Dresden Generating Station

11-1 (2012-301) NRC – SCENARIO 01

TBCCW - PUMP, SWAP DUE TO DEGRADING PUMP

RPS - MG SET, TRIPS / RE-ENERGIZE FROM RESERVE POWER

ISO COND - SYSTEM, TUBE LEAK

TURBINE AUX - LOSS OF ALL TURBINE SEAL OIL, WITH FAILURE OF ESOP TO START

MPT – TR 2 HIGH TEMPERATURE REQUIRING LOAD DROP

FW - FWLC CONTROLLER, FW FLOW INDICATION FAILS UPSCALE

MANUAL SCRAM - STEAM LEAK IN THE DRYWELL

EMERGENCY DEPRESSURIZE - ON EXCEEDING PRIMARY CONTAINMENT PRESSURE DUE TO STEAM LEAK INSIDE THE DRYWELL AND PARTIAL LOSS OF ABILITY TO SPRAY THE DRYWELL

EXAM MATERIAL

Rev. 00

04/12

Developed By: _____ _____
Exam Author Date

Approved By: _____ _____
Facility Representative Date

Scenario Outline

Station: Dresden Station	Scenario No.: 11-1 (2012-301) NRC – Scenario 01

Evaluators	Operators	/ crew position
		/ ATC
		/ BOP
		/ CRS

Initial Conditions: Initial Power = Full Power

Turnover: Maintain load per TSO direction.

Event No.	Malf. No.	Event Type*		Event Description
1	NONE	C	BOP	TBCCW - Pump, Swap Due To Degrading Pump
2	B02	C / T	ATC	RPS - MG Set, Trips / Re-energize From Reserve Power
3	ICTUBLK	C / T	BOP	ISO COND - System, Tube Leak
4	K50	C	BOP	TURBINE AUX - Loss Of All Turbine Seal Oil, With Failure Of ESOP To Start
5	SER1633 E230	C	ATC	MPT – TR 2 High Temperature Requiring Load Drop
6	RLMRFPB	I	ATC	FW - FWLC Controller, FW Flow Indication Fails Upscale
7	I21	M	TEAM	Manual Scram - Steam Leak in the Drywell.
8	I21 K23 K40	M	TEAM	EMERGENCY DEPRESSURIZE - On Exceeding Primary Containment Pressure Due To Steam Leak inside the Drywell And Partial Loss of Ability to Spray the Drywell

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

Scenario Objective

Evaluate the operators in

Scenario Summary

Initial Conditions:

1. Unit is at Full Power.
2. The following equipment is OOS:
   a. None
3. LCOs:
   a. None

Scenario Sequence

- 2B TBCCW pump degrades causing pump discharge pressure to drop. The Team swaps TBCCW pumps.
- A trip of 2B RPS MG Set causes a loss of RPS Bus A. The crew will reenergize RPS Bus A from reserve power and restore affected systems to a normal condition
- The Isolation Condenser develops a tube leak and must be isolated. With the Isolation Condenser inoperable, a 14 day Tech. Spec. LCO will be entered.
- The Main Hydrogen Seal Oil pump trips with a failure of the Emergency Hydrogen Seal Oil pump to start. The team starts the Emergency Hydrogen Seal Oil pump and verifies the generator load does not exceed the capacity limit curves for possibly reduced generator hydrogen pressure.
- The main power transformer oil temperature rises causing the team to determine they must lower load on the transformer per DOA 6100-01.
- Indicated Feedwater flow slowly fails upscale, causing FRVs to close. This results in lowering RPV level. Team takes manual control of FWLC; and/or, places FWLC in 1-Element control.
- A small steam leak in the Drywell begins. The Team will scram the reactor due to the rising Drywell pressure.
- Shortly after the reactor scram, the leak will increase enough that Containment sprays are required. When the Team attempts to spray the Drywell, Bus 23-1 and 28 trip resulting in a loss of one Division of Drywell Spray. The leak worsens and Primary Containment pressure will exceed the PSP limit and require the Team to Emergency Depressurize.

Event One – TBCCW Pump Degrading / Swap TBCCW pumps.

- 2B TBCCW pump degrades causing pump discharge pressure to drop.

Malfunctions required: 1

- (2B TBCCW pump degrades)

Success Path:

- Swap TBCCW pumps.

Event Two – Loss of RPS

- A trip of 2B RPS MG Set causes a loss of RPS Bus A

Malfunctions required: 1

- 2B RPS MG Set Trip

Success Path:

- Perform DOA 500-05, Loss of Reactor Protection System Bus

Event Three – Isolation condenser Tube Leak

- Isolation condenser develops a tube leak.

Malfunctions required: 1

- (Isolation condenser tube Leak)

Success Path:

- Team isolates Isolation Condenser.
- Team addresses Tech Specs.

Event Four – Main Seal Oil Pump Trip / Failure of Emergency Seal Oil Pump to Auto Start

- The Main Hydrogen Seal Oil pump trips with a failure of the Emergency Hydrogen Seal Oil pump to start.

Malfunctions required: 1

- (Main Seal Oil Pump Trip / Failure Of Emergency Seal Oil Pump To Auto Start)

Success Path:

- The team starts the Emergency Hydrogen Seal Oil pump.

Event Five – Main Power Transformer Trouble

- The team responds to a TR 2 high oil temperature condition.

Malfunctions required: 1

- (TR 2 high oil temperature)

Success Path:

- Completes DOA 6100-01, Main Transformer Trouble.
- Begins load drop per DGP 03-01, Power Changes.

Event Six – FWLC Controller, FW Flow Indication Fails Upscale

- Indicated Feedwater flow slowly fails upscale, causing FRVs to close. This results in lowering RPV level.

Malfunctions required: 1

- FW flow fails upscale

Success Path:

- Team takes manual control of FWLC; and/or,
- Places FWLC in 1-Element control.

Event Seven – Steam Leak in the Drywell / Manual Scram

A small steam leak develops in the Drywell.

Malfunctions required: 1

- (Steam Leak in the Drywell)

Success Path:

- Performs a manual scram.

Event Eight – Loss of Bus 23-1 and 28 / Emergency Depressurization

The steam leak in the Drywell increases enough to require Containment sprays. When the Team attempts to spray the Drywell, Bus 23-1 and 28 trip on overcurrent. The leak worsens and Primary Containment pressure exceeds the PSP limit. The Team performs an Emergency Depressurization.

Malfunctions required: 2

- (Steam leak in the Drywell).
- (Bus 23-1 and 28 overcurrent trips).

Success Path:

- The Team performs an Emergency Depressurization.

PRE-SCENARIO ACTIVITIES

1 If applicable, conduct pre-scenario activities in accordance with TQ-JA-150-08, SIMULATOR EXAMINATION BRIEFING.

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

a. a. Initialize simulator in an IC which allows establishing the following: (Jump Drive IC 160 can be used)

1) Reactor power at ~95%.

2) Generator at ~950 MWe.

b. Cut in/out Cond Demins as needed, to maintain DP within limits.

c. Ensure running Condensate pump amps within limits.

d. Advance the chart recorders.

3 Verify the following simulator conditions:

a. 2B and 3B Service Water pumps running.

b. 2B TBCCW pump running with 2A available.

4 Place the following equipment out of service:

a. None

NOTE: Perform the above setup prior to running the setup CAEP file.

5 For the TR 2 high oil temperature Event, set all the outside air temperatures to 85 °F by RUNNING CAEP file: **Change Air Temps.cae**

6 Run the initial setup CAEP file: **ILT-N-1.cae**

7 Complete the Simulator Setup Checklist.

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

√ Critical Tasks

⌛ Time Critical Tasks

■ Required Actions

❑ Optional Actions

Event One – TBCCW Pump Degrading / Swap TBCCW pumps.		
Trigger	Position	Crew Actions or Behavior
1		**FLOOR INSTRUCTOR / SIMULATOR OPERATOR / ROLE PLAY:** If the team announces that they will adjust gains, inform them an extra NSO will perform the adjustment. Then: ❖ Tell the team you are time compressing. ❖ Direct the SIMULATOR OPERATOR to activate **trigger 1** and verify gains within limits. ❖ Inform the team the gains are adjusted. (NOTE: trigger 1 can be toggled OFF, then back ON as many times as necessary to adjust gains)
		ROLE PLAY: As the EO sent to the 2B TBCCW pump, make the following report to the Control Room: "The 2B TBCCW pump is making a lot of noise and the motor is very hot".
2 & 3		**SIMULATOR OPERATOR:** When the Communicator makes the above report, activate **Trigger 2**, This simulates the 2B TBCCW pump degrading. **Trigger 3** automatically activates as the degradation progresses.
		ROLE PLAY: EO to check operation of 2A TBCCW pump following start: report the "2A TBCCW pump is operating normally".
	BOP	❑ Acknowledges and announces alarm(s): ❖ 923-4 D-2, U2 or U3 TBCCW Press Lo. ❑ Checks TBCCW system parameters ❑ Acknowledges report from the field and updates the Team
	CRS	❑ Enters DOA 3800-01, Loss of Turbine Building Closed Cooling Water. ■ Directs swapping TBCCW pumps.
	BOP	❑ Performs DOA 3800-01, Loss of Turbine Building Closed Cooling Water. ■ Starts 2A TBCCW pump. (Immediate action) ■ Secures 2B TBCCW pump. ❑ Directs EO to check operation of 2A TBCCW pump.
	ATC	❑ Assists as directed.

Event One – TBCCW Pump Degrading / Swap TBCCW pumps.		
Trigger	Position	Crew Actions or Behavior
Event 1 Completion Criteria: • **TBCCW pumps swapped.** **AND/OR,** • **At the direction of the Lead Examiner.**		

Event Two – Loss of RPS		
Trigger	Position	Crew Actions or Behavior
		ROLE PLAY: At the discretion of the Floor Instructor/Evaluator, call as the Shift Manager and report: "Engineering has determined the following equipment inoperable: • 2-500-2B-1, 2B RPS MG SET 2B-1 EPA BKR • 2-500-2B-2, 2B RPS MG SET 2B-2 EPA BKR ALL other EPA breakers are operable".
4		**SIMULATOR OPERATOR ACTIONS:** After The Team has determined the Tech Spec requirements or at the discretion of the Floor Instructor/Evaluator, activate **trigger 4**, which inserts a 2B RPS MG Set overcurrent trip to simulate trip of 2B RPS MG SET 2B-1 EPA BKR.
		NOTE: Communications from the AEER should be over the phone (not the radio) **ROLE PLAY:** EO to check 2B RPS MG set: wait 2 min. and call on the phone and report: ❖ "The 2B RPS MG Set motor is running with normal output of 120 volts". ❖ "The 2A RPS Bus voltage is 0.0". ❖ "The 2B RPS MG SET 2B-1 EPA BKR has tripped but ONLY has the POWER IN, MOTOR GEN red indicating light lit ". (All other lights are NOT lit) ❖ "The 2B RPS MG SET 2B-2 EPA BKR has NO indicating lights lit".
5		**NOTE:** When the team begins to re-power 2A RPS bus, report: "Another NSO has completed the steps for bypassing OPRMs". EO to power the 2A RPS bus from the Reserve source: wait five minutes, call the U2 NSO on the phone and report "I am at step G.3.I.(1) of DOP 0500-03, for supplying power to RPS 2A bus. The next several steps are yours. When notified by the NSO to resume at step G.3.I.(6) then after ~ 1 min, **activate trigger 5**. Call on the phone and report "I have completed DOP 0500-03 step G.3.I.(6) thru step G.3.I.9. RPS Bus 2A has been reenergized from the alternate power supply". If asked: "RPS Bus 2A AC voltage is 120".
	CRS	❑ References Technical Specifications and determines: ▪ TS 3.3.8.2 (RPS Electric Power Monitoring) Condition B: Remove associated in-service power supply(s) from service within 1 hr. ❑ May direct WEC to brief an operator to swap RPS Bus A to the alternate power supply per DOP 0500-03, RPS Power Supply Operation.
	ATC	❑ Announces loss of 2A RPS Bus. ❑ Perform actions of DOA 0500-05, Loss of RPS.
	CRS	❑ Enters DOA 500-05, Loss of Reactor Protection System Bus, and directs actions. ■ Directs swapping 2A RPS Bus to Reserve Power per DOP 0500-03, RPS Power Supply Operation.

Event Two – Loss of RPS		
Trigger	Position	Crew Actions or Behavior
	ATC	❑ Coordinates with an EO to restore power to the 2A RPS Bus per DOP 0500-03, RPS Power Supply Operation. ■ Resets the RPS CH A half scram per DOP 0500-07, Insertion/Reset of Manual Half Scram.
	CRS	❑ References Technical Specifications and determines: ▪ TS 3.3.6.2 (Secondary Containment Isolation Instrumentation) Condition A:: Place channel in trip within 12 hr. (Failed in trip condition) ▪ TS 3.3.7.1 (Control Room Emergency Ventilation (CREV) System Instrumentation) Condition A: Declare CREV System inoperable 1 hour from discovery of loss of CREV System Instrumentation alarm capability in both trip systems.
		NOTE: After restoring the RPS Bus, the Team should begin to identify and plan for system restoration back to their normal lineups.
	CRS	❑ Coordinates restoration of affected plant systems.
	TEAM	❑ Resets the Division 2 Refuel Floor Rad Monitor and Reactor Building Vent Rad Monitor. ❑ Restores Reactor Building Ventilation IAW DOP 5750-02, Reactor Building Ventilation and secures SBGT IAW DOP 7500-01, SBGT Operation. ❑ Resets ACAD/CAM system per DOP 2400-01 to reclose the 2-2499-3B and 4B valves. ❑ Restarts RWCU per DOP 1200-03, RWCU System Operation with the Reactor at Pressure.
	CRS	❑ Coordinates restoration of affected plant systems.
Event 2 Completion Criteria: **RPS Bus 2A reenergized and plans for restoration of affected plant systems in progress.** **OR,** **At the discretion of the Floor Instructor/Lead Evaluator.**		

Event Three – Isolation condenser Tube Leak		
Trigger	Position	Crew Actions or Behavior
7		**Simulator Operator:** At the discretion of the Floor Instructor/Evaluator, activate **trigger 7**, which initiates a tube leak in the Isolation Condenser.
		ROLE PLAY: NLO to IC Area: (wait 3 min.) Report, "there is no evidence of steam leakage in the area but the IC is making noises. It sounds like metal parts expanding (creaking)".
		ROLE PLAY: **NOTE:** (IC temps may be viewed on RNI display IC1, Isolation Condenser) NLO to check IC Vent outside: (WAIT 3 MIN.) If IC shell temp is > 190°F, report "some fog/steam exiting from the vent" If IC shell temp is < 190°F, report "NO steam exiting vent".
		ROLE PLAY: Chemistry to sample IC shell side: Report "shell side sample results will take approximately 90 minutes".
		ROLE PLAY: Rad Protection to survey IC Vent outside: Report "the radiological surveys will be initiated". Security to control access to IC Vent outside: Report "the area will be roped off".
	BOP	Announces alarms for the Isolation Condenser (IC) and refers to the following DANs: ❑ 902-3 B-3, IC Hi Rad ❑ 902-3 C-4, IC Hi Temp ❑ Monitors temperature and radiation levels for the Isolation Condenser
	CRS	❑ Directs/verifies Operators take action per DAN 902-3 C-4. ❑ After determining there is a leak in the IC, enters DOA 1300-01. ❑ Declares the Isolation Condenser Inoperable. ❑ Requests Chemistry to sample Iso-Condenser shell side for change in activity.
	BOP	Performs DOA 1300-01, Isolation Condenser Tube Leak, as directed and monitors: ❑ IC vent rad levels. ❑ IC shell side water level. ❑ IC temperatures from TR 1340-1. ❑ IC area temperatures from 902-21 panel. ❑ IC area rad levels from 902-2 panel
	BOP	❑ Reports IC vent rad above 3 mr/hr and IC shell side level and temperatures rising.

Event Three – Isolation condenser Tube Leak		
Trigger	Position	Crew Actions or Behavior
	BOP	Isolates the IC by closing the following valves per DAN 902-3 B-3 or DOA 1300-01. ■ MO 2-1301-1 ■ MO 2-1301-2 ■ MO 2-1301-3 ■ MO 2-1301-4 ■ AO 2-1301-17 ■ AO 2-1301-20 ❑ MO-2-1301-10 ❑ MO 2-4399-74
	BOP	❑ May dispatch an NLO to the Isolation Condenser area. ❑ May bypass the IC area hi rad input to the Rx Bldg Hi Rad alarm.
	TEAM	❑ Dispatches personnel outside to investigate discharge from the vent.
	TEAM	❑ Calls Chemistry and requests a sample of the shell side water to analyze for a change in activity.
	TEAM	❑ Directs Rad Protection to conduct radiological surveys.
	TEAM	❑ Directs Security to limit access underneath the IC vent.
	CRS	❑ References Tech Specs and determines: • 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.
<u>Event 4 Completion Criteria:</u> • **DOA 1300-01 is addressed,** • **The IC is isolated,** • **Tech Spec requirements are determined,** **AND / OR,** • **At the discretion of the Lead Examiner.**		

Event Four – Main Seal Oil Pump Trip / Failure Of Emergency Seal Oil Pump To Auto Start		
Trigger	Position	Crew Actions or Behavior
8		**Simulator Operator:** At the direction of the Lead Evaluator, insert **trigger 8** to trip the Main Hydrogen Seal Oil Pump (MSOP).
9		**Simulator Operator / Role Play:** NLO directed to investigate local panel trouble alarm, wait 1 min., activate **trigger 9**, and then report that "The local alarm is Differential seal oil pressure low". If the ESOP is running, add to the report "and it reset". NLO to report local Generator H_2 pressure: Wait 1 min, and then report "the local Generator H_2 pressure indicates (use value from Monitor program) psig."
		Role Play: NLO sent to check the MSOP breaker: Wait 3 min. then report, "The MSOP breaker is tripped in the tripped free position". If directed to check the MSOP, report, "I can't find anything wrong with the MSOP. NLO to align Seal Oil and H_2 valves: Wait 2 min, then report "the (Insert nomenclature of requested valves) are (insert position requested)". **Note:** The simulator does not model the Seal Oil and H_2 valves.
	BOP	Announces: ❑ 902-7 A-11, H_2 Seal Oil Sys Oil Pp/Vac Pp Trip, alarm. ❑ MSOP tripped. ❑ Generator machine gas pressure dropping.
	BOP	❑ Determines ESOP did NOT automatically start as expected. ■ Starts the ESOP.
	TEAM	❑ Makes PA announcement warning of H_2 and /or oil vapor around the main generator.
	CRS	■ Directs starting ESOP. ❑ Enters DOP 6700-20, 480V Circuit Breaker Trip.
	BOP	❑ Announces 902-7 E-11, H_2 Seal Oil & Alterrex Pnl Trouble, alarm ❑ Dispatches NLO to investigate local panel trouble alarm.
	BOP	Performs DOP 6700-20, 480V Circuit Breaker Trip, as directed: ❑ Dispatches NLO to MCC 28-2 to investigate the MSOP trip. ■ Places MSOP in PTL.

Event Four – Main Seal Oil Pump Trip / Failure Of Emergency Seal Oil Pump To Auto Start		
Trigger	Position	Crew Actions or Behavior
	BOP	Performs DAN 902-7 A-11, H_2 Seal Oil Sys Oil Pp/Vac Pp Trip, additional actions: ❑ Directs NLO to close: o H-09, U2 H2 SEAL OIL VACUUM TK INLET SPRYA SV. o H-13, U2 MAIN SEAL OIL PMP DISCH STOP CHC VLV. ■ Stops the Seal Oil Vacuum Pump. ❑ Monitors 250 VDC electrical system (DOP 6900-01). ❑ Periodically monitors seal oil bearing pressure, hydrogen purity, and hydrogen differential pressure. ❑ Enters DOP 5320-11, Filling and Venting the Generator with Hydrogen to Raise Purity and/or Pressure during Normal Operation, if necessary. ❑ Directs an Operator to check for hydrogen at Generator shaft seal in Alterrex housing.
	ATC	Assists as directed.

Event 5 Completion Criteria:

- **ESOP started,**

AND/OR,

- **At the discretion of the Floor Instructor**

Event Five – Main Power Transformer Trouble		
Trigger	Position	Crew Actions or Behavior
10		**SIMULATOR OPERATOR:** At the direction of the Lead Evaluator, insert **trigger 10** to cause TR2 trouble alarm and Process Computer indication of 95°C ramping up at 1°C every 5 minutes (viewable on trend for computer point E230).
		ROLE PLAY: EO sent to investigate TR2 high oil temperature, wait 3 min. then report, "TR2 local thermometer indicates 95°C and all coolers are operating. "Wait about 5 min. and report local thermometer indicates 97°C and slowly rising. Continue to report temperature rise of 1°C per 5 min. until load reduction is commenced. NSO checks OIS to verify recirc runback logic is NOT armed: Cue NSO that recirc runback logic is NOT armed.
		ROLE PLAY: Engineering: Inform Team that "I recommend reducing load to reduce TR 2 oil temperature below the 65 °C temperature rise limit of DOA 6100-01, Attachment C.
		NOTE: **Trigger 11** will automatically activate if load is dropped causing oil temperature to drop.
11		**SIMULATOR OPERATOR / ROLE PLAY:** If the EO is directed to open the TR2 high oil temperature cutout switch, wait 3 min.; insert **trigger 11**, and then report, "TR2 high oil temperature cutout switch is open." This trigger will automatically activate when the Team has dropped load and TR 2 oil temperature has dropped below 94.5 °C.
		QNE: If contacted, inform the team you will come to the Control Room.
12 **13**		**SIMULATOR OPERATOR:** Verify **trigger 12** automatically activates when generator load is dropped to 850 MWe. This causes Process Computer indication for TR2 oil temperature to begin dropping to 97.0°C over 5 min. Verify **trigger 13** automatically activates when generator load is dropped to 775 MWe or At the direction of the Lead Evaluator. This causes Process Computer indication for TR2 oil temperature to begin dropping to 90.0 °C over 3 min.

Event Five – Main Power Transformer Trouble		
Trigger	Position	Crew Actions or Behavior
	TEAM	Announces Main TR2 Trouble alarm. ❑ Refers to Sequence of Events Recorder. ❑ Reports TR2 high oil temperature. ❑ References DAN 902-8 C-11, Main TR2 Trouble. ■ Enters DOA 6100-01, Main Transformer Trouble. ❑ Determines TR 2 oil temperature using Process Computer point E230. ❑ Dispatches EO to investigate TR2 high oil temperature. ❑ Determines temperature rise is >65 °C using Attachment C of DOA 6100-01. ❑ Contacts Engineering for guidance.
	CRS	■ Announces entry into DOA 6100-01, Main Transformer Trouble. ■ Directs load drop per DGP 03-01, Power Changes, until Main Transformer oil temperature is within limits.
	BOP	❑ Directs HVO to open the cutout switch for TR2 high oil temperature.
	ATC	Begins load drop per DGP 03-01, Power Changes, as directed. ■ Due to FCL >93%, reduces power by 80 MWe of generator power OR 9% of APRM power by inserting control rods in reverse sequence (preferred) or CRAM rod insertion. ■ Reduces Reactor power by decreasing core flow as necessary to lower TR 2 oil temperature. ❑ Reports that TR 2 temperature is dropping below the limit.
	CRS	❑ Notifies TSO of TR 2 problem and load drop.

Event 6 Completion Criteria:

- **Load dropped enough to drop TR 2 oil temperature below limit,**

AND/OR,

- **At the discretion of the Floor Instructor**

Event Six – FWLC Controller, FW Flow Indication Fails Upscale		
Trigger	Position	Crew Actions or Behavior
6		**SIMULATOR OPERATOR / ROLE PLAY:** At the discretion of the Lead Examiner, activate **trigger 6.** This slowly fails 2B RFP flow transmitter output upscale.
		ROLE PLAY: IMD to investigate: wait a few minutes and then report, "the 2B Feedwater Flow transmitter has failed. Feedwater level control can be placed in 1-Element control and returned back to automatic control".
	Team	■ Announces RPV level dropping. May receive the following alarm: • 902-5 F-8, RPV Lvl Lo.
	ATC	■ Performs DOA 0600-01, TRANSIENT LEVEL CONTROL, and takes manual control of the FWRVs or places the FWRVs in 1-element.
	CRS	■ Enters DOA 0600-01, TRANSIENT LEVEL CONTROL. ❑ Requests IMD to troubleshoot.
	Team	❑ Enters DGA-07, Unpredicted Reactivity Addition.
	CRS	❑ Directs placing FWLC in 1-Element and back to automatic control.
	ATC	■ Places FWLC in 1-Element and back to automatic control per DOP 0600-06, Feedwater Regulating Valve (FWRV) Operation.
	BOP	❑ Monitors panels and assists as directed.

Event 3 Completion Criteria:

- **FWLC returned to automatic control,**

AND/OR

- **At the direction of the Lead Examiner.**

Event Seven - Small Steam Leak in Drywell / Manual Scram		
Trigger	Position	Crew Actions or Behavior
14		**SIMULATOR OPERATOR:** At the discretion of the Lead examiner, activate **trigger 14**, which causes a small Main Steam line leak to develop in the Drywell.
		Role Play: U-3 NSO to report Drywell pressure status: Report "U-3 Drywell pressure is 1.2 psig and steady".
	TEAM	■ Recognizes and announces that Drywell pressure is slowly rising.
	ATC	Performs the following actions per DOA 0040-01, Slow Leak, 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	Performs the following actions per DOA 0040-01 Slow Leak, as directed: ❑ Notifies Shift Supervisor and Rad Protection. ❑ Monitors for EP conditions. ❑ Directs search for leak. ❑ Shutdown H_2 Addition. ❑ Makes PA announcement. ❑ Verify Crib House inlet temperature is <95^{o}F. ❑ Initiates Torus cooling per "Hard Card".
		Role Play: NLO to check Drywell CAM: (wait 2 min.) Report, "The Drywell CAM is trending up". NLO to search for leak Report, "I am on my way out to check for leaks". NLO to check Cribhouse inlet temperature: (wait 5 min.) Report, "Cribhouse inlet temp is 70^{o}F".
	CRS	■ Enters and directs performance of DOA 0040-01, Slow Leak. ❑ Set Scram contingency of 1.5 psig DW pressure. ❑ 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, Reactor Scram.
	ATC / BOP	Performs scram preparatory actions per DGP 02-03, Reactor Scram, as directed. ❑ Starts MSP and TGOP. ❑ Trips H_2 addition.

Event Seven - Small Steam Leak in Drywell / Manual Scram		
Trigger	Position	Crew Actions or Behavior
	ATC	Performs the following actions per DGP 02-03, Reactor Scram, as directed: ■ 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.
	BOP	❑ Verifies Turbine and Generator tripped. ❑ Check auxiliary power transferred to RAT. ❑ May start maximum Torus cooling per DGP 02-03 Hardcard.
	TEAM	Verifies the following as time allows: ❑ Group Isolations ❑ Automatic start of ECCS systems ❑ Automatic start of EDGs.
	CRS	❑ Enters DEOP 100, RPV Control, due to high Drywell Pressure and/or low Reactor water level.

Event 7 Completion Criteria:

- **Reactor scrammed.**

AND/OR,

- **Or at the discretion of the Lead Examiner.**

Event Eight – Loss Of Bus 23-1 and 28 / Emergency Depressurization		
Trigger	Position	Crew Actions or Behavior
15		**SIMULATOR OPERATOR:** At the discretion of the Lead Evaluator, activate **trigger 15**, which increases the steam leak in the DW enough to require initiating Drywell sprays.
	TEAM	■ Recognizes and announces that Drywell pressure is rising rapidly.
	CRS	Enters DEOP 0200-01, Primary Containment Control, when Drywell pressure reaches 2 psig and performs/directs: ❑ Verifying of Torus water level <27.5 ft. ❑ Initiation of Torus sprays. ❑ Monitoring of Drywell temperature (Drywell sprays may be initiated for temperature control) ❑ Monitoring Torus Temperature. ❑ Monitors Torus level.
		ROLE PLAY: EO to check operation of the EDGs after auto start: Wait 3 minutes and then report “the EDGs are operating normally”.
	CRS	Per DEOP 0200-01, Primary Containment Control, when Drywell pressure reaches 9 psig directs: ❑ Verifying Recirc Pumps and Drywell Coolers tripped. ❑ Verifies the Drywell spray initiation curve prior to the operator manually opening any of the Drywell spray valves. Then directs the Operator to initiate Drywell Sprays. ■ **√ Initiation of Drywell sprays.**
	BOP	Performs DEOP 0200-1, Primary Containment Control, actions as directed: ❑ Monitors Drywell temperature and pressure and attempts to initiate torus sprays and drywell sprays pre Hard Card LPCI/CCSW OPERATION, as directed.
16		**SIMULATOR OPERATOR:** Verify **trigger 16 automatically activates** when MO 1501-27A begins to open. This trips Bus 23-1 and 28 on overcurrent. As a result, Div. I of Drywell sprays cannot be initiated.
	ATC / BOP	■ **√ Initiates Drywell Sprays.** ❑ Notices and reports the loss of ECCS equipment powered from Bus 23-1. ❑ Reports the loss of Bus 23-1 and 28. ■ Reports the “B” LOOP of Drywell Spray is initiated, but “A” LOOP could not be initiated.
	US	❑ Directs Operators to investigate the loss of Bus 23-1 and 28. Directs entry into DGA-12 for Partial Loss of AC Power.

Event Eight – Loss Of Bus 23-1 and 28 / Emergency Depressurization		
Trigger	Position	Crew Actions or Behavior
	BOP	❑ Refers to DAN 902-8 F-5, 4KV Bus 23-1 Overcurrent. As directed, Performs DGA-12, Partial or Complete Loss of AC power: ❑ Takes actions per DGA 12 for any faulted buses. ❑ Recognizes the loss of Bus 28. ❑ Dispatches EO to Bus 23-1 to investigate the loss of Bus 23-1. ❑ May enter DOA 6500-01, 4kV Breaker Trip.
		NOTE: If team crossties Bus 28 and 29 and Bus 29 trips, allow the team to re-energize Bus 29 from Bus 24-1.
		ROLE PLAY: EO to bus 23-1: Wait 2 min. then report "The feed breaker to Bus 23-1 from Bus 23 has an overcurrent flag up on it and will not reset". EO to Bus 28: Wait 2 min. then report "Bus 28 has an overcurrent flag up and will not reset"
		ROLE PLAY: If contacted as EMD Foreman: Respond, "I will report to Bus 23-1". **NOTE**: EMD personnel will not report back. DO NOT REPORT BACK ON ATTEMPTS TO OPEN DW SPRAY VALVE UNTIL after Torus bottom pressure is > 20 #.
	ATC / BOP	❑ May dispatch an Operator to attempt to manually open "A" LOOP of drywell spray.
		ROLE PLAY: EO to open "A" LOOP of drywell spray: Wait 2 min, then report "The handwheel for MO 2-1501-28A will not engage".
17		**SIMULATOR OPERATOR:** After the Team has attempted to put on Drywell Sprays and at the discretion of the Lead Evaluator, activate **trigger 17**, which increases the Main Steam line leak enough to require the Team to Emergency Depressurize due to exceeding PSP curve.
	CRS	❑ May anticipate Emergency Depressurization and direct opening turbine bypass valves.
	BOP	❑ If directed, opens turbine bypass valves.

Event Eight – Loss Of Bus 23-1 and 28 / Emergency Depressurization		
Trigger	Position	Crew Actions or Behavior
	CRS	■ Recognizes that Emergency Depressurization per DEOP 0400-02 is necessary due to one of the below: o Drywell temperature cannot be maintained below 281°F. o Exceeding the PSP. √ **Enters DEOP 400-02, Emergency Depressurization, and directs**: ■ If Drywell pressure >2 psig, prevention of injection from LPCI/CS pumps not needed for core cooling. ❑ Initiation of Iso Condenser to maximum flow. ❑ Verification of Torus level > 6ft. ■ Opening all ADS valves. ❑ Verifying all relief valves open.
	BOP	√ **Performs DEOP 400-02, Emergency Depressurization, as directed.** ❑ If Drywell pressure is greater than +2 psig, prevents injection from LPCI/CS pumps not needed for Core cooling per Hard Card, LPCI INJ/CC CONTROL/SHUTDOWN. ❑ Initiates Iso Condenser to maximum flow per Hard Card, ISOLATION CONDENSER. ❑ Verifies Torus level >6 feet. ■ √ **Opens all ADS valves** ❑ Verifies all relief valves open.

Event 8 / Scenario Completion Criteria:

- **Emergency depressurization in progress.**

AND/OR

- **Or at the discretion of the Lead Evaluator.**

Critical Tasks:	
(RPV-5.1)	When drywell pressure exceeds the suppression chamber spray initiation pressure or before containment pressure exceeds the Pressure Suppression Pressure, ***INITIATE*** drywell/containment sprays, while in the safe region of the drywell spray initiation limit or above the containment spray initiation pressure.
(PC-6.1)	When suppression chamber pressure cannot be maintained below the pressure suppression pressure limit, ***INITIATE*** emergency depressurization before drywell design pressure is exceeded.

PROCEDURE	TITLE
DAN 902-3 B-3	IC HI RAD
DAN 902-3 C-4	IC HI TEMP
DAN 902-5 F-8	RPV LVL LO
DAN 902-7 A-11	H2 SEAL OIL SYS OIL PP/VAC PP TRIP
DAN 902-7 E-11	H2 SEAL OIL & ALTERREX PNL TROUBLE
DAN 902-8 C-11	MAIN TR2 TROUBLE
DAN 923-4 D-2	U2 OR U3 TBCCW PRESS LO
DEOP 0100	RPV CONTROL
DEOP 0200-01	PRIMARY CONTAINMENT CONTROL
DEOP 0400-02	EMERGENCY DEPRESSURIZATION
DGA 07	UNPREDICTED REACTIVITY ADDITION
DGA 12	PARTIAL OR COMPLETE LOSS OF AC POWER
DGP 02-03	REACTOR SCRAM
DGP 03-01	POWER CHANGES
DOA 0040-01	SLOW LEAK
DOA 0500-05	LOSS OF RPS
DOA 0600-01	TRANSIENT LEVEL CONTROL
DOA 1300-01	ISOLATION CONDENSER TUBE LEAK
DOA 3800-01	LOSS OF TURBINE BUILDING CLOSED COOLING WATER
DOA 6100-01	MAIN TRANSFORMER TROUBLE
DOP 0500-03	RPS POWER SUPPLY OPERATION
DOP 0500-07	INSERTION/RESET OF MANUAL HALF SCRAM
DOP 0600-06	FEEDWATER REGULATING VALVE (FWRV) OPERATION
DOP 5750-02	REACTOR BUILDING VENTILATION
DOP 6700-20	480V CIRCUIT BREAKER TRIP
DOP 7500-01	SBGT OPERATION
TS 3.3.8.2	RPS ELECTRIC POWER MONITORING
TS 3.5.3	ISOLATION CONDENSER

EXAM ILT-N-1 QUANTITATIVE ATTRIBUTES	
9	Total malfunctions (5-8)
2	Malfunctions after EOP entry (1-2)
4	Abnormal events (2-4)
2	Major transients (1-2)
2	EOPs entered/requiring substantive actions (1-2)
1	EOP contingencies requiring substantive actions (0-2)
2	Critical tasks (2-3)

Computer Aided Exercise Programs

```
# ILT-N-1.cae
# For ILT Class 11-1 NRC Exam
# Written by MP
# Rev 00
# Date 05/12


# INITIAL CONDITIONS

# Sets APRM Master Gain pot to 1.0
irf niagain 1.0

# Inserts failure of ESOP to auto start.
imf t53

# Sets TR 2 oil temperature at 94.0 deg. F.
imf e230 94.0

# EVENT TRIGGERS

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

# Trigger 2 Simulates 2B TBCCW pump degradation by rampimg down pump speed.
trgset 2 "0"|2
trg 2 "ramp wtnp(2) 1.0 0.0 5:00"|2

# Trigger 3 Activates when 2B TBCCW pump speed is <0.02"
# Simulates 2B TBCCW pump degradation by rampimg down pump speed.
trgset 3 "(wtnp(2) .lt. 0.1)"|2
trg 3 "ramp wtnp(2) 0.01 0.001 1:00:00"|4

# Trigger 4 Trips 2B RPS MG Set
trgset 4 "0"|4
imf b02 (4)|4

# Trigger 5 Transfers RPS Bus 2A to the normally energized reserve power EPAs
trgset 5 "0"|4
irf b03 (5) true|6

# Event Trigger 6 Slowly fails 2B RFP flow transmitter output upscale.
trgset 6 "0"|6
imf rlmrfpb (6) 4.0e6 4:00|6

# Event Trigger 7 Inserts an IC tube leak.
trgset 7 "0"|6
imf ictublk (7) 2.0|8

# Event Trigger 8 Trips Generator MSOP.
trgset 8 "0"|8
imf k50 (8)|8

# Event Trigger 9 Acknowledges the Alterrex panel trouble alarm.
trgset 9 "0"|8
irf t81 (9) true|10

# Event Trigger 10 actuates TR2 trouble alarm due to high oil temperature and
```

```
# provides Process Computer TR 2 oil temp of 94.0 deg. and slowly rising.
trgset 10 "0"|10
imf ser1633 (10 1:15) on|10
mmf e230 (10) 98.0 5:00|10

# Event Trigger 11 deletes TR2 trouble alarm to simulate either:
# opening the cutout switch; or,
# after load drop, oil temperature falling below the alarm setpoint.
trgset 11 "(ppg228 .lt. 850.0) .and. (pp_e230_2v .lt. 94.5)"|12
trg 11 "dmf ser1633"|12

# Event Trigger 12 Activates when load is dropped. (MWe < 850.0)
# Ramps Process Computer TR 2 oil temp over longer time
# to make its increase to appear to slow down.
trgset 12 "ppg228 .lt. 850.0"|12
trg 12 "mmf e230 97.0 5:00"|12

# Event Trigger 13 Activates when load is dropped. (MWe < 775.0)
# Ramps Process Computer TR 2 oil temp back below the alarm point.
trgset 13 "ppg228 .lt. 775.0"|14
trg 13 "mmf e230 90.0 3:00"|14

# Event Trigger 14 Inserts a steam leak upstream of the restrictors.
trgset 14 "0"|14
imf i21 (14) 0.002 5:00 0.0025|14

# Event Trigger 15 Increases DW MSL leak to 0.4%.
trgset 15 "0"|16
trg 15 "mmf i21 0.4"|16

# Event Trigger 16 Activates when DW Spray valve MO 1501-27A starts to open.
# Trips Bus 23-1 and Bus 28 on overcurrent.
trgset 16 "lpv27a .gt. 0.01"|16
imf k23 (16)|16
imf k40 (16)|18

# Event Trigger 17 Increases the steam leak from 2.0% to 6.0% over 5 minutes.
trgset 17 "0"|18
trg 17 "mmf i21 6.0 5:00 2.0"|18

# END
```

```
# Change Air Temps.cae
# Written by MP
# Rev 11
# Date 02/12

# This CAEP file sets the outside air temps to 85 deg.
# The first group of variables changed are the outside air temps and
# the ventilation air inlet temps.

# Sets Met Twr Air Temp.
set ppc320 = 85.0

# Sets ambient and vent inlet temps.
set istambt = 85.0
set vrt1 = 85.0
```

```
set vrt3 = 85.0|2
set vrt1u3 = 85.0|2
set vtt1 = 85.0|2
set vtt2 = 85.0|2
set vtt31 = 85.0|4
set vtt32 = 85.0|4
set vtt4 = 85.0|4


# Sets Exh temps so they quickly stabilize.

# Sets U2 RB temps 10 deg above ambient.
set vrt2 = 95.0|6
set vrt2a = 95.0|6

# Set3 U3 RB temps 20 deg above ambient.
set vrt2a3 = 105.0|6
set vrt2u3 = 105.0|6

# Sets U2&3 TB Exh temps 30 deg above ambient
set vtt3 = 115.0|8
set vtt33 = 115.0|8

# Sets East TB Exh temps 8 deg above ambient
set vtt5 = 93.0|8

# Sets other RB temps to 10 deg above ambient
set vrtrb0 = 95.0|8
set vrtrb1 = 95.0|10
set vrtrb2 = 95.0|10
set vrtrb3 = 95.0|10


# END
```

Unit 2 Risk: GREEN

Unit 2 is in Mode 1 at Full 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 Full Power

Leading Thermal Limit: MAPRAT @ 0.819

Action Limit: 0.980

Equipment Unavailable: None

Protected Equipment: None

Current Action Statements

None LCO Started: LCO Expires:

TS

Cause:

Unit 1 Plant Status

Today

Today

Switchyard Status

Today

Today

Unit 2 Plant Status

Today	Unit 2 Activities
	**** Shift 1 Activities ****
	**** Shift 2 Activities ****
	**** Shift 3 Activities ****
Today	**** Unit 2 Procedures In-Progress **** Do Not Delete ****

❑

Dresden Generating Station

11-1 (2012-301) NRC – SCENARIO 02

HVAC - REACTOR BUILDING FANS, SWAP FOR MAINTENANCE

FW - FWRV, REMOVE FROM SERVICE FOR MAINTENANCE

HVAC - RECIRC MG VENT FAN, DEGRADES CAUSING LOW FLOW

HPCI - SYSTEM, INOPERABLE DUE TO FAILURE OF TURNING GEAR TO ENGAGE

DWEDS - ALARM FAILURE, MANUALLY PUMP SUMPS

MAIN STEAM - ERV, SPURIOUS OPENING

MANUAL SCRAM - LOSS OF INSTRUMENT AIR SYSTEM

EMERGENCY DEPRESSURIZE - ON 2 AREAS ABOVE MAX SAFE RADIATION LEVELS DUE TO HPCI STEAM LINE LEAK INTO THE HPCI ROOM.

EXAM MATERIAL

Rev. 00

04/12

Developed By: _____ _____
Exam Author Date

Approved By: _____ _____
Facility Representative Date

Scenario Outline

Station: Dresden Station	Scenario No.: 11-1 (2012-301) NRC – Scenario 02

Evaluators	Operators	/ crew position
		/ ATC
		/ BOP
		/ CRS

Initial Conditions: Initial Power = 70%
Load dropped to support FRV Maintenance

Turnover: Remove 2B FWRV From Service For Maintenance
Swap Reactor Building Fans For Maintenance
Place HPCI on the Turning Gear

Event No.	Malf. No.	Event Type*		Event Description
1	NONE	N	BOP	HVAC - Reactor Building Fans, Swap For Maintenance
2	NONE	N	ATC	FW - FWRV, Remove From Service For Maintenance
3	RRMFAEXH	C	ATC	HVAC - Recirc MG Vent Fan, Degrades Causing Low Flow
4	HPTGFAIL	C / T	BOP	HPCI - System, Inoperable Due to Failure of Turning Gear to Engage
5	SER0512	C	ATC	DWEDS - Alarm Failure, Manually Pump Sumps
6	ADS3CBN ADS3CSD	C / T	BOP	MAIN STEAM - ERV, Spurious Opening
7	NP2	M	TEAM	Manual Scram - Loss Of Instrument Air System
8	HPRMBRKP	M	TEAM	EMERGENCY DEPRESSURIZE - On 2 Areas Above Max Safe Radiation Levels Due To HPCI Steam Line Leak into the HPCI Room.

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

Scenario Objective

Evaluate the Team's ability to operate the plant with a steam leak requiring Emergency Depressurization.

Scenario Summary

Initial Conditions:

1. Unit is at 70% power.
2. The following equipment is OOS:
   a. None
3. LCOs:
   a. None

Scenario Sequence

- The Team swaps Reactor Building Supply Fans.
- The Team removes 2B FWRV from service.
- 2A Recirc MG vent fan degrades causing low ventilation flow. Recirc MG Set temperatures will rise. The Team starts 2B Recirc MG vent fan and secures 2A Recirc MG vent fan.
- The Team attempts to place the HPCI Turbine on the turning gear. The turning gear fails to engage causing the HPCI System to be inoperable. The Team addresses Tech Spec requirements.
- The Drywell Equipment Drain Sump level alarm fails which requires the Drywell Sumps pumped. The Team determines from the sump pumping that actual Drywell leakage has not increased.
- An ERV spuriously opens due to an electrical failure. Pulling its fuses closes the ERV.
- A large leak develops in the Instrument Air system. The Team will scram the reactor and close the outboard MSIVs due to the leak severity.
- A Fuel Element Failure (FEF) and an unisolable HPCI steam line leak in the HPCI Room occur. When the HPCI Room temperature reaches Max Normal Level, (150 °F) the Team will enter DEOP 0300-01, Secondary Containment Control. The HPCI Room High Temperature isolation fails and the crew will attempt to close the HPCI steam line isolation valves MO 2301-4 & 5 manually. Failures in the control logic for the MO 2301-4 & 5 valves prevent closing the valves. The Team will Emergency Depressurize when 2 or more reactor building radiation levels exceed Max Safe Levels.

Event One – Swap Reactor Building Supply Fans

- When directed, swaps Reactor Building Supply Fans.

Malfunctions required:

- (None)

Success Path:

- Swaps Reactor Building Supply Fans.

Event Two – Remove 2B FWRV from Service

- The Team removes 2B FWRV from service.

Malfunctions required: 0

- (None)

Success Path:

- Performs DOP 0600-06, Feedwater Regulating Valve (FWRV) Operation, to remove 2B FWRV from service.

Event Three – Recirc MG Vent Fan Degrades Causing Low Flow

- 2A Recirc MG vent fan degrades causing low ventilation flow. Recirc MG Set temperatures will rise.

Malfunctions required: 1

- (Degraded Recirc MG vent fan)

Success Path:

- The Team will start 2B Recirc MG Vent Fan and secure 2A Recirc MG vent fan.

Event Four – HPCI Inoperable Due to Failure of Turning Gear to Engage

- The Team attempts to place the HPCI Turbine on the turning gear. The turning gear fails to engage causing the HPCI System to be inoperable.

Malfunctions required: 1

- (HPCI Turbine turning gear failure to engage)

Success Path:

- The Team declares HPCI inoperable.
- The Team references Tech Specs.

Event Five – Drywell Equipment Sump Level Alarm Failure

- The Drywell Equipment Drain Sump level alarm fails

Malfunctions required: 1

- (Drywell Equipment Drain Sump level alarm fail)

Success Path:

- Pumps the Drywell Equipment Sump.
- Determines from the sump pumping that actual Drywell leakage has not increased

Event Six – Spurious ERV Opening

- An ERV spuriously opens.

Malfunctions required: 1

- (ERV fails open)

Success Path:

- Performs DOA 0250-01, Relief Valve Failure, and pulls the ERV's control power fuses.

Event Seven – Loss of Instrument Air / Reactor Scram

- A large leak develops in the Instrument Air system

Malfunctions required: 1

- (Instrument Air Leak)

Success Path:

- Performs a manual scram.
- Closes the outboard MSIVs.

Event Eight – FEF / Steam Leak in HPCI Room / Secondary Containment High Radiation / Emergency Depressurization

- A fuel element failure and an unisolable HPCI steam line leak in the HPCI Room occur

Malfunctions required: 2

- (Fuel Element Failure)
- (Unisolable HPCI steam line leak in the HPCI Room)

Success Path:

- Performs DEOP 0300-01, Secondary Containment Control.
- Performs DEOP 0400-02, Emergency Depressurization

PRE-SCENARIO ACTIVITIES

1 If applicable, conduct pre-scenario activities in accordance with TQ-JA-150-08, SIMULATOR EXAMINATION BRIEFING.

2 Provide the Team with marked up copies of the following:

a. DOP 5750-02, Reactor Building Ventilation.

b. DOP 0600-06, Feedwater Regulating Valve (FWRV) Operation. Mark Step G.11.h as N/A.

c. DOP 2300-02, HPCI System Turning Gear Operation

3 Simulator Setup (the following steps can be done in any logical order)

a. a. Initialize simulator in an IC which allows establishing the following: (Jump Drive IC 157 can be used)

1) Reactor power at ~70%.

2) Generator at ~630 MWe.

b. Cut in/out Cond Demins as needed, to maintain DP within limits.

c. Ensure running Condensate pump amps within limits.

d. Advance the chart recorders.

4 Verify the following simulator conditions:

a. Verify 2A Recirc MG Vent fan running with 2B in standby.

b. Verify BOTH 2A & 2B FWRVs in Master Auto.

c. 2A and 2B RFPs running with 2C RFP in STBY on Bus 22.

d. Verify Zinc Injection label in place for lined up to 2A RFP.

e. Verify 2A & 2B IACs are operating with 3C IAC OFF.

f. Verify 2A & 2B Reactor Building Vent fans running with 2C in standby.

5 Place the following equipment out of service:

a. None

NOTE: Perform the above setup prior to running the setup CAEP file.

6 Run the initial setup CAEP file: ILT-N-2.cae

7 Load but DO NOT RUN CAEP file: ILT-N-2 Rad.cae

8 Complete the Simulator Setup Checklist.

9 The Rad Malfunctions used in CAEP file ILT-N-2 Rad.cae do not reset when the IC is reset. Therefore, when the scenario is completed, EITHER:

a. Run CAEP file: ILT-N-2 Clear Rad.cae; OR,

b. Stop and Restart MST.

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

- √ Critical Tasks
- ⌛ Time Critical Tasks
- ■ Required Actions
- ❑ Optional Actions

Event One – Swap Reactor Building Supply Fans		
Trigger	Position	Crew Actions or Behavior
1		**SIMULATOR OPERATOR / ROLE PLAY:** If requested to set APRM gains to 1, (wait 3 min) activate **trigger 1**, then report: "APRM gains are set to 1". (This trigger can be toggled OFF, then back ON to adjust the gains more than once).
		ROLE PLAY: At the direction of the Lead Examiner, call as the Shift Manager and direct the Team to start 2C Reactor Building Vent Fan and secure 2B Reactor Building Vent Fan. EO stationed at Reactor Building Vent Fans: If asked, report that "the Reactor Building Vent Fans operated as expected".
	CRS	Directs starting 2C Reactor Building Vent Fan and securing 2B Reactor Building Vent Fan per DOP 5750-02, Reactor Building Ventilation.
	BOP	Performs DOP 5750-02, Reactor Building Ventilation, as follows. ■ Places switch 2B RBX vent fan C/S in TRIP. ■ **IMMEDIATELY places switch for** 2C **RBX vent fan C/S in CLOSE**.
		NOTE: C/S must be held in START long enough (20 seconds per DOP 5750-02) for fan to develop sufficient flow, or fan will trip and standby fan will start.
	ATC	❑ Monitors panel, provides assistance as directed.
Event 1 Completion Criteria: • **Reactor Building Vent Fans swapped,** **AND/OR,** • **At the direction of the Lead Examiner.**		

Event Two – Remove 'B' FWRV from Service		
Trigger	Position	Crew Actions or Behavior
		ROLE PLAY: At the direction of the Lead Examiner, call as the Shift Manager and direct the Team to remove 2B FWRV from service for maintenance.
	CRS	❑ Directs ATC to remove 2B FWRV from service for maintenance per DOP 0600-06, Feedwater Regulating Valve (FWRV) Operation for IMD to perform DIP 0600-07.
	ATC	Removes 2B FWRV from service for maintenance per DOP 0600-06, Feedwater Regulating Valve (FWRV) Operation. ❑ Verifies total Feedwater flow is ≤8.3 Mlbm/hr. ❑ Verifies reactor level stable. ■ Places 2B FWRV REG VLV CONTROL STATION in MAN. ❑ Verifies 2A FWRV operating in MASTER AUTO. ■ Slowly reduces 2B FWRV DEMAND to close 2B FWRV while verifying 2A FWRV automatically adjusts. ■ Closes isolation valve MO 2-3206B, 2B FW REG ISOL.
	BOP	❑ Assist ATC as directed.
Event 2 Completion Criteria: • **2B FWRV removed from service,** **AND/OR,** • **At the direction of the Lead Examiner.**		

Event Three – Recirc MG Vent Fan Degrades Causing Low Ventilation Flow.		
Trigger	Position	Crew Actions or Behavior
		NOTE: Ensure the ATC operator performs this Event
4 **5** **6**		**Simulator Operator:** At the discretion of the Lead Examiner, activate **trigger 4** which causes reduced Recirc MG Set ventilation flow. Verify **trigger 5** automatically activates when a Recirc MG Set temperature alarm is received. This adjusts the ventilation flow so temperatures remain below levels requiring speed to be reduced. After the Team has successfully transferred to 2B Recirc MG Set Vent Fan, activate **trigger 5**. This deletes the reduced Recirc MG Set ventilation flow malfunction.
		Role Play: EO to check Recirc MG Set ventilation: Wait 2 min, and then report that "2A Recirc MG vent fan is making a lot of noise and is severely vibrating". EO to check operation of 2B Recirc MG vent fan: Wait 2 min, and then report that "2B Recirc MG vent fan is operating normally".
	ATC	Acknowledges and announces alarms as they are received: ❖ 902-4 F-5, 2A/B Recirc M-G Exh Air Temp Hi. ❖ 902-4 E-4, 2A Recirc M-G Temp Hi. ❖ 902-4 E-9, 2B Recirc M-G Temp Hi. ❖ 902-4 B-9, 2A/B Recirc M-G Mtr/Gen Temp Hi ■ Sends operator to check status of the Recirc MG ventilation system. ■ Starts 2B Recirc MG vent fan IAW DAN 902-4 F-5. ■ Secures 2A Recirc MG vent fan. ❑ Sends operator to check operation of the 2B Recirc MG vent fan.
	CRS	■ Directs swapping Recirc MG vent fans.
	TEAM	❑ May reference DOA 5750-01, Ventilation System Failure.
	BOP	❑ Assists as directed.
Event 3 Completion Criteria: • **Swapped to 2B Recirc MG vent fan,** **AND/OR,** • **At the direction of the Lead Examiner.**		

Event Four – HPCI Inoperable Due to Failure of Turning Gear to Engage		
Trigger	Position	Crew Actions or Behavior
		ROLE PLAY: At the discretion of the Lead examiner, as the Shift Manager, direct the CRS to "place U2 HPCI on the turning gear per DOP 2300-02 step G.2. Engineering and an extra EO are standing by in the U2 HPCI room".
	CRS	❑ Directs BOP to place U2 HPCI on the turning gear per DOP 2300-02, HPCI System Turning Gear Operation, step G.2.
	BOP	Performs DOP 2300-02, HPCI System Turning Gear Operation, step G.2. ❑ Verifies the TURNING GEAR control switch is in NORMAL. ■ Starts the EMERG OIL PP. ■ Resets the TURNING GEAR with the TURNING GEAR RESET pushbutton. ■ Places the TURNING GEAR Control Switch to start. ■ Observes that the TURNING GEAR ENGAGE light is NOT illuminated, THEN turns the TURNING GEAR control switch to ENGAGE. ■ Observes that the Turning Gear Motor automatically stopped after 5 seconds. ❑ May notify the CRS and request concurrence with repeating the steps to engage the turning gear. ❑ Repeats the necessary above steps up to 3 times to attempt to engage the turning gear..
	BOP	■ Notifies the CRS that the U2 HPCI turning gear did not engage and DOP 2300-02 directs proceeding to step G.4.
	CRS	❑ May direct BOP to place U2 HPCI on the turning gear per DOP 2300-02, HPCI System Turning Gear Operation, step G.4; **OR**, ❑ May declare HPCI inoperable at this point.
	BOP	■ Notifies the CRS that the U2 HPCI turning gear still did not engage and DOP 2300-02 has a Caution which states the HPCI System must be declared inoperable if the Turning Gear can NOT be engaged from the Control Room.
		ROLE PLAY: Respond as Engineering / EO in the U2 HPCI room about turning gear status: Report that "The U2 HPCI turning gear motor ran for about 5 seconds, but the turning gear did not engage. The U2 HPCI turning gear appears to be binding and not engaging".
	CRS	■ Declares HPCI inoperable. ■ References Technical Specifications and determines: ❖ TS 3.5.1 Action G applies. Verify Isolation Condenser is OPERABLE immediately AND restore HPCI System to OPERABLE status within 14 days.
	ATC	❑ Monitors panels and assists as directed.

Event Four – HPCI Inoperable Due to Failure of Turning Gear to Engage		
Trigger	Position	Crew Actions or Behavior
Event 4 Completion Criteria: • **HPCI declared inoperable,** • **Tech Specs addressed,** **AND/OR,** • **At the direction of the Lead Examiner.**		

Event Five – Drywell Equipment Drain Sump Alarm Failure		
Trigger	Position	Crew Actions or Behavior
		NOTE: To ensure the ATC Operator performs these actions, call the Control Room as the WEC supervisor requesting the BOP report back which Service Water pumps are operating.
		NOTE: This event simulates failure of the alarm circuit; actual sump level is below the alarm setpoint. Therefore the sump pumps will not automatically start when the AO 2-2001-5 AND AO 2-2001-6, DW EQUIP DRN ISOL VLV(s), are opened. The sump pumping is intended to result in about a 3 gpm leak rate calculation.
7		**SIMULATOR OPERATOR / ROLE PLAY:** At the discretion of the Lead Examiner, activate **trigger 7**, which forces up alarm 902-4 B-17, Drywell Equip Sump Lvl Hi.
		ROLE PLAY: EO to check Drywell CAM: Wait 2 min, and then report that "the Drywell CAM reading is unchanged".
		NOTE / ROLE PLAY: When the ATC opens AO 2-2001-5 AND AO 2-2001-6, DW EQUIP DRN ISOL VLV(s), the recorder 2-2040-2, D/W EQUIPMENT DRAIN SUMP FLOW, does not reset to approximately zero as expected. It does reset when a pump is started.
		FLOOR INSTRUCTOR ROLE PLAY: When AO 2-2001-5 AND AO 2-2001-6, DW EQUIP DRN ISOL VLV(s), are open, cue the ATC that recorder 2-2040-2, D/W EQUIPMENT DRAIN SUMP FLOW, reset to zero".
		FLOOR INSTRUCTOR ROLE PLAY: As U3 CRS, inform the U2 CRS that "I will perform the leakage rate calculation". Cue the Team that it has been 2 hours since the Drywell Equipment Sump was last pumped.
	ATC	Announces alarm: ❑ 902-4 B-17, Drywell Equip Sump Lvl Hi.
	CRS	■ Directs pumping the Drywell Equipment Drain Sump per DOP 2000-24, Drywell Sump Operation.

Event Five – Drywell Equipment Drain Sump Alarm Failure		
Trigger	Position	Crew Actions or Behavior
	ATC	Pumps the Drywell Equipment Drain Sump per DOP 2000-24, Drywell Sump Operation: ❑ Verifies ONE of the following conditions exists: o The Drywell CAM indicates normal activity with no unexplained changes. o Obtains an acceptable drywell air sample. o Verifies reactor water level, drywell pressure, and main steam line radiation monitors are within normal limits with NO unexplained changes. ❑ Verifies open AO 2-2001-3, DW EQUIP SUMP DISCH VLV. ■ Opens AO 2-2001-5 AND AO 2-2001-6, DW EQUIP DRN ISOL VLV(s). ❑ Verify recorder 2-2040-2, D/W EQUIPMENT DRAIN SUMP FLOW: o Indicates "RCD" on digital display. o Integrator value resets to approximately zero. ■ Manually starts 2A OR 2B EQUIP DRN PP.
	ATC	WHEN pumping is complete OR level has reach the desired point, THEN: ❑ Verify EQUIP DRN PP stops. ❑ Close AO 2-2001-5 AND AO 2-2001-6, DW EQUIP DRN ISOL VLV(s). ❑ Places the 2A OR 2B EQUIP DRN PP control switch in NORMAL-AFTER-STOP. ❑ Reset the annunciators associated with the Drywell Equipment and Drywell Floor drain valves.
	BOP	❑ Assists as directed.
Event 5 Completion Criteria: • **Drywell Equipment Sump pumped and leak rate determined to be unchanged.** **AND/OR,** • **At the direction of the Lead Examiner.**		

Event Six – Spurious ERV Opening		
Trigger	Position	Crew Actions or Behavior
8 **9**		**SIMULATOR OPERATOR / ROLE PLAY:** At the discretion of the Lead Examiner, activate **trigger 8**, which causes "E" ERV to spuriously open due to an electrical failure. As the EO sent to pull control power fuses for the "E" ERV (wait 3 min) activate **trigger 9**, which removes control power fuses for the "E" ERV, then call the control room on the phone and report: "I have pulled the "E" ERV fuses". As the QNE called to evaluate core parameters (wait 2 min) then report: "core parameters are within limits".
	BOP	Determines/announces that "E" ERV is open. Performs DOA 0250-01, Relief Valve Failure, immediate actions: ■ Places the "E" ERV control switch to OFF.
	ATC	❑ Verifies FWLCS has stabilized level.
	CRS	■ Enters DOA 0250-01, Relief Valve Failure, and directs actions.
	BOP	Determines that "E" ERV is still open and performs subsequent actions of DOA 0250-01: ■ Cycles "E" ERV control switch to MAN and OFF twice. ■ Cycles the ADS INHIBIT switch from NORMAL to INHIBIT to NORMAL several times. ■ Directs "E" ERV control power fuses pulled. ❑ If torus temp is greater than circulating water inlet temperature, starts torus cooling as directed. ❑ If > 95° and DEOP 0200-01, Primary Containment Control, entry is required. ❑ Monitors Turbine Bypass Valve Operation. ❑ May check hydrogen addition operation. ❑ May monitor torus temp per DOS 1600-20, Suppression Pool Temp Monitoring. ❑ Resets the acoustic monitor.
	CRS	❑ May direct scram preparatory actions per DGP 02-03, Reactor Scram. ❑ May enter DEOP 0200-01, Primary Containment Control, for high Torus level. If Torus temperature reaches 95°F, then enters DEOP 0200-1, Primary Containment Control, and performs/directs: ❑ Monitoring of PC/P ■ Initiation of torus cooling. (May already be started per DOA 0250-01) ❑ Monitoring of Torus level. ❑ Verifying initiation of drywell and torus H_2/O_2 monitors.
	ATC	❑ Performs scram preparatory actions per DGP 02-03, Reactor Scram, as directed. ○ Scram preparatory conditions already exist.
	BOP	■ Determines/announces that E ERV closed when fuses pulled.

Event Six – Spurious ERV Opening		
Trigger	Position	Crew Actions or Behavior
	CRS	■ Declares “E” ERV inoperable. ■ Determines following Technical Specifications apply: • 3.0.3, within 1 hour place the unit, in: ❖ MODE 3 within 13 hours; and ❖ MODE 4 within 37 hours. • 3.4.3, Safety and Relief Valves, Condition A.1: Restore the relief valve to OPERABLE status within 14 days. • 3.5.1, ECCS Operating, Condition K.1: With HPCI System and one or more ADS valves inoperable, enter LCO 3.0.3 immediately. • 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.
	CRS	❑ Directs performance of Suppression Chamber–to–Drywell Vacuum Breaker testing.
	TEAM	❑ May enter and perform DGA-07, Unpredicted Reactivity Addition
Event 6 Completion Criteria: • **The failed ERV is closed,** • **Technical Specification determination completed,** **AND/OR,** • **At the direction of the Lead Examiner.**		

Event Seven – Instrument Air Leak / Reactor Scram		
Trigger	Position	Crew Actions or Behavior
10 **11**		**SIMULATOR OPERATOR:** At the direction of the Lead Examiner, activate **trigger 10** to initiate a large Instrument Air leak. Verify **trigger 11** automatically activates when IA pressure drops <40.0 psig. This binds the 'A' MSIVs. **ROLE PLAY:** EO sent to check air compressor and air dryer operation, wait 3 min. then report, "The air compressors are all running loaded and there are no problems at the air dryers." Personnel sent to inspect IA system for rupture, acknowledge the order. If asked, U1 air system is not is service If directed to perform other actions as plant personnel, acknowledge the request. If asked later for progress, report that you are on the way to perform the task.
	BOP	❑ Announces alarm 923-1 F-4, U2 INST AIR PRESS LOW. ❑ Verifies U2 SA to IA Auto Crosstie Valve opens at 85 psig
	CRS	■ Announces entry into DOA 4700-01, Instrument Air System Failure, and directs team actions. ■ Briefs team to be prepared to manually scram the reactor and close the outboard MSIVs IF Instrument Air pressure drops to 55 psig. ❑ Announces entry into DOA 0600-01, Transient Level Control, and directs concurrent performance with DOA 4700-01, IA System Failure.
	BOP	❑ Directs EO(s) to check air compressors and air dryers for proper operation ❑ Directs in-plant personnel to inspect U2 IA system for proper lineup and leaks. ❑ May direct EO to cross-connect U2 to U3 IA Systems per DOP 4700-03, U2/3 IA Cross-Connect Operation. (Requires Shift Manager's permission) ❑ May direct EO to cross-connect U2 to U3 SA Systems
	CRS	❑ May direct scram preparations per DGP 02-03, Reactor Scram.
	ATC	❑ Performs scram preparations per DGP 02-03, Reactor Scram, as directed: o Reduces power with Recirc flow to 56 Mlbm/hr core flow o Starts the turbine motor suction pump AND turning gear oil pump. o Trips H2 addition.
	CRS	√ When IA pressure drops to 55 psig, directs team to: ■ Scram the reactor per DGP 02-03, Reactor Scram. ■ Close the outboard MSIVs.

Event Seven – Instrument Air Leak / Reactor Scram		
Trigger	Position	Crew Actions or Behavior
	ATC	Performs the following actions per DGP 02-03, Reactor Scram, and DEOP 0100, RPV Control, as directed: ■ √ Places Mode Switch to Shutdown and depresses the Scram pushbuttons. ■ Determines all rods are inserted. ❑ Maintains RPV level as directed by CRS. ❑ Inserts SRMs and IRMs.
	CRS	Enters DEOP 0100, RPV Control, ❑ Directs actions of DEOP 0100. ❑ Directs actions of DGP 02-03. ❑ Verification of all isolations, ECCS and EDG starts. ❑ Holding RPV/L +8 to +48 inches. ❑ Maintaining RPV/P <1060 psig using the Isolation Condenser.
	BOP	■ √ Closes the outboard MSIVs. ❑ If directed, maintains RPV/P <1060 psig using the Iso Cond to control RPV/P (may use Hardcard) ❑ Performs Reactor Scram actions per his Hardcard.
Event 7 Completion Criteria: • **Team has performed a reactor scram and stabilized the plant,** **AND/OR,** • **At the direction of the Lead Examiner.**		

Event Eight – FEF / Steam Leak In HPCI Room / Secondary Containment High Radiation / Emergency Depressurization		
Trigger	Position	Crew Actions or Behavior
12		**Simulator Operator:** At the discretion of the Floor Instructor / Lead Evaluator, activate **trigger 12**. This causes: • A FEF. • A HPCI Room steam line break. When trigger 12 is activated, immediately RUN CAEP file **ILT-N-2 Rad.cae**.
13		**Simulator Operator / Role Play:** EO to reinstall 'E' ERV fuses: wait 2 min, activate **trigger 13**, and then report "'E' ERV fuses are installed".
		Role Play: EO sent to HPCI: wait 2 min, then report "the HPCI room is filled with steam. I left the area". Several minutes after above report, report as one of the EOs sent to the Rx Bldg "there is steam coming from the West LPCI Corner Room stairway; I am leaving the Rx Bldg". For any subsequent requests to enter the Unit 2 Rx Bldg, report "I cannot enter the Rx Bldg due to the presence of steam. EO to Panel 902-39 in AEER: wait 3 min, call on the phone and report "there is an acrid odor coming from the 902-39 panel, but there is no indication of a fire"..
		Role Play: RP to take local RX Bldg radiation readings: Report "I cannot enter the Unit 2 RX Bldg due to the steam leak. I am able to get radiation levels through the doorways. The highest reading is on the 1st floor through the door from Unit 3. The reading is (provide the value from the W. CRD area ARM on the Monitor screen)". Once the W CRD area ARM is full upscale (100 mr/hr), for further reports provide EITHER: • The W. CRD ARM value; OR, • Value provided by the Floor Instructor.
		Note: Use time compression, if desired, and report that radiation levels are 2600 mr/hr.
		Floor Instructor / Lead Evaluator: If desired once the W. CRD area ARM is full scale, provide the Communicator with field radiation levels. A W.CRD area radiation level of >2500 mr/hr will provide the crew a second area above Max Safe.
	BOP	❑ Announces alarm 902-3 A-1 for Rx Bldg Rad Hi. ❑ Obtains DEOP related ARM readings and reports values to Unit Supervisor.

Event Eight – FEF / Steam Leak In HPCI Room / Secondary Containment High Radiation / Emergency Depressurization		
Trigger	Position	Crew Actions or Behavior
	CRS	❑ Enters DEOP 0300-01, Secondary Containment Control, due to Vent Rad above 4 mr/hr. ❑ Verifies Reactor Building Vent Isolation and SBGT start. ❑ Enters DGA-16, Coolant High Activity/Fuel Element Failure and directs: ❑ Directs Manual Actions for 15 min. Off-Gas Timer. ❑ ⌛ Within 40 minutes, isolate Main Control Room Ventilation AND start the air filtration unit per DOA 5750-04, Smoke, Noxious Fumes or Airborne Contaminants in the Control Room.
	BOP	❑ Announces alarm 902-3 G-2 for Area High Temperature. ❑ Checks back panel and determines HPCI Room temperatures are rising. Reports values to Unit Supervisor.
	CRS	When Rx Bldg Area High Temp alarm is received for the HPCI area, re-enters DEOP 0300-01, Secondary Containment Control. ❑ Directs operator to isolate the HPCI system. ❑ Determines steam leak cannot be isolated.
	BOP	❑ When directed, attempts to close HPCI MO 2301-4 & 5 to isolate the HPCI system. Reports the valves will not close. May send operator to check its breaker.
	CRS	❑ Reenters DEOP 0300-01, Secondary Containment Control, due to Rx Bldg Radiation above Max Normal. (HPCI Room >150 mr/hr)
	ATC / BOP	❑ Performs DGA 16, Coolant High Activity/Fuel Element Failure as directed: ❑ Performs Manual Actions for 15 min. Off-Gas Timer. ❑ ⌛ Isolates Main Control Room Ventilation AND starts the air filtration unit per DOA 5750-04, Smoke, Noxious Fumes or Airborne Contaminants in the Control Room.
	ATC / BOP	❑ Announces Drywell, Main Steam Line, SPING Radiation alarms.
	CRS	When two Rx Bldg Radiation levels exceed Max Safe (>2500 mr/hr), enters DEOP 0400-02, Emergency Depressurization, and performs / directs: ❑ If Drywell Pressure above 2 psig, preventing Core Spray and LPCI injection not needed for core cooling ❑ Initiating IC to maximum flow ❑ Verifying Torus level above 6' ■ √ Opening all ADSVs **(SC-1.2)** ('E' ERV has its fuses pulled) ❑ May direct reinstalling 'E' ERV fuses.

Event Eight – FEF / Steam Leak In HPCI Room / Secondary Containment High Radiation / Emergency Depressurization		
Trigger	Position	Crew Actions or Behavior
	BOP	Performs DEOP 0400-02, Emergency Depressurization, as directed: ❑ Prevents Core Spray and LPCI injection not needed for core cooling ❑ Initiates IC to maximum flow ❑ Verifies Torus level above 6' ■ √ Opens all available ADSVs **(SC-1.2)** ('E' ERV has its fuses pulled)
Event 7 / Scenario Completion Criteria: • **Emergency Depressurization in Progress,** • **RPV stabilized,** **AND/OR,** • **At the direction of the Lead Examiner.**		

Critical Tasks:	
	With a loss of instrument air in progress, when instrument air header pressure drops to 55 psig then ***INITIATE*** a manual reactor scram ***AND CLOSE*** the outboard MSIVs.
(SC 1.2)	With a primary system discharging into the secondary containment and area radiation/temperature/water levels exceed maximum safe operating levels in more than one area, ***INITIATE*** emergency depressurization. (May anticipate Blowdown)

REFERENCES

PROCEDURE	TITLE
DAN 902-3 A-1	Rx Bldg Rad Hi
DAN 902-3 G-2	Area High Temperature
DAN 902-4 B-9	2A/B Recirc M-G Mtr/Gen Temp Hi
DAN 902-4 B-17	Drywell Equip Sump Lvl Hi
DAN 902-4 B-4(9)	2A(B) Recirc M-G Temp Hi
DAN 923-1 F-4	U2 Inst Air Press Low
DEOP 0100	Reactor Control
DEOP 0200-01	Primary Containment Control
DEOP 0300-01	Secondary Containment Control
DEOP 0400-02	Emergency Depressurization
DEOP 100	RPV Control
DGA-16	Coolant High Activity/Fuel Element Failure
DGA-07	Unpredicted Reactivity Addition
DGP 02-03	Reactor Scram
DOA 0250-01	Relief Valve Failure
DOA 0600-01	Transient Level Control
DOA 4700-01	Instrument Air System Failure
DOA 5750-01	Ventilation System Failure
DOA 5750-04	Smoke, Noxious Fumes or Airborne Contaminants in the Control Room
DOP 0600-06	Feedwater Regulating Valve (FWRV) Operation
DOP 2000-24	Drywell Sump Operation
DOP 2300-02	HPCI System Turning Gear Operation
DOP 4700-03	U2/3 IA Cross-Connect Operation
DOP 5750-02	Reactor Building Ventilation
DOP 6700-20	480V Circuit Breaker Trip
DOS 1600-20	Suppression Pool Temp Monitoring
TS 3.4.3	Safety and Relief Valves
TS 3.5.1	ECCS Operating
TS 3.6.1.8	Suppression Chamber–to–Drywell Vacuum Breaker

EXAM ILT-N-1 QUANTITATIVE ATTRIBUTES	
7	Total malfunctions (5-8)
1	Malfunctions after EOP entry (1-2)
2	Abnormal events (2-4)
2	Major transients (1-2)
2	EOPs entered/requiring substantive actions (1-2)
1	EOP contingencies requiring substantive actions (0-2)
2	Critical tasks (2-3)

Computer Aided Exercise Programs

```
# ILT-N-2.cae
# For ILT Class 11-1 NRC Exam
# Written by MP
# Rev 00
# Date 05/12


# INITIAL CONDITIONS

# Sets APRM Master Gain pot to 1.0
irf niagain 1.0

# E ERV bind malfunction is set to 25%
imf ads3ebn 25.0

# Prevents HPCI turbine turning gear from engaging from the control room.
imf hptgfail
ior hpdngtgm 1
set hpzngtgm = false|2

# Closes 3C to 2B IA X-tie.
irf vp6 0.0|2

# Binds HPCI 4 valve @ 90%.
# Overrides HPCI 5 valve control switch to prevent closing.
imf hp4vlbn 90.0|2
ior hpdcl5 1|2

# Lifts Leads to HPCI Isolation Relays.
irf hpgp4rly lifted|4


# EVENT TRIGGERS

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

# Event Trigger 2 Forces up alarm 902-6 H-3, FW Control System Panel Trouble.
trgset 2 "0"|4
imf ser1274 (2) on|6

# Event Trigger 3 Returns alarm 902-6 H-3, FW Control System Panel Trouble, to NORMAL.
trgset 3 "0"|6
trg 3 "imf ser1274 normal"|6

# Event Trigger 4 Inserts Recirc MG Set 2A/B Vent Fan Filter Clogged.
Trgset 4 "0"|6
imf rrmfaexh (4)|8

# Event Trigger 5 Activates when a Recirc MG Set high temp alarm is received.
# Slows the temperature rise so load drop is not required.
Trgset 5 "sezpoint(341) .or. sezpoint(388)"|8
trg 5 "set rrkwvfan = 20.0"|8

# Event Trigger 6 Deletes Recirc MG Set 2A/B Vent Fan Filter Clogged.
Trgset 6 "0"|8
trg 6 "dmf rrmfaexh"|10
```

```
# Event Trigger 7 Forces up alarm 902-4 B-17, Drywell Equip Sump Lvl Hi.
# Sets mass in DWEDS to simulate a 3 gpm leak rate over 2 hrs.
trgset 7 "0"|10
trg 7 "set pcmdwes = 4200.0"|10
imf ser0512 (7) on|10

# Event trigger 8 causes the E ERV setpoint to drift to fail it open.
Trgset 8 "0"|12
imf ads3esd (8) 75.0|12

# Event Trigger 9 Deletes E ERV binding malfunction so valve will close and removes fuses for the E ERV.
Trgset 9 "0"|12
trg 9 "dmf ads3ebn"|12
irf adsrfe (9) pulled|14

# Event trigger 10 Inserts a large IA leak.
trgset 10 "0"|14
imf np2 (10) 87.0 10:00 40.0|14

# Event Trigger 11 Acivates when U2 IA pressure <40.0 psig".
# Binds 1A & 2A MSIVs.
trgset 11 "ppf285 .lt. 40.0"|14
imf i12 (11)|16
imf i16 (11)|16

# Event Trigger 12 Initiates a HPCI Room steam line break of 5%.
trgset 12 "0"|16
imf hprmbrkp (12) 100.0 15:00 5.0|16
imf radffd (12) 4.0 15:00 1.0|18

# Event Trigger 13 Installs E ERV fuses.
Trgset 13 "0"|18
trg 13 "irf adsrfe in"|18

# END



# ILT-N-2 Rad.cae
# For ILT Class 11-1 NRC Exam
# Written by MP
# Rev 00
# Date 05/12


# This CAEP ramps Rad level for a HPCI room unisolable leak with a FEF.

# Starts a ramp of the HPCI CUBICAL ARM.
set RMARMFAILF(2) = true
ramp RMARMFAILD(2) 5.0 3000.0 8:00

# After 1 min, starts a ramp of the WEST LPCI PUMP AREA ARM.
set RMARMFAILF(3) = true|1:00
ramp RMARMFAILD(3) 2.0 1000.0 5:00|1:00

# After 2 min, starts a ramp of the WEST CRD MODULE AREA ARM.
set RMARMFAILF(5) = true|2:00
ramp RMARMFAILD(5) 0.2 100.0 2:00|2:00

# After 2 min, starts a ramp of the REACTOR BUILDING SOUTH ACCESS ARM.
```

```
set RMARMFAILF(7) = true|2:00
ramp RMARMFAILD(7) 1.0 100.0 2:00|2:00


# END



# ILT-N-2 Clear Rad.cae
# For ILT Class 11-1 NRC Exam
# Written by MP
# Rev 00
# Date 05/12


# This CAEP Clears the Rad level ramps.
# Reseting the IC does not clear them.
# Restarting MST will also clear them.

# Stops ramp of the HPCI CUBICAL ARM.
set RMARMFAILF(2) = false

# Stops ramp of the WEST LPCI PUMP AREA ARM.
set RMARMFAILF(3) = false

# Stops ramp of the WEST CRD MODULE AREA ARM.
set RMARMFAILF(5) = false

# Stops ramp of the REACTOR BUILDING SOUTH ACCESS ARM.
set RMARMFAILF(7) = false


# END
```

Unit 2 Risk: GREEN

Unit 2 is in Mode 1 at 630 MWe,

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 Full Power

Leading Thermal Limit: MAPRAT @ 0.819

Action Limit: 0.980

Equipment Unavailable: None

Protected Equipment: None

Current Action Statements

None LCO Started: LCO Expires:

TS

Cause:

Unit 1 Plant Status

Today

Today

Switchyard Status

Today

Today

Unit 2 Plant Status

Today	Unit 2 Activities
	**** Shift 1 Activities ****
	□
	□
	**** Shift 2 Activities ****
	□ Load dropped last shift per TSO. Load pickup expected late next shift.
	□ When directed by the Shift Manager, start 2C Reactor Building Vent Fan and secure 2B Reactor Building Vent Fan per DOP 5750-02, Reactor Building Ventilation
	□ When directed by the Shift Manager, remove 'B' FWRV from service per DOP 0600-06, step G.11 to support IMD performing DIP 0600-07.
	□ When requested by Engineering, place the HPCI turbine on the turning gear per DOP 2300-02, step G.2
	□
	**** Shift 3 Activities ****
	□
	□
Today	**** Unit 2 Procedures In-Progress **** Do Not Delete ****
	□
	□

Dresden Generating Station

11-1 (2012-301) NRC – SCENARIO 03

CRD - CONTROL ROD, DRIFTS OUT

CRD - CONTROLLER, INDICATION FAILS UPSCALE

CORE SPRAY - SYSTEM LEAK / LOCALIZED FLOODING

FW - COND/BSTR PUMP, TRIPS DUE TO OVERCURRENT

MANUAL SCRAM - LOSS OF ALL FEEDWATER, DUE TO TRIP OF ALL RFPS.

ATWS - ELECTRICAL, ARI UNSUCCESSFUL / TEAM INSERTS RODS BY PULLING SCRAM FUSES.

EXAM MATERIAL

Rev. 00

04/12

Developed By: _____ _____
Exam Author Date

Approved By: _____ _____
Facility Representative Date

Scenario Outline

Station: Dresden Station	Scenario No.: 11-1 (2012-301) NRC – Scenario 03

Evaluators	Operators	/ crew position
		/ ATC
		/ BOP
		/ CRS

Initial Conditions: Initial Power = 5%

Turnover: Startup in Progress. On hold for QNE direction.

Event No.	Malf. No.	Event Type*		Event Description
1	RODK08DO	C / T	ATC	CRD - Control Rod, Drifts Out
2	RDFCFHI	C	ATC	CRD - Controller, Indication Fails Upscale
3	CSPPBBRK	C / T	BOP	CORE SPRAY - System Leak / Localized Flooding
4	H21	C	ATC	FW - Cond/Bstr Pump, Trips Due To Overcurrent
5	H32/H33/H34	M	TEAM	Manual Scram - Loss Of All Feedwater, Due To Trip of All RFPs.
6	B12 SER1026 SER1060 AW4	M	TEAM	ATWS - Electrical, ARI Unsuccessful / Team Inserts Rods By Pulling Scram Fuses.

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

Scenario Objective

Evaluate the Team's ability to operate the plant with an electrical ATWS

Scenario Summary

Initial Conditions:

1. Unit is at 5% power.
2. The following equipment is OOS:
   a. None
3. LCOs:
   a. None

Scenario Sequence

- A control rod begins to drift out. The NSO must insert the rod to position 00 and it fails to latch when fully inserted. The Team will give it an individual scram signal and reference Tech Spec requirements.
- The indicated flow to the CRD Flow Controller fails high. This causes the controller demand to the CRD FCV to fail low. If the team does not recognize the failure quickly and restore CRD cooling flow, the ROD DRIVE TEMP HI alarm comes up. The Team takes manual control of the CRD Flow Controller to restore system parameters to normal.
- A small, isolable break occurs on the 2B Core Spray pump piping, rendering the pump inoperable.
- 2A Condensate/Booster Pump trips with failure of the STBY pump to auto start. Also, the first pump the Team attempts to start will trip. The other non-running pump will start.
- 2A RFP trips and when 2B RFP auto starts, but after a short time, it also trips. The 2C RFP can be started manually, but it also trips a short time later. The Team will manually scram the reactor.
- An electrical ATWS occurs when the reactor is scrammed. ARI is unsuccessful. The Team inserts control rods by pulling scram fuses, venting the scram air header, and / or driving control rods.

Event One – Control Rod Drift Out

- A Control Rod will drift out

Malfunctions required: 1

- Control Rod K-08 drift out

Success Path:

- Control Rod fully inserted and individual scram signal applied.
- The Control Room Supervisor references appropriate Tech Specs and makes correct LCO call.

Event Two – Indicated Flow to CRD Flow Controller Fails High

- Indicated flow to the CRD Flow Controller fails high. This causes the controller demand to the CRD FCV to fail low.

Malfunctions required: 1

- Indicated flow to the CRD Flow Controller fails high

Success Path:

- The crew takes manual control of the CRD Flow Controller

Event Three - Core Spray Leak / Localized Flooding

- A leak occurs on the 2B Core Spray pump casing.

Malfunctions Required: 1

- 2B CS pump casing weld failure.

Success Path:

- Isolates the leak per DOA 0040-02, Localized Flooding in the Plant.
- References Tech. Specs.

Event Four – Condensate/Booster Pump Trip with Failure of STBY to Auto Start

- 2A Condensate/Booster Pump trips with failure of the STBY pump to auto start. Also the first pump the Team attempts to start will trip.

Malfunctions required: 1

- (Condensate/Booster pump trip with failure of STBY to auto start)

Success Path:

- Starts a Condensate/Booster pump.

Event Five – Loss of Feedwater

- All RFPs trip resulting in insufficient Feedwater flow.

Malfunctions required: 1

- Loss of Feedwater

Success Path:

- The Team performs a manual scram

Event Six – Electrical ATWS / ARI Unsuccessful.

- An electrical ATWS occurs when the reactor is scrammed. ARI is unsuccessful.

Malfunctions required: 2

- Electrical ATWS

Success Path:

- The Team inserts control rods by pulling scram fuses, venting the scram air header, and / or driving control rods

PRE-SCENARIO ACTIVITIES

1 If applicable, conduct pre-scenario activities in accordance with TQ- JA-150-08, SIMULATOR EXAMINATION BRIEFING.

   a. Inform the crew that the QNE (Floor Instructor) 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 applicable procedure(s) marked up and completed through the appropriate steps:

      1) DGP 01-01, Unit Startup, marked up for Reactor at 5% power.

      2) DOP 0400-01, Reactor Manual Control System Operation.

      3) DOP 0400-02, Rod Worth Minimizer.

      4) DOP 5600-06, Turbine Startup.

      5) CRSP

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

   a. Initialize simulator in an IC with ~5% power (IC 149 on the jump drive can be used) and perform the following before continuing below:

      1) Verify control rod sequence XI.1.0 with step 20 fully withdrawn.

      2) Verify Reactor power ~5%.

3 Verify the following simulator conditions:

   a. Verify Torus to Drywell DP within limits (vent Torus as needed).

   b. Verify Torus level >-3.5 in. (Variable PPC232) if necessary, water can be quickly added by opening and closing valve 1402-2A on Instructor Station drawing CS1.

   c. In each RPS Channel, select one APRM for recording.

   d. Verify 2A RFP running with 2B RFP in STBY.

   e. Verify Zinc Injection label in place for lined up to 2A RFP.

   f. Verify 2A and 2C Condensate pumps running.

   g. Verify 2B and 2D Condensate pumps OFF.

   h. Verify 2D Condensate pump in STBY.

   i. Verify Cond/Booster min flow to 75%.

   j. Ensure running Condensate pump amps within limits.

   k. Cut in/out Cond Demins as needed, to maintain DP within limits.

   l. Verify TR 86 LTC in MANUAL.

   m. Advance the chart recorders.

4 Place the following equipment out of service:

   a. None

   NOTE: Perform the above setup prior to running the setup CAEP file.

5 Run the initial setup CAEP file: ILT-N-3.cae

6 Complete the Simulator Setup Checklist.

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

- √ Critical Tasks
- ⌛ Time Critical Tasks
- ■ Required Actions
- ❑ Optional Actions

Event One – Control Rod Drift Out		
Trigger	Position	Crew Actions or Behavior
2 **3**		**Simulator Operator:** At the discretion of the Lead examiner, activate **trigger 2**, which causes Control Rod K-08 to drift out. Verify **trigger 3** automatically activates when EITHER control rod K-08 passes position 10 so it settles at position 12; OR, the scram toggle switch for CRD K-08 is placed to the UP position. This deletes control rod K-08 drift out malfunction so it stops adjacent to control rods already at position 12 and it does not drift out later when the reactor is scrammed.
		Role Play: EO to check K-08 accumulator: Wait 2 min, then report "I see nothing abnormal at K-08 accumulator." WEC/EO to disarm K-08: 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". EO to close CRD K-08's 2-0305-102, WITHDRAW VLV: Wait 2 min. and report, "CRD K-08's 2-0305-102 is closed".
	ATC	Notices and announces that Control Rod K-08 is drifting out. Performs actions of DOA 0300-05, Inoperable Or Failed Control Rod Drives as directed. Immediate: ■ Bypasses the Rod Worth Minimizer. ■ √ Inserts the CRD to 00 using Emergency Rod In. Subsequent: ■ Due to the CRD failing to remain at the FULL IN OR OVERTRAVEL IN position, continuously applies an emergency insert signal using EMERG ROD IN on RONOR switch.
	CRS	■ Enters DOA 0300-05, Inoperable or Failed Control Rod Drives, and directs actions. ❑ May refer to Tech. Spec 3.3.2.1 Condition C.
	BOP	■ At back panel 902(3)-16, places the scram toggle switch for CRD K-08 to the UP position.
	ATC	■ Releases RONOR switch. ■ Announces that procedure directs entering DOA 0300-12, Mispositioned Control Rod. ❑ Discontinues ALL non-emergency control rod motion and notifies CRS and QNE to evaluate core parameters. ❑ Directs EO to close CRD K-08's 2-0305-102, WITHDRAW VLV, to prevent CRD discharge volume from filling.

Event One – Control Rod Drift Out		
Trigger	Position	Crew Actions or Behavior
	CRS	■ References TS 3.1.3, Condition C, and determines the following actions are required: • C.1 Fully insert inoperable control rod within 3 hours. (DOA 0300-05, Inoperable or Failed Control Rod Drives, directs inserting the rod) • C.2 Disarm the associated CRD within 4 hours. ❑ Directs disarming rod K-08.
	CRS	■ Enters DOA 0300-12, Mispositioned Control Rod.
	CRS	❑ Directs taking rod K-08 OOS on the RWM.
	ATC	❑ Takes rod K-08 OOS on the RWM.
	TEAM	❑ May enter DGA 07, Unpredicted Reactivity Addition.
Event 1 Completion Criteria: • **When Control Rod K-08 Has Been Inserted To Position 00, AND** • **Tech Specs Have Been Addressed,** **AND/OR,** • **At the direction of the Lead Examiner.**		

Event Two – Indicated Flow to CRD Flow Controller Fails High		
Trigger	Position	Crew Actions or Behavior
4		**Simulator Operator:** At the discretion of the Lead Examiner, activate **trigger 4**, which causes the indicated flow to the CRD Flow Controller to fail high. This causes the controller demand to the CRD FCV to fail low. **NOTE:** If the team does not recognize the failure quickly and restore CRD cooling flow, the ROD DRIVE HI TEMP alarm comes up after ~ 5 min.
5 **6**		**Simulator Operator:** If CRD Temperature variable **rdgtemp(21)** reaches 250.0 deg. F, verify the following automatic triggers: ❖ **Trigger 5**: automatically activates when variable **rdgtemp(21)** is >250.0 deg. F. Forces up alarm 902-5 F-3, ROD DRIVE HI TEMP. ❖ **Trigger 6**: automatically activates alarm 902-5 F-3 is up and variable **rdgtemp(21)** is <245.0 deg. F. Returns alarm 902-5 F-3, ROD DRIVE HI TEMP, TO NORMAL.
	ATC	❑ From panel monitoring or alarm 902-5 F-3, ROD DRIVE HI TEMP, notices and announces loss of CRD system flow. ■ Diagnoses failure of the CRD Flow Controller. ■ Performs DOA 0300-01, Control Rod Drive System Failure, actions as directed by the CRS. ■ Restores CRD system flows and pressures to normal. ■ Places CRD Flow Controller in manual and adjusting as needed.
	BOP	❑ May obtain CRD temperatures on the back panel.
	CRS	■ Directs entering and performing actions of DOA 0300-01, Control Rod Drive System Failure. ❑ Notifies Shift Manager and IMD of CRD Flow Controller failure. ❑ Enters TRM 3.3.h for CRD FCV closed causing loss of RVWLIS.
		Role Play; EO to check CRD FCV operation: (wait 2 min) Report, “the CRD FCV appears to be operating normally and is at position is: (Use position displayed on Instructor Station drawing RD2; report as percent)”. EO to check CRD system flow locally (FI 2-302-56); (wait 1 min) Report “CRD system flow indicates >100 gpm (pegged high)”. EO to check drive water flow locally (FI 2-302-64): (wait 1 min) Report, “CRD drive water flow indicates (same as control room meter)”. EO to check cooling water flow locally (FI 2-302-65): (wait 1 min) Report, “CRD cooling water flow indicates (same as control room meter)”. EO to check CRD pumps locally: (wait 1 min) Report, “CRD Pumps appear to be operating normally”. Respond as groups notified.

Event Two – Indicated Flow to CRD Flow Controller Fails High		
Trigger	Position	Crew Actions or Behavior
Event 2 Completion Criteria: • **Team has taken manual control of the CRD Flow Controller,** **AND/OR,** • **At the direction of the Lead Examiner.**		

Event Three – Core Spray Leak / Localized Flooding		
Trigger	Position	Crew Actions or Behavior
		NOTE: Torus level drops slowly, so the Tech Spec Torus level low limit is not expected to be reached.
7		**Simulator Operator:** Activate **trigger 7** to start a 2B Core Spray pump casing to piping weld rupture at 1%. It takes about 1 minute for the sump alarm to come in.
		Role Play: EO sent to the west corner room, wait approx. 3 min. then report: "There is a leak on the casing weld of 2B Core Spray pump. It is not spraying on other equipment. All of the water is going to the sump and both sump pumps are operating properly. Water in the sump is about 2 ft. from the top and steady."
8		**Simulator Operator / Role Play:** If directed to isolate keep fill to 2B CS, initiate **trigger 8** to close 2-1402-36B, ECCS Keep Fill to 2B Core Spray system. Then report "The keep fill supply valve(s) 2-1402-36B(37B) are closed."
		Role Play: EO 2B CS: If the suction valve is NOT full closed, then if asked, "there is still water spraying from the casing weld". IF MO 2-1402-3B, PP Suct Vlv is closed, then report: "The leak is almost stopped and the sump level is dropping." EO to shut 2-1402-8B, PP disch vlv: wait 5 min. then report, "the 2-1402-8B is closed".
		Maintenance estimate to repair 2B Core Spray pump: Report it will take 3 days to repair the crack.
	BOP	■ Receives and announces alarm 902-4 D-19, LPCI/CS West Sump Lvl Hi. ❑ Dispatches an in-plant operator to the west corner room to check for leaks and/or verify proper sump operation.
	CRS	❑ Enters DOA 0040-02, Localized Flooding in the Plant, and directs team response.
	BOP	Performs DOA 0040-02, Localized Flooding in the Plant: ❑ Makes PA announcement. ❑ Monitor plant equipment and parameters in the west corner room.
	CRS	Refers to P&ID M27, Diagram of Core Spray Piping, determines leak isolation points, and directs: ■ Placing 2B Core Spray PP in PTL. ■ MO 2-1402-3B, PP Suct Vlv, closed, and ❑ 2-1402-36B(37B) Keep Fill Supply valve(s), closed. (Not required to stop leak)

Event Three – Core Spray Leak / Localized Flooding		
Trigger	Position	Crew Actions or Behavior
	BOP	Isolates leak as follows: ■ Places 2B Core Spray PP in PTL. ■ Closes MO 2-1402-3B, PP Suct Vlv. ❑ May direct 2-1402-36B(37B), Keep Fill Supply valve(s), closed.
	CRS	❑ May refer to DEOP 0300-01, Secondary Containment Control, due to water on the floor going to the sump, and determines entry condition is not met.
	BOP	If receives annunciator 902-4 C-23, Torus Narrow Range Wtr Lvl Lo: ❑ Checks Torus level on panel 902-3. ❑ Refers to DOP 1600-02, Torus Water Control, to restore Torus level.
	CRS	❑ Enters DEOP 0200-01, Primary Containment Control, if Torus level drops to -4.5" and directs team actions. (Not expected as level drops slowly)
	CRS	❑ Enters DOP 1600-02, Torus Water Level Control, and directs restoring Torus water level.
	BOP	Restores Torus level per DOP 1600-02, Torus Water Level Control, as directed: ❑ Verifies MO 2301-35, -36 closed. ❑ Verifies MO 2301-6 open. ❑ Verifies CST level adequate. ❑ Opens MO 2301-14. ❑ Closes MO 2301-14 when Torus level rises to -2.5 in. to -4.0 in.
	CRS	■ Declares 2B Core Spray PP inoperable. ■ References Tech Specs: ▪ TS 3.5.1, Condition B: Return the CS subsystem to operable within 7 days or must be in Mode 3 within 12 hrs and Mode 4 within 36 hrs. ▪ If torus level drops to ≤-4.5", enters TS 3.6.2.2 Condition A. Restore suppression pool water level to within limits within 2 hours. ▪ Enters TRM 3.4.a Structural Integrity Condition B.

Event 3 Completion Criteria:

- **The localized flooding is stopped, and**
- **Tech Specs and TRM are referenced,**

OR,

At the discretion of the Floor Instructor/Lead Evaluator.

Event Four – Condensate/Booster Pump Trip with Failure of STBY to Auto Start		
Trigger	Position	Crew Actions or Behavior
		NOTE: The first Cond/Boost pump the ATC attempts to start will also trip. The other non-running Cond/Boost pump will start and remain running.
9 **25** **26**		**SIMULATOR OPERATOR / ROLE PLAY:** At the discretion of the Lead Examiner, activate **trigger 9.** This will cause a trip of 2A Cond/Boost pump. Verify **trigger 25** automatically activates when 2B Cond/Boost PP breaker closes and if 2D Cond/Boost PP trip malfunction is not true. This trips 2B Cond/Boost PP. Verify **trigger 26** automatically activates when 2D Cond/Boost PP breaker closes and if 2B Cond/Boost PP trip malfunction is not true. This trips 2D Cond/Boost PP.
		ROLE PLAY: EO to check operation of started Cond/Boost pump: wait 2 min, the report "the 2B (or 2D) Cond/Boost pump is operating normally". EO to check the breaker for tripped pump: wait 2 min, and then report "the breaker has an overcurrent target up". If another Cond/Boost pump trips, report: the breaker is open, but no flags are up".
	ATC	■ Announces alarm: • 902-6 F-5, CONDENSATE BOOSTER PP TRIP. ■ Determines STBY pump (2D) did not start. ❑ May place STBY PP SELECTOR switch to OFF. ■ Attempts to start either 2B or 2D Condensate Booster pump. ■ Determines Condensate Booster pump started tripped. ■ Starts other non-tripped pump. ❑ Determines it started and is operating properly.
	CRS	■ Enters DOA 0600-01, TRANSIENT LEVEL CONTROL. ■ Enters DOA 6500-10, 4KV CIRCUIT BREAKER TRIP. ■ Directs starting an available Condensate Booster pump.
	ATC	Refers to DOA 6500-10, 4KV CIRCUIT BREAKER TRIP and: ❑ Directs an EO to check the Condensate Booster pump just started and inspect tripped Condensate Booster pumps. ❑ Direct an EO to check the breakers of tripped Condensate Booster pumps. ■ Places 2A Condensate Booster pump control switch in Pull to Lock. ❑ Notifies Ops Shift Supervisor. ❑ Requests EMD to troubleshoot.

Event Four – Condensate/Booster Pump Trip with Failure of STBY to Auto Start		
Trigger	Position	Crew Actions or Behavior
	BOP	❑ Monitors panels and assists as directed.

Event 5 Completion Criteria:

- **An available Condensate Booster pump started,**

AND/OR

- **At the direction of the Lead Examiner.**

Event Five – Loss of Feedwater		
Trigger	Position	Crew Actions or Behavior
10		**Simulator Operator:** After completion of the previous Event, and at the discretion of the Lead Evaluator, activate **trigger 10**, which trips 2B RFP. **Note**: 2C RFP is prevented from starting.
		Simulator Operator / Role Play: EO to open/close the CRD 2-0301-25 valve: On Instructor Station drawing RD2, change the CRD 2-0301-25 valve position to the requested position and then report its position.
	BOP	■ Reports annunciator 902-6 F-7, RFP Trip. ❑ Determines Standby RFP did not auto start as expected. ❑ Attempts to start the Standby RFP. (Unsuccessful)
	TEAM	■ Determines that reactor will scram automatically on low RPV level due to insufficient Feedwater flow.
	CRS	■ Directs team to perform a manual reactor scram per DGP 02-03, Reactor Scram.
	ATC	Performs DGP 02-03, Reactor Scram, actions as directed: ■ Depresses BOTH Scram buttons. ■ Places RX MODE SW in SHUTDOWN. ■ Observes that control rods did not go in and initiates ARI. ■ Announces: • Rods did NOT go in. • ARI actuated. • Electrical ATWS. ❑ Controls RPV level as directed.
		Note: HPCI is one of the Preferred ATWS Injection systems. If it is used, the operator must inject in a controlled manner to prevent causing a power spike and complicating the accident mitigation strategy.
	BOP	Performs DGP 02-03, Reactor Scram, actions as directed: ❑ Silences annunciators at Panel 902(3) 8, until the NSO reports reactor level and pressure trends. ❑ Silences Panels 902(3) 54 and 902(3) 65 annunciator alarms.

Event 5 Completion Criteria:

- **Reactor has been manually scrammed,**

AND/OR,

- **At the direction of the Lead Examiner.**

Event Six – Electrical ATWS / ARI Unsuccessful		
Trigger	Position	Crew Actions or Behavior
11 **12**		**SIMULATOR OPERATOR / ROLE PLAY:** Operator to pull scram fuses: wait 4 min, then activate **trigger 11**. This sequentially pulls the scram fuses. Operator to vent the scram air header: wait 5 min, the activate **trigger 12**. This vents the scram air header.
13		**SIMULATOR OPERATOR / ROLE PLAY:** Operator to bypass Low RPV water level MSIV and High Radiation Offgas isolations: wait 3 min, activate **trigger 13**, and then report "the Low RPV water level MSIV and High Radiation Offgas isolations have been defeated".
	CRS	❑ Enters DEOP 100, RPV Control. Due to report of ATWS condition, exits DEOP 100 AND enters DEOP 0400-05, Failure to Scram, and directs/performs: ❑ Placing ADS to inhibit. (Not expected to be a Critical Task for this scenario) ❑ Placing Core Spray pumps in PTL. ■ √ Inserting control rods using Alternate Rod Insertion. ❖ Directs driving control rods. ❖ Directs pulling scram fuses. ❖ Directs venting scram air header. ❑ Verifying required auto actions. ❑ Installing of the jumpers for the MSIV low level isolations and the Off Gas high Rad isolations. ❑ Stabilizing RPV pressure below 1060 psig.
	ATC	■ √ Inserts control rods per DEOP 500-05, Alternate Insertion Of Control Rods, as follows: (RPV-6.1) ❖ Pulling scram fuses. ❖ Venting scram air header. ❖ Drives rods by: ⇒ Bypassing the RWM. ⇒ Maximizing CRD drive water pressure. ⇒ Uses either the ROD MOVEMENT CONTROL switch or the EMERG ROD IN position of the ROD OUT NOTCH OVERRIDE switch.
	CRS	❑ Based on report that all control rods are inserted, exits DEOP 0400-05 and enters DEOP 0100.

Event Six – Electrical ATWS / ARI Unsuccessful		
Trigger	Position	Crew Actions or Behavior
	ATC / BOP	■ Performs as directed: ❖ Re-establishes injection using available injection systems to MAINTAIN RPV water level above -143" (in band directed by Unit Supervisor).
Event 6 Completion Criteria: • **Control rods inserted, (Or in progress)** **AND/OR,** • **At the direction of the Lead Examiner.**		

Critical Tasks:	
	With a control rod drifting out to a position where core damage could occur, TAKE ACTION TO PLACE THE CONTROL ROD AT A SAFE POSITION (00).
(RPV-6.1)	With a reactor scram required and the reactor not shutdown, TAKE ACTION TO REDUCE POWER by injecting boron and/or inserting control rods, to prevent exceeding the primary containment design limits.

REFERENCES

PROCEDURE	TITLE
DAN 902-3 D-7	2A/B CORE SPRAY HDR PRESS LO
DAN 902-5 A-3	ROD DRIFT ALARM
DAN 902-5 F-3	ROD DRIVE HI TEMP
DAN 902-6 F-5	CONDENSATE BOOSTER PP TRIP
DAN 902-6 F-7	RFP TRIP
DEOP 0100	RPV CONTROL
DEOP 0400-05	FAILURE TO SCRAM
DEOP 0500-05	ALTERNATE INSERTION OF CONTROL RODS
DGA-07	UNPREDICTED REACTIVITY ADDITION
DGP 01-01	UNIT STARTUP
DGP 02-03	REACTOR SCRAM
DOA 0300-01	CONTROL ROD DRIVE SYSTEM FAILURE
DOA 0300-05	INOPERABLE OR FAILED CRDS
DOA 0300-12	MISPOSITIONED CONTROL ROD
DOA 6500-10	4KV CIRCUIT BREAKER TRIP
DOP 0400-01	REACTOR MANUAL CONTROL SYSTEM OPERATION
DOP 0400-02	ROD WORTH MINIMIZER
DOP 5600-06	UNIT 2 TURBINE STARTUP
TS 3.1.3	CONTROL ROD OPERABILITY
TS 3.5.1	ECCS OPERATING

EXAM ILT-N-1 QUANTITATIVE ATTRIBUTES	
7	Total malfunctions (5-8)
1	Malfunctions after EOP entry (1-2)
3	Abnormal events (2-4)
2	Major transients (1-2)
1	EOPs entered/requiring substantive actions (1-2)
1	EOP contingencies requiring substantive actions (0-2)
2	Critical tasks (2-3)

Computer Aided Exercise Programs

```
# ILT-N-3.cae
# For ILT Class 11-1 NRC Exam
# Written by MP
# Rev 00
# Date 05/12


# INITIAL CONDITIONS

# Sets APRM Master Gain pot to 1.0
irf niagain 1.0

# Inserts an Electrical ATWS
imf b12

# Prevents ARI from working.
imf ser1026 off
imf ser1060 off
irf aw4 pulled|4

# Prevents 2D Cond/Boost PP from Auto starting by
# Overriding OFF the PUMP 2D position of the STBY SELECT switch,
# and overriding ON the 2D Cond/Boost PP STANDBY light.
ior fwdselcb2 (6) 1|2
ior fwdselcb4 (6) 1|2
ior fwlsbycb4 (6) on|2


# EVENT TRIGGERS

# Event Trigger 1 sets gain for all 6 APRMs.
trgset 1 "0"|2
trg 1 "irf niagainf true"|4

# Event Trigger 2 Causes control rod K-08 to drift out.
trgset 2 "0"|4
trg 2 "imf rodk08do"|4

# Event Trigger 3 Activates when EITHER:
# Control rod K-08 passes position 10; OR,
# Control rod K-08 individual scram switch is placed to the SCRAM position.
# Deletes control rod K-08 drift out malfunction.
trgset 3 "(rdzactls(91) .gt. 30.5).or. (.not. rpdtscrm_drw(91))"|28
trg 3 "dmf rodk08do"|6

# Event Trigger 4 inserts a failure high of the indicated flow to the CRD flow controller.
# Sets one of the CRD"s enthalpy higher, so alarm 902-5 F-3 comes up sooner.
trgset 4 "0"|6
imf rdfcfhi (4)|6
trg 4 "set rdhmech(21) = 190.0"|8

# Event trigger 5 Activates when CRD temp high is reached.
# Forces alarm 902-5 F-3 up.
trgset 5 "rdgtemp(21) .gt. 250.0"|8
imf ser0973 (5) on|8

# Event trigger 6 Returns alarm 902-5 F-3 to normal.
trgset 6 "sezpoint(973) .and. (rdgtemp(21) .lt. 245.0)"|8
```

```
trg 6 "imf ser0973 normal"|10

# Trigger 7 Initiates a 1% break at the 2B core spray pump casing.
# Sets West LPCI Corner Room sump level to just below first pump start.
trgset 7 "0"|10
trg 7 "set wamwlps = 6500.0"|10
imf csppbbrk (7) 1.0|10

# Trigger 8 Shuts the ECCS keep fill to the 2B CS pump (closes the 2-1402-36B valve)
trgset 8 "0"|12
irf csbfilof (8) closed|12

# Event Trigger 9 Trips 2A Cond/Boost PP.
trgset 9 "0"|12
imf h21 (9)|12

# Event Trigger 25 Activates when 2B Cond/Boost PP breaker closes and
# if 2D Cond/Boost PP trip malfunction is not true.
# Trips 2B Cond/Boost PP.
trgset 25 "et_array(9) .and. fwsacbcb(2) .and. (.not. fwm433f(4))"|24
imf h22 (25)|14

# Event Trigger 26 Activates when 2D Cond/Boost PP breaker closes and
# if 2B Cond/Boost PP trip malfunction is not true.
# Trips 2B Cond/Boost PP.
trgset 26 "et_array(9) .and. fwsacbcb(4) .and. (.not. fwm433f(2))"|26
imf h24 (26)|14

# Event Trigger 10 Trips RFPs.
trgset 10 "0"|14
imf h31 (10)|14
imf h32 (10 1:00)|16
imf h33 (10 2:00)|16
imf h34 (10 2:00)|16

# Event trigger 11 Simulates pulling RPS scram fuses.
Trgset 11 "0"|16
irf rpfusea1 (11) pulled|18
irf rpfusea2 (11 20) pulled|18
irf rpfusea3 (11 40) pulled|18
irf rpfusea4 (11 60) pulled|18
irf rpfuseb1 (11 1:20) pulled|20
irf rpfuseb2 (11 1:40) pulled|20
irf rpfuseb3 (11 2:00) pulled|20
irf rpfuseb4 (11 2:20) pulled|20

# Event trigger 12 Simulates venting scram air header.
trgset 12 "0"|22
irf rdscrair (12) open|22

# Event Trigger 13 installs MSL Group 1 RPV level byp and Offgas High Rad byp jumpers.
trgset 13 "0"|22
irf ci59jp (13) in|22
irf ogogjp (13) in|22

# END
```

Unit 2 Risk: GREEN

Unit 2 is in S/U at 5 MWe,

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 913 MWe

Leading Thermal Limit: MAPRAT @ 0.819

Action Limit: 0.980

Equipment Unavailable: None

Protected Equipment: None

Current Action Statements

None LCO Started: LCO Expires:

TS

Cause:

Unit 1 Plant Status

Switchyard Status

Unit 2 Plant Status

Today	Unit 2 Activities **** Shift 1 Activities **** **** Shift 2 Activities **** Startup in progress. On hold for Steam Tunnel inspection. After Steam Tunnel Inspection, and when directed by the Shift Manager, resume the startup per DGP 01-01. Turbine maintenance is in progress. Turbine warm-up will commence after post maintenance inspections have been completed. **** Shift 3 Activities ****
Today	**** Unit 2 Procedures In-Progress **** Do Not Delete **** DGP 01-01, Unit Startup