



## SIMULATOR EXERCISE GUIDE, THREE COLUMN

**SEG**  
Page 1 of 33

**SITE:** DAEC

**Revision #:** 0

**LMS ID:** PDA OPS 19-1 NRC Scenario #1

**LMS Rev. Date:**

**SEG TITLE:** NRC Exam Scenario #1

**SEG TYPE:** ☐ Training

☒ Evaluation

**PROGRAM:** ☐ LOCT ☒ LOIT ☐ Other:

**DURATION:** 90 minutes

**Developed by:**

\_\_\_\_\_  
Instructor/Developer

\_\_\_\_\_  
Date

**Reviewed by:**

\_\_\_\_\_  
Instructor (Instructional Review)

\_\_\_\_\_  
Date

**Validated by:**

\_\_\_\_\_  
SME (Technical Review)

\_\_\_\_\_  
Date

**Approved by:**

\_\_\_\_\_  
Training Supervision

\_\_\_\_\_  
Date

**Approved by:**

\_\_\_\_\_  
Training Program Owner (Line)

\_\_\_\_\_  
Date

## SIMULATOR EXERCISE GUIDE REQUIREMENTS

<b>Terminal Objective</b>	This Evaluation Scenario Guide evaluates the Operators' ability to: "Given the malfunctions presented in this ESG, the students will protect the public, protect plant personnel, and protect plant equipment, in accordance with plant procedures."
<b>Enabling Objectives:</b>	Evaluation Guide, no tasks are trained
<b>Prerequisites:</b>	NONE
<b>Training Resources:</b>	<ul style="list-style-type: none"> <li>A. Simulator</li> <li>B. Evaluation Team</li> <li>C. Operations Management Representative</li> <li>D. Simulator Operator</li> <li>E. Booth Communicator</li> <li>F. Simulator video recording equipment</li> </ul>
<b>References:</b>	<ul style="list-style-type: none"> <li>1 AOP 901, Rev 31</li> <li>2 TS 3.4.1, Amendment 223</li> <li>3 ARP 1C04B, A-1, Rev. 83</li> <li>4 AOP 255.2, Rev 46</li> <li>5 AOP 264, Rev 14</li> <li>6 ARP 1C23C, Rev 55</li> <li>7 ARP 1C08C, Rev 62</li> <li>8 ARP 1C06B, Rev 64</li> <li>9 AOP 639, Rev 36</li> <li>10 EOP 1, Rev 20</li> <li>11 ATWS, Rev 23</li> <li>12 EOP 2, Rev 18</li> <li>13 EOP 3, Rev 4</li> <li>14 RIP 103.2, Rev 4</li> <li>15 RIP 102.1, Rev 9</li> <li>16 ARP 1C14A, Rev 20</li> <li>17 OI 151, Rev 71</li> <li>18 OI 152, Rev 116</li> <li>19 ED, Rev 11</li> </ul>
<b>Protected Content:</b>	Identify here and in training material as {C001}; See Comment for details. None
<b>Evaluation Method:</b>	In accordance with NUREG 1021
<b>Operating Experience:</b>	NONE

**Risk Significant**      Control Feedwater Following a Scram  
**Operator Actions:**    Initiate an Emergency Depressurization

**TASKS ASSOCIATED WITH SIMULATOR EXERCISE GUIDE**

Task #	Task Title
94.22	Respond to Earthquake Condition
94.58	Respond to Loss of Reactor Recirculation Pump(s)
94.03	Respond to Power/Reactivity Abnormal Change Condition
94.18	Respond to Reactor Water/Condensate High Conductivity Condition
95.57	Perform /Q to Reduce Reactor Power or Scram the Reactor
95.06	Perform Reactor SCRAM Using Repeated Manual Scram
95.08	Insert Control Rods by Increasing CRD Cooling Flow and Pressure
95.65	Spray the Drywell with RHR Not Required for Adequate Core Cooling
96.80	Perform an Emergency Depressurization Using SRVs
1.02	Determine Operability for Technical Specification Required Components
3.01	Implement Emergency Plan
5.22	Direct Crew Response to Earthquake Condition
5.58	Direct Crew response to Loss of Reactor Recirculation Pump(s)
5.03	Direct Crew Responses to Power/Reactivity Abnormal Change Condition
5.18	Direct Crew Response to Reactor Water/Condensate High Conductivity Condition
6.52	Direct Crew Response to Control RPV Injection prior to, during and subsequent to Emergency Depressurization during ATWS
6.56	Direct Crew Response to Perform /Q to reduce Reactor Power / Scram the Reactor During ATWS
6.06	Direct Crew Response to Perform Reactor SCRAM using Repeated Manual Scram
6.08	Direct Crew Response to Insert Control Rods by Increasing CRD Cooling Flow and Pressure
6.80	Direct Crew Response to Perform an Emergency Depressurization Using SRVs

**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
0.0	Initial Development for PDA 19-1 License exam		N/A	See Cover	
				See Cover	

## OVERVIEW / SEQUENCE OF EVENTS

### OVERVIEW

See below event description for overview

### SEQUENCE OF EVENTS

**ALL TIMES IN THIS SCENARIO ARE APPROXIMATE**

Event #	Description
1.	Shift EHC Pumps IAW OI 693.2, Section 6.2.1(2)
2.	Raise Rx Power with Control Rods to 80% power for 1 hr hold (Xe)
3.	<p>The crew will respond to an accumulator alarm on control rod 22-07. The alarm will be low nitrogen pressure due to a packing leak on the V-18-296, Accumulator Instrument Cartridge Valve.</p> <p>The Crew enters <b>TS 3.1.5 Condition A</b> to either declare the control rod 'slow', or to declare the control rod inoperable, within 8 hours, for an inoperable accumulator.</p>
4.	A Design Basis Earthquake will occur at DAEC. The crew will enter AOP 901, Earthquake and take the appropriate actions.
5.	H2 Main Seal Oil Pump fails and the crew will have to start the Emergency H2 Seal Pump and secure the H2 Seal Oil Vacuum Pump per ARP 1C08C D-6
6.	<p>a. The earthquake will also result in Hi Vibrations and trip of the B Recirc MG set.</p> <p>b. The crew will respond to the trip of the Recirc MG set IAW AOP 255.2, Power/Reactivity Abnormal Change, and AOP 264, Loss of Recirc Pump (s). The Crew will enter <b>TS 3.4.1, Condition D</b> to perform SLO STPs within 24 hours.</p>
7.	When the events caused by the earthquake are under control, a condenser tube leak will occur. The crew will enter AOP 639, Reactor Water/Condensate High Conductivity. This tube leak will lead to a reactor scram.

8.	<p>On the scram, the Crew will determine that a Hydraulic ATWS has occurred. The Crew will insert ALL the control rods by either drifting them in, per RIP 103.2, Increase CRD Cooling Flow and Pressure, or by performing the scram reset scram IAW RIP 102.1, Repeated Manual Scram, as directed by the Hydraulic ATWS RIPS. <b>(Critical)</b></p> <p>Power will be high enough that the crew may enter Power Level Control Prior to all rods being inserted.</p> <p>The crew will enter Power Level Control, they will Lock Out ADS <b>(Critical)</b>, secure and prevent injection from HPCI, Condensate and Feedwater, CS and RHR, until RPV level lowered to below 87" <b>(Critical)</b></p> <p>Once they reach a level that will allow the crew to re-inject, prior to all rods inserting, they will maintain RPV level above -25" using Condensate and Feedwater and or RCIC. <b>(Critical)</b></p>
9.	<p>An unisolable leak in the torus will develop. The crew will monitor the leak IAW EOP 2, and prior to the torus level lowering below 7.1 feet, they will enter an Emergency Depressurization. <b>(Critical)</b></p>
10.	<p>The scenario will end after the crew has depressurized the plant and are restoring RPV level to the desired band.</p>

## SIMULATOR SET UP INSTRUCTIONS

1. Perform simulator set up per TDAP 1839 Attachment 2, Simulator Setup Checklist \_\_\_\_\_
2. Using the exam flash drive with the scenario simulator files, insert in the left instructor station computer and navigate to the D:\ directory \_\_\_\_\_
3. Copy the *NRCScenario1.dat* file from the exam flash drive to C:\Trex\_Duane-TELEC\Executive\SiteSpecific\InitialCondition and rename the file to an available IC using the format "ic\_###" \_\_\_\_\_
  - a. Reset to the newly created IC \_\_\_\_\_
  - b. Place the Simulator in **RUN** \_\_\_\_\_
  - c. Run schedule file *Weather.sch* following directory path  
D:\NRCOperational\NRCScenarios\NRC\_Scenario\_1\NRCScenario1\_SimFiles \_\_\_\_\_

### **OR**

Reset to IC 23, place the simulator in **RUN** and perform the following (this will take approximately 15 minutes for the plant:

- a. Insert Event Triggers, Malfunctions, Overrides, and Remotes using schedule file *SEG\_Setup.sch* located on the exam flash drive using the following directory path D:\NRCOperational\NRCScenarios\NRC\_Scenario\_1\NRCScenario1\_SimFiles \_\_\_\_\_
4. Have a second instructor verify:
  - b. Auto triggers are setup as indicated below and evaluate to "FALSE" \_\_\_\_\_
  - c. Malfunctions \_\_\_\_\_
  - d. Remotes \_\_\_\_\_
  - e. Overrides \_\_\_\_\_
5. Open Keypad file *NRC\_Scenario\_1.key* located on the exam flash drive using the following directory path  
D:\NRCOperational\NRCScenarios\NRC\_Scenario\_1\NRCScenario1\_SimFiles \_\_\_\_\_
6. Setup Thundersound on the Instructor Station computer to the right and verify the following settings:
  - a. Click on the checkbox under "Playing" for Earthquake \_\_\_\_\_
  - b. Click the STOP button to toggle audio model to "playing" \_\_\_\_\_
  - c. Verify Instructor Station sound volume is set to approximately 25% \_\_\_\_\_
  - d. Verify the dB controller (under the Instructor Station monitor) level 2 knob is aligned to the detent (white line on the knob is pointing slightly counterclockwise) \_\_\_\_\_
  - e. Verify the Front Room (both) sub amplifiers are set to approximately 50% of scale \_\_\_\_\_
7. Place Guarded Equipment tags on: \_\_\_\_\_
  - 1B35 Switch
  - 1B43 Switch
8. Markup IPOI 3, Section 5, Steps 1 through 7, specifically the following:
  - a. Step 7.a mark "N/A"
  - b. Step 7.b.7 mark with a circle
  - c. Step 7.b.8 leave blank
  - d. Step 7.c.1 through 3 mark "N/A"
  - e. Step 7.d.1 through 8 mark "N/A"

9. Display “DR” and “Power” on the Operator Terminals \_\_\_\_\_
10. Markup MOL pull sheet STEP 37 for control rods withdrawn to their current position \_\_\_\_\_
11. Ensure MOL pull sheets are in the 1C05B hanging file \_\_\_\_\_

## EVENT TRIGGER DEFINITIONS:

Trigger No	Trigger Logic Statement	Trigger Word Description
3	rxqic >= 0.8	Core Power at 80%
5	an_1c06b(1)	1C80 Trouble
7	!rpd1srun(1)	MODE SW out of RUN
9	rd_fi	All rods full in
11	ZDITCBPVJINCR   ZDITCBPVTSTG	SEP 307 Attmpt

## MALFUNCTIONS:

Time	Malf. No	Malfunction Title	ET	Delay	Ramp	Initial Value	Final Value
As dir	RD072207	CONTROL ROD ACCUMULATOR TROUBLE- ROD 22-07	3			INACTIVE	ACTIVE
Set up	RP05G	HYDRAULIC LOCK SCRAM DISCHARGE VOLUME (VARIABLE)				0	65

## OVERRIDES:

Time	OR #	Override Title	ET	Delay	Ramp	Initial Value	Final Value
Set up	DI-MS-076	HS-4535 RX WTR LVL LO-LO TRIP OVRD - A1				NORMAL	NORMAL
Set up	DI-MS-077	HS-4536 RX WTR LVL LO-LO TRIP OVRD - A2				NORMAL	NORMAL
Set up	DI-MS-072	HS-4427A GRP 1 CHAN A1 ALL SIGNALS OVRD				NORMAL	NORMAL
Set up	DI-MS-074	HS-4427C GRP 1 CHAN A2 ALL SIGNALS OVRD				NORMAL	NORMAL
Setup	DO-EG-077	X390 MAIN GENERATOR ALTERREX SUPPLEMENTARY				OFF	ON



**REMOTE FUNCTIONS:**

Time	RF #	Remote Function Title	ET	Delay	Ramp	Initial Value	Final Value

**KEYPAD FILE:**

NRC_Scenario_1.key	
Key	Key Action
1	Delete Malfunction RD072207
2	Insert Malfunction ZZ03
3	Schedule D:\NRCOperational\NRCScenarios\NRC_Scenario_1\NRCScenario1_SimFiles\Seal_Oil_Pump_Trip.sch
4	Schedule D:\NRCOperational\NRCScenarios\NRC_Scenario_1\NRCScenario1_SimFiles\B_Recirc_Pump_VibTrip.sch
5	Toggle Event 2
6	Schedule D:\NRCOperational\NRCScenarios\NRC_Scenario_1\NRCScenario1_SimFiles\Condenser_Tube_Leak.sch
7	Schedule D:\NRCOperational\NRCScenarios\NRC_Scenario_1\NRCScenario1_SimFiles\Defeat_12_Install.sch

**SCHEDULE FILE(S):**

Weather.sch			
At Time	Event	Action	Description
00:00:01	None	Insert remote hv01 to 223 in 7200	WIND DIRECTION AT 50 meters (165 ft)
00:00:01	None	Insert remote hv02 from 23 to 27 in 7200	WIND SPEED AT 50 meters (165 ft)
00:00:01	None	Insert remote hv03 to 45 in 28800	DEW POINT TEMPERATURE
00:00:01	None	Insert remote hv05 to 68 in 28800	AMBIENT TEMPERATURE AT 50 meters (165 ft)
00:00:01	None	Insert remote hv06 to 73 in 28800	AMBIENT TEMPERATURE AT 10 meters (35 ft)
00:00:01	None	Insert remote hv07 to 73 in 28800	RIVER WATER TEMPERATURE

Seal_Oil_Pump_Trip.sch			
At Time	Event	Action	Description
00:00:00	None	Create Event 20 ZDIEGHS3640(4) -desc Emerg Seal Oil Pump HS Start	
00:00:00	None	Insert Override DO-EG-028 to OFF	HS-3641(1) MAIN SEAL OIL PUMP 1P-92 (GREEN)
00:00:00	None	Insert Override DO-EG-029 to OFF	HS-3641(2) MAIN SEAL OIL PUMP 1P-92 (RED)
00:00:00	None	Insert Malfunction AN1C08C(24) to ON	1C08C (D-06) HYDROGEN SEAL OIL MAIN PUMP 1P 92 AUTO TRIP
00:00:00	None	Insert Override DO-EG-026 to ON	HS-3640(1) EMERGENCY SEAL OIL PUMP 1P-93 (GREEN)
00:00:00	None	Insert Override DO-EG-027 to OFF	HS-3640(2) EMERGENCY SEAL OIL PUMP 1P-93 (RED)
00:00:00	None	Insert Malfunction EG08B	LOSS OF SEAL OIL PUMP- RSOP
00:00:00	None	Insert Malfunction EG08A	LOSS OF SEAL OIL PUMP- MSOP
None	20	Delete Override DO-EG-026	HS-3640(1) EMERGENCY SEAL OIL PUMP 1P-93 (GREEN)
None	20	Delete Override DO-EG-027	HS-3640(2) EMERGENCY SEAL OIL PUMP 1P-93 (RED)
None	20	Delete Malfunction EG08B	LOSS OF SEAL OIL PUMP- RSOP
None	20	Toggle Event 20	

B Recirc PumpVibTrip.sch			
At Time	Event	Action	Description
00:00:00	None	Insert malfunction rr35b to 50.00000	Recirc Pump High Vibes - Pump B
00:00:00	None	Insert malfunction rr05b to 100.00000 on event 2	RECIRC PUMP SHAFT SEIZURE- PMP B
00:00:00	None	Insert malfunction rr06b after 2 on event 2	RECIRC M-G DRIVE MOTOR BREAKER TRIP- M-G B
00:00:01	None	Insert malfunction pc14 to 35.00000 on event 9	PRIMARY CONTAINMENT TORUS LEAKAGE
00:00:01	None	Insert malfunction ms19a on event 11	SPURIOUS GROUP I ISOLATION- RELAY A71-K7A
00:00:01	None	Insert malfunction ms19b on event 11	SPURIOUS GROUP I ISOLATION- RELAY A71-K7B

Condenser_Tube_Leak.sch			
At Time	Event	Action	Description
00:00:00	None	Insert malfunction mc07 to 0.90000	MAIN CONDENSER TUBE (1E-7A) LEAKAGE
None	5	Modify malfunction mc07 after 180 from 0.90000 to 2.00000 in 240	MAIN CONDENSER TUBE (1E-7A) LEAKAGE
None	7	Delete malfunction mc07	MAIN CONDENSER TUBE (1E-7A) LEAKAGE

Defeat_12_Install.sch			
At Time	Event	Action	Description
00:03:00	None	Insert Remote RP02 to TEST	ATWS TEST SWITCH (AKA DEFEAT 12) HS-1863A (RUN,TEST)
00:03:40	None	Insert Remote RP03 to TEST	ATWS TEST SWITCH (AKA DEFEAT 12) HS-1864A (RUN,TEST)

## SHIFT TURNOVER INFORMATION

- Day of week and shift
  - Today, day shift
- Weather conditions
  - Cloudy, with a cold front coming in later today
- Plant power:
  - ~75% reactor power with the corresponding MWe, MWth, and core flow
- Reactor coolant leakage is normal (if asked: 1.56 identified, 0.03 unidentified)
- Plant PRA Status
  - CDF:  $1.32 \times 10^{-6}$ , GREEN, 1 year to Yellow
  - LERF  $3.32 \times 10^{-7}$ , GREEN, 1 year to Yellow
  - SFP risk is LOW, time to 200°F is 56 Hours
- “B” side protected, specifically guarded equipment is
  - Skimmer Surge Tank Room
  - 1B3507, ‘A’ Fuel Pool Cooling Pump Breaker
  - 1B4327, ‘B’ Fuel Pool Cooling Pump Breaker
  - 1C136, Fuel Pool Filter/Demin Control Panel
- No Locked in / failed annunciators or alarms
- No Existing LCO action statements
- Procedures or major maintenance in progress
  - Alternate EHC Pumps (“A” EHC pump is currently running)
  - Raise reactor power to approximately 80% using the Control Rod Withdrawal Sequence Sheets
  - Later in the shift, Security will be running a force-on-force drill
- No equipment to be taken out of service or returned to service this shift
- Comments, problems, operator workarounds, etc.
  - The Radwaste Operator is NSPEO qualified
  - Two extra NSPEOs available in Work Control
  - Operations Management as agreed that the CRS will serve as the Reactivity SRO

## SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
<p>EVENT 1: Alternate EHC Pumps</p> <p>If contacted to verify the non-running EHC Pump is ready for start</p> <p>wait 2 minutes</p> <p>If contacted to verify the B EHC Pump is running sat,</p>	<p style="text-align: center;"><b>Simulator Operator</b> <b>Acknowledge the request</b></p> <p style="text-align: center;"><b>Simulator Operator</b> <b>Report the B EHC Pump is ready for start</b></p> <p style="text-align: center;"><b>Simulator Operator</b> <b>Report the B EHC Pump is running sat.</b> <b>If asked about the status of the A EHC pump, REPORT that all EHC parameters are normal</b></p>	<p>The Crew will perform the actions of OI 693.2, Section 6.2.1 and alternate the EHC Pumps</p> <p>CRS</p> <ul style="list-style-type: none"> <li>Supervise the evolution</li> </ul> <p>BOP</p> <ul style="list-style-type: none"> <li>Start standby EHC Pump 1P 97B by momentarily placing handswitch HS-3665B in the START position</li> <li>Verify annunciator EHC PUMPS 1P-97A/B BOTH RUNNING (1C07A, C-4) is activated.</li> <li>Verify the Amps for both EHC Pumps have stabilized</li> <li>At 1C07, stop EHC Pump 1P 97A by momentarily placing handswitch HS 3665A in the STOP position.</li> <li>Verify all annunciators are reset for the evolution</li> </ul>

<p>EVENT 2: Raise Power with control rod withdrawal</p>	<p><b>ATC EVALUATOR NOTE:</b> The ATC Operator will withdraw the following control rods for RWM Step 37:</p> <ul style="list-style-type: none"> <li>• 14-19</li> <li>• 14-27</li> <li>• 30-27</li> <li>• 30-19</li> </ul> <p>The ATC Operator may plot on the Power to Flow map and/or print a ACUMEN Report after withdrawing control rods per the control rod sequence sheets</p>	<p>Crew: Raise reactor power using Control Rod Sequence Sheets</p> <p>CRS:</p> <ul style="list-style-type: none"> <li>• Provide Control Rod Refocus Brief per IPOI 3</li> <li>• Direct control rod withdrawal to a target power of 80% reactor power</li> </ul> <p>ATC:</p> <p>Repeat as necessary to establish the target power directed:</p> <ul style="list-style-type: none"> <li>• Select the desired control rod using the rod select matrix</li> <li>• Using control rod movement switch withdraw the control rods as directed to establish the desired reactor power</li> <li>• Monitor core parameters as power is changed, such as: <ul style="list-style-type: none"> <li>○ Recirc flow</li> <li>○ Reactor jet pump total core flow</li> <li>○ Total steam flow</li> <li>○ Total feed flow</li> <li>○ Reactor water level</li> <li>○ Reactor pressure</li> <li>○ APRM power</li> </ul> </li> </ul> <p>BOP:</p> <ul style="list-style-type: none"> <li>• Provide peer checks are requested</li> <li>• Monitor plant parameters as power is changed, such as: <ul style="list-style-type: none"> <li>○ Generator output</li> </ul> </li> </ul>
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## SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
<p>EVENT 3: When rxqic is <math>\geq 0.8</math> or at the direction of the Lead Evaluator,</p> <p>When directed to investigate control rod 22-07 for an accumulator alarm,</p> <p>When directed to recharge the accumulator, wait 4 min and then report,</p> <p>If called as the RE to see if there are any slow control rods,</p>	<p><b>SIMULATOR OPERATOR</b> <b>Verify ET 3 is active TRUE</b></p> <p>This will result in an Accumulator alarm for control rod 22-07.</p> <p><b>BOOTH COMMUNCIATOR</b> <b>Acknowledge the request, WAIT 3 minutes and REPORT, "The alarm was due to low nitrogen pressure. Pressure is currently 900 psig."</b></p> <p><b>SIMULATOR OPERATOR</b> <b>Click KEYPAD Key 1</b></p> <p>This will delete Malfunction RD072207 and clear the 1C05 indication and alarm. <b>Accumulator 22-07 is recharged to 1090 psig</b></p> <p><b>BOOTH COMMUNCIATOR</b> <b>Acknowledge call and inform the Operator that there are NO slow control rods.</b></p>	<p>Crew: Respond to annunciator 1C05A (F-7), CRD ACCUMULATOR LO PRESSURE OR HI LEVEL</p> <p>ATC:</p> <ul style="list-style-type: none"> <li>Check the Full Core Display on 1C05 to determine which accumulator(s) is/are in the trouble condition. <ul style="list-style-type: none"> <li>Determines that the alarm is on Control Rod 22-07</li> </ul> </li> <li>Send an Operator to the accumulators to determine the cause of the alarm</li> <li>Inform the CRS to comply with Technical Specification requirements for Control Rod Scram Accumulators</li> <li>Direct the Second Assistant to either drain the water from the accumulator, or recharge the accumulator</li> </ul> <p>CRS (1.02)</p> <p>Will enter <b>TS 3.1.5 Condition A</b> to either declare the control rod 'slow', or to declare the control rod inoperable, within 8 hours, for an inoperable accumulator.</p> <ul style="list-style-type: none"> <li>Call for maintenance support to correct the problem</li> </ul>

## SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
<p>Event 4: Earthquake</p> <p>After the CRD accumulator, and at the direction of the Lead Evaluator:</p> <p>When contacted as any dept. in organization:</p>	<p style="text-align: center;"><b>SIMULATOR OPERATOR</b></p> <p style="text-align: center;"><b>Click KEYPAD Key 2</b></p> <p>This will insert Malfunction ZZ03 for DBE, this malfunction will delete after 6 minutes</p> <p style="text-align: center;"><b>Simulator Operator:</b> <b>Acknowledge the request</b></p>	<p>CREW: Perform the actions directed from AOP 901, Earthquake</p> <p><b>CRS (5.22)</b></p> <ul style="list-style-type: none"> <li>• Direct Crew Response to an Earthquake Condition</li> <li>• IF the amber DESIGN BASIS EARTHQUAKE, or amber OPERATING BASIS EARTHQUAKE lights are ON, and not a malfunction, THEN commence shutting down the reactor to be in cold shutdown within 24 hours.</li> <li>• Enter EOP 2 T/L on High/Low Torus Water Level (may be administratively exited)</li> <li>• Direct Health Physics to perform radiation surveys of the normally accessible areas inside DAEC Buildings, and the site grounds including the Independent Spent Fuel Storage Installation.</li> <li>• Direct chemist to review KAMAN data and perform sensor checks.</li> <li>• Direct control room operators monitor the control room panels for changes in some of the following critical plant parameters:</li> <li>• Spent fuel pool and skimmer surge tank levels</li> <li>• SBLC tank levels</li> <li>• SJAE and offgas flow changes</li> <li>• Changes in jockey fire pump cycling</li> <li>• Core Spray and RHR system pressure</li> </ul>



## SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
<p>Event 4: Earthquake</p> <p>If contacted as Duty Station Manager:</p> <p>If contacted as HP or Chemistry:</p> <p>If contacted as an NSPEO:</p>   <p>Wait 15 min. and report,</p>	<p><b>BOOTH COMMUNICATOR</b> <b>Acknowledge the request.</b></p> <p><b>BOOTH COMMUNICATOR</b> <b>Acknowledge the request.</b></p> <p><b>BOOTH COMMUNICATOR</b> <b>Acknowledge the request to perform inside and outside plant walkdowns.</b> Keep track of which operator has been sent to what location in the plant.</p> <p><b>BOOTH COMMUNICATOR</b> <b>There is no damage in the areas that you have walked down</b></p>	<p>CREW: Enter and carry out the actions of AOP 901, Earthquake.</p> <p>ATC: <b>(94.22)</b></p> <ul style="list-style-type: none"> <li>Monitor reactor power, pressure, and level on 1C05</li> <li>Monitor for any Control Rod out of position</li> </ul> <p>BOP:</p> <ul style="list-style-type: none"> <li>At 1C06, verify River Water Supply system integrity by: <ul style="list-style-type: none"> <li>Verify all available RWS pumps will start and deliver &gt;6000 gpm flow</li> <li>Using HS 4918, RIVER WATER SUPPLY LOOP SELECT switch, select A CV4915 and B CV4914, one at a time, to verify RWS makeup flow can be established with each loop ensuring RWS piping is intact</li> </ul> </li> <li>Monitor Process and Area Radiation Monitoring System channels on Panels 1C10 and 1C11</li> <li>Send operators, with portable radiation monitors, to perform a quick walk through of the plant to determine the general condition of the plant structure and system's integrity, and immediately report back any damage to the Control Room</li> <li>Realign HPCI suction source to the CST per OI 152, Section 8.3: <ul style="list-style-type: none"> <li>Swap HPCI Suction lineup by placing the following valves on 1C03 in the indicated positions: <ul style="list-style-type: none"> <li>MO-2321, INBD Torus Suction ISOL to CLOSE</li> <li>MO-2322, OUTBD Torus Suction ISOL to CLOSE</li> <li>MO-2300, CST Suction to OPEN</li> </ul> </li> </ul> </li> </ul>

## SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
<p>EVENT 5: Loss of Main H2 Seal Oil Pump</p> <p>At the direct of the Lead Evaluator:</p> <p>If sent to the H2 Seal Oil Skid:</p> <p>If asked for the status of the Emergency Seal Oil Pump:</p> <p>If sent to breaker 1B33-01, Hydrogen Seal Oil Pump:</p>	<p><b>BOP EVALUTOR NOTE</b></p> <p>This is a BOP action, ensure that the BOP Operator is nearby before inserting this event</p> <p><b>SIMULATOR OPERATOR</b></p> <p><b>Click KEYPAD Key 3</b></p> <p>This will run a schedule file for the H2 Seal Oil Pump Trip</p> <p><b>BOOTH COMMUNICATOR</b></p> <p><b>Acknowledge the request and WAIT 3 minutes and REPORT, "The Main H2 Seal Oil Pump has a sheared shaft."</b></p> <p><b>Acknowledge the request and REPORT, "The ESOP is running sat"</b></p> <p><b>If the ESOP has not been started, REPORT "it is ready for start"</b></p> <p><b>Acknowledge the request, and WAIT 3 minutes and REPORT, "the breaker is in the trip free position."</b></p>	<p>CREW: Determine that there is a loss of the Main H2 Seal Oil Pump and take actions per ARP 1C08C (D-6)</p> <p>CRS</p> <ul style="list-style-type: none"> <li>Direct the start of the Emergency H2 Seal Oil Pump</li> </ul> <p>BOP:</p> <ul style="list-style-type: none"> <li>Start the Emergency H2 Seal Oil Pump per the ARP</li> <li>Secure the H2 Seal Oil Vacuum Pump per the ARP</li> <li>Send an operator to the H2 Seal Oil Skid to investigate</li> </ul>

## SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
<p>EVENT 6: Hi vibrations and Trip of "B" Recirc MG at the direction of the Lead Evaluator:</p> <p>When contacted to investigate B Reactor Recirc Pump Hi Vibrations</p>	<p><b>SIMULATOR OPERATOR</b> <b>Click KEYPAD Key 4</b></p> <p>This will run a schedule file for the high vibrations on the B Recirc Pump</p> <p><b>BOOTH COMMUNICATOR</b> <b>Acknowledge request and WAIT 2 minutes and REPORT, "All channels are reading 15 mils and stable. The GREEN OK lights are lit. The vibration probe gap is reading -7.2"</b></p> <p><b>EVALUTOR NOTE:</b> When the BOP goes to the back panel area to check 1C21, direct the</p> <p><b>SIMULATOR OPERATOR</b> <b>Click KEYPAD Key 5</b></p> <p>This will trip the B Recirc Pump</p>	<p>CREW: Respond to ARP 1C04B (B-1), ARP 1C04B (A-1), and AOP 264</p> <p>CRS</p> <ul style="list-style-type: none"> <li>• Direct the actions for Hi Vibrations on "B" RR Pump</li> <li>• Notify System Engineering of Hi vibration condition</li> </ul> <p>BOP:</p> <ul style="list-style-type: none"> <li>• Dispatch operator to 1C466C to investigate Hi Vibrations</li> <li>• At 1C21 Check Recirc Pump temperature recorder TRS 4600 for increasing B Recirc Pump bearing temperatures</li> <li>• Send an Operator to 1C113B in the MG Set Room to monitor relays</li> </ul>

## SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
<p>EVENT 6: Trip of Recirc continued</p> <p>If contacted as organization:</p> <p>When contacted to investigate 'B' RR pump trip:</p> <p>If asked to investigate 1A2:</p> <p>If asked to investigate MG Set fans:</p>	<p><b>BOOTH COMMUNICATOR</b> <b>Acknowledge the request</b></p> <p><b>Acknowledge request and WAIT 2 minutes and REPORT, "That a 'B' Recirc MG Generator Lockout has occurred and the 'B' GENERATOR FIELD BREAKER is OPEN."</b></p> <p><b>Acknowledge request and WAIT 2 minutes and REPORT, "The 'B' RECIRC MG SET MOTOR BREAKER 1A204 is OPEN "</b></p> <p><b>Acknowledge request and WAIT 2 minutes and REPORT, "1VSF11 A MGSET Handswitch is in AUTO."</b></p>	<p>CREW: Perform the actions of AOP 264, Loss of Recirc Pump (s)</p> <p>CRS: <b>(5.58)</b></p> <ul style="list-style-type: none"> <li>Direct the actions of AOP 264 Loss of Recirc Pump (s)</li> <li>Comply with Technical Specification 3.4.1 Condition D, 24 hours to satisfy the conditions of the LCO. <ul style="list-style-type: none"> <li>May direct STP 3.4.1-02 Single Loop Operation.</li> <li>May STP 3.4.2-03 Daily Jet Pump Operability Single Loop Operation.</li> </ul> </li> <li>Direct lowering reactor power by inserting control rods using the control rod sequence sheets to lower power less than or equal to (<math>\leq</math>) 60.0% (1147 MWth)</li> <li>Contact organization for assistance</li> </ul> <p>ATC: <b>(94.58)</b></p> <ul style="list-style-type: none"> <li>Stabilize reactor water level between 186" and 195"</li> <li>For the Recirc Pump that tripped, perform the following: <ul style="list-style-type: none"> <li>Verify open B RECIRC PUMP DISCH BYP valve MO-4630</li> <li>Close B RECIRC PUMP DISCHARGE valve MO-4628</li> <li>Plot operating point on Power/Flow map</li> <li>For the Recirc Pump that tripped, after 5 minutes, reopen B RECIRC PUMP DISCHARGE valve MO-4628</li> </ul> </li> <li>Insert control rods as directed by the CRS to maintain power less than or equal to (<math>\leq</math>) 60.0% (1147 MWth)</li> </ul> <p>BOP:</p> <ul style="list-style-type: none"> <li>Direct Operator to investigate the trip of the B recirc pump</li> </ul>
<b>EVALUATOR NOTE:</b> The conductivity event should be directed toward the end of this event (i.e. after MO-4628 is opened, or after power reduction < 60%). Due to the leak size, it will take approximately 2-3 minutes before the control room annunciator is received.		

## SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
EVENT 6: Trip of Recirc continued	<p><b>EVALUATOR NOTE:</b> Total core flow is to be determined by assessing Core Plate D/P</p>	<p>CREW: Perform the actions of AOP 255.2, Power/Reactivity Abnormal Change</p> <p><b>ATC (94.03)</b></p> <ul style="list-style-type: none"> <li>Take any necessary steps to bring the reactor power/reactivity transient under control, including, but not limited to: <ul style="list-style-type: none"> <li>Assuming manual control of a malfunctioning system</li> <li>Inserting control rods per the current rod pull sheet</li> </ul> </li> <li>Place one APRM recorder in each trip system to fast speed to monitor for APRM undamped oscillations greater than normal</li> <li>Verify proper operation/indication of systems and/or indications</li> <li>Verify control rod positions are correct for the established sequence, by using Rod Position Log</li> <li>Verify thermal limits on the Official 3D Case</li> <li>When power is stabilized, plot location on the Stability Power / Flow Map</li> <li>In the event of inadvertent entry into area above the power to flow map exit this area by inserting control rods</li> </ul> <p><b>CRS (5.03)</b></p> <ul style="list-style-type: none"> <li>Direct the actions of AOP 255.2, Power/Reactivity Abnormal Change</li> <li>Establish critical parameter monitoring of Reactor Power, Reactor Pressure, and RPV Water Level, as priorities allow</li> </ul>

## SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
<p>EVENT 7: Condenser Tube Leak At the direction of the Lead Evaluator,</p> <p>When called on to investigate the alarm on 1C80,</p>	<p style="text-align: center;"><b>SIMULATOR OPERATOR</b></p> <p style="text-align: center;"><b>Click KEYPAD Key 6</b></p> <p>This will start a schedule file for condenser tube leak which will drive a reactor scram</p> <p style="text-align: center;"><b>Verify that when 1C06B A-1, 1C-80 TROUBLE alarms, that ET 5 goes TRUE</b></p> <p style="text-align: center;"><b>BOOTH COMMUNCIATOR</b></p> <p style="text-align: center;"><b>Acknowledge the request and WAIT 3 minutes and REPORT, “Report that the alarm was the ‘Influent High conductivity’ alarm, and it is currently reading _____”</b></p> <p>On the PPC monitor, call up GD 24, this will give you the condensate filter demineralizer panel. When you relay your report, give them the reading of the Condensate influent conductivity.</p> <p style="text-align: center;"><b>EVALUATOR NOTE:</b></p> <p>The only action of annunciator on 1C80 at power operation is to enter AOP 639, Reactor Water/Condensate High Conductivity</p>	<p>CREW: Respond to annunciator 1C06B (A-1) and AOP 639</p> <p><b>BOP (94.18)</b></p> <ul style="list-style-type: none"> <li>Send an Operator to 1C80 to investigate</li> <li>Based on the report, the crew will enter AOP 639, Reactor Water/Condensate High Conductivity.</li> </ul> <p><b>CRS: (5.18)</b></p> <ul style="list-style-type: none"> <li>Direct entry in AOP 639, Reactor Water/Condensate High Conductivity</li> <li>IF a valid Condensate Demineralizer Influent Conductivity reading of greater than or equal to 1.0 mho/cm (CRS-1514 Pt 1 or 7 at 1C06 or CIT 1704 at 1C80) is received and is not due to condensate system startup or plant startup, THEN Reduce Reactor Recirc flow to 39 Mlbm/hr per IPOI 4, Fast Power Reduction AND SCRAM</li> </ul>

## SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
<p>EVENT 7: Condenser Tube Leak</p> <p>When called as chemistry,</p> <p>When contacted as the system engineer,</p> <p>If asked to monitor conductivity at other places in the plant,</p>	<p style="text-align: center;"><b>BOOTH COMMUNCIATOR</b></p> <p><b>Acknowledge the request and state that it will take about an hour and a half to get the sample.</b></p> <p><b>Acknowledge the request and inform the control room that you will review the information from PI and get back to them with a recommendation</b></p> <p><b>Acknowledge the request</b> Call up the conductivity monitor 1514 on THUNDERVIEW from panel 1C06, and monitor point CE1516A.</p>	<p>CREW: Take actions directed by AOP 639</p> <p>BOP:</p> <ul style="list-style-type: none"> <li>Observe chart recorder CRS-2738 CLEANUP INFLUENT CONDUCTIVITY at 1C04 to determine the trend of reactor coolant conductivity</li> <li>Direct Plant Chemistry Department to sample as necessary, reactor water condensate, Hotwell, CSTs and makeup demin system to verify any high conductivity levels identified in Steps 1 and 3</li> <li>IF a suspected loop has been identified, and it is recommended that the loop be isolated, THEN Isolate the suspected leaking Condenser Circ Water loop per OI 442</li> <li>IF condensate demineralizer influent conductivity is greater than 0.1 mho/cm, THEN maintain the filter demineralizer bypass valve MO-1708 closed</li> <li>IF a valid Condensate Demineralizer Influent Conductivity reading of greater than or equal to 1.0 mho/cm (CRS-1514 Pt 1 or 7 at 1C06 or CIT 1704 at 1C80) is received and is not due to condensate system startup or plant startup, THEN Reduce Reactor Recirc flow to 39 Mlbm/hr per IPOI 4, Fast Power Reduction AND SCRAM</li> </ul>

## SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
EVENT 8: ATWS		<p>CREW: AOP 639 action to insert a manual reactor scram</p> <p>ATC:</p> <ul style="list-style-type: none"> <li>• Inserts manual scram <ul style="list-style-type: none"> <li>○ Reports that there is a Hydraulic ATWS</li> <li>○ Reports Reactor Power</li> </ul> </li> <li>• Performs ATWS QRC <ul style="list-style-type: none"> <li>○ Reports that the ATWS QRC is complete, with the exception of SBL Control</li> <li>○ Reports reactor power</li> </ul> </li> </ul> <p>CRS: <b>(6.56)</b></p> <ul style="list-style-type: none"> <li>• Enters EOP 1 and transitions to ATWS</li> <li>• Per ATWS directs the following; <ul style="list-style-type: none"> <li>○ Lockout ADS prior to ADS actuation <b>(Critical)</b></li> <li>○ Install Defeat 15</li> <li>○ Install Defeat 11</li> <li>○ Directs the ATWS QRC</li> </ul> </li> </ul> <p>BOP: <b>(95.57)</b></p> <ul style="list-style-type: none"> <li>• Lockout ADS prior to ADS actuation <b>(Critical)</b></li> <li>• Install Defeat 15</li> <li>• Install Defeat 11</li> </ul>



## SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
<p>EVENT 8: ATWS</p> <p>If directed to install Defeat 12,</p> <p>When Defeat 12 is installed:</p>	<p><b>BOOTH COMMUNCIATOR</b> <b>Acknowledge the request AND direct the Simulator Operator to Click KEYPAD Key 7</b></p> <p>This will run a schedule file to place the ATWS RPT switches in the TEST position after a time delay</p> <p><b>BOOTH COMMUNCIATOR</b> <b>Call the control room and inform them that you have installed Defeat 12</b></p>	<p>CREW: Take the actions directed from ATWS</p> <p>CRS:</p> <ul style="list-style-type: none"> <li>• Directs the initiation of SBLC</li> <li>• Directs the Hydraulic ATWS RIPS <b>(Critical) (6.08, 6.06)</b></li> </ul> <p>ATC:</p> <ul style="list-style-type: none"> <li>• Initiates SBLC</li> <li>• Performs the ATWS RIPS until the reactor is shutdown under all conditions <b>(Critical) (95.06, 95.08)</b> <ul style="list-style-type: none"> <li>○ RIP 103,2, Increase CRD Cooling Flow and Pressure <ul style="list-style-type: none"> <li>▪ Start second CRD</li> <li>▪ Place CRD Flow Controller FC-1814 in MANUAL and run the output to maximum</li> <li>▪ Observe increased cooling water flow on FI-1838 and cooling water dP increase on PDI-1832A</li> <li>▪ Throttle open MO-1830, DRIVE WATER <math>\Delta P</math> CONTROL, as necessary to maximize cooling water flow and pressure</li> </ul> </li> <li>○ RIP 102,1, Repeated Manual Scram <ul style="list-style-type: none"> <li>▪ Install DEFEAT 3 (RPS Scram Logic Defeat)</li> <li>▪ Direct the in-plant operator to install DEFEAT 12 (Reset of ARI)</li> <li>▪ Reset the reactor scram</li> <li>▪ Confirm SDV high level trip is clear</li> <li>▪ Determine control rod position</li> <li>▪ Re-Scram the plant</li> </ul> </li> </ul> </li> </ul>

## SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
EVENT 8: ATWS	<p style="text-align: center;"><b>EVALUATOR NOTE</b></p> <p><b>IF</b> the crew has not taken action to lower reactor water level to 87 inches <b>AND</b> large irregular neutron flux oscillations induced by neutronic/thermal-hydraulic instabilities is observed (APRMs), <b>THEN</b> the Critical Task has been failed</p> <p style="text-align: center;"><b>EVALUATOR NOTE</b></p> <p><b>IF</b> the crew has not taken action to restore and/or maintain reactor water level &gt; -25 inches using the preferred injection systems <b>AND</b> the crew transitions to Emergency Depressurization, <b>THEN</b> the Critical Task has been failed</p>	<p>CREW: Take the actions directed from ATWS (lower reactor water level to 87 inches)</p> <p>CRS:</p> <ul style="list-style-type: none"> <li>• Assess reactor power <ul style="list-style-type: none"> <li>○ If reactor power is &gt; 5%, the crew will enter power level control <ul style="list-style-type: none"> <li>▪ Directs to secure and prevent injection from, Condensate and Feed, HPCI, RHR, and CS</li> <li>▪ Inform at an RPV level of 87 inches</li> <li>▪ If conditions allow RPV injection, maintain RPV level &gt; -25 inches</li> </ul> </li> </ul> </li> </ul> <p>ATC:</p> <ul style="list-style-type: none"> <li>• Secure and prevent injection from Condensate and Feed <ul style="list-style-type: none"> <li>• Take manual control of the Master Level Controller and close the feed regulating valves <b>(Critical)</b></li> </ul> </li> <li>• Inform the CRS reactor power when level reaches 87 inches</li> <li>• If directed, maintain RPV level &gt; -25 inches <b>(Critical)</b></li> </ul> <p>BOP:</p> <ul style="list-style-type: none"> <li>• Secure and prevent injection from HPCI, RHR, and CS <ul style="list-style-type: none"> <li>• Place the HPCI Aux Oil Pump to Pull-to-Lock</li> <li>• Trip the A and B CS Pumps if they receive an initiation signal <b>(Critical)</b></li> <li>• Prevent injection from RHR as necessary by overriding the selected loop inject valve <b>(Critical)</b></li> </ul> </li> </ul>

## SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
EVENT 8: ATWS to EOP 1		<p>CREW: Determines that all control rods are inserted</p> <p>CRS:</p> <ul style="list-style-type: none"> <li>• Exits ATWS and returns to EOP 1</li> <li>• Directs the following; <ul style="list-style-type: none"> <li>○ RPV level be maintained 170" to 211" using High Pressure injection systems</li> <li>○ Control RPV pressure 800 to 1050 psig using EHC</li> </ul> </li> </ul> <p>ATC:</p> <ul style="list-style-type: none"> <li>• Assess the Feedwater system for conductivity, and maintains RPV level using; <ul style="list-style-type: none"> <li>○ RCIC</li> <li>○ If necessary uses Condensate and Feed</li> </ul> </li> <li>• Controls RPV pressure using EHC</li> </ul>

## SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
<p>EVENT 9: EOP 2 and 3 for lowering Torus level</p> <p>When directed to the Torus area to determine where the leak is,</p> <p>If contacted as the Rad Waste Operator:</p>	<p style="text-align: center;"><b>BOOTH COMMUNCIATOR</b></p> <p style="text-align: center;"><b>Acknowledge the request and WAIT 4 minutes and REPORT, “There is a lot of water flowing out of a cracked pipe right at the torus. The cracked pipe is the “A” CS suction line.”</b></p> <p style="text-align: center;"><b>Acknowledge the request</b></p>	<p>CREW: Determines that Torus Level is lowering, and perform the following actions</p> <p><b>SRO (6.65)</b></p> <ul style="list-style-type: none"> <li>• Direct the following actions from EOP 2 <ul style="list-style-type: none"> <li>○ Obtain a round of Primary Containment Parameters <ul style="list-style-type: none"> <li>▪ Determine that Torus level is lowering <ul style="list-style-type: none"> <li>• Direct that torus level be raised by: <ul style="list-style-type: none"> <li>○ HPCI, OI 152</li> <li>○ Core Spray, OI 151</li> </ul> </li> </ul> </li> </ul> </li> <li>• <b>(Critical)</b> Before 7.1 feet <ul style="list-style-type: none"> <li>○ Perform an Emergency Depressurization</li> </ul> </li> </ul> </li> <li>• Direct the following actions from EOP 3 <ul style="list-style-type: none"> <li>○ Operate available sump pumps to restore and maintain water level below the Max Normal Operating Limit</li> <li>○ Operate available coolers in the affected area</li> </ul> </li> </ul> <p><b>BOP:</b></p> <ul style="list-style-type: none"> <li>• Deliver a round of Primary Containment Parameters</li> <li>• Report that Torus level is lower than expected for this condition <ul style="list-style-type: none"> <li>○ Attempt to raise torus water level: <ul style="list-style-type: none"> <li>▪ With HPCI IAW OI 152</li> <li>▪ With Core Spray IAW OI 151</li> </ul> </li> </ul> </li> <li>• Responds to Annunciator 1C14, B-4, Area Water Levels Above Max Safe</li> <li>• Reports to the CRS that the Torus Room is above the Max Normal Operating Limit</li> <li>• Contact the Rad Waste Operator to lineup and pump the Torus area</li> </ul>

## SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
EVENT 9: EOP 2 and lowering Torus level  When directed to open the CS manual valves, V-21-01 and 02,	<p style="text-align: center;"><b>BOOTH COMMUNICATOR</b></p> <p><b>Acknowledge the request and WAIT 4 minutes and REPORT, “You are at the directed valve, but you cannot get the lock to work. You have to go and find a bolt cutter to get the chain off of the handwheel.”</b></p> <p><b>Acknowledge the request and WAIT 4 minutes and REPORT, “You attempted to open the CS valve, but it was hard to turn. While you were attempting to open it, there was a loud cracking sound, and now the valve handwheel spins freely.”</b></p> <p><b>EVALUATOR NOTE:</b> The CRS may direct SEP 307 to anticipate ED, however a spurious GROUP 1 isolation will occur and will prevent this mitigation strategy</p>	CREW: EOP 2 actions continued using Core Spray BOP: <ul style="list-style-type: none"><li>Attempt to raise torus water level;<ul style="list-style-type: none"><li>With the CS system<ul style="list-style-type: none"><li>Monitor CST level on 1C06</li><li>Verify that the CS outboard and inboard torus suction valves are open</li><li>Unlock and open V-21-01, for “A” CS, and V-21-02, for “B” CS, as necessary.</li></ul></li></ul></li></ul> <p>(Critical) When the crew determines that they cannot maintain torus level above 7.1 feet, and BEFORE 7.1 feet in the torus, the crew will perform an Emergency Depressurization (Critical)</p> <p>CRS: (6.80)<ul style="list-style-type: none"><li>May direct SEP 307 to anticipate ED</li><li>Directs that ED be entered</li><li>Directs the following from ED<ul style="list-style-type: none"><li>Verify torus level is above 4.5’</li><li>Open 4 ADS SRVs BEFORE Torus level is below 7.1” (Critical)</li><li>Maintain RPV level using CS or RHR</li></ul></li></ul></p> <p>ATC: (95.80)<ul style="list-style-type: none"><li>Verify torus level is above 4.5’</li><li>Open 4 ADS SRVs BEFORE Torus level is below 7.1” (Critical)</li><li>Maintains RPV level using the directed injection system</li></ul></p>
When directed to go to the other CS,		

## SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
When the ED has been performed and RPV level is being restored to the directed band, and at the direction of the Lead Evaluator,	<p><b>Simulator Operator</b></p> <p><b>Place the simulator in FREEZE.</b></p> <p><b>Announce the scenario is complete; please stand by your stations and do not discuss the scenario with your crew.</b></p>	

\*\*\* END OF SCENARIO \*\*\*

## SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

### QUANTITATIVE ATTRIBUTES

#### **Malfunctions:**

*Before EOP Entry:*

1. CRD Accumulator Alarm
2. Earthquake resulting in
  - Loss of Main H2 Seal Oil Pump
  - Hi Vibrations and Trip of "B" Recirc Pump
  - Condenser Tube Leak

*After EOP Entry:*

1. ATWS
2. Unisolable Torus Leak

#### **Abnormal Events:**

1. AOP 901, Earthquake
2. AOP 255.2, Power/Reactivity Abnormal Change
3. AOP 264, Loss of Recirc Pump (s)
4. AOP 639, Reactor Water/Condensate High Conductivity

#### **Major Transients:**

1. Earthquake
2. Condenser Tube Leak
3. Torus leak resulting in ED

#### **Critical Tasks:**

1. IF a reactor scram is required and the reactor is NOT shutdown under all conditions, THEN lockout ADS before automatic actuation.
2. IF a scram is required and Reactor power is above 5%, THEN reduce power below 5% using one or more of the following methods:
  - Injection of Boron
  - Inserting control rods using RIPs
3. IF a reactor scram is required, and Reactor power is >5%, and Power/level control is required, THEN terminate and prevent injection until conditions allow reinjection
4. IF performing ATWS Power/level control and Conditions are met to allow reinjection, THEN crew actions are taken to maintain RPV level above -25" by injecting using Table 1B systems
5. BEFORE torus level drops to 7.1 feet, THEN perform Emergency RPV Depressurization

**Appendix D**
**Scenario Outline**
**Form ES-D-1**

Facility: Duane Arnold Energy Center      Scenario No.: 1      Op-Test No.: 19-1 NRC

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

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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Initial Conditions/Turnover:

Reactor Power is 75%

Guarded Equipment: Spent Fuel Cooling Pumps, Skimmer Surge Tank Room, Fuel Pool Heat Exchanger Room 1B35, 1B43, Fuel Pool Pump Breakers, 1C136, Fuel Pool Panel

Evolutions in progress or planned for upcoming shift

- Alternate EHC Pumps for maintenance later in the shift
- Raise Power with rods IAW the pull sheet to achieve 80% Reactor Power
- Later this shift, Security will be running a force on force drill

Plant PRA/PSA Status including CDF/LERF &amp; color

- Green-CDF 1.34 E-6/ ICDP to Yellow equal 1 year
- Green-LERF 3.27 E-7 ILERP to Yellow equal to 1 year

2 Extra Non Licensed Personnel Available in Work Control

Event No.	Malf. No.	Event Type*	Event Description
1		N-BOP N-CRS	Shift EHC Pumps
2		R-ATC R-CRS	Raise Power With Rods to 80% RTP
3		TS- CRS	Control Rod 22-07 N2 Leak  Tech Spec 3.1.5 Condition A
4	zz03	C-CRS C-BOP	Entry into AOP 901, Earthquake Verify river water supply piping integrity
5	eg08a eg08c do-eg-026 do-eg-027	C-BOP C-CRS	H2 Main Seal Oil Pump fails and the crew will have to start the Emergency H2 Seal Pump ARP 1C08C D-6
6.a	rr35b		Respond to B Recirc MG Set high vibrations
6.b	rr05b rr06b	C-CRS  C-ATC  TS- CRS	B Recirc pump shaft seizure and subsequent pump trip CRS will direct entry into AOP 255.2 and 264 ATC Operator will close tripped recirc pump discharge valve  Tech Spec 3.4.1, Condition D



7	mc07	M-All	Condenser Tube Leak will require the entry into AOP 639, resulting in inserting a manual reactor scram
8	rp05g	C-ATC C-CRS	<p>Entry into EOP 1, Transition to EOP ATWS</p> <p>Hydraulic ATWS</p> <ul style="list-style-type: none"> <li>Potential to enter Power Level Control</li> </ul> <p>Rods will insert via:</p> <ul style="list-style-type: none"> <li>RIP 103.2, Increase CRD Cooling Flow and Pressure</li> <li>RIP 102.1, Repeated Manual Scram</li> </ul>
9	pc14 di-ms-076 di-ms-077 di-ms-072 di-ms-074 ms19a ms19b	C-BOP C-CRS	<p>Leak in the torus results in the performance of ED.</p> <p>Anticipating ED will not be available due to a spurious group 1 isolation</p>



## SIMULATOR EXERCISE GUIDE, THREE COLUMN

**SEG**  
Page 1 of 31

**SITE:** DAEC

**Revision #:** 0

**LMS ID:** PDA OPS 19-1 NRC Scenario #2

**LMS Rev. Date:**

**SEG TITLE:** NRC Exam Scenario #2

**SEG TYPE:**

☐ Training

☒ Evaluation

**PROGRAM:** ☐ LOCT ☒ LOIT ☐ Other:

**DURATION:** 90 minutes

**Developed by:**

\_\_\_\_\_  
Instructor/Developer

\_\_\_\_\_  
Date

**Reviewed by:**

\_\_\_\_\_  
Instructor (Instructional Review)

\_\_\_\_\_  
Date

**Validated by:**

\_\_\_\_\_  
SME (Technical Review)

\_\_\_\_\_  
Date

**Approved by:**

\_\_\_\_\_  
Training Supervision

\_\_\_\_\_  
Date

**Approved by:**

\_\_\_\_\_  
Training Program Owner (Line)

\_\_\_\_\_  
Date

## SIMULATOR EXERCISE GUIDE REQUIREMENTS

**Terminal Objective** This Evaluation Scenario Guide evaluates the Operators' ability to:  
"Given the malfunctions presented in this ESG, the students will protect the public, protect plant personnel, and protect plant equipment, in accordance with plant procedures."

**Enabling Objectives:** Evaluation Guide, no tasks are trained

**Prerequisites:** NONE

**Training Resources:**

- A. Simulator
- B. Evaluation Team
- C. Operations Management Representative
- D. Simulator Operator
- E. Booth Communicator
- F. Simulator video recording equipment

**References:**

- 1. AOP 301, Rev 73
- 2. AOP 411, Rev 29
- 3. AOP 903, Rev 59
- 4. AOP 358, Rev 32
- 5. ARP 1C03A, Rev 62
- 6. ARP 1C05A, Rev 90
- 7. ARP 1C06A, Rev 75
- 8. ARP 1C06B, Rev 65
- 9. ATWS, Rev 23
- 10. ED, Rev 11
- 11. EOP 1, Rev 20
- 12. EOP 3, Rev 22
- 13. IPOI 3, Rev 160
- 14. IPOI 5 QRC 1, Rev 6
- 15. SEP 307, Rev 4
- 16. OI 734 QRC 1, Rev 0
- 17. Technical Specifications

**Protected Content:** Identify here and in training material as {C001}; See Comment for details.  
None

**Evaluation Method:** In accordance with NUREG 1021

**Operating Experience:** None

**Risk Significant Operator Actions:** Initiate RPV Emergency Depressurization

<b>UPDATE LOG:</b> 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
0.0	Changed form number to match new industry SAT procedure which superseded TR-AA-230-1003.			See cover	
				See cover	

**TASKS ASSOCIATED WITH SIMULATOR EXERCISE GUIDE**

Task #	Task Title
94.16	Respond to GSW Abnormal Operation Condition
94.36	Respond to a Loss of 1A4
95.68	Perform Actions of EOP 3 for High Area Temperature, Radiation, and Water Level including EOP 1 and ED
95.46	Perform actions of RC/P of EOP 1
95.47	Establish a Cooldown of the RPV at a Rate of <100 Degrees F/hr
95.55	Perform initial ATWS actions (/)
95.95	Initiate ATWS/ARI
1.02	Determine Operability for Technical Specification Required Components
5.16	Direct Crew Response to GSW Abnormal Operation Condition
5.24	Direct Crew Response to High Winds / Severe Thunderstorms / Tornado Condition
5.36	Direct Crew Response to a Loss of 1A4
6.67	Direct Crew Response for performance of EOP 3 for high area temperatures/radiation /water level including EOP 1and ED
6.45	Direct Crew Response for performance of initial EOP 1 actions (RC)
6.47	Direct Crew Response to Establish a Cooldown of the RPV at a Rate of <100 Degrees F/hr
6.55	Direct Crew Response to Perform Initial ATWS Actions (/)

## OVERVIEW / SEQUENCE OF EVENTS

### OVERVIEW

See below event description for overview

### SEQUENCE OF EVENTS

**ALL TIMES IN THIS SCENARIO ARE APPROXIMATE**

Event #	Description
1.	Shift Stator Water Cooling Pumps in accordance with OI 697 Generator Stator Cooling Water System section 7.0
2.	Reduce Rx Power with Control Rods using the Control Rod Sequence Sheets to approximately 95% RTP
3.	After the completion of the power adjustment, the "A" Core Spray pump supply breaker will fail and close in. The pump will operate for 5 seconds and then the breaker will mechanically fail. The CRS will declare the "A" Core Spray Pump inoperable and enter TS 3.5.1 Condition B to Restore to operable within 7 days.
4.	After the Core Spray pump is declared inoperable, a leak on 1T-218 develops and causes 1C05A E-3, SBLC Tank HI/LO Level alarm to come in. The crew will direct an In-plant Operator to investigate. The leak is reported to be from 1T-218, at the combined suction line. The leak will be stopped when V-26-1 is CLOSED. The CRS will declare SBLC Inoperable TS 3.1.7 Condition B (8 Hour LCO)
5.	The Crew will receive a call from Security informing them that the National Weather Service has just issued a Severe Thunderstorm Warning for the DAEC vicinity. The warning will be in effect for the next hour. The crew will enter AOP 903 Severe Weather and take the appropriate actions.
6.	After the initial actions of AOP 903 are complete, a lightning strike will occur in the DAEC area and will result in the trip of the "B" GSW pump, the standby pump will not automatically start. The Crew will manually start the standby GSW pump. This start will send a slug of mud through the GSW system. The Crew will perform the actions of ARP 1C06A B-4, GSW Auto Filter High Dp. The Crew will also enter AOP 411 GSW Abnormal Operation
7.	During the monitoring of GSW cooled components another lightning strike will occur and result in the trip of the "C" RBCCW pump, the Crew will receive a RBCCW low pressure alarm on 1C06B, (D-3). The Crew will determine that the standby RBCCW pump did not automatically start and start the standby RBCCW pump.
8.	From the lowering of reactor power a leak will develop in the RWCU HX room. The leak will propagate to the point where the RWCU system will try to isolate due to a high temperature in the RWCU Hx room.

	The leak will not be able to be isolated and the crew will have to insert a manual reactor scram prior to the RWCU Hx room reaching a Max Safe Temperature limit. <b>(Critical)</b>
9.	On the reactor scram, there will be an electrical ATWS. ARI will be successful to insert all of the control rods except 1.  The crew will determine that they are no longer in ATWS and return to EOP 1.
10.	With a primary system leaking into the secondary containment, the crew will rapidly cool down to a pressure band of 500 to 700 psig to take the driving head off of the leak.
11.	After all but one of the control rods have inserted, 1A4 will lockout when the Turbine TRIPS.  The crew will enter AOP 301, Loss of Essential Electrical Power, and take the "B" SBDG to Pull-to-Lock due to running without ESW cooling flow.
12.	When the area above the TIP room exceeds a Max Safe Temperature Limit, the crew will perform an Emergency Depressurization due to Two Areas above Max Safe Operating Limit. <b>(Critical)</b>
13.	During the ED, only 2 ADS SRVs will open requiring the operator to open the 2 LLS SRVs to complete.

## SIMULATOR SET UP INSTRUCTIONS

1. Perform simulator set up per TDAP 1839 Attachment 2, Simulator Setup Checklist \_\_\_\_\_
2. Using the exam flash drive with the scenario simulator files, insert in the left instructor station computer and navigate to the D:\ directory \_\_\_\_\_
3. Copy the *NRCScenario2.dat* file from the exam flash drive to C:\Trex\_Duane-TELEC\Executive\SiteSpecific\InitialCondition and rename the file to an available IC using the format "ic\_###" \_\_\_\_\_
  - a. Reset to the newly created IC \_\_\_\_\_
  - b. Place the Simulator in **RUN** \_\_\_\_\_
  - c. Run schedule file *Weather.sch* following directory path \_\_\_\_\_  
D:\NRCOperational\NRCScenarios\NRC\_Scenario\_2\NRCScenario2\_SimFiles

### OR

Reset to IC 20, place the simulator in **RUN** and perform the following (this will take approximately 15 minutes for the plant to stabilize):

- a. Insert Event Triggers, Malfunctions, Overrides, and Remotes using schedule file *SEG\_Setup.sch* located on the exam flash drive using the following directory path D:\NRCOperational\NRCScenarios\NRC\_Scenario\_2\NRCScenario2\_SimFiles \_\_\_\_\_
4. Have a second instructor verify: \_\_\_\_\_
  - b. Auto triggers are setup as indicated below and evaluate to "FALSE" \_\_\_\_\_
  - c. Malfunctions \_\_\_\_\_
  - d. Remotes \_\_\_\_\_
  - e. Overrides \_\_\_\_\_
5. Open Keypad file *NRC\_Scenario\_2.key* located on the exam flash drive using the following directory path \_\_\_\_\_  
D:\NRCOperational\NRCScenarios\NRC\_Scenario\_2\NRCScenario2\_SimFiles
6. Setup Thundersound on the Instructor Station computer to the right and verify the following settings: \_\_\_\_\_
  - a. Click on the checkbox under "Playing" for THUNDERSTORM \_\_\_\_\_
  - b. Click the STOP button to toggle audio model to "playing" \_\_\_\_\_
  - c. Verify Instructor Station sound volume is set to approximately 25% \_\_\_\_\_
  - d. Verify the dB controller (under the Instructor Station monitor) level 2 knob is aligned to the detent (white line on the knob is pointing slightly counterclockwise) \_\_\_\_\_
  - e. Verify the Front Room (both) sub amplifiers are set to approximately 50% of scale \_\_\_\_\_
7. Place Guarded Equipment tags on: \_\_\_\_\_
  - 1B35 Switch
  - 1B43 Switch
8. Markup MOL pull sheet STEP 37 for control rods withdrawn to their current position \_\_\_\_\_
9. Ensure MOL pull sheets are in the 1C05B hanging file \_\_\_\_\_



## EVENT TRIGGER DEFINITIONS:

Trigger No.	Trigger Logic Statement	Trigger Word Description
20	tc_trip	Main Turbine Trip
21	rrltaf < 170	GP 3 Signal

## MALFUNCTIONS

Time	Malf. No.	Malfunction Title	Delay	Ramp	ET	Initial Value	Final Value
Set up	ed08d	4.16 KV/480V BUS FAULT- BUS 1A4			20	INACTIVE	ACTIVE
Set up	rp05a	RPS SCRAM CIRCUIT FAILURE (ATWS)- AUTO SCRAM FAILURE				ACTIVE	ACTIVE
Set up	rp05b	RPS SCRAM CIRCUIT FAILURE (ATWS)- MANUAL SCRAM FAILURE				ACTIVE	ACTIVE
Set up	rp05d	RPS SCRAM CIRCUIT FAILURE (ATWS)- RPS FUSE REMOVAL FAILURE				ACTIVE	ACTIVE
Set up	rp05e	ALL INDIVIDUAL ROD SCRAM SWITCHES FAIL				ACTIVE	ACTIVE
Set up	rd020227	CONTROL ROD BLADE STUCK- ROD 02-27				ACTIVE	ACTIVE
As dir	rm02re7606b	RE-7606B REAC BLDG MAIN EXHAUST B			21	As Is	100

## OVERRIDES

Time	OR No.	Override Title	Delay	Ramp	ET	Initial Value	Final Value
Set up	DI-TC-009	BPVJINCR BYPASS VALVE OPENING JACK, INCREASE				TRANSI /OFF	TRANSI/ OFF
Set up	DI-AD-017	HS-4405 ADS PSV4405				AUTO	AUTO
Set up	DI-AD-019	HS-4406 ADS PSV4406				AUTO	AUTO

## REMOTE FUNCTIONS

Time	RF. No.	Remote Function Title	Delay	Ramp	ET	Initial Value	Final Value

## KEYPAD FILE:

NRC_Scenario_2.key	
Key	Key Action
1	Insert remote an07 to ACK
2	Schedule D:\NRCOperational\NRCScenarios\NRC_Scenario_2\NRCScenario2_SimFiles\ ACS_BkrFailure.sch
3	Toggle Event 1
4	Schedule D:\NRCOperational\NRCScenarios\NRC_Scenario_2\NRCScenario2_SimFiles\ SBLCTankLeak.sch
5	Toggle Event 2
6	Schedule D:\NRCOperational\NRCScenarios\NRC_Scenario_2\NRCScenario2_SimFiles\ LightningStrikeOne.sch
7	Schedule D:\NRCOperational\NRCScenarios\NRC_Scenario_2\NRCScenario2_SimFiles\ LightningStrikeTwo.sch
8	Schedule D:\NRCOperational\NRCScenarios\NRC_Scenario_2\NRCScenario2_SimFiles\ EOP3Scram_ED.sch
9	Toggle Event 3

## SCHEDULE FILES:

Weather.sch			
At Time	Event	Action	Description
00:00:01	None	Insert remote hv01 to 223 in 7200	WIND DIRECTION AT 50 meters (165 ft)
00:00:01	None	Insert remote hv02 from 23 to 27 in 7200	WIND SPEED AT 50 meters (165 ft)
00:00:01	None	Insert remote hv03 to 45 in 28800	DEW POINT TEMPERATURE
00:00:01	None	Insert remote hv05 to 68 in 14400	AMBIENT TEMPERATURE AT 50 meters (165 ft)
00:00:01	None	Insert remote hv06 to 73 in 14400	AMBIENT TEMPERATURE AT 10 meters (35 ft)
00:00:01	None	Insert remote hv07 to 73 in 28800	RIVER WATER TEMPERATURE

ACS_BkrFailure.sch			
At Time	Event	Action	Description
00:00:00	None	Insert remote cs03 to CLOSE	MANUAL OPER OF 'A' CS PUMP (1P-211A BREAKER)
00:00:05	None	Insert malfunction cs01a	CORE SPRAY PUMP TRIP- CORE SPRAY PUMP A TRIP
None	1	create event 19 zaocspi2106 <= 0.195 -desc Close A CS Vent Valve	
None	1	Insert remote cs05 to OPEN	MANUAL CORE SPRAY A VENT VALVE (CLOSE,OPEN)
None	19	Modify remote cs05 to CLOSE	

SBLCTankLeak.sch			
At Time	Event	Action	Description
00:00:00	None	Insert malfunction sl07 to 100.00000 in 120	SBLC TANK 1T218 LEAK
None	2	Modify malfunction sl07 to 0.00000 in 10	

LightningStrikeOne.sch			
At Time	Event	Action	Description
00:00:00	None	create event 10 zdiswhs4904a(4) - desc A GSW Pump started	
00:00:00	None	Insert malfunction SW37A	GSW PUMP 1P89A FAIL TO AUTO-ACTUATE
00:00:01	None	Insert malfunction zz04 to 100.00000 delete in 4	Thunderstorm Event
00:00:02	None	Insert remote SW32	MAN OPER OF 'B' GSW PUMP (1P-89B BREAKER)
None	10	Insert malfunction AN1C06A(17) after 10 to ON delete in 120	1C06A (B-04) GSW AUTO FILTER HI dP
00:00:00	None	create event 10 zdiswhs4904a(4) - desc A GSW Pump started	

LightningStrikeTwo.sch			
At Time	Event	Action	Description
00:00:00	None	Insert malfunction stsw01a	RBCCW PUMP 1P81A FAIL TO AUTO-START
00:00:01	None	Insert malfunction zz04 to 100.00000 delete in 4	Thunderstorm Event
00:00:02	None	Insert malfunction sw10c	RBCCW PUMP TRIP- PUMP C
00:00:15	None	Insert malfunction AN1C06B(33) to ON	1C06B (D-03) RBCCW PUMP DISCH HEADER LO PRESSURE
00:00:15	None	create event 11 ZAOSWPI4821 >= 0.32 -desc RBCCW Pressure Recovers	
None	11	Delete malfunction AN1C06B(33)	1C06B (D-03) RBCCW PUMP DISCH HEADER LO PRESSURE

EOP3Scram ED.sch			
At Time	Event	Action	Description
00:00:00	None	Create event 22 rrprv < 400 -desc RPV Press less than 400 psig	
00:00:00	None	Create event 23 ZDICUHS2701(1) -desc MO2701 HS to Close	
00:00:00	None	Create event 25 ZDIHVHS7611A & ZDIHVHS7611B -desc RX Exhaust Fans Running	
00:00:01	None	Insert malfunction cu11a	MO2700 THERMAL OVERLOAD BREAKER TRIP
00:00:01	None	Insert malfunction ms28b	GROUP 5 ISOLATION VALVE(S) FAIL(S) TO CLOSE- MO2701
00:00:03	None	Insert malfunction cu07 to 0.5 in 600	RWCU LEAK IN HEAT EXCHANGER ROOM (VI)
None	3	Insert malfunction cu05 to 80.00000 in 300	TEMPERATURE TRANSMITTERS 2742G,J,H,K FAILURE
None	22	Modify malfunction cu05 to 43.00000 in 300	
None	23	Insert malfunction ed22d	BREAKER TRIP 1D4204 FOR MO2701

## SHIFT TURNOVER INFORMATION

- Day of week and shift
  - Today, day shift
- Weather conditions
  - Cloudy, with a chance for thunderstorms during the shift
- Plant power:
  - 100% reactor power with the corresponding MWe, MWth, and core flow
- Reactor coolant leakage is normal (if asked: 1.56 identified, 0.03 unidentified)
- Plant PRA Status
  - CDF:  $1.32 \times 10^{-6}$ , GREEN, 1 year to Yellow
  - LERF  $3.32 \times 10^{-7}$ , GREEN, 1 year to Yellow
  - SFP risk is LOW, time to 200°F is 56 Hours
- “B” side protected, specifically guarded equipment is
  - Skimmer Surge Tank Room
  - 1B3507, ‘A’ Fuel Pool Cooling Pump Breaker
  - 1B4327, ‘B’ Fuel Pool Cooling Pump Breaker
  - 1C136, Fuel Pool Filter/Demin Control Panel
- No Locked in / failed annunciators or alarms
- No Existing LCO action statements
- Procedures or major maintenance in progress
  - Shift Stator Water Cooling Pumps in accordance with OI 697 Generator Stator Water Cooling System
  - Lower Reactor power with control rods to achieve 95% for Load Line Adjustment by inserting control rods in the reverse sequence of the rod movement control sheet package. RE’s will deliver the adjustment sheet positions to the control room upon completion of the insertions
- No equipment to be taken out of service or returned to service this shift
- Comments, problems, operator workarounds, etc.
  - The Radwaste Operator is NSPEO qualified
  - Two extra NSPEOs available in Work Control
  - Operations Management as agreed that the CRS will serve as the Reactivity SRO

## SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
<p>EVENT 1: Shift Stator Water Pumps</p> <p>When the crew assumes the watch,</p> <p>When contacted as in plant operator to verify Stator Cooling Pump suction valve is OPEN</p> <p>If asked to report status of Stator Water Cooling pump</p>	<p><b>BOOTH COMMUNCIATOR</b> <b>Report: V-45-13 “B” Stator Water Cooling Pump suction isolation valve is OPEN”</b></p> <p><b>BOOTH COMMUNCIATOR</b> <b>Report: “B” Stator water cooling pump is operating normally. Acknowledging the 1C83 alarms.”</b></p> <p><b>SIMULATOR OPERATOR</b> <b>Click KEYPAD Key 1</b> This will acknowledge the alarms at 1C83</p>	<p>CREW: Shift Stator Water Cooling Pumps in accordance with OI 697 Stator</p> <p>CRS</p> <ul style="list-style-type: none"> <li>Direct RO to Swap Stator Water Cooling pumps in accordance with OI 697 Generator Stator Cooling Water system</li> </ul> <p>BOP:</p> <ul style="list-style-type: none"> <li>Verify “B” Stator Cooling Pump 1P91B suction valve V-45-13 is OPEN</li> <li>Start “B” Stator Cooling Pump 1P91B by momentarily placing it’s Handswitch to RUN on 1C08.</li> <li>Annunciator 1C08C D-4 H2/Stator Cooling panel Trouble alarms due to reserve pump running</li> <li>Verify both pumps are running</li> <li>Stop the “A” Stator Cooling Pump 1P91A by placing switch to STOP position momentarily</li> <li>1C08C D-4 H2/Stator Cooling panel Trouble should clear</li> </ul>

## SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
<p>EVENT 2:</p> <p>Insert Control Rods to reduce power</p> <p>The Crew will reduce reactor power with rods to achieve 95%</p>	<p><b>ATC EVALUTOR NOTE:</b></p> <p>This will require the ATC Operator to insert control rods to position 18.</p> <p><b>ATC EVALUATOR NOTE:</b></p> <p>The ATC Operator will insert the following control rods for RWM Step 37:</p> <ul style="list-style-type: none"> <li>• 30-19</li> <li>• 30-27</li> <li>• 14-27</li> <li>• 14-19</li> </ul> <p>The ATC Operator may plot on the Power to Flow map and/or print a ACUMEN Report after inserting control rods per the control rod sequence sheets</p>	<p>CREW: Lower reactor power using the Control Rod Sequence Sheets to the specified reactor power level</p> <p>CRS:</p> <ul style="list-style-type: none"> <li>• Provide Control Rod Refocus Brief per IPOI 3</li> <li>• Direct control rod insertion to a target power of 95% reactor power</li> </ul> <p>ATC:</p> <p>Repeat as necessary to establish the target power directed:</p> <ul style="list-style-type: none"> <li>• Select the desired control rod using the rod select matrix</li> <li>• Using control rod movement switch insert the control rods as directed to establish the desired reactor power</li> <li>• Monitor core parameters as power is changed, such as: <ul style="list-style-type: none"> <li>○ Recirc flow</li> <li>○ Reactor jet pump total core flow</li> <li>○ Total steam flow</li> <li>○ Total feed flow</li> <li>○ Reactor water level</li> <li>○ Reactor pressure</li> <li>○ APRM power</li> </ul> </li> </ul> <p>BOP:</p> <ul style="list-style-type: none"> <li>• Provide peer checks are requested</li> <li>• Monitor plant parameters as power is changed, such as: <ul style="list-style-type: none"> <li>○ Generator output</li> </ul> </li> </ul>

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS		
TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
<p>EVENT 3: Core Spray Pump Start and TRIP</p> <p>At the direction of the Lead Evaluator,</p> <p>If contacted as the in plant operator to investigate 1A3 switchgear room report</p>	<p style="text-align: center;"><b>SIMULATOR OPERATOR</b> <b>Click KEYPAD Key 2</b></p> <p>This will run a schedule file for the failure of A Core Spray</p> <p style="text-align: center;"><b>BOOTH COMMUNCIATOR</b> <b>ACKNOWLEDGE the request, and WAIT 3 minutes and REPORT, “The A Core Spray breaker is heavily damaged with some breaker parts on the floor in front of the cubical. There is no fire or smoke, just an acrid smell.”</b></p>	<p>CREW: Respond to annunciator 1C03A, A-9, “A” Core Spray Pump 1P211A Trip or Motor Overload</p> <p>BOP:</p> <ul style="list-style-type: none"><li>Determine that Drywell pressure is not &gt; 2 psig</li><li>Determine that RPV level is not &lt; 64"</li><li>Determine that the CS pump should not have initiated</li><li>May go to 1C43 to investigate the status of the Core Spray Initiation relays</li><li>Inform the CRS</li></ul> <p>CRS will (<b>1.02</b>)</p> <ul style="list-style-type: none"><li>Enter TS 3.5.1, Condition B to restore to Operable within 7 days.</li></ul> <p>BOP:</p> <ul style="list-style-type: none"><li>Will determine the Core Spray Pump has TRIPPED.</li></ul>
<b>EVALUATOR NOTE:</b> The next event will take approximately 2-3 minutes before a control room annunciator is received.		



## SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
<p>EVENT 3: Core Spray Pump Start and TRIP</p> <p>If called as the Second Assistant to vent the CS system,</p> <p>When directed to vent the CS system,</p>	<p><b>BOOTH COMMUNCIATOR</b> <b>ACKNOWLEDGE</b> the request and <b>WAIT 5 minutes and REPORT, “You are standing by the CS vent valve, you have you venting rig attached, and are ready to vent the ‘A’ CS system.”</b></p> <p><b>SIMULATOR OPERATOR</b> <b>Click KEYPAD Key 3</b> This will automatically cycle the A Core Spray discharge vent valve to lower the discharge pressure to clear the annunciator</p>	<p>CREW: Respond to 1C03A annunciators</p> <p>BOP</p> <ul style="list-style-type: none"> <li>○ May vent Core Spray per OI 151 Core Spray System</li> <li>○ Coordinate with the in-plant Operator to vent the Core Spray system per Section 8.1</li> </ul>
<b>EVALUATOR NOTE:</b> The next event will take approximately 2-3 minutes before a control room annunciator is received.		

<p><b>EVENT 4:</b> SBLC Leak</p> <p>At the direction of the Lead Evaluator,</p> <p>If directed to investigate the SBLC leak wait 3 minutes and report the following</p> <p>If directed to CLOSE V-26-01</p>	<p><b>SIMULATOR OPERATOR</b> <b>Click KEYPAD Key 4</b></p> <p>This will cause a leak from 1T218 to be developed. SBLC Storage tank level will lower until the Low Level alarm comes in.</p> <p><b>BOOTH COMMUNCIATOR</b> <b>ACKNOWLEDGE the request and WAIT 3 minutes and REPORT, "The leak is downstream of V-26-01 SBLC Storage Tank 1T218 Outlet Isolation and is isolatable."</b></p> <p><b>ACKNOWLEDGE the request and WAIT 1 minute and REPORT, "V-26-01 is directed SBLC Storage Tank 1T218 Outlet Isolation has been closed"</b></p> <p><b>SIMULATOR OPERATOR</b> <b>Click KEYPAD Key 5</b></p> <p>This will modify the malfunction to 0% and stop the leak.</p>	<p>CREW: Respond to annunciator 1C05A, (E-3) SBLC Tank HI/LO Level</p> <p>ATC:</p> <ul style="list-style-type: none"> <li>• Determine that SBLC Tank Level is lowering</li> <li>• Report to the CRS Tank Level and Trend</li> <li>• Direct an In-plant Operator to investigate the SBLC skid</li> </ul> <p>CRS:</p> <ul style="list-style-type: none"> <li>• Direct V-26-01 to be closed when location of the leak is known</li> <li>• Determine both SBLC subsystems are INOPERABLE</li> <li>• Enter LCO 3.1.7 Condition B restore 1 subsystem to OPERABLE within 8 hours</li> </ul>
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EVENT 5 Lightning Strike	<p align="center"><b>BOOTH COMMUNCIATOR</b></p> <p align="center"><b>Call the Control Room Supervisor as the Security Lieutenant and REPORT, “The National Weather Service has issued a severe thunderstorm warning for the DAEC area for the next 2 hours.”</b></p> <p align="center"><b>ACKNOWLEDGE the report:</b></p> <ul style="list-style-type: none"> <li>• <b>For ITC, report that the grid models show that the grid is stable</b></li> <li>• <b>For the Real Time Desk, acknowledge the information provided</b></li> </ul> <p align="center"><b>ACKNOWLEDGE the REPORT.</b></p>	<p>CREW: Take the actions directed by AOP 903, for severe thunderstorm warning</p> <p>CRS:</p> <ul style="list-style-type: none"> <li>• Enter and direct the actions of AOP 903, for severe thunderstorm warning</li> <li>• Contact ITC to check status of grid stability</li> <li>• Contact the Real Time Desk and inform them of any known disturbances or plant malfunctions</li> </ul> <p>BOP:</p> <ul style="list-style-type: none"> <li>• Verify the outside speakers are on</li> <li>• Make the site-wide announcement</li> <li>• Turn outside speakers off</li> <li>• Contact security to inform their personnel</li> <li>• Monitor wind speed using “AOP903”</li> </ul>
<p><b>EVALUATOR NOTE:</b> The next event is a lightning strike which trips the “B” GSW pump. This event was created for the BOP Operator to correct the abnormal condition of the GSW system.</p>		

<p>EVENT 5.a. Lightning Strike</p> <p>At the direction of the Lead Evaluator,</p> <p>When the “B” GSW pump has tripped,</p> <p>When contacted to investigate B GSW Breaker 1A409,</p> <p>If sent to investigate the auto strainer or the “B” GSW Pump,</p> <p>If sent to adjust Turbine Lube Oil temperature,</p>	<p><b>SIMULATOR OPERATOR</b> <b>Click KEYPAD Key 6</b></p> <p>This will run a schedule file and cause a lightning Strike and the trip the “B” GSW Pump</p> <p><b>BOOTH COMMUNICATOR</b> <b>Call the CRS and REPORT as the CAS Operator that, “A lightning bolt just hit in the yard near warehouse.”</b></p> <p><b>Acknowledge the request and WAIT 2 minutes and REPORT, “There is a ground fault flag (Relay 409-150G) on breaker 1A409.”</b></p> <p><b>Acknowledge the request and WAIT 4 minutes and REPORT, “The “B” GSW motor is warm to the touch but nothing else is abnormal. The GSW strainer, 1S-24, is turning, PDIS-4906 is reading 5 psid and lowering.”</b></p> <p><b>Acknowledge the request.</b></p> <p><b>SIMULATOR OPERATOR</b> <b>Adjust Remote Function SW 14 to lower Turbine Lube Oil temperature</b></p>	<p>Crew: Respond to Annunciator 1C06A, B-3</p> <p>BOP:</p> <ul style="list-style-type: none"> <li>At 1C06, confirm General Service Water Pumps Discharge Header Press low on PI-4903 GSW PUMPS DISCH HDR PRESS <ul style="list-style-type: none"> <li>Verify auto start of the standby pump.</li> <li>Determine that the “A” GSW pump did not automatically start.</li> </ul> </li> <li>Start the “A” GSW pump</li> <li>Shortly after the start of the “A” GSW pump, the crew will respond to annunciator 1C06A B-4, GSW AUTO FILTER HIGH ΔP</li> <li>Send an operator to the GSW strainer 1S-24 to verify high differential pressure on PDIS-4906</li> <li>Inform the CRS that AOP 411 is referenced in the ARP</li> </ul> <p>CRS</p> <ul style="list-style-type: none"> <li>Direct actions of ARP 1C06A B-3, B-4, C-4, and AOP 411 (Loss of GSW). <b>(5.16)</b></li> </ul>
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<p>EVENT 5.a. Lightning Strike</p>		<p>CREW: Perform actions per AOP 411</p> <p>BOP: <b>(94.16)</b></p> <ul style="list-style-type: none"> <li>• IF there is insufficient GSW cooling OR less than 2 GSW pumps are running THEN make every effort to achieve at least 2 pumps running.</li> <li>• Monitor GSW combined outlet temperatures (Computer Point M004) and send an operator to monitor GSW load return line temperatures (local).</li> <li>• IF turbine bearing temperatures approach 250°F, THEN manually scram the reactor AND trip the main turbine AND start turbine lift pumps and turning gear oil pump.</li> <li>• IF a condensate or feed pump high temperature annunciator 1C06B(D-5) TURB INSTRUMENT PANEL 1C-20 TROUBLE is received THEN perform the following as required:</li> <li>• Monitor generator hydrogen, stator, and exciter cooler temperatures.</li> </ul> <p>ATC:</p> <ul style="list-style-type: none"> <li>• Reduce reactor power to <math>\leq 50\%</math> using IPOI 4 Fast Power Reduction if necessary and secure the affected pump(s).</li> <li>• Scram the reactor prior to securing both condensate or feed pumps</li> </ul>
<p><b>EVALUATOR NOTE:</b> The next event was developed for the ATC Operator and it is recommended to be inserted when the BOP is investigating GSW cooled component recorders located in the Control Room Back Panel area.</p>		

<p>EVENT 5.b. Lightning Strike</p> <p>When the BOP Operator is in the Control Room Back panels or at the direction of the Lead Evaluator:</p> <p>If sent to investigate the RBCCW system and breaker,</p>	<p><b>SIMULATOR OPERATOR</b> Click <b>KEYPAD Key 7</b> <b>This will start a schedule file for another lightning strike and a trip of the “C” RBCCW Pump</b></p> <p><b>BOOTH COMMUNICATOR</b> <b>ACKNOWLEDGE the request and WAIT 3 minutes and REPORT, “The ‘C’ RBCCW pump breaker is warm and in the trip free position. The pump seems normal, The “A” RBCCW pump is running Sat.”</b></p>	<p>CREW: Respond the annunciator 1C06B D-3, RBCCW Pump Disch Header Lo Pressure alarm</p> <p>ATC:</p> <ul style="list-style-type: none"> <li>• Confirm the low pressure condition on PI-4821 and/or Computer Contact Point M508</li> <li>• Normally two pumps are in operation, confirm that A, B &amp; C RBCCW PUMPS 1P-81A, B &amp; C are all running</li> <li>• If any pump fails to start, attempt to start that pump ONCE using the following control switch; <ul style="list-style-type: none"> <li>• HS-4829 A RBCCW PUMP 1P-81A</li> </ul> </li> </ul>
<p><b>EVALUATOR NOTE:</b> The next event will cause a leak in the RWCU HX Room and will take approximately 1-2 minutes for a control room annunciator to be received.</p>		

<p>EVENT 6 RWCU HX room leak</p> <p>At the direction of the Lead Evaluator,</p>	<p style="text-align: center;"><b>SIMULATOR OPERATOR</b> <b>Click KEYPAD Key 8</b></p> <p>This will start a leak in the RWCU Hx room to drive the crew to insert a manual reactor scram</p> <p style="text-align: center;"><b>NOTE: If the BOP shifts main plant ventilation to a 3-2-3 lineup CU07 will modify to cause RWCU HX Room temperature to rise above MAX SAFE</b></p>	<p>Crew: Respond to the following Annunciators:</p> <ul style="list-style-type: none"> <li>○ 1C04B B-4, Steam Leak Detection Ambient High Temperature</li> <li>○ 1C04B D-4, Steam Leak Det Hi ΔT</li> <li>○ 1C04B A-9, RWCU LO FLOW</li> <li>○ 1C04B B-9, RWCU Filter/Demin Trouble</li> </ul> <p>BOP:</p> <ul style="list-style-type: none"> <li>• Go to 1C21 and determine that the leak is from RWCU Hx room</li> <li>• Maximize plant ventilation IAW OI 734, QRC1, Maximize Plant Ventilation             <ul style="list-style-type: none"> <li>• Start 1V-EF-1, 1V-EF-2, and 1V-EF-3 MAIN PLANT EXHAUST FANS and verify their respective dampers indicate OPEN</li> <li>• Start the Reactor Building Exhaust Fans                 <ul style="list-style-type: none"> <li>○ Start the Reactor Building Supply Fans</li> </ul> </li> </ul> </li> </ul> <p>ATC:</p> <ul style="list-style-type: none"> <li>• Verify Automatic Actions             <ul style="list-style-type: none"> <li>○ Determine that MO 2700, the RWCU Inboard Isolation Valve did not close, and has a thermal overload on the breaker                 <ul style="list-style-type: none"> <li>○ Send someone to 1B3219 to attempt to reset the thermal overload</li> </ul> </li> <li>○ Determine that MO 2701 did not close and attempt to close the valve                 <ul style="list-style-type: none"> <li>○ When the HS for MO 2701 is taken to the close position, all indication for MO 2701 is lost</li> <li>○ Will report to the CRS that MO 2701 is not closed</li> </ul> </li> </ul> </li> <li>• Prompt the CRS that this is an EOP 3 entry</li> <li>• Insert a manual reactor scram prior to reaching a Max Safe Operating Temperature Limit in the RWCU Hx room. <b>(Critical)</b></li> </ul>
<p>If the crew actions appear to be keeping the RWCU Hx room from reaching a Max Safe temperature,</p> <p>If sent to attempt to reset the thermal overload on 1B3219,</p>	<p style="text-align: center;"><b>SIMULATOR OPERATOR</b> <b>Raise the severity of MF CU07, RWCU Leak in Hx Room, in increments of 0.1 with a 30 second ramp.</b></p> <p style="text-align: center;"><b>EVALUATOR NOTE</b> <b>RWCU HX Room Ambient temps:</b> <b>MNOL: 130°F</b> <b>MSOL: 212°F</b></p> <p style="text-align: center;"><b>BOOTH COMMUNCIATOR</b> <b>ACKNOWLEDGE the request, WAIT 2 minutes and REPORT, “I have depressed the thermal overload for MO 2700 on breaker 1B3219.”</b></p>	

<p>EVENT 6 RWCU HX room leak</p> <p>When the Operator attempts to close MO 2701,</p> <p>If sent to attempt to investigate 1D42 ckt 04 for MO 2701,</p>	<p><b>SIMULATOR OPERATOR</b> <b>Verify that Event Trigger 23 goes TRUE</b></p> <p>This will result in the breaker trip for MO2701, and the valve will remain open.</p> <p><b>BOOTH COMMUNCIATOR</b> <b>Acknowledge the request and WAIT 2 minutes and REPORT, "There is an acrid odor near 1D4204, and the breaker door is warm to the touch."</b></p> <p><b>EVALUATOR NOTE</b> <b>RWCU HX Room Ambient temps:</b> <b>MNOL: 130°F</b> <b>MSOL: 212°F</b></p>	<p>Crew: In response to the leak in the RWCU Hx room</p> <p>CRS: <b>(6.67)</b></p> <ul style="list-style-type: none"> <li>• Enter EOP 3 and direct the following <ul style="list-style-type: none"> <li>○ Operate available coolers in the affected area</li> <li>○ Operate available main plant supply and exhaust fans <ul style="list-style-type: none"> <li>▪ Maximize plant ventilation IAW OI 734, QRC1, Maximize Plant Ventilation</li> </ul> </li> <li>○ Attempt to isolate the leaking system <ul style="list-style-type: none"> <li>▪ Determines that RWCU will not isolate due to the thermal overload on MO 2700 <ul style="list-style-type: none"> <li>• Direct that the thermal overload condition be reset and the valve closed</li> </ul> </li> <li>▪ Determine that MO 2701 did not isolate, and send an Operator to 1D4204 to investigate</li> </ul> </li> <li>○ Determine that a pressure reduction will decrease leakage into secondary containment</li> <li>○ Determine that a reactor scram be inserted prior to the RWCU Hx room reaching a Max Safe Operation Limit <ul style="list-style-type: none"> <li>▪ Set a critical parameter on the RWCU Hx room for inserting a reactor scram</li> </ul> </li> <li>○ Insert a reactor scram prior to reaching a Max Safe Operation Limit in the RWCU Hx room. <b>(Critical)</b></li> </ul> </li> </ul>
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<p>EVENT 7: Reactor Scram ATWS</p>	<p><b>EVALUATOR NOTE:</b> IF ARI automatically initiates due to low RPV water level and all control rods are inserted before the manual ARI pushbuttons have been depressed <b>THEN</b> this Critical Task is failed</p>	<p>Crew: Perform the following in response to rising temperatures in the RWCU HX Room.</p> <p>CRS:</p> <ul style="list-style-type: none"> <li>• Enter EOP 1</li> <li>• Upon the ATC report, Exit EOP 1 and transition to ATWS <b>(6.55)</b></li> <li>• Per ATWS <ul style="list-style-type: none"> <li>○ Lock out ADS</li> <li>○ Install defeat 15</li> <li>○ Perform the ATWS QRC</li> </ul> </li> </ul> <p>BOP: <b>(95.55)</b></p> <ul style="list-style-type: none"> <li>• Lock out ADS prior to ADS Actuation <b>(Critical)</b></li> <li>• Install Defeat 15</li> </ul> <p>ATC:</p> <ul style="list-style-type: none"> <li>• Per the ATWS QRC <ul style="list-style-type: none"> <li>○ Verify the MODE Switch is in SD</li> <li>○ FW Master Controller in Auto and set at 158.5 inches</li> <li>○ HSS-4450 in 1 element</li> <li>○ Recirc run back to minimum</li> <li>○ Initiate ARI <b>(Critical) (95.95)</b></li> <li>○ Verify Recirc Pumps trip</li> <li>○ Report that the ATWS QRC is complete with the exception of initiating SBLC</li> <li>○ ARI DID work</li> <li>○ Determines that all but one control rod has inserted</li> </ul> </li> </ul>
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<p>EVENT 8: Re-entry to EOP 1 1A4 Lockout</p> <p>When the turbine trips,</p>	<p><b>SIMULATOR OPERATOR</b> <b>Verify Event Trigger 20 goes TRUE</b> This will result in the lock out of 1A4</p>	<p>Crew: Exits ATWS and returns to EOP 1 and directs the following actions</p> <p><b>CRS: (6.45)</b></p> <ul style="list-style-type: none"> <li>• Per EOP 1 <ul style="list-style-type: none"> <li>○ Restore and maintain RPV level to 170" to 211"</li> <li>○ Install defeat 11</li> <li>○ Establishes an RPV pressure band of 800 psig to 1055 psig using SRVs and MSL drains <b>(6.47)</b></li> <li>○ When the plant is stable, assigns a new pressure band of 500 to 700 psig to remove the driving head of the leak in the RWCU HX room</li> </ul> </li> </ul> <p><b>BOP: (95.46)</b></p> <ul style="list-style-type: none"> <li>• Install Defeat 11</li> <li>• When directed establish a new pressure band of 500 to 700 psig to remove the driving head from the leak in the RWCU HX room using EHC pressure set or SRVs.</li> </ul> <p><b>ATC: (95.46)</b></p> <ul style="list-style-type: none"> <li>• Maintain RPV level 170" to 211" using Main Feedwater</li> <li>• Will establish a RPV pressure band of 800 psig to 1055 psig using EHC</li> <li>• When directed establish a new pressure band of 500 to 700 psig to remove the driving head from the leak in the RWCU HX room using EHC pressure set or SRVs. <b>(95.47)</b></li> </ul>
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<p>EVENT 8: Re-entry to EOP 1 1A4 Lockout</p> <p>If sent to investigate the lockout trip of 1A4,</p>	<p><b>BOOTH COMMUNICATOR</b> <b>ACKNOWLEDGE the request, WAIT 3 minutes and REPORT, "That 1A4 has a lockout trip."</b></p>	<p>Crew: Respond to the lock out of 1A4, and perform the actions of AOP 301</p> <p>CRS: <b>(5.36)</b></p> <ul style="list-style-type: none"> <li>Enter and direct the performance of AOP 301 for the loss of 1A4</li> </ul> <p>BOP: <b>(94.36)</b></p> <ul style="list-style-type: none"> <li>Will determine that the "B" EDG is running without any cooling water, and take the HS for the "B" EDG to the PTL position</li> <li>Prompt CRS to enter AOP 358 to restore RPS</li> <li>Send an operator to investigate 1A4</li> <li>Verify "A" CRD is running</li> <li>Verify "A" and "C" GSW pumps are running</li> <li>Verify "A" and "C" RWS pumps are running</li> <li>Verify that the "A" Chiller and CB air conditioning is in service</li> <li>Verify that the "A" and "C" Battery Room Exhaust Fans are running</li> </ul>
<p><b>EVALUATOR NOTE:</b> The next event is to drive the crew to Emergency Depressurization. The ramp rate for the second area going above maximum safe operating limit (MSOL) is approximately 2 minutes.</p>		

<p>Event 9: Second Area above MSOL / ED</p> <p>When the actions of AOP 301 have been directed, and at the direction of the Lead Evaluator,</p> <p>If the temperature in the RWCU Hx room has fallen below Max Safe,</p>	<p style="text-align: center;"><b>SIMULATOR OPERATOR</b> <b>Click KEYPAD Key 9</b></p> <p>This will begin the leak above the TIP room and drive the crew to Emergency Depressurize</p> <p style="text-align: center;"><b>EVALUTOR NOTE:</b> <b>RWCU ABOVE TIP ROOM AMBIENT:</b> <b>MNOL: 111.5°F</b> <b>MSOL: 150°F</b></p> <p><b>IF</b> the crew has <b>NOT</b> attempted opening the necessary SRVs required for emergency depressurization within 10 minutes with both areas above MSOL <b>THEN</b> the Critical Task is failed</p> <p style="text-align: center;"><b>SIMULATOR OPERATOR</b> <b>Modify Malfunction CU07 by</b> <b>increments of 0.1 until the area has</b> <b>gone above Max Safe again</b></p>	<p>Crew: Respond to the rising temperatures above the TIP room and continue in the actions of EOP 3</p> <p>CRS:</p> <ul style="list-style-type: none"> <li>• Direct that the Defeat 9 be installed to maximize cooling to the reactor building</li> <li>• If the temperature rise above the TIP room is identified early enough, the CRS will direct the crew to anticipate Emergency Depressurization <ul style="list-style-type: none"> <li>◦ Direct the performance of SEP 307, Rapid Depressurization with Bypass Valves. This will be unsuccessful as the Turbine Bypass Valve Jack will not engage <b>(6.48)</b></li> </ul> </li> <li>• Wait until two areas exceed Max Safe</li> <li>• When two areas exceed Max Safe, enter ED</li> </ul> <p>BOP:</p> <ul style="list-style-type: none"> <li>• Determine that RM 7606B REACTOR BUILDING VENT SHAFT RAD MONITOR is failed upscale and cannot be reset preventing Defeat 9 from being installed.</li> <li>• Verify torus level is &gt; 4.5 ft</li> <li>• Open 4 ADS SRVs <b>(Critical)</b> <ul style="list-style-type: none"> <li>◦ Receive the report from 1C03, that 2 ADS SRVs opened, and 2 LLS SRV have opened</li> </ul> </li> </ul> <p>ATC:</p> <ul style="list-style-type: none"> <li>• Maintain RPV level using Condensate and Feed, CS or RHR during the ED</li> <li>• Restore RPV level to 170" to 211"</li> </ul> <p>BOP: <b>(95.68)</b></p> <ul style="list-style-type: none"> <li>• Install Defeat 9 to maximize reactor building ventilation <b>(UNSUCCESSFUL)</b></li> <li>• Perform SEP 307, Rapid Depressurization with Bypass Valves. <b>(UNSUCCESSFUL)</b></li> <li>• Report Torus level</li> <li>• Report to the CRS that 2 ADS SRVs opened, and 2 LLS SRV opened</li> <li>• Place Torus Cooling in service <ul style="list-style-type: none"> <li>◦ Utilize RHRSW Hard card to place RHRSW in service</li> <li>◦ Place Torus cooling in service using Torus Cooling Hard card</li> </ul> </li> </ul>
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The Scenario will be complete when the RPV is depressurized and RPV level is being restored, and at the direction of the Lead Evaluator

**Simulator Operator**  
**Place the simulator in FREEZE.**

**Announce the scenario is complete; please stand by your stations and do not discuss the scenario with your crew.**

**\*\*\* END OF SCENARIO \*\*\***

## QUANTITATIVE ATTRIBUTES

### **Malfunctions:**

#### *Before EOP Entry:*

1. Inadvertent initiation of the “A” Core Spray Pump
2. “B” GSW pump trip and initiating entry into AOP 411, Loss of GSW
3. Trip of the “C” RBCCW Pump
4. Leak in the RWCU HX Room

#### *After EOP Entry:*

1. ATWS
  - ARI inserts all rods but 1
2. Loss of 1A4

### **Abnormal Events:**

1. AOP 411, Loss of GSW
2. AOP 301, Loss of Essential Power

### **Major Transients:**

1. Steam leak in the RWCU Hx room spreads to area above TIP room
2. ATWS
3. Emergency Depressurization

### **Critical Tasks:**

1. If the reactor is at power and a primary system is discharging into secondary containment, THEN insert a manual scram before any parameter reaches the Max. Safe Operating Limit
2. IF a scram is required and Reactor power is above 5%, THEN reduce power below 5% using one or more of the following methods
  - Initiation of ARI
3. IF a reactor scram is required and the reactor is NOT shutdown under all conditions, THEN lockout ADS before automatic actuation
4. WHEN a primary system is discharging into secondary containment and the same parameter is exceeding the Max. Safe Operating limits in more than one area, THEN perform Emergency RPV Depressurization

Facility: Duane Arnold Energy Center Scenario No.: 2 Op-Test No.: 19-1 NRC

Examiners	Operators

Initial Conditions/Turnover:  
Reactor Power is 100%

Guarded Equipment: Skimmer Surge Tank Room, Fuel Pool Heat Exchanger Room, 1C136 Fuel Pool Cooling Panel, 1B3507 'A' Fuel Pool Cooling Pump Breaker, 1B4327 'B' Fuel Pool Cooling Pump Breaker.

Evolutions in progress or planned for upcoming shift

- Shift Stator Water Cooling pumps in accordance with OI 697 Generator Stator Water Cooling System
- Reduce Reactor Power to 95% with Control Rod Insertion for Load Line Adjustment

Plant PRA/PSA Status including CDF/LERF & color

- CDF GREEN – 1.47E-6/ Cumulative Core Damage Probability (CCDP) No Limit
- LERF GREEN – 3.92 E-7/ Cumulative Large/Early Release Probability (CLERP) No Limit

Rain will be moving into the area later in the shift.

2 Extra Non Licensed Personnel Available in Work Control

Event No.	Malf. No.	Event Type*	Event Description
1		N-BOP N-CRS	Shift Stator Water Cooling Pumps in accordance with OI 697 Generator Stator Water Cooling System section 7.0
2		R-ATC R-CRS	Reduce Rx Power with Rods In Accordance With Load Line Adjustment to 95% RTP
3	DI-CS-008	I-BOP I-CRS TS-CRS	"A" Core Spray pump will receive an inadvertent start signal.  Tech Spec 3.5.1 Condition B (3.3.5.1 Also Possible)

4	sl07	TS-CRS	Leak on 1T-218 develops and causes 1C05A E-3, SBLC Tank HI/LO Level alarm to come in  Tech Spec 3.1.7, Condition B
5a./b.	sw37a an1c06a (17) sw32 stsw01a sw10c	C-CRS C-BOP  C-ATC	Lightning Strike causes: 5.a. Trip of B GSW Pump ○ Standby Pump Fails to Auto Start → AOP 411 (Possible) ○ High ΔP across Auto Filter → ARP Actions 5.b. C RBCCW Pump ○ Standby Pump Fails to Auto Start → ARP Actions
6	cu05 cu11a cu12a ms28b cu07 DO-CU-003 DO-CU-004 DO-CU-027 DO-CU-028 DO-PC-091 DO-PC-092	M-All	A leak will develop in the RWCU HX room requiring EOP 3 Entry • Scram prior to Temperatures Reaching Max Safe • Leak will not be Isolated • Defeat 9 will not work to restore ventilation
7	rp05a rp05b rp05d rp05e rd02022 7	C-ATC C-CRS	On the reactor scram, there will be an electrical ATWS • ARI will be effective at inserting all but 1 control rod
8	ed08d	C-All	After all but one of the control rods have inserted, 1A4 will lockout. The crew will take actions In Accordance With AOP 301
9	DI-AD-015 DI-AD-017	C-BOP C-CRS	TIP room exceeds a Max Safe Temperature Limit, the crew will enter ED. • If the crew attempts to use the EHC Control System, it will fail to control the B/P Valves • Only two ADS SRV's will open, requiring the crew to open the LLS SRV's to complete the ED





## SIMULATOR EXERCISE GUIDE, THREE COLUMN

**SEG**  
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**SITE:** DAEC

**Revision #:** 0

**LMS ID:** NRC Scenario 3

**LMS Rev. Date:**

**SEG TITLE:** NRC Scenario 3, Rev. 0

**SEG TYPE:** ☐ Training

☒ Evaluation

**PROGRAM:** ☐ LOCT ☒ LOIT ☐ Other:

**DURATION:** 60 minutes

**Developed by:**

\_\_\_\_\_  
Instructor/Developer

\_\_\_\_\_  
Date

**Reviewed by:**

\_\_\_\_\_  
Instructor (Instructional Review)

\_\_\_\_\_  
Date

**Validated by:**

\_\_\_\_\_  
SME (Technical Review)

\_\_\_\_\_  
Date

**Approved by:**

\_\_\_\_\_  
Training Supervision

\_\_\_\_\_  
Date

**Approved by:**

\_\_\_\_\_  
Training Program Owner (Line)

\_\_\_\_\_  
Date

## SIMULATOR EXERCISE GUIDE REQUIREMENTS

<b>Terminal Objective</b>	This Evaluation Scenario Guide evaluates the Operators' ability to: "Given the malfunctions presented in this ESG, the students will protect the public, protect plant personnel, and protect plant equipment, in accordance with plant procedures."
<b>Enabling Objectives:</b>	Evaluation Guide, no tasks are trained
<b>Prerequisites:</b>	Enrolled in Licensed Operator Continuing Training, License Operator Initial Training, Senior Reactor Operator- Certification Training
<b>Training Resources:</b>	<ul style="list-style-type: none"> <li>A. Simulator</li> <li>B. Evaluation Team</li> <li>C. Simulator Operator</li> <li>D. Booth Communicator</li> </ul>
<b>References:</b>	<ul style="list-style-type: none"> <li>1. ARP 1C08B, Rev. 98</li> <li>2. AOP 410, Rev. 30</li> <li>3. TS 3.8.7, AMD 223</li> <li>4. TS 3.7.2, AMD 223</li> <li>5. IPOI 3, Rev 160</li> <li>6. AOP 903, Rev, 59</li> <li>7. ARP 1C04B, Rev. 64</li> <li>8. ARP 1C23C, Rev. 55</li> <li>9. AOP 408, Rev. 32</li> <li>10. AOP 304.1, Rev.60</li> <li>11. EOP 1, Rev, 20</li> <li>12. EOP 2, Rev, 18</li> <li>13. OI 416, Rev 67</li> <li>14. OI 454, Rev 70</li> <li>15. OI 644 QRC 1, Rev. 8</li> <li>16. ED Rev. 11</li> </ul>
<b>Protected Content:</b>	<b>Identify here and in training material as {C001}; See Comment for details.</b> None
<b>Evaluation Method:</b>	In accordance with NUREG 1021
<b>Operating Experience:</b>	None

**Risk Significant  
Operator Actions:**

Initiate RPV Emergency Depressurization

**TASKS ASSOCIATED WITH SIMULATOR EXERCISE GUIDE**

Task #	Task Title
94.08	Respond to Loss of 4160V Non-essential Power Condition (1A1 or 1A2)
94.14	Respond to Well Water System Abnormal Operation Condition
94.15	Respond to the loss of River Water Supply
94.24	Respond to High Winds / Severe Thunderstorms / Tornado Condition
95.65	Spray the Drywell with RHR Not Required for Adequate Core Cooling
95.63	Perform DW/T leg of EOP 2
95.80	Perform an Emergency Depressurization Using SRVs
1.02	Determine Operability for Technical Specification Required Components
3.01	Implement Emergency Plan
5.08	Direct Crew Response to Loss of 4160V Nonessential Power Condition
5.14	Direct Crew Response to Well Water System Abnormal Operation Condition
5.15	Direct Crew Response to the loss of River Water Supply
5.24	Direct Crew Response to High Winds / Severe Thunderstorms / Tornado Condition
6.65	Direct Crew Response to Spray the Drywell with RHR Not Required for Adequate Core Cooling
6.74	Direct Crew Response for performance of ALC when injection systems are lined up and available, or when no pumps are available
6.78	Direct Crew Response for performance of Emergency Depressurization
6.80	Direct Crew Response to Perform an Emergency Depressurization Using SRVs

**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
0.0	New for PDA 19-1 LOIT NRC Exam.			See cover	
				See cover	

TASKS ASSOCIATED WITH SIMULATOR EXERCISE GUIDE	
Task #	Task Title
94.03	Respond to Power/Reactivity Abnormal Change Condition
94.08	Respond to Loss of 4160V Non-essential Power Condition (1A1 or 1A2)
94.14	Respond to Well Water System Abnormal Operation Condition
94.15	Respond to the loss of River Water Supply
94.24	Respond to High Winds / Severe Thunderstorms / Tornado Condition
95.65	Spray the Drywell with RHR Not Required for Adequate Core Cooling
95.63	Perform DW/T leg of EOP 2
95.80	Perform an Emergency Depressurization Using SRVs
1.02	Determine Operability for Technical Specification Required Components
3.01	Implement Emergency Plan
5.03	Direct Crew Responses to Power/Reactivity Abnormal Change Condition
5.08	Direct Crew Response to Loss of 4160V Nonessential Power Condition
5.14	Direct Crew Response to Well Water System Abnormal Operation Condition
5.15	Direct Crew Response to the loss of River Water Supply
5.24	Direct Crew Response to High Winds / Severe Thunderstorms / Tornado Condition
6.65	Direct Crew Response to Spray the Drywell with RHR Not Required for Adequate Core Cooling
6.74	Direct Crew Response for performance of ALC when injection systems are lined up and available, or when no pumps are available
6.78	Direct Crew Response for performance of Emergency Depressurization
6.80	Direct Crew Response to Perform an Emergency Depressurization Using SRVs

## OVERVIEW / SEQUENCE OF EVENTS

### OVERVIEW

See below event description for overview

The Scenario will end when the plant has been depressurized and RPV level is returning to the directed band.

### SEQUENCE OF EVENTS

**ALL TIMES IN THIS SCENARIO ARE APPROXIMATE**

Event #	Description
1.	<p>The plant is starting up following a failure of the lube oil system of the “B” Feedwater pump. The plant is currently at 50% power and the startup was on hold due to the performance of STP 3.5.1-10, HPCI System Operability Test and Comprehensive Pump test. The STP has been completed SAT and torus cooling was in service.</p> <p>After turnover, the crew will finish securing from torus cooling by securing “A” side RHRSW and “A” side ESW.</p>
2.	Raise Power with Recirc to 55%-60% in preparation of putting the “B” RFP in service.
3.	<p>Due to the electrical transients on the 1A3, Essential Switchgear, the feeder breaker 1A312, to 1B09 opens on ground fault. Subsequently, a loss of “A” side RWS occurs. The crew will start 1P-117B (D) IAW ARP 1C08A(B-6), LC XFMR 1X09 Breaker 1A312, or MCC 1B9 BKR 1B903 Trip, and AOP 410 Loss of River Water Supply. Based on the loss of 1B09.</p> <p>The Control Room Supervisor will enter TS 3.8.7, Condition D, to declare associated River Water Supply subsystem(s) inoperable, Immediately. From 3.8.7, the crew will enter TS 3.7.2, Condition A, to restore the RWS subsystem to OPERABLE status within 7 days.</p>
4.	<p>A report is received by the Control Room Supervisor that the National Weather Service has issued a Severe Thunder Storm Watch for the next 60 minutes. The Control Room Supervisor will enter AOP 903, for the Severe Thunder Storm.</p> <p>Once the site wide announcement is completed, a lightning strike will cause a trip of the “A” Well Water Pump The Crew will respond to the trip of the “A” Well by performing the actions of ARP 1C23C, F-1, “A” Well Water Pump 1P58A Trouble. This will refer the Operator to AOP 408, Loss of Well Water Flow. The Operator will restore adequate Well Water flow via AOP 408.</p> <p>When the Balance of Plant goes to monitor Well Water parameters at 1C23, an additional lightning strike will occur and trip the running RWCU pump. The crew will take action in accordance with 1C04B (A-9), RWCU Pump LO Flow, and B-9, RWCU Filter/Demin Trouble.</p>

	The Control Room Supervisor will enter TRM Spec 3.3.4 for online chemistry monitoring is not met with RWCU OOS.
5.	A LOCA will develop from the "B" recirculation loop due to raising reactor power. The crew will insert a manual scram prior to the DW reaching 2 psig and enter EOP 1 on the scram, and when the DW reaches 2 psig, the crew will re-enter EOP 1 and enter EOP 2.
6.	<p>As the DW temperature and pressure rise, the crew will take action to spray the DW prior to the DW temperature reaching 280°F. <b>(Critical)</b></p> <p>When drywell pressure rises above 2 psig, the following equipment issues will be identified by the crew:</p> <ul style="list-style-type: none"> <li>• The "B" CS pump will start and trip after operating for 3 minutes ("B" CS will be unavailable)</li> <li>• The "A" CS pump will fail to automatically start and will be manually started by the crew <b>(Critical)</b></li> </ul> <p>HPCI will initially start and inject to the vessel. The HPCI Aux Oil Pump will fail and HPCI will be unavailable when secured</p>
7.	On the turbine trip the Startup Transformer will develop an electrical fault and cause a loss of 1A1 and 1A2 Non-essential Electrical Buses. The Control Room Supervisor will enter and direct the actions of AOP 304.1, Loss of 4160V Non-Essential Electrical Power.
8.	<p>The primary leak will begin to worsen and overcome all high pressure makeup sources. The Control Room Supervisor will enter Alternate Level Control and prepare for an Emergency Depressurization. When RPV level reaches +15", the crew will;</p> <ul style="list-style-type: none"> <li>• Open 4 ADS SRVs <b>(Critical)</b></li> </ul> <p>When RPV pressure lowers to 450 psig, the crew will determine that the selected RHR inject valve and "A" Core Spray Inject valve did not automatically open, and Operator action is necessary to manually open both valves <b>(Critical)</b></p> <p>The scenario will end when the crew has performed and Emergency Depressurization and RPV level is being returned to the directed band.</p>

## SIMULATOR SET UP INSTRUCTIONS

1. Perform simulator set up per TDAP 1839 Attachment 2, Simulator Setup Checklist \_\_\_\_\_
2. Using the exam flash drive with the scenario simulator files, insert in the left instructor station computer and navigate to the D:\ directory \_\_\_\_\_
3. Copy the *NRCScenario3.dat* file from the exam flash drive to C:\Trex\_Duane-TELEC\Executive\SiteSpecific\InitialCondition and rename the file to an available IC using the format "ic\_###" \_\_\_\_\_
  - a. Reset to the newly created IC \_\_\_\_\_
  - b. Place the Simulator in **RUN** \_\_\_\_\_
  - c. Run schedule file *Weather.sch* following directory path  
D:\NRCOperational\NRCScenarios\NRC\_Scenario\_3\NRCScenario3\_SimFiles \_\_\_\_\_

### OR

4. Reset to IC 13, place the simulator in **RUN** and perform the following (this will take approximately 15 minutes for the plant to stabilize):
  - a. Insert Event Triggers, Malfunctions, Overrides, and Remotes using schedule file *NRCScenario3Setup.sch* located on the exam flash drive using the following directory path  
D:\NRCOperational\NRCScenarios\NRC\_Scenario\_3\NRCScenario3\_SimFiles \_\_\_\_\_
  - b. Have a second instructor verify:
    - (1) Auto triggers are setup as indicated below and evaluate to "FALSE" \_\_\_\_\_
    - (2) Malfunctions \_\_\_\_\_
    - (3) Remotes \_\_\_\_\_
    - (4) Overrides \_\_\_\_\_
  - c. Verify that an A RWS Pump is in service (single river water supply pump) \_\_\_\_\_
  - d. The orange 45% runback placard is in place on 1C05 \_\_\_\_\_
  - e. Secure both "B" RFP and the "B" RFP Aux Lube Oil Pump \_\_\_\_\_
  - f. Secure the B" Condensate pump \_\_\_\_\_
5. Setup Thundersound on the Instructor Station computer to the right and verify the following settings:
  - a. Click on the checkbox under "Playing" for THUNDERSTORM \_\_\_\_\_
  - b. Click the STOP button to toggle audio model to "playing" \_\_\_\_\_
  - c. Verify Instructor Station sound volume is set to approximately 25% \_\_\_\_\_
  - d. Verify the dB controller (under the Instructor Station monitor) level 2 knob is aligned to the detent (white line on the knob is pointing slightly counterclockwise) \_\_\_\_\_
  - e. Verify the Front Room (both) sub amplifiers are set to approximately 50% of scale \_\_\_\_\_



6. Place Guarded Equipment tags on: \_\_\_\_\_
  - 1B35 Switch
  - 1B43 Switch
7. Mark up IPOI 3, Power Operation (35%-100% Rated Power), Section 4.0, Raising Power Above 35%, up to Step 9 and leave for the crew \_\_\_\_\_
8. Markup the BOL pull sheets for a reactor power startup (withdrawn) to the current control rod position of the Initial Conditions \_\_\_\_\_
9. Ensure BOL pull sheets are in the 1C05B hanging file \_\_\_\_\_

# EVENT TRIGGER DEFINITIONS:

Trigger No.	Trigger Logic Statement	Trigger Word Description
1	rxqic >= 0.55	Calculated Core Power >= 55%
3	ZDIEG286B   ZDIEG286P	Main Generator Trip
5	pcpdwg > 2.0	Drywell Pressure above 2.0 psig
7	ZDIRHH2001(2)   ZDIRHHS1903(2)	Drywell Sprays Initiated
9, 11, 13	Manually activated	

# MALFUNCTIONS:

Time	Malf. No.	Malfunction Title	Delay	Ramp	ET	Initial Value	Final Value
SETUP	stcs01	CORE SPRAY INJECTION VALVE FAILS TO OPEN - MO-2117				INACTIVE	ACTIVE
SETUP	cs05a	CORE SPRAY PUMP A - FAILURE TO AUTO-INITIATE				INACTIVE	ACTIVE
SETUP	strh01	LPCI A INJECT VALVE FAILS TO AUTO OPEN - MO-2003				INACTIVE	ACTIVE
SETUP	strh02	LPCI B INJECT VALVE FAILS TO AUTO OPEN - MO-1905				INACTIVE	ACTIVE
As dir	ed08m	4.16 KV/480V BUS FAULT- BUS 1B09			1	INACTIVE	ACTIVE
As dir	ed06c	STARTUP TRANSFORMER LOSS			3	ACTIVE	ACTIVE
As dir	cs01b	CORE SPRAY PUMP TRIP- CORE SPRAY PUMP B TRIP	3 min		5	INACTIVE	ACTIVE
As dir	hp12	HPCI Aux Oil Pump Trips	5 sec		5	ACTIVE	ACTIVE
As dir	(new) rr15b	RECIRC LOOP RUPT- DESIGN BASES LOCA AT 100%- LOOP B		20 min	7	1	3
As dir	sw21a	WELL WATER PUMP TRIP- PUMP A, 1P58A			9	INACTIVE	ACTIVE
As dir	cu01b	RWCU PUMP TRIP – PUMP B			11	INACTIVE	ACTIVE
As dir	rr15b	RECIRC LOOP RUPT- DESIGN BASES LOCA AT 100%- LOOP B		4 min	13	0	1

**OVERRIDES:**

Time	OR No.	Override Title	Delay	Ramp	ET	Initial Value	Final Value

**REMOTE FUNCTIONS:**

Time	RF. No.	Remote Function Title	Delay	Ramp	ET	Initial Value	Final Value

**SCHEDULE FILE(S): NONE**

## SHIFT TURNOVER INFORMATION

- Day of week and shift
  - It is Today Dayshift
- Weather conditions
  - Cloudy and warm with a chance of storms.
- Plant power, 50% and the associated MWE and Core Flow
- Protected train
  - None
  - Guarded Equipment
    - Skimmer Surge Tank Room, Fuel Pool Heat Exchanger Room, 1C136 Fuel Pool Cooling Panel, 1B3507 'A' Fuel Pool Cooling Pump Breaker, 1B4327 'B' Fuel Pool Cooling Pump Breaker
    - Time to 200° F is 74 hours
- There are no Technical Specification Action statements in effect
- No Locked in / failed annunciators and alarms
- Evolutions in progress or planned for upcoming shift
  - STP 3.5.1-10, HPCI system Operability Test and Comprehensive Pump Test, was completed SATISFACTORY early last shift and torus cooling shutdown is in progress:
    - "A" RHRSW is in service with "A" RHRSW pump in operation
    - "A" ESW is in service to support plant conditions
  - The Plant is a 50% power due to repairs on the "B" Feedwater Pump lube oil system
    - 4 days ago, 1P-2B, the "B" RFP Aux Lube Oil Pump, automatically started due to a faulty pressure switch. After the automatic start, 1P-2B catastrophically failed
    - Power was reduced and the "B" Feedwater pump was removed from service
    - The lube oil system has been repaired, the Mechanics have just signed off their post maintenance testing for the 1P-2B

- Plant PRA/PSA Status including CDF/LERF & color
  - CDF GREEN – 1.47E-6/ Cumulative Core Damage Probability (CCDP) No Limit
  - LERF GREEN – 3.92 E-7/ Cumulative Large/Early Release Probability (CLERP) No Limit
- Procedures or major maintenance in progress
  - The Plan is to perform the following;
    - Prepare to start the “B” Feedwater Pump IAW OI 644, Feedwater System.
      - Currently in IPOI 3, Section 4.0, raising power above 35%, through step 8
      - Reactor Power must be raised with Recirc to between 55 and 60% power to start the “B” Feedwater Pump.
        - The scheduled Reactivity SRO went home due to a family emergency. Operations Management will allow the CRS to oversee the 5 to 7% power rise with Recirc to position the plant for the start of the “B” Feedwater Pump.
      - The two extra ROs are currently in the simulator performing JITT on the start of the second Feedwater pump
      - The WCC is currently preparing a prejob brief the start of the “B” Feed water Pump
      - When the “B” Feedwater System is operating, the Reactor Engineers will come to the control room for a rod pull brief to continue with the power rise to 100%.
- Equipment to be taken out of or returned to service this shift/maintenance on major plant equipment
  - Secure A RHRSW Pump and A ESW system
- Comments, problems, operator workarounds, etc.
  - Two (2) extra RO
  - Three (3) Extra NSPEO

## SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
EVENT 1: Secure "A" RHRSW Pump and "A" ESW		<p>CREW: Secure "A" RHRSW and "A" ESW</p> <p>CRS:</p> <ul style="list-style-type: none"> <li>Direct Operators to secure "A" RHRSW and "A" ESW</li> </ul> <p>BOP:</p> <ul style="list-style-type: none"> <li>Close MO-2046, RHR HX Service Water Outlet using HS-2046A</li> <li>Stop 1P-22A by placing HS-4925A momentarily to STOP</li> <li>Verify associated pump ammeter on 1C03 indicates 0 amps</li> <li>Verify flow indicator FI-2050 RHRSW INLET FLOW at 1C03 indicates 0 gpm</li> <li>Stop A ESW Pump by placing HS-4928A on 1C06 in the STOP position</li> </ul> <p>ATC:</p> <ul style="list-style-type: none"> <li>Provide peer-checks are requested</li> </ul>

## SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
EVENT 2: Raise reactor power with recirc		<p>CREW: Raise Reactor Power with Recirc IAW OI 264, Sec 4.2</p> <p>CRS:</p> <ul style="list-style-type: none"> <li>Direct the ATC to raise reactor power to 55-60% with recirc</li> <li>Supervise the manipulation of the Recirculation System</li> </ul> <p>ATC:</p> <ul style="list-style-type: none"> <li>Raise Recirc Flow with SIC-9245A, A Recirc MG Set Speed Control, and SIC-9245B, B Recirc MG Set Speed Control.</li> <li>Monitor core parameters as power is changed, such as: <ul style="list-style-type: none"> <li>Recirc flow</li> <li>Reactor jet pump total core flow</li> <li>Total steam flow</li> <li>Total feed flow</li> <li>Reactor water level</li> <li>Reactor pressure</li> <li>APRM power</li> </ul> </li> </ul> <p>BOP:</p> <ul style="list-style-type: none"> <li>Provide peer-checks are requested</li> <li>Monitor plant parameters as power is changed, such as: <ul style="list-style-type: none"> <li>Generator output</li> </ul> </li> </ul>
<b>EVALUATOR NOTE:</b> The loss of River Water Supply is automatically initiated when calculated core thermal power is $\geq 55\%$ . The next event can be directed by the Lead Evaluator prior to this automatic initiation.		

## SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
<p>EVENT 3: Breaker 1A312 TRIP</p> <p>At the direction of the Lead Evaluator:</p> <p>If sent to 1A3 switchgear to investigate,</p> <p>If/When sent to Intake Structure to investigate.</p> <p>If necessary, acknowledge annunciators at 1C102,</p>	<p style="text-align: center;"><b>SIMULATOR OPERATOR</b> <b>ACTIVATE ET 1/VERIFY ET 1 is active</b> This will insert ED08N for loss of 1B09</p> <p style="text-align: center;"><b>BOOTH COMMUNICATOR</b> <b>ACKNOWLEDGE the request, WAIT 2 minutes and REPORT, “Breaker 1A312 is tripped with indication of ground fault, all other indications are normal.”</b></p> <p style="text-align: center;"><b>EVALUATOR NOTE:</b> Time compression can be used for the Intake Structure Report.</p> <p style="text-align: center;"><b>BOOTH COMMUNICATOR</b> <b>ACKNOWLEDGE the request, WAIT 10 minutes and REPORT, “There is no power for ‘A’ side equipment at the intake structure, all equipment appears normal and 1K-16B is running and operating normally.”</b></p> <p style="text-align: center;"><b>SIMULATOR OPERATOR</b> <b>SET RF AN03 to ACK</b> This will acknowledge 1C102 annunciators</p>	<p>CREW: Respond to ARP 1C08B (B-6) LC XFMR 1X09 Breaker 1A312, or MCC 1B21 BKR 1B2003 Trip and AOP 410, Loss of River Water Supply.</p> <p>BOP:</p> <ul style="list-style-type: none"> <li>Send an Operator to the Intake Structure to verify 1K-16B is maintaining system air pressure and supplying both Intake Structure Instrument Air headers.</li> <li>Start River Water Supply Pumps 1P-117B and D as required per OI 410 (River Water Supply System) and perform the following: <ul style="list-style-type: none"> <li>Monitor Circ Water Pit level on Computer Point F092 and Cooling Tower Basin levels on LI-4231 and LI-4232</li> <li>Be prepared to perform AOP 410 (Loss of River Water Supply)</li> </ul> </li> <li>Start Standby Pump (B or D RWS Pump) to restore needed makeup flow</li> <li>Send an operator to the Intake Structure to verify alarms and check RWS pump breaker condition. <b>(94.15)</b></li> </ul> <p>CRS:</p> <ul style="list-style-type: none"> <li>Enter AOP 410 Loss of River Water Supply <b>(5.15)</b></li> <li>Comply with the Technical Specification requirements for Distribution Systems-Operating <b>(3.8.7 Condition D)</b> and inoperable RWS subsystem. <b>(3.7.2 Condition A) (1.02)</b></li> <li>Contact organization for support</li> </ul>
<b>EVALUATOR NOTE:</b> The next event is to setup for the associated system/component failures in the follow-on events and can be directed at the Lead Examiner’s direction.		



## SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
<p>EVENT 4: AOP 903, lightning strike</p> <p>Call the control room as Security and report,</p> <p>When contacted as ITC,</p> <p>When called as security personnel,</p> <p>After the site wide announcement is complete and at the direction of the Lead Evaluator,</p>	<p style="text-align: center;"><b>Simulator Operator</b></p> <p style="text-align: center;"><b>The National Weather Service has just declared a Severe Thunderstorm Warning For DAEC for the next 60 minutes</b></p> <p style="text-align: center;"><b>Simulator Operator</b></p> <p style="text-align: center;"><b>Inform the control room that the grid is stable.</b></p> <p style="text-align: center;"><b>Simulator Operator</b></p> <p style="text-align: center;"><b>Inform the control room that you will notify any personnel working outside that may not have heard the warning</b></p> <p style="text-align: center;"><b>Simulator Operator</b></p> <p style="text-align: center;"><b>Activate ET 9</b></p> <p>This will trip the "A" Well Water Pump</p>	<p>CREW: Perform actions directed by AOP 903, Severe Weather and for the loss of "A" Well Water Pump</p> <p>CRS:(5.24)</p> <ul style="list-style-type: none"> <li>Enter and direct that AOP 903, Severe Weather, Section B be entered and the necessary announcements be made to DAEC</li> <li>Will call ITC to determine the status of the grid and inform the ITC Real Time Desk of the severe storm warning</li> <li>Enter and direct AOP 408, Loss of Well Water</li> </ul> <p>BOP:(94.24)</p> <ul style="list-style-type: none"> <li>Make the thunderstorm warning</li> <li>Request Security inform personnel working outside, who may not have been able to hear the page announcement, of the WARNING condition</li> <li>Monitor wind speed using SPDS display SPMET1, YR9400 MET System Recorder, Group Display "AOP903", Real Time Plot "Wind", and other available local wind speed display</li> <li>Inform the CRS/SM to Refer to EPIP 1.1 and 1.2 for Emergency Action Level Classification and Notification requirements</li> <li>Start the "C" Well Water Pump <ul style="list-style-type: none"> <li>Verify all Well Water Pump parameters at 1C23</li> </ul> </li> </ul>

**EVALUATOR NOTE:** This first event was developed for the BOP Operator for the loss of Well Water. Ensure that the BOP Operator is in the vicinity of 1C07 and the well water system controls. The next event was developed for the ATC Operator for the loss of RWCU system.

## SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
<p>EVENT 4: AOP 903, lightning strike</p> <p>When the BOP is adjusting well water at 1C23,</p> <p>If contacted to investigate TRIP of "B" RWCU pump</p>	<p><b>SIMULATOR OPERATOR</b> <b>Activate ET11</b> This will trip the "B" RWCU Pump</p> <p><b>SIMULATOR OPERATOR</b> <b>Call the control room as a security Guard and report that there was a lightning strike just north of the plant</b></p> <p><b>BOOTH COMMUNICATOR</b> <b>ACKNOWLEDGE the request, WAIT 3 minutes and REPORT, "B" RWCU pump is warm to the touch. "A" RWCU pump is normal. Both RWCU Demin Beds are in HOLD."</b></p>	<p>CREW: Respond to a loss of RWCU Pump "B" and the following annunciators:</p> <ul style="list-style-type: none"> <li>1C04B A-9 RWCU PUMP LO FLOW</li> <li>1C04B B-9 RWCU FILTER/DEMIN TROUBLE</li> </ul> <p>ATC:</p> <ul style="list-style-type: none"> <li>Will determine that the B RWCU Pump has tripped and take action IAW ARP 1C04B A-9, RWCU Pump Lo Flow <ul style="list-style-type: none"> <li>Verify the running RWCU Pump has tripped</li> <li>Direct an operator to verify the RWCU Beds in HOLD</li> <li>Direct an operator in investigate the pumps locally</li> <li>Direct an operator to reset the breaker1B3509(1B4329)</li> <li>Check for fault light on the variable speed drives</li> <li>Crack open MO-2723, Cleanup Demin Bypass valve</li> </ul> </li> <li>As Time permits, <ul style="list-style-type: none"> <li>If the RWCU System will remain shutdown/isolated for an extended period of time, computer point B017, RWCU System Flow, may need to be substituted to zero to maintain accurate ACUMEN Periodic Reports.</li> <li>Restore RWCU to service</li> </ul> </li> </ul> <p>CRS:</p> <ul style="list-style-type: none"> <li>Determine that TRM Spec 3.3.4, RCS Conductivity Monitoring Instrumentation, is not met and enter Condition A</li> <li>Direct Chemistry to swap to Recirc Sample Point for monitoring RCS Chemistry</li> </ul>
<p><b>EVALUATOR NOTE:</b> The next event will be a Loss of Coolant Accident and the follow-on events will be automatically inserted based on Operator actions. The leak rate will take approximately 2 minutes before control room annunciators will alert the Operating crew of the primary leak into containment.</p>		

## SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
<p>EVENT 5: LOCA</p> <p>When the actions of the lightning strikes are under control and at the directions of the Lead Evaluator,</p>	<p style="text-align: center;"><b>SIMULATOR OPERATOR ACTIVATE ET 13</b></p> <p>This will begin the LOCA</p>	<p>CREW: Respond to the rising in Dry Well Pressure</p> <p>CRS:</p> <ul style="list-style-type: none"> <li>• Enter and direct AOP 573, Primary Containment Abnormal</li> <li>• Set a Critical Parameter on DW pressure, and place a line in the sand to insert a manual scram at 1.8 psig</li> </ul> <p>BOP:</p> <ul style="list-style-type: none"> <li>• Will begin to perform the actions of AOP 573</li> <li>• Will monitor DW pressure and report to the CRS as necessary</li> </ul> <p>ATC:</p> <ul style="list-style-type: none"> <li>• Will insert a reactor scram prior to DW pressure reaching 2 psig</li> </ul>

## SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
EVENT 5: LOCA and EOP 1		<p>CREW: Perform actions directed by EOP 1</p> <p>CRS:</p> <ul style="list-style-type: none"> <li>• Enter and Direct EOP 1, RPV Control</li> <li>• Restore and maintain RPV level to 170" to 211" with high pressure sources</li> <li>• Install Defeat 11</li> <li>• Maintain RPV pressure 800 psig to 1055 psig using EHC and MSL drains</li> <li>• When plant conditions are stable, Directs that a pressure band of 500 psig to 700 psig be established using the SRVs to take the head off of the leak</li> </ul> <p>ATC:</p> <ul style="list-style-type: none"> <li>• Insert a manual reactor scram</li> <li>• Will provide the crew with the scram report: <ul style="list-style-type: none"> <li>○ All Rods fully inserted</li> <li>○ Will provide an RPV level and that there is an EOP entry condition</li> <li>○ Will provide a reactor pressure</li> </ul> </li> <li>• Maintain RPV level 170" to 211" using Main Feedwater</li> <li>• Will maintain RPV pressure 800 psig to 1055 psig using EHC</li> <li>• Utilize MSL drains and SRVs to lower reactor pressure to the desired band</li> <li>• Will operate available high pressure systems to maintain RPV level in the directed band</li> </ul> <p>BOP:</p> <ul style="list-style-type: none"> <li>• Install Defeat 11</li> </ul>

## SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
<p>EVENT 6: Hi DW Pressure SCRAM, ECCS failures</p> <p>When the DW reaches 2 psig,</p> <p>If contacted to investigate HPCI Aux Oil Pump Breaker</p> <p>If contacted to investigate HPCI Aux Oil Pump</p>	<p><b>SIMULATOR OPERATOR</b> <b>VERIFY ET 5 goes TRUE</b></p> <p>This will trip the “B” CS pump after a 3 min time delay and TRIP the HPCI Aux Oil Pump after 5 seconds</p> <p><b>BOOTH COMMUNICATOR</b> <b>ACKNOWLEDGE request WAIT 3 minutes and REPORT “1D41-13 is TRIPPED. There is no indication of smoke or fire.”</b></p> <p><b>ACKNOWLEDGE request WAIT 3 minutes and REPORT “The HPCI Aux Oil Pump has catastrophically failed and there are pieces lying about.”</b></p> <p><b>SIMULATOR OPERATOR</b> <b>VERIFY ET7 goes ACTIVE</b></p> <p>When drywell sprays are initiated, the drywell leak to get worse to overtake all available high pressure injection sources</p>	<p>CREW: Mitigate containment parameters in accordance with EOP 2</p> <p>CRS:</p> <ul style="list-style-type: none"> <li>Enter EOP 2, Primary Containment Control</li> <li>Obtains a round of Primary Containment parameters</li> <li>Per PC/P <ul style="list-style-type: none"> <li>When the torus pressure is above 2 psig and below 11 psig, direct to Spray the Torus</li> </ul> </li> <li>Per DW/T <ul style="list-style-type: none"> <li>Verifies torus level &lt; 13.5 feet</li> <li>Plots DW temp vs DW pressure on the DWSIL curve</li> <li>Verifies Recirc pumps Tripped</li> <li>Directs spraying the DW prior to DW air temperature reaching 280°F <b>(Critical) (6.65)</b></li> </ul> </li> <li>Per TT <ul style="list-style-type: none"> <li>Maximize Torus Cooling</li> </ul> </li> </ul> <p>ATC:</p> <ul style="list-style-type: none"> <li>TRIP the “A” Reactor Recirc pump when directed prior to spraying the DW</li> </ul> <p>BOP: <b>(95.63)</b></p> <ul style="list-style-type: none"> <li>Sprays the Torus</li> <li>Install Defeat 4</li> <li>Sprays the DW <b>(Critical) (95.65)</b></li> <li>Establishes Torus Cooling</li> <li>Determines that the “B” CS pump has tripped, and reports the issue to the CRS</li> <li>Determines that the “A”CS pump did not automatically start and start the CS pump and report it to the CRS <b>(Critical)</b></li> <li>Determines that the HPCI Aux Oil Pump does not restart after HPCI turbine trip</li> </ul>

## SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
EVENT 7: Startup Transformer Lockout		<p>CREW: Loss of Non-Essential Power</p> <p>CRS: <b>(5.08)</b></p> <ul style="list-style-type: none"> <li>Enter and direct AOP 304.1, Loss of 4160V Non-Essential Electrical Power</li> </ul> <p>ATC:</p> <ul style="list-style-type: none"> <li>Start RCIC to maintain reactor water level in the directed band</li> </ul> <p>BOP:</p> <ul style="list-style-type: none"> <li>Verify two Well Water Pumps are in service</li> <li>Verify Well Water Pump 1P-58D secured. In AUTO, verify FC-4414 demand is zero. In HAND, verify speed adjust at 1C373 is zero</li> <li>Verify GSW Pumps 1P-89A and B in service</li> <li>Place BUS 1A1 TRANSFER switch in MANUAL</li> <li>Place BUS 1A2 TRANSFER switch in MANUAL</li> </ul>

## SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
EVENT 8: ALC		<p>CREW: Take actions directed by EOP 1/ ALC</p> <p>CRS: <b>(6.74, 6.78)</b></p> <ul style="list-style-type: none"> <li>• Enter into the ALC leg of EOP 1</li> <li>• Secures the cooldown if still in progress</li> <li>• Directs ADS locked out</li> <li>• Maximize injection with CRD IAW AIP 407</li> <li>• Inject with SBLC pumps IAW AIP 406</li> <li>• Ensures that there are low pressure ECCS systems available to inject into the RPV</li> <li>• Waits for RPV level to lower to +15 inches</li> <li>• After RPV level lowers to below +15 inches and prior to RPV level lowering to -25", implements the mitigation strategy of Emergency Depressurization <b>(Critical)</b></li> </ul> <p>ATC: <b>(95.80)</b></p> <ul style="list-style-type: none"> <li>• Inform the CRS that RPV level cannot be maintained</li> <li>• Maximize injection with CRD IAW AIP 407</li> <li>• Inject with SBLC pumps IAW AIP 406</li> <li>• Monitor RPV level and reports to Control Room Supervisor</li> </ul> <p>BOP:</p> <ul style="list-style-type: none"> <li>• Reports that the "A" CS pump had to be manually started</li> <li>• Lockout ADS timers</li> </ul>

## SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
EVENT 8: ALC	<p><b>EVALUTOR NOTE:</b>  The following valves shall be manually opened at or before reactor pressure lowers to their respective specified shutoff head pressure values identified in EOP 1. They are:</p> <ul style="list-style-type: none"> <li>Core Spray (MO-2117) at 330 psig</li> <li>LPCI (MO-1905) at 260 psig</li> </ul>	<p>CREW: Take actions directed by Emergency Depressurization (ED)</p> <p>CRS: <b>(6.80)</b></p> <ul style="list-style-type: none"> <li>When RPV level has dropped to +15", enter ED</li> <li>Verify torus level is &gt; 4.5 ft</li> <li>Open 4 ADS SRVs <b>(Critical)</b></li> <li>Directs maximizing injection with low pressure systems</li> <li>Restore RPV level to 170" to 211"</li> </ul> <p>BOP:</p> <ul style="list-style-type: none"> <li>Report torus level</li> <li>Open 4 ADS SRVs <b>(Critical)</b></li> <li>Recognizes that at a reactor pressure of 450 psig, that MO-1905, LPCI Inject did not open and MO-2117, Core Spray Injection Valve failed to open, and manually opens both injection valves <b>(Critical)</b></li> </ul> <ul style="list-style-type: none"> <li>Establishes injection into the RPV with low pressure systems</li> <li>Restores RPV level to 170" to 211"</li> </ul>



## SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
When the plant has been emergency depressurized and RPV level is being restored to the directed band, and at the direction of the Lead Evaluator,	<p style="text-align: center;"><b>SIMULATOR OPERATOR</b></p> <p style="text-align: center;"><b>Place the Simulator in FREEZE and Announce that the scenario is complete, please stand by your stations and do not discuss the scenario with your crew</b></p>	

\*\*\* END OF SCENARIO \*\*\*

## QUANTITATIVE ATTRIBUTES

### **Malfunctions:**

#### *Before EOP Entry:*

1. Trip of 1B09, the "A" RWS subsystem
2. Trip of the "A" Well
3. LOCA

#### *After EOP Entry:*

1. Loss of Condensate and Feed due to the loss of the non-essential busses
2. Failure of automatic injection following ED

### **Abnormal Events:**

1. AOP 410 for the loss of 1 subset of River Water Supply
2. AOP 408 for the loss of the "D" Well
3. AOP 304.1 for the loss of the startup transformer
4. AOP 903 for weather related events

### **Major Transients:**

1. LOCA
2. Failure of ECCS to automatically start

### **Critical Tasks:**

1. IF the reactor is shutdown under all conditions and RPV level drops to +15", THEN perform Emergency RPV Depressurization before RPV level reaches -25".
2. IF the reactor is shutdown under all conditions, THEN crew actions must be taken to restore and maintain RPV level for adequate core cooling. (> -25" or -39")
3. BEFORE drywell temperature reaches 280°F and WHILE in the safe region of the DWSIL, THEN initiate drywell sprays

Facility: Duane Arnold Energy Center Scenario No.: 3 Op-Test No.: 19-1 NRC

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

Initial Conditions/Turnover:

Reactor Power is 50%.

Guarded Equipment: Skimmer Surge Tank Room, Fuel Pool Heat Exchanger Room, 1C136 Fuel Pool Cooling Panel, 1B3507 'A' Fuel Pool Cooling Pump Breaker, 1B4327 'B' Fuel Pool Cooling Pump Breaker.

Severe weather is expected to enter the area during the shift.

Evolutions in progress or planned for upcoming shift

- Complete securing of "A" RHRSW pump and "A" side ESW
- Raise Power with Recirc to 55%-60% in preparation of putting the 'B' RFP in service

Plant PRA/PSA Status including CDF/LERF & color

- CDF GREEN – 1.47E-6/ Cumulative Core Damage Probability (CCDP) No Limit
- LERF GREEN – 3.92 E-7/ Cumulative Large/Early Release Probability (CLERP) No Limit

2 Reactor Operators are in the Training Center

3 Extra Non Licensed Personnel Available in Work Control

Event No.	Malf. No.	Event Type*	Event Description
1	None	N-BOP N-SRO	Complete securing of "A" RHRSW pump and "A" side ESW
2	None	R-ATC R-SRO	Raise Power with Recirc to 55%-60% from an initial power of 50%
3	ed08m	C-BOP C-SRO TS-SRO	Breaker 1A312, feeder breaker to 1B09 opens on ground fault. Subsequently, a loss of "A" side RWS occurs. The crew will start 1P-117B(D) IAW ARP 1C08A, B-6 and AOP 410 Loss of River Water Supply  Tech Spec 3.8.7, Condition D → 3.7.2 Condition A

4	sw21d rr37a rr37b cu01a/b	C-ATC C-BOP C-SRO TS-SRO	<p>Shortly after the crew enters AOP 903, a lightning strike will result in:</p> <ul style="list-style-type: none"> <li>The Tripping of the "A" well → AOP 408</li> </ul> <p>An additional lightning strike will result in:</p> <ul style="list-style-type: none"> <li>Reactor Water Cleanup Pump Trip → TRM 3.3.4</li> </ul>
5	rr15b	M-All	A LOCA will develop. The crew will insert a manual scram prior to the DW reaching 2 psig. The crew will enter EOP 1 on the scram, and when the DW reaches 2 psig, the crew will re-enter EOP 1 and enter EOP 2.
6	cs01b cs05a hp12	C-BOP C-SRO	<p>On the 2 psig signal;</p> <p>The "B" CS pump will start and trip.</p> <p>The "A" CS pump will fail to automatically start. The "A" CS pump can be started manually by taking the CS pump HS to the start position.</p> <p>The HPCI Aux Oil Pump Feeder Breaker will trip on start and prevent HPCI from injecting</p>
7	fw02b	C-All	<p>On the turbine trip the startup transformer will lockout. The crew will perform the applicable actions of AOP 304.1, Loss of 4160V Non-Essential Electrical Power.</p> <p>This will result in a loss of all Condensate and Feed</p>
8		C-BOP	<p>The primary leak will worsen and the crew will perform actions directed by Alternate Level Control and prepare for an Emergency Depressurization. When RPV level reaches +15", the crew will;</p> <ul style="list-style-type: none"> <li>Open 4 ADS SRVs</li> <li>When RPV pressure lowers to 450 psig, the crew will determine that the selected RHR and "A" CS inject valves did not automatically open, and operator actions are taken to manually open the valves</li> </ul>