

# ***Dresden Generating Station***

**ILT-N-1**

**RPIS FAILURE FOR ROD F5**

**TRIP OF 2B CIRC WATER PUMP / LOAD DROP**

**TRIP OF THE 2B RECIRC PUMP / FUEL ELEMENT FAILURE**

**TRIP OF 2A CIRC WATER PUMP / LOSS OF MAIN CONDENSER**

**FAILURE OF RPS TO DE-ENERGIZE**

**UNISOLABLE ISO COND STEAM LINE LEAK INTO THE REACTOR BUILDING**

**EMERGENCY DEPRESSURIZATION**

**Rev. 00**

**09/05**

Developed By:

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Exam Author

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Date

Approved By:

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Facility Representative

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Date

Facility: <u>Dresden</u>	Scenario No: <u>ILT-N-1</u>	Op-Test No: <u>ILT 05-1</u>
Examiners: _____		Operators: _____
_____		_____
_____		_____
<p><u>Initial Conditions:</u> Full reactor power; IRM channel 12 out of service; 2B EHC Pump OOS; Unit 3 is in Mode 1.</p> <p><u>Turnover:</u> Power ascension in progress.</p>		

Event No.	Malf. No.	Event Type*	Event Description
1	rdfailf5	I NSO SRO	RPIS failure for rod F5 <sup>T</sup>
2	hp7	R NSO SRO	Trip of 2B circ water pump / Load Drop
3	rrmgmboc radffd	C NSO SRO	Trip of the 2B recirc pump <sup>T</sup> / Fuel Element Failure
4	hp6	C NSO SRO	Trip of 2A circ water pump / Loss of Main Condenser
5	hp5 b12	M NSO SRO	Manual Reactor Scram with ATWS (Failure of RPS to de-energize and ARI successful)
6	ic1vbn icstmr	M NSO SRO	Unisolable Isolation Condenser steam line leak into the Reactor Building / Emergency Depressurize

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

## **Scenario Objective**

Evaluate the operators in using the Secondary Containment Control DEOP procedure.

## **Scenario Summary**

Initial Conditions:

- Steady at full power.
- IRM channel 12 out of service.
- 2B EHC Pump OOS.
- Unit 3 is in Mode 1.
- Setting up scaffolding on Unit 2 Reactor Building 517' and East LPCI Corner Room for upcoming maintenance activities.

## **Scenario Sequence**

- An RPIS failure to a rod occurs and that rod must be driven in fully.
- 2B Circulating Water Pump trips resulting in decreasing Main Condenser Vacuum. The crew reduces power to restore vacuum to within operating limits.
- An electrical fault causes the 2B recirc MG set to trip. The team will carry out actions for a recirc pump trip, and enter single loop operation. A small fuel element failure occurs due to all the power changes.
- 2A Circulating Water Pump trips causing a loss of the Main Condenser. This requires the crew to perform a Manual Scram.
- An ATWS condition exists due to a failure of RPS to de-energize but ARI is successful. The team will control pressure using the Isolation Condenser.
- A leak into the Reactor Building develops from the Isolation Condenser steam line, between the 1 and 2 valves. The 1 valve will not isolate, challenging secondary containment.
- A fuel element failure (previously installed) raises radiation levels in the reactor building to the point where the team must Emergency Depressurize.
- The scenario is terminated when the Emergency Depressurization is in progress and the plant stabilized.

## **Event One – RPIS failure for rod F5**

- A total RPIS failure for rod F5 requires the crews to fully insert the control rod.

Malfunctions required:

- 1 (RPIS failure for rod F5)

Success Path:

- The team recognizes a total RPIS failure for rod F5 and the control rod is fully inserted.

### **Event Two – Trip of 2B Circ Water Pump / Load Drop**

- 2B Circulating Water Pump trips resulting in decreasing Main Condenser Vacuum. The crew reduces power to restore vacuum to within operating limits.

Malfunctions required:

- 1 (2B Circulating Water Pump trip)

Success Path:

- Power is reduced per applicable procedures.

### **Event Three – Trip of the 2B Recirc Pump / Fuel Element Failure**

- An electrical fault causes the 2B MG Set to trip. A small Fuel Element Failure occurs due to the power changes.

Malfunctions required:

- 2 (Trip of 2B Recirc MG set)  
(Fuel Element Failure)

Success Path:

- Perform actions for a tripped Recirc Pump.

### **Events Four and Five – Trip of 2A Circ Water Pump / Loss of Main Condenser / ATWS**

- 2A Circulating Water Pump trips on overload. The crew is required to trip the remaining Circ Water Pump and Scram the Reactor. Initiation of ARI is required to insert control rods due to an electrical ATWS.

Malfunctions required:

- 2 (2A Circulating Water Pump trip)  
(Electrical ATWS)

Success Path:

- Securing of 2C Circ water Pump.
- Attempts to manually scram the Reactor.
- Initiates ARI.

## **Events Six – Unisolable Isolation Condenser Steam Line Leak into the Reactor Building / Emergency Depressurize**

- The Isolation Condenser Steam Line develops a leak into the Reactor Building. The Fuel Element Failure causes increased radiation levels in the reactor building. The crew is required to perform an Emergency Depressurization.

Malfunctions required:

- 1 (Unisolable Steam leak into the Rx Bldg from the Iso Cond steam line)

Success Path:

- Control RPV level.
- Emergency Depressurize.

## **Scenario Recapitulation**

Total malfunctions	7	(5 to 8)
Malfunctions after EOP entry	1	(1 to 2)
Abnormal events	3	(2 to 4)
Major transients	2	(1 to 2)
EOPs Entered	2	(1 to 2)
EOP Contingencies	1	(0 to 2) (Emergency Depressurization)
Approximate scenario run time	60	(60 to 90 min)
EOP run time	50%	(40 to 70%)
Crew critical tasks	2	(2 to 3)

## PRE-SCENARIO ACTIVITIES

### 1 If applicable, conduct pre-scenario activities in accordance with TQ-AA-106-0107, SIMULATOR EXAMINATION BRIEFING.

- a. Direct the crew to perform their briefs prior to entering the simulator.

### 2 Simulator Setup (the following steps can be done in any logical order):

- a. Initialize simulator in IC 12. (full power)
- b. Secure the following equipment and tag out of service:

- 1) IRM channel 12.
- 2) 2B EHC Pump.

- c. Run the initial setup CAEP file: **ILT-N-1.CAE**.

**NOTE:** The CAEP file raises the Circulating Water inlet temperature. This causes MWe to drop and Drywell pressure to slowly rise. Allow the simulator to stabilize for ~15 minutes.

- d. Adjust recirculation flow to establish ~905 MWe.
- e. Vent the DW and Torus if necessary to establish DW pressure ~1.5 psig.
- f. Ensure running Condensate pump amps within limits.
- g. Verify Condensate Minimum Flow valve closed.
- h. Advance the chart recorders.

### 3 Verify the following simulator conditions:

- a. Control Rod F-5 is at position 48
- b. CRSP marked up through appropriate step.
- c. CRD drive water pressure ~260#.

### 4 Open Monitor file: **ILT-N-1.mon**. It includes variables:

- a. ppf218
- b. ppf219
- c. ppf220
- d. cdpcnvac (3 variable array)
- e. rrgangen
- f. ppr216

### 5 Complete the Simulator Setup Checklist.

Legend for team actions:

■ - Required Actions      □ - Optional Actions      √ - Critical Task

**Event One – RPIS failure for rod F5: A total RPIS failure for rod F5 requires the crews to fully insert the control rod**

Trigger	Position	Crew Actions or Behavior
<b>1</b>		<p><b><u>SIMULATOR OPERATOR / FLOOR INSTRUCTOR:</u></b></p> <p>If the crew determines APRM gains need adjusted at any time during this scenario, inform the crew you will perform the gain adjustment. After several minutes, activate <b>trigger 1</b>, and report APRM gains are adjusted to the crew. Toggle <b>Trigger 1</b> OFF then back ON as often as needed to repeat this.</p>
<b>2</b>		<p><b><u>SIMULATOR OPERATOR:</u></b></p> <p>At the direction of the Lead Examiner, activate <b>trigger 2</b>, RPIS failure for control rod F-05</p>
		<p><b><u>Role Play:</u></b></p> <p>QNe: If asked, respond, “I concur with entering a substitute position for Control Rod F-05”.</p>
	<b>NSO</b>	<p>Reports and responds to DANs 902-5 A-3 ROD DRIFT, and B-3 ROD WORTH MIN BLOCK.</p> <ul style="list-style-type: none"> <li>■ Determines/announces that CRD F-05 has Rod Drift light and no position indication on the Full Core Display.</li> <li>■ Checks other Control Rod F-05 position indications: <ul style="list-style-type: none"> <li>• Selects Control Rod F-05 and determines no indication for it on the Four Rod Display.</li> <li>• Checks the RWM position indication and determines no position indication for Control Rod F-05.</li> <li>• Runs an OD 7 program to check rod positions and determines no position indication for Control Rod F-05.</li> </ul> </li> <li>■ Announces Control Rod F-05 has no position indication.</li> </ul>
	<b>SRO</b>	<ul style="list-style-type: none"> <li>■ Enters DOA 0300-06, RPIS Failure, and directs its actions.</li> <li>□ Notifies the Shift Manager, QNE, Work Week Manager, Fin team, IMD, OR EMD.</li> </ul>

**Event One – RPIS failure for rod F5: A total RPIS failure for rod F5 requires the crews to fully insert the control rod**

Trigger	Position	Crew Actions or Behavior
	<b>NSO</b>	<p>Performs actions of DOA 0300-06, RPIS Failure, as directed:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Stops any power change or control rod motion in progress.</li> <li><input checked="" type="checkbox"/> Enters substitute position of 48 for Control Rod F-05.</li> <li><input checked="" type="checkbox"/> Inserts Control Rod F-05 one notch.</li> <li><input checked="" type="checkbox"/> Determines no control rod position indication at alternate position.</li> <li><input checked="" type="checkbox"/> Drives Control Rod F-05 to fully inserted position. <ul style="list-style-type: none"> <li>• Determines rod is actually moving in by drive flow and drop in RX power.</li> <li>• Determines rod is full in when drive flow drops to the stall flow.</li> </ul> </li> <li><input type="checkbox"/> Announces procedure directs electrically or hydraulically isolating control rod F-05 HCU.</li> <li><input type="checkbox"/> Notifies the QNE.</li> <li><input type="checkbox"/> Records the failed indication per DOS 0300-06.</li> </ul>
	<b>SRO</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> May enter DOA 0300-12, Mispositioned Control Rod and direct its actions.</li> <li><input type="checkbox"/> Notifies the Shift Manager, QNE, Work Week Manager, Fin team, IMD, OR EMD.</li> </ul>
	<b>NSO</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Performs actions of DOA 0300-12, Mispositioned Control Rod, as directed:</li> </ul>
	<b>SRO</b>	<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> References ITS 3.1.3, Condition C, and determines the following actions are required: <ul style="list-style-type: none"> <li>• C.1 Fully insert inoperable control rod within 3 hours. (DOA 0300-06, RPIS Failure, directs inserting the rod)</li> <li>• C.2 Disarm the associated CRD within 4 hours.</li> </ul> </li> <li><input type="checkbox"/> Directs electrically or hydraulically isolating control rod F-05 HCU.</li> </ul>
		<p><b><u>SIMULATOR OPERATOR / ROLE PLAY:</u></b></p> <p>NLO directed to disarm control rod F-05, report: "I'll disarm F-05 after I receive a pre-job brief" (it is not intended for this to be completed).</p>
		<p><b><u>Event 1 Completion Criteria:</u></b></p> <ul style="list-style-type: none"> <li>• DOA 0300-06 actions have been taken.</li> <li>• Technical Specifications have been referenced.</li> <li>• OR, at the direction of the Lead Examiner.</li> </ul>



**Events Two – Trip of 2B Circ Water Pump / Load Drop: 2B Circulating Water Pump trips resulting in decreasing Main Condenser Vacuum. The crew reduces power to restore vacuum to within operating limits.**

Trigger	Position	Crew Actions or Behavior
3		<p><b><u>NOTE:</u></b></p> <p>The Event is designed to cause Main Condenser vacuum to drop below the operational limit specified in DGP 03-01, Routine Power Changes, <u>Limitations and Actions</u> section. The crew should drop load enough to raise vacuum above the limit.</p> <p>For the next Event, it is necessary for the recirc pump to trip with recirc pump speeds above 60%, otherwise the action is merely to scram. Therefore the recirc pump trip is automatically activated before pump speeds are lowered to 60%. Vacuum is recovered above the operational limit well before pump speed is dropped to 60%.</p> <p><b><u>SIMULATOR OPERATOR:</u></b></p> <p>At the direction of the Lead Examiner, activate <b>trigger 3</b>, which causes 2B Circulating Water Pump to trip,</p> <p><b><u>ROLE PLAY:</u></b></p> <p>NLO to check 2B Circulating Water Pump breaker: wait 2 min, then report, “the 2B Circulating Water Pump breaker has an overcurrent target up”.</p> <p><b><u>ROLE PLAY:</u></b></p> <p>NLO to check local vacuum readings on instruments 2-3141-11A, B, &amp; C: wait 2 min, then report the values on the Monitor screen. (to the nearest 0.1; i.e. 24.1)</p> <ul style="list-style-type: none"> <li>• Variable: cdpcnvac(1) for 2-3141-11A</li> <li>• Variable: cdpcnvac(2) for 2-3141-11B</li> <li>• Variable: cdpcnvac(3) for 2-3141-11C</li> </ul> <p><b><u>SIMULATOR OPERATOR / ROLE PLAY:</u></b></p> <p>Repeat the following as requested during the remainder of the scenario.</p> <p>NLO to cut out a Condensate Demin bed: wait 2 min, then on Instructor Station Drawing FW4, cut out a Condensate Demin bed, and report when it is cut out.</p> <p><b><u>SIMULATOR OPERATOR / ROLE PLAY:</u></b></p>
4		<p>When 2C Condensate vacuum is &lt;24.0 in. Hg, verify <b>Trigger 4</b> automatically activates. This returns the Turb Vacuum Lo alarm to normal. (The alarm was overridden due to it coming in early)</p>
5		<p>When Rx power is &lt;85%, (variable rxnfavgs &lt;0.85) verify <b>Trigger 5</b> automatically activates. Or, at the direction of the Lead Examiner, activate <b>trigger 5</b>. This ramps the Circulating Water inlet temperature to 84 Deg. F. over 5 min. to simulate operating gates at the Dresden Lock and Dam.</p> <p>2 Min. after <b>Trigger 5</b> activates, call the Control Room as Engineering and report “Dresden Lock and Dam completed moving gates”.</p>

**Events Two – Trip of 2B Circ Water Pump / Load Drop: 2B Circulating Water Pump trips resulting in decreasing Main Condenser Vacuum. The crew reduces power to restore vacuum to within operating limits.**

Trigger	Position	Crew Actions or Behavior
6		<p><b><u>ROLE PLAY:</u></b></p> <p>Acknowledge direction to perform post shutdown actions for RFP and Condensate Pump. Wait ~10 min. for each request and then report the actions completed.</p> <p><b><u>SIMULATOR OPERATOR:</u></b></p> <p>If the crew drops recirculation pump speed to &lt;66%, (variable rrgangen(1) &lt;0.66) verify <b>Trigger 6</b> automatically activates to trip 2B Recirculation Pump and go to the next event.</p>
	<b>ANSO</b>	<p>Performs DAN 902-7 A-15, Circ Wtr PP Trip and performs DOA 6500-10, 4KV Circuit Breaker Trip, as directed:</p> <ul style="list-style-type: none"> <li>■ Reports 2B Circulating Water Pump tripped.</li> <li>□ May send NLO to check Circ Pump breaker.</li> <li>■ Reports Main Condenser Vacuum dropping.</li> </ul>
	<b>SRO</b>	<ul style="list-style-type: none"> <li>■ Enters DOA 4400-01, Circulating Water System Failure, and DOA 6500-10, 4KV Circuit Breaker Trip.</li> <li>□ Notifies the Shift Manager, Work Week Manager, Fin team, IMD, OR EMD.</li> </ul>
	<b>ANSO</b>	<p>Performs DOA 4400-01, Circulating Water System Failure.</p> <ul style="list-style-type: none"> <li>■ Announces that due to condenser vacuum dropping, entry to DOA 3300-02, LOSS OF CONDENSER VACUUM, is required.</li> <li>■ Announces that required to reduce power per DGP 03-01, Routine Power Changes, to maintain vacuum.</li> </ul>
	<b>ANSO</b>	Announces alarm 902-7 H-3, TURB VACUUM LO
	<b>SRO</b>	<ul style="list-style-type: none"> <li>■ Enters DOA 3300-02, Loss of Condenser Vacuum, and directs actions.</li> </ul>
	<b>NSO / ANSO</b>	<p>Performs DOA 3300-02, Loss of Condenser Vacuum, as directed:</p> <ul style="list-style-type: none"> <li>■ Announces that required to reduce power per DGP 03-01, Routine Power Changes, to maintain vacuum.</li> <li>□ Trips Hydrogen addition.</li> </ul>
	<b>SRO / ANSO</b>	<ul style="list-style-type: none"> <li>■ Using available vacuum indication, determines that Main Condenser vacuum is outside the operational limit specified in DGP 03-01, Routine Power Changes, <u>Limitations and Actions</u> section.</li> </ul>
	<b>SRO</b>	<ul style="list-style-type: none"> <li>■ Enters DGP 03-01, Routine Power Changes, and directs reducing load to maintain Main Condenser vacuum with the limits specified in the <u>Limitations and Actions</u> section of the procedure.</li> </ul>

**Events Two – Trip of 2B Circ Water Pump / Load Drop: 2B Circulating Water Pump trips resulting in decreasing Main Condenser Vacuum. The crew reduces power to restore vacuum to within operating limits.**

Trigger	Position	Crew Actions or Behavior
	<b>NSO / ANSO</b>	<p>Performs DGP 03-01, Routine Power Changes, as directed:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Notifies the Load Dispatcher.</li> <li><input type="checkbox"/> If necessary, inserts control rods to establish &lt;93% flow FCL.</li> <li>■ Reduces core flow to <u>NOT</u> &lt; 56 Mlbm/hr with recirc flow (DOP 0202-03).</li> <li><input type="checkbox"/> Secures the third RFP (DOP 3200-05). (between 9.0 to 9.8 MLBm/hr Feedwater flow)</li> <li><input type="checkbox"/> Removes the fourth condensate/condensate booster pump from service (DOP 3300-03).</li> <li><input type="checkbox"/> Cuts out a Condensate Demin unit.</li> </ul>
	<b>SRO / ANSO</b>	<ul style="list-style-type: none"> <li>■ Using available vacuum indication, determines that Main Condenser vacuum is back within the operational limit specified in DGP 03-01, Routine Power Changes, <u>Limitations and Actions</u> section.</li> </ul>
	<b>SRO</b>	<ul style="list-style-type: none"> <li>■ Directs NSO to stop dropping load.</li> </ul>
	<b>NSO</b>	<ul style="list-style-type: none"> <li>■ Stops load drop.</li> </ul>
		<p><b><u>Events 2 Completion Criteria:</u></b></p> <ul style="list-style-type: none"> <li>• Load drop completed to restore condenser vacuum to within limits;</li> <li>• OR, at the direction of the Lead Examiner.</li> </ul>

**Events Three – Trip of the 2B Recirc Pump / Fuel Element Failure: An electrical fault causes the 2B MG Set to trip. A small Fuel Element Failure occurs due to the power changes.**

Trigger	Position	Crew Actions or Behavior
6		<p><b><u>SIMULATOR OPERATOR:</u></b></p> <p>At the direction of the Lead Examiner, activate <b>trigger 6</b>, which causes 2B Recirc MG Set to trip. A short time later, a fuel element failure also occurs.</p> <p><b><u>NOTE:</u></b> The fuel element failure eventually causes Off Gas Rad monitor radiation to increase, but not high enough to cause an alarm. The 2/3 Chimney SPING radiation level will also increase and may reach the alarm point before the next Event is started.</p> <p><b><u>ROLE PLAY:</u></b></p> <p>NLO sent to 2B Recirc MG Set: wait 3 min, then report: "I am at the 2B Recirc MG Set and there appears to be some scorch marks on the generator end. There is also a burnt smell from the generator end".</p> <p>NLO sent to Bus 22, to check the breaker for the 2B Recirc MG Set: wait 3 min, then report: The breaker for the 2B Recirc MG Set drive motor is tripped, with an overcurrent flag up."</p> <p><b><u>ROLE PLAY:</u></b></p> <p>As the QNE: wait 3 min, then report: "I have analyzed the situation and have determined that no core operating limits have been exceeded".</p> <p>If contacted as EMD (wait 5 min), then report: "The 2B Recirc MG Set appears to have had some serious arcing inside the generator casing, and it will require disassembly of the generator to correct it. I estimate that it will take a minimum of 3 days to complete the repairs".</p>
	NSO	<ul style="list-style-type: none"> <li><input type="checkbox"/> Announces alarms: <ul style="list-style-type: none"> <li>• 902-5 A-6 2B RECIRC M-G GEN LOCKOUT</li> <li>• 902-5 A-7 2B RECIRC PP DP LOW</li> <li>• 902-5 B-6 2B RECIRC M-G AUX LOCKOUT</li> <li>• 902-5 A-9 RECIRC M-G SET DRIVE MOTOR TRIP</li> </ul> </li> <li>■ Announces 2B Recirc MG tripped.</li> <li>■ Monitors RPV water level control.</li> <li><input type="checkbox"/> Directs NLO to report to Bus 22 for Recirc MG breaker inspection,</li> </ul>
	NSO	<p>Performs immediate actions of DOA 0202-01, Recirc Pump Trip – One Or Both Pumps.</p> <ul style="list-style-type: none"> <li>■ IF running RR Pp speed is &gt;77% AND FCL &lt;91.7%, THEN reduces RR Pp speed to 77% (75 to 79%)</li> <li>■ Inserts CRAM Rods per DGP 03-04 to reduce Rx power to 25-30%</li> <li>■ Closes RR PP disch valve MO 2-0202-5B.</li> <li>■ 5 min. after closing, re-opens MO 2-0202-5B.</li> <li>■ Monitors MSL and Off Gas Rad monitors for increased activity.</li> <li><input type="checkbox"/> Notifies QNE to monitor core parameters or has Unit Sup make call.</li> </ul>

**Events Three – Trip of the 2B Recirc Pump / Fuel Element Failure: An electrical fault causes the 2B MG Set to trip. A small Fuel Element Failure occurs due to the power changes.**

Trigger	Position	Crew Actions or Behavior
	<b>SRO</b>	<ul style="list-style-type: none"> <li>■ Enters and directs actions for: <ul style="list-style-type: none"> <li>• DOA 0202-01, Recirc Pump Trip – One Or Both Pumps</li> <li>• DOA 6500-10, 4KV Circuit Breaker Trip</li> <li>• DGP 03-03, Single Recirculation Loop Operation</li> </ul> </li> <li>□ Notifies Shift Manager.</li> <li>□ Notifies QNE, Chemistry, Work Week Manager, Fin team, IMD, OR EMD.</li> </ul>
	<b>SRO</b>	<ul style="list-style-type: none"> <li>■ References appropriate plant licensing documents: <ul style="list-style-type: none"> <li>• References ITS 3.4.1, Condition C. 24 hours to satisfy the LCO requirements.</li> </ul> </li> </ul>
	<b>NSO</b>	<ul style="list-style-type: none"> <li>□ Begins performing subsequent actions of DOA 0202-01, Recirc Pump Trip – One Or Both Pumps and DGP 03-03, Single Recirculation Loop Operation.</li> </ul>
		<b>NOTE:</b> The following actions may occur before the next Event is started depending on how long the above actions take. However, DO NOT delay the start of the next Event if the above actions have been adequately completed as determined by the Lead Examiner.
	<b>ANSO</b>	<ul style="list-style-type: none"> <li>□ Observes and reports that Off Gas radiation monitors are increasing. May refer to alarm procedures for guidance.</li> <li>□ Announces alarm 923-7 B-3, U2/3 Chimney Noble Gas Hi.</li> <li>□ Determines site release rate from Plant Parameter Displays System (PPDS).</li> </ul>
	<b>CREW</b>	<ul style="list-style-type: none"> <li>□ May enter/perform DGA 16, Coolant High Activity/Fuel Element Failure, and directs actions.</li> </ul>
		<p><b>Event 4 Completion Criteria:</b></p> <ul style="list-style-type: none"> <li>• Immediate actions of DOA 0202-01, Recirc Pump Trip – One Or Both Pumps, completed.</li> <li>• OR, at the direction of the Lead Examiner.</li> </ul>

**Events Four and Five – Trip of 2A Circ Water Pump / Loss of Main Condenser / ATWS: 2A Circulating Water Pump trips on overload. The crew is required to trip the remaining Circ Water Pump and Scram the Reactor. Initiation of ARI is required to insert control rods due to an electrical ATWS**

Trigger	Position	Crew Actions or Behavior
7		<p><b><u>NOTE:</u></b></p> <p>The following event is based on a failure of the RPS electrical scram (inserted in setup). ARI will be successful in inserting all control rods. Since the ARI action is part of the SCRAM procedure, 'all rods in' may be reported before the US enters DEOP 400-05 flowchart.</p> <p><b><u>NOTE:</u></b></p> <p>The evaluator needs to ensure the ANSO does NOT perform the actions for the Circulating Water pump trip. A Control Room Breathing Air alarm is inserted to draw the ANSO over to the BOP panels so the NSO will take the actions for the Circulating Water pump trip.</p> <p><b><u>SIMULATOR OPERATOR:</u></b></p> <p>At the direction of the Lead Examiner, activate <b>trigger 7</b>, which causes a Control Room Breathing Air alarm.</p>
8		<p><b><u>SIMULATOR OPERATOR:</u></b></p> <p>After the ANSO is at the BOP panels and at the direction of the Lead Examiner, activate <b>trigger 8</b>, which causes 2A Circulating Water Pump to trip and creates an air leak into the Main Condenser.</p> <p><b><u>ROLE PLAY:</u></b></p> <p>NLO to check Control Room Breathing Air: wait 2 min, then report: "The Control Room Breathing Air system looks normal".</p> <p><b><u>ROLE PLAY:</u></b></p> <p>NLO to 2A Circ pump breakers: wait 3 min, then report: "2A Circulating Water pump breaker has an overcurrent target up".</p>
	<b>NSO</b>	<p>Performs the following per DAN 902-7 A-15, Circ Wtr PP Trip, DOA 4400-01, Circulating Water System Failure, and DOA 6500-10, 4KV Circuit Breaker Trip, as directed:</p> <ul style="list-style-type: none"> <li>■ Reports ONLY one Circulating Water Pump is operating.</li> <li>■ Stops 2C Circulating Water Pump.</li> <li>■ Performs a manual scram</li> <li>□ May send NLO to check 2A Circ Pump breaker.</li> </ul>
	<b>SRO</b>	<ul style="list-style-type: none"> <li>□ May direct performance of DOA 4400-01, Circulating Water System Failure, and DOA 6500-10, 4KV Circuit Breaker Trip.</li> <li>■ Directs a reactor scram, based on loss of Circ Water System.</li> <li>□ Notifies the Shift Manager, Work Week Manager, Fin team, IMD, OR EMD.</li> </ul>

**Events Four and Five – Trip of 2A Circ Water Pump / Loss of Main Condenser / ATWS: 2A Circulating Water Pump trips on overload. The crew is required to trip the remaining Circ Water Pump and Scram the Reactor. Initiation of ARI is required to insert control rods due to an electrical ATWS**

Trigger	Position	Crew Actions or Behavior
	<b>SRO</b>	<p>Enters DEOP 100, RPV Control, and may enter DEOP 400-05, Failure to Scram, depending on timing of reports from NSO regarding status of rods. If DEOP 400-05 is entered, it will be exited as soon as report of 'all rods in' is received. Performs/directs the following:</p> <ul style="list-style-type: none"> <li>■ Enters DGP 02-03, Reactor Scram, and directs actions.</li> <li>■ Verification of all isolations, ECCS and EDGs starts.</li> <li>■ Holding RPV/L +8 to +48 inches.</li> <li>■ Maintaining RPV/P &lt;1060 psig using the Iso Cond to control RPV/P.</li> </ul>
	<b>NSO</b>	<p>Performs the following actions per DGP 02-03, Reactor Scram, and DEOP 100, RPV Control, as directed:</p> <ul style="list-style-type: none"> <li>■ Places Mode Switch to Shutdown and depresses the Scram pushbuttons.</li> <li>■ Checks control rods inserted and determines control rods did NOT insert.</li> <li>■ √ <b>Initiates ARI</b> and determines control rods inserted.</li> <li>■ Announces control rods did not go in, Electric ATWS, ARI initiated, all rods in.</li> <li>■ Maintains RPV level as directed by SRO.</li> <li>■ Verifies 2A Recirc pump runs back to minimum. (Only 2A is running)</li> <li>■ Inserts SRMs and IRMs.</li> </ul>
	<b>ANSO</b>	<p>Performs the following actions per DGP 02-03, Reactor Scram, and DEOP 100, RPV Control, as directed:</p> <ul style="list-style-type: none"> <li>■ Verifies turbine tripped.</li> <li>■ Verifies generator tripped.</li> <li>■ Verifies aux power transfers.</li> <li>■ Controls RPV/P using the Isolation Condenser, as directed.</li> </ul>
	<b>NSO / ANSO</b>	<p>May announce the following alarms due to lowering vacuum:</p> <ul style="list-style-type: none"> <li>❑ 902-7 H-3, TURB VACUUM LO</li> <li>❑ 902-5 F-5, CONDR VACUUM LO</li> </ul>
	<b>NSO / ANSO</b>	<ul style="list-style-type: none"> <li>❑ May report SJAE flow is high AND Main Condenser Vacuum lowering.</li> </ul>
	<b>SRO</b>	<ul style="list-style-type: none"> <li>❑ May direct team to enter and execute DOA 3300-02, Loss of Condenser Vacuum.</li> </ul>

**Events Four and Five – Trip of 2A Circ Water Pump / Loss of Main Condenser / ATWS: 2A Circulating Water Pump trips on overload. The crew is required to trip the remaining Circ Water Pump and Scram the Reactor. Initiation of ARI is required to insert control rods due to an electrical ATWS**

Trigger	Position	Crew Actions or Behavior
		<p><b><u>Events 4 &amp; 5 Completion Criteria:</u></b></p> <ul style="list-style-type: none"> <li>• Reactor scram, with plant stabilized.</li> <li>• OR, at the direction of the Lead Examiner.</li> </ul>



**Events Six – Unisolable Isolation Condenser Steam Line Leak into the Reactor Building / Emergency Depressurize: The Isolation Condenser Steam Line develops a leak into the Reactor Building. The Fuel Element Failure causes increased radiation levels in the reactor building. The crew is required to perform an Emergency Depressurization.**

Trigger	Position	Crew Actions or Behavior
<b>9</b>		<p><b><u>SIMULATOR OPERATOR:</u></b></p> <p>At the direction of the Lead Examiner, activate <b>trigger 9</b>, which starts an Isolation Condenser line break.</p>
<b>10</b>		<p><b><u>SIMULATOR OPERATOR</u></b></p> <p>Verify <b>Trigger 10</b> activates automatically when Isolation Condenser Area radiation reaches 100 mr/hr. (variable ppr216 &gt;100.0) This causes the RWCU and Vessel Instrument Area Radiation Monitors to ramp full scale and alarm by using overrides.</p>
<b>11</b>		<p>Verify <b>Trigger 11</b> activates automatically when the RWCU Area Radiation Monitor is bypassed. This clears its SER alarm.</p>
<b>12</b>		<p>Verify <b>Trigger 12</b> activates automatically when the Vessel Instrument Area Radiation Monitor is bypassed. This clears its SER alarm.</p>
	<b>ANSO</b>	<ul style="list-style-type: none"> <li>■ Announces numerous alarms due to the Iso Cond steam line break and fuel element failure such as: <ul style="list-style-type: none"> <li>• 902-3 A-1, RX BLDG RAD HI</li> <li>• 902-3 B-1, REFUEL FLOOR RAD HI</li> <li>• 902-3 B-4, ISOL COND VLVS OFF NORM</li> <li>• 902-3 G-2, AREA TEMP HI</li> </ul> </li> <li>■ Dispatch NLO(s) and/or Rad Tech(s) to check areas for leaks and radiation levels.</li> </ul>
	<b>ANSO</b>	<ul style="list-style-type: none"> <li>■ Checks backpanel ARMs and temperature recorders to determine the areas affected are the Iso Condenser, RWCU and Vessel Instrument Rack areas.</li> </ul>
		<p><b><u>ROLE PLAY:</u></b></p> <p>As dispatched NLO OR as an NLO on rounds, (wait 2 min) then report over the radio: "There is steam accumulating on 3<sup>rd</sup> and 4<sup>th</sup> floor of Unit 2 reactor building. It appears to be coming from the Iso Cond 2 valve room area, and it is getting very hot and humid up here".</p>
	<b>SRO</b>	<ul style="list-style-type: none"> <li>■ Enters DEOP 300-1 Secondary Containment Control, when informed area rad or temperature level(s) are above Max Normal.</li> </ul>
	<b>NSO / ANSO</b>	<p>Performs DEOP 300-1, Secondary Containment Control actions as directed:</p> <ul style="list-style-type: none"> <li>■ Verifies Rx Bldg Vent. isolates and SBGT starts.</li> <li>■ Monitors affected areas temperatures and radiation levels</li> <li>■ Operates all available area coolers (LPCI/CS and HPCI room coolers)</li> </ul>

**Events Six – Unisolable Isolation Condenser Steam Line Leak into the Reactor Building / Emergency Depressurize: The Isolation Condenser Steam Line develops a leak into the Reactor Building. The Fuel Element Failure causes increased radiation levels in the reactor building. The crew is required to perform an Emergency Depressurization.**

Trigger	Position	Crew Actions or Behavior
	<b>ANSO</b>	<ul style="list-style-type: none"> <li>■ Makes PA announcement to evacuate the reactor building.</li> <li>■ Determines leak is from the Iso Cond 2 valve room from knowledge, reports from field, or by receiving alarm 902-3 H-2, ISOL COND LINE BREAK (GRP 5 ISOL) and reports to US.</li> <li>■ Closes Iso Cond 2 Valve, attempts closure of the 1 (valve will not close).</li> <li>■ Determines leak is unisolable (between 1 and 2 valve) due to the Iso 1 valve being unable to close.</li> </ul>
	<b>ANSO</b>	<ul style="list-style-type: none"> <li>□ Should periodically check backpanel ARMs temperature recorders to determine rate and/or trend of the areas affected from steam leak.</li> </ul>
		<p><b><u>ROLE PLAY:</u></b></p> <p>If dispatched as RPT, wait until directed by the Lead Evaluator to make the report. Then report: “The Unit 2 reactor building 2<sup>nd</sup> floor, near 5 &amp; 6 racks, 3<sup>rd</sup> floor, near 2 valve room door, and the entire 4<sup>th</sup> floor rad levels are &gt; 3000 mr/hr. I need to get another detector to read any higher levels”.</p>
	<b>SRO</b>	<p>√ When notified of 2 or more areas above Max Safe, enters DEOP 400-2 <b>Emergency Depressurization</b>, and directs:</p> <ul style="list-style-type: none"> <li>■ Verifies all rods in to at least position 4.</li> <li>■ Drywell Pressure &lt; 2.0 psig.</li> <li>■ Verifies SP/L &gt;6 feet.</li> <li>■ Open all ADS valves.</li> <li>■ Verifies all relief valves are open.</li> </ul>
	<b>NSO / ANSO</b>	<p>√ Executes DEOP 400-02, <b>Emergency Depressurization</b>, as directed:</p> <ul style="list-style-type: none"> <li>■ Verifies SP/L &gt;6 feet.</li> <li>■ Opens all ADS valves.</li> <li>■ Verifies all relief valves are open.</li> </ul>
	<b>SRO</b>	May request a RPT to update DEOP related area rad levels which are fullscale on the ARMs.
		<p><b><u>Events 6/Scenario Completion Criteria:</u></b></p> <ul style="list-style-type: none"> <li>• Emergency Depressurization in progress.</li> <li>• OR, at the direction of the Lead Examiner.</li> </ul>

Critical Tasks	
(RPV-6.1)	With a reactor scram required and the reactor not shutdown, <b>TAKE ACTION TO REDUCE POWER</b> by injecting boron and /or inserting control rods.
(SC-1.2)	With the primary system discharging into the secondary containment and area radiation/temperature/water levels exceed maximum safe operating levels in more than one area, <b>INITIATE</b> an emergency depressurization.

## REFERENCES

PROCEDURE	TITLE
DAN 902-3 A-1	RX BLDG RAD HI
DAN 902-3 B-1	REFUEL FLOOR RAD HI
DAN 902-3 B-4	ISOL COND VLVS OFF NORM
DAN 902-3 G-2	AREA TEMP HI
DAN 902-4 A-6	2B RECIRC M-G GEN LOCKOUT
DAN 902-4 A-7	2B RECIRC PP DP LOW
DAN 902-4 A-9	RECIRC M-G SET DRIVE MOTOR TRIP
DAN 902-4 B-6	2B RECIRC M-G AUX LOCKOUT
DAN 902-5 A-3	ROD DRIFT
DAN 902-5 B-3	ROD WORTH MIN BLOCK
DAN 902-5 F-5	CONDR VACUUM LO
DAN 902-7 A-15	CIRC WTR PP TRIP
DAN 902-7 H-3	TURB VACUUM LO
DAN 923-7 B-3	U2/3 CHIMNEY NOBLE GAS HI
DOA 0202-01	RECIRC PUMP TRIP – ONE OR BOTH PUMPS
DOA 0300-06	RPIS FAILURE
DOA 3300-02	LOSS OF CONDENSER VACUUM
DOA 4400-01	CIRCULATING WATER SYSTEM FAILURE
DOA 6500-10	4KV CIRCUIT BREAKER TRIP
DGP 02-03	REACTOR SCRAM
DGP 03-01	ROUTINE POWER CHANGES
DGP 03-03	SINGLE RECIRCULATION LOOP OPERATION
DGP 03-04	CONTROL ROD MOVEMENTS
DGA 16	COOLANT HIGH ACTIVITY/FUEL ELEMENT FAILURE
DEOP 100	RPV CONTROL
DEOP 200-1	PRIMARY CONTAINMENT CONTROL
DEOP 300-1	SECONDARY CONTAINMENT CONTROL
DEOP 400-2	EMERGENCY DEPRESSURIZATION
DEOP 400-5	FAILURE TO SCRAM

## Computer Aided Exercise Programs

### ILT 05-1 NRC EXAM SCENARIO ILT-N-1 Initial Setup CAEP:

```
# ILT-N-1.cae
# ILT 05-1 NRC Exam
# Setup for ILT-N-1
# Written by MP
# Rev 00
# Date 09/05
```

#### # INITIAL CONDITIONS

```
# Causes a failure of RPS electrical scram but ARI works
imf b12
```

```
# Binds Iso Cond 1 valve open
imf ic1vbn 100.0
```

```
# Overrides 902-3 G-2 Area Temp Hi Mn Stm Hdr Bypass Vlvs and East Wall OFF.
imf ser0653 off
imf ser0652 off
```

```
# Adjusts RBCCW mass so no head tank high lvl alarm when circ water temp changed.
set wrmtot = 677000.0
```

```
# Sets circ water temp to 88 deg. F
irf wp3 88.0
```

```
# Override U3 RBCCW and TBCCW temps to 93.0 degs.
ior wrtpump2 93.0|2
ior wttpump2 93.0|2
```

```
# Overrides 907-7 H-3, Turb Vacuum Lo, OFF since it comes in early.
imf ser0753 off|2
```

```
# Overrides 907-5 F-5, Condr Vacuum Lo, OFF since it comes in early.
imf ser0981 off|2
```

```
# Sets gain for all 6 APRMs to 1.0
irf niagain 1.0|2
irf niagainf true|4
```

#### #SETUP EVENT TRIGGERS

```
# Event Trigger 1 sets gain for all 6 APRMs to 1.0.
trgset 1 "0"|4
trg 1 "irf niagainf true"|8
```

```
# Event Trigger 2 inserts an RPIS failure for rod F5
trgset 2 "0"|4
imf rdfailf5 (2)|4
```

```
# Event Trigger 3 trips 2B circ water pump on Overcurrent.
trgset 3 "0"|4
trg 3 "irf wp3 89.8 2:00"|4
imf hp7 (3)|4
```

# Event Trigger 4 Activates when 2C Condenser Vacuum <24.0.

trgset 4 "cdpcrvac(3) .lt. 24.0"|6

trg 4 "imf ser0753 normal"|6

# Event Trigger 5 Activates when Rx power <85%.

trgset 5 "rxnfavgs .lt. 85.0"|6

trg 5 "irf wp3 84.0 5:00"|6

# Event Trigger 6 As a contingency, activates when 2A recirc pump speed reaches 66%.

# This is so 2B Recirc pump trips before 2A Recirc pump is below 60%.

# Then the action required is to scram which is not desired at this point.

# Trips B MG set on motor overcurrent

# After 2:00 min, inserts a FEF.

trgset 6 "rrgangen(1) .lt. 0.66"|6

imf rrmgmboc (6)|6

imf radffd (6 2:00) 0.5|6

# Event Trigger 7 inserts Control Room Breathing Air alarm.

trgset 7 "0"|8

imf ser1716 (7) on|8

# Event Trigger 8 trips 2A circ water pump on Overcurrent.

# Causes air leak into main condenser so vacuum goes away quickly.

trgset 8 "rptscram"|8

imf hp6 (8)|8

imf hp5 (8) 100 1:00|8

# Event Trigger 9 starts an Iso Steam line leak into the RX Bldg between the 1 and 2 valves.

trgset 9 "0"|8

imf icstmr (9) 1.0|8

# Event Trigger 10 Activates when IC Area rad is >100 mr/hr.

# Ramps RWCU Area Rad meter to full scale over 3 min. using override.

# After 2 min, overrides RWCU Area Rad Hi light ON and inserts SER alarm.

# Ramps Vessel Instru Rack Area Rad to full scale over 2 min using override.

# After 80 sec, overrides Vessel Instru Rack Area Rad Hi light ON and inserts SER alarm.

trgset 10 "ppr216 .gt. 100.0"|10

ior mrgrwcu (10) 1.0 3:00|10

ior mrlrwcu (10 2:00) on|10

imf ser0260 (10 2:00) on|10

ior mrginst (10) 1.0 2:00|10

ior mrlinsth (10 80) on|12

imf ser0268 (10 80) on|12

# Event Trigger 11 Activates when RWCU Area Rad (STA 7) alarm is bypassed.

# Returns SER alarm to OFF.

trgset 11 "mrdrwcu\_drw"|12

trg 11 "imf ser0260 off"|12

# Event Trigger 12 Activates when Vessel Instru Rack Area Rad (STA 8) alarm is bypassed.

# Returns SER alarm to OFF.

trgset 12 "mrdinstb\_drw"|12

trg 12 "imf ser0268 off"|12

# END

Date: TODAY

## Unit 2 Turnover

### Online Information

905 MWe

Online Risk: Green

Risk Equipment:

### Protected Pathway(s)

### Shutdown Information

Time to Boil: 0

Shutdown Risk: N/A

### Reactivity Management

Limit: MFLCPR 0.904 Steady

Action Level: 0.980

S/D Method: DGP 2-1 (Reverse Sequence)

### Unit 2 Priorities

Operate per Load Dispatcher.

### LCORAs

LCORA Title None

Start  
Clock Ends

### Compensatory Actions

Degradation  
Documentation  
None

Frequency  
Responsible

Compensatory Action

### Unit 2 Conditions, Status, Abnormalities

2 hr ago IRM 12 OOS due to power supply failure. IMD waiting for replacement power supply to arrive from Quad Cities Station.

5 hr ago 2B EHC pump OOS due to a problem with its pressure compensator. Expected BIS next shift.

During the past hour, Dresden Lock and Dam made some gate adjustments causing circulating water inlet temperature to rise ~5 deg. F. DW pressure may drift up slightly as a result. Dresden Lock and Dam will make additional gate adjustments within the hour. Expect Circulating Water inlet temperature to drop by as much as 5 deg. F. when they do this.

### Unit 2 Abnormal Component Positions

None

### U2 Open Operability Determinations with Compensatory Actions

#### Shift 1 Activities (X = Completed)

☐  
☐

#### Shift 2 Activities

☐  
☐

#### Shift 3 Activities

☐  
☐

#### Common Unit Activities

#### Shift 1 Activities (X = Completed)

☐  
☐

#### Shift 2 Activities

☐  
☐

#### Shift 3 Activities

☐  
☐

### Unit 2 Procedures in Progress (Non-Surveillance)

None

### Unit 2 Surveillances in Progress

None

Date: TODAY

## Unit 3 Turnover

### Online Information

905 MWe

Online Risk: Green

Risk Equipment:

### Protected Pathway(s)

### Shutdown Information

Time to Boil: 0

Shutdown Risk: N/A

### Reactivity Management

Limit: MFLCPR 0.904 Steady

Action Level: 0.980

S/D Method: DGP 2-1 (Reverse Sequence)

### Unit 3 Priorities

Maintain load per BPO direction.

### LCORAs

LCORA Title None

Start  
Clock Ends

### Compensatory Actions

Degradation  
Documentation  
None

Frequency  
Responsible

Compensatory Action

### Unit 3 Conditions, Status, Abnormalities

During the past hour, Dresden Lock and Dam made some gate adjustments causing circulating water inlet temperature to rise ~5 deg. F. DW pressure may drift up slightly as a result. Dresden Lock and Dam will make additional gate adjustments within the hour. Expect Circulating Water inlet temperature to drop by as much as 5 deg. F. when they do this.

### Unit 3 Abnormal Component Positions

None

### U3 Open Operability Determinations with Compensatory Actions

None

### Shift 1 Activities (X = Completed)

☐  
☐

### Shift 2 Activities

☐  
☐

### Shift 3 Activities

☐  
☐

### Common Unit Activities

### Shift 1 Activities (X = Completed)

☐  
☐

### Shift 2 Activities

☐  
☐

### Shift 3 Activities

☐  
☐

### Unit 3 Procedures in Progress (Non-Surveillance)

None

### Unit 3 Surveillances in Progress

None



# ***Dresden Generating Station***

**ILT-N-2**

**RAISE REACTOR POWER BY WITHDRAWING CONTROL RODS**

**CONTROL ROD DRIFT OUT**

**IRM CHANNEL 14 FAILS UPSCALE WITH FAILURE TO HALF SCRAM**

**RECIRC LOOP LEAK**

**LOSS OF HIGH PRESSURE FEED**

**EMERGENCY DEPRESSURIZATION**

**Rev. 00**

**09/05**

Developed By:

\_\_\_\_\_  
Exam Author

\_\_\_\_\_  
Date

Approved By:

\_\_\_\_\_  
Facility Representative

\_\_\_\_\_  
Date

Facility: <u>Dresden</u>	Scenario No: <u>ILT-N-2</u>	Op-Test No: <u>ILT 05-1</u>
Examiners: _____		Operators: _____
_____		_____
_____		_____
<p><u>Initial Conditions:</u> ~1% reactor power; IRM channel 12 out of service; 2B EHC Pump OOS; 2B RFP OOS, Unit 3 is in Mode 1.</p> <p><u>Turnover:</u> Power ascension in progress.</p>		

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R NSO SRO	Raise Reactor power by withdrawing control rods
2	rode11do	C NSO SRO	Control Rod Drift Out <sup>T</sup>
3	nii14pot	I NSO SRO	IRM channel 14 fails upscale with failure to half scram <sup>T</sup>
4	f44	M NSO SRO	Recirc loop leak (rising D/W pressure)
5	h31 h33 h34 at37 at43	M NSO SRO	2A RFP trips & 2C RFP fails to start / HPCI spuriously isolates. (loss of high pressure feed) Emergency Depressurization.

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

## **Scenario Objective**

Evaluate the operators in using the Emergency Depressurization DEOP contingency procedure.

## **Scenario Summary**

Initial Conditions:

- Mode 2 at approximately 1% reactor power.
- Load ascension in progress per DGP 01-01 and DOP 400-02.
- Ensure 2A RFP is the only RFP running.
- IRM channel 12 out of service.
- 2B EHC Pump OOS.
- 2B Reactor Feed Pump OOS, expected to return to service this shift.
- Unit 3 is in Mode 1.
- Setting up scaffolding on Unit 2 Reactor Building 517' and East LPCI Corner Room for upcoming maintenance activities.

## **Scenario Sequence**

- The NSO, as directed by the SRO, continues the power ascension for unit startup by control rod withdrawal.
- During the control rod withdrawal, a control rod begins to drift out when moved. NSO must insert the rod to position 00 and it latches in when fully inserted.
- IRM channel 14 fails upscale, without a half-scam. The NSO inserts an A channel half scram. NSO/SRO recognize that it cannot be bypassed and the SRO must make the Tech Spec determination.
- A recirculation loop develops a leak causing drywell pressure to slowly increase. Shortly thereafter, 2A RFP trips and 2C fails to start. When HPCI starts, it spuriously isolates, resulting in a total loss of high pressure feed. After the reactor scram, the team should perform the RPV Control and Primary Containment Control DEOPs. The leak worsens causing RPV level to drop to TAF. The team should Emergency Depressurize and restore RPV level with low pressure injection systems.

## **Event One – Raise Reactor Power By Withdrawing Control Rods**

- The crew increases reactor power by withdrawing control rods per DOP 0400-01, and DGP 01-01.

Malfunctions required:

- 0

Success Path:

- Control rods pulled per applicable procedures.

### **Event Two – Control Rod Drift Out**

- Control Rod N-03 will drift out after it is withdrawn.

Malfunctions required:

- 1 (Control Rod N-03 drift out).

Success Path:

- Control Rod N-03 fully inserted and latched in at position 00.
- The Unit Supervisor references appropriate Tech Specs and makes correct LCO call.

### **Event Three – IRM Channel 14 Fails Upscale With Failure To Half Scram**

- IRM channel 14 fails upscale, with no automatic A channel half scram.

Malfunctions required:

- 2 (IRM upscale).  
(Failure of half scram to occur).

Success Path:

- The crew inserts an A channel half scram, references appropriate Tech Specs and makes correct LCO call.

### **Event Four and Five – Recirc Loop Leak / Loss of High Pressure Feed**

- The crew recognizes and responds to a recirc leak and a loss of all high pressure feed.

Malfunctions required:

- 2 (slow B recirc discharge line leak – increases after reactor scram).  
(Loss of high pressure injection due to trip of all RFPs and a HPCI Spurious Isolation).

Success Path:

- The crew sets contingency for rising D/W pressure, then orders scram on loss of all RFPs.
- Emergency Depressurize.
- Use low pressure injection systems to restore RPV level.

### **Scenario Recapitulation**

Total malfunctions	5	(5 to 8)
Malfunctions after EOP entry	1	(1 to 2)
Abnormal events	2	(2 to 4)
Major transients	2	(1 to 2)
EOPs Entered	2	(1 to 2)
EOP Contingencies	2	(0 to 2) (Alternate Level Control/Emergency Depressurization)
Approximate scenario run time	60	(60 to 90 min)
EOP run time	50%	(40 to 70%)
Crew critical tasks	3	(2 to 3)



## PRE-SCENARIO ACTIVITIES

- 6 If applicable, conduct pre-scenario activities in accordance with TQ-AA-106-0107, SIMULATOR EXAMINATION BRIEFING.
  - b. Provide the crew with a copy of DGP 01-01 Unit Startup marked up and completed through G.53.
  - c. Inform the crew that (identify an individual) is the QNE present in the Control Room.
  - d. Verify a standard startup REMA is available.
  - e. Direct the crew to perform their briefs prior to entering the simulator.
- 7 Simulator Setup (the following steps can be done in any logical order)
  - a. Initialize simulator in IC 7 (startup in progress with a bypass valve partially open) and perform the following before continuing below:
    - 1) Verify shell/chest warming off.
    - 2) Adjust control rods pattern so Step 33 is withdrawn with step 34 ready to withdraw.
    - 3) Verify a bypass valve is partially open. (Step 34 can be partially or fully withdrawn if necessary to establish the bypass valve open)
    - 4) Verify control rod N-03 at position 08. (part of step 35: move from 08 to 12, then will drift out)
    - 5) Markup the CRSP to agree with current rod pattern.
    - 6) Verify 2A RFP ON.
    - 7) Verify 2C RFP in Standby, on Bus 22.
    - 8) OPEN MO 2-3606 2B2 Startup Vent.
  - b. If the DW and Torus are not inerted, perform the following:
    - 1) Vent DW pressure to <0.75 psig.
    - 2) Run CAEP file: **inert.cae**.
    - 3) Vent or add N<sub>2</sub> to the DW and Torus as necessary to establish normal at power pressures.
    - 4) Verify N<sub>2</sub> Makeup controller and DW/Torus DP controller in AUTO and with normal at power setpoints.
  - c. Secure the following equipment and tag out of service:
    - 1) IRM channel 12.
    - 2) 2B EHC Pump.
    - 3) 2B RFP Pump.
    - 4) 2B RFP Aux Oil Pump.

**NOTE: Do NOT move rod N-03 after running CAEP file ILT-N-2.CAE.** It will begin drifting out.

  - d. Run the initial setup CAEP file: **ILT-N-2.CAE**.
  - e. Cut in/out Cond Demin Beds as needed, to maintain dp within limits.
  - f. Ensure running Condensate pump amps within limits.
  - g. Advance the chart recorders.
- 8 Verify the following simulator conditions:
  - a. One bypass valve partially open.

b. Drywell and Torus pressures are normal with containment inerted.

9 Complete the Simulator Setup Checklist.

Legend for team actions:

■ - Required Actions      □ - Optional Actions      ✓ - Critical Task

**Event One – Raise Reactor Power By Withdrawing Control Rods:** · The NSO, as directed by the SRO, continues the power ascension for unit startup by control rod withdrawal.

Trigger	Position	Crew Actions or Behavior
<b>1</b>		<p><b><u>SIMULATOR OPERATOR / FLOOR INSTRUCTOR:</u></b></p> <p>If the crew determines APRM gains need adjusted at any time during this scenario, inform the crew you will perform the gain adjustment. After several minutes, activate <b>trigger 1</b>, and report APRM gains are adjusted to the crew. Toggle <b>Trigger 1</b> OFF then back ON as often as needed to repeat this.</p>
	<b>SRO</b>	<p>Directs pulling control rods:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Reviews REMA.</li> <li><input type="checkbox"/> Designates second verifier.</li> <li><input type="checkbox"/> Directs NSO to pulls rods.</li> </ul>
	<b>NSO</b>	<p>Performs the following actions per DOP 0400-01, Reactor Manual Control System Operation, and DGP 03-04, Control Rod Movements, as directed</p> <p><u>Verifies the following prior to moving any control rod:</u></p> <ul style="list-style-type: none"> <li>■ Control rod selected on the select matrix is correct rod.</li> <li>■ Second Verification requirements satisfied.</li> <li>■ Rod Out Permit light is illuminated.</li> </ul> <p><u>Withdraws rods as follows:</u></p> <ul style="list-style-type: none"> <li>■ Moves RONOR Switch to NOTCH OVERRIDE (use of RONOR is optional) and the Rod Movement Control switch to ROD OUT.</li> <li>■ Verifies ON light and proper Control Rod Timer operation.</li> <li>■ Releases switches before target position is reached.</li> </ul> <p><u>Verifies rod settles to target position and proper response of nuclear instrumentation.</u></p>
	<b>ANSO</b>	<p>Performs second verification checks.</p> <p><u>For first rod in a step:</u></p> <ul style="list-style-type: none"> <li>■ Verifies correct control rod pattern</li> <li>■ Verifies correct step and array.</li> <li>■ Verifies RWM rod blocks enabled</li> </ul> <p><u>For all rods moved:</u></p> <ul style="list-style-type: none"> <li>■ Verifies correct control rod selected.</li> <li>■ Verifies planned control rod motion is correct.</li> </ul> <p><u>Verifies control rod at target position.</u></p>
		<p><b><u>Event 1 Completion Criteria:</u></b></p> <ul style="list-style-type: none"> <li>• Sufficient rod moves (event 2 starts when control rod N-03 is selected).</li> <li>• OR, at the direction of the Lead Examiner.</li> </ul>



**Event Two –Control Rod Drift Out:** · During the control rod withdrawal, a control rod begins to drift out when moved. NSO must insert the rod to position 00 and it latches in when fully inserted.

Trigger	Position	Crew Actions or Behavior
2		<p><b><u>NOTE:</u></b> The drift out rod malfunction for N-03 was inserted during the simulator setup.</p> <p><b><u>Simulator Operator:</u></b> When Control Rod N-03 is inserted past position 02, verify <b>trigger 2</b> AUTOMATICALLY activates, which removes the drift out malfunction for Control Rod N-03.</p>
		<p><b><u>Role Play:</u></b> WEC/NLO to disarm N-03: acknowledge the request. It is not intended to complete the request. QNE to evaluate core limits: Acknowledge the request. Wait 2 min. and report, “core parameters are within limits”.</p>
	NSO	<p>Notifies and announces that Control Rod N-03 is drifting out..</p> <p>Performs actions of DOA 0300-05, Inoperable Or Failed Control Rod Drives as directed.</p> <p><u>Immediate:</u></p> <ul style="list-style-type: none"> <li>■ Bypasses the Rod Worth Minimizer.</li> <li>■ Inserts the CRD to 00 using Emergency Rod In.</li> <li>□ Announces that control rod N-03 latched in at position 00.</li> </ul> <p><u>Subsequent:</u></p> <ul style="list-style-type: none"> <li>■ Announces that procedure directs entering DOA 0300-12, Mispositioned Control Rod.</li> <li>■ Discontinues <u>ALL</u> non-emergency control rod motion and notifies US and QNE to evaluate core parameters.</li> </ul>
	SRO	<ul style="list-style-type: none"> <li>■ Enters DOA 0300-05, Inoperable Or Failed Control Rod Drives, and directs actions.</li> </ul>

**Event Two –Control Rod Drift Out:** · During the control rod withdrawal, a control rod begins to drift out when moved. NSO must insert the rod to position 00 and it latches in when fully inserted.

Trigger	Position	Crew Actions or Behavior
	<b>SRO</b>	<ul style="list-style-type: none"> <li>■ References ITS 3.1.6, Condition A, and determines the following actions are required: <ul style="list-style-type: none"> <li>• A.1 Move associated control rod(s) to correct position within 8 hours. (cannot be done due to bad RPIS)</li> </ul> </li> <li>OR;</li> <li>• A.2 Declare associated control rod(s) inoperable within 8 hours. (required action)</li> <li>■ References ITS 3.1.3, Condition C, and determines the following actions are required: <ul style="list-style-type: none"> <li>• C.1 Fully insert inoperable control rod within 3 hours. (DOA 0300-05, Inoperable or Failed Control Rod Drives, directs inserting the rod)</li> <li>• C.2 Disarm the associated CRD within 4 hours.</li> </ul> </li> <li>□ Directs disarming rod N-03.</li> <li>■ Enters DOA 0300-12, Mispositioned Control Rod, and directs actions.</li> </ul>
	<b>SRO</b>	□ Directs taking rod N-03 OOS on the RWM.
	<b>NSO</b>	□ Takes rod N-03 OOS on the RWM.
	<b>SRO</b>	□ Directs continuation of startup with rod withdrawal.
	<b>NSO</b>	□ Continues control rod withdrawal as directed by the SRO.
		<p><b><u>Event 2 Completion Criteria:</u></b></p> <ul style="list-style-type: none"> <li>• When Control Rod N-03 Has Been Inserted To Position 00, AND</li> <li>• Tech Specs Have Been Addressed,</li> <li>• OR, At The Direction Of The Lead Examiner.</li> </ul>

**Event Three – IRM Channel 14 Fails Upscale With Failure To Half Scram:** · IRM channel 14 fails upscale, without a half-scram. The NSO inserts an A channel half scram. NSO/SRO recognize that it cannot be bypassed and the SRO must make the Tech Spec determination.

Trigger	Position	Crew Actions or Behavior
<b>3</b>		<p><b><u>SIMULATOR OPERATOR:</u></b></p> <p>At the discretion of the Lead Examiner, activate <b>trigger 3</b>, which fails IRM 14 channel upscale and prevents half scram (setup in initial conditions) from coming in.</p>
	<b>NSO / ANSO</b>	<p>Acknowledges, announces, and performs actions for 902-5 DANs A-5, B-11, C-3, and C-15.</p> <ul style="list-style-type: none"> <li>■ Stop control rod movements.</li> <li>■ Verifies IRM 14 readings against other IRMs on 902-36 panel.</li> <li>■ Identifies failure to get A channel half scram and reports to SRO.</li> <li>□ Verify IRM range switch is in the correct position.</li> <li>□ Verify IRM 14 function switch in operate.</li> <li>□ Verifies power supplies operating properly.</li> </ul>
	<b>SRO</b>	<ul style="list-style-type: none"> <li>■ References appropriate plant licensing documents: <ul style="list-style-type: none"> <li>• ITS 3.3.1.1 condition A, required action A.1 OR A.2, Place channel in 1 trip system in trip within 6 hours OR Place 1 trip system in trip within 6 hours.</li> <li>• TRM 3.3.a: Required Channels met, no action required.</li> </ul> </li> <li>■ Directs inserting A channel half scram per DOP 500-07 Insertion/Reset of Manual Half Scram or DOA 500-02, Partial ½ or Full Scram Actuation.</li> <li>□ Notifies the Shift Manager.</li> <li>□ Notify Work Week Manager, Fin team, IMD, OR EMD.</li> </ul>
	<b>NSO</b>	<ul style="list-style-type: none"> <li>■ Inserts A channel half scram per DOP 500-07 Insertion/Reset of Manual Half Scram.</li> </ul>
		<p><b><u>Event 3 Completion Criteria:</u></b></p> <ul style="list-style-type: none"> <li>• Applicable Tech Spec has been referenced and A channel half scram inserted.</li> <li>• OR, at the direction of the Lead Examiner.</li> </ul>

**Event Four and Five – Recirc Loop Leak / Loss of High Pressure Feed: A recirc loop leak with a loss of high pressure feed results in RPV level dropping to TAF. Emergency Depressurization is performed to recover RPV level using low pressure injection systems.**

Trigger	Position	Crew Actions or Behavior
<b>4</b>		<p><b><u>SIMULATOR OPERATOR:</u></b></p> <p>At the discretion of the Lead Examiner, activate <b>trigger 4</b>, causing a 0.005% recirc loop leak and removes scram jumpers (installed in initial conditions), which allows reactor to scram normally.</p>
<b>5</b>		<p><b><u>SIMULATOR OPERATOR:</u></b></p> <p>When D/W pressure reaches 1.4 psig, verify <b>trigger 5</b> automatically activates, which trips ALL RFPs.</p>
<b>6</b>		<p><b><u>SIMULATOR OPERATOR:</u></b></p> <p>When HPCI starts, verify <b>trigger 6</b> automatically activates, which causes a spurious HPCI isolation, and after a 3 min. delay, increases 2B Recirc disch line break size.</p>
<b>7</b>		<p><b><u>SIMULATOR OPERATOR / ROLE PLAY:</u></b></p> <p>NLO sent to lineup CRD crosstie: wait 4 min, activate <b>trigger 7</b>, then report: “the CRD crosstie is lined up”.</p>
<b>8</b>		<p><b><u>SIMULATOR OPERATOR / ROLE PLAY:</u></b></p> <p>NLO sent to lineup makeup to SBLC Boron tank: wait 4 min, activate <b>trigger 8</b>, and report: “makeup lined up to SBLC Boron tank”.</p>
<b>9</b>		<p>NLO sent to lineup makeup to SBLC Test tank: wait 4 min, activate <b>trigger 9</b>, and report: “makeup lined up to SBLC Test tank”.</p> <p><b><u>SIMULATOR OPERATOR / ROLE PLAY:</u></b></p> <p>NLO sent to check EDG operation: wait 3 min, then report: “Both EDGs are operating normally”.</p> <p>NLO sent to cut out Cond Demin beds: wait 3 min, cutout Demin beds as needed (using instructor station), then report: “Cond Demin beds cutout”.</p>
	<b>NSO</b>	<ul style="list-style-type: none"> <li>■ Determines/announces increasing Drywell pressure.</li> </ul>
	<b>SRO</b>	<ul style="list-style-type: none"> <li>■ Enters DOA 0040-01, Slow Leak, and directs actions. Sets contingencies.</li> <li>□ May enter DGP 02-03, Reactor Scram, and direct scram preparations.</li> </ul>
	<b>NSO</b>	<ul style="list-style-type: none"> <li>□ Performs DGP 02-03, Reactor Scram, scram preparation actions if directed. <ul style="list-style-type: none"> <li>• Starts the motor suction pump AND turning gear oil pump.</li> </ul> </li> </ul>

**Event Four and Five – Recirc Loop Leak / Loss of High Pressure Feed: A recirc loop leak with a loss of high pressure feed results in RPV level dropping to TAF. Emergency Depressurization is performed to recover RPV level using low pressure injection systems.**

Trigger	Position	Crew Actions or Behavior
	<b>NSO / ANSO</b>	<p>Performs DOA 0040-01, Slow Leak, as directed.</p> <ul style="list-style-type: none"> <li>■ Maintains water level with the Feedwater Control System.</li> <li>■ Notify Licensed Shift supervisor AND Radiation Protection.</li> <li>□ Monitor for DEOP and GSEP entry conditions.</li> <li>□ Direct Operators to locate <u>AND</u> isolate leak.</li> <li>□ Make PA announcements regarding the leak.</li> <li>□ Verify release limits are NOT violated.</li> <li>■ MONITOR torus bulk water temperature.</li> <li>□ Verify Crib House inlet temperature is less than 95°F.</li> <li>■ Initiate torus cooling per DOP 1500-02, Torus Water Cooling Mode of Low Pressure Coolant Injection System, or the applicable hard card.</li> <li>□ Monitor RBCCW System temperature for deviation from normal.</li> </ul>
	<b>NSO</b>	<ul style="list-style-type: none"> <li>■ Determines/announces all RFPs are tripped.</li> </ul>
	<b>SRO</b>	<ul style="list-style-type: none"> <li>□ Enters DGP 02-03, Reactor Scram, and directs a manual scram.</li> </ul>
	<b>SRO</b>	<p>Enters DEOP 100, RPV Control, due to high PC/P and/or low RPV/L and performs/directs:</p> <ul style="list-style-type: none"> <li>■ Entering DGP 02-03, Reactor Scram.</li> <li>■ Verification of all isolations, ECCS and EDGs starts</li> <li>■ Holding RPV/L +8 to +48 inches</li> <li>■ Maintaining RPV/P &lt;1060 psig</li> <li>□ Bypass DW cooler isolations per DEOP 500-02, Bypassing Interlocks and Isolations</li> </ul>
	<b>NSO</b>	<p>Performs DGP 02-03, Reactor Scram, and DEOP 100, RPV Control, as directed:</p> <ul style="list-style-type: none"> <li>■ Places Mode Switch to Shutdown and depresses the Scram pushbuttons.</li> <li>■ Checks rods inserted.</li> <li>■ Maintains RPV level as directed by SRO.</li> <li>□ Checks recirc pumps run back to minimum speed.</li> <li>■ Inserts SRMs and IRMs</li> </ul>

**Event Four and Five – Recirc Loop Leak / Loss of High Pressure Feed: A recirc loop leak with a loss of high pressure feed results in RPV level dropping to TAF. Emergency Depressurization is performed to recover RPV level using low pressure injection systems.**

Trigger	Position	Crew Actions or Behavior
	<b>ANSO</b>	<p>Performs the following actions per DGP 02-03, Reactor Scram, and DEOP 100, RPV Control, as directed:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Verifies turbine tripped.</li> <li><input type="checkbox"/> Verifies generator tripped.</li> <li><input type="checkbox"/> Verifies aux power transfers.</li> <li>■ Controls RPV/P using the Isolation Condenser.</li> </ul>
	<b>NSO / ANSO</b>	<ul style="list-style-type: none"> <li>■ Determines/announces Drywell pressure rapidly rising.</li> <li>■ Determines/announces RPV level is dropping.</li> </ul>
	<b>SRO</b>	<ul style="list-style-type: none"> <li>■ Directs starting HPCI to maintain Level.</li> </ul>
	<b>ANSO</b>	<ul style="list-style-type: none"> <li>■ Starts HPCI as directed.</li> <li>■ Determines/announces HPCI isolated.</li> </ul>
	<b>SRO</b>	<p>Determines insufficient high pressure feed is available, then performs/directs:</p> <ul style="list-style-type: none"> <li>■ Inhibiting ADS before –59 inches.</li> <li><input type="checkbox"/> Initiating the Isolation Condenser</li> <li><input type="checkbox"/> Lining up high pressure Alternate Injection systems.</li> <li><input type="checkbox"/> Verifying at least two low pressure injection systems available.</li> <li>■ Waiting until RPV level drops to TAF.</li> <li>■ Verifying any low pressure system lined up with a pump running.</li> </ul>
	<b>ANSO</b>	<ul style="list-style-type: none"> <li>■ Inhibits ADS as directed.</li> </ul>
	<b>SRO</b>	<p>Enters DEOP 200-1, Primary Containment Control, when PC/P reaches 2 psig and performs/directs:</p> <ul style="list-style-type: none"> <li>■ Monitoring of PC/P.</li> <li>■ Initiation of torus sprays before PC/P of 9 psig.</li> <li>■ <b>When PC/P is above 9 psig or before DW/T reaches 281°F:</b> <ul style="list-style-type: none"> <li>• Verification of DSIL.</li> <li>• Tripping of recirc pumps.</li> <li>• Tripping of DW coolers.</li> <li>• ✓ <b>Initiation of DW sprays.</b></li> </ul> </li> <li><input type="checkbox"/> <b>Monitoring of DW/T. (D/W sprays may be initiated for temp control)</b></li> <li>■ Monitoring of SP/T and initiation of torus cooling.</li> <li><input type="checkbox"/> Monitors SP/L.</li> <li><input type="checkbox"/> Verifies initiation of drywell and torus H<sub>2</sub>/O<sub>2</sub> monitors.</li> </ul>

**Event Four and Five – Recirc Loop Leak / Loss of High Pressure Feed: A recirc loop leak with a loss of high pressure feed results in RPV level dropping to TAF. Emergency Depressurization is performed to recover RPV level using low pressure injection systems.**

Trigger	Position	Crew Actions or Behavior
	<b>ANSO</b>	<p>Performs DEOP 200-1, Primary Containment Control, actions as directed:</p> <ul style="list-style-type: none"> <li>■ ✓ Monitors PC/P and <b>initiates</b> torus sprays and <b>drywell sprays</b> per Hard Card LPCI/CCSW OPERATION, as directed.</li> <li>□ Monitors DW/T.</li> <li>■ Monitors SP/T and initiates torus cooling per Hard Card LPCI/CCSW OPERATION as directed.</li> <li>□ Monitors SP/L.</li> <li>□ Verifies initiation of drywell and torus H<sub>2</sub>/O<sub>2</sub> monitors.</li> </ul>
	<b>SRO</b>	<p>Before RPV level reaches –164 inches, enters DEOP 400-02, Emergency Depressurization, and directs:</p> <ul style="list-style-type: none"> <li>□ Initiation of Iso Condenser to maximum flow.</li> <li>□ Verification that SP/L &gt;6 feet.</li> <li>■ ✓ <b>Opening all ADS valves.</b></li> <li>■ Verification all relief valves are open.</li> </ul>
	<b>ANSO</b>	<p>Performs DEOP 400-02, Emergency Depressurization, as directed:</p> <ul style="list-style-type: none"> <li>□ Initiates Iso Condenser to maximum flow per Hard Card, ISOLATION CONDENSER.</li> <li>□ Verifies SP/L &gt;6 feet.</li> <li>■ ✓ <b>Opens all ADS valves.</b></li> <li>■ Verifies all relief valves are open.</li> </ul>
	<b>SRO</b>	<p>✓ <b>Directs NSO/ANSO to control RPV level above TAF</b> using any of the preferred injection systems listed below:</p> <ul style="list-style-type: none"> <li>□ Condensate</li> <li>□ Core Spray</li> <li>□ LPCI</li> </ul>
	<b>NSO / ANSO</b>	<p>✓ <b>Restores RPV level to that directed by the SRO (above TAF)</b> using the systems specified by the SRO.</p>
		<p><b><u>Event 4 and 5/Scenario Completion Criteria:</u></b></p> <ul style="list-style-type: none"> <li>• Performed Emergency Depressurization.</li> <li>• Restored RPV level above TAF.</li> <li>• OR, at the direction of the Lead Examiner.</li> </ul>

Critical Tasks	
(RPV-1.1)	With Reactor pressure greater than shutoff head of the low pressure system(s) and when RPV water level reaches TAF, <b>INITIATE</b> emergency depressurization, before level reaches Minimum Zero-Injection RPV Water Level.
(RPV-1.2)	Action is taken to restore RPV water level above TAF, by <b>OPERATING</b> available low pressure system(s), when RPV pressure decreases below the shutoff head of the low pressure system(s).
(RPV-5.1)	When drywell pressure exceeds the suppression chamber spray initiation pressure or before containment pressure exceeds the Pressure Suppression Pressure, <b>INITIATE</b> drywell/containment sprays, while in the safe region of the drywell spray initiation limit or above the containment spray initiation pressure.



## REFERENCES

PROCEDURE	TITLE
DAN 902-3 C-15	ADS MAIN DC PWR FAILURE
DAN 902-5 A-5	IRM HI
DAN 902-5 B-11	CHANNEL A/B NEUTRON MONITOR
DAN 902-5 C-3	ROD OUT BLOCK
DAN 902-5 C-15	CHANNEL B RX SCRAM
DOP 0500-07	INSERTION/RESET OF MANUAL HALF SCRAM
DGP 02-03	REACTOR SCRAM
DGP 03-04	CONTROL ROD MOVEMENTS
DOA 0040-01	SLOW LEAK
DOA 0250-01	RELIEF VALVE FAILURE
DOA 0300-12	MISPOSITIONED CONTROL ROD
DOA 0040-01	SLOW LEAK
DOA 0500-02	PARTIAL ½ OR FULL SCRAM ACTUATION
DEOP 0100	RPV CONTROL
DEOP 200-1	PRIMARY CONTAINMENT CONTROL
DEOP 400-02	EMERGENCY DEPRESSURIZATION
DEOP 500-02	BYPASSING INTERLOCKS AND ISOLATIONS

## Computer Aided Exercise Programs

### ILT 05-1 NRC EXAM SCENARIO ILT-N-2 Initial Setup CAEP:

```
# ILT-N-2.cae
# ILT 05-1 NRC Exam
# Setup for ILT-N-2
# Written by MP
# Rev 00
# Date 09/05
```

#### # INITIAL CONDITIONS

```
# Inserts rod N-03 drift out malfunction.
imf rodn03do
```

```
# installs rps scram jumpers, not allowing half scram when IRM 18 fails
irf rpjumpas on
```

```
# Presets APRM gain pot.
irf niagain 1.0
```

```
# Overrides OFF the IC Rad Vent Rad Mon Dwncsl alarm
imf ser0004 off
imf ser0019 off
```

```
# Sets IC tube inlet and shell enthalpies to 60.0 so temperature alarm resets
set ich2la = 60.0|2
set ichshell = 60.0|2
```

```
# Sets Stator Clg Wtr PCV to 28.0 psig
irf kp4 28.0|2
```

#### #SETUP EVENT TRIGGERS

```
# Event Trigger 1 sets gain for all 6 APRMs to 1.0
trgset 1 "0"|2
trg 1 "irf niagainf true"|2
```

```
# Event Trigger 2 deletes rod N-03 drift out malfunction when it is inserted past position 02
trgset 2 "rdzactls(25) .lt. 6.0"|4
trg 2 "dmf rodn03do"|4
```

```
# Event Trigger 3 fails IRM 14 upscale
trgset 3 "0"|4
imf nii14pot (3) 125.0|4
```

```
# Event Trigger 4 Inserts a small leak in B Recirc disch and removes scram jumpers installed in setup.
trgset 4 "0"|4
imf f44 (4) 0.005|4
```

```
# Event Trigger 5 Activates when DW pressure reaches 1.4 psig.
# Trips 2A and 2C RFPs
# After 5:00 min, increases size of B Recirc disch line leak to 0.6%.
trgset 5 "ppc268 .gt. 1.4"|6
trg 5 "mmf f44 (0 5:00) 0.6"|6
imf h31 (5)|6
imf h33 (5)|6
imf h34 (5)|6
```

```
# Event Trigger 6 Activates when HPCI speed >2000 rpm.  
# Causes a spurious HPCI isolation.  
trgset 6 "hpsturb .gt. 2000.0"|8  
imf at37 (6) 0.0|8  
imf at43 (6) 0.0|8  
  
# Event Trigger 7 opens U3/U2 CRD cross-tie valve  
trgset 7 "0"|8  
irf rdxtieu3 (7) true|8  
  
# Event Trigger 8 lines up makeup to SBLC Main Boron tank.  
trgset 8 "0"|10  
irf scmumntk (8) true|10  
  
# Event Trigger 9 lines up SBLC pumps to test tank and makeup to test tank  
trgset 9 "0"|10  
irf scoptttk (9) true|10  
  
# END
```

Date: TODAY

## Unit 2 Turnover

### Online Information

0 MWe

Online Risk: Green

Risk Equipment:

### Protected Pathway(s)

### Shutdown Information

Time to Boil: 0

Shutdown Risk: N/A

### Reactivity Management

Limit: MFLCPR NA

Action Level: NA

S/D Method: DGP 2-1 (Reverse Sequence)

### Unit 2 Priorities

Continue with startup.

### LCORAs

LCORA Title None

Start  
Clock Ends

### Compensatory Actions

Degradation  
Documentation  
None

Frequency  
Responsible

Compensatory Action

### Unit 2 Conditions, Status, Abnormalities

2 hr ago	IRM 12 OOS due to power supply failure. IMD waiting for replacement power supply to arrive from Quad Cities Station.
5 hr ago	2B EHC pump OOS due to a problem with its pressure compensator. Expected BIS next shift.
7 hr ago	2B RFP OOS, expected to return later this shift

### Unit 2 Abnormal Component Positions

None

### U2 Open Operability Determinations with Compensatory Actions

#### Shift 1 Activities (X = Completed)

☐  
☐

#### Shift 2 Activities

☐  
☐

#### Shift 3 Activities

☐  
☐

#### Common Unit Activities

#### Shift 1 Activities (X = Completed)

☐  
☐

#### Shift 2 Activities

☐  
☐

#### Shift 3 Activities

☐  
☐

### Unit 2 Procedures in Progress (Non-Surveillance)

DGP 01-01 The QNE is present in the control room

### Unit 2 Surveillances in Progress

None

Date: TODAY

## Unit 3 Turnover

### Online Information

912 MWe

Online Risk: Green

Risk Equipment:

### Protected Pathway(s)

I.

II.

### Shutdown Information

Time to Boil: 0

Shutdown Risk: N/A

### Reactivity Management

Limit: MFLCPR 0.904 Steady

Action Level: 0.980

S/D Method: DGP 2-1 (Reverse Sequence)

### Unit 3 Priorities

Maintain load per BPO direction.

### LCORAs

LCORA Title None

Start  
Clock Ends

### Compensatory Actions

Degradation  
Documentation  
None

Frequency  
Responsible

Compensatory Action

### Unit 3 Conditions, Status, Abnormalities

None

### Unit 3 Abnormal Component Positions

None

### U3 Open Operability Determinations with Compensatory Actions

None

### Shift 1 Activities (X = Completed)

☐  
☐

### Shift 2 Activities

☐  
☐

### Shift 3 Activities

☐  
☐

### Common Unit Activities

### Shift 1 Activities (X = Completed)

☐  
☐

### Shift 2 Activities

☐  
☐

### Shift 3 Activities

☐  
☐

### Unit 3 Procedures in Progress (Non-Surveillance)

None

### Unit 3 Surveillances in Progress

None

# ***Dresden Generating Station***

**ILT-N-3**

**EMERGENCY DIESEL GENERATOR INOPERABLE**

**SPURIOUS ERV OPENING**

**LOSS OF RBCCW / MANUAL SCRAM**

**ELECTRICAL ATWS / ARI UNSUCCESSFUL**

**DRYWELL STEAM LEAK / SPRAY THE DRYWELL**

**Rev. 00**

**09/05**

Developed By:

\_\_\_\_\_  
Exam Author

\_\_\_\_\_  
Date

Approved By:

\_\_\_\_\_  
Facility Representative

\_\_\_\_\_  
Date

Facility: <u>Dresden</u>	Scenario No: <u>ILT-N-3</u>	Op-Test No: <u>ILT 05-1</u>
Examiners: _____		Operators: _____
_____		_____
_____		_____
<p><u>Initial Conditions:</u> ~82% reactor power; IRM channel 12 out of service; 2B EHC Pump OOS; 2B RFP OOS, Unit 3 is in Mode 1.</p> <p><u>Turnover:</u> Steady. Operating per Load Dispatcher.</p>		

Event No.	Malf. No.	Event Type*	Event Description
1	ser1589 ser0710 t18	C	ANSO SRO Emergency Diesel Generator Inoperable due to cooling water pump failure. <sup>T</sup>
2	ads3cbn ads3csd	C	ANSO SRO Spurious ERV Opening. Pulling its fuses closes the ERV. <sup>T</sup>
3	ser1784 wrppdsh1 ser1735 ser0369 ser0322 rrmpmahi rrmpmbhi	C	ANSO SRO Loss of RBCCW / Manual Scram
4	B12 ser1026 ser1060 aw4	M	Crew Electrical ATWS / ARI Unsuccessful
5	ads4bsd	M	Crew Drywell Steam Leak due to Safety Valve opening / Spray The Drywell

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

### **Scenario Objective**

Evaluate the operators in using the Failure to Scram DEOP contingency procedure and the Primary Containment Control DEOP.

### **Scenario Summary**

Initial Conditions:

- ~80% power.
- IRM channel 12 OOS.
- 2B EHC Pump OOS.
- 2B RFP OOS, expected to return to service this shift.
- Unit 3 is in Mode 1.
- Setting up scaffolding on Unit 2 Reactor Building 517' and East LPCI Corner Room for upcoming maintenance activities.

### **Scenario Sequence**

- The Unit 2 Emergency Diesel Generator (EDG) cooling water pump breaker fails rendering the EDG Inoperable.
- An ERV spuriously opens due to an electrical failure. Pulling its fuses closes the ERV.
- A Loss of RBCCW occurs due to a pipe rupture in the RX Bldg. A Manual Scram is required due to impending loss of flow to the Recirc pumps.
- An electrical ATWS occurs and ARI is unsuccessful. Pulling Scram fuses and/or venting the scram air header are successful.
- A Drywell Steam Leak occurs due to a Safety Valve opening. Spraying the Drywell is required to control Drywell pressure.

### **Event One – U2 EDG Cooling Water Pump Breaker Failure**

- The Unit 2 EDG cooling water pump breaker fails rendering the EDG Inoperable.

Malfunctions required:

- 1 (U2 EDG cooling water pump breaker trip)

Success Path:

- Places U2 EDG control switch to STOP.
- Determines Technical Specifications requirements.



### **Event Two – Spurious ERV Opening**

- An ERV spuriously opens due to an electrical failure. Pulling its fuses closes the ERV.

Malfunctions required:

- 1 (Spurious ERV Opening)

Success Path:

- Take manual control of the CRD Flow Controller.

### **Event Three – Loss of RBCCW / Manual Scram**

- A Loss of RBCCW occurs due to a pipe rupture in the RX Bldg. A Manual Scram is required due to impending loss of flow to the Recirc pumps.

Malfunctions required:

- 1 (RBCCW pipe rupture).

Success Path:

- Scrams Reactor
- Trips Recirc pumps

### **Event Four – Electrical ATWS / ARI Unsuccessful**

- An electrical ATWS occurs and ARI is unsuccessful. Pulling Scram fuses and/or venting the scram air header are successful.

Malfunctions required:

- 2 (Electrical ATWS)  
(ARI failure)

Success Path:

- Pulls scram fuses or vents scram air header.

### **Event Five – Drywell Steam Leak / Spray The Drywell**

- A Drywell Steam Leak occurs due to a Safety Valve opening. Spraying the Drywell is required to control Drywell pressure.

Malfunctions required:

- 1 (Safety Valve opens).

Success Path:

- Spraying the Drywell.

### **Scenario Recapitulation**

Total malfunctions	6	(5 to 8)
Malfunctions after EOP entry	1	(1 to 2)
Abnormal events	2	(2 to 4)
Major transients	2	(1 to 2)
EOPs Entered	3	(1 to 2)
EOP Contingencies	1	(0 to 2) (Level/Power Control)
Approximate scenario run time	60	(60 to 90 min)
EOP run time	50%	(40 to 70%)
Crew critical tasks	4	(2 to 3)

## PRE-SCENARIO ACTIVITIES

- 10 If applicable, conduct pre-scenario activities in accordance with TQ-AA-106-0107, SIMULATOR EXAMINATION BRIEFING.
  - f. Direct the crew to perform their briefs prior to entering the simulator.
- 11 Simulator Setup (the following steps can be done in any logical order)
  - a. Initialize simulator in IC 13 (an IC ~80% RX power)
  - b. Balance individual recirc pump controllers.
  - c. Secure the following equipment and tag out of service:
    - 1) IRM channel 12.
    - 2) 2B EHC Pump. (Verify 2A EHC Pump running first)
    - 3) 2B RFP Pump. (Verify other 2 RFPs running first)
    - 4) 2B RFP Aux Oil Pump.
  - d. Verify 2D condensate pump OFF and in STBY. (Verify other 3 condensate pumps running first)
  - e. Verify 2A and 2B RBCCW pumps operating with 2/3 RBCCW pump OFF.  
**NOTE: 2/3 RBCCW pump must be off prior to running the initial setup CAEP file!**
  - f. Run the initial setup CAEP file: **ILT-N-3.CAE**.
  - g. Verify condensate demins DP within limits.
  - h. Ensure Condensate pump amps within limits.
  - i. Mark up rod sequence as completed to the appropriate step in CRSP.
  - j. Advance the chart recorders.
- 12 Verify the following simulator conditions:
  - a. Reactor Power ~ 80%.
  - b. CRD Drive Water pressure ~260#.
  - c. Feedwater flows and Reactor level stable.
- 13 Complete the Simulator Setup Checklist.

Legend for team actions:

■ - Required Actions      □ - Optional Actions      √ - Critical Task

**Event One – U2 EDG Cooling Water Pump Breaker Failure: The Unit 2 EDG cooling water pump breaker fails rendering the EDG Inoperable.**

Trigger	Position	Crew Actions or Behavior
<b>1</b>		<p><b><u>SIMULATOR OPERATOR / FLOOR INSTRUCTOR:</u></b></p> <p>If the crew determines APRM gains need adjusted at any time during this scenario, inform the crew you will perform the gain adjustment. After several minutes, activate <b>trigger 1</b>, and report APRM gains are adjusted to the crew. Toggle <b>Trigger 1</b> OFF then back ON as often as needed to repeat this.</p>
<b>2</b>		<p><b><u>SIMULATOR OPERATOR:</u></b></p> <p>At the discretion of the Lead Examiner, activate <b>trigger 2</b>, which simulates Unit 2 EDG cooling water pump breaker control power transformer failure.</p>
<b>3</b>		<p><b><u>SIMULATOR OPERATOR / ROLE PLAY:</u></b></p> <p>HVO/NLO to U2 EDG to check Trouble alarm: wait 3 min, activate <b>trigger 3</b>, which clears the U2 EDG Trouble alarm. Then report “I acknowledged the local alarm which is ‘Diesel Clg Wtr Pump Failure Or Locked Out’. It will not reset”.</p> <p><b><u>ROLE PLAY:</u></b></p> <p>HVO/NLO in U2 EDG room to check cooling water pump control switch indication: report “all cooling water pump control switch indicating lights are OFF”.</p> <p>NLO to check the U2 EDG cooling water pump breaker: Wait 2 min, then report “the U2 EDG cooling water pump breaker is closed, but there is an acrid smell coming from the cubicle”.</p>
	<b>ANSO</b>	<ul style="list-style-type: none"> <li>■ Announces alarms: <ul style="list-style-type: none"> <li>• 902-8 A-7, U2 Diesel Gen Trouble.</li> <li>• 902-7 G-8, U2 Diesel Gen Clg Wtr PP Trip/Lkout</li> </ul> </li> <li>■ Sends an operator to check the U2 EDG Trouble alarm.</li> <li>■ Sends an operator to check the U2 EDG cooling water pump breaker.</li> <li>■ Performs DOA 6600-01, Diesel Generator Failure, as directed: <ul style="list-style-type: none"> <li>• Places the U2 EDG output breaker to the Pull-To-Lock position.</li> <li>• Places the U2 EDG control switch to STOP.</li> </ul> </li> <li>■ Informs the Unit Supervisor of the field reports.</li> </ul>
	<b>SRO</b>	<ul style="list-style-type: none"> <li>■ Enters DOA 6600-01, Diesel Generator Failure, and directs actions.</li> <li>■ Declares the U2 EDG inoperable.</li> </ul>

**Event One – U2 EDG Cooling Water Pump Breaker Failure: The Unit 2 EDG cooling water pump breaker fails rendering the EDG Inoperable.**

Trigger	Position	Crew Actions or Behavior
	<b>SRO</b>	<ul style="list-style-type: none"> <li>■ Determines following Technical Specifications apply: <ul style="list-style-type: none"> <li>• 3.7.2, Diesel Generator Cooling Water (DGCW) System, Condition A.1: Declare associated DG inoperable immediately.</li> <li>• 3.8.1, AC Sources—Operating, Condition: <ul style="list-style-type: none"> <li>❖ B1: Perform SR 3.8.1.1 for OPERABLE required offsite circuit(s) within 1 hour and once per 8 hours thereafter.</li> <li>❖ B.3.1: Determine OPERABLE DG(s) are not inoperable due to common cause failure OR B.3.2: perform SR 3.8.1.2 for OPERABLE DG(s) within 24 hours.</li> <li>❖ B.4: Restore required DG to OPERABLE status within 7 days.</li> </ul> </li> </ul> </li> </ul>
	<b>SRO</b>	<ul style="list-style-type: none"> <li>❑ Directs performance of DOS 0040-08, Unit 2 Operating Power Sources And Distribution.</li> <li>❑ Directs Engineering to determine the EDG is not inoperable due to common cause failure OR directs performing operability surveillance for the EDG.</li> </ul>
		<p><b><u>Event 1 Completion Criteria:</u></b></p> <ul style="list-style-type: none"> <li>• U2 EDG declared inoperable; and,</li> <li>• Technical Specification determination completed.</li> <li>• OR, at the direction of the Lead Examiner.</li> </ul>

**Event Two – Spurious ERV Opening: An ERV spuriously opens due to an electrical failure. Pulling its fuses closes the ERV.**

Trigger	Position	Crew Actions or Behavior
<b>4</b>		<p><b><u>SIMULATOR OPERATOR:</u></b></p> <p>At the discretion of the Lead Examiner, activate <b>trigger 4</b>, which causes E ERV to spuriously open due to an electrical failure.</p>
<b>5</b>		<p><b><u>SIMULATOR OPERATOR / ROLE PLAY:</u></b></p> <p>NLO to pull control power fuses for E ERV: wait 5 min, activate <b>trigger 5</b>, which removes control power fuses for E ERV. Then call the control room on the phone and report that “I have pulled E ERV fuses”.</p> <p><b><u>ROLE PLAY:</u></b></p> <p>QNE to evaluate core parameters: wait 2 min, then report “core parameters are within limits”.</p>
	<b>ANSO</b>	<p>Determines/announces that E ERV is open. Performs DOA 0250-01, Relief Valve Failure, immediate actions:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Places the E ERV control switch to OFF.</li> <li><input type="checkbox"/> Verifies FWLCS has stabilized level.</li> </ul>
	<b>SRO</b>	<ul style="list-style-type: none"> <li>■ Enters DOA 0250-01, Relief Valve Failure, and directs actions.</li> </ul>
	<b>ANSO</b>	<p>Determines that E ERV is still open and performs subsequent actions of DOA 0250-01:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Trips hydrogen addition.</li> <li>■ Monitors torus temp per DOS 1600-20, Suppression Pool Temp Monitoring</li> <li>■ When torus temp is greater than circulating water inlet temperature, starts torus cooling.</li> <li>■ Reports when &gt; 95° and DEOP 200-01, Primary Containment Control, entry is required.</li> <li><input type="checkbox"/> Cycles E ERV control switch to manual and OFF twice</li> <li><input type="checkbox"/> Cycles the ADS INHIBIT switch from normal to inhibit to normal several times</li> <li>■ Directs E ERV control power fuses pulled.</li> </ul>
	<b>SRO</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> May direct scram preparatory actions per DGP 02-03, Reactor Scram.</li> </ul>
	<b>SRO</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> May enter DEOP 200-01, Primary Containment Control, for high Torus level.</li> </ul>

**Event Two – Spurious ERV Opening: An ERV spuriously opens due to an electrical failure. Pulling its fuses closes the ERV.**

Trigger	Position	Crew Actions or Behavior
	<b>SRO</b>	<p>If Torus temperature reaches 95°F, then enters DEOP 200-1, Primary Containment Control, and performs/directs:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Monitoring of PC/P</li> <li><input checked="" type="checkbox"/> Initiation of torus cooling. (May already be started per DOA 0250-01)</li> <li><input type="checkbox"/> Monitoring of Torus level.</li> <li><input type="checkbox"/> Verifying initiation of drywell and torus H<sub>2</sub>/O<sub>2</sub> monitors</li> </ul>
	<b>NSO</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Performs scram preparatory actions per DGP 02-03, Reactor Scram, as directed. <ul style="list-style-type: none"> <li>• Reduces core flow to 56 MLBM/hr.</li> <li>• Starts MSOP and TGOP.</li> <li>• Trips H2 Addition.</li> </ul> </li> </ul>
	<b>ANSO</b>	<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Determines/announces that E ERV closed when fuses pulled.</li> </ul>
	<b>SRO</b>	<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Declares E ERV inoperable.</li> <li><input checked="" type="checkbox"/> Determines following Technical Specifications apply: <ul style="list-style-type: none"> <li>• 3.4.3, Safety and Relief Valves, Condition A.1: Restore the relief valve to OPERABLE status within 14 days.</li> <li>• 3.5.1 ECCS Operating, Condition G.1: Restore ADS valve to OPERABLE status within 14 days.</li> <li>• 3.6.1.8, Suppression Chamber–to–Drywell Vacuum Breaker, SR 3.6.1.8.2: Perform a functional test of each required vacuum breaker within 12 hours.</li> </ul> </li> </ul>
	<b>SRO</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Directs performance of Suppression Chamber–to–Drywell Vacuum Breaker testing.</li> </ul>
	<b>CREW</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> May enter and perform DGA 7, Unpredicted Reactivity Addition.</li> </ul>
		<p><b><u>Event 2 Completion Criteria:</u></b></p> <ul style="list-style-type: none"> <li>• The failed ERV is closed.</li> <li>• Technical Specification determination completed.</li> <li>• OR, at the discretion of the Lead Examiner.</li> </ul>

**Event Three – Loss of RBCCW / Manual Scram: A Loss of RBCCW occurs due to a pipe rupture in the RX Bldg. A Manual Scram is required due to impending loss of flow to the Recirc pumps.**

Trigger	Position	Crew Actions or Behavior
6		<p><b><u>SIMULATOR OPERATOR:</u></b></p> <p>At the discretion of the Lead Examiner, activate <b>trigger 6</b>, which simulates a leak in the Reactor Building from the RBCCW system.</p>
7		<p><b><u>SIMULATOR OPERATOR / ROLE PLAY:</u></b></p> <p>Operator to defeat RBV high drywell pressure and RPV water level interlocks: wait 5 min, activate <b>trigger 7</b> and then report, “the RBV high drywell pressure and RPV water level interlocks are defeated.”</p>
26		<p><b>Verify Trigger 26 automatically activates</b> when E. RBFDS mass is &gt;7950.0 (variable wamrfsa2). This holds E. RBFDS mass above Hi Hi level.</p>
27-30		<p><b>Verify Triggers 27-30 automatically activate</b> when all RBCCW pumps are OFF. This returns overrides to normal.</p> <p><b><u>ROLE PLAY:</u></b></p> <p>NLO sent to check RBCCW head tank level, wait 2 min. then report: “RBCCW head tank level is out of the sight glass low. The head tank makeup valve is open”.</p> <p>NLO to check RBCCW system, wait 2 and then report: “There is a very large leak coming from the RBCCW HX area. The floor is flooded with water”.</p> <p>If asked about isolating the leak, report: The leak cannot be isolated”.</p> <p>NLO to check RBFDS: wait 2 min. and report, “the East Rx Bldg Floor Drain sump is overflowing onto torus basement floor.”</p> <p>Radwaste Control Room: if asked about inputs to Radwaste, report “floor drain input has increased significantly”.</p>
	<b>ANSO</b>	<ul style="list-style-type: none"> <li>■ Announces alarm 923-1 F-1, U2 RBCCW Head Tank Lvl Hi/Lo <ul style="list-style-type: none"> <li>• Refers to DAN and performs actions.</li> <li>• Monitors operation of the RBCCW system.</li> <li>• Dispatches NLO to check U2 RBCCW Head tank level.</li> <li>• Announces entry to DOA 3700-01, Loss of Cooling by Reactor Building Closed Cooling Water (RBCCW) System, is required.</li> </ul> </li> </ul>
	<b>SRO</b>	<ul style="list-style-type: none"> <li>■ Enters DOA 3700-01, Loss of Cooling by Reactor Building Closed Cooling Water (RBCCW) System, and directs actions.</li> </ul>
	<b>ANSO</b>	<ul style="list-style-type: none"> <li>■ Performs DOA 3700-01, Loss of Cooling by Reactor Building Closed Cooling Water (RBCCW) System, actions as directed.</li> </ul>
	<b>ANSO</b>	<ul style="list-style-type: none"> <li>■ Announces alarm 923-4 A-3, U2 E. RBFDS Sump Lvl Hi-Hi <ul style="list-style-type: none"> <li>• Dispatches operators to check sumps</li> <li>• Announces entry to DEOP 300-01, Secondary Containment Control, is required.</li> </ul> </li> </ul>



**Event Three – Loss of RBCCW / Manual Scram: A Loss of RBCCW occurs due to a pipe rupture in the RX Bldg. A Manual Scram is required due to impending loss of flow to the Recirc pumps.**

Trigger	Position	Crew Actions or Behavior
	<b>SRO</b>	<ul style="list-style-type: none"> <li>■ Enters DEOP 300-01, Secondary Containment Control, and directs: <ul style="list-style-type: none"> <li>• Defeating RBV high drywell pressure and RPV water level interlocks.</li> <li>• Starting RBV.</li> </ul> </li> </ul>
	<b>ANSO</b>	<ul style="list-style-type: none"> <li>■ Performs DEOP 300-01, Secondary Containment Control, actions as directed. <ul style="list-style-type: none"> <li>• Starts RBV.</li> </ul> </li> </ul>
	<b>SRO</b>	<ul style="list-style-type: none"> <li>□ May enter DOA 0040-02, Localized Flooding in Plant, and direct actions.</li> </ul>
	<b>ANSO</b>	<ul style="list-style-type: none"> <li>□ Performs DOA 0040-02, Localized Flooding in Plant, actions as directed.</li> </ul>
	<b>SRO</b>	<ul style="list-style-type: none"> <li>□ May direct scram preparatory actions per DGP 02-03, Reactor Scram.</li> </ul>
	<b>NSO</b>	<ul style="list-style-type: none"> <li>□ Performs scram preparatory actions per DGP 02-03, Reactor Scram, as directed. <ul style="list-style-type: none"> <li>• Reduces core flow to 56 MLBM/hr.</li> <li>• Starts MSOP and TGOP.</li> <li>• Trips H2 Addition.</li> </ul> </li> </ul>
	<b>SRO</b>	<p>Determines RBCCW System loss CANNOT be prevented and performs / directs:</p> <ul style="list-style-type: none"> <li>■ Manual scram per DGP 02-03, Reactor Scram.</li> <li>□ May enter DOA 0202-01, Recirculation (Recirc) Pump Trip – One or Both Pumps and directs tripping both Recirc pumps.</li> <li>□ Directs tripping RBCCW pumps.</li> </ul>
		<p><b><u>Event 3 Completion Criteria:</u></b></p> <ul style="list-style-type: none"> <li>• Reactor scram ordered.</li> <li>• OR, at the discretion of the Lead Examiner.</li> </ul>

**Event Four – Electrical ATWS / ARI Unsuccessful: An electrical ATWS occurs and ARI is unsuccessful. Pulling Scram fuses and/or venting the scram air header are successful.**

Trigger	Position	Crew Actions or Behavior
<p><b>25</b></p> <p><b>8</b></p> <p><b>9</b></p>		<p><b><u>NOTE:</u></b> This Event begins when the SRO orders a manual scram.</p> <p><b><u>SIMULATOR OPERATOR:</u></b></p> <p><b>Verify Trigger 25 automatically activates</b> when the Mode SW is placed to S/D. This pulls a few scram fuses so some control rods insert.</p> <p><b><u>SIMULATOR OPERATOR / ROLE PLAY:</u></b></p> <p>Operator to pull scram fuses: wait 4 min, then activate <b>trigger 8</b>. This sequentially pulls the scram fuses.</p> <p>Operator to vent the scram air header: wait 5 min, the activate <b>trigger 9</b>. This vents the scram air header.</p> <p><b><u>ROLE PLAY:</u></b></p> <p>Operator to jumper the MSIV Group1 -59 in. and offgas hi hi radiation isolations: acknowledge the request. No trigger is provided as it is not intended to complete this action. Stall if status is requested.</p>
	<b>NSO</b>	<p>Performs DGP 02-03, Reactor Scram, as directed:</p> <ul style="list-style-type: none"> <li>■ Presses scram pushbuttons</li> <li>■ Places mode switch in shutdown</li> <li>■ Verifies control rods inserted and determines rods are still not inserted</li> <li>■ Initiates ARI and determines rods are still not inserted.</li> <li>■ Announces ATWS condition.</li> <li>■ Runs Recirc pumps back to minimum.</li> <li>■ √ IF reactor power is &gt;6%, THEN trips the recirc pumps AND Initiates SBLC.</li> </ul>
	<b>ANSO</b>	<ul style="list-style-type: none"> <li>■ Establishes maximum torus cooling. (May already be completed)</li> </ul>

**Event Four – Electrical ATWS / ARI Unsuccessful: An electrical ATWS occurs and ARI is unsuccessful. Pulling Scram fuses and/or venting the scram air header are successful.**

Trigger	Position	Crew Actions or Behavior
	<b>SRO</b>	<ul style="list-style-type: none"> <li>■ Enters DEOP 100, RPV Control and directs actions.</li> <li>■ Due to report of ATWS condition, exits DEOP 100 AND enters DEOP 400-05, Failure to Scram, and directs/performs actions: <ul style="list-style-type: none"> <li>• Placing ADS to inhibit.</li> <li>• Placing Core Spray pumps in PTL.</li> <li>• √ Inserting control rods using Alternate Rod Insertion. <ul style="list-style-type: none"> <li>❖ Directs driving control rods.</li> <li>❖ Directs pulling scram fuses.</li> <li>❖ Directs venting scram air header.</li> </ul> </li> <li>• Verifying required auto actions.</li> <li>• Installing jumpers for MSIV low level and Off Gas high Rad isolations.</li> <li>• √ If RX power &gt;6%, terminating and preventing all injection except boron and CRD until RPV level ≤35 inches.</li> <li>• √ Holding RPV level between –164 inches and the level lowered to.</li> <li>• Stabilizing RPV pressure below 1060 psig.</li> </ul> </li> </ul>
	<b>NSO</b>	<ul style="list-style-type: none"> <li>■ √ Terminates and prevents all injection except boron and CRD at the 902-5 panel in automatic as follows: <ul style="list-style-type: none"> <li>• Using the RX LOW FLOW CONTROL STATION, 2(3)-640-20, lowers FWLC SETPOINT to –40 inches.</li> </ul> </li> </ul>
	<b>ANSO</b>	<ul style="list-style-type: none"> <li>■ √ Terminates and prevents all injection except boron and CRD at the 902-3 panel as follows: <ul style="list-style-type: none"> <li>• Place HPCI Aux Oil Pump AND HPCI 14 valve in PTL.</li> <li>• Verify HPCI flow controller in AUTO AND reduce setpoint to 2000 gpm.</li> <li>• PLACES LPCI 22 valve(s) in Pull-to-Close.</li> </ul> </li> </ul>
	<b>NSO</b>	<ul style="list-style-type: none"> <li>■ √ Drives control rods per DEOP 500-05, Alternate Insertion Of Control Rods, as follows: <b>(RPV-6.1)</b> <ul style="list-style-type: none"> <li>• Bypasses the RWM.</li> <li>• Starts a second CRD pump.</li> <li>• Maximizes CRD drive water pressure.</li> <li>• Inserts Control Rods by using the ROD MOVEMENT CONTROL switch or the EMERG ROD IN position of the ROD OUT NOTCH OVERRIDE switch.</li> </ul> </li> </ul>

**Event Four – Electrical ATWS / ARI Unsuccessful: An electrical ATWS occurs and ARI is unsuccessful. Pulling Scram fuses and/or venting the scram air header are successful.**

Trigger	Position	Crew Actions or Behavior
	<b>NSO</b>	<ul style="list-style-type: none"> <li>■ Reports when all control rods are inserted.</li> <li>□ Secures SBLC.</li> </ul>
		<p><b><u>Event 4 Completion Criteria:</u></b></p> <ul style="list-style-type: none"> <li>• Control rod insertion in progress.</li> <li>• OR, at the direction of the Lead Examiner.</li> </ul>

**Event Five – Drywell Steam Leak / Spray The Drywell: A Drywell Steam Leak occurs due to a Safety Valve opening. Spraying the Drywell is required to control Drywell pressure.**

Trigger	Position	Crew Actions or Behavior
<b>10</b>		<b><u>SIMULATOR OPERATOR:</u></b> At the discretion of the Lead examiner, activate <b>trigger 10</b> , which fails a safety valve partially open causing a steam leak in the Drywell.
	<b>CREW</b>	<ul style="list-style-type: none"> <li>■ Determines/announces Drywell pressure rising.</li> </ul>
	<b>SRO</b>	Enters DEOP 200-01, Primary Containment Control, and performs / directs: <ul style="list-style-type: none"> <li>□ Spraying the Torus before 9 psig PC/P.</li> <li>■ Spraying the Drywell when PC/P reaches 9 psig.               <ul style="list-style-type: none"> <li>• Verifies below Drywell Spray Initiation Limit.</li> <li>• Tripping all recirc pumps. (Already tripped)</li> <li>• Tripping all Drywell Coolers. (Already tripped)</li> <li>• √ Starting Drywell Sprays.</li> </ul> </li> <li>□ Securing Torus / Drywell sprays before Torus / Drywell pressure reaches 0 psig.</li> <li>□ Monitoring DW/T.</li> <li>■ If cannot hold SP/T below 95°F, starting all available torus cooling. (may have already started)</li> </ul>
	<b>ANSO</b>	Performs DEOP 200-01, Primary Containment Control, as directed: <ul style="list-style-type: none"> <li>□ Sprays the Torus.</li> <li>■ √ Sprays the Drywell.               <ul style="list-style-type: none"> <li>• Trips all recirc pumps. (Already tripped)</li> <li>• Trips all Drywell Coolers. (Already tripped)</li> <li>• Starts Drywell Sprays.</li> </ul> </li> <li>□ Secures Torus / Drywell sprays before Torus / Drywell pressure reaches 0 psig.</li> <li>□ Monitors DW/T..</li> <li>■ Starts all available torus cooling. (may have already started)</li> </ul>
		<b><u>Event 5/Scenario Completion Criteria:</u></b> <ul style="list-style-type: none"> <li>• Drywell pressure controlled.</li> <li>• OR, at the direction of the Lead examiner.</li> </ul>

Critical Tasks	
(RPV-6.1)	With a reactor scram required and the reactor not shutdown, <b>TAKE ACTION TO REDUCE POWER</b> by injecting boron and/or inserting control rods, to prevent exceeding the primary containment design limits.
(RPV-6.2)	With a reactor scram required and the reactor not shutdown and conditions for ADS blowdown are met, <b>INHIBIT ADS</b> to prevent an uncontrolled RPV depressurization, to prevent causing a significant power excursion. (Conditions are not expected to occur that cause an automatic ADS initiation, therefore this may not be a Critical Task for this scenario)
(RPV-6.3)	During an ATWS with conditions met to perform power/level control <b>TERMINATE AND PREVENT INJECTION</b> , with exception of boron and CRD, into the RPV until conditions are met to re-establish injection.
(RPV-6.4)	When conditions are met to establish injection use available injection systems to <b>MAINTAIN RPV</b> water level above –164”.
(RPV-5.1)	When drywell pressure exceeds the suppression chamber spray initiation pressure or before containment pressure exceeds the Pressure Suppression Pressure, <b>INITIATE</b> drywell/containment sprays, while in the safe region of the drywell spray initiation limit or above the containment spray initiation pressure.

## REFERENCES

PROCEDURE	TITLE
DAN 902-3 E-12	2E Electromatic Relief Vlv Open
DAN 902-4 H-17	Vlv Leak Det System Temp Hi
DAN 902-4 H-19	Acoustic Monitor Actuated
DAN 902-7 G-8	U2 Diesel Gen Clg Wtr PP Trip/Lkout
DAN 902-8 A-7	U2 Diesel Gen Trouble
DAN 923-1 F-1	U2 RBCCW Head Tank Lvl Hi/Lo
DAN 923-4 A-3	U2 E. RBFD Sump Lvl Hi-Hi
DOS 0040-08	Unit 2 Operating Power Sources And Distribution
DOS 1600-20	Suppression Pool Temp Monitoring
DOA 0040-02	Localized Flooding in Plant
DOA 0202-01	Recirculation (Recirc) Pump Trip – One or Both Pumps
DOA 0250-01	Relief Valve Failure
DOA 3700-01	Loss of Cooling by Reactor Building Closed Cooling Water (RBCCW) System
DOA 6600-01	Diesel Generator Failure
DGP 02-03	Reactor Scram
DGA 7	Unpredicted Reactivity Addition
DEOP 0100	RPV Control
DEOP 200-01	Primary Containment Control
DEOP 300-01	Secondary Containment Control
DEOP 400-05	Failure to Scram
DEOP 500-02	Bypassing Interlocks And Isolations
DEOP 500-05	Alternate Insertion of Control Rods

## Computer Aided Exercise Programs

# ILT-N-3.cae  
# ILT 05-1 NRC Exam  
# Setup for ILT-N-3  
# Written by MP  
# Rev 00  
# Date 09/05

### # INITIAL CONDITIONS

# Inserts RPS failure.  
Imf b12

# Overrides Panel 2202-70A(B) Trouble alarm points OFF so pulling ARI fuses does not cause alarm.  
# Pulls ARI fuses.  
Imf ser1026 off  
imf ser1060 off  
irf aw4 pulled|2

# Sets Safety Valve 4B binding to 15%.  
Imf ads4bbn 15.0

# Causes E ERV to bind open  
imf ads3ebn 100.0|2

# Inserts a trip of 2/3 RBCCW pump in case the crew tries to start it.  
Imf q03|2  
imf q04|2

# Sets APRM gains to 1.0  
irf niagain 1.0|4  
irf niagainf (0 5) true|4

### #SETUP EVENT TRIGGERS

# Event Trigger 1 sets gain for all 6 APRMs to 1.0  
trgset 1 "0"|4  
trg 1 "irf niagainf true"|4

# Event trigger 2 Simulates U2 EDG cooling water pump breaker control power transformer failure:  
# Forces up alarm 902-8 A-7, U2 Diesel Gen Trouble.  
# Forces up alarm 902-7 G-8, U2 Diesel Gen Clg Wtr PP Trip/lkout.  
# Inserts U2 Diesel Gen Clg Wtr PP Trip malfunction.  
Trgset 2 "0"|6  
imf ser1589 (2) on|6  
imf ser0710 (2) on|6  
imf t18 (2)|6

# Event trigger 3 Clears alarm 902-8 A-7, U2 Diesel Gen Trouble.  
Trgset 3 "0"|8  
trg 3 "imf ser1589 normal"|8

# Event trigger 4 causes the E ERV setpoint to drift to fail it open.  
Trgset 4 "0"|8  
imf ads3esd (4) 75.0|8

# Event Trigger 5 Deletes E ERV binding malfunction so valve will close.  
# Removes fuses for the E ERV.  
Trgset 5 "0"|10



trg 5 "dmf ads3ebn"|10  
irf adsrfe (5) pulled|10

# Trigger 6 Simulates a RBCCW leak in the Rx Bldg.  
# Ramps E. RBFDS mass to fill it.  
# Overrides alarm 923-1 E-2 RBCCW Head Tank Lvl Lo.  
# After 10 min, ramps RBCCW Disch pressure meter to 10 psig over 5 min.  
# After 11 min, overrides ON alarm 923-1 D-1 RBCCW Pressure Lo Unit 2.  
# After 12 min, overrides ON alarm 902-4 G-3 2A Recirc PP Seal Clg Wtr Flow Lo  
# and inserts 2A Recirc PP motor hi temp malfunction.  
# After 12:15 min, overrides ON alarm 902-4 G-7 2B Recirc PP Seal Clg Wtr Flow Lo.  
# and inserts 2B Recirc PP motor hi temp malfunction.

Trgset 6 "0"|10  
trg 6 "ramp wamrfsa2 5000.0 8000.0 3:00"|12  
imf ser1784 (6) on|12  
ior wrppdsh1 (6 10:00) 10.0 5:00|12  
imf ser1735 (6 11:00) on|12  
imf ser0369 (6 12:00) on|14  
imf ser0322 (6 12:15) on|14  
imf rrmpmahi (6 12:00)|14  
imf rrmpmbhi (6 12:15)|14

# Trigger 7 Jumpers the RBV Group II Isolation signal.  
Trgset 7 "0"|16  
irf cirbvnt (7) lifted|16

# Event Trigger 8 Pulls RPS fuses.  
Trgset 8 "0"|16  
irf rpfusea1 (8) pulled|16  
irf rpfusea3 (8 30) pulled|18  
irf rpfuseb1 (8 1:00) pulled|18  
irf rpfuseb3 (8 1:30) pulled|18  
irf rpfuseb4 (8 1:45) pulled|18

# Event Trigger 9 vents the scram air header.  
Trgset 9 "0"|20  
irf rdscrair (9) open|20

# Event Trigger 10 Drifts Safety Valve 4B setpoint to 70.0 psig.  
Trgset 10 "0"|20  
imf ads4bsd (10) 70.0|20

# Event Trigger 25 Activates when the Mode SW is placed to S/D.  
# Pulls a few scram fuses so some control rods insert.  
Trgset 25 "rpdmode4\_drw"|22  
irf rpfusea2 (25) pulled|22  
irf rpfusea4 (25) pulled|22  
irf rpfuseb2 (25) pulled|22

# Event Trigger 26 Activates when E. RBFDS mass is >7950.0  
# Holds E. RBFDS mass above Hi Hi level.  
Trgset 26 "wamrfsa2 .gt. 7950.0"|24  
trg 26 "ramp wamrfsa2 7950.0 8000.0 20:00"|24

# Trigger 27 Deletes RBCCW pressure meter override.  
Trgset 27 ".not. (wrsp(1) .or. wrsp(2))"|24  
trg 27 "dor wrppdsh1"|24

# Trigger 28 Deletes alarm 923-1 D-1 RBCCW Pressure Lo Unit 2 override.  
Trgset 28 ".not. (wrsp(1) .or. wrsp(2))"|26

trg 28 "imf ser1735 normal"|26

# Trigger 29 Deletes alarm 902-4 G-3 2A Recirc PP Seal Clg Wtr Flow Lo override.

Trgset 29 ".not. (wrsp(1) .or. wrsp(2))"|26

trg 29 "imf ser0369 normal"|26

# Trigger 30 Deletes alarm 902-4 G-7 2B Recirc PP Seal Clg Wtr Flow Lo.

Trgset 30 ".not. (wrsp(1) .or. wrsp(2))"|28

trg 30 "imf ser0322 normal"|28

# END

Date: TODAY

## Unit 2 Turnover

### Online Information

715 MWe

Online Risk: Green

Risk Equipment:

### Protected Pathway(s)

### Shutdown Information

Time to Boil: 0

Shutdown Risk: N/A

### Reactivity Management

Limit: MFLCPR 0.904 Steady

Action Level: 0.980

S/D Method: DGP 2-1 (Reverse Sequence)

### Unit 2 Priorities

Maintain load per Load Dispatcher.

### LCORAs

LCORA Title None

Start  
Clock Ends

### Compensatory Actions

Degradation  
Documentation  
None

Frequency  
Responsible

Compensatory Action

### Unit 2 Conditions, Status, Abnormalities

2 hr ago	IRM 12 OOS due to power supply failure. IMD waiting for replacement power supply to arrive from Quad Cities Station.
5 hr ago	2B EHC pump OOS due to a problem with its pressure compensator. Expected BIS next shift.
7 hr ago	2B RFP OOS, expected to return later this shift Load was drop per the Load Dispatcher. May pick up load later in shift.

### Unit 2 Abnormal Component Positions

None

### U2 Open Operability Determinations with Compensatory Actions

#### Shift 1 Activities (X = Completed)

☐  
☐

#### Shift 2 Activities

☐  
☐

#### Shift 3 Activities

☐  
☐

#### Common Unit Activities

#### Shift 1 Activities (X = Completed)

☐  
☐

#### Shift 2 Activities

☐  
☐

#### Shift 3 Activities

☐  
☐

### Unit 2 Procedures in Progress (Non-Surveillance)

None

### Unit 2 Surveillances in Progress

None

Date: TODAY

## Unit 3 Turnover

### Online Information

912 MWe

Online Risk: Green

Risk Equipment:

### Protected Pathway(s)

### Shutdown Information

Time to Boil: 0

Shutdown Risk: N/A

### Reactivity Management

Limit: MFLCPR 0.904 Steady

Action Level: 0.980

S/D Method: DGP 2-1 (Reverse Sequence)

### Unit 3 Priorities

Maintain load per BPO direction.

### LCORAs

LCORA Title None

Start  
Clock Ends

### Compensatory Actions

Degradation  
Documentation  
None

Frequency  
Responsible

Compensatory Action

### Unit 3 Conditions, Status, Abnormalities

None

### Unit 3 Abnormal Component Positions

None

### U3 Open Operability Determinations with Compensatory Actions

None

### Shift 1 Activities (X = Completed)

☐  
☐

### Shift 2 Activities

☐  
☐

### Shift 3 Activities

☐  
☐

### Common Unit Activities

### Shift 1 Activities (X = Completed)

☐  
☐

### Shift 2 Activities

☐  
☐

### Shift 3 Activities

☐  
☐

### Unit 3 Procedures in Progress (Non-Surveillance)

None

### Unit 3 Surveillances in Progress

None