

Dresden Generating Station

ILT-N-2

SWAP SBT TRAINS

RAISE POWER USING CONTROL RODS

INSTRUMENT AIR COMPRESSOR TRIP

RPS MG SET TRIP

SERVICE WATER PUMP TRIP

APRM FAILED UPSCALE WITH HALF SCRAM

LOCA IN DRYWELL – MANUAL SCRAM WITH ATWS

LOSS OF RFPs – HPCI FAILS TO AUTO START

Rev. 00

1/20

Developed By:

Exam Author

Date

Approved By:

Facility Representative

Date

Scenario Outline

Facility: <u>Dresden Generating Station</u>	Scenario No.: <u>2020-301 ILT-N-2</u>	Op-Test No.: <u>2020-301</u>
Examiners <hr/> <hr/> <hr/>	Operators <hr/> <hr/> <hr/>	/ crew position <hr/> / ATC <hr/> / BOP <hr/> / CRS <hr/>
Initial Conditions: <u>Unit 2 is performing a startup and is at 5% Power (APRM 6 is in Bypass)</u> <u>Continuing with startup by raising power with control rods</u>		
Turnover: <u>Swap SBGT Trains Primary/Standby per DOP 7500-01</u>		
Critical Tasks: <u>RPV-5.1 - With a reactor scram required and the reactor not shutdown, take action per DEOP 400-5, Failure to Scram, to reduce power by inserting control rods within 15 minutes.</u> <u>RPV-5.4 - Per DEOP 400-5, Failure to Scram, with a reactor scram required, the reactor not shutdown, and the automatic ADS timer initiated, inhibit ADS before an automatic actuation occurs. (Not applicable if conditions for ADS initiation are not met)</u> <u>PC-1.1 - While executing DEOP 200-1, Primary Containment Control, when drywell pressure exceeds 9 psig and only if operating within the safe region of the drywell spray initiation limit (DSIL), initiate drywell sprays within 15 minutes.</u> <u>PC-1.2 - After initiating drywell sprays per the primary containment pressure or temperature legs of DEOP 200-1, Primary Containment Control, terminate drywell sprays before drywell pressure drops to < 0 psig. (May not be applicable if scenario does not run long enough).</u>		

Event No.	Malf. No.	Event Type*	Event Description #
1	NONE	N BOP	(New) - SBGT - Swap trains Primary/Standby
2	NONE	R ATC	CRD - Reactivity, Raise Power Using Control Rods
3	NONE	C BOP	(New) - INST AIR - Compressor, Swap Due To Oil Leak
4	B02	C / T ATC / CRS	(New) - RPS - MG Set, Trips / Re-energize From Reserve Power
5	Q22	C BOP	(New) - SERV WATER - Pump, Trip Due To Overcurrent
6	RRMASUPD	+/- T ATC / CRS	(New) – NI - APRM Fail Upscale with Half Scram
7	F41 RODE###ST	M C ALL ATC	(New) - Manual Scram – LOCA in drywell (New) ATWS – 7 Stuck rods (4 rods will be able to moved, QNE determination will be needed to determine if the Reactor will stay shutdown)
8	H31 H32 H33 H34 HPAOPASF	€ €	Loss of RFPs (New) – HPCI – Auto-start failure

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (T)ech Spec
(New) – Event not used on previous 2 NRC Exams, (Pre) – Event used on previous 2 NRC Exams

Scenario Objective

Evaluate the Team's ability to operate the plant with a LOCA in the drywell, resulting in a manual SCRAM with a failure of seven rods to go in.

Scenario Initial Conditions

1. Unit 2 is at ~5% power. Continuing with startup per DGP 1-1, step G.54
2. Unit 3 is at full power.
3. The following equipment is OOS:
 - a. ~~None~~ APRM 6 is in Bypass
4. LCOs:
 - a. ~~None~~ TS LCO 3.5.1

Scenario Sequence

Event #	Description
1	SBGT - Swap trains Primary/Standby: The BOP operator will swap the SBGT lineup, changing 2/3A from Primary to Standby; and 2/3B from Standby to Primary, per DOP 7500-01.
2	CRD - Reactivity, Raise Power Using Control Rods: The NSO, as directed by the SRO, continues the power ascension for unit startup by control rod withdrawal.
3	INST AIR - Compressor, Swap Due To Oil Leak: The 3C IAC develops an oil leak and must be secured. The team will start a standby IAC, and secure the 3C IAC.
4	RPS - MG Set, Trips / Re-energize From Reserve Power: The Team receives a report that the Engineering department determined that EPAs 2B-1 and 2B-2 are inoperable. The CRS determines Tech Spec requirements, and then a trip of RPS EPA 2B-1 causes a loss of RPS Bus A. The Team will reenergize RPS Bus A from reserve power and begin restoration of affected systems to a normal condition.
5	SERV WATER - Pump, Trip Due To Overcurrent: The 2B Service Water pump trips on overload. The Team will start a standby pump.
6	NI – APRM Fails Upscale with Half Scram: APRM 2 will spuriously fail upscale, resulting in a half scram on RPS A. The CRS will review Tech Spec requirements. The ATC will bypass APRM2 and reset the half scram.
7	Manual Scram – LOCA in drywell, followed by ATWS with stuck rods: A LOCA in the DW causes DW pressure to increase. The Team manually scrams the reactor prior to an automatic scram.
8	Seven rods stay out due to being stuck. Four of them can be inserted. QNE determination is needed to determine if the reactor will remain shutdown under all conditions.
8	FW – Loss of Feed Pumps: A loss of all high capacity high-pressure feed due to loss of RFP's with a failure of HPCI to auto-start. The Crew will take action to manually start HPCI.

Event One – Swap SBTs Primary/Standby

The BOP operator will place the 2/3A SBT in STBY and place the 2/3B SBT in PRI per DOP 7500-01.

Malfunctions required: 0

- None

Success Path:

- Perform DOP 7500-01, step G.1.a

Event Two – Power Change with Rods

The team increases reactor power by withdrawing control rods per DGP 01-01, DOP 0400-01, and DGP 03-04.

Malfunctions required: 0

- None.

Success Path:

- Control rods pulled per applicable procedures..

Event Three – Instrument Air Compressor Trip

The team receives a report that the 3C Instrument Air Compressor has an oil leak. The Standby Instrument Air Compressor 2B is started. If the team delays securing the 3C IAC, it will trip on low lube oil pressure.

Malfunctions required: 0

- 3C Instrument Air Compressor has an oil leak

Success Path:

- Standby Air Compressor 2B is started.

Event Four – RPS MG Set Trip / Re-energize from Reserve power

A trip of RPS EPA 2B-1 causes a loss of RPS Bus A. The crew will re-energize the RPS bus from reserve power.

Malfunctions required: 1

- (RPS EPA 2B-1 trips)

Success Path:

- The CRS determines Tech Spec requirements.
- Re-energize RPS Bus A from Reserve Power.

Event Five – Service Water Pump Trip

2B Service Water pump trips on overload. The crew will start the standby service water pump.

Malfunctions required: 1

- (2B Service Water pump trip)

Success Path:

- The Team starts a standby pump.

Event Six – APRM Fails Upscale

APRM Channel 2 fails upscale, resulting in a half scram. The crew will check Tech Specs, bypass APRM 2, and reset the half scram.

Malfunctions required: 1

- (APRM Channel 2 Fails Upscale).

Success Path:

- Bypass APRM Channel 2
- Performs DOP 0500-07, Insertion/Reset of Manual Half Scram.

Event Seven - Small Steam Leak in Drywell / Seven Control Rods Remain Withdrawn

A small steam leak upstream of the restrictors occurs.

Malfunctions required: 2

- (Small steam leak before restrictors)
- (Stuck control rods)

Success path:

- Performs DOA 0040-01, Slow Leak.
- Performs a manual scram.
- Performs DEOP 0400-05, Failure to SCRAM

Event Eight – Loss of RFPs with HPCI Failing to Auto Start

All RFPs trip one minute after the mode switch is placed in Shutdown. HPCI fails to Auto Start, and must be manually started by the crew. The size of the steam leak increases, and DEOP 0200-01 must be entered, and drywell sprays started.

Malfunctions required: 2

- (Loss of RFPs)
- (HPCI failure to auto start)

Success Path:

- Performs DOA 2300-02, HPCI Fast Startup.
- Performs DEOP 0200-01, Primary Containment Control
- The Team sprays the Drywell to lower drywell pressure

PRE-SCENARIO ACTIVITIES

- 1 If applicable, conduct pre-scenario activities in accordance with TQ-AA-155-J040, SIMULATOR EXAMINATION BRIEFING.
 - a. Inform the crew that the QNE is present in the Control Room.
 - b. Direct the crew to perform their briefs prior to entering the simulator.
 - c. Provide the crew with a copy of DGP 01-01, Unit Startup marked up and completed through G.53, and also step G.58 signed off as complete.
 - d. Provide the crew with a copy of the REMA and Control Rod Move Sheets.
 - e. Crew directed to continue with plant startup, per Shift Manager.
 - f. Rod moves have been completed up to and including Step 13. Rod L-03 is the next rod to be moved.
 - g. Provide the crew with a marked up copy of DOP 7500-01, Standby Gas Treatment System Operation, with Prerequisites, Precautions, Limitations and Actions and step G.1.a.(1) signed off.
 - h. Crew directed to place 2/3B SBTG in Primary and 2/3A SBTG in Standby per DOP 7500-01.
- 2 Simulator Setup (the following steps can be done in any logical order)
 - a. Initialize simulator in an ~5% power IC. (IC 322 used for validation, sequence 21.00 Key 0994)
 - b. Cut in/out Cond Demins as needed, to maintain DP within limits.
 - c. Ensure running Condensate pump amps within limits.
 - d. Ensure DW pressure is approximately 1.20 psig. Vent as necessary to achieve this.
 - e. Verify CRD parameters are in band.
 - f. Advance the chart recorders.
- 3 Verify the following simulator conditions:
 - a. Verify Reactor Power ~5%, adjust rods or Recirc as appropriate.
 - b. Bypass APRM Channel 6, and place EST card on joystick.
 - c. Verify 2B and 3B Service Water pumps running.
 - d. Verify 3C IAC running and 2B IAC secured.
 - e. Ensure that SBTG 2/3A is in Primary and SBTG 2/3B is in Standby.
 - f. Verify that annunciators 923-5 A-6 and B-6, STBY GAS TRT SYS A(B) TROUBLE, are NOT in the alarm state.
- 4 Run **Pump_Sumps.cae**

NOTE: Do NOT run the initial setup CAEP file until the above setup is completed.

- 5 Run the initial setup CAEP file: **19-1 (2020-301) ILT-N-2.cae**
- 6 Place the following equipment out of service:
 - a. None
- 7 Ensure this setup is peer checked.
- 8 Complete the Simulator Setup Checklist.

Symbols are used throughout the text to identify specific items as indicated below:

- √ Critical Tasks
- Required Actions
- Optional Actions

Event One – Swap SBTs

Trigger	Position	Crew Actions or Behavior
		<p>ROLE PLAY:</p> <p>Call in as the WEC supervisor and request the following: “In support of a clearance order for next shift, request that you place 2/3B SBT in PRI and 2/3A SBT in STBY per DOP 7500-01.”</p> <p>NOTE: If unexpected FW Heater alarms or Offgas alarms come in, at the discretion of the Lead Evaluator, report that the alarm will be addressed by another team of operators.</p>
	CRS	<input type="checkbox"/> Directs placing 2/3B SBT in PRIMARY and 2/3A SBT in STANDBY.
	ATC	<p>Performs DOP 7500-01, STANDBY GAS TREATMENT SYSTEM OPERATION, actions:</p> <ul style="list-style-type: none"> ■ Places the 2/3B SBT SELECT switch to the PRI position on the 923-5 panel ■ Places the 2/3A SBT SELECT switch to the STBY position on the 923-5 panel <input type="checkbox"/> Verifies that the heaters are OFF for the 2/3A and 2/3B trains <input type="checkbox"/> Verifies that the 2/3A <u>AND</u> 2/3B SBT fans are OFF. <input type="checkbox"/> Verifies that annunciators 923-5 A-6 <u>AND</u> B-6, STBY GAS TRT SYS A(B) TROUBLE, are <u>NOT</u> in the alarm state. <input type="checkbox"/> Notifies supervisor that 2/3B SBT is in PRIMARY and 2/3A SBT is in STANDBY

Event 1 Completion Criteria:

- 2/3B SBT is in PRI and 2/3A SBT is in STBY,
-- AND/OR --

At the direction of the Lead Examiner.

Event Two – Continue raising power by control rod withdrawal

Trigger	Position	Crew Actions or Behavior
	CRS	<p>Directs pulling control rods.</p> <ul style="list-style-type: none"> ■ Reviews REMA. ■ Designates second verifier. ■ Directs NSO to pull rods.
	ATC	<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"> ■ Control rod selected on the select matrix is correct rod. □ Second Verification requirements satisfied. □ Rod Out Permit light is illuminated. □ Drive water pressure at nominal 260 psid. <p><u>Withdraws rods as follows:</u></p> <ul style="list-style-type: none"> ■ Moves Rod Out Notch Override (RONOR) Switch to NOTCH OVERRIDE position (use of RONOR switch is optional) and the Rod Movement Control switch to ROD OUT. □ Verifies ON light illuminated and proper Control Rod Timer operation. ■ Releases switches before target position is reached. (If rod is being withdrawn to 48, then switches are held to 48 with coupling check) ■ Verifies rod settles to target position and proper response of nuclear instrumentation.
	BOP	<p>Performs second verification checks.</p> <p><u>For first rod in a step:</u></p> <ul style="list-style-type: none"> □ Verifies correct control rod pattern ■ Verifies correct step and array. ■ Verifies RWM rod blocks enabled <p><u>For all rods moved:</u></p> <ul style="list-style-type: none"> ■ Verifies correct control rod selected. ■ Verifies planned control rod motion is correct. □ Immediately notify the NSO of errors during rod motion. ■ Verifies control rod at target position.

Event 2 Completion Criteria:

- Sufficient power increase,
- AND/OR --

At the direction of the Lead Examiner.

Event Three – Oil Leak on Instrument Air Compressor

Trigger	Position	Crew Actions or Behavior
1		<p>ROLE PLAY: Call in as the U2 2 EO and report “During my rounds I noticed that there is a large oil leak on the 3C IAC”.</p> <p>If asked about the status of the 3C IAC, say “The oil level is below the bottom of the normal band. I recommend securing 3C IAC”.</p> <p>SIMULATOR OPERATOR: After communication about the 3C IAC, activate TRIGGER 1, which trips the 3C Instrument Air Compressor after 10 minutes.</p> <p>ROLE PLAY: EO to investigate 3C IAC trip: (Wait 4 min) Report “the 3C IAC tripped on low lube oil pressure. There is nothing else abnormal at the compressor”.</p> <p>EO to check 3C IAC breaker: (Wait 2 min) Report “the 3C IAC breaker is closed and looks normal”.</p> <p>Note: The compressor will NOT be restored to operation.</p> <p>SIMULATOR OPERATOR / ROLE PLAY: EO to lineup 2B IAC to U2 Instrument Air System, wait 2 min, then report “2B IAC is lined up to U2 Instrument Air System”.</p> <p>ROLE PLAY: EO to verify proper operation of 2B IAC: (Wait 2 min) Report “the 2B IAC is operating normally”.</p>
	CRS	<ul style="list-style-type: none"> ■ Enters DOA 4700-01, INSTRUMENT AIR SYSTEM FAILURE, <u>OR</u> DOP 4700-01, INSTRUMENT AIR SYSTEM STARTUP ❑ May enter DOP 6700-20, 480 Volt Breaker Trip. ❑ May designate Instrument Air Pressure a Critical Parameter. ❑ Notifies the SM and WWM
		<p>ROLE PLAY: <u>If DOP 4700-01 is used to start 2B IAC:</u> If the U2 EO is asked to verify 2B IAC oil level, per DOP 4700-01 step G.5.a, (wait 2 min) respond with “2B IAC oil level is at the maximum line on the dipstick”</p> <p>If asked to verify other field actions in DOP 4700-01 are met, call in as the U2 2 EO and report “DOP 4700-01 step _____ is complete”.</p>
	BOP	<p>Performs DOA 4700-01 <u>OR</u> DOP 4700-01 as directed: If DOP 4700-01 is performed:</p> <ul style="list-style-type: none"> ❑ May verify STBY lineup of 2B IAC per DOP 4700-01, steps G.5a, 5b, 5c, 5e, 5f, 5.g, 5j and 5k. ❑ Verifies the 2B IA COMP switch is in normal-after-trip. ■ Starts the 2B IAC. ■ Secures the 3C IAC. ❑ Directs an EO to verify proper operation of 2B IAC and align to the instrument air header.

Event Three – Oil Leak on Instrument Air Compressor

Trigger	Position	Crew Actions or Behavior
	BOP	<p>If DOA 4700-01 is performed:</p> <ul style="list-style-type: none"> ■ Starts the 2B IAC. ■ Secures the 3C IAC. □ Dispatches an operator to verify proper operation of 2B IAC and align to the instrument air header. <p>If appropriate, announces alarm 923-1 B-5, U2 OR U3 INST AIR COMP TRIP: Reports 3C IAC tripped.</p> <ul style="list-style-type: none"> □ Directs an EO to investigate the cause of the 3C Instrument Air Compressor trip. □ May send a EO to check 3C IAC breaker.

Event 3 Completion Criteria:

- Unit 2 Standby IAC started,
- AND/OR --

At the discretion of the Floor Instructor / Lead Evaluator.

Event Four – RPS MG Set Trip / Re-energize From Reserve Power

Trigger	Position	Crew Actions or Behavior
		<p>ROLE PLAY:</p> <p>At the discretion of the Lead Examiner, call the CRS as the Shift Manager and inform him that “Engineering has determined that defective components were installed in RPS EPAs 2B-1 and 2B-2 during their last preventative maintenance. Therefore, RPS EPAs 2B-1 and 2B-2 are inoperable and may exhibit erratic operation. Engineering considers all other EPAs operable”.</p>
	CRS	<ul style="list-style-type: none"> ■ References Licensing Documents and determines the following applies: <ul style="list-style-type: none"> • TS 3.3.8.2, REACTOR PROTECTION SYSTEM (RPS) ELECTRIC POWER MONITORING, Condition A & B: Remove associated in-service power supply from service within 1 hour. □ Directs WEC to brief an operator to transfer RPS Bus A to Reserve Power. □ May direct Team to review DOA 0500-05, LOSS OF REACTOR PROTECTION SYSTEM BUS. □ Notifies the SM and WWM
	ATC/BOP	<ul style="list-style-type: none"> □ Reviews DOA 0500-05 as directed.
2		<p>SIMULATOR OPERATOR:</p> <p>After the CRS has addressed Tech Specs and / or at the discretion of the Lead Examiner, activate TRIGGER 2, which inserts a 2B RPS MG Set overcurrent trip. This simulates RPS EPA 2B-1 tripping.</p> <p>NOTE: Communications from the AEER should be over the phone (not the radio)</p> <p>ROLE PLAY:</p> <p><u>EO to check RPS power supplies:</u> wait 2 min. and call and report, “the RPS EPA 2B-1 is tripped”.</p> <p><u>If asked about the status of lights on EPA 2B-1 and 2B-2:</u> report, “the incoming light is lit on RPS EPA 2B-1, all other lights are out on RPS EPA’s 2B-1 and 2B-2”</p> <p><u>EO to power the 2A RPS bus from the reserve power:</u> wait five minutes, call the U2 NSO on the phone and report “Steps G.3.I.(1) thru (4) of DOP 0500-03, for supplying power to RPS 2A bus are your steps.”</p>
3		<p>SIMULATOR OPERATOR / ROLE PLAY:</p> <p>When notified that Steps G.3.I (1) thru 4 are complete, and requested to re-energize RPS Bus 2A, wait a minute, and then activate TRIGGER 3. Report “RPS Bus 2A has been reenergized from the alternate power supply”. If asked: “AC voltage is 120 V”.</p>
	ATC	<p>Announces loss of 2A RPS Bus.</p> <p>Performs the following:</p> <ul style="list-style-type: none"> ■ Perform actions of DOA 0500-05. ■ Directs an EO to restore power to the 2A RPS Bus per DOP 0500-03, RPS POWER SUPPLY OPERATION. □ Bypass APRM 6. (Condition met per initial conditions) ■ Resets the RPS CH A half scram per DOP 0500-07, INSERTION/RESET OF MANUAL HALF SCRAM.
	BOP	<ul style="list-style-type: none"> □ May Restore Reactor Building Ventilation IAW DOP 5750-02, REACTOR BUILDING VENTILATION and secures SBTG IAW DOP 7500-01, SBTG OPERATION. □ May reset ACAD/CAM system per DOP 2400-01, CAM SYSTEM H2 AND O2 DETECTION SUBSYSTEM OPERATION, to re-close the 2-2499-3B and 4B valves. □ If directed, performs actions of DGA-7.

Event Four – RPS MG Set Trip / Re-energize From Reserve Power

Trigger	Position	Crew Actions or Behavior
	CRS	<ul style="list-style-type: none">■ Enters DOA 0500-05 and directs actions.□ Enters DGA-7, Unexpected Reactivity Change.□ Coordinates restoration of affected plant systems.□ Enters TS LCO 3.3.7.2 Cond A & 3.3.6.2 Cond A

Event 4 Completion Criteria:

- Tech Specs referenced,
 - RPS Bus A reenergized and restoration of affected plant systems in progress,
-- AND/OR --
- At the discretion of the Lead Examiner.

Event Five – Service Water Pump Trip

Trigger	Position	Crew Actions or Behavior
4		<p><u>SIMULATOR OPERATOR:</u> At the discretion of the Lead Examiner, activate TRIGGER 4, which trips the 2B Service Water Pump.</p>
		<p><u>FLOOR INSTRUCTOR / EVALUATOR:</u> When the 2/3 DFP pump starts, announce the XL-3 is alarming and hand the XL-3 sheet to the responding operator.</p>
		<p><u>ROLE PLAY:</u> <u>EO at Service Water Pump just started: (wait 2 min.)</u> Report: “The Service Water Pump (just started) is operating normally and 2B Service Water Pump shows no sign of damage”. <u>EO at 2B Service Water Pump at Bus 24: (wait 2 min.)</u> Report: “2B Service Water Pump Breaker is open with an overcurrent target up”. <u>EMD:</u> Acknowledges need to go to Bus 24 and troubleshoot overcurrent flag at 2B Service Water Pump breaker. <u>EO at 2/3 DFP: (wait two min.)</u> Report “The 2/3 DFP is running normally”. <u>If requested to secure the 2/3 DFP:</u> Report “The Unit 3 Supervisor will address actions needed to secure the 2/3 DFP”.</p>
	BOP	<ul style="list-style-type: none"> <input type="checkbox"/> Announces 2B Service Water Pump trip. <input type="checkbox"/> May announce 2/3 DFP started. <input type="checkbox"/> Refers to DAN 923-1 C-3, U2 OR U3 SERV WATER PP TRIP. ■ Starts an available Service Water Pump. (may start more than one) <p>Refers to DOA 6500-10, 4KV CIRCUIT BREAKER TRIP, and:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Directs an EO to the Cribhouse to check the Service Water Pump just started and inspect 2B Service Water Pump. <input type="checkbox"/> Direct an EO to check the breaker of 2B Service Water Pump. ■ Places 2B Service Water Pump control switch in Pull to Lock. <input type="checkbox"/> May dispatches an operator to the Crib House to check 2/3 DFP operation <input type="checkbox"/> Notifies Ops Shift Supervisor. <input type="checkbox"/> Requests EMD to troubleshoot.
	CRS	<ul style="list-style-type: none"> <input type="checkbox"/> Notifies Shift Manager, WWM and may notify EMD. ■ Enters DOA 3900-01, LOSS OF COOLING BY SERVICE WATER SYSTEM. <input type="checkbox"/> Enters DOA 6500-10. <input type="checkbox"/> May refer to TRM 3.7.i, Fire Water Supply System, Restore equipment to OPERABLE status within 7 days
	ATC	<ul style="list-style-type: none"> <input type="checkbox"/> Assists as directed.

Event 5 Completion Criteria:

- An available Service Water pump is started,
 -- AND / OR --
 At the discretion of the Lead Examiner.

Event Six – APRM 2 Fails Upscale

Trigger	Position	Crew Actions or Behavior
5		<u>SIMULATOR OPERATOR / ROLE PLAY:</u> At the discretion of the Lead Examiner, activate TRIGGER 5 , which fails APRM 2 upscale.
	ATC	Responds to alarms: <ul style="list-style-type: none"> <input type="checkbox"/> 902-5 A-6, APRM Hi. <input type="checkbox"/> 902-5 B-4, OPRM Trouble/Inop. <input type="checkbox"/> 902-5 B-11, Channel A/B Neutron Monitor. <input type="checkbox"/> 902-5 C-3, Rod Out Block. <input type="checkbox"/> 902-5 C-12, Channel 1-3 APRM HI-Hi/Inop. <input type="checkbox"/> 902-5 D-10, Channel A RX Scram. Announces: <ul style="list-style-type: none"> ■ The half scram condition on the A RPS channel. ■ That APRM 2 has failed high ■ When directed, bypasses APRM 2. ■ Resets half scram on RPS Channel A per DOP 0500-07, Insertion/Reset of Manual Half Scram.
	CRS	Performs/directs: <ul style="list-style-type: none"> ■ Directs bypassing APRM 2. ■ Directs NSO to reset half scram on RPS Channel A, per DOP 0500-07, Insertion/Reset of Manual Half Scram. <input type="checkbox"/> Notifies the SM and WWM
	CRS	<ul style="list-style-type: none"> ■ References Technical Specifications and determines: <ul style="list-style-type: none"> • TS 3.3.1.1 - With APRM 2 and APRM 6 bypassed, still have sufficient APRMs on both RPS channels. No TS LCO entry is required.

Event 6 Completion Criteria:

- **APRM 2 bypassed**
- **Appropriate Tech Specs referenced,**
- AND / OR --**

At the direction of the Lead Examiner.

Event Seven - Small Steam Leak in Drywell / Seven Control Rods Remain Withdrawn

Trigger	Position	Crew Actions or Behavior
6		<p><u>SIMULATOR OPERATOR:</u></p> <p>At the discretion of the NRC chief examiner, activate TRIGGER 6, which causes a small Main Steam line leak to develop in the Drywell.</p> <p><u>Role Play:</u></p> <p>U-3 NSO to report Drywell pressure status: Report "U-3 Drywell pressure is 1.2 psig and steady".</p>
	TEAM	<ul style="list-style-type: none"> ■ Recognizes and announces that Drywell pressure is slowly rising. □ May direct an operator to check the Unit 2 Drywell CAM. □ May direct operators to search for leaks.
		<p><u>Role Play:</u></p> <p>EO to check Drywell CAM: (wait 2 min.)</p> <p>Report, "The Drywell CAM is trending up at a faster rate than earlier in the shift".</p> <p>EO to search for leaks</p> <p>Report, "I am on my way out to check for leaks".</p> <p>EO to check Cribhouse inlet temperature: (wait 5 min.)</p> <p>Report, "Cribhouse inlet temp is 70°F".</p>
	CRS	<ul style="list-style-type: none"> □ Enters and directs performance of DOA 0040-01, SLOW LEAK. □ Set Scram contingency of 1.5 psig DW pressure. ■ Prior to reaching the Drywell Pressure scram setpoint, directs a manual reactor scram per DGP 02-03.
	ATC	<p>Performs the following actions per DOA 0040-01 as directed:</p> <ul style="list-style-type: none"> □ Maintain Level with FWLCS (immediate action). □ Monitors leakage rate, reactor water level, and Drywell pressure. ■ Inserts manual reactor scram prior to 1.5 psig DW pressure
	BOP	<p>Performs the following actions per DOA 0040-01 as directed:</p> <ul style="list-style-type: none"> □ Notifies Shift Supervisor and Rad Protection. □ Directs search for leak. □ Shutdown H2 Addition. □ Makes PA announcement. □ Verify Crib House inlet temperature is <95°F. □ Initiates Torus cooling per "Hard Card".
	ATC	<p>Performs the following actions per DGP 02-03 as directed:</p> <ul style="list-style-type: none"> ■ Presses scram pushbuttons ■ Places mode switch in shutdown ■ Check rods inserted. ■ Determines that seven control rods are not inserted. ■ Initiates ARI ■ Announces ATWS condition and RX power is <6%. □ Inserts SRM/IRMs.

Event Seven - Small Steam Leak in Drywell / Seven Control Rods Remain Withdrawn

Trigger	Position	Crew Actions or Behavior
	BOP	<ul style="list-style-type: none"> <input type="checkbox"/> Check auxiliary power transferred to RAT. <input type="checkbox"/> May start maximum torus cooling per DOP 1500-02, TORUS WATER COOLING MODE OF LOW PRESSURE COOLANT INJECTION SYSTEM, Hardcard.
	TEAM	<p>Verifies the following as time allows:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Group Isolations <input type="checkbox"/> Automatic start of ECCS systems <input type="checkbox"/> Automatic start of EDGs.
	CRS	<ul style="list-style-type: none"> ■ Enters DEOP 100, RPV CONTROL, from DGP 02-03, REACTOR SCRAM. <p>Due to ATWS report, exits DEOP 100, enters DEOP 0400-05, FAILURE TO SCRAM and performs/directs the following:.</p> <ul style="list-style-type: none"> ■ ✓ Inhibiting ADS. <input type="checkbox"/> Placing Core Spray in PTL. <input type="checkbox"/> Verification of all isolations, ECCS and EDGs start. <input type="checkbox"/> Holding Reactor water level between TAF and +48". ■ ✓ Inserting control rods. <input type="checkbox"/> Maintaining RPV pressure <1060 psig.
	BOP	<ul style="list-style-type: none"> ■ ✓ Inhibits ADS. <input type="checkbox"/> Places Core Spray in PTL. <input type="checkbox"/> Controls RPV pressure as directed.
	ATC	<p>✓ Performs manual control rod insertion per DEOP 500-5, ALTERNATE INSERTION OF CONTROL RODS, as directed (three of the seven rods will NOT insert):</p> <ul style="list-style-type: none"> ■ Bypasses the RWM ■ Starts the available CRD pump or use CRD x-tie from Unit 3. ■ Maximizes drive water pressure using one or more of the methods in DEOP 500-05. ■ Inserts rods using RONOR in EMERG ROD IN or the normal rod movement control switch
8		<p><u>Simulator Operator / Role Play:</u></p> <p>When requested: Wait three min, activate the appropriate trigger and report completed.</p> <p>TRIGGER 8: installs scram jumpers. (Wait 3 min)</p> <p>At the discretion of the Lead Evaluator, report "SCRAM jumpers are installed on U2 per DEOP 500-05"</p>
9		<p>TRIGGER 9: bypasses Offgas High Rad. (Wait 3 min)</p> <p>At the discretion of the Lead Evaluator, report "Offgas High Rad isolations bypassed on U2 per DEOP 500-02"</p>
17		<p>TRIGGER 17: removes ARI fuses (Wait 3 min)</p> <p>At the discretion of the Lead Evaluator, report "ATWS ARI Fuses are removed on U2 per DEOP 0500-05"</p>

Event Seven - Small Steam Leak in Drywell / Seven Control Rods Remain Withdrawn

Trigger	Position	Crew Actions or Behavior
13 14 15 16		<p><u>Simulator Operator:</u></p> <p>Verify the following triggers automatically activate when the associated rod is selected, drive water pressure is restored to > 200 psig and an “insert” signal is given:</p> <p>TRIGGER 13: deletes the stuck malfunction for CRD F-09.</p> <p>TRIGGER 14: deletes the stuck malfunction for CRD H-05.</p> <p>TRIGGER 15: deletes the stuck malfunction for CRD L-14</p> <p>TRIGGER 16: deletes the stuck malfunction for CRD P-07</p>
		<p><u>Simulator Operator / Role Play:</u></p> <p>At the discretion of the Lead Evaluator, report as the QNE: “I have performed an evaluation of the current core configuration, and confirmed that the reactor will remain shutdown under all conditions.”</p>
	CRS	<p><input type="checkbox"/> May contact QNE to determine if reactor will remain shutdown under all conditions.</p> <p><input checked="" type="checkbox"/> If informed that the reactor will remain shutdown under all conditions, exits DEOP 0400-05 and enters DEOP 100.</p> <p><input type="checkbox"/> If water level has <u>not</u> been lowered below TAF, directs securing SBLC injection.</p>

Event 7 Completion Criteria:

- Manually Scrammed Reactor
- Rods being manually driven

--AND/OR--

Or at the discretion of the NRC Chief Examiner.

Event Eight – Insert Control Rods

Trigger	Position	Crew Actions or Behavior
7 10		<p>NOTE: TRIGGER 7 will auto activate once the mode switch is taken to shutdown. All RFPs will trip 10 seconds later.</p> <p>SIMULATOR OPERATOR: After the Team has stabilized the plant and at the discretion of the Lead Evaluator, activate TRIGGER 10, which increases the size of the steam leak.</p> <p>ROLE PLAY: EO sent to check EDG operation: wait 3 min, then report: “Both EDGs are operating normally”.</p> <p>ROLE PLAY: Acknowledge other requests; delay as necessary.</p>
	TEAM	<ul style="list-style-type: none"> ■ Determines/announces Drywell pressure rapidly rising.
	CRS	<p>Enters DEOP 0200-01, Primary Containment Control, when PC/P reaches 2 psig and performs/directs:</p> <ul style="list-style-type: none"> □ Monitoring of PC/P. □ Initiation of torus sprays before PC/P of 9 psig. ■ When PC/P is above 9 psig or before DW/T reaches 281°F: <ul style="list-style-type: none"> • Verification of DSIL. • Tripping of recirc pumps. • Tripping of DW coolers. • ✓ Initiation of DW sprays. □ Monitoring of DW/T. (D/W sprays may be initiated for temp control) ■ Monitoring of SP/T and initiation of torus cooling. □ Monitors SP/L. ■ ✓ Securing Drywell and Torus Sprays before Drywell or Torus reach 0 psig (if applicable)
	BOP	<p>Performs DEOP 0200-01, Primary Containment Control, actions as directed:</p> <ul style="list-style-type: none"> □ Monitors PC/P and initiates torus sprays as directed: ■ Initiates drywell sprays per Hard Card LPCI/CCSW OPERATION, as directed: <ul style="list-style-type: none"> ❖ Opens the 27A/B and 28A/B valves in desired loop. ❖ Adjusts sprays to maintain < 9 psig, but high enough to ensure ECCS NPSH by any combination of the following: <ul style="list-style-type: none"> ○ Open or close 27A/B AND 28A/B valves in the desired containment spray loop. ○ Throttling 21A/B OR 38A/B valves in the desired containment spray loop. (Maintain LPCI pump discharge pressure > 125 psig.) □ Monitors DW/T. □ Monitors SP/T and initiates torus cooling per Hard Card LPCI/CCSW OPERATION as directed. (May already be initiated for previous Event) □ Monitors SP/L. □ Verifies initiation of drywell and torus H₂/O₂ monitors. ■ ✓ Secures Drywell and Torus Sprays before Drywell or Torus reach 0 psig (if applicable)
	ATC	<ul style="list-style-type: none"> □ Determines/announces RFP trip. □ Attempts to start the available RFPs. □ Announces loss of all RFPs.

Event Eight – Insert Control Rods

Trigger	Position	Crew Actions or Behavior
11		NOTE: TRIGGER 11 Auto Activates when the HPCI Auto Initiation Button is pushed. This allows HPCI to start and inject.
	CRS	<ul style="list-style-type: none"> ■ Directs starting HPCI to restore and maintain RPV Level in the DEOP directed level band (TAF to +48).
	BOP	<ul style="list-style-type: none"> ■ Determines HPCI did not start on initiation signal ■ Starts HPCI as directed and restores level in the DEOP directed level band (TAF to +48): <ul style="list-style-type: none"> ❖ Depresses AND holds the HPCI AUTO-START Pushbutton. ❖ Adjusts flow in Auto <u>OR</u> Manual Mode. ❖ Starts HPCI Room Cooler.

Event 8 / Scenario Completion Criteria:

- HPCI has been started to restore RPV level to DEOP directed level band,
- DW Sprays initiated and DW pressure lowering
- AND / OR --

At the direction of the Lead Examiner.

REFERENCES

PROCEDURE	TITLE
DAN 923-1 B-5	U2 or U3 Inst Air Comp Trip
DAN 923-1 C-3	Service Water Pump Trip
DEOP 0100	RPV Control
DEOP 0200-01	Primary Containment Control
DEOP 0400-05	Failure to SCRAM
DEOP 0500-05	Alternate Insertion of Control Rods
DGA-07	Unexpected Reactivity Change
DGP 01-01	Unit Startup
DGP 02-03	Reactor Scram
DGP 03-01	Power Changes
DGP 03-04	Control Rod Movements
DOA 0040-01	Slow Leak
DOA 0202-03	Reactor Recirculation System Flow Control Failure
DOA 0500-05	Loss of Reactor Protection System Bus
DOA 0600-01	Transient Level Control
DOA 2300-02	HPCI Fast Startup
DOA 3900-01	Loss of Cooling by Service Water System
DOA 4700-01	Instrument Air System Failure
DOA 6500-10	4kV Circuit Breaker Trip
DOP 0010-10	Unit 2(3) Technical Specification Instrumentation Operability Manual
DOP 0202-16	Reactor Recirculation System Manual Hold and Local Manual Operation
DOP 0400-01	Reactor Manual Control System Operation
DOP 0500-03	Reactor Protection System Power Supply Operation
DOP 0500-07	Insertion/Reset of Manual Half Scram
DOP 2400-01	CAM System H2 and O2 Detection Subsystem Operation
DOP 4700-01	Instrument Air System Startup
DOP 5750-02	Reactor Building Ventilation
DOP 6700-20	480V Circuit Breaker Trip
DOP 7500-01	STANDBY GAS TREATMENT SYSTEM OPERATION
TS 3.3.8.2	Reactor Protection System (RPS) Electric Power Monitoring
TS 3.4.1	Recirculation Loops Operating
TS 3.6.4.3	Standby Gas Treatment System

ILT-N-2 Quantitative Attributes	
7	Total malfunctions (5 to 8)
2	Malfunctions after EOP entry (1 to 2)
4	Abnormal events (2 to 4)
1	Major transients (1 to 2)
2	EOPs entered/requiring substantive actions (1 to 2)
1	EOPs contingency requiring substantive actions (0 to 2)
3	Crew critical tasks (2 to 3)

CAEP FILES

```
# 19-1 (2020-301) ILT-N-2.cae
# For ILT Class 19-1 NRC Exam
# Written by FDW
# Rev 00
# Date 01/20
```

INITIAL CONDITIONS

```
# Sets APRM Master Gain pot to 1.0
irf niagain 1.0 |2
```

```
# Sticks 7 rods, Example for CRD D-07 is "imf rodd07st"
# Rods are D-07, F-09, H-05, K-07, :-14, N-04, and P-07
imf rodd07st |2
imf rod09st |2
imf rodh05st |4
imf rodk07st |4
imf rod14st |4
imf rodn04st |4
imf rodp07st |6
```

```
# Prevents HPCI Autostart
set hcipremaninfg = false|2
```

EVENT TRIGGERS

```
# Event Trigger 1 inserts an IAC trip - Event #3
trgset 1 "0"|6
imf n33 (1 10:00)|6
```

```
# Event Trigger 2 causes 2B RPS MG Set to trip simulating trip of 2B RPS MG SET 2B-1 EPA Bkr – Event #4
trgset 2 "0"|10
imf b02 (2)|10
```

```
# Event Trigger 3 places 2A RPS Bus on reserve power – Event #4
trgset 3 "0"|10
irf b03 (3) true|10
```

```
# Event Trigger 4 inserts a trip of the 2B service water pump. (takes several seconds to occur) – Event #5
trgset 4 "0"|12
imf q22 (4)|12
```

```
# Event Trigger 5 fails APRM #2 upscale
trgset 5 "0"|14
imf nia2pot (5) 125 60|14
```

```
# Event Trigger 6 Inserts a 0.01% steam leak upstream of the restrictors
trgset 6 "0"|14
```

imf i21 (6) 0.01|14

Event Trigger 7 causes RFP 2A, 2B and 2C to trip one minute after the mode switch is placed in Shutdown

trgset 7 "rpdmode4"|14

imf h31 (7 60)|16

imf h32 (7 60)|16

imf h33 (7 60)|16

imf h34 (7 60)|16

Event Trigger 8 installs scram jumpers

trgset 8 "0"|18

irf rpjumpas (8) on|18

Event Trigger 9 installs Offgas High Radiation bypass jumpers

trgset 9 "0"|18

irf ogogjp (9) in|18

Event Trigger 10 Increases the steam leak. - Post Major

trgset 10 "0"|24

trg 10 "mmf i21 5.0"|24

Event Trigger 11 allows HPCI to be started manually

trgset 11 "hpdinit"|24

trg 11 "set hcipremaninfo = true"|24

Event Trigger 13 clears stuck rod F-09

trgset 13 "rdlselw(102) .and. (rds303em .or. rds302in) .and. (rddpdriv .gt. 250.0)"|20

trg 13 "dmf rodF09st"|20

Event Trigger 14 clears stuck rod H-05

trgset 14 "rdlselw(45) .and. (rds303em .or. rds302in) .and. (rddpdriv .gt. 250.0)"|20

trg 14 "dmf rodH05st"|20

Event Trigger 15 clears stuck rod L-14

trgset 15 "rdlselw(171) .and. (rds303em .or. rds302in) .and. (rddpdriv .gt. 250.0)"|22

trg 15 "dmf rodL14st"|22

Event Trigger 16 clears stuck rod P-07

trgset 16 "rdlselw(80) .and. (rds303em .or. rds302in) .and. (rddpdriv .gt. 250.0)"|20

trg 16 "dmf rodP07st"|20

Event Trigger 17 Removes ARI fuses

trgset 17 "0"|26

irf aw4 (17) true|26

Event Trigger 28 sets gain for all 6 APRMs.

trgset 28 "0"|26

trg 28 "irf niagainf true"|26

END

Unit 2 Risk: GREEN

Unit 2 is in Mode 2 at 5% power

Leading Thermal Limit: MFLCPR @ 0.881

Action limit: 0.980

Equipment Unavailable: None

Protected Equipment: None

Unit 3 Risk: GREEN

Unit 3 is in Mode 1 at 100% power

Leading Thermal Limit: MAPRAT @ 0.885

Action Limit: 0.980

Equipment Unavailable: None

Protected Equipment: None

Current Action Statements

None

LCO Started: N/A

LCO Expires: N/A

Cause: N/A

Unit 2 Plant Status

Today

Unit 2 Activities

**** Shift 1 Activities ****

**** Shift 2 Activities ****

- Swap SBGT standby lineup (2/3B SBGT to Primary, and 2/3A SBGT to Standby) per DOP 7500-01. This is in preparation for hanging a C/O after this shift. Partial Procedure use has been authorized.
- Continue with Startup per DGP 01-01

**** Shift 3 Activities ****

XL-3 Alarms

.....

Sensor 51-20 in alarm 2/3 FIRE PUMP RUNNING

.....

Dresden Generating Station

ILT-N-4

SWAP TBCCW PUMPS

STUCK CONTROL ROD

LOSS OF RFP / RECIRC RUNBACK

**RB FUEL POOL UPSCALE - FAILURE OF RB VENT DAMPERS TO
CLOSE**

HP HEATER TRIP

ISO CONDENSER TUBE LEAK

RECIRC LEAK IN DW – MANUAL SCRAM

**LOSS OF ALL FWRV'S AND HPCI WITH RECIRC LEAK –
EMERGENCY DEPRESSURIZATION DUE TO RPV LVL AT TAF**

Rev. 00

01/20

Developed By:

Exam Author

Date

Approved By:

Facility Representative

Date

Scenario Outline

Facility: <u>Dresden Generating Station</u>	Scenario No.: <u>2020-301 ILT-N-4 (Spare)</u>	Op-Test No.: <u>2020-301</u>
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Examiners 	Operators / crew position / ATC / BOP / CRS
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Initial Conditions: Unit 2 is at 100% Power.

2A EHC Pump OOS

Turnover: Swap TBCCW pumps per DOP 3800-01

Exercise 3 Control Rods and record stall flows

Critical Tasks:

RPV-1.1 – If the RPV level trend is not reversible with an RPV injection source lined up with a pump running, initiate emergency depressurization with RPV water level between the Top-of-Active Fuel and the Minimum Steam Cooling RPV Water Level or within two and ½ minutes after TAF is reached, whichever is later.
~~RPV-1.2 – When high and low pressure systems are available for RPV injection, do not stop or divert injection from the RPV until level is restored to above the Top-of Active Fuel (TAF). √ Maximizes injection flow with minimum ECCS Pump lineups prescribed by the transient mitigation guidelines (OP-DR-103-102-1002)~~
RPV-1.5 - Per DEOP 100, RPV CONTROL, with the automatic ADS timer initiated, inhibit ADS before an automatic actuation occurs.
RPV-2.1 – When conditions are met per DEOP 400-2, EMERGENCY DEPRESSURIZATION, within 15 minutes the minimum number of available SRV's required for emergency depressurization (MNSRED) are opened.
PC-1.1 – While executing DEOP 200-1, PRIMARY CONTAINMENT CONTROL, when drywell pressure exceeds 9 psig and only if operating within the safe region of the drywell spray initiation limit (DSIL), initiate drywell sprays within 15 minutes.

Event No.	Malf. No.	Event Type*	Event Description #
1	NONE	N BOP	(New) – TBCCW – Swap TBCCW pumps
2	RODXXXST	C ATC	(New) - CRD - Control Rod, Stuck And Requires Higher Pressure To Move
3	RLMRFBP	C ATC	(New) – FW – Recirc Runback, due to loss of RFP
4	RMARMPFAILF(1) RMARMPFAILD(1) VRMISO42A VRMISO42B MRGFPB	I/T BOP / CRS	(New) - PRM – RB Fuel Pool Channel B Rad detector fails upscale causing RB Vent to isolate with failure of 2 isolation dampers to close. CRS will reference Tech Specs.
5	HDD3202C2 HDD3202O2 HDD3202S2	R ATC	(New) – FW – HP Heater trip (Reactivity Move)
6	ICTUBLK	C/T BOP/CRS	(New) ISO COND – System, Tube leak
7	F41	M ALL	MANUAL SCRAM – Recirc leak in Drywell.
8	RLMFAFC RLMFBFC RLMLFFC HPPMGDG	M ALL C ALL M ALL	(New) - Loss of All Feedwater Reg Valves HPCI degraded EMERGENCY DEPRESSURIZE - On Lowering Reactor Water Level

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

(New) – Event not used on previous 2 NRC Exams, (Pre) – Event used on previous 2 NRC Exams

Scenario Objective

Evaluate the Team's ability to operate the plant with a drywell leak and degraded high pressure injection systems.

Scenario Initial Conditions

1. Unit 2 is at ~100% power.
2. The following equipment is OOS:
 - a. 2A EHC Pump
3. LCOs:
 - a. None

Scenario Sequence

Event #	Description
1	TBCCW – Swap TBCCW pumps: The BOP will start 2A TBCCW pump and secure 2B TBCCW pump per DOP 3800-01.
2	CRD - Control Rod, Stuck And Requires Higher Pressure To Move: ATC will perform monthly rod exercising. The first rod will perform as expected. The second rod will stick requiring drive water pressure to be increased to >325 psid in order for the rod to move.
3	FW - Recirc Runback, Due To Loss of RFP: The 2B RFP loses oil pressure and trips. Insufficient feedwater flow causes RPV level to drop and the crew to respond to a Recirc runback. ATC will insert CRAM rods to reduce the FCL below the MELLLA boundary.
4	PRM – RB Fuel Pool upscale, with failure of 2 RB Vent Dampers to close. The RB Fuel Pool Channel B Rad detector will fail upscale causing RB Vent to isolate. 2 of the RB Vent Isolation Dampers will fail to close. The BOP will be able to close the dampers manually. The CRS will reference the Tech Specs.
5	FW HP Heater trip (Reactivity move): 2D2 Feedwater Heater extraction valve fails closed. The crew will address the loss of feedwater heating and evaluate which region of feedwater heating they are operating in. The ATC will reduce power by 60 MWe with core flow.
6	ISO COND - System, Tube Leak: The Isolation Condenser develops a tube leak and must be isolated. With the Isolation Condenser inoperable the CRS will reference Tech Specs.
7	MANUAL SCRAM - Recirc leak in Drywell: A leak will develop in the Recirc line causing Drywell pressure to rise. The crew may take scram prep actions per DGP 02-03, but will manually scram the reactor by 1.5 psig in the Drywell. Drywell pressure will rise above 9 psig and this drives the crew to spray the Drywell.
8	EMERGENCY DEPRESSURIZE - On Lowering Reactor Water Level Due To Recirc System Leak, Loss of All Feedwater Reg Valves, and HPCI being degraded: After the crew stabilizes the plant following the manual scram the Recirc leak will get bigger, the FWRVs will fail closed and with HPCI degraded (malfunction put in during scenario setup), Reactor water level will lower. When RWL reaches TAF (-170") the crew will enter DEOP 0400-02, Emergency Depressurization, and blowdown the reactor.

Event One – Swap TBCCW Pumps

The BOP will start the 2A TBCCW pump and secure the 2B TBCCW pump.

Malfunctions required: 0

- None

Success Path:

- 2A TBCCW pump is running and 2B TBCCW pump is secured.

Event Two – Stuck Control Rod

A control rod sticks and requires higher pressure to move.

Malfunctions required: 1

- (Control rod stuck)

Success Path:

- Performs DOP 0400-01, Reactor Manual Control System Operation .
- Determines Technical Specifications requirements.

Event Three – Recirc Runback

The crew recognizes and responds to failure of the 2B RFP lube oil system. Low feedwater flow causes RPV level to drop and a recirc runback to occur.

Malfunctions required: 1

- (RFP trip with low feedwater flow)

Success Path:

- Take action for recirc runback.

Event Four – Fuel Pool Channel B Fails Upscale

The RB Fuel Pool Channel B Rad detector fails upscale, causing RB Vent to isolate. 2 of the RB Vent Isolation Dampers will fail to close.

Malfunctions required: 2

- (Failure of 2B Fuel Pool Radiation Detector upscale)
- (Failure of two RB Vent Dampers to go closed)

Success Path:

- Team manually isolates the RB Vent Dampers manually.
- Determines Technical Specifications requirements.

Event Five – HP Heater trip (Reactivity move)

2D2 Feedwater Heater level fails upscale

Malfunctions Required: 1

- (2D2 Heater level fails upscale)

Success Path:

- Inserts CRAM rods per DGP 03-04 to clear APRM Highs OR to reduce power below MELLRA boundary
- Reduces power with core flow to maintain CTP below 100%, or at the initial power level (does NOT decrease flow \leq 55 Mlbm/hour with FCL \geq 58%)
- Reduces power by 60 MWE with core flow due to “D” Heater being tripped

Event Six – Isolation Condenser Tube Leak

Isolation condenser develops a tube leak.

Malfunctions required: 1

- (Isolation Condenser Tube Leak)

Success Path:

- Team isolates the Isolation Condenser
- Determines Technical Specifications requirements.

Event Seven – Recirc Leak in Drywell - Manual Scram

A LOCA in the Drywell occurs, causing DW pressure to rise, and requiring a manual scram.

Malfunctions required: 1

- (Recirc loop leak)

Success Path:

- Performs DGP 02-03, Reactor Scram.
- Performs DEOP 0100, RPV Control
- Performs DEOP 0200-01, Primary Containment Control.

Event Eight – Loss of All FWRV's and HPCI with Recirc Leak – Emergency Depressurization due to RPV Lvl at TAF

Emergency Depressurization is required when it is determined that RPV/L cannot be maintained above TAF. RPV/L is restored using low pressure ECCS pumps.

Malfunctions Required: 2

- (FWRVs failed closed)
- (HPCI degraded)

Success Path:

- Performs DEOP 0400-02, Emergency Depressurization

PRE-SCENARIO ACTIVITIES

- 1 If applicable, conduct pre-scenario activities in accordance with TQ-AA-155-J040, SIMULATOR EXAMINATION BRIEFING.
 - a. Direct the crew to perform their briefs prior to entering the simulator.
 - b. Provide the Team a marked up copy of DOP 3800-01, Turbine Building Closed Cooling Water System Operation.
 - c. Provide the Team a marked up copy of DOS 0300-01, Control Rod Exercise.
- 2 Simulator Setup (the following steps can be done in any logical order)
 - a. Initialize simulator in an ~100% power IC. (IC 323 used for validation, sequence 2S.0.0 Key 758C)
 - b. Cut in/out Cond Demins as needed, to maintain DP within limits.
 - c. Ensure running Condensate pump amps within limits.
 - d. Ensure CRD parameters are normal, and CRD Drive Pressure is 250 to 280 psid.
 - e. Advance the chart recorders.
- 3 Verify the following simulator conditions:
 - a. Verify Reactor Power ~100%, adjust rods or Recirc as appropriate.
 - b. 2B TBCCW pump is running.
 - c. 2A TBCCW pump is secured.
- 4 Run **Pump_Sumps.cae**

NOTE: Do NOT run the initial setup CAEP file until the above setup is completed.

- 5 Run the initial setup CAEP file: **19-1 (2020-301) ILT-N-4.cae**
- 6 Place the following equipment out of service:
 - a. 2A EHC Pump
- 7 Place a Protected Pathway donut on 2B EHC Pump.
- 8 Ensure this setup is peer checked.
- 9 Complete the Simulator Setup Checklist.

Symbols are used throughout the text to identify specific items as indicated below:

- ✓ Critical Tasks
- Required Actions
- Optional Actions

Event One – Swap TBCCW Pumps

Trigger	Position	Crew Actions or Behavior
28		<p><u>SIMULATOR OPERATOR ROLE PLAY:</u></p> <p>If requested to set gains to 1, (wait 3 min) activate TRIGGER 28, then report “gains set to 1”. (This trigger can be triggered OFF, then back ON to adjust gains more than once).</p> <p><u>SIMULATOR OPERATOR ROLE PLAY:</u></p> <p>EO at TBCCW pumps:</p> <ul style="list-style-type: none"> • If asked, pre-start checks are complete for the 2A TBCCW pump • When told the 2A TBCCW pump is being started, report: “I understand 2A TBCCW pump is being started, everyone is clear of the area.” • When asked about 2A TBCCW pump operation, wait 1 minute and report: “the 2A TBCCW pump is operating normally.” • When asked about 2B TBCCW pump after pump is secured, report: “the 2B TBCCW pump is at rest.” • When asked about TBCCW system parameters locally, wait 1 minute and report: “TBCCW system parameters are normal.”
	CRS	<ul style="list-style-type: none"> ■ Directs BOP to start the 2A TBCCW pump and secure the 2B TBCCW pump IAW DOP 3800-01, Turbine Building Closed Cooling Water System Operation.
	BOP	<p>Performs DOP 3800-01, steps G.4.a through g:</p> <ul style="list-style-type: none"> □ May contact EO at TBCCW pumps for status of the 2A TBCCW pump. □ Informs the EO the 2A TBCCW pump is being started. ■ Starts the 2A TBCCW pump by taking control switch on the 923-1 panel to START. ■ Directs the EO to check for proper operation of the 2A TBCCW pump. ■ Secures the 2B TBCCW pump by taking control switch on the 923-1 panel to TRIP. □ Verifies TBCCW system parameters. □ Notifies CMO to perform vibration monitoring on the running 2A TBCCW PP at the next opportunity.

Event 1 Completion Criteria:

- 2A TBCCW pump is running,
- 2B TBCCW pump is secured,
- AND/OR --

At the discretion of the Lead Examiner.

Event Two – Stuck Control Rod

Trigger	Position	Crew Actions or Behavior
1		<p>The crew will start exercising control rods per DOS 0300-01, Control Rod Exercise. On the <u>second</u>D-6 rod they will experience a stuck rod.</p> <p><u>SIMULATOR OPERATOR:</u></p> <p>Verify TRIGGER 1 automatically activates when:</p> <ul style="list-style-type: none"> Control rod D-09 is selected; Drive water pressure is greater than 325 psig; and, Either the Rod Movement Control switch is placed to the ROD IN position, or the Rod Out Notch Override is placed to the EMERG ROD IN position. <p>This deletes Control Rod D-09 stuck malfunction.</p> <p><u>ROLE PLAY:</u></p> <p>EO to check D-09 accumulator: Wait 2 min, then report “I see nothing abnormal at D-09 accumulator”.</p> <p>Shift Manager / QNE to concur with raising drive water pressure: advise the CRS that “I concur with raising drive water pressure”.</p>
	ATC	<ul style="list-style-type: none"> Observes and announces that Control Rod D-09 did not move using normal drive pressure. Requests permission from CRS to raise drive water pressure per DOP 0400-01, Reactor Manual Control System Operation, to attempt to move the control rod.
	CRS	<ul style="list-style-type: none"> May contact Shift Manager and/or QNE for concurrence to raise drive water pressure. Directs ATC to raise drive water pressure per DOP 0400-01, Reactor Manual Control System Operation, to attempt to move the control rod.
		<p><u>NOTE:</u> The pressure is to be raised incrementally to the following ranges for each attempt to move the rod:</p> <ul style="list-style-type: none"> 280 to 320 psid (~300 psid) 320 to 380 psid (~350 psid; the control rod will move)
	ATC	<p>Repeats the following until the control rod moves:</p> <ul style="list-style-type: none"> Raises drive water pressure per DOP 0400-01, REACTOR MANUAL CONTROL SYSTEM OPERATION, (Attachment B) as follows: <ul style="list-style-type: none"> May place FIC 2-0340-01, CRD Flow Contrlr, in MAN if desired. (All CAPS) Throttles closed MO 2-0302-08, DRIVE WTR PCV, to establish the desired drive water pressure. Attempts to move the control rod. Observes and announces that the stuck control rod moved with ~350 psid. Returns the drive water pressure to the normal band by throttling open MO 2-302-8, DRIVE WTR PCV. (250 to 280 psid) May place FIC 2-340-1, CRD Flow Controller, back to AUTO if desired. Completes moving the rod to its target position.

Event 2 Completion Criteria:

➤ Control Rod D-09 Has Been moved to its original target position

-- AND/OR--

At the direction of the Lead Examiner.

Event Three – 2B RFP TRIP / RECIRC RUNBACK

Trigger	Position	Crew Actions or Behavior
<p>2</p> <p>21</p> <p>3 & 4</p> <p>5 & 6</p>		<p><u>SIMULATOR OPERATOR:</u></p> <p>At the discretion of the Floor Instructor / Lead Evaluator, activate TRIGGER 2, which inserts 2B RFP low oil pressure, causes failure of its auxiliary oil pump to start and trips the pump 30 seconds later. Also insert failure to cause level to drop slowly to less than 25 inches to cause the Recirc runback.</p> <p>NOTE: Verify TRIGGER 21 automatically activates to remove 2B RR Pump speed hold override, once runback is complete. If it does not work, manually delete digital override “rrdbspdhdres”.</p> <p>Verify TRIGGERS 3 & 4 automatically activate when 2B RFP’s breaker opens. This causes:</p> <ul style="list-style-type: none"> • Sets the FRV Isol MO 2-3206A&B to 25% open to reduce FW flow enough to cause RPV level to drop. • Overrides the valves’ CLOSED lights OFF so they still appear full open. ■ Verify TRIGGERS 5 & 6 automatically activate when Recirc Pump Runback light comes ON. This causes FRV Isol MO 3206A & B to ramp back to 100% open. <p><u>ROLE PLAY:</u></p> <p><u>EO to check 2B RFP:</u> (wait 2 min), Report, “Oil reservoir level is low. There is a large amount of oil on the pump base-plate The oil had not reached the base plate drain yet. I plugged the base plate drain”.</p> <p><u>EO to check 2B RFP breaker:</u> (Wait 2 min), Report, “2B RFP breaker is open and no targets are up”.</p> <p><u>EO to check 2B RFP Aux Oil pump breaker:</u> (wait 2 min), Report, “I see no problems with 2B RFP Aux Oil pump breaker”.</p> <p><u>EO (if requested) to verify 2B RFP is at rest:</u> Report “2B RFP is at rest”.</p> <p><u>If QNE is contacted:</u> Report, “I will come to the control room”</p>
	ATC	<p>Performs the following actions per DAN 902-6 H-8, 2B RFP BRG OIL PRESS LO:</p> <ul style="list-style-type: none"> ❑ Attempts to start 2B RFP Auxiliary Oil Pump. ❑ Directs EO to report 2B RFP oil pressure, oil reservoir level and check for oil leaks. ❑ Informs US 2B RFP is running with low oil pressure and the auxiliary oil pump will not start. ❑ Announces trip of 2B RFP. ❑ Announces runback of the Recirc pumps. ❑ Enters DAN 902-4 H-6, RECIRC PUMP RUNBACK. ❑ If directed, enters DGA-7, Unexpected Reactivity Addition

Event Three – 2B RFP TRIP / RECIRC RUNBACK

Trigger	Position	Crew Actions or Behavior
	ATC	<p><u>DAN 902-4 H-6 actions;</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> IF required to control Reactor Level, <u>THEN</u> ENTER and perform DOA 0600-01, TRANSIENT LEVEL Control, concurrently with this procedure. <input type="checkbox"/> Verify the REACTOR RECIRC RUNBACK indicating light is ON at Panel 902(3)-4. <input type="checkbox"/> Verify BOTH Reactor Recirc pumps have runback to 68% speed. <input type="checkbox"/> Verifies not operating above MELLLA boundary, if operating above boundary inserts CRAM arrays. ■ WHEN the condition(s) requiring Recirc Pump Runback has cleared, <u>THEN</u> resets the runback per DOP 0202-03, REACTOR RECIRCULATION FLOW CONTROL SYSTEM OPERATION. <input type="checkbox"/> Resets Speed Hold as required per DOP 0202-16, REACTOR RECIRCULATION SYSTEM MANUAL HOLD AND LOCAL MANUAL OPERATION. (Enough Verifiable actions?)
	CRS	<ul style="list-style-type: none"> <input type="checkbox"/> May direct entry into DOA 0600-01, Transient Level Control. <input type="checkbox"/> Directs entry into DOA 6500-10, 4KV Circuit Breaker Trip ■ Directs resetting speed hold per DOP 0202-16 <u>OR</u> sets contingency for resetting speed hold on a SCRAM. <input type="checkbox"/> May direct performance of DOP 0202-03. <input type="checkbox"/> Directs insertion of CRAM arrays if operating above MELLLA boundary. <input type="checkbox"/> Contacts the Shift Manager, and appropriate maintenance departments. <input type="checkbox"/> Directs entry into DGA-7, Unexpected Reactivity Addition

Event 3 Completion Criteria:

- Crew has taken the actions of the DANs for RR runback
-- AND/OR --

At the discretion of the Floor Instructor/Lead Evaluator.

Event Four – 2B Fuel Pool Rad Monitor Fails Upscale With Failure of RB Vent Dampers to Isolate

Trigger	Position	Crew Actions or Behavior
7, 8		<p><u>SIMULATOR OPERATOR:</u></p> <p>At the discretion of the Floor Instructor / Lead Evaluator, activate TRIGGER 7. This fails 2B Fuel Pool Rad monitor upscale. TRIGGER 8 will auto activate with TRIGGER 7 to allow the malfunction to work properly.</p> <p>Note: One set of U2 RBV Isolation Dampers fail to close.</p> <p><u>CUE:</u></p> <p>If an operator checks the 2B Fuel Pool Rad Monitor recorder on the back panel, cue the operator the 2B Fuel Pool Rad Mon is pegged high.</p>
18, 19		<p><u>SIMULATOR OPERATOR:</u></p> <p>Verify TRIGGERS 18 & 19 auto activate when the operator takes the 2-5742A & B control switch to CLOSE, this deletes the malfunction that bound them open.</p>
20		<p>Activate TRIGGER 20 after the scenario has been completed prior to going to FREEZE. This will reset the necessary variable in the background of the simulator.</p> <p><u>ROLE PLAY:</u></p> <p><u>EO (if requested) sent to check RX Bldg to Atmosphere D/P on the Refuel floor:</u> wait 2 min, then report “the RX Bldg to Atmosphere D/P is (Insert the value from Instructor Station drawing 923-5-03 OR variable VRP4)”.</p> <p><u>EO (if requested) sent to check SGBT operation:</u> wait 2 min, then report “2/3A SGBT is running normally”.</p> <p>Acknowledge requests as plant support groups.</p>
	BOP	<p>Announces alarms indicating 2B Fuel Pool Rad high and a Secondary Containment Isolation have occurred:</p> <ul style="list-style-type: none"> <input type="checkbox"/> 902-3 E-16, RX BLDG FUEL POOL CH B RAD HI. <input type="checkbox"/> 923-5 A-1, U2 RX BLDG VENT/EXH FAN TRIP. <input type="checkbox"/> 923-5 C-1, RX BLDG DP LO (may not come in if dampers are closed quickly). <input type="checkbox"/> Checks back panels and determines that 2B Fuel Pool Rad monitor has failed high (all other monitors are indicating normal levels). <p>Verifies expected automatic actions have occurred. Discovers and announces the following:</p> <ul style="list-style-type: none"> ■ RX Bldg Vent Outlet Dampers AO 2-5742A & B failed to close. <input type="checkbox"/> May take actions per DAN 920(3)-E-16 <ul style="list-style-type: none"> ○ Place control switches for U2 and U3 DW and Torus Purge Fans to PTL ○ Place Control Room Isolation switch, CRM ISOL on Panel 923-5 to ISOLATE position. ○ Place CRM AIR FILT UNIT BOOSTER FANS control switch on Panel 923-5 to FAN A <u>OR</u> FAN B position.
	CRS	<ul style="list-style-type: none"> <input type="checkbox"/> Acknowledges reports of failed 2B Fuel Pool Rad monitor and the Secondary Containment Isolation. <input type="checkbox"/> Acknowledges report of RX Bldg Vent Outlet Dampers AO 2-5742A & B failure to close. <input type="checkbox"/> Notifies SM and WWM <input type="checkbox"/> May direct that CREVs be isolated

Event Four – 2B Fuel Pool Rad Monitor Fails Upscale With Failure of RB Vent Dampers to Isolate

Trigger	Position	Crew Actions or Behavior
	BOP	<p>Performs the following to complete the Secondary Containment Isolation:</p> <ul style="list-style-type: none"> ■ Places RX Bldg Vent Outlet Isol Damper control switch to the CLOSE position and observes that the RX Bldg Vent Outlet Dampers AO 2-5742A & B close. ■ Dispatches an operator to check SBTG for normal operation.
	CRS	<p>Refers to Technical Specifications and determines:</p> <ul style="list-style-type: none"> ■ Technical Specification 3.3.6.2 Table 3.3.6.2-1 Cond A Function 4: Place channel in trip within 24 hrs. (Condition met) ■ Technical Specification 3.6.4.1. Cond A: Restore secondary containment to OPERABLE status within 4 hrs. ■ Technical Specification 3.6.4.2. Cond A: Isolate the affected penetration flow path by at least one closed and de-activated automatic valve within 8 hours. (Entered individually on AO 2-5742A AND on 2-5742B) ■ Technical Specification 3.6.4.2. Cond B: Isolate the affected penetration flow path by at least one closed and de-activated automatic valve within 4 hours. (Entered for BOTH AO 2-5742A & B)

Event 4 Completion Criteria:

- Secondary Containment Isolation completed; AND,
- Technical Specifications have been referenced and required LCOs identified.
- AND/OR--

At the discretion of the Floor Instructor/Lead Evaluator.

Event Five – HP Heater Trip

Trigger	Position	Crew Actions or Behavior
9		<p>FLOOR INSTRUCTOR/ SIMULATOR OPERATOR:</p> <p>When directed, activate TRIGGER 9 which causes 2D2 FW Heater extraction valve MO 2-3103-B to close.</p> <p>ROLE PLAY:</p> <p>If EO is asked to check MO 2-3103-B breaker: wait 3 min, then report “the feed breaker to MO 2-3103-B is closed and there appears to be no problems”.</p> <p>If EO is asked to check heaters locally: report “2D2 heater level is 18 inches, both normal and emergency drain controllers indicate that they are full open. All other heaters are operating normally.”</p> <p>If QNE is asked for assistance: Report “I will come to the control room”</p> <p>EO 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>
	ATC	<ul style="list-style-type: none"> <input type="checkbox"/> Either discovers MO 2-3103-B closed or closing, or observes that plant parameters are changing <input type="checkbox"/> Announces that 2-3103-B Heater extraction valve is closing or closed. <input type="checkbox"/> Monitors feedwater temperature and heater levels. <input type="checkbox"/> Places 2-3103-B Heater extraction valve control switch in pull to stop for 2D2 heater with level indication still on scale (as desired) to minimize feedwater temperature decrease. ■ Reduces power with flow as necessary to maintain CTP < 100% OR at the initial power level if operating at off-rated conditions (Does NOT decrease flow ≤ 55 M#/hr with FCL ≥ 58%) ■ Due to high pressure heater trip, reduces power by 60 MWe (OR 170 MWth) with core flow. ■ Inserts CRAM rods per DGP 03-04 to clear APRM highs OR to reduce power below the MELLLA boundary OR to reduce power below the unstable power/flow region boundaries. (as applicable) <input type="checkbox"/> Performs DOA 3500-02, LOSS OF FEEDWATER HEATERS, as directed. <input type="checkbox"/> Verifies operating within limitations of the Power to Flow Map. (Requires determining which region of the Feedwater Temperature Operating Domain the unit is operating) <input type="checkbox"/> Performs DOP 3500-03, Removing High Pressure Heaters From Operation, for the 2D2 heater, if directed. <input type="checkbox"/> Performs DGA-07, Unpredicted Reactivity Addition, as directed.
	CRS	<ul style="list-style-type: none"> ■ Enters DOA 3500-02 and directs actions. ■ Directs reducing load to by 60 MWe per DGP 03-01, POWER CHANGES. <input type="checkbox"/> Directs performing DOP 3500-03, REMOVING HIGH PRESSURE HEATERS FROM SERVICE. Verifies immediate operator actions complete. <input type="checkbox"/> Notifies the QNE and TSO of power change. <input type="checkbox"/> Directs insertion of CRAM rods per DGP 03-04, CONTROL ROD MOVEMENTS, to reduce power below MELLLA or to clear APRM highs (as applicable). <input type="checkbox"/> May direct entry into DGA-07, UNEXPECTED REACTIVITY ADDITION.
	BOP	<ul style="list-style-type: none"> <input type="checkbox"/> Peer checks DOA 3500-02 activities. ■ If directed, performs DGA-7, Unpredicted Reactivity Addition

Event Five – HP Heater Trip

Trigger	Position	Crew Actions or Behavior
<p style="text-align: center;"><u>Event 5 Completion Criteria:</u></p> <p>➤ DOA 3500-02 actions complete -- AND/OR -- At the direction of the Lead Examiner.</p>		

Event Six – Isolation Condenser Tube Leak

Trigger	Position	Crew Actions or Behavior
10		<p><u>SIMULATOR OPERATOR:</u></p> <p>At the discretion of the Floor Instructor/Evaluator, activate TRIGGER 10 which initiates a tube leak in the Isolation Condenser.</p> <p><u>ROLE PLAY:</u></p> <p>EO to IC Area: (wait 3 min.) Report, “there is no evidence of steam leakage in the area but the Isolation Condenser is making noises. It sounds like metal parts expanding (creaking)”.</p> <p><u>ROLE PLAY:</u></p> <p>NOTE: (IC temps may be viewed on RNI display IC1, Isolation Condenser)</p> <p>EO to check IC Vent outside: (WAIT 3 MIN.)</p> <p>If IC shell temp is > 190°F, report “some fog/steam exiting from the vent”</p> <p>If IC shell temp is < 190°F, report “NO steam exiting vent”.</p> <p><u>ROLE PLAY:</u></p> <p>Chemistry to sample IC shell side: Report “shell side sample results will take approximately 90 minutes”.</p> <p><u>ROLE PLAY:</u></p> <p>Rad Protection to survey IC Vent outside: Report “the radiological surveys will be initiated”.</p> <p>Security to control access to IC Vent outside: Report “the area will be roped off”.</p>
	BOP	<p>Announces alarms for the Isolation Condenser (IC) and refers to the following DANs:</p> <ul style="list-style-type: none"> <input type="checkbox"/> 902-3 B-3, IC HI RAD <input type="checkbox"/> 902-3 C-4, IC HI TEMP <input type="checkbox"/> Monitors temperature and radiation levels for the Isolation Condenser
	CRS	<ul style="list-style-type: none"> <input type="checkbox"/> Directs/verifies Operators take action per DAN 902-3 C-4. ■ After determining there is a leak in the IC, enters DOA 1300-01, ISOLATION CONDENSER TUBE LEAK. ■ Declares the Isolation Condenser Inoperable. <input type="checkbox"/> Requests Chemistry to sample Iso-Condenser shell side for change in activity. <input type="checkbox"/> Notifies SM and WWM
	BOP	<p>Performs DOA 1300-01 as directed and monitors:</p> <ul style="list-style-type: none"> <input type="checkbox"/> IC vent rad levels. <input type="checkbox"/> IC shell side water level. <input type="checkbox"/> IC temperatures from TR 1340-1. <input type="checkbox"/> IC area temperatures from 902-21 panel. <input type="checkbox"/> IC area rad levels from 902-2 panel <input type="checkbox"/> Reports IC vent rad above 3 mr/hr and IC shell side level and temperatures rising.

Event Six – Isolation Condenser Tube Leak

Trigger	Position	Crew Actions or Behavior
	BOP	<p>Isolates the IC by closing the following valves per DAN 902-3 B-3 or DOA 1300-01.</p> <ul style="list-style-type: none"> ■ MO 2-1301-1 ■ MO 2-1301-2 □ MO 2-1301-3 (May place control switch in Pull To Lock) ■ MO 2-1301-4 ■ AO 2-1301-17 ■ AO 2-1301-20 □ MO-2-1301-10 □ MO 2-4399-74 □ May dispatch an EO to the Isolation Condenser area. □ May bypass the IC area hi rad input to the Rx Bldg Hi Rad alarm.
	TEAM	<ul style="list-style-type: none"> □ Dispatches personnel outside to investigate discharge from the vent. □ Calls Chemistry and requests a sample of the shell side water to analyze for a change in activity. □ Directs Rad Protection to conduct radiological surveys. □ Directs Security to limit access underneath the IC vent.
	CRS	<p>References Tech Specs and determines:</p> <ul style="list-style-type: none"> ■ LCO 3.5.3.A.1: Verify HPCI is OPERABLE immediately. ■ LCO 3.5.3.A.2: Restore IC System to OPERABLE status within 14 days.

Event 6 Completion Criteria:

- DOA 1300-01 is addressed,
- The IC is isolated,
- Tech Spec requirements are determined,
- AND/OR --

At the discretion of the Lead Examiner.

Event Seven – Recirc Leak in DW – Manual Scram

Trigger	Position	Crew Actions or Behavior
11		<p><u>SIMULATOR OPERATOR:</u></p> <p>At the discretion of the Lead examiner, activate TRIGGER 11, which causes a small Recirc Loop leak to develop in the Drywell.</p> <p><u>ROLE PLAY:</u></p> <p>U-3 NSO to report Drywell pressure status: Report “U-3 Drywell pressure is 1.2 psig and steady”.</p>
	TEAM	<ul style="list-style-type: none"> ■ Recognizes and announces that Drywell pressure is slowly rising. □ May direct an operator to check the Unit 2 Drywell CAM. □ May direct operators to search for leaks.
		<p><u>ROLE PLAY:</u></p> <p><u>EO to check Drywell CAM:</u> (wait 2 min.) Report, “The Drywell CAM is reading 4700 counts and trending up”.</p> <p><u>EO to search for leak:</u> Report, “I am on my way out to check for leaks”.</p> <p><u>EO to check Cribhouse inlet temperature:</u> (wait 5 min.) Report, “Cribhouse inlet temp is 70°F”.</p> <p><u>If NSO checks Hydrogen Addition flow:</u> Cue the NSO that “Hydrogen Addition flows are normal”.</p>
	CRS	<ul style="list-style-type: none"> ■ Enters and directs performance of DOA 0040-01, SLOW LEAK. □ Set Scram contingency of 1.5 psig DW pressure. (Since DW pressure starts much lower than normal, may set a lower pressure Scram contingency. □ May enter DGP 02-03, REACTOR SCRAM, and direct taking scram preparatory actions. ■ Prior to reaching the Drywell Pressure scram setpoint, directs a manual reactor scram per DGP 02-03.
	ATC	<ul style="list-style-type: none"> ■ Performs the following actions per DOA 0040-01 as directed: □ Maintain Level with FWLCS (immediate action). □ Monitors leakage rate, reactor water level, and Drywell pressure. ■ Inserts manual reactor scram prior to 1.5 psig DW pressure.
	BOP	<ul style="list-style-type: none"> ■ Performs the following actions per DOA 0040-01 as directed: □ Notifies Shift Supervisor and Rad Protection. □ Directs search for leak. □ Shutdown H₂ Addition. □ Makes PA announcement. □ Verify Crib House inlet temperature is <95°F. ■ Initiates Torus cooling per DOP 1500-02, TORUS WATER COOLING MODE OF LOW PRESSURE COOLANT INJECTION SYSTEM, Hard Card.
	ATC / BOP	<ul style="list-style-type: none"> □ Performs scram preparatory actions per DGP 02-03 as directed. □ Starts MSP and TGOP. □ Trips H₂ addition.

Event Seven – Recirc Leak in DW – Manual Scram

Trigger	Position	Crew Actions or Behavior
	ATC	<p>Performs the following actions per DGP 02-03 as directed:</p> <ul style="list-style-type: none"> ■ Presses scram pushbuttons ■ Places mode switch in shutdown □ Check rods inserted. □ Verifies Recirc Pumps run back. □ Maintains RPV/L between +25 and +35 inches or as directed by Unit Supervisor. □ Inserts SRM/IRMs.
	CRS	<p>Enters DEOP 100, RPV Control, and directs actions:</p> <ul style="list-style-type: none"> ■ Verification of all isolations, ECCS and EDG starts. ■ Holding RPV/L +8 to +48 inches. ■ Maintaining RPV/P <1060 psig using the BPV's.

Event 7 Completion Criteria:

➤ Team has performed a reactor scram,

-- AND / OR --

At the discretion of the Lead Examiner.

Event Eight – Loss Of High Pressure Feed / Recirc Loop Leak / Emergency Depressurization

Trigger	Position	Crew Actions or Behavior
12		<u>SIMULATOR OPERATOR:</u> At the discretion of the Lead examiner, activate TRIGGER 12 , which increases the size of the Recirc Loop leak in the Drywell.
14		Verify TRIGGER 14 , automatically activates when the Mode Switch is placed to S/D. After 1 min, this causes all feedwater regulating valves to fail closed.
15		<u>SIMULATOR OPERATOR / ROLE PLAY:</u> <u>EO sent to lineup CRD crosstie</u> : wait 4 min, activate TRIGGER 15 , then report: “the CRD crosstie is lined up”.
16		<u>SIMULATOR OPERATOR / ROLE PLAY:</u> <u>EO sent to lineup makeup to SBLC Boron tank</u> : wait 4 min, activate TRIGGER 16 , and report: “makeup lined up to SBLC Boron tank”.
17		<u>EO sent to lineup makeup to SBLC Test tank</u> : wait 4 min, activate TRIGGER 17 , and report: “makeup lined up to SBLC Test tank”.
		<u>ROLE PLAY:</u> <u>EO sent to check EDG operation</u> : wait 3 min, then report: “Both EDGs are operating normally”. <u>EO sent to cut out Cond Demin beds</u> : wait 3 min, cutout Demin beds as needed (using instructor station), then report: “Cond Demin beds cutout”. <u>BOP checks OIS</u> : Inform BOP that “the OIS display lost power”. <u>ROLE PLAY:</u> Acknowledge other requests; delay as necessary.
	ATC	<ul style="list-style-type: none"> ■ Determines/announces all feedwater regulating valves are failed closed.
	TEAM	<ul style="list-style-type: none"> ■ Determines/announces Drywell pressure rapidly rising. ■ Determines/announces RPV level is dropping.
	CRS	<ul style="list-style-type: none"> □ Directs starting HPCI to maintain Level.
	BOP	<ul style="list-style-type: none"> □ Starts HPCI as directed. ■ Determines/announces HPCI is degraded.
	CRS	Determines insufficient high pressure feed is available, then performs/directs: <ul style="list-style-type: none"> ■ Inhibiting ADS before -59 inches. □ Lining up high pressure Alternate Injection systems. (SBLC & CRD) □ Verifying at least two low pressure injection systems available. □ Waiting until RPV level drops to TAF. □ Verifying any low pressure system lined up with a pump running.
	BOP	<ul style="list-style-type: none"> ■ √ Inhibits ADS as directed.

Event Eight – Loss Of High Pressure Feed / Recirc Loop Leak / Emergency Depressurization

Trigger	Position	Crew Actions or Behavior
	CRS	<p>Enters DEOP 0200-01, Primary Containment Control, when PC/P reaches 2 psig and performs/directs:</p> <ul style="list-style-type: none"> ❑ Monitoring of PC/P. ❑ Initiation of torus sprays before PC/P of 9 psig. ■ When PC/P is above 9 psig or before DW/T reaches 281°F: <ul style="list-style-type: none"> • Verification of DSIL. • Tripping of Recirc pumps. • Tripping of DW coolers. • ✓ Initiation of DW sprays. ❑ Monitoring of DW/T. (D/W sprays may be initiated for temp control) ❑ Monitoring of SP/T and initiation of torus cooling. ❑ Monitors SP/L. ❑ Verifies initiation of drywell and torus H₂/O₂ monitors. ■ ✓ Orders Torus / DW Spray secured before Torus / DW pressure drops to 0 psig (N/A if scenario does not run long enough)
	BOP	<p>Performs DEOP 0200-01, Primary Containment Control, actions as directed:</p> <ul style="list-style-type: none"> ❑ Monitors PC/P ■ Initiates torus sprays and drywell sprays per Hard Card LPCI/CCSW OPERATION, as directed. ❑ Monitors DW/T. ❑ Monitors SP/T and initiates torus cooling per Hard Card LPCI/CCSW OPERATION as directed. ❑ Monitors SP/L. ❑ Verifies initiation of drywell and torus H₂/O₂ monitors. ■ ✓ Secures Torus / DW Spray before Torus / DW pressure drops to 0 psig (N/A if scenario does not run long enough)
		<p>NOTE:</p> <p>Above a RPV pressure of 500 psig, TAF is -170 inches, and MSCRWL is -185 inches on the Fuel Zone indicators. Below 500 psig, TAF is -143 inches and MSCRWL is -162 inches on the Fuel Zone Indicators.</p>
	CRS	<p>If the RPV level trend is not reversible with an RPV injection source lined up, with a pump running, with RPV level between TAF and the MSCRWL directs entering DEOP 0400-02, Emergency Depressurization, and directs:</p> <ul style="list-style-type: none"> ❑ Verification that SP/L >6 feet. ■ Opening all ADS valves. ❑ Verification all relief valves are open.
	BOP	<p>Performs DEOP 0400-02, Emergency Depressurization, as directed:</p> <ul style="list-style-type: none"> ❑ Verifies SP/L >6 feet. ■ ✓ Opens all ADS valves. ■ Verifies all relief valves are open.
	CRS	<ul style="list-style-type: none"> ■ ✓ Directs ATC/BOP to maximizes injection flow with minimum ECCS Pump lineups prescribed by the transient mitigation guidelines (OP-DR-103-102-1002) to the reactor when pressure drops below 350 psig to restore level to above TAF.

Event Eight – Loss Of High Pressure Feed / Recirc Loop Leak / Emergency Depressurization

Trigger	Position	Crew Actions or Behavior
	ATC / BOP	<ul style="list-style-type: none"> ■ ✓ Maximizes injection flow with minimum ECCS Pump lineups prescribed by the transient mitigation guidelines (OP-DR-103-102-1002) to the reactor when pressure drops below 350 psig to restore level to above TAF.
20		<p><u>SIMULATOR OPERATOR:</u></p> <p>Prior to going to FREEZE activate TRIGGER 20, this will reset the necessary variable that was changed in the background of the simulator.</p>

Event 8 / Scenario Completion Criteria:

- Sprays the Drywell
 - Emergency Depressurization in progress.
- AND / OR --

At the direction of the Lead Examiner.

References

PROCEDURE	TITLE
DAN 902-3 B-3	IC Hi Rad
DAN 902-3 C-4	IC Hi Temp
DAN 902-4 H-6	Recirc Loop Runback
DAN 902-6 H-8	2B RFP Brg Oil Press Lo
DEOP 100	RPV Control
DEOP 200-01	Primary Containment Control
DEOP 400-2	Emergency Depressurization
DGP 02-03	Reactor Scram
DGP 03-01	Power Changes
DGP 03-04	Control Rod Movements
DOA 0040-01	Slow Leak
DOA 0600-01	Transient Level Control
DOA 1300-01	Isolation Condenser Tube Leak
DOA 3500-02	Loss of Feedwater Heaters
DOA 6500-10	4kV Circuit Breaker Trip
DOP 0400-01	Reactor Manual Control System Operation
DOP 0202-03	Reactor Recirculation Flow Control System Operation
DOP 0202-16	Reactor Recirculation System Manual Hold and Local Manual Operation
DOP 1500-02	Torus Water Cooling Mode of Low Pressure Coolant Injection System
DOP 3500-03	Removing High Pressure Heaters from Operation
DOP 3800-01	Turbine Building Closed Cooling Water System Operation
DOP 6700-20	480V Circuit Breaker Trip
DGA-7	Unpredicted Reactivity Addition
OP-DR-103-102-1002	Strategies for Successful Transient Mitigation
DOS 0300-01	Control Rod Exercise
TS 3.3.6.2	Secondary Containment Isolation Instrumentation
TS 3.5.3	IC System
TS 3.6.4.1	Secondary Containment
TS 3.6.4.2	Secondary Containment Isolation Valves (SCIVs)

Simulator Scenario Review Checklist

ILT-N-4 Quantitative Attributes	
7	Total malfunctions (5 to 8)
2	Malfunctions after EOP entry (1 to 2)
3	Abnormal events (2 to 4)
1	Major transients (1 to 2)
2	EOPs entered/requiring substantive actions (1 to 2)
1	EOPs contingency requiring substantive actions (0 to 2)
5	Crew critical tasks (2 to 3)

CAEP Files

19-1 (2020-301) ILT-N-4.cae
For ILT Class 19-1 NRC Exam
Written by FDW
Rev 00
Date 01/20

INITIAL CONDITIONS

Sets APRM Master Gain pot to 1.0
irf niagain 1.0

Degrades HPCI
imf hppmpdg 0.90

Fails the RBV Isolation.
imf vrmiso42a
imf vrmiso42b

Inserts malfunction to have control rod D-09 stuck
imf rodd09st|2

Overrides 2B RR pump to prevent spurious speed hold
ior rrdbspdhldres hold_reset|2

EVENT TRIGGERS

Event Trigger 1 Activates when control rod D-09 is selected – Event #2
drive water pressure is greater than 325 psig and
when either the Rod Movement Control switch is placed to the ROD IN position,
or the Rod Out Notch Override is placed to the EMERG ROD IN position.
Deletes the control rod D-09 stuck rod malfunction to allow the rod to move.
trgset 1 "rdlselw(100) .and. (rddpdriv .gt. 325.0) .and. (rds302in .or. rds303em)"|2
trg 1 "dmf rodd09st"|2

Event Trigger 2 Simulates a lube oil leak on 2B RFP causing trip of the pump – Event #3
Fails its aux oil pump breaker control SW to prevent pump start.
Insert 2B RFP low oil pressure
After 30 sec. trips 2B RFP.
trgset 2 "0"|4
trg 2 ""|4
ior fwdop2 (2) off|4
ior fwdop5 (2) trip|4
imf ser1375 (2) on|6
ior fwdopnc2 (2 30) off|6
imf h32 (2 30)|6

Event Trigger 3 Activates when 2B RFP breaker opens Event #3
Sets the FRV Isol MO 3206A to 30% open to reduce FW flow enough to cause RPV level to drop.
Overrides the valves CLOSED light off so it still appears full open.
trgset 3 ".not. fwsacbf(2)"|6
trg 3 "set fwv3206a(1) = 0.25"|8
ior fwl32061 (2) off|8

Event Trigger 4 Activates when 2B RFP breaker opens.- Event #3
Sets the FRV Isol MO 3206B to 30% open to reduce FW flow enough to cause RPV level to drop.
Overrides the valves CLOSED light off so it still appears full open.
trgset 4 ".not. fwsacbf(2)"|8
trg 4 "set fwv3206a(2) = 0.25"|8
ior fwl32062 (4) off|10

Event Trigger 5 Activates when Recirc Pump Runback light comes on.- Event #3
Returns the FRV Isol MO 3206A to 100% open.
trgset 5 "rrlrcp191"|10
trg 5 "ramp fwv3206a(1) 0.25 1.0 1:00"|10

Event Trigger 6 Activates when Recirc Pump Runback light comes on.- Event #3
Returns the FRV Isol MO 3206B to 100% open.
trgset 6 "rrlrcp191"|10
trg 6 "ramp fwv3206a(2) 0.25 1.0 1:00"|12

Event Trigger 7 fails 2B Fuel Pool Rad monitor upscale. – Event #4
Closes all but one set of RBV dampers.
trgset 7 "0"|12
trg 7 "set rmarmfpfaild(2) = true"|12

Event Trigger 8 works with Trigger 7 to fail the 2B Fuel Pool Rad monitor
trgset 8 "et_array(7)"|12
trg 8 "set rmarmfpfaild(2) = 70.0"|12
ior mrgfpb (8) 1.0|14
ior vrp4 (8) -0.3|14

Event Trigger 9 Inserts an closes the extraction valve to the 2D1 HP Heater - Event 5
trgset 9 "0"|14
ior hdd3103c2 (9) close|14
ior hdd3103s2 (9) off|16

Event Trigger 10 inserts an IC tube to shell leak at 1% severity - Event 6
trgset 10 "0"|16
imf ictublk (10) 5.0|16
imf ser0011 (10 3:00) on|16
imf ser0018 (10 3:00) on|18
ior ua113000 (10) 0.85 5:00|18
ior ua113001 (10) 0.52 5:00|18
ior ua024501 (10) 0.75 5:00|18
ior ua024500 (10) 0.95 5:00|20

Event Trigger 11 Inserts a small recirc loop leak. – Major – Event 7
trgset 11 "0"|20
imf f41 (11) 0.01 2:00|20

Event Trigger 12 Increases the recirc loop leak. - Post Major – Event 7
trgset 12 "0"|20
trg 12 "mmf f41 2.0"|22

Event Trigger 14 Activates when Mode Switch is placed to S/D – Event 8
After 1:00 min, fails ALL FW Reg valves closed.
trgset 14 "rpdmode4"|22
imf rlmfadc (14 1:00)|22
imf rlmfbfc (14 1:00)|22
imf rlmffcc (14 1:00)|22

Event Trigger 15 opens U3/U2 CRD cross-tie valve
trgset 15 "0"|24
irf rdxtieu3 (15) true|24

Event Trigger 16 lines up makeup to SBLC Main Boron tank.
trgset 16 "0"|24
irf scmumntk (16) true|24

Event Trigger 17 lines up SBLC pumps to test tank and makeup to test tank
trgset 17 "0"|26
irf scoppttk (17) true|26

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# Event Trigger 18 allows the RB Vent Dampers to close that were failed open
trgset 18 "hwvrd5742c"|26
trg 18 "dmf vrmiso42a"|26

# Event Trigger 19 allows the RB Vent Dampers to close that were failed open
trgset 19 "et_array(18)"|28
trg 19 "dmf vrmiso42b"|28

# Event Trigger 20 resets the variable that was set to allow the 2B FP Rad Monitor to fail
trgset 20 "0"|28
trg 20 "set rmarmfpfailf(2) = false"|28

# Event Trigger 21 removes the override for the 2B RR pump speed hold
trgset 21 "et_array(6)"|30
trg 21 "dor rrdbspdhldres (0 10)"|30

# Event Triggers 22-27 work together to simulate the IC Tube Leak being isolated
trgset 22 "(.not. hwiclop1m) .or. (.not. hwiclop2m)"|30
trg 22 "ior ua113000 0.30 10:00"|30

trgset 23 "et_array(22)"|32
trg 23 "ior ua113001 0.0 10:00"|32

trgset 24 "et_array(22)"|32
trg 24 "ior ua024501 0.2 10:00"|32

trgset 25 "et_array(22)"|34
trg 25 "ior ua024500 0.2 10:00"|34

trgset 26 "et_array(22) .and. (hwua113000 < 0.5)"|34
trg 26 "dmf ser0011"|34

trgset 27 "et_array(26)"|36
trg 27 "dmf ser0018"|36

# Event Trigger 28 sets gain for all 6 APRMs.
trgset 28 "0"|36
trg 28 "irf niagainf true"|36

#### END ####

```

Unit 2 Risk: GREEN

Unit 2 is in Mode 1 at 100% power,
Leading Thermal Limit: MFLCPR @ 0.881
Action limit: 0.980
Equipment Unavailable: 2A EHC Pump
Protected Equipment: 2B EHC Pump

Unit 3 Risk: GREEN

Unit 3 is at 100% power.
Leading Thermal Limit: MFLCPR @ 0.883
Action Limit: 0.980
Equipment Unavailable: None
Protected Equipment: None

Current Action Statements

None	LCO Started:	N/A	LCO Expires: N/A
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Cause: N/A

Unit 2 Plant Status

Today

Unit 2 Activities

**** Shift 1 Activities ****

☐

☐

**** Shift 2 Activities ****

☐ Start 2A TBCCW pump and secure 2B TBCCW pump IAW DOP 3800-01 step G.4, pre-start checks for the 2A TBCCW pump are complete .

☐ Exercise CRDs A-06, D-09 and N-08 per DOS 0300-01.

**** Shift 3 Activities ****

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