flow control valves 4. Check Secondary Radiation (No actions needed) 5. Check Pzr PORVs and Block Valves (No actions needed) 6. Reset SI (BOP) 7. Reset Containment Isolation and 1B-03 and 1B-04 Non safeguards lockouts (BOP) 8. Establish Air to Containment (BOP) Check Air pressure >80 psig Open 1IA-3047 and 1IA-3048 on at a time <p>When RWST level lowers to 34%, the crew will return to EOP-1.3, step 23:</p> <p><u>EOP-1.3, Transfer to Containment Sump Recirculation – Low Head Injection</u></p> <ol style="list-style-type: none"> 23. Check containment sump ‘B’ level – GREATER THAN 38 inches. (RO) 24. Prepare for high radiation levels in PAB (BOP or RO evacuates ALL personnel from the PAB) 25. Align Train ‘B’ of RHR for containment sump recirculation. (BOP) <ol style="list-style-type: none"> a. Check RHR train ‘B’ – READY FOR RECIRCULATION; RNO: OBSERVE CAUTION PRIOR TO STEP 27 and go to Step 27. 27. Align train ‘A’ of RHR for containment sump recirculation (BOP) <ol style="list-style-type: none"> a. Check RHR train ‘A’ – READY FOR RECIRCULATION b. Check SI test line return isolation AOVs – AT LEAST ONE SHUT c. (CT-36) Open train ‘A’ RHR pump suction from containment sump ‘B’ MOV: 1SI-851A d. (CT-36) Shut train ‘A’ RHR pump suction from RWST MOV: 1SI-856A e. Check train ‘B’ RHR – ON RECIRCULATION; RNO: Ensure train ‘A’ RHR pump is running. 28. Check CCW HX Outlet Temperature – LESS THAN 150°F (BOP or RO) 29. Check RHR trains – AT LEAST ONE ON SUMP RECIRCULATION (BOP) 30. Monitor containment sump performance: (BOP) <ul style="list-style-type: none"> • Containment sump level • RHR pump operation – NORMAL • Low head injection flow - STABLE

Events #6 and # 7	Containment Sump Recirculation
ROLE PLAY	<p><u>Booth Communications:</u></p> <ul style="list-style-type: none"> • PAB AO: When directed to perform EOP-1.3, Attachment A alignment, insert trigger 9, and report when all actions are complete. • PAB AO: When directed to shut 1SI-897A and 1SI-897B, insert trigger 11 and report when complete. • Respond to reports or direction to field operators as necessary. <p><u>STA Communication:</u></p> <ul style="list-style-type: none"> • When CSF Status Trees are in effect and plant conditions are met, report to the SRO that CSF INTEGRITY RED path conditions exist. <p><u>SM Communications:</u></p> <ul style="list-style-type: none"> • Respond to reports from crew members as required.
NOTES	

	Scenario Termination
	Terminate the scenario when the crew has established one train of sump recirculation, or per Lead Evaluator.
NOTES	<ul style="list-style-type: none"> • Freeze the simulator • Determine if the NRC has any follow up questions • Save SBT Data (see sim setup instructions)

QUANTITATIVE ATTRIBUTES

Malfunctions:

Before EOP Entry:

- P-32A, SW Pump winding ground, pump trip
- RCP 1P-1B high vibration

After EOP Entry:

- One set of reactor trip pushbuttons fail
- 1P-10B RHR Pump trip
- 1P-10A RHR Pump fails to auto start

Abnormal Events:

- Service Water System Malfunction
- RCP Malfunction

Major Transients:

- LB LOCA

Critical Tasks:

1.	CT-5	Manually start at least one low head ECCS pump
2.	CT-36	Establish at least one train of sump recirculation

Major Procedures:

AOP-9A ⇒ AOP-1B ⇒ EOP-0 ⇒ EOP-1 ⇒ EOP-1.3 ⇒ CSP-P.1 ⇒ EOP-1 ⇒ EOP-1.3

CT-5	Manually start at least one low head ECCS pump
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Critical Task:

Manually start at least one low-head ECCS pump to establish successful sump recirculation.

Plant Conditions:

- Large-break LOCA
- Reactor trip
- SI
- RCS pressure below the shutoff head of the low-head ECCS pumps
- Both low-head ECCS pumps fail to automatically start upon SI
- At least one low-head ECCS pump can be started, provided that manual action is taken as necessary

Cues:

Indication and/or annunciation that low-head ECCS pumped injection is required

- SI actuation
- RCS pressure below the shutoff head of the low-head ECCS pumps

AND

Indication and/or annunciation that no low-head ECCS pump is injecting into the core

- Control switch indication that the circuit breakers or contactors for both low-head ECCS pumps are open
- All low-head ECCS pump discharge pressure indicators read zero
- All flow rate indicators for low-head pumped injection read zero

Performance Indicator:

Manipulation of controls as required to start at least one low-head ECCS pump

- Control switch indication that the circuit breaker or contactor for at least one low-head ECCS pump is closed

Feedback:

Indication and/or annunciation that at least one low-head ECCS pump is injecting

- Flow rate indication of injection from at least one low-head ECCS pump

Basis:

SAFETY SIGNIFICANCE -- Failure to manually start at least one low-head ECCS pump under the postulated conditions constitutes misoperation or incorrect crew performance in which the crew does not prevent “degraded emergency core cooling system (ECCS) ...capacity.” In this case, at least one low-head ECCS pump can be manually started from the control room. Therefore, failure to manually start a low-head ECCS pump also represents a failure by the crew to “demonstrate the following abilities:

- Effectively direct or manipulate engineered safety feature (ESF) controls that would prevent a significant reduction of safety margin (beyond that irreparably introduced by the scenario)
- Recognize a failure or an incorrect automatic actuation of an ESF system or component”

Additionally, under the postulated plant conditions, failure to manually start a low-head ECCS pump (when it is possible to do so) is a “violation of the facility license condition.” The acceptable results obtained in the FSAR analysis of a large-break LOCA are predicated on the assumption of minimum ECCS pumped injection. The analysis assumes that a minimum pumped ECCS flow rate, which varies with RCS pressure, is injected into the core. The flow rate values assumed for minimum pumped injection are based on operation of one each of the

following ECCS pumps: high-head pump, intermediate-head pump, and low-head pump. Operation of this minimum required complement of ECCS injection pumps is consistent with the FSAR assumption that only minimum safeguards are actuated. For both the minimum and maximum cases specified in Comment 1 of this critical task worksheet and for all cases in between, failure to perform the critical task means that the plant is needlessly left in an unanalyzed condition. Performance of the critical task would return the plant to a condition for which analysis shows acceptable results.

CT-36	Transfer to cold leg recirculation
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Critical Task:

Transfer to cold leg recirculation and establish ECCS recirculation flow from at least one train of RHR prior to loss of suction of running ECCS pumps.

Plant Conditions:

- LOCA inside containment
- RWST level decreases to 34%
- Containment recirculation sump level is at or above 38 inches
- Transfer to cold leg recirculation can be performed manually from switches in the control room

Cues:

Indication and/or annunciation that safety injection is actuated

AND

Indication and/or annunciation that RWST level is at or below 34%

AND

Indication that containment sump level is at or above 38 inches

Performance Indicator:

Manipulation of controls as required to transfer to cold leg recirculation and establish ECCS recirculation flow that at least meets the assumptions of the plant-specific LOCA analyses:

- Valve position indication that the cold leg recirculation flow path is established
- Control switch indication that the circuit breakers or contactors for the low-head injection pumps are closed

Feedback:

Flow indication of the recirculation of containment sump water through the RHR heat exchangers and into the RCS

Basis:

The justification for selecting this task as critical can be thoroughly argued only on the basis of plant-specific requirements. A detailed justification cannot be presented on a generic basis because of the following plant-specific variables:

- ECCS recirculation-mode alignments
- Methods for transfer to cold leg recirculation
- RWST inventory criteria for initiating switchover
- RWST inventory transfer allowances for completing transfer of injection pumps and spray pumps

The plant-specific justification for selecting this task as critical should be argued along one or more of the following lines:

- Improper performance or omission by an operator will result in direct adverse consequence(s) or a significant degradation in the mitigative capability of the plant
- Operation or correct performance prevents a significant reduction of safety margin beyond that irreparably introduced by the scenario
- Operation or correct performance prevents unnecessary challenges to the following CSFs:
 - Core cooling
 - Containment
- The crew demonstrates the ability to take one or more actions that would prevent a challenge to plant safety

Booth Summary

Event #2	Raise Reactor Power to POAH
Action	Booth: None
Role Play	<ul style="list-style-type: none"> Respond to reports or direction to field operators as necessary.

Event #3	P-32A Service Water Pump Trip
Action	Booth: Insert TRIGGER 1 per Lead Evaluator
Role Play	<ul style="list-style-type: none"> TH AO: If directed to investigate the loss of P-32A, Wait 2 minutes and report that P-32A is not running, and otherwise appears normal. TH AO: If directed to shut SW-10, P-32A Discharge Isolation valve, wait 1 minute, Insert Trigger 19, and report when complete. TH AO: If directed to service water system conditions / check zurn strainer normal, wait 1 minute and report that service water strainers are operating normally, power available, and strainer ΔP is normal, and the system is intact. Reset circulating water pump cooling low flow alarms. Respond to reports or direction to field operators as necessary.

Event #4	1P-1B RCP High Vibration
Action	<p>Booth: Insert TRIGGER 3 per Lead Evaluator</p> <p>Note: RCP high vibration alarm occurs approximately 8 minutes after the trigger is entered. Trigger 7 deletes malfunctions when the RCP is tripped.</p>
Role Play	<ul style="list-style-type: none"> TH AO: If directed to check RCP vibration reading on 1C-76 in rod drive room, wait 2 minutes and report vibration readings as read from RCPs PPCS page. Respond to reports or direction to field operators as necessary.

Event #5	Reactor Trip – Pushbuttons Fail
Action	<p>Booth: None</p> <p>Trigger 15 opens reactor trip breakers once the second set of pushbuttons is depressed.</p>
Role Play	<ul style="list-style-type: none"> Respond to reports or direction to field operators as necessary.

Event #6	RHR Pump Failures
Action	<p>Booth: None</p> <p>Trigger 5 inserts motor winding ground when the reactor is tripped.</p>
Role Play	<ul style="list-style-type: none"> PAB AO: If directed to investigate 1P-10B trip, wait 2 minutes and report the motor is stopped and hot to the touch. TH AO: If directed to check the breaker for 1P-10B at 1B04, wait 2 minutes and report the breaker has tripped on overcurrent. EOP-0, Att A communications: <ul style="list-style-type: none"> PAB AO: When directed to check rad waste service water valves SHUT at C-180, report the TV-LW61 and TV-LW62 are both SHUT TH AO: When directed to check Circ Water Pump House temperature, wait 1 minute and report 76°F and stable. TH AO: When directed to check G03/G04 switchgear room temperature, wait 1

	<p>minute and report 80°F and stable.</p> <ul style="list-style-type: none"> Respond to reports or direction to field operators as necessary.
--	--

Event #7	LB LOCA – Containment Sump Recirculation
Action	<p>Booth:</p> <p>Trigger 5 inserts when the reactor is tripped.</p> <p>Insert TRIGGER 9 when directed by crew for EOP-1.3, Att A alignment.</p> <p>Insert TRIGGER 11 when directed by crew to isolate SI test lines.</p>
Role Play	<ul style="list-style-type: none"> PAB AO: When directed to perform EOP-1.3, Attachment A alignment, insert trigger 9, and report when all actions are complete. PAB AO: When directed to shut 1SI-897A and 1SI-897B, insert trigger 11 and report when complete. Respond to reports or direction to field operators as necessary.

SHIFT TURNOVER INFORMATION

PLANT CONDITIONS:

	UNIT 1
Time in core life (MWD/MTU):	BOL
Reactor power (%):	0% (1.3x10E-6 amps in IR)
Boron concentration (ppm):	2250 ppm
Rod height, CBD @:	196

TECHNICAL SPECIFICATION ACTION CONDITIONS IN EFFECT:

<u>TSAC</u>	<u>Description</u>	<u>Required Action & Completion Time</u>
U1 3.3.2.A/D	One channel inoperable	Place channel in trip – 1 hour

EQUIPMENT OUT OF SERVICE:

- G02 Emergency Diesel Generator for maintenance.
- 1PT-949, Containment Pressure instrument.
- 1W-3A, Control Rod Drive Shroud Fan.

PLANNED EVOLUTIONS:

- Raise reactor power to POAH.

TURNOVER INFORMATION:

- G01 Emergency Diesel Generator is aligned to both 1A05 and 2A05 4160 Safeguards Busses.
- On line risk is GREEN.
- Today is Tuesday, day shift.

Pre-Scenario Procedure Checks

Procedure	OS1	
	1 st Check	2 nd Check
AOP-1B		
AOP-9A		
EOP 0		
EOP 1		
EOP 1.3		
CSP-P.1		
Specific ARP/ARBs to be second checked – All Others first checked		
	1 st Check	2 nd Check
C02 D 3-2		
C02 D 3-6		
C02 F 3-1		
1C04 1C 1-5		
1C04 1C 3-10		
C01 A 3-5		
C01 B 3-4		

Facility: Point Beach Scenario No.: 4 Op-Test No.: 2021

Examiners: _____ Operators: _____

Initial Conditions: Reactor power is 47%. G03, EDG is out of service due to maintenance with
G04, EDG aligned. 1LT-426, PZR Level transmitter (Red) removed from service

Turnover: Conduct an up power to 100% power at 15% per hour per OP 1C, Startup to Power
Operations

Critical Tasks: CT-3, Manually Actuate Containment Cooling
CT-17, Isolate Faulted SG

Event No.	Malf. No.	Event Type*	Event Description
1		C-RO C-SRO	Letdown inadvertently isolates, needs to be re-established NEW
2		TS-SRO	0LT-4040, T-24A CST Level Transmitter fails low 2017 Repeat
3		R-RO C-BOP R-SRO	Inadvertent Turbine trip with no reactor trip NEW
4		C-RO C-SRO TS-SRO	Seismic event 1P-11A, CCW pumps failure due to a mechanical failure requiring pump shift 2019 Repeat
5		C-RO C-SRO	Seismic event causes multiple dropped rods, without an automatic RX Trip
6		M-ALL	Steam Generator fault in containment upstream of the orifice
7		C-BOP C-SRO	Safety Injection fails to actuate
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			



SIMULATOR EXERCISE GUIDE

SEG

SITE: PBNP **Revision #: 0**

LMS ID: PBN LOI NRC 25E **LMS Rev. Date:**

SEG TITLE: 2021 NRC Exam Scenario 4

SEG TYPE: Training Evaluation

PROGRAM: LOCT LOIT Other:

DURATION: 90 minutes

Developed by: John Rogers _____
Instructor/Developer Date

Reviewed by: Jeff Hinze _____
Instructor (Instructional Review) Date

Validated by: John Rogers _____
SME (Technical Review) Date

Approved by: Adam Moore _____
Training Supervision Date

Approved by: Joe Krear _____
Training Program Owner (Line) Date

Facility: Point Beach Scenario No.: 4 Op-Test No.: 2021

Examiners: _____ Operators: _____

Initial Conditions: Reactor power is 47%. G03, EDG is out of service due to maintenance with
G04, EDG aligned. 1LT-426, PZR Level transmitter (Red) removed from service

Turnover: Conduct an up power to 100% power at 15% per hour per OP 1C, Startup to Power
Operations

Critical Tasks: CT-A Restore Normal or Excess Letdown
CT-17, Isolate Faulted SG

Event No.	Malf. No.	Event Type*	Event Description
1		C-RO C-SRO	Letdown inadvertently isolates, needs to be re-established NEW
2		TS-SRO	0LT-4040, T-24A CST Level Transmitter fails low 2017 Repeat
3		R-RO C-BOP R-SRO	Inadvertent Turbine trip with no reactor trip NEW
4		C-RO C-SRO TS-SRO	Seismic event 1P-11A, CCW pumps failure due to a mechanical failure requiring pump shift 2019 Repeat
5		C-RO C-SRO	Seismic event causes multiple dropped rods, without an automatic RX Trip
6		M-ALL	Steam Generator fault in containment upstream of the orifice
7		C-BOP C-SRO	Safety Injection fails to actuate

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

SIMULATOR EXERCISE GUIDE REQUIREMENTS

Terminal Objective:	Given the site simulator and specific plant conditions, the students will be able to respond to various plant abnormal and emergency events, in accordance with site procedures and technical Specifications.
Enabling Objectives:	1. None
Prerequisites:	<ol style="list-style-type: none"> 1. Simulator available 2. Students enrolled in Initial License Program
Training Resources:	<ol style="list-style-type: none"> 1. Floor Instructor as Shift Manager / Shift Technical Advisor 2. Simulator Booth Operator 3. Communicator 4. NRC Evaluators
References:	<ol style="list-style-type: none"> 1. AOP-1D, Chemical and Volume Control System Malfunction 2. AOP-6A, Dropped Rod 3. AOP-9B, Component Cooling System Malfunction 4. AOP-25, Turbine Trip Without Reactor Trip 5. AOP-28, Seismic Event 6. EOP-0, Reactor Trip or Safety Injection 7. EOP-1, Loss of Reactor or Secondary Coolant 8. EOP-1.1, SI Termination 9. EOP-2, Faulted Steam Generator Isolation 10. OM 3.7, AOP and EOP Procedure Usage For Response To Plant Transients 11. Technical Specifications Manual 12. Technical Requirements Manual
Protected Content:	None
Evaluation Method:	Simulator performance will be evaluated in accordance with NUREG 1021.
Operating Experience:	None
Risk Significant Operator Actions:	<p><u>Initiating Event with Core Damage Frequency:</u></p> <p>Steam Break Inside Containment (4.12E-09 CDF) (2.00E-11 LERF)</p> <p>Failure to isolate AFW to the Faulted Steam Generator from T (1.41E-03)</p>

UPDATE LOG: Indicate in the following table any minor changes or major revisions made to the material after initial approval.

#	DESCRIPTION OF CHANGE	REASON FOR CHANGE	AR/TWR#	PREPARER	DATE
				REVIEWER	DATE
0	Developed for the 2021 ILT NRC Exam				

OVERVIEW / SEQUENCE OF EVENTS

OVERVIEW

Initial conditions for the scenario are: Unit 1 reactor power is stable at approximately 47% during a plant startup following a short forced outage. Power ascension to 100% is planned for this shift.

Examinees will respond to an inadvertent CVCS letdown isolation and a CST level instrument failure. A seismic event causes the running CCW pump to degrade. A second seismic event causes two dropped rods, requiring a reactor trip. Coincident with the reactor trip, A S/G faults inside containment; containment spray will fail to automatically actuate.

The scenario will be terminated when the crew has completed actions through Step 7 of EOP-1.1, SI Termination.

SEQUENCE OF EVENTS

Event #	Description
1.	<p>Inadvertent Letdown Isolation</p> <ul style="list-style-type: none"> Letdown Orifice Isolation valve, 1CV-200A inadvertently closes causing a loss of letdown flow. The crew will respond per AOP-1D, CVCS Malfunction, to minimize charging flow and restore letdown to service.
2.	<p>OLT-4040 Condensate Storage Tank T-24A Level Transmitter fails low</p> <ul style="list-style-type: none"> The crew should reference ARP C01 A 2-9 and ARB C01 A 3-9 for the failed level transmitter and determine the applicable Technical Specification's Required Actions.
3.	<p>Inadvertent Turbine Trip Without Reactor Trip</p> <ul style="list-style-type: none"> The Unit 1 Main Turbine will inadvertently trip with reactor power at approximately 47%. The reactor will not trip. The crew will stabilize the plant per AOP-25, Turbine Trip Without Reactor Trip
4.	<p>Seismic Event / 1P-11A, CCW Pump Failure</p> <ul style="list-style-type: none"> A seismic event occurs that results in the mechanical failure of 1P-11A, CCW Pump. The crew will implement AOP-28, Seismic Event, in response to the Seismic Event. The crew will respond to the loss of 1P-11A, CCW Pump, per AOP-9B, Component Cooling System Malfunction, to restore CCW system flow. SRO will address Technical Specifications
5.	<p>Multiple Dropped Rods</p> <ul style="list-style-type: none"> A second seismic event causes two rods to drop, requiring a reactor trip. The crew will respond to AOP-6A, Dropped Rod, to trip the reactor.

<p>6.</p>	<p>Faulted Steam Generator</p> <ul style="list-style-type: none"> • Coincident with the reactor trip, the 'A' S/G will fault inside containment. • Safety Injection and Containment Pressure Condensate Isolation (CPCI) will fail to actuate, SI may be manually actuated. • The crew will isolate the faulted S/G per EOP-2, Faulted Steam Generator Isolation.
	<p>Terminate the scenario when crew has completed through Step7 of EOP-1.1, SI Termination, or per Lead Evaluator.</p>

SIMULATOR SET-UP INSTRUCTIONS

Perform simulator set up per the site specific Simulator Setup Checklist.

Check	Action
1.	Reset to IC-32
2.	Perform Simulator Setup Checklist
3.	Open schedule file. Z:/2021 ILT NRC Simulator Files/NRC Scenario 4.sch
4.	To record SBT data: <ol style="list-style-type: none"> 1. Launch "SBT Report" from Thunderbar 2. Open "Scenario Validation Checklist.sbt" (TRex_PB\Lightning)
5.	Take schedule(s) to run
6.	Verify required event file(s) open if required
7.	Take sim to run
8.	Place turnover sheets on RO desk
9.	Place reactivity sheets on RO desk
10.	Guard the following: <ul style="list-style-type: none"> • G01, G02, G04 EDG's Place the following OOS: <ul style="list-style-type: none"> • G03 EDG • 1LT-426 Pressurizer Level Place red dots on the G03 alarm and PZR Level: <ul style="list-style-type: none"> • C02 E 2-1 • C02 E 2-2 • 1C04 1C 3-3
11.	<ul style="list-style-type: none"> • Conduct simulator crew pre-scenario brief using TR-AA-230-1007-F06, Simulator Instructor Pre-Exercise Checklist. • Brief the scenario evaluators • Brief surrogates using TR-AA-230-1007-F11, Surrogate Brief Checklist, if necessary
12.	Run Scenario
13.	To save SBT Data: <ol style="list-style-type: none"> 1. In the SBT Report program click the Generate Report icon (green arrow) 2. In Test Title enter a unique test title, to be same as file name 3. In report name enter the location the test files are to be saved, use same file name as Test Title 4. Click "Generate" (generates and saves two files in the selected folder) 5. Verify files saved in the selected folder 6. The generated report and SBT Report program may now be closed 7. Collect procedure markups for SBT 8. Save any InSight, Alarm, Event, Schedule Files to the secure drive that were in use
14.	Reset simulator to appropriate IC.

BOOTH OPERATOR BRIEFING:

Review the scenario sequence, event triggers and expected field communications.

Z:/2021 ILT NRC Simulator Files/NRC Scenario 4.sch

At Time	On Event	Action	Description
		Preloads / Initial Conditions	
00:00:00		Insert malfunction MAL1DSG001B	DIESEL G03 FAILURE TO START
00:00:00		Insert malfunction XMT1RCS007C to -15	1-LT426 PRZR NARROW RANGE LEVEL FIXED BIAS
		Event Z:/2021 ILT NRC Exam Simulator Files/NRC 4.evt	
		Event 1: Inadvertent Loss of Letdown	
	1	Insert malfunction VLV1CVRO5 to Close on event 1 delete in 30	1-CV-200A LTDN ORIFICE STOP VLV NO 1-200A
		Event 2: CST Level Instrument Failure	
	2	Insert malfunction XMT1AFW005A to 0 in 5 on event 2	0-LT4040 COND STOR TK T24A LEVEL FIXED OUTPUT
		Event 3: Inadvertent Turbine Trip	
	3	Insert malfunction MAL1EHC008 on event 3	INADVERTANT TURBINE TRIP
		Event 4: Seismic Event / 'A' CCW Pump Failing	
	5	Schedule Z:/2021 ILT NRC Exam Simulator Files/NRC 4 Seismic 1.sch	
	5	Insert malfunction PMP1CCW001C to 50.00000 in 15 on event 5	1-P11A COMPONENT COOLING PUMP NO 1-P11A HEAD CAPACITY
		Event 5: Dropped Rods / 2nd Seismic Event	
	7	Insert malfunction MAL1CRF002-J4 after 5 on event 7	ROD DROP J4
	7	Insert malfunction MAL1CRF002-I3 after 10 on event 7	ROD DROP I3
	7	Schedule Z:/2021 ILT NRC Exam Simulator Files/NRC 4 Seismic 2.sch after 5	
	7	Insert remote LOA1ANN008 to ON on event 7 delete in 5	SEI-RESET Seismic detector reset C-206
		Event 6: Faulted Steam Generator	
	9	Insert malfunction MAL1SGN002A to 10000000.00000 in 10 on event 9	SG A MAIN STEAM LINE BREAK UPSTREAM OF FT
	11	Insert remote LOA1SGN023 to 0 in 10 on event 11	1MS-235 P-29 AFP & RADWASTE STM ISOL
00:00:00		Insert malfunction RLY1PPL078 to Fail_As_Is	1-SIA-A TRAIN "A" AUTO SI INITIATION
00:00:00		Insert malfunction RLY1PPL079 to Fail_As_Is	1-SIA-B TRAIN "B" AUTO SI INITIATION

00:00:00		Insert malfunction RLY1PPL018 to Fail_As_Is	1-CPA CPCI ACTUATION RELAY TRAIN A
00:00:00		Insert malfunction RLY1PPL019 to Fail_As_Is	1-CPB CPCI ACTUATION RELAY TRAIN B

Seismic Event Schedule Files

At Time	On Event	Action	Description
00:00:00		Insert remote LOA1ANN004 to SEIS_EVT	SEI-6210 Switchgear Seismic Detector
00:00:00		Insert remote LOA1ANN005 to SEIS_EVT	SEI-6211 Facade Seismic Detector
00:00:00		Insert remote LOA1ANN006 to SEIS_EVT	SEI-6212 Drum Area Seismic Detector
00:00:00		Insert remote LOA1ANN007 to SEIS_EVT	SEI-6213 Aux FW Tunnel Seismic Detector
00:00:00		Insert malfunction ANN-ROA-B06 to On	SEISMIC DETECTOR ACTIVATION
00:00:00		Insert malfunction ANN-1BOPF-A01 after 5 to On delete in 15	LO PRESS FEEDWATER HEATER 1A,2A OR 3A LEVE
00:00:00		Insert malfunction ANN-1BOPF-B01 after 5 to On delete in 15	LO PRESS FEEDWATER HEATER 1B,2B OR 3B LEVE
00:00:00		Insert malfunction ANN-1BOPF-D02 after 10 to On delete in 20	STILLING MANIFOLD LEVEL HI
00:00:00		Insert malfunction ANN-1BOPF-B02 after 20 to On delete in 30	HEATER DRAIN TANK LEVEL HI-LO
00:00:00		Insert malfunction ANN-ROD-A01 after 10 to On delete in 20	SERVICE AIR HEADER PRESSURE LOW

Event file: Trigger 9 Unit 1 Reactor Trip (JCRFTR)

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

Bolded steps are Verifiable Actions taken by the Operators.

(IA) actions are those allowed to be taken from memory, before referencing the procedure, as allowed by OM 3.7, Attachment F, AOP Actions Allowed From Memory.

Event # 1	Inadvertent Letdown Isolation
ACTION	Booth: Insert TRIGGER 1 per Lead Evaluator
STUDENT RESPONSE	<p>Symptoms and Indications:</p> <ul style="list-style-type: none"> • PPCS Alarms: <ul style="list-style-type: none"> ○ PRIORITY 1 & 2 COMPOSITE ALARM ○ F-134 LETDOWN LINE FLOW ○ P-135 LOW PRESS LETDOWN PRESS • 1C04 Indications: <ul style="list-style-type: none"> ○ 1PI-135, Letdown Pressure lowers to < 50 psig ○ 1FI-134, Letdown Line Flow lowers to approximately 0 gpm ○ Pressurizer level rising ○ Auto Charging Pump speed lowering ○ VCT Level lowering • Annunciators <ul style="list-style-type: none"> ○ PRESSURIZER HIGH LEVEL CHANNEL ALERT (1C04 1C 3-3) ○ PPCS PRIORITY ALARM (1C20D 2-1) <p>BOP/RO</p> <ul style="list-style-type: none"> • Diagnoses the loss of letdown and reduces charging flow to minimum. <p>SRO</p> <ul style="list-style-type: none"> • Implements AOP-1D, CVCS Malfunction <p>Crew</p> <ol style="list-style-type: none"> 1. Check RCS leak – NOT IN PROGRESS (RO) 2. Determine CVCS Malfunction: (RO) <ul style="list-style-type: none"> ○ IF inadvertent letdown isolation occurred, THEN go to Step 48 48. Check letdown – INADVERTENTLY ISOLATED (RO) 49. (IA) Reduce charging to – MINIMUM (RO) <i>Go to manual on both charging pumps, secure one, and reduce the other charging pump to minimum speed</i> 50. Check that letdown restoration can be performed (RO) 51. Ensure letdown orifice outlet valves –SHUT (RO) 52. Ensure normal charging – IN SERVICE (RO) 53. Check PZR Level – GREATER THAN 20% (RO) 54. Establish letdown (RO) <ol style="list-style-type: none"> a. Open letdown line containment isolation valves b. Open RC loop B cold leg letdown isolation valve c. Ensure component cooling flow to non-regen heat exchanger – ESTABLISHED, 1HC-130 <p>Conditions for CT-A start here</p>

Event # 1	Inadvertent Letdown Isolation						
<p>CT-A</p>	<p><i>Takes 1HC-130 controller to manual, and establishes flow using pot</i></p> <p>d. Ensure charging flow – AT LEAST 20 GPM <i>Adjusts charging pump controller until min of 20 gpm established</i></p> <p>e. Adjust backpressure and open letdown orifice outlet valves – ESTABLISH DESIRED LETDOWN FLOW. (CT-A) <i>Opens one of 1CV-200A/B/C while maintaining pressure using hand controller 1HC-135, LP Letdown Line Pressure Controller in manual. Once letdown is established and stable, takes hand controllers 1HC-130 and 1HC-135 to Auto</i></p> <p>55. Check PZR Level – AT PROGRAM LEVEL (RO) 56. Notify Duty Station Manager (SRO directs SM to make notifications) 57. Return to procedure and step in effect (SRO)</p> <ul style="list-style-type: none"> Assess Technical Specifications: IF PZR level rises >52%, THEN LCO 3.4.9 is NOT MET <table border="1" data-bbox="402 825 1421 999"> <thead> <tr> <th>CONDITION</th> <th>REQUIRED ACTION</th> <th>COMPLETION TIME</th> </tr> </thead> <tbody> <tr> <td>A. PZR water level not within limit in MODE 1</td> <td>A.1 Restore PZR water level to within limit.</td> <td>1 hour</td> </tr> </tbody> </table>	CONDITION	REQUIRED ACTION	COMPLETION TIME	A. PZR water level not within limit in MODE 1	A.1 Restore PZR water level to within limit.	1 hour
CONDITION	REQUIRED ACTION	COMPLETION TIME					
A. PZR water level not within limit in MODE 1	A.1 Restore PZR water level to within limit.	1 hour					
<p>ROLE PLAY</p>	<p><u>Booth Communications:</u></p> <ul style="list-style-type: none"> Respond to reports or direction to field operators as necessary. <p><u>SM Communications:</u></p> <ul style="list-style-type: none"> If asked, direct the crew to restore letdown using 1CV-200B orifice Isolation valve. Respond to reports from crew members as required. 						
<p>NOTES</p>	<p>Continuation Criteria: After the crew has restored letdown flow and is controlling charging flow, or at the discretion of the Lead Examiner, continue with the next event.</p>						

Event # 2	0LT-4040 Condensate Storage Tank T-24A Level Transmitter fails low						
ACTION	Booth: Insert TRIGGER 2 per Lead Evaluator						
STUDENT RESPONSE	<p>Symptoms and Indications:</p> <ul style="list-style-type: none"> • PPCS Alarms: <ul style="list-style-type: none"> ○ L-4040 CST Lvl A Low • C01 Indications: <ul style="list-style-type: none"> ○ CST T-24A Level instrument reads 0% • Annunciators <ul style="list-style-type: none"> ○ C01 A 2-9, T-24A or B Condensate Storage Tanks – Level High or Low ○ C01 A 3-9, T-24A or B Condensate Storage Tanks Level Low-Low <p>BOP</p> <ul style="list-style-type: none"> • Diagnoses the CST Level instrument failure. References ARB’s, and dispatches AO to investigate locally. <p>SRO</p> <ul style="list-style-type: none"> • Asses Technical Specifications <p>TS 3.3.3, Post Accident Monitoring (PAM)</p> <table border="1" data-bbox="402 968 1419 1167"> <thead> <tr> <th data-bbox="402 968 799 1041">CONDITION</th> <th data-bbox="799 968 1170 1041">REQUIRED ACTION</th> <th data-bbox="1170 968 1419 1041">COMPLETION TIME</th> </tr> </thead> <tbody> <tr> <td data-bbox="402 1041 799 1167">A. One or more Functions with one required channel inoperable.</td> <td data-bbox="799 1041 1170 1167">A.1 Restore required channel to OPERABLE status.</td> <td data-bbox="1170 1041 1419 1167">30 days</td> </tr> </tbody> </table>	CONDITION	REQUIRED ACTION	COMPLETION TIME	A. One or more Functions with one required channel inoperable.	A.1 Restore required channel to OPERABLE status.	30 days
CONDITION	REQUIRED ACTION	COMPLETION TIME					
A. One or more Functions with one required channel inoperable.	A.1 Restore required channel to OPERABLE status.	30 days					
ROLE PLAY	<p><u>Booth Communications:</u></p> <ul style="list-style-type: none"> • TH AO: If directed to locally investigate 0LT-4040 T-24A Condensate Storage Tank Level Transmitter, wait two minutes and THEN report that there doesn’t seem to be anything out-of-normal locally. • Respond to reports or direction to field operators as necessary. <p><u>SM Communications:</u></p> <ul style="list-style-type: none"> • Respond to reports from crew members as required. 						
NOTES	<p>Continuation Criteria:</p> <p>After the crew has addressed Technical Specifications, or at the discretion of the Lead Examiner, continue with the next event.</p>						

Event # 3	Inadvertent Turbine Trip Without Reactor Trip
ACTION	Booth: Insert TRIGGER 3 per Lead Evaluator
STUDENT RESPONSE	<p>Symptoms and Indications:</p> <ul style="list-style-type: none"> • Annunciators <ul style="list-style-type: none"> ○ AUTOMATIC ROD MOTION (1C04 1A 1-7) ○ REACTOR COOLANT HIGH TAVG TREF DEVIATION (1C04 1A 4-10) ○ BLEEDER TRIP VALVES AIR PRESSURE (1C03 1D 4-9 LOW) ○ 20 / AST SOLENOID TRIP (1C03 1E1 4-2) ○ TURBINE STOP VALVES TWO CLOSED (1C03 1E1 4-3) ○ TAVG STEAM DUMP CHANNEL ALERT (1C03 1E2 4-2) • 1C03 Indications <ul style="list-style-type: none"> ○ Condenser Steam Dumps indicate open ○ S/G Steam Flow drops dramatically and then rises due to CSDs ○ Turbine Stop Valves indicate closed ○ Turbine Gov. Valves indicate closed ○ Turbine First Stage Pressure indicates 0 psig • 1C04 Indications <ul style="list-style-type: none"> ○ Tavg rising ○ Tref lowering ○ NI Power lowering ○ Control Rods driving IN in AUTOMATIC at maximum rate <p>BOP/RO</p> <ul style="list-style-type: none"> • Diagnoses the turbine trip without reactor trip, places rod control in manual. <p>SRO</p> <ul style="list-style-type: none"> • Implements AOP-25, Turbine Trip Without Reactor Trip <p>Crew</p> <ol style="list-style-type: none"> 1. Verify turbine trip (BOP) 2. (IA) Ensure rod control in MANUAL (RO) 3. Check reactor power – BETWEEN 5% and 50% (RO) 4. Stabilize reactor power and temperature. <ol style="list-style-type: none"> a. Set condenser steam dumps to stabilize reactor power referencing ATTACHMENT A, Reactor Power, Tavg and CSD Controller Settings, as needed: (BOP) <ul style="list-style-type: none"> ○ Condenser steam dumps to pressure control mode <ol style="list-style-type: none"> a) Null 1HFC-484 output by adjusting Auto Setpoint to match 1PI-484, Steam Header Pressure. b) Place condenser steam dump mode selector switch to MANUAL c) Adjust 1HFC-484 Auto Setpoint to match reactor power to controller output. ○ Condenser steam dumps to manual control mode: <ol style="list-style-type: none"> a) Null 1HFC-484 output by adjusting Auto Setpoint to match 1PI-484, Steam Header Pressure.

Event # 3	Inadvertent Turbine Trip Without Reactor Trip
	<p>b) Place 1HFC-484 to auto balance and balance output.</p> <p>c) Place condenser steam dump mode selector to manual.</p> <p>d) Place 1HFC-484 to manual.</p> <p>b. Stabilize temperature as follows: (RO)</p> <p>1) If temperature is lowering:</p> <p>a) Step rods out in 3 to 5 step increments to stabilize reactor temperature at approximate reactor power per Attachment A, Reactor Power, Tavg and CSD Controller Settings</p> <p>c. Control reactor power between 5% and 40% as directed by shift management. (RO/BOP) <i>1HFC-484 and rods will be adjusted as necessary to maintain reactor power</i></p> <p>5. Verify generator trip (BOP)</p> <p>6. Check steam generator levels – STABLE AT OR TRENDING TO NORMAL (BOP)</p> <p>7. Check pressurizer pressure – STABLE AT OR TRENDING TO 2235 PSIG (RO)</p> <p>8. Check pressurizer level – STABLE AT OR TRENDING TO PROGRAM LEVEL (RO)</p>
<p>ROLE PLAY</p>	<p><u>Booth Communications:</u></p> <ul style="list-style-type: none"> • TH AO: If AOs are dispatched to investigate the cause of the turbine trip, wait 3 minutes and report that that there is no apparent cause. • Respond to other reports or direction to field operators as necessary. <p><u>SM Communications:</u></p> <ul style="list-style-type: none"> • Respond to reports from crew members as required.
<p>NOTES</p>	<p>Continuation Criteria:</p> <p>After the crew has stabilized reactor power and temperature, or at the discretion of the Lead Examiner, continue with the next event.</p>

Event # 4	Seismic Event / 1P11A, CCW Pump Failure
ACTION	Booth: Insert TRIGGER 5 per Lead Evaluator Trigger 5 will open and run schedule file "NRC Seismic 1.sch." After all events have run, CLOSE schedule file "NRC 4 Seismic 1.sch." (<i>This is necessary for the next seismic event to run properly</i>)

Event # 4	Seismic Event / 1P11A, CCW Pump Failure						
<p>STUDENT RESPONSE</p>	<p>Symptoms and Indications:</p> <ul style="list-style-type: none"> • Rumbling sound accompanied by various momentary alarms • Annunciators: <ul style="list-style-type: none"> ○ SEISMIC DETECTOR ACTIVATION (C01A 2-6) ○ 1C03 1D 1-4 and 1-5 1P-1A(B) RCP COOLING WATER FLOW LOW ○ 1C03 1F 1-1, 2-1, 3-1, 4-1 LP Feedwater Heater High and Low Level alarms • PPCS Alarms: <ul style="list-style-type: none"> ○ SEI-6210 through 6213 SEISMIC DETECTOR alarms • 1C03 Indications: <ul style="list-style-type: none"> ○ 1P-11A indicates running but at reduced flow (1FI-619) <p>BOP/RO</p> <ul style="list-style-type: none"> • Diagnoses reduced CCW system flow. <p>SRO</p> <ul style="list-style-type: none"> • Implements AOP-28, Seismic Event and AOP-9B, Component Cooling System Malfunction. <p>Crew</p> <p><u>AOP-9B, Component Cooling System Malfunction</u></p> <ol style="list-style-type: none"> 1. (IA) Check component cooling pumps – AT LEAST ONE RUNNING (RO) RNO: IF component cooling surge tank level greater than 20%, THEN start one component cooling pump. <ul style="list-style-type: none"> • 1P-11B <p><u>AOP-28, Seismic Event</u> (Implemented as a secondary priority)</p> <ol style="list-style-type: none"> 1. Check plant conditions – NORMAL (RO/BOP and crew will contact AOs for field walkdowns) 2. Check seismic instruments – NOT TRIGGERED (BOP) 3. Notify DSM and implement Emergency Plan (SRO will direct SM to make notifications) 4. Perform a walkdown inspection per Attachment A, Seismic Event Checklist (Crew to coordinate with AOs) <ul style="list-style-type: none"> • Assess Technical Specifications: CCW LCO 3.7.7 is NOT MET <table border="1" data-bbox="402 1583 1419 1793"> <thead> <tr> <th>CONDITION</th> <th>REQUIRED ACTION</th> <th>COMPLETION TIME</th> </tr> </thead> <tbody> <tr> <td>A. One CC pump inoperable</td> <td>A.1 Restore CC pump to OPERABLE status.</td> <td>72 hours AND 144 hours from discovery of failure to meet the LCO</td> </tr> </tbody> </table>	CONDITION	REQUIRED ACTION	COMPLETION TIME	A. One CC pump inoperable	A.1 Restore CC pump to OPERABLE status.	72 hours AND 144 hours from discovery of failure to meet the LCO
CONDITION	REQUIRED ACTION	COMPLETION TIME					
A. One CC pump inoperable	A.1 Restore CC pump to OPERABLE status.	72 hours AND 144 hours from discovery of failure to meet the LCO					

Event # 4	Seismic Event / 1P11A, CCW Pump Failure
<p>ROLE PLAY</p>	<p><u>Booth Communications:</u></p> <ul style="list-style-type: none"> • PAB AO: One minute after the seismic event, report that 1P-11A, CCW Pump is making an excessive noise and you recommend securing the pump. • PAB AO: If asked, report pre-start check on 1P-11B, CCW pump, SAT • PAB AO: After 1P-11B is started, report a SAT start on 1P-11B. • Lead AO: If directed to perform plant walkdowns per AOP-28, Att A, wait 10 minutes and report that the only damage was the CCW Pump. • Respond to other reports or direction to field operators as necessary. <p><u>SM Communications:</u></p> <ul style="list-style-type: none"> • If asked, plant management has approved continued operation while walkdowns are being performed. • Respond to reports from crew members as required.
<p>NOTES</p>	<p>Continuation Criteria:</p> <p>After the crew has switched operating CCW pumps, or at the discretion of the Lead Examiner, continue with the next event.</p>

Event # 5	Multiple Dropped Rods (J4 and I3)
ACTION	Booth: Check that schedule file “NRC 4 Seismic 1.sch” is CLOSED, Then Insert TRIGGER 7 per Lead Evaluator
<p>STUDENT RESPONSE</p> <p>Conditions for CT-17 start here</p> <p>CT-17 action</p>	<p>Symptoms and Indications:</p> <ul style="list-style-type: none"> • Rumbling sound accompanied by various alarms • Annunciators: <ul style="list-style-type: none"> ○ SEISMIC DETECTOR ACTIVATION (C01A 2-6) ○ ROD BOTTOM ROD DROP (1C04 1A 1-5) ○ POWER RANGE ROD DROP (1C04 1A 4-5) • PPCS Alarms: <ul style="list-style-type: none"> ○ SEI-6210 through 6213 SEISMIC DETECTOR alarms • 1C04 Indications: <ul style="list-style-type: none"> ○ Control Rod I3 (CBA) and J4 (CBC) rod bottom lights lit ○ Control Rod I3 and J4 IRPI indications at 0 steps <p>BOP/RO</p> <ul style="list-style-type: none"> • Diagnoses multiple dropped rods and trips the reactor. (RO) • Performs EOP-0 Immediate Actions. (RO) <p>SRO</p> <ul style="list-style-type: none"> • Directs a reactor trip per AOP-6A, Dropped Rod • Implements EOP-0, Reactor Trip or Safety Injection <p>Crew <u>AOP-6A, Dropped Rod</u></p> <ol style="list-style-type: none"> 1. Check only one rod dropped RNO: Perform the following: <ul style="list-style-type: none"> ○ Trip the reactor (RO) ○ Go to EOP-0, Reactor Trip or Safety Injection (SRO) <p><u>EOP-0, Reactor Trip or Safety Injection</u></p> <ol style="list-style-type: none"> 1. Verify Reactor Trip (RO) 2. Verify Turbine Trip (RO) 3. Verify Power to AC Safeguards Busses (RO) 4. Check if SI actuated (RO) RNO: Check if SI is required <ul style="list-style-type: none"> ○ Steam line A pressure less than 545 psig <p>IF SI is required, THEN manually actuate both trains of SI and Containment Isolation</p> <p>Foldout Page #3: Faulted S/G Isolation Criteria (BOP) IF any S/G pressure trending lower in an uncontrolled manner OR any S/G completely depressurized, THEN the following may be performed:</p> <p>(CT-17) Isolate feed flow to faulted S/G.</p> <p style="text-align: center;"><i>Ensure 1FIC-4074A, 1P-53 AFP to 1HX-1A FCV in manual and shut AND 1AF-4001 AFP Disch SG A Inlet MOV shut</i></p>

Event # 5	Multiple Dropped Rods (J4 and I3)
	<p>Maintain total feed flow greater than or equal to 275 gpm until narrow range level in at least one S/G is greater than [52%] 33%.</p> <p><i>Control feed flow to B S/G using 1FIC-4074B, 1P-53 AFP to 1HX-1B FCV and 1AF-4000, 1P29 AFP Disch SG B Inlet MOV</i></p> <ol style="list-style-type: none"> 5. Perform Attachment A, Automatic Action Verification, while continuing with this procedure. (BOP) 6. Verify AFW Pumps – RUNNING (RO) 7. Check RCP Seal Cooling (RO) 8. Check RCS Temperatures (RO) <ul style="list-style-type: none"> o Condenser steam dumps - AVAILABLE RNO: Adjust S/G(s) atmospheric steam dump controllers to 1005 psig o RCS Temperature <ul style="list-style-type: none"> ▪ With and RCP running: RCS average temperature – STABLE AT OR TRENDING TO 547°F 9. IF temperature is less than 547°F and lowering, THEN perform the following: <ul style="list-style-type: none"> o Stop dumping steam o IF cooldown continues, THEN control total feed flow. <i>Control feed flow to B S/G using 1FIC-4074B, 1P-53 AFP to 1HX-1B FCV and 1AF-4000, 1P29 AFP Disch SG B Inlet MOV</i> o IF cooldown continues, THEN isolate main steam lines <i>Shut 1MS-2017/2018, Steam Generator A/B Main Steam Stop CV</i> 10. Check PZR PORVs and spray valves (RO) 11. Check if RCPs Should be stopped (RO) 12. Check if S/G are NOT faulted (RO) RNO: Perform the following: (SRO) <ul style="list-style-type: none"> • Notify STA to MONITOR CSP Status per CSP-ST.0, CSF Status Trees • Go to EOP-2, Faulted Steam Generator Isolation
<p>ROLE PLAY</p>	<p><u>Booth Communications:</u></p> <ul style="list-style-type: none"> • Respond to reports or direction to field operators as necessary. <p><u>SM Communications:</u></p> <ul style="list-style-type: none"> • Respond to reports from crew members as required.
<p>NOTES</p>	

Event # 6	Faulted 'A' Steam Generator
ACTION	<p>Booth: TRIGGER 9 will auto insert on reactor trip.</p> <p>Insert Trigger 11 per crew direction for local S/G isolations</p>
STUDENT RESPONSE	<p>Symptoms and indications:</p> <ul style="list-style-type: none"> • Steam Flow indicated on A S/G • Containment Pressure rising rapidly to >25 psig (Containment Spray setpoint) • S/G A level and pressure lowering rapidly, inconsistent with plant trip <p>BOP/RO</p> <ul style="list-style-type: none"> • Performs actions as directed. <p>SRO</p> <ul style="list-style-type: none"> • Implements EOP-2, Faulted Steam Generator Isolation <p>Crew</p> <p><u>EOP-2, Faulted Steam Generator Isolation</u></p> <ol style="list-style-type: none"> 1. Check main steam isolation (RO) 2. Check if any S/G is not faulted (RO) 3. Identify faulted S/G (RO) 4. (CT-17) Isolate faulted S/G (RO) <ol style="list-style-type: none"> a. Ensure feedwater isolation valve is – SHUT, 1CS-3124 b. Ensure MDAFW valve – SHUT, 1AF-4074A c. Ensure TDAFW valve – SHUT, 1AF-4001 d. Ensure SSG supply valve – SHUT, AF-4023 e. Isolate flow from faulted S/G: <ol style="list-style-type: none"> 1) Ensure atmospheric steam dump – SHUT, 1MS-2016 2) Shut steam supply to turbine-driven AFW pump: 1MS-2020 3) Ensure S/G blowdown isolation valves – SHUT: 1MS-5958, 1MS-2042 4) Locally shut 1P-29 AFP/Radwaste steam isolation: 1MS-235 5) Locally shut main steam trap isolation: 1MS-228 5. Check CST level – GREATER THAN 4 ft (RO) 6. Check secondary radiation (RO) 7. Go to EOP-1, Loss of Primary or Secondary Coolant (SRO)

CT-17 action

Event # 6	Faulted 'A' Steam Generator
<p>ROLE PLAY</p>	<p><u>Booth Communications:</u></p> <ul style="list-style-type: none"> • PAB AO: When directed to locally shut 1MS-235, AFP/Radwaste steam isolation, and 1MS-228, main steam trap isolation, then insert Trigger 11, wait two minutes and report the valves are shut. • Respond to reports or direction to field operators as necessary. <p><u>SM Communications:</u></p> <ul style="list-style-type: none"> • Respond to reports from crew members as required.
<p>NOTES</p>	

Event # 6	Faulted 'A' Steam Generator
ACTION	Booth: None
STUDENT RESPONSE	<p>BOP performs EOP-0, Attachment A, Automatic Action Verification (BOP)</p> <p>A1 – Verify feedwater isolation A2 – Verify containment isolation A3 – Verify ECCS Pumps RUNNING a. SI pumps – BOTH RUNNING b. RHR Pumps – BOTH RUNNING A4 – Verify service water pumps running A5 – Verify containment accident cooling units RUNNING A6 – Verify component cooling water pumps – ONLY ONE RUNNING A7 – Check if main steam lines can remain open A8 – Verify containment spray not required a. Containment pressure recorder – HAS REMAINED LESS THAN 25 psig RNO: Perform the following: 1) Check containment spray actuated: annunciator C01 B 2-6, CONTAINMENT SPRAY, lit A9 – Verify ECCS Flow A10 – Verify AFW valve alignment – PROPER EMERGENCY ALIGNMENT A11 – Verify proper ECCS valve alignment A12 – Check containment spray NOT ACTUATED RNO: Check containment spray alignment: 1. Ensure all containment spray pump discharge valves are open 2. Ensure at least one containment spray pump is running 3. IF two containment spray pumps are running, THEN place one containment spray pump in pull-out <i>Takes one of 1P-14A/B, Containment Spray pump to pullout</i> 4. WHEN containment spray has been actuated for GREATER THAN two minutes, THEN ensure spray additive eductor suction valve is open on the running train A13 – Stop any boration via the blender in progress A14 – Ensure the Auxiliary building filter/exhaust fans – OPERATING A15 – Notify the STA to IMPLEMENT Status trees, Notify the SM of any equipment malfunctions previously noted. A16 – Verify Service Water system alignment A17 – Check miscellaneous valves – SHUT A18 – Check Control Room ventilation A19 – Check cable spreading room ventilation system – OPERATING A20 – Check Computer Room ventilation system – OPERATING A21 – Check AFW recirc fans – ONE RUNNING A22 – Check Circ Water Pump House temperature less than 105°F A23 – Check G03/G04 switchgear room temperature less than 95°F A24 – Periodically check status of spent fuel cooling.</p>

Event # 6	Faulted 'A' Steam Generator
<p>STUDENT RESPONSE</p>	<p><u>EOP-1, Loss of Primary or Secondary Coolant:</u></p> <ol style="list-style-type: none"> 1. Check if RCPs should be stopped (RO) <ol style="list-style-type: none"> a. RCPs – ANY RUNNING; RNO: Go to Step 2 (SRO) 2. Check if S/Gs are NOT faulted (BOP) 3. Check intact S/G level (BOP) <ol style="list-style-type: none"> a. S/G Level – Greater than [52%] 33%: RNO: Maintain total feed flow greater than 275 gpm until level is greater than [52%] 33% in at least one S/G. Control feed to B S/G based on level using 1FIC-4074B, 1P-53 AFP to 1HX-1B FCV and 1AF-4000, 1P29 AFP Disch SG B Inlet MOV 4. Check secondary radiation (BOP) 5. Check PORVs and Block valves (RO) 6. Reset SI (BOP) 7. Reset isolation and lockout signals (BOP) <ul style="list-style-type: none"> • Containment isolation • 1B03 and 1B04 non-safeguards equipment lockouts 8. Establish Instrument Air to containment (BOP) <ol style="list-style-type: none"> a. Check instrument air header pressure – GREATER THAN 80 PSIG b. Open instrument air containment isolation valves one at a time: <ul style="list-style-type: none"> • IA 3047 • IA-3048 9. Check power supply to charging pumps (BOP) 10. Check if charging flow has been established (RO) 11. Check if ECCS flow should be terminated <i>Evaluator Note: Step 11 is the same as Foldout Page #2</i> <ol style="list-style-type: none"> a. RCS subcooling based on core exit thermocouples – GREATER THAN [62°F] 37°F (RO) b. Secondary heat sink: (BOP) <ul style="list-style-type: none"> o Level in at least one S/G – GREATER THAN [52%] 33% OR o Total feed flow to intact S/G – GREATER THAN OR EQUAL TO 275 GPM c. RCS Pressure (RO) <ul style="list-style-type: none"> • Pressure – GREATER THAN [1850 psig] 1725 psig AND • Pressure – STABLE OR RISING d. PZR Level – GREATER THAN [26%] 11% (RO) e. Go to EOP-1.1, SI Termination (SRO) <p><u>EOP-1.1, SI Termination</u></p> <p><i>Evaluator Note: Foldout Page #5 may apply upon entry to EOP-1.1.</i></p> <p>Foldout Page #5: IF RCS hot leg temperatures are not stable, THEN control steam dump and total feed flow as necessary to stabilize RCS hot leg</p>

Event # 6	Faulted 'A' Steam Generator
	<p>temperatures. (BOP) <i>RCS temperature stabilized using B S/G feed flow and 1HC-478, SG B Atmos Steam Dump Controller</i></p> <ol style="list-style-type: none"> 1. Reset SI (BOP) 2. Reset isolation and lockout signals (BOP) <ul style="list-style-type: none"> • Containment isolation • 1B03 and 1B04 non-safeguards equipment lockouts 3. Establish Instrument Air to containment (BOP) <ol style="list-style-type: none"> c. Check instrument air header pressure – GREATER THAN 80 PSIG d. Open instrument air containment isolation valves one at a time: <ul style="list-style-type: none"> • IA 3047 • IA-3048 4. Check if charging flow has been established (RO) 5. Stop ECCS pumps and place in standby: (BOP) <ol style="list-style-type: none"> a. Stop both SI pumps and place in auto b. RHR pumps – ANY RUNNING WITH SUCTION ALIGNED TO RWST c. Stop both RHR pumps and place in auto 6. Verify SI flow not required (RO) 7. Check if containment spray should be stopped (BOP) <ol style="list-style-type: none"> a. Containment spray pumps – ANY RUNNING b. Containment pressure – LESS THAN 20 psig c. Reset containment spray signal d. Ensure containment spray pump RWST suction MOVs - OPEN e. Stop both containment spray pumps and place in auto f. Shut containment spray pump discharge valve and place in auto-after-shut position <i>Shuts 1SI-860A/B/C/D, Containment Spray Pump flow MOVs, and places control switch in Auto</i> g. Ensure both spray additive eductor suction valves – SHUT <i>Places 1YIC-926A/B, Spray Add Eductor Suct Flow controller in manual and shuts valve</i>

Event # 6	Faulted 'A' Steam Generator
<p>ROLE PLAY</p>	<p><u>Booth Communications:</u></p> <ul style="list-style-type: none"> • EOP-0, Att A communications: <ul style="list-style-type: none"> ○ PAB AO: When directed to check rad waste service water valves SHUT at C-180, report the TV-LW61 and TV-LW62 are both SHUT ○ TH AO: When directed to check Circ Water Pump House temperature, wait 1 minute and report 76°F and stable. ○ TH AO: When directed to check G03/G04 switchgear room temperature, wait 1 minute and report 80°F and stable. • Respond to other reports or direction to field operators as necessary. <p><u>SM Communications:</u></p> <ul style="list-style-type: none"> • Respond to reports from crew members as required.
<p>NOTES</p>	

	Scenario Termination
	<p>Terminate the scenario when crew has completed through Step 7 of EOP-1.1, SI Termination, or per Lead Evaluator.</p>
<p>NOTES</p>	<ul style="list-style-type: none"> • Freeze the simulator • Determine if the NRC has any follow up questions • Save SBT Data (see sim setup instructions)

QUANTITATIVE ATTRIBUTES

Malfunctions:

Before EOP Entry:

- 1CV-200A inadvertently shuts
- CST Level Instrument fails
- Inadvertent turbine trip
- 1P-11A CCW Pump failure
- Two dropped rods

After EOP Entry:

- Safety Injection fails to auto actuate

Abnormal Events:

- CVCS Malfunction
- Instrument Malfunction
- Turbine Trip Without Reactor Trip
- Dropped Rod
- Seismic Event

Major Transients:

- Faulted Steam Generator

Critical Tasks:

1.	CT-A	Restore Letdown
2.	CT-17	Isolate faulted S/G

Major Procedures:

AOP-1D ⇒ AOP-24 ⇒ AOP-25 ⇒ AOP-9B ⇒ AOP-28 ⇒ AOP-6A ⇒ EOP-0 ⇒ EOP-2 ⇒ EOP-1 ⇒ EOP-1.1

CT-A

Restore normal or excess letdown

Critical Task:

Restore letdown or excess letdown prior to automatic reactor trip.

Plant Conditions:

- Any condition greater than P-7
- Loss of letdown where letdown can be restored from the control room

Cues:

- PZR level going up
- VCT level lowering
- Letdown flow and pressure annunciators
- PZR High Level Channel Alert

Performance Indicator:

- Manipulation of controls as required to restore letdown or excess letdown

Feedback:

- Indication and/or annunciator that letdown has been restored.

Basis:

Taking action to ensure letdown is restored and maintained such that a reactor trip (either manual or automatic) is prevented.

CT-17

Isolate faulted steam generator

Critical Task:

Isolate the faulted steam generator before creating a challenge to the Integrity CSF.

Plant Conditions:

Faulted Steam Generator

Cues:

Indication and/or annunciation that both the following are occurring:

- Steam pressure and flow rate indications that make it possible to identify a single SG as faulted
- AND
- Valve position and flow rate indication that AFW continues to be delivered to the faulted SG

Performance Indicator:

Manipulation of controls as required isolating the faulted SG

- MSIVs indicate closed
- Indication of feedline isolation
 - Feedwater control valves indicate closed
 - Feedline isolation valves indicate closed
 - Main feed pumps indicate tripped
- Indication that AFW flow to the faulted SG is stopped
 - AFW flow control valves for faulted SG indicate closed

Feedback:

- Any depressurization of intact SGs stops
- Steam flow indication from faulted SG decreases to zero
- RCS cooldown stops
- Main feedwater flow rate indication of zero
- AFW flow rate indication to faulted SG of zero

Basis:

SAFETY SIGNIFICANCE - Failure to isolate a faulted SG that can be isolated causes challenges to CSFs beyond those irreparably introduced by the postulated conditions. Also, depending upon plant conditions, it could constitute a failure by the crew to "demonstrate the ability to recognize a failure or an incorrect automatic actuation of an ESF system or component."

Failure to isolate a faulted SG can result in challenges to the following CSFs:

- Integrity
- Subcriticality

Booth Summary

Event #1	Inadvertent Letdown Isolation
Action	Booth: Insert TRIGGER 1 per Lead Evaluator
Role Play	<ul style="list-style-type: none"> Respond to reports or direction to field operators as necessary.

Event #2	0LT-4040 Condensate Storage Tank T-24A Level Transmitter fails low
Action	Booth: Insert TRIGGER 2 per Lead Evaluator
Role Play	<ul style="list-style-type: none"> TH AO: If directed to locally investigate 0LT-4040 T-24A Condensate Storage Tank Level Transmitter, wait two minutes and THEN report that there doesn't seem to be anything out-of-normal locally Respond to reports or direction to field operators as necessary.

Event #3	Inadvertent Turbine Trip Without Reactor Trip
Action	Booth: Insert TRIGGER 3 per Lead Evaluator
Role Play	<p><u>Booth Communications:</u></p> <ul style="list-style-type: none"> TH AO: If AOs are dispatched to investigate the cause of the turbine trip, wait 3 minutes and report that that there is no apparent cause. Respond to other reports or direction to field operators as necessary.

Event #4	Seismic Event / 1P11A, CCW Pump Failure
Action	<p>Booth: Insert TRIGGER 5 per Lead Evaluator</p> <p>Trigger 5 will open and run schedule file "NRC Seismic 1.sch." After all events have run, CLOSE schedule file "NRC 4 Seismic 1.sch." (<i>This is necessary for the next seismic event to run properly</i>)</p>
Role Play	<p><u>Booth Communications:</u></p> <ul style="list-style-type: none"> PAB AO: One minute after the seismic event, report that 1P-11A, CCW Pump is making an excessive noise and you recommend securing the pump. PAB AO: If asked, report pre-start check on 1P-11B, CCW pump, SAT PAB AO: After 1P-11B is started, report a SAT start on 1P-11B. Lead AO: If directed to perform plant walkdowns per AOP-28, Att A, wait 10 minutes and report that the only damage was the CCW Pump. Respond to other reports or direction to field operators as necessary.

Event #5	Multiple Dropped Rods (J4 and I3)
Action	Booth: Check that schedule file "NRC 4 Seismic 1.sch" is CLOSED, Then Insert TRIGGER 7 per Lead Evaluator
Role Play	<ul style="list-style-type: none"> Respond to other reports or direction to field operators as necessary.

Event #6	Faulted 'A' Steam Generator
Action	Booth: Insert TRIGGER 9 per Lead Evaluator Insert Trigger 11 per crew direction for local S/G isolations
Role Play	<p><u>Booth Communications:</u></p> <ul style="list-style-type: none"> • PAB AO: When directed to locally shut 1MS-235, AFP/Radwaste steam isolation, and 1MS-228, main steam trap isolation, then insert Trigger 11, wait two minutes and report the valves are shut. • EOP-0, Att A communications: <ul style="list-style-type: none"> ○ PAB AO: When directed to check rad waste service water valves SHUT at C-180, report the TV-LW61 and TV-LW62 are both SHUT ○ TH AO: When directed to check Circ Water Pump House temperature, wait 1 minute and report 76°F and stable. ○ TH AO: When directed to check G03/G04 switchgear room temperature, wait 1 minute and report 80°F and stable. • Respond to other reports or direction to field operators as necessary.

SHIFT TURNOVER INFORMATION

PLANT CONDITIONS:

	UNIT 1
Time in core life (MWD/MTU):	9500
Reactor power (%):	47%
Boron concentration (ppm):	1111 ppm
Rod height, CBD @:	220

TECHNICAL SPECIFICATION ACTION CONDITIONS IN EFFECT:

<u>TSAC</u>	<u>Description</u>	<u>Required Action & Completion Time</u>
U1 3.3.1.A/K	RPS one channel inoperable	Place channel in trip – 1 hour

EQUIPMENT OUT OF SERVICE:

- G03 Emergency Diesel Generator for maintenance.
- 1LT-426 Pressurizer Level Transmitter.

PLANNED EVOLUTIONS:

- Power ascension to 100%.

TURNOVER INFORMATION:

- G04 Emergency Diesel Generator is aligned to both 1A06 and 2A06 4160 Safeguards Busses.
- On line risk is GREEN.
- Today is Tuesday, day shift.

Pre-Scenario Procedure Checks

Procedure	SRO	
	1 st Check	2 nd Check
AOP-1D		
AOP-6A		
AOP-9B		
AOP-25		
AOP-28		
EOP-0		
EOP-1		
EOP-1.1		
EOP-2		
Specific ARP/ARBs to be second checked – All Others first checked		
	1 st Check	2 nd Check
1C20D 2-1		
1C03 1E1 4-2		
1C03 E1 4-3		
1C03 D 1-4		
1C03 D 1-5		
C01 A 2-9		
C01 A 3-9		

Post-Scenario Procedure Checks

Procedure	SRO	
	1 st Check	2 nd Check
AOP-1D		
AOP-6A		
AOP-9B		
AOP-25		
AOP-28		
EOP-0		
EOP-1		
EOP-1.1		
EOP-2		
ARB's	1 st Check	2 nd Check
1C20D 2-1		
1C03 1E1 4-2		
1C03 1E1 4-3		
1C03 D 1-4		
1C03 D 1-5		
C01 A 2-9		
C01 A 3-9		
RESET IC		N/A
Booth Cleared Exam Material		
Magnets Replaced		
P&IDs cleaned and replaced		
Dots removed from alarm windows		