Facility: **Prairie Island** Scenario No.: **1** Op-Test No.: **2012301**

Examiners: **D. McNeil** (R. Baker) Operators: _____
M. Bielby (D. Oliver) _____
D. Reeser _____

Initial Conditions: **Power is level near 10%. Negative ITC. The main generator is synched to the grid @ 10 MWe.**

Turnover: **The Crew will prepare to perform a power ascension to 15% power and complete the remainder of 1C1.2 actions including transferring from the M to R sources, then raise power to 100%. Turbine overspeed and associated SP will not be performed during this power assention. The Heater Drain Tank alarms have been authorized to leave flashing.**

Event No.	Malf. No.	Event Type*	Event Description
1		R (RO)	Raise power to 15%
2		I (RO) TS (SRO)	Blue Channel Pressurizer level channel fails high
3		C (RO)	11 Charging Pump Trips.
4		I (RO/ BOP) TS (SRO)	N43 Power Range NI Fails Low
5		M (ALL)	Turbine Locks Out Initiating a Loss of All AC Power
6		C (BOP, SRO)	11 TDAFW Pump Auto Start Failure

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

Op-Test No.: **2012301** Scenario No.: **1** Event No.: **1&2** Page **1** of **9**

Event Description: **Raise power to 15% and Transfer on-site loads from the M to R source.**

Time	Position	Applicant's Actions or Behavior
		Examiner Note: Applicants should begin the scenario at step 5.14 in 1C1.2, Unit 1 Startup Procedure, and proceed to the procedure's end. The crew will have conducted the necessary briefing on the intended method with which to raise power in the following steps. 1C1.2, Unit 1 Startup Procedure does not provide specific direction as to how to raise reactor power to greater than 15%
	SRO	• Directs and supervises the crew's completion of 1C1.2, Unit 1 Startup Procedure. • Implements 1C1.4, Unit 1 Power Operation
	RO/BOP	Reactor power above 15%.
		Examiner note: Turbine load should be adjusted using the "On Line Control" screen, "Manual" control mode, and "5%" increase/decrease (▲/▼) control . **Do not proceed to the next event until the P-7 permissive has cleared.** (PRNI > 10%)

	RO	• Perform the following to block the power range low setting high flux trip and intermediate range high flux trip:
		  • Turn both power range low setting high flux trip block switches to "BLOCK" and release:
		  • CS-46277, POWER RANGE BLOCK TRAIN A
		  • CS-46278, POWER RANGE BLOCK TRAIN B
		  • Turn both intermediate range high flux trip block switches to "BLOCK" and release:
		  • CS-46275, INTERMEDIATE RANGE BLOCK TRAIN A
		  • CS-46276, INTERMEDIATE RANGE BLOCK TRAIN B
		  • Verify the following status lights are LIT:
		  • 47014-0402, POWER RANGE LO SETTING TRIP BLOCKED
		  • 47014-0302, INTERMEDIATE RANGE BLOCKED

Event Description: **Raise power to 15% and Transfer on-site loads from the M to R source.**

Time	Position	Applicant's Actions or Behavior

	RO	• Verify permissive aqua status lights are NOT LIT:
		  • 47014-0304, P-7 LO POWER TRIP BLOCK
		  • 47014-0204, P-8 LO POWER LO FLOW TRIP BLOCKED
		  • 47014-0104, P-9 REACTOR TRP BLOCKED

	CUE	○ When directed by the crew to perform SP 1005A, provide a cue that SP 1005A will be performed within the next 12 hours. ○ When directed by the crew, rack in the following breakers to the "CONNECT" position: • **BKR 11-4**, BUS 11 1M XFMR • **BKR 12-4**, BUS 12 1M XFMR • **BKR 13-9**, BUS 13 1M XFMR • **BKR 14-9**, BUS 14 1M XFMR
	BOP	• Places EH Control in "FSP" control mode.
		Examiner Note: The control switch for the bus feeder breakers must be held to "CLOSE" for 1 second before the breaker will CLOSE. This time delay allows the breaker synch check relaying to operate.

	BOP	• For each non-safeguards bus, CLOSE the 1M Transformer breaker and observe the load transfer on the ammeter, THEN OPEN the corresponding 1R Transformer breaker:
		  • Bus 14:
		  • CLOSE BKR 14-9, 4.16KV BUS 14 1M XFMR, using CS-46365.
		  • OPEN BKR 14-4, 4.16KV BUS 14 1R XFMR, using CS-46361.
		  • Bus 13:
		  • CLOSE BKR 13-9, 4.16KV BUS 13 1M XFMR, using CS-46364.
		  • OPEN BKR 13-1, 4.16KV BUS 13 1R XFMR, using CS-46360.
		  • Bus 12:
		  • CLOSE BKR 12-4, 4.16KV BUS 12 1M XFMR, using CS-46363.
		  • OPEN BKR 12-1, 4.16KV BUS 12 1R XFMR, using CS-46359.

Event Description: **Raise power to 15% and Transfer on-site loads from the M to R source.**

Time	Position	Applicant's Actions or Behavior

	BOP	• Bus 11:
		  • CLOSE BKR 11-4, 4.16KV BUS 11 1M XFMR, using CS-46362.
		  • OPEN BKR 11-1, 4.16KV BUS 11 1R XFMR, using CS-46358.
		• Transfer the Steam Dump System to TAVG control:
		  • Verify CV-31100, CONDENSER STEAM DUMP, valve CLOSED.
		  • Turn CS-46338, STEAM DUMP MODE, selector to "RESET".
		  • Place CS-46338 in "TAVG".
		Verify 47014-0405, LOSS OF LOAD INTERLOCK aqua status light, is NOT LIT

		Examiner Note: At the discretion of the lead examiner, proceed to the next event.

Event Description: **Pressurizer level channel 1L-428 (Blue) fails high**

Time	Position	Applicant's Actions or Behavior
	CUE	**Annunciator 47012-0307, PRZR HI LVL CHANNEL ALERT** **Blue status light ON for high Pressurizer level reactor trip**
		Examiner Note: The RO may take manual control of charging and pressurizer heaters.
	RO	Identifies the failed LPZR channel, by observing one channel of LPZR off-scale high, with the other two channels slowly lowering, and charging pump speed lowering. Stops any dilution in progress When directed by the SRO: • Control Pressurizer heaters manually. • Place charging pump speed control in "MANUAL" AND adjust Pressurizer level to setpoint. • Select position "2-1" (WHITE-RED) on PRZR Level Control selector switch. o Return Pressurizer heaters to "AUTO". o Return one charging pump speed control to "AUTO". • Ensure Pressurizer level recorder not selected to Blue channel.
	BOP	Places the turbine load ramp on hold. (If applicable.)
	ANY	Follow the applicable ARP's, which includes guidance to implement 1C51.
	SRO	Directs the crew to place the ramp on hold. • Implements 1C51.3, BLUE BUS (113) INSTRUMENTS FAILURE GUIDE Refers to Tech Specs: • Determines LCO 3.3.1 Condition A and Table 3.3.1-1 Function 9, condition K applies.
	CUE	o If directed as I&C to trip bistables, report that 2 I&C technicians will be available in 1 hour. **(Note: bistables will not be tripped during this scenario.)** o Acknowledge reports as appropriate for the failure if contacted as Operations Management, and if asked, agree to make other notifications.
		Examiner Note: At the discretion of the lead examiner, proceed to the next event.

Event Description: **11 CV Pump trips.**

Time	Position	Applicant's Actions or Behavior
	CUE	**Annunciator 47015-0103, 11 CHARGING PUMP TRIP**
	RO	Takes manually control of charging Manually Isolate Letdown, as necessary Perform the following as directed by the SRO/ARP: • Start another charging pump. • If letdown isolation occurred then restore letdown per 1C12.1, LETDOWN, CHARGING AND SEAL WATER INJECTION. • Maintain Pressurizer level and seal injection flow. • Determine reason for charging pump trip.
	BOP	1C12.1, LETDOWN, CHARGING AND SEAL WATER INJECTION, Section 5.3 Starting a second charging pump: • Verify the discharge desurger, for pump to be started, is pressurized in accordance with Section 5.13. • Transfer the inservice charging pump from AUTOMATIC to MANUAL speed control per C7, Reactor Control System. • Verify that the speed controller of the charging pump to be started is in MANUAL at minimum speed. • Reduce the speed of the inservice charging pump until the seal injection flow drops from eight (8) gpm to approximately six (6) gpm. • Verify charging pump discharge header pressure 1PI-133 is less than 2400 psig. • For the charging pump to be started, verify the control switch green light is "LIT" and white light is "OFF". • Start the second charging pump. • Adjust the charging pump speed to maintain charging pump discharge pressure, 1PI-133 less than 2500 psig and approximately eight (8) gpm seal injection. • After pressure and flow have stabilized, then simultaneously adjust charging pump speed and 1C-142, CHG LINE FLOW CONT, until: o Seal Injection flow is approximately eight (8.0) gpm. o One (1) charging pump is in service at minimum speed, in MANUAL. Transfer the speed control for the charging pump which is operating at greater than minimum speed from MANUAL to AUTOMATIC per C7, Reactor Control System.
	SRO	• Direct RO/BOP actions for starting another charging pump o Implement 1C21.1 as necessary. o Initiate Work Request as necessary. o Effect necessary repairs and return system to normal.

Event Description: **11 CV Pump trips.**

Time	Position	Applicant's Actions or Behavior
		Examiners Note: The 11 CV pump will not be returned to service.
	CUE	○ If directed to investigate 11 Charging pump, after 3 minutes, report that the 11 Charging pump appears intact with no visible damage. ○ If directed to log VFD faults, after 3 minutes, report that there is a VFD Overfrequency fault on 11 Charging Pump. ○ If directed to verify discharge desurger is pressurized, request that the pump be taken to PTL and after 3 minutes, report that the desurger is pressurized. ○ Acknowledge reports as appropriate for the failure if contacted as Operations Management, and if asked, agree to make other notifications.
		Examiner Note: At the discretion of the lead examiner, proceed to the next event.

Event Description: **N43 Power Range NI Fails low**

Time	Position	Applicant's Actions or Behavior
	CUE	**Annunciators:** **47013-0201, NIS POWER RANGE NEGATIVE FLUX RATE CHANNEL ALERT** **47013-0203, NIS POWER RANGE CHANNEL DEVIATION** **47013-0303, COMPUTER ALARM DELTA I CHECK TYPER** **47013-0403, COMPUTER ALARM FLUX TILT CHECK TYPER** **Blue status lights on for high flux low setpoints and negative rate reactor trips.**
	RO	• Identifies the failed NIS channel, by observing control rods stepping out and N43 meter indication off-scale low with the other three channels slowly rising due to rods stepping out. • Places rods in manual upon determining that either there is an instrument malfunction or that the generator load is stable.
		Examiner Note: The crew may elect to implement 1C5 AOP 1, UNCONTROLLED ROD MOTION.
	SRO	Implements 1C51.3, BLUE BUS (113) INSTRUMENTS FAILURE GUIDE Refers to Tech Specs: • Determines LCO 3.3.1 Condition A and Table 3.3.1-1 Function 2a, 2b, 3a, 3b, 6, 16b.1, 16c, 16d, 16e; conditions D, E, Q and R apply. Directs an operator to remove N43 from service IAW 1C51.3 Notify Nuclear Engineering to perform SP-1120.
	BOP	Removes N43 from service: On the MISCELLANEOUS CONTROL AND INDICATION PANEL drawer: • Place ROD STOP BYPASS switch in the "N-43" position. • Place POWER MISMATCH BYPASS switch in the "N-43" position. • Place UPPER SECTION CURRENT COMPARATOR DEFEAT switch in the "N-43" position and verify the Upper Section Channel Defeat Light is LIT. • Place LOWER SECTION CURRENT COMPARATOR DEFEAT switch in the "N-43" position and verify the Lower Section Channel Defeat Light is LIT.

Time	Position	Applicant's Actions or Behavior
	BOP	On the COMPARATOR AND RATE drawer: • Place COMPARATOR CHANNEL DEFEAT switch in the "N-43" position and verify Comparator Defeat Light is LIT. • At N-43 POWER RANGE B drawer, remove, and concurrently verify removal of, the instrument power fuses. • At N-43 POWER RANGE A drawer, remove, and concurrently verify removal of, the control power fuses. Verify the following annunciators are received: • 47013-0101, NIS POWER RANGE POSITIVE FLUX RATE CHANNEL ALERT • 47013-0102, NIS POWER RANGE HI SETPOINT CHANNEL ALERT • 47013-0201, NIS POWER RANGE NEGATIVE FLUX RATE CHANNEL ALERT • 47014-0303, N43 NUCLEAR OVERPOWER ROD STOP BYPASSED Aqua Light Verify the following status lights LIT: 44178-0306, PWR RNG LO Q-HI F NC43P 44178-0307, PWR RNG HI Q-HI F NC43R 44205-0304, PWR RNG HI F RATE NC43U/K Trip and concurrently verify the following bistables to remove channel from service (Key Hook No. 82): IF the Thermal Power Monitor is selected to NIS input, THEN Check if TPM power is equal to the average of the remaining NIS channels. If not equal, then change TPM "Power Source" input from "NIS" to "Calorimetric" AND notify the computer group.
	RO	Restore Tavg equal to Tref using one or two step increments with control rods then place rod control to "AUTO". Verify the NR-45 recorder is selected to an operable channel.
	CUE	○ If directed as I&C to trip bistables, report that 2 I&C technicians will be available in 1 hour. ○ Acknowledge reports as appropriate for the failure if contacted as Operations Management, and if asked, agree to make other notifications.
		Examiner Note: At the discretion of the lead examiner, proceed to the next event.

Event Description: **Turbine Trip occurs - Loss of All AC Power (Station Blackout).**

Time	Position	Applicant's Actions or Behavior
	CUE	**Annunciators:** **47023-0603, SEISMIC MONITORING PANEL** **EVENT ALARM on the Seismic Monitoring Panel 121SR**
		Examiner Note: Ensure the Reactor has been tripped PRIOR to inserting the SBO.
	CREW	Determines a reactor trip is warranted
	SRO	Implements 1E-0, REACTOR TRIP OR SAFETY INJECTION
	RO/BOP	Performs the first 3 Immediate action of 1E-0: • Verifies the Reactor is tripped • Verifies the Turbine is tripped • Determines that both Safeguard buses are de-energized
	SRO	Implements 1ECA-0.0, LOSS OF ALL SAFEGUARDS AC POWER
		Examiner Note: After the SBO has occurred, the 15 EDG will have tripped, and the 16 EDG will be running unloaded. The output breaker failed to close.

Op-Test No.: **2012301** Scenario No.: **1** Event No.: **7** Page **10** of **9**

Event Description: 11 TDAFW Pump auto start failure.

Time	Position	Applicant's Actions or Behavior
	BOP	Starts the 11TDAFW Pump at step 2 RNO, as directed.

Event Description: Bus 16 EDG output breaker fails when operator attempts to close (Bus 15 EDG failed upon loss of power).

Time	Position	Applicant's Actions or Behavior
		Note: At Step 6.a.2 RNO of 1ECA-0.0, the 16 EDG output breaker will catastrophically fail damaging the bus, but no fire results.
	CUE	Unit 2 SI Pumps are both off and the corresponding Unit 2 bus (25) is energized.
		Examiner Note: The scenario may be terminated after bus 15 is powered from a Unit 2 source, and the crew is ready to transition out of 1ECA-0.0.

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

Facility: **PINGP Units 1 and 2** Scenario No.: **2** Op-Test No.: **2012301**

Examiners: D. McNeil (R. Baker) Operators: _____
M. Bielby (D. Oliver) : _____
D. Reeser : _____

Initial Conditions: Unit 1 @ ~ 225 MWe BOL, Plant Startup in Progress. Unit 2 @ 100% power, MOL Equilibrium Xenon. Repairs and testing complete on 12 MFW pump. 2nd Condensate pump is in service.

Turnover: Power is to be reduced < MWe to facilitate a common cause evaluation of the 11 MFP. Crew will brief power reduction and MFP swapping prior to entering the simulator. Maintain Unit 2 @ 100% power. Equipment OOS, Nothing abnormal, only equipment related to plant specific issues.

Event No.	Malf. No.	Event Type*	Event Description
1		R (RO) N (BOP)	Reduce power to < 200 MWe
2		N (SRO) N (BOP)	Swap Running MFP (Start 12 MFP and Secure 11 MFP)
3		I (RO) TS (SRO)	12 SG Pressure Transmitter Fails High
4		I (RO) TS (SRO)	Blue Channel Pressurizer Pressure Fails High
5		M (ALL)	12 SG Tube Rupture ~ 250 gpm
6		C (BOP) C (SRO)	12 MSIV Fails to Close
7		C (BOP)	SI Pumps Fail to Auto Start
8		C (BOP)	12 MDAFW Pump Fails to Auto Start

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

QUANTITATIVE ATTRIBUTES

Malfunctions:

Before EOP Entry:

1. 12 SG Pressure fails high
2. Blue Channel Pressurizer Pressure fails high

After EOP Entry:

1. 12 MSIV fails open
2. Both Safety Injection Pumps fail to auto start
3. 12 MDAFWP fails to start automatically

Abnormal Events:

1. 12 SG Pressure fails high
2. Blue Channel Pressurizer Pressure fails high

Major Transients:

1. 12 SG Tube Rupture

Critical Tasks:

1. E-0 – F: Establish and maintain 200 GPM AFW flow to the Steam Generator(s) before transition out of E-0, unless the transition is to FR-H.1, in which case the task must be initiated before RCPs are manually tripped in accordance with step 2 of FR-H.1
2. E-0 – H: Manually start at least one Safety Injection pump before transition out of E-0.
3. E-3 – A: Isolate feedwater flow into and steam flow from the ruptured Steam Generator before a transition to ECA-3.1 occurs.
4. E-3 – B: Establish/maintain an RCS temperature so that transition from E-3 does not occur because of the inability to maintain required subcooling or such that an extreme or severe challenge to the Subcriticality and/or the Integrity CSF occurs.
5. E-3 – C: Depressurize RCS to meet SI termination criteria prior to overfilling the ruptured Steam Generator.
6. E-3 – D: Terminate SI prior to overfilling the ruptured Steam Generator.

SCENARIO OVERVIEW:

INITIAL CONDITIONS:

1. This scenario can be run from the following Specific IC set:
   - IC-292

2. The following equipment is OOS:
   - 11 TD AFW Pump

SEQUENCE OF EVENTS:

Event 1: Reduce turbine load below 200 MW
- The crew will lower turbine load to ~195 MW per 1C1.4

Event 2: Swap running MFP
- The crew will start 12 MFP and stop 11 MFP per 1C1.4 and 1C28.2.

Event 3: 12 SG Pressure fails high
- PT-478, 12 SG Pressure, fails high.
- The 12 SG PORV will open.
- The crew will respond per C47 and 1C51 to close and manually control the 12 SG PORV.

Event 4: Blue Channel Pressurizer Pressure fails high
- PT-431, Blue Channel Pressurizer Pressure, fails high.
- Both Pressurizer spray valves will fully open and Pressurizer heaters will de-energize.
- The crew will take manual control of spray valves and close them.
- The crew will respond per C47 and 1C51.3 to change the controlling pressure channel and restore pressure.

Event 5: 12 SG Tube Rupture
- A Steam Generator tube leak will begin to ramp in on 12 SG when Blue Channel Pressurizer Pressure is failed high.
- The crew will respond to a Train “B” radiation alarm and perform 1C4 AOP2
- The Tube Leak will grow to an ~250 GPM Tube rupture.
- The crew will respond per 1E-0 and 1E-3 to trip the reactor and initiate safety injection.

Event 6: 12 MSIV fails open
- During isolations in 1E-3 the 12 MSIV will NOT close.
- The crew will respond per 1E-3 Attachment B to isolate the 12 SG.

Event 7: Both Safety Injection pumps fail to auto start

- When Safety Injection is initiated, either manually or automatically, the 11 and 12 SI pumps will not start on the 'S' signal.
- The crew will respond per 1E-0 Attachment L to start the pumps manually.

Event 8: 12 MDAFWP fails to auto start

- 12 MDAFWP fails to start automatically.
- The crew will respond per 1E-0 to start 12 MDAFWP.

SCENARIO TIME-LINE:

SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
INITIAL CONDITIONS (IC): • IC-292 • Mode: 1 • Exposure: BOC • Power: 42.5% • Boron: (CB): 1415 ppm • Temperature: ~552°F • Pressure: ~2235 psig • Xenon: Building In • Rods: "D" @ 170 • Generator: ~225 MW	SRO BOP ATC	• If IC-292 is not available: o Reset to IC-8. o Reduce Turbine load to 225. o ~8 rod steps in and 20 gal Boration.
1. SIMULATOR SET UP a. Set up the simulator to IC-292. b. PRIOR TO PLACING THE SIMULATOR TO RUN, verify the "FRV Patch.sch" file is open and running. c. Enter the malfunctions, remotes, and overrides, as specified by the "Simulator Input Summary." d. Complete the "Simulator Setup Checklist."		
2. Simulator Pre-brief: a. The Simulator Pre-Brief is conducted prior to the crew entering the simulator. 1) Inform the crew that power is to be lowered to 195 Mw to swap MFPs. 2) Provide the crew a marked up copy of 1C1.4 marked up to Step 5.2.11 and 1C28.2 Section 5.7 Swapping FWPs marked up for performance. a) Inform crew there are no fuel conditioning requirements. b) Inform crew to lower Turbine load to 195 Mw at 0.5%/minute with rods in "MANUAL" with Turbine in "AUTO" in LOAD mode. c) Inform the Crew to swap 12 and 11 MFPs. 3) Provide the crew a reactivity plan developed by the off going RO for the power reduction from current power to 195 Mw. 4) Inform the crew to verify the reactivity plan developed by the off going reactor operator. 5) Inform the crew that Nuclear Engineering was **not** available to provide a reactivity prediction. b. An SRO candidate will perform a pre-job brief for the performance of 1C1.4 and 1C28.2 Section 5.7.		

SCENARIO TIME-LINE:

	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	3. COMPLETE TURNOVER: a. "UNIT 1 LPEO / PEO TURNOVER LOG." b. PRA Printout. c. Verify crew performs walk down of control boards and the reviews turnover checklists.	CREW	Review the following with the off-going operator: • "Unit 1 LPEO / PEO Turnover Log" • PRA printout • Walk-down the control boards and ask quest appropriate

SCENARIO TIME-LINE:

SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
4. When the crew has assumed the duty, and at the discretion of the lead evaluator, allow the crew to reduce turbine load to ~195 MW. a. When contacted, as Duty Chemist, acknowledge load change. 4. Turbine Load reduction to ~195 MW cont…	BOP ATC SRO	**1C1.4, Unit 1 Power Operation, Section 5.2, step 5.2.6.** • Notify Duty Chemist of the load decrease • Turn ON all pressurizer heaters • Increase letdown flow if desired (80 gpm letdo will already be established, no actions will be • If desired, THEN transfer Heating System to U to heating boiler (No actions will be needed si power reduction is only to 90%) • If desired, THEN place CS-46280, ROD BANI SELECTOR, in MANUAL". Refer to precautio • Start the load decrease as follows: o Using the "On Line Control" screen, selec desired Control Mode (VPC,FSP or LOAD o Using the "On Line Control" screen, selec desired rate. o Set the desired Target setting using the "T increase/decrease controls using the "On Control" screen. o Initiate a negative reactivity addition by us control rods or boration of the RCS per C1 o WHEN Tave shows a decrease, THEN se on the "On Line Control" screen to initiate decrease. o Vary the boration rate or batch borate as necessary to maintain Tave and Tref withi desired +/- 1.5°F band. • To suspend the load decrease, perform the fo o Select "Hold" on the "On Line Control" scr o Stop the boration per C12.5, if necessary o If reduced power steady state operation is anticipated, THEN, change ERCS TPM P Source from NIS to calorimetric (LEFM pr source) when steady state conditions are o Place CS-46300, MAKE-UP MODE SELE in "AUTO". o Momentarily turn CS-46457, BORIC ACID UP CONTROL, to "START". o Verify CS-46280, ROD BANK SELECTOR returned to "AUTO".

SCENARIO TIME-LINE:

	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
2	5. When the crew has reduced turbine load below 195 MW and returned Rod Control to automatic, and/ or at the discretion of the Lead Evaluator, direct the crew to proceed with swap of 12 and 11 MFP, if necessary. a. When contacted to perform Turbine building actions for starting 12 MFP perform the following: 1) Follow along in 1C28.2 Step 5.7 and report actions complete after 2 minutes for unmodeled actions. 2) The following outplant actions are modeled on the simulator: a) When directed to unblock 12 MFP Recirc valve, CV-31875, 12 FW PMP Recirc, wait 3 minutes and enter the remotes to unblock CV-31875 ***(Relative Order 1a, Event Trigger 10)*** and report completion. b) When directed to close F-22-4 and open F-22-3 wait 3 minutes enter remotes to align the warm-up lines ***(Relative Order 1b, Event Trigger 1)*** and report completion. 3) When asked to report Combined AFW flow as indicated on FI-26601, wait 1 minute, and report combined AFW flow as observed on ERCS screen “FW1” in the booth.	BOP ATC SRO	**1C28.2 UNIT 1 FEEDWATER SYSTEM** **5.7 Swapping FWPs** • Reduce turbine load to approximately 200 MW • Verify two (2) condensate pumps are running second condensate pump per 1C28.3. • Verify the FWP warmup line for the pump to b is OPEN: o F-22-4, 12 FW PMP WARMUP LINE • Verify the following annunciators NOT LIT: o 47010-0501, 11 FEEDWATER PUMP SE WATER LO PRESS. o 47010-0503, 12 FEEDWATER PUMP SE WATER LO PRESS. o 47010-0101, 11 FEEDWATER PUMP LO OUT. o 47010-0103, 12 FEEDWATER PUMP LO OUT. • Verify oil levels in 12 FWP motor are approxi 1/4 to 1/2 sight glass. • Place the computer points, listed in Attachme trend, Operations Group Display: o OP6 for 12 FWP • Verify the following: *NOTE:* 1T2821A on 12 FWP should approximate 1T2826A and 1T2827A. o The difference between 1T2826A and 1T2 12 FWP is less than 40°F. o 1P2449A 11/12 FW PMPS SUCT HDR P, approximately 400 psig. • IF the FWP recirc valve is blocked OPEN, TH restore it to normal as follows: o CLOSE the vent on the bottom of the stra the desired recirc valve (located just down of the air isolation valve). ▪ CV-31875, 12 FW PMP RECIRC, Air S Vent o OPEN the air isolation valve to the desired valve: ▪ CV-31875 A/S, 12 FW PMP RECIRC 31875 AIR SPLY VLV o Attach block to the air isolation valve for th desired recirc valve: ▪ CV-31875 A/S, 12 FW PMP RECIRC 31875 AIR SPLY VLV o Rotate the desired FW pump recirc valve device handwheel COUNTER-CLOCKWIS
2	5. Swap 11 and 12 MFPs continued.		

SCENARIO TIME-LINE:

	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
2	5. Swap 11 and 12 MFPs continued.		the blocking device is fully backed off: ▪ CV-31875, 12 FW PMP RECIRC, Bloc Device *NOTE:* Feedwater pump suction pressure and Condensate System flow should be closely monit during performance of the following steps. • OPEN the recirc valve on the running FWP: o CS-46416, 11 FWP RECIRC CV-31874 *NOTE:* The recirc valve on the pump to be started open until the FW Pump switch is placed in the "S position. • Place the recirc valve control switch for the pu started to the OPEN position: o CS-46417, 12 FWP RECIRC CV-31875 *NOTE: Bearing temperatures rise quickly and the stabilize within the following limits:* • *Pump journal bearing temperatures 130-180° Maximum of 220°F.* • *Pump thrust bearing temperatures 130-180°F Maximum of 200°F.* • *Motor sleeve bearing temperatures 130-180°I Maximum of 194°F.* *Continuously rising bearing temperatures or an a temperature rise is an indication of a condition re immediate remedial action to prevent serious dam* • Start the second FWP. o CS-46419, 12 FW PMP • Stop the first running FWP. o CS-46418, 11 FW PMP • CLOSE the in-service FWP warm up line: o F-22-4, 12 FW PMP WARMUP LINE • OPEN the FWP warmup valve for the stopped pump: o F-22-3, 11 FW PMP WARMUP LINE • Check vibration on Vibration Monitoring Pane the running FWP, step-up gear, and motor wit requirements of Limitation 4.5. • Increase plant load until the second FWP disc flow is steady and exceeds 5000 gpm as indic locally near 15A FW Heater. o FI-26601, 12 FW PMP DISCH FI • Place the second FWP recirc valve in "AUTO" o CS-46417, 12 FWP RECIRC VLV • Stop the second condensate pump per 1C28.

SCENARIO TIME-LINE:

	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
			required.

SCENARIO TIME-LINE:

	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
3	6. When the crew has reduced turbine load below 200 MW and returned Rod Control to automatic, and/or at the discretion of the Lead Evaluator, enter the malfunction to fail 12 SG pressure high. ***(Relative Order 3, Trigger 3)*** a. If directed as I&C to trip bistables, report that 2 I&C technicians will be available in 1 hour **(Note: bistables will not be tripped during this scenario.)** b. If contacted as Operations Management, acknowledge the report of the failure, and if asked agree to make other notifications to the NRC Resident Inspector, Duty Station Manager. c. If contacted as the FIN team supervisor, inform the crew that you will write a work order and assign an I&C supervisor to investigate. d. If desired, allow the crew to hold a crew brief.	BOP ATC SRO	***Note: Per rules of usage, reference use ac may be used prior to consulting procedur follows:*** • ***Manual control of "B" SG PORV*** ***Note: If 1C5 AOP1 is entered it should be exite step 1*** **47011-0405. FW CONTROL SYSTEM TROUBLE** • Verify Steam Generator Level Control operati properly in automatic • Control level in manual for any Steam Genera which has shifted to manual • Refer to 1C51, Instrument Failure Guide **1C51.3 12 STEAM GENERATOR PRESSURE 1 HIGH** • Take manual control of 12 SG PORV and ens valve is closed • Verify SG Level Control operating properly in automatic • Refer to T.S. LCO 3.3.2 Condition A and Tabl Function 1e

SCENARIO TIME-LINE:

	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	7. When the crew has recovered SG pressure control, and/or at the discretion of the Lead Evaluator, enter the malfunction to fail PT-431, Blue Channel Pressurizer Pressure high. ***(Relative Order 4, Trigger 4)*** a. If directed as I&C to trip bistables, report that 2 I&C technicians will be available in 1 hour **(Note: bistables will not be tripped during this scenario.)** b. If contacted as Operations Management, acknowledge the report of the failure, and if asked agree to make other notifications to the NRC Resident Inspector, Duty Station Manager. c. If contacted as the FIN team supervisor, inform the crew that you will write a work order and assign an I&C supervisor to investigate. d. If desired, allow the crew to hold a crew brief. ***NOTE: If not diagnosed and responded to quickly enough this failure will result in a Reactor Trip and, potentially, a Safety Injection. If this should occur proceed immediately to Event 5 where the SGTR will be diagnosed during performance of 1E-0 or 1ES-0.1.*** ***NOTE: The SGTR take ~1.5 Minutes to generate an alarm. Enter the trigger accordingly.***	BOP ATC SRO	***Note: Per rules of usage reference use act may be used prior to consulting procedur follows:*** • ***Manual Control of Pressurizer Spray Valve*** **47012-0508 PRZR HI/LO PRESS** • Check pressure high or low. • If high, then perform the following actions: o Verify both pressurizer sprays are OPEN. o Verify all pressurizer heaters are OFF. • If necessary then control pressure in manual. • If due to channel failure, then refer to 1C51, INSTRUMENT FAILURE GUIDE – UNIT 1. **C51.3 Pressurizer Pressure 1P-431 High** • Place Pressurizer Pressure Controller in MAN stabilize pressure. • Select position “2-1” (WHITE-RED) on channe selector switch. • When pressure returned to normal with no de from setpoint, then return pressure control to automatic. • Verify Pressurizer Pressure Recorder not sele Blue channel. • Refer to the following Technical Specifications o T.S. LCO 3.3.1 Condition A & Table 3.3.1- Functions 6, 8a, 8b. o T.S. LCO 3.3.2 Condition A & Table 3.3.2- Function 1d. o T.S. LCO 3.4.1.a • Trip bistables.

SCENARIO TIME-LINE:

	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	8. When the crew has recovered Pressurizer pressure control, and/or at the discretion of the Lead Evaluator, enter the malfunction to cause a SGTR on 12 SG which will ramp in over the next 15 minutes. ***(Relative Order 5, Trigger 5)*** a. If directed to perform cation column frisks acknowledge the order and, after 1 minute, report 12 Steam Generator cation column has elevated activity, 11 Steam Generator cation column is reading background. b. If asked to take primary or secondary samples per RPIP 4503, state that the samples are in progress. c. If contacted as Operations Management, acknowledge the report of the failure, and if asked agree to make other notifications to the NRC Resident Inspector, Duty Station Manager. d. If directed to turn on all turbine building roof exhausters, wait 3 minutes and report all turbine building roof exhausters are running.	BOP ATC SRO	**C47022-0108, HI RADIATION TRAIN B PANEL ALA** • Determine the initiating alarm and respond to the a specified in C47048, TRAIN B RADIATION MONI SYSTEM ALARM RESPONSE PROCEDURES. • If malfunction of radiation monitor… N/A **C47048: 1R-15** • If primary-to-secondary leakage is confirmed by sa other indication, then: o Enter 1C4 AOP2, STEAM GENERATOR TUB -AND- o Turn on all turbine building roof exhausters. • If radiation monitor malfunctioned… N/A • Refer to T.S. 3.7.14, and T.S. 3.4.14 **1C4 AOP2, STEAM GENERATOR TUBE LEAK** • IF at any time RCS inventory can not be maintaine available charging flow, THEN perform the followin o Manually trip the reactor - enter 1E-O, Reacto Safety Injection. o WHEN reactor is verified tripped, THEN initiat Injection. o Exit this procedure • Continuously monitor 1R15 and 1R19 in the Contr for further increase. • If the only indication of a SG tube leak is a radioch analysis greater than 5 GPD… N/A • Notify the Operations Manager of the following: o Entry into this AOP per SWI O-28. o To determine if additional training on SG tube rupture is desired. • Notify NRC Resident Inspector of entry into this A SWI O-28.
	8. Response to Tube Leak continued. e. When directed to perform sampling required in 1C4 AOP2 agree to perform samples and inform the control room the samples are being drawn. After 3 minutes report 12 SG Cation frisk had elevated counts and 11 SG Cation frisk read background.		• Perform the following steps while continuing on in procedure: o Direct the duty chemist to: ▪ Perform RPIP 4503. ▪ Repeat Radiochemistry analysis • At least every 24 hours. • Whenever a 50% increase in count ra occurs. • Whenever process flows are changed ▪ Inform the Control Room when each SG s drawn. ▪ Inform the Control room when the leaking identified (11 or 12 SG)... o When the duty chemist reports sample time… o Stop Steam generator blowdown to the river u approval for release is given by Radiation Prot

SCENARIO TIME-LINE:

	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
			and Chemistry Manager. o Continuously monitor rate of change and GPD on ERCS using Tabular Display\Load Group\SGLeak_U1. o Determine the appropriate Procedure Section.

SCENARIO TIME-LINE:

	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	9. When the crew has determined tube leakage exceeds the available charging they will perform a reactor trip and initiate Safety Injection per 1C4 AOP2. a. Upon hearing the announcement of reactor trip, or when called as Turbine Building Operator to isolate the Unit 1 MSR's per Attachment J, then enter ***Relative Order 7 (Schedule file E-0_Att-J.sch).*** b. When called as the Turbine Building Operator to verify the status of Turbine Building Roof Exhausters, report that the Turbine Building Roof Exhausters are all secured. c. When directed to perform sampling after 3 minutes report 12 SG Cation frisk had elevated counts and 11 SG Cation frisk read background.	BOP ATC SRO	**1E-0, REACTOR TRIP OR SAFETY INJECTION** • Verify Reactor Trip. • Verify Turbine Trip. • Verify both safeguards buses energized. • Check if SI is actuated. • Perform Attachment L. ***Critical Task: Manually actuate at least one train o actuated safeguards equipment before transition o 0.*** • Check AFW Status. ***Critical Task: Establish and maintain 200 GPM AFW the Steam Generator(s) before transition out of E-0 the transition is to FR-H.1, in which case the task r initiated before RCPs are manually tripped in acco with step 2 of FR-H.1.*** • Verify total AFW flow greater than 200 gpm. • Verify AFW pumps discharge pressure greater tha psig. • Check NR SG levels greater than 5% in any SG. • Maintain NR SG level between 5% and 50%. • Check RCS temperatures stable at or trending to 5 • Check PRZR PORVS and Spray Valves closed • Check if RCPs should be stopped. • Check if SGs are not faulted. • Check if SG tubes are not ruptured. o Transition to 1E-3.
	9. Response to Steam Generator Tube Rupture continued.		**1E-3, STEAM GENERATOR TUBE RUPTURE** • Check if RCPs should be stopped. • Identify Ruptured SG. • Isolate flow from ruptured SG. o Set ruptured SG PORV in auto at 75% o Check Ruptured SG PORV – CLOSED o Close steam supply from ruptured to 11 TDAF o Verify Ruptured SG blowdown isolated. o Close Ruptured SG MSIV. ->RNO ▪ Close 11 MSIV. ▪ Set 11 SG PORV to 71.8%. ▪ Place Steam Dumps to off. ***Critical Task: Isolate feedwater flow into and steam from the ruptured Steam Generator before a transi ECA-3.1 occurs.*** ▪ Perform ATT B while continuing in 1E-3. *Attachment B actions are listed below)* • Check ruptured SG level.

SCENARIO TIME-LINE:

	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	9. Response to Steam Generator Tube Rupture continued.		• Reset SI • Check ruptured SG pressure – Greater than 210 p ***Critical Task: Establish/maintain an RCS temperatu that transition from E-3 does not occur because of inability to maintain required subcooling or such t extreme or severe challenge to the Subcriticality a Integrity CSF occurs.*** • Initiate RCS Cooldown… **Note:** ***During the cooldown, the SS must continue 8 to prepare the plant for depressurization.*** • Check intact SG level… • Check PRZR PORVs and Block Valves… • Reset SI • Reset Containment Isolation • Establish Instrument Air to containment • Check if RHR pumps should be stopped… • Establish Charging flow… • Check if RCS Cooldown should be stopped… • Check Ruptured SG pressure – Stable or increasi • Check RCS subcooling based on core exit T/Cs – than 40°F ***Critical Task: Depressurize RCS to meet SI termina criteria prior to overfilling the ruptured Steam Gen*** • Depressurize RCS to minimize break flow and refi • Check if SI flow should be terminated… ***Critical Task: Terminate SI prior to overfilling the r Steam Generator.*** • Stop SI pumps • Establish Charging flow… • Verify SI flow not required… **1E-3 Attachment B, Main Steamline Isolation** • Dispatch personnel to locally close cylinder heatin valves (CY-1-1 and CY-1-4) • Dispatch personnel to locally close air ejector suct (AR-5-1 and AR-5-2) • Verify turbine stop valves – CLOSED

SCENARIO TIME-LINE:

	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	9. Response to Steam Generator Tube Rupture continued. d. When directed to perform local actions of 1E-3 Attachment B, Main Steamline Isolation, follow along with the procedure and after 2 minutes report completion of directed step(s).		• Verify MSR steam isolation valves - CLOSED: o CV-31096 o CV-31097 o CV-31094 o CV-31095 • WHEN air ejector suction valves are closed, THEN normal and secondary air ejector steam supply va 32327 and MV-32355) • Verify standby air ejector suction valves (MV-3234 MV-32347) – CLOSED • Verify standby air ejector steam supply valves (MV CLOSED • Verify 11 and 12 hogging jet suction valves (MV-3 MV-32309) – CLOSED • Verify 11 and 12 hogging jet steam supply valves 32316 and MV-32317) – CLOSED • Verify steam dumps selected to OFF • Verify A/B main steam line free blows (CV-31645 a 31646) – CLOSED • Evaluate the need to transfer gland steam to heati
	10. When SI has been verified to not be required and has been terminated and/or at the discretion of the Lead Evaluator, place the simulator in FREEZE.		
	Emergency Plan Classification - Classify the event per F3-2 a. The SM may delegate ED duties to the Unit 2 SS if a Unit 2 SS is participating as part of the crew	SM	Classify the event as follows: • **Alert** - EAL **FA1** declared • Complete PINGP 577 • Initiate PINGP 1125 • Initiate PINGP 666

Facility: Prairie Island Scenario No.: 3 Op-Test No.: 2012301

Examiners: **D. McNeil** (R. Baker) Operators: _____
M. Bielby (D. Oliver) _____
D. Reeser _____

Initial Conditions: 93% Power and stable

Turnover: TSO is waiting to direct a reduction to 90% power. When directed, the crew is expected to reduce power to ~ 90% power and then perform a condensate pump swap.

Event No.	Malf. No.	Event Type*	Event Description
1		I (RO) TS (SRO)	T_{cold} Instrument Fails High
2		R (RO) N (BOP)	Restore T_{ave} to T_{ref} (Power reduction per TSO)
3		N (BOP)	Swap Condensate Pumps
4		C (RO) TS (SRO)	Pressurizer PORV significant leakage PCV-431C
5		C (BOP)	12 Condensate Pump Trip – 11 Condensate Pump Locks Out
6		C (RO)	Reactor Fails to Auto Trip
7		M (ALL)	Main Feedwater Line Break Inside Containment
8		C (BOP)	'A' Train Safeguards Equipment Fails to Auto Actuate

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

Guide Requirements

Goal of Training:

During all plant operating conditions, the crew will demonstrate the ability to monitor and operate the plant within the limits of the Operations Manuals and Technical Specifications.

When presented with various scenario events, the crew will demonstrate the ability to respond to the events using appropriate operating and administrative procedures to return the plant to stable conditions.

Learning Objectives:

1. During all plant operating conditions, demonstrate the ability to perform communications, verification practices (STAR and peer checks), procedure use, alarm response, reactivity control, and crew briefs in accordance with Operations Standards and Expectations.
2. Diagnose and perform corrective actions for T_{cold} instrument failing high per 1C5 AOP1, C47 and 1C51.3.
3. Restore T_{avg} to T_{ref} following inadvertent rod movement per 1C51.3.
4. Diagnose and perform corrective actions for Pressurizer PORV leakage per C47 and 1C4 AOP1.
5. Perform power reduction to ~90% power per 1C1.4.
6. Swap running condensate pumps per 1C28.3.
7. Diagnose and perform corrective actions for Main Feedwater break inside containment per 1E-0, 1E-2 and 1E-1.
8. Diagnose and perform corrective actions for failure of the Reactor to trip automatically when required per 1E-0.
9. Diagnose and perform corrective actions for 'A' Train Safeguards equipment failing to actuate per 1E-0.
10. Apply Technical Specifications to specific scenario events.

Prerequisites: None

Training Resources:

1. Full Scope Simulator
2. Lead Evaluator
3. Booth Operator (Primary communicator)
4. Backup Communicator

References:

1. 1C4 AOP1
2. 1C5 AOP1
3. 1C28.3
4. C47
5. 1C51.3
6. 1E-0
7. 1E-1
8. Tech Specs

Commitments: None

2012 ILT NRC SIMULATOR EVALUATION #3, REV. 0

Evaluation Method:	This is an evaluation scenario.
Operating Experience:	None – This is an evaluation scenario.
Related PRA Information:	**Initiating Event with Core Damage Frequency:** LOSS OF MAIN FEEDWATER (4%) **Important Components:** REACTOR PROTECTION **Important Operator Actions with Task Number:** None

TASKS ASSOCIATED WITH SIMULATOR EXERCISE(S):

None. This is an evaluation scenario and no credit will be taken for tasks performed.

GENERAL EXPECTATIONS

Over the duration of the scenario, monitor crew performance for adherence to the conduct of operations standards and Operations department Standards and Expectations:	• Communications • Verification Practices (STAR and Peer Checks) • Procedure Use • Alarm Response • Reactivity Control • Crew Briefs
Performance for adherence to administrative procedural requirements and operations management expectations:	• Reportability of the malfunction or event • Notifications to the Operations Manager and NRC Resident Inspector per SWI-O-28 • Notification to the Duty Station Manager per operations management request • Tech Spec implementation; interpretation; and documentation of decision made, actions taken, and the basis for decisions made and actions taken

QUANTITATIVE ATTRIBUTES

Malfunctions:

Before EOP Entry:

1. T_{cold} fails high
2. Leaking Pressurizer PORV PCV-431C
3. 12 Condensate pump trips/11 Condensate pump locks out
4. Reactor fails to trip automatically

After EOP Entry:

1. Main Feedwater line break inside containment
2. 'A' Train safeguards equipment fails to auto actuate

Abnormal Events:

1. T_{cold} fails high
2. Leaking Pressurizer PORV PCV-431C
3. 12 Condensate pump trips/11 Condensate pump locks out

Major Transients:

1. Main Feedwater line break inside containment

Critical Tasks:

1. E-0 – A: Manually trip the reactor from the control room before transition out of E-0.
2. E-2 – A: Isolate the faulted STEAM GENERATOR before transition out of E-2.

SCENARIO OVERVIEW:

INITIAL CONDITIONS:

1. This scenario can be run from the following Specific IC sets:
   - IC-293

2. The following equipment is OOS:
   - None

SEQUENCE OF EVENTS:

Event 1: T_{cold} instrument fails high

- T_{cold} instrument fails high causing auctioneered T_{avg} to indicate high.
- Control rods automatically insert.
- Charging pump speed rises.
- The crew will respond per 1C5 AOP1, C47 and 1C51 to defeat the failed channel and restore Rod Control to automatic.

Event 2: Restore T_{avg} to T_{ref} and/or Power Reduction to 90% power

- The crew will reduce power per 1C1.4.

Event 3: Swap Condensate pumps

- The crew will receive a report from the condensate system engineer of abnormal noise on the 11 condensate pump and recommendation to remove it from service.
- The crew will start 13 condensate pump and place 11 condensate pump in standby per 1C28.3.

Event 4: Leaking Pressurizer PORV PCV-431C

- A small leak will develop on Pressurizer PORV PCV-431.
- The crew will respond per C47 and 1C4 AOP1 to identify and isolate the leaking PORV.

Event 5: 12 Condensate pump trips and 11 Condensate pump locks out

- 12 Condensate pump will trip.
- 11 Condensate pump will restart, if in standby, but immediately lockout.
- 11 MFP will trip in response to loss of 12 Condensate pump.
- A first out will be generated on low low SG level if the reactor is not manually tripped earlier.
- The crew will respond per C47 and 1E-0, to manually trip the reactor.

Event 6: Reactor Fails to automatically trip

- The reactor will not trip automatically.
- The crew will respond per 1E-0 to manually trip the reactor.

Event 7: Main Feedwater line break inside containment

- Upon the reactor trip a Main Feedwater line break inside containment will occur.
- The crew will respond per 1E-2 to isolate the faulted SG.

Event 8: 'A' Train safeguards equipment fails to auto actuate

- 'A' train safeguards equipment will fail to actuate automatically.
- The crew will respond per 1E-0 to manually actuate the 'A' Train safeguards equipment using the control switch in the control room.

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	INITIAL CONDITIONS (IC): • IC-293 • Mode: 1 • Exposure: MOC • Power: ~91.7% • Boron: (CB): 638 ppm • Temperature: ~ 559°F • Pressure: ~2235 psig • Xenon: Building in • Rods: “D” @ 200 • Generator: 530	SRO BOP ATC	• If IC-293 is not available: o Reset to IC-10. o Reduce power to 530 Mw. o ~18 rod steps in and 15 gal Boration.
	1. SIMULATOR SET UP a. Set up the simulator to IC-293. b. Enter the malfunctions, remotes, and overrides, as specified by the "Simulator Input Summary." c. Complete the "Simulator Setup Checklist.”		

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	2. Simulator Pre-brief: a. The Simulator Pre-Brief is conducted prior to the crew entering the simulator. 1) Inform the crew that power is to be lowered to 90% upon TSO request due to grid loading. 2) Provide the crew a marked up copy of 1C1.4 Section 5.3 marked up for performance. a) Inform the crew there are no fuel conditioning requirements. b) Inform crew to lower Reactor Power to 90% at 0.5%/minute with rods in "MANUAL" with Turbine in "AUTO" in FSP mode. 3) Provide the crew a reactivity plan developed by the off going RO for the power reduction from current power to 195 Mw. 4) Inform the crew to verify the reactivity plan developed by the off going reactor operator. 5) Inform the crew that Nuclear Engineering was **not** available to provide a reactivity prediction. b. An SRO candidate will perform a pre-job brief for the performance of 1C1.4 Section 5.3.		
	3. COMPLETE TURNOVER: a. "UNIT 1 LPEO / PEO TURNOVER LOG." b. PRA Printout. c. Verify crew performs walk down of control boards and the reviews turnover checklists.	CREW	Review the following with the off-going operator: • "Unit 1 LPEO / PEO Turnover Log" • PRA printout • Walk-down the control boards and ask questions as appropriate

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
EVENT 1 & 2	4. When the crew has assumed the duty, and at the discretion of the lead evaluator, enter the malfunction to cause the Blue Channel T_{cold} to fail high. ***(Relative Order 1, Trigger 1)*** a. If directed as I&C to trip bistables, report that 2 I&C technicians will be available in 1 hour. **(Note: bistables will not be tripped during this scenario.)** b. If contacted as Operations Management, acknowledge the report of the failure, and if asked agree to make other notifications to the NRC Resident Inspector, Duty Station Manager. c. If contacted as the FIN team supervisor, inform the crew that you will write a work order and assign an I&C supervisor to investigate. d. If desired, allow the crew to hold a crew brief.	BOP ATC SRO	***Note: Per rules of usage reference use actions may be used prior to consulting procedure as follows:*** • ***Place Rod Control in manual*** • ***Manually control Charging*** **1C5 AOP1, UNCONTROLLED ROD MOTION** • Check Generator Electrical Load – STABLE • Place Rod Bank Selector Switch to "MANUAL" • Check Rod Motion – STOPPED • Check for Failed Instrument: o NIS power range channels – ALL IN AGREEMENT o RCS loop Tavg channels – ALL IN AGREEMENT o Turbine impulse pressure 1PT-485 – NORMAL FOR POWER • Go to 1C51, Instrument Failure Guide **C47012-0104, REACTOR COOLANT SYSTEM HI TAVG** • Check RCS Tavg • If due to an instrument malfunction: o Place rod control in manual and adjust as needed o Shift charging pumps to manual and adjust as needed o Verify steam dumps not armed o Refer to 1C51 **1C51.3, TAVG LOOP 1B 1T-403 - HIGH** • Place rod control in manual and maintain Tavg • Place charging pump speed in manual and maintain pressurizer level • If necessary, take manual control of steam dumps

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
EVENT 1 & 2 cont…	4. Response to T_{AVG} failing high continued.		• Select blue channel on the Tavg defeat switch and pull out • Return the following to auto: o Rod control o Charging pump speed control o Steam dumps • Refer to T.S: o LCO 3.3.1 condition A, table 3.3.1-1 function 6, 7 o LCO 3.3.2 condition A, table 3.3.2-1 function 4d o TRM TLCO 3.3.3 condition A • Trip bistables

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
EVENT 2	5. When the crew has restored Tave to Tref, and/or at the discretion of the Lead Evaluator, deliver the direction for the crew to reduce power to 90%. a. When directed by the Lead Evaluator contact the control room as the TSO and direct power reduction to 90% power. b. When contacted, as Duty Chemist, acknowledge load change. ***Note: This event only needs to be performed if, in the opinion of the Lead Evaluator, adequate performance of reactivity manipulations has not been observed for the ATC operator.*** 5. Power reduction continued.	BOP ATC SRO	**1C1.4 UNIT 1 POWER OPERATION** **5.3 Small Turbine Load Adjustment** NOTE: IF the load change will be performed in conjunction with rod movement and/or boron concentration change, THEN 1C5 and/or C12.5 will also be used. • Verify Pre-Job Brief completed, as necessary. • Notify the Duty Chemist of the load change. • IF desired, THEN place CS-46280, ROD BANK SELECTOR, in "MANUAL". Refer to Precaution 3.7. • Start the load change as follows: ○ Using the "On Line Control" screen, select the desired Control Mode (VPC, FSP, or LOAD). ○ Using the "On Line Control" screen, select the desired demand rate. ○ Verify the "VPL" control is not Red. IF the "VPL" control is Red, THEN using the "On Line Control" screen, lower the "Target" setting to a value slightly less than the "Actual" value using the decrease (▼) control. ○ Select the "Go" control to initiate the load decrease. Continue to reduce load until the "VPL" control is no longer Red. ○ Raise the "VPL" as necessary using the "Valve Limiter" pop-up screen. ○ Set the "Target" setting to the desired load by using the "On Line Control" screen "Target" increase/decrease (▲/▼) controls. ○ Select the "Go" control using the "On Line Control" screen. ○ To suspend the load change, select turbine control "Hold" on the "On Line Control" screen. ○ Verify the load change stops when desired load is

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
EVENT 2 cont…			obtained. o Lower the “VPL” until the “Valve Position Limit” signal is at or close to the “Current Valve Demand” signal. This will prevent unexpected turbine load increases due to grid transients. o Verify CS-46280, ROD BANK SELECTOR, in “AUTO”

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
EVENT 3	6. When the crew has restored Tavg to Tref, and/or at the discretion of the Lead Evaluator, notify the control room of abnormal noise in the 11 Condensate pump ***(Relative Order 3)*** a. As the Shift Manager, contact the control room and inform the Shift Supervisor the Condensate system engineer, over the course of a system walkdwon, discovered an abnormal noise coming from the 11 Condensate pump and has recommended swapping the 11 and 13 Condensate pumps due to concern of immenent failure and that you agree with this course of action. Indicate the System Engineer will be writing a CAP and WR to address the pump and will contact the FIN team. b. Follow along in 1C28.3 step 5.6 and report back all local actions and checks are complete as requested after 2 minutes. None of the local checks are modeled in the simulator. c. If contacted as the SM and/or the Condensate system engineer for a recommendation on the auto/manual selector for 11 Condensate pump then recommend placing the 11 Condensate pump into pullout.	BOP ATC SRO	**1C28.3, UNIT 1 CONDENSATE SYSTEM** **Section 5.6 Swapping Condensate Pumps** • Check condensate pump oil cooling water flow using cooling water return sight glass. • Check condensate pump gland seal water flow using the following: o Flow through the gland seal water sight glass – local. o Seal water pressure is 18-24 psig – local. o Following annunciators NOT LIT: ▪ 47009-0402, 11 CONDENSATE PUMP SEAL WATER LO PRESS ▪ 47009-0403, 12 CONDENSATE PUMP SEAL WATER LO PRESS ▪ 47009-0404, 13 CONDENSATE PUMP SEAL WATER LO PRESS • Ensure the motor bearing of the condensate pump have the proper oil level - local. • Verify all condensate pump suction valves are open - local. • Notify the duty chemist that a condensate pump is being started and secondary chemistry may be affected. • Place the desired condensate pump selector switch in “MANUAL”. • Start the desired condensate pump by placing the control switch to the “START position. • Check the pump visually for excessive vibration or seal leakage. • Check the bearing temperatures and motor stator temperatures on ERCS • Close the discharge vent of the running condensate pump - local. • Verify pump gland seal water pressure is 18-24 psig – local. • Verify heat removal fans have started – local. • Check condensate header pressure approx. 440 psig on

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
EVENT 3 cont…	6. Swapping 13 and 11 Condensate Pumps continued.		4122101, 11/12/13 CD PMP DISCH HDR PI. • Stop the desired condensate pump by placing the control switch to the “STOP” position. • If desired, Then place a condensate pump selector switch in “STANDBY”. • Open the discharge vent valve of the condensate pump that was stopped – local.

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
EVENT 4	7. When the crew has swapped running Condensate Pumps, and/or at the discretion of the Lead Evaluator, enter the malfunction to cause Pressurizer PORV PCV-431C leakage. ***(Relative Order 4, Trigger 4)*** a. If contacted as Operations Management, acknowledge the report of the failure, and if asked agree to make other notifications to the NRC Resident Inspector, Duty Station Manager. b. If contacted as the FIN team supervisor, inform the crew that you will write a work order and assign a Mechanical Maintenance supervisor to investigate. c. If desired, allow the crew to hold a crew brief.	BOP ATC SRO	***Note: Per rules of usage, reference use actions may be used prior to consulting procedure as follows:*** • ***Manually close EITHER Pressurizer Block Valve.*** **47012-0109 PRZR SAFETY/RELIEF VALVE FLOW** • Check flow monitor light to determine which valve opened. • Depress individual flow monitor lights to reset alarm and lights. • Check safety/relief line temperatures, they should decrease after valves reseat. • Determine cause for opening of valve. • If PORV fails to seat, then close PORV block valve with power maintained to the valve. • Enter T.S. LCO 3.4.11, Condition A • Refer to 1C4 AOP1, Reactor Coolant Leak • Effect necessary repairs and return system to normal. **1C4 AOP1, REACTOR COOLANT LEAK** • Determine charging pumps can maintain pressurizer level. • Table 1: Close PORV isolation valves one at a time to try to determine which PORV is leaking • Make notifications per SWI O-28

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
EVENT 5 & 6	8. When the crew has closed the leaking PORVs associated block valve, and/or at the discretion of the Lead Evaluator, enter the malfunction to trip the 12 Condensate Pump. ***(Relative Order 5, Trigger 5)*** ***NOTE: When the reactor is tripped proceed immediately to Event 7.***	BOP ATC SRO	***Note: Per rules of usage reference use actions may be used prior to consulting procedure as follows:*** • ***Manually Trip the Reactor*** **C47010:0101, 11 Feedwater Pump Locked Out** • If reactor power is greater than 85%, then manually trip the reactor and go to 1E-0, Reactor trip or Safety Injection. **C47017:0304 11 STM GEN LO LO LVL Reactor Trip** • Perform 1E-0, Reactor Trip or Safety Injection.

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
EVENT 7 & 8	9. When the crew has recognized the need to trip the reactor and performed a manual trip, and/or at the discretion of the Lead Evaluator, enter the Main Feedline break inside containment. ***(Relative Order 7, Trigger 7)*** a. Upon hearing the announcement of reactor trip, or when called as Turbine Building Operator to isolate the Unit 1 MSR's per Attachment J, then enter (***Relative Order 7a).*** b. If directed to open reactor trip breakers, wait 1 minute and delete malfunctions RP02A and RP02B and then report completion ***(Relative Order 7b)***. c. If directed to perform cation column frisks acknowledge the order and, after 1 minute, report BOTH 11 and 12 Steam Generator cation column has are reading background.	BOP ATC SRO	**1E-0, REACTOR TRIP OR SAFETY INJECTION** ***Critical Task: Manually trip the reactor from the control room before transition out of E-0.*** • Verify Reactor Trip. • Verify Turbine Trip. • Verify both safeguards buses energized. • Check if SI is actuated. • Perform Attachment L. • Check AFW Status • Verify total AFW flow greater than 200 gpm. • Verify AFW pumps discharge pressure greater than 900 psig. • Check WR SG levels greater than 50% in any SG. • Control feed flow to maintain wide range SG level between 50% and 59%. • Check RCS temperatures stable at or trending to 547°F. • Check PRZR PORVS and Spray Valves: • PRZR PORVs closed. • PRZR Spray Valves closed. • Check if RCPs should be stopped: • Stop both RCPs. • Check if SGs are not faulted. • Check no SG pressure decreasing in an uncontrolled manner. • Check no SG completely depressurized. • Transition to 1E-2. **1E-2. FAULTED STEAM GENERATOR ISOLATION** • Check MSIV and Bypass Valve closed on 12 SG. • Check if either SG is NOT faulted: • Identify faulted SG.

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES

EVENT 7 & 8 cont…	9. Main Feedline break inside containment continued.		• Isolate faulted SG.
			Critical Task: Isolate the faulted STEAM GENERATOR before transition out of E-2.
			• Check CST level - Greater than 10,000 Gallons.
			• Check Secondary Radiation.
			• Go To 1E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1.
			
			1E-1, LOSS OF REACTOR OR SECONDARY COOLANT.
			NOTE: The crew may transition to 1ES-0.2, SI TERMINATION, from 1E-1 info page once conditions are met.
			• Check if RCPs should be stopped.
			• Check if SGs are not faulted.
			• Check intact SG levels.
			• Check secondary radiation - Normal.
			• Check PRZR PORVs and block valves.
			• Reset SI
			• Reset Containment Isolation
			• Establish Instrument Air to Containment
			• Check power supply to Charging Pumps - OFFSITE POWER AVAILABLE.
			• Check if SI flow should be terminated:
			  ○ RCS subcooling based on core exit T/Cs - GREATER THAN 20°F.
			  ○ Secondary heat sink.
			  ○ RCS pressure:
			  ▪ Pressure - GREATER THAN 2000 PSIG.
			  ▪ Pressure - STABLE OR INCREASING.
			  ○ PRZR level - GREATER THAN 7%.
			• Go to 1ES-0.2, SI TERMINATION, Step 1.

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
EVENT 7 & 8 cont…	9. Main Feedline break inside containment continued.		**1ES-0.2, SI TERMINATION** • Reset SI. • Reset Containment Isolation. • Establish instrument air to containment. • Stop Safeguards Pumps. • Check if charging flow has been established. • Verify SI flow is not required.
	10. When SI has been verified to not be required and has been terminated and/or at the discretion of the Lead Evaluator, place the simulator in FREEZE		
	Emergency Plan Classification - Classify the event per F3-2 a. The SM may delegate ED duties to the Unit 2 SS if a Unit 2 SS is participating as part of the crew	SM	Classify the event as follows: • **???** - EAL **???** declared • Complete PINGP 577 • Initiate PINGP 1125 • Initiate PINGP 666