Facility: PRAIRIE ISLAND Scenario No.: 1 Op-Test No.: PI-ILT-NRC-1801

Examiners: Operators: Shift Supervisor
Lead Reactor Operator
Reactor Operator

Initial Conditions:

Reactor Power at 100%, Boron Concentration at 1367 ppm, RCS temperature at 560°, RCS pressure at 2235 psig, Xenon at equilibrium, Bank D rods at 218, Generator Power at 580 Mw.

12 MD AFW Pump is out of service. T.S. LCO 3.7.5 Condition B was entered with 48 hours remaining. 11 TD AFW Pump is protected.

Turnover:

Transfer Bus 15 from CT11 to 1RY per section 6.16 of 1C20.5.

Event No.	Malf. No.	Event Type*	Event Description
1		N (BOP, SRO)	TRANSFER BUS 15 FROM CT11 TO 1RY
2		C (ATC, BOP, SRO)	LETDOWN HX HIGH TEMP
3		C (BOP, SRO) TS(SRO)	11 CFCU IN LOCAL
4		I (ATC, SRO) TS (SRO)	RCS TAVG FAILS HIGH
5		R (ATC) N(SRO)	11 MFP STATOR HIGH TEMP / RAPID LOAD REDUCTION
6		C (ATC, SRO)	LOSS OF FEED / AUTO REACTOR TRIP FAILURE
7		M (ALL)	LOSS OF HEAT SINK

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

Xcel Energy

SIMULATOR EXERCISE GUIDE (SEG)

SITE: PRAIRIE ISLAND **SEG # PI-ILT-NRC-1801S**

SEG TITLE: 2018 ILT NRC SIMULATOR EVALUATION #1 **REV. # 0**

PROGRAM: INITIAL LICENSE OPERATOR TRAINING #: FL-ILT

COURSE: INITIAL LICENSE OPERATOR TRAINING #: FL-ILT

TOTAL TIME: 2.0 HOURS

Developed by:	**Fredrick Collins** *Instructor*	*Date*
Reviewed by:	**Justin Hasner** *Instructor* *(Simulator Scenario Development Checklist.)*	*Date*
Validated by:	**Justin Hasner** *Validation Lead Instructor* *(Simulator Scenario Validation Checklist.)*	*Date*
Approved by:	**Shawn Sarrasin** *Training Supervision*	*Date*

Guide Requirements

Evaluation Objectives:

Evaluate the crews ability to:

1. Transfer power on Bus 15 from CT11 to 1RY per 1C20.5.
2. Perform a rapid power reduction from 100% to <330 Mw (~55%) per 1C1.4 AOP1.

Evaluate the crew's ability to diagnose and respond to:

3. Letdown Heat Exchanger high temperature per C47015-0408.
4. 11 CFCU placed in local per C47019.
5. Blue RCS T-Hot Instrument failing HIGH per C7 AOP1 and 1C51.3.
6. 11 Main Feed Pump high stator temperature per C47010-0401.
7. Loss of Main Feed Water per C47010-0401, 1E-0, and 1ES-0.1.
8. Loss of Heat Sink per 1FR-H.1.

Training Resources:

1. Full Scope Simulator
2. NRC Evaluation Team
3. Booth Operator (Backup Communicator)
4. Primary Communicator

Related PRA Information:

Initiating Event with Core Damage Frequency:
NONE

Important Components:
12 MD AFW PMP
11 TD AFW PMP

Important Operator Actions with Task Number:
OPERATOR FAILS TO LINE UP OTHER UNIT MDAFW PUMP (4.7%) CRO 061 ATI 00 000 005 – Cross-connect MD AFW Pumps

QUANTITATIVE ATTRIBUTES

Malfunctions:

Before EOP Entry:

1. Component Cooling Water Return from Letdown Heat Exchanger fails CLOSED.
2. 11 CFCU inadvertently placed in LOCAL.
3. TE-403, RCS T-Hot Transmitter, fails HIGH.
4. 11 Main Feed Pump stator high temperature.

After EOP Entry:

1. 11 TD AFW Pump failure.
2. Automatic reactor trip failure.

Abnormal Events:

1. Uncontrolled Rod Motion.
2. RCS Temperature Instrument Failure.
3. Rapid Power Reduction.

Major Transients:

1. Loss of Heat Sink.

Critical Tasks:

1. PI-CT-1: Manually trip the reactor from the Control Room to prevent both steam Generators from reaching DRYOUT conditions.
2. PI-CT-10: Establish feedwater flow to the Steam Generators to prevent both Steam Generators from reaching DRYOUT conditions.

CRITICAL TASK SHEET

Number:	PI-CT-1
Critical Task:	Manually trip the reactor from the Control Room to prevent both Steam Generators from reaching DRYOUT conditions.
Safety Significance:	If the main turbine trips and the reactor fails to automatically trip, then the steam dumps and/or SG PORVs will draw steam from the Steam Generators. This steam will not return to the main condenser and hot-well. This results in rapidly lowering hot-well level, eventual trip of the Main Feed Water Pumps, and loss of feed water to the Steam Generators. During a loss of feed water to the Steam Generators, the turbine, steam dumps, or SG PORVs are drawing steam from the Steam Generators. This causes Steam Generator levels to rapidly lower. Once the SGs are dry, the heat removal capability of the RCS is lost. This leads to RCS pressure increase and RCS boundary failure.

Plant Conditions:	• At least one of the following occurs:
	  ○ Loss of normal feed water to the Steam Generators.
	  ○ Main Turbine Trip.
	• The reactor fails to automatically trip.
	• Rods fail to automatically insert.
	• Reactor Power is greater than 5%.
	• At least one of the following is drawing steam from the SGs:
	  ○ Main Turbine.
	  ○ Steam Dumps.
	  ○ SG PORVs.

Cues:	• Steam Generator levels lowering. • Both Reactor Trip breakers closed.

Performance Indicator:	• Opening the Reactor Trip Breakers by operating one of the following Reactor Trip Switches:
	
	  ○ CS-46331.
	  ○ CS-46450.
	
	  -OR-
	
	• Inserting all control rods by operating CS-46447, AMSAC/DSS Control Switch.
	
	NOTE:
	• Steam Generator dry out indicated by BOTH of the following:
	  ○ Wide Range Level < 13% [17%] AND
	  ○ SG Pressure rapidly lowering or completely depressurized.

Feedback:	• Control rods at bottom of core. • Neutron flux decreasing.

CRITICAL TASK SHEET

Number:	PI-CT-10
Critical Task:	Establish feed water flow to the Steam Generators to prevent both Steam Generators from reaching DRYOUT conditions.
Safety Significance:	With insufficient feed water flow, the Steam Generators dry out, causing an RCS pressure increase that opens the pressurizer PORVs. The open PORVs create a small break LOCA that challenges the Core Cooling CSF. Failure to maintain an adequate heat sink will result in degradation of the Fuel Clad Barrier and RCS Barrier.

Plant Conditions:	• SGs are required for heat sinks.
	• Feed water flow is available but not established from any of the following:
	  ○ Auxiliary Feed water Pumps
	  ○ Main Feed Water Pumps
	  ○ Condensate Pumps
	• Sufficient time is available to align feed water flow to at least one Steam Generator prior to Wide Range level lowering below 13% [17%].
	• NO ATWS.
	• NO Station Blackout.

Cues:	• Less than 200 GPM of feed water flow to the Steam Generators. • Both Steam Generators levels lowering. • RCS pressure is above the pressure of all Steam Generators.

Performance Indicator:	• Prior to the need to establish bleed and feed, the crew manipulates controls to establish feed water flow into at least one SG with one or more of the following:
	  ○ Auxiliary Feed Water Pumps
	  ○ Main Feed Water Pumps
	  ○ Condensate Pumps
	
	NOTES:
	• The crew establishing RCS bleed and feed instead of using a feed water source would most likely constitute a failure.
	
	• Steam Generator dry out indicated by BOTH of the following:
	  ○ Wide Range Level <13% [17%] AND
	  ○ SG Pressure rapidly lowering or completely depressurized.

Feedback:	• Increasing water level in at least one Steam Generator. • Feed water flow into at least one SG.

SCENARIO OVERVIEW:

INITIAL CONDITIONS:

- Exposure: BOC
- Power: 100%
- Boron: (CB): 1367 ppm
- Temperature: 560°F
- Pressure: 2235 psig
- Xenon: Equilibrium
- Rods: "D" @ 218
- Generator: 580 MW

EQUIPMENT OOS

- N51 and N52 Displays
- 12 MD AFW Pump

SEQUENCE OF EVENTS:

Event 1: Transfer Power on Bus 15 from CT11 to 1RY

- Bus 15 is initially receiving power from CT11.
- A designated operator is stationed to monitor Bus Phase Currents.
- The crew will transfer Bus 15 to 1RY transformer per 1C20.5.

Event 2: Letdown Heat Exchanger High Temperature

- 11 Letdown HX temperature will rise to greater than 140°F.
- CV-31204 will auto swap to VC TNK position.
- The crew will manually control temperature using 1HC-130.
- The crew will re-position CV-31204 when temperature returns to 110°F.

Event 3: 11 Containment Fan Coil Placed in Local

- The crew will place the 11 CFCU in off.
- The crew will return 11 CFCU to remote.
- The crew will start 11 CFCU.
- The SS will enter T.S. LCO 3.6.5 Condition C.

Event 4: TE-403, Blue Channel RCS T-Hot Transmitter, fails HIGH

- Blue Channel RCS Tavg and Delta T fail High.
- Rods automatically step in.
- Charging pump speed rises to maximum and Pressurizer level rises.
- The crew will place Rod Control in manual per C7 AOP1.
- The crew will place Pressurizer Level control in manual per 1C51.3.
- The SS will enter TS LCO 3.3.1 Conditions A and E AND TS LCO 3.3.2 Conditions A and D.

Event 5: 11 Main Feed Pump High Stator Temperature / Rapid Load Reduction

- 11 MFP Motor Stator Temperature will rapidly rise to 125°F.
- Annunciator 47010-0401, 11 MFP Motor Stator Hi Temp Alarm, will be received.
- 11 MFP Motor Stator Temperature will slowly rise to 150°F over 45 minutes.
- The System Engineer will recommend securing 11 MFP within 30 minutes.
- The crew will perform a rapid power reduction per 1C1.4 AOP1.

Event 6: Loss of Main Feed Water / Automatic Reactor Trip Failure

- Both Main Feed Pumps lockout.
- The reactor will not automatically trip and rods will not automatically step in.
- The crew will manually trip the reactor and enter 1E-0.
- The crew will transition to 1ES-0.1.

Event 7: Loss of Heat Sink

- 11 TD AFW Pump will trip on overspeed after the reactor trip.
- 11 TD AFW Pump will NOT be available for the remainder of the scenario.
- The crew will transition to 1FR-H.1.
- 21 MD AFW Pump will be aligned to Unit 1 after the crew has transitioned to 1FR-H.1.
- Establishing Condensate to the Steam Generators is an available success path; however, the crew should use AFW flow from Unit 2.
- Once feedwater flow (from Unit 2 AFW or Condensate) is established, the crew will transition back to 1ES-0.1.

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	1. **SIMULATOR PRE-BRIEF:** a. The Simulator Pre-Brief is conducted prior to the crew entering the simulator. 2. **COMPLETE TURNOVER:** a. "UNIT 1 LPEO / PEO TURNOVER LOG." b. 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" • Walk-down the control boards and ask questions as appropriate
EVENT 1	**Booth Operator / Communicator:** 1. After the crew has assumed the duty, they will transfer power on Bus 15 from CT11 to 1RY per section 6.16 of 1C20.5. 2. If contacted as the out-plant operator to check Bus 15 Room clear, then wait two minutes and report back that Bus 15 Room is clear of personnel. 3. If contacted as the out-plant operator to check closing springs on BKR 15-3, then wait two minutes and report back the closing springs are charged on BKR 15-3.	BOP	**<u>1C20.5, UNIT 1 – 4.16KV SYSTEM</u>** • Place CS-46951, BKR 15-3 MAN/AUTO CLOSURE SEL SW, in "MANUAL". • Place CS-46906, BUS 15 SYNCHROSCOPE SEL SW, in "1RY". • Check 115 – 130 volts on Bus Incoming volt meter. • Check 115 – 130 volts on Bus Running volt meter. • Check the difference between incoming and running is less than 8 volts. • Check Synchroscope is less than or approximately 20° from the twelve o'clock position. • Check the two white synchronizing lights are NOT LIT. • Place CS-46953, BKR 15-3 BUS 15 SOURCE FROM 1RY XFMR, in "CLOSE". • Place CS-46955, BKR 15-7 BUS 15 SOURCE FROM BUS CT11, in "TRIP". • Check Bus 15 voltage is approximately 4.16kv. • Check 44021 Bus 15 light LIT. • Place CS-46906, BUS 15 SYNCHROSCOPE SEL SW, in "OFF". • Place CS-46951, BKR 15-3 MAN/AUTO CLOSURE SEL SW, in "AUTO".

EVENT 2	**Booth Operator / Communicator:** 1. After the crew has transferred Bus 15 to RY Source, and/or at the discretion of the Lead Evaluator, then enter: **Trigger 2, Letdown Heat Exchanger High Temperature.** 2. 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. 3. If contacted as Chemistry and/or Radiation Protection, then acknowledge report of change to demineralizer status. **Plant Response:** 1. 1HC-130 output lowers to zero. 2. 11 Letdown HX outlet temperature rises. 3. CV-31204 re-positions to VC TNK position. 4. Annunciator 47015-0408 alarms. 5. 1HC-130 will function correctly in manual mode. ***NOTE: Crew may choose to delay resetting CV-31204 to demineralizer position until a brief is completed for a possible reactivity change.***	ATC BOP	**C47015-0408, LTDN FLOW HI TEMP** • Monitor 1TI130, LTDN HX OUTL TEMP. • Ensure CV-31204, LTDN DIVERT TO PURIF (1TCV-145), to VC TNK position. • Verify charging and letdown flows are approximately balanced per 1C12.1. • Verify CV-31202 controller output indicates an open demand. • If CV-31202 controller output indicates NO open demand, then place 1HC-130 in manual and adjust letdown HX outlet temperature to approx. 110°F. • Notify Chemistry and Rad Protection. • Initiate Work Request. • Reset CV-31204 to demineralizer position when temperature decreases below 130°F.

EVENT 3	**Booth Operator / Communicator:** 1. After the crew has responded to the Letdown Heat Exchanger high temperature, and/or at the discretion of the Lead Evaluator, then enter: **Trigger 3, 11 FCU in LOCAL** 2. If contacted as the Operations Management, acknowledge the report of the failure, and agree to make other notifications to the NRC, Duty Station Manager, etc. as asked. **Plant Response:** 1. 11 CFCU stops. 2. The following annunciators will be received: a. 47019-0304, 11 CONTAINMENT FAN COIL UNIT LOCAL CONTROL SI AUTO BLOCKED. **Booth Operator / Communicator:** 1. One Minute after inserting trigger 1, call the control room and inform them that while performing OJT/TPE your under instruction accidentally placed the 11 CFCU Local/Remote selector switch in LOCAL. 2. When directed by the crew to return 11 CFCU Local/Remote selector switch to remote acknowledge the order enter **Trigger 13,** and inform the control room CS-19880, 11 CNTMT FCU LCL/REM SEL SW to REMOTE is in REMOTE.	BOP SS	**C47019-0304, 11 CONTAINMENT FAN COIL UNIT LOCAL SONTROL SI AUTO BLOCKED:** • IF unexpected, THEN dispatch an operator to investigate • Place CS-46018, 11 CNTMT FAN COIL UNIT, in the OFF position. • IF 11 CFCU is aligned for support cooling THEN: o Monitor 11 RCP stator temperatures. o Annunciator 47021-0503, Reactor Vessel Support Cooling LO Flow, may be received. o IF restarting 11 CFCU is delayed, THEN consider aligning 12 CFCU for support cooling. • Return CS-19880, 11 CNTMT FCU LCL/REM SEL SW to REMOTE • Start 11 CFCU in desired speed using CS-46018 The SS will **enter** the following TS LCOs: • LCO 3.6.5 Condition C: • Restore CFCU(s) to OPERABLE status within 7 days. AND • 10 days from discovery of failure to meet the LCO.

EVENT 4	**Booth Operator:**
	1. After the crew has restarted 11 CFCU and addressed Tech Specs, and/or at the discretion of the Lead Evaluator, then enter:
	Trigger 4, RCS T-Hot Transmitter fails HIGH.
	
	2. If contacted as I&C to trip bistables, inform the crew two I&C Technicians will be available in 45 minutes.
	3. If contacted as the Operations Management, acknowledge the report of the failure, and agree to make other SWI O-28 notifications to the NRC, Duty Station Manager, etc.
	4. 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.
	
	Plant Response:
	1. Blue Channel RCS Tavg and Delta T fail high.
	2. Control Rods automatically step IN.
	3. Tavg will lower due to rod movement.
	4. Multiple annunciators on C panel.
		ATC
		
		ATC
		
		ATC
		
		BOP
		
		SS
			C7 AOP1, PLANT STABILIZATION
			• Check turbine generator load STABLE.
			• Place rod bank selector switch in MANUAL.
			• Check rod motion STOPPED.
			• Go to 1C5 AOP1, Step 4.
			
			1C5 AOP1, UNCONTROLLED ROD MOTION
			• Check for failed instruments.
			  • RCS loop Tavg channels – ALL IN AGREEMENT
			  • Go to 1C51.
			
			1C51.3, TAVG LOOP 1B 1T-403 - HIGH
			• Place rods in manual and maintain Tave at Tref.
			• Place charging pump speed control in manual and maintain pressurizer level.
			• Select Blue Channel on the Tavg defeat switch and pull out.
			• Return Rods and pressurizer level control to AUTO.
			• The SS will **enter** the following TS LCOs:
			  • 3.3.1 Condition A to enter condition in Table 3.3.1-1 immediately.
			  • 3.3.1 Condition E to place channel in trip within 6 hours.
			  • 3.3.2 Condition A to enter condition in Table 3.3.2-1 immediately.
			  • 3.3.2 Condition D to place channel in trip within 6 hours OR be in Mode 3 in 12 hours AND in Mode 4 in 18 hours.
			  • TRM TLCO 3.3.3 Condition A.

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
EVENT 5	**Booth Operator:** 1. When the crew has returned rod control to automatic and/or at the discretion of the lead evaluator, then enter: **Trigger 5, 11 Main Feed Pump High Stator Temperature.** 2. If contacted as an out-plant operator to locally check 11 Main Feedwater Pump, inform CR that motor coolers are in operation and cool air is directed on the motor. 3. If contacted as the Operations Management, acknowledge the report of the failure, and agree to make other notifications to the NRC, Duty Station Manager, etc. as asked. 4. If contacted as the FIN Team Supervisor, inform the crew that you will write a work order and assign a Maintenance Supervisor to investigate. 5. When personnel outside of the control room is notified of the 11 MFP issue, then wait approximately 1 minute and call the control room, as the System Engineer, and recommend securing 11 MFP within 30 minutes. **Plant Response:** 1. 11 MFP Motor Stator Temperature will rapidly rise to 125°F. 2. Annunciator 47010-0401, 11 MFP Motor Stator Hi Temp Alarm, will be received. 3. 11 MFP Motor Stator Temperature will slowly rise to 150°F over 45 minutes.	BOP ATC / BOP / SS	**C47010-0401, 11 FEEDWATER PUMP MOTOR STATOR HI TEMP** • Check stator temperature high by observing the redundant stator temperatures. • Verify motor coolers in operation and that cool air is directed on the motor. • Check for excessive motor current OR low bus voltage. • If temperatures continue to increase, then make preparations to secure 11 Feedwater Pump. o Verify 12 Feedwater Pump running. o Manually reduce power to 330 MWe. o Stop 11 Feedwater Pump.

EVENT 5 (cont)	**Booth Operator / Communicator:** 1. Rapid Load Reduction: a. If contacted as the TSO, acknowledge that Unit 1 is reducing power due to loss of feed pump. b. If contacted as Unit 2 Control Room Operators to monitor Unit 1 Heater Drain Tank alarms (Panel F), then acknowledge request and inform Unit 1 Operators that an extra operator will monitor Panel F. **NOTE** ***It is NOT intended to wait for the plant to reach 50% power prior to proceeding to the next event. The next event is best started from ~90% power.***	ATC / SS ATC / SS	**1C1.4 AOP1, RAPID POWER REDUCTION UNIT 1** • Determine the predicted Boron addition and final Control Rod Position by obtaining values from the appropriate contingency reactivity plan. • Borate the RCS as necessary to maintain control rods above the insertion limit and control delta I within limits. • Control Rods in auto or manual during the load reduction. • Place pressurizer heaters to “ON”. • Using the “On Line Control” screen, select the “Control Mode” pop-up screen. • Select the desired control mode (“VPC”, “FSP”, or “LOAD”). • Using the “On Line Control” screen, select the “Demand Rate” pop-up screen. • Select the desired rate of load change. • Set the desired Target setting using the “On Line Control” screen. • Using the “On Line Control” screen, select the Go control to initiate load reduction. **1C12.5, UNIT 1 BORON CONCENTRATION CONTROL** • Verify the Boric Acid integrator is reset. • Set 1YIC-110, BA TO BLENDER BATCH INTEGRATOR, to quantity desired. • Place CS-46300, MAKE-UP MODE SELECTOR, to “BORATE”. • If desired, then adjust 1HC-110, BA TO BLENDER FLOW CONT, to “MANUAL” and adjust output for desired flow rate. • Momentarily place CS-46457, BORIC ACID MAKE-UP CONTROL, to “START”, to initiate the boration. • When the desired quantity of boric acid has been added, then verify automatic makeup stopped as

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
EVENT 5 (cont)			indicated by CS-46457, BORIC ACID MAKE-UP CONTROL, green light LIT. • If additional boration is desired, then return to step 2. • When the boration is complete, then verify 1HC-110, BA TO BLENDER FLOW CONT, is in “AUTO”. • Reset the Boric Acid integrator. • Perform a 10 gallon flush.

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
EVENTS 6 & 7	**Booth Operator / Communicator:** 1. When reactor power reaches 92% and/or at the discretion of the lead evaluator, then enter: **Trigger 6, Loss of Main Feedwater/Automatic Reactor Trip Failure** 2. Upon hearing the announcement of Reactor Trip, or when called as the Turbine Building Operator to isolate the Unit 1 MSRs per Attachment J, then: a. Open and run schedule file **E-0_Att-J.sch** located in X:\\Trex_PI\Lightning\Schedule\EOPs. b. When the isolation is complete, inform the crew the MSR's are isolated. 3. If contacted as an out-plant operator to reset CV-31059, or locally start 11 TD AFW Pump, then wait ~ 2 minutes and report CV-31059 will not reset. 4. If contacted as out-plant operator and/or FIN Team to investigate 11 and/or 12 Main Feed Pumps, then wait approximately 2 minutes and report both Main Feed Pumps are locked out and cannot be restored. **Plant Response:** 1. 11 Main Feed Pump trips. 2. 12 Main Feed Pumps trips. 3. Both Steam Generators Narrow Range levels lower rapidly. 4. The reactor will fail to automatically trip when the turbine trips due to loss of feedwater pumps. 5. Control rods will not move in auto. 6. 11 TD AFW Pump will trip after auto starting.	BOP ATC / BOP / SS ATC / SS	**C47010-0101, 11 FEEDWATER PUMP LOCKED OUT** • If reactor power is greater than 85%, then manually trip the reactor and go to 1E-0. • If turbine power is greater than 330 MWe, then reduce to less than 330 MWe per 1C1.4 AOP1. • If necessary, refer to 1E-0, Reactor Trip or Safety Injection. **1E-0, REACTOR TRIP OR SAFETY INJECTION** • **Manually** trip reactor. o C-Panel reactor trip switch CS-46450 fails to trip reactor. Reactor can be successfully tripped using D-Panel RTS CS-46331. • Verify the Main Turbine is tripped. • Verify both Safeguards buses energized. • Check if Safety Injection has actuated or is required. • Go to 1ES-0.1. **1FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK** • **Check** if secondary heat sink is required: o RCS pressure greater than any intact SG pressure. o RCS hot leg temperature greater than 350°F. • **Check** if bleed and feed is required: o **Determine** both SG wide range levels are >13%. • **Attempt** to establish AFW flow to at least one SG: o **Check** SG blowdown isolation valves closed. o **Determine** loss of AFW failure due to TD AFW pump overspeed trip, which cannot be reset.

EVENTS 6 & 7 cont.	**Booth Operator / Communicator:** 1. If contacted as an out-plant operator to reset CV-31059, or locally start 11 TD AFW Pump, then wait ~ 2 minutes and report CV-31059 will not reset. 2. If contacted as Unit 2 and/or out-plant operator to lineup 21 MD AFW Pump to Unit 1, then acknowledge order. a. Steps 5.7.1 – 5.7.7 of 1C28.1 can be completed prior to transitioning to 1FR-H.1. b. DO NOT perform steps 5.7.8 – 5.7.10 of 1C28.1 until after transitioning to 1FR-H.1 c. If needed, report 2AF-13-1, 12 & 21 MD AFW PMPS DISCH X-CONN, is stuck in the closed position and operators/FIN Team is working on freeing the valve. **CRITICAL TASKS** • **Manually trip the reactor from the Control Room to prevent both steam Generators from reaching DRYOUT conditions** • ***Establish feedwater flow to the Steam Generators to prevent both Steam Generators from reaching DRYOUT conditions*.** ***NOTE: The crew can successfully restore AFW flow from either 21 MD AFWP or condensate pumps; however, 21 MD AFWP is the preferred method.*** **Plant Response:** 1. 11 TD AFW Pump will trip after auto starting 2. Wide Range Steam Generator levels lower. 3. Red Path in Heat Sink CSF.	ATC / BOP / SS SS	○ **Attempt** to restore AFW flow using 21 MD AFWP per 1C28.1. ○ **Check** total flow to SGs greater than 200 gpm. ○ **Return** to procedure and step in effect. ***The crew may also attempt to establish flow using condensate pumps.*** • **Reset** SI. • **Check** condensate system in service. • **Check** FW containment isolation valves OPEN. • **Determine** MFW flow cannot be established to SGs. • **Attempt** to establish feed flow from condensate system: ○ Check SI pumps – both stopped. ○ Depressurize RCS to less than 1950 psig. ○ Determine auxiliary spray is failed closed and use a PRZR PORV. ○ Block automatic SI by turning PRZR SI unblock-block switches to BLOCK and release: ▪ CS-46409, PRZR SI UNBLOCK-BLOCK TRN A ▪ CS-46423, PRZR SI UNBLOCK-BLOCK TRN B ○ Depressurize one SG to <380 psig. ▪ Check condensate system in service. ▪ Close MSIV from SG not being depressurized. ▪ Dump steam to condenser at max rate. ○ Establish condensate flow. ▪ Locally open one MFW pump discharge isolation valve. ▪ Control flow with FW bypass valves • **Check** NR in at least one SG greater than 7%. • Transition back to 1ES-0.1.

SCENARIO TIME-LINE:

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

EVENTS 6 & 7 cont.	**Booth Operator / Communicator:**
	1. After the crew has transitioned to 1FR-H.1, if necessary, report 2AF-13-1, 12 & 21 MD AFW PMPS DISCH X-CONN, has been freed and is open.
	2. If contacted (after entering 1FR-H.1) as Unit 2 and/or out-plant operator to perform steps 5.7.8 – 5.7.10 of 1C28.1, then enter **Trigger 8, ALIGN 21 AFWP TO UNIT 1**.
	3. If contacted as an out-plant operator to locally open one MFP discharge isolation valve, then wait approximately 3 minutes, enter **Trigger 9, 11 FW PUMP DSCHG VLV**, and report to the Control Room that 11 MFP Discharge Isolation valve is open.
	4. If contacted as an out-plant operator to locally open one MFP discharge isolation valve, then wait approximately 3 minutes, enter **Trigger 10, 12 FW PUMP DSCHG VLV**, and report to the Control Room that 11 MFP Discharge Isolation valve is open.
		BOP	**1C28.1, AUXILIARY FEEDWATER SYSTEM UNIT 1**
			Section 5.7.
			• Place CS-46425, 12 MD AFWP, in PULLOUT.
			• Place CS-46785, 21 MD AFWP, in MANUAL.
			• Stop 21 MD AFW Pump, if running, using CS-46770.
			• CLOSE 21 MD AFW Pump discharge valves to Unit 2 Steam Generators.
			• CLOSE 12 MD AFW Pump discharge valves to Unit 1 Steam Generators.
			• Close AF-13-4, 12 AFWP Discharge.
			• Open MD AFW pump manual discharge cross-connect valves:
			  ○ AF-13-1
			  ○ 2AF-13-1
			• Start 21 MD AFW Pump using CS-46770.
			• Throttle flow as necessary to maintain desired Unit 1 SG level using MV-32381 and MV-32382.
			• Verify expected response of SG levels given adequate AFW flow.
			• When conditions allow, then post the “12/21 AFW Pumps Cross-Connected” warning sign on each unit’s Aux Feedwater Control Panel.

END	Once the crew **restored feed flow to the steam generators**, and/or at the discretion of the Lead Evaluator, then place the simulator in FREEZE. Inform the crew that training has the duty.		
	Booth Operator: *Collect SBT data per Attachment 1.*		

PI-ILT-NRC-1801S, 2018 ILT NRC SIMULATOR EVALUATION #1, REV. 0

SIMULATOR INPUT SUMMARY

@Time	Event	Action	Description
00:00:00		Insert override DI-46425P to True	12 MD AFW PUMP OOS
00:00:00		Insert override DI-46425ST to False	12 MD AFW PUMP OOS
00:00:00		Insert override DI-46295O to False	CV-31329, AUX PRZR SPRAY, FAILS TO OPEN
00:00:00		Insert malfunction RP02A	FAILURE OF AUTOMATIC REACTOR TRIPS TRAIN A
00:00:00		Insert malfunction RP02B	FAILURE OF AUTOMATIC REACTOR TRIPS TRAIN B
00:00:00		Insert override DI-46450T to False	C PANEL RX TRIP SW FAILURE
00:00:00		Insert override DI-46447B to True	AMSAC BLOCK
	2	Insert malfunction VC20 on event 2	CCW RETURN FROM LETDOWN HEAT EXCHANGER FAILS CLOSED
	3	Insert malfunction M47019:0304W to Cry_Wolf on event 3	11 CFCU IN LOCAL
	3	Insert override DI-46018F to false on event 3	11 CFCU IN LOCAL
	3	Insert override DI-46018S to false on event 3	11 CFCU IN LOCAL
	13	Remove malfunction M47019:0304W to Cry_Wolf on event 13	11 CFCU IN REMOTE
	13	Remove override DI-46018F to false on event 13	11 CFCU IN REMOTE
	13	Remove override DI-46018S to false on event 13	11 CFCU IN REMOTE
	4	Insert malfunction RX05C on event 4	REACTOR COOLANT LOOP TH TRANSMITTER TE-403A FAILS HIGH
	5	Insert malfunction M47010:0401W after 35 to Cry_Wolf on event 5	11 MFP MOTOR STATOR HI TEMP ALARM
	5	Insert malfunction CP-1T2809A from 90.00000 to 125.00000 in 35 on event 5	11 FW PMP MTR STR T
	5	Insert malfunction CP-1T2809A after 35 from 125.00000 to 150.00000 in 2700 on event 5	11 FW PMP MTR STR T
	6	Insert malfunction FW13A on event 6	MAIN FEEDWATER PUMP #11 TRIP
	6	Insert malfunction FW13B on event 6	MAIN FEEDWATER PUMP #12 TRIP
	6	Insert malfunction RD02 on event 6	CONTROLLING ROD BANK FAILS TO MOVE IN AUTO
	6	Insert malfunction FW33 after 30 on event 6	11 TD AFW PUMP TRIP
	8	Insert remote FW157 to CLOSED on event 8	12 AFWP DISCHARGE VALVE (AF-13-4)
	8	Insert remote FW156 to OPEN on event 8	21 AFWP CROSS-TIE TO 12 AFWP LINE (AF-13-1)
	8	Insert remote FW133 after 60 to START on event 8	21 MOTOR DRIVEN AFW PUMP
	9	Insert remote FW126 to LOCAL on event 9	11 FW PUMP DSCHG VLV CONTROL SW
	9	Insert remote FW129 after 5 to OPEN on event 9	11 FW PMP DSCHG VLV OPEN LOCAL PB
	10	Insert remote FW127 to LOCAL on event 10	12 FW PUMP DSCHG VLV CONTROL SW
	10	Insert remote FW131 to OPEN on event 10	12 FW PMP DSCHG VLV OPEN LOCAL PB

Simulator Setup:

Beginning of Day:

___ 1. If it is the first scenario of the day, then perform a **shutdown** and **restart** of the floor PCs that are connected to the LAN.

___ 2. **Log in** on floor PCs with user ID & password: <pitrgsim>

___ 3. **Update** or **Verify** Control Room Placards:

a. NRC Code Placard:

i. NRC Current Authentication Code **A4YP**.

ii. Today's Date.

b. High Flux at Shutdown Alarm Setpoint placards: **5000 cps**.

c. Feedwater regulating valve position placard **set to current values**.

d. Recommended SG Blowdown flow **set to current values**.

___ 4. Verify **Current** Plant Status Magnetic Placards are in Place:

a. Blowdown 46470 "**SGB to CDSR**"

b. H2 in VCT Space

c. 11 BA TANK "Lined Up for Service"

d. 11 BA PUMP "Lined Up to 11 BA Tank"

e. 12 BA PUMP "Lined Up to 11 BA Tank"

f. CC to SFP MV-32115 "In Service"

g. CC to SFP MV-32117 "In Service"

___ 5. Current Plant **Pink Status Control Tags** in place:

a. CS-46540, 22 CC WTR PUMP

b. CS-46572, 121 SFP HX INLT

___ 6. Current Plant **Yellow Caution Tags** in place:

a. NONE

___ 7. Verify that copy machine and printers are loaded with **YELLOW BORDER** paper.

___ 8. Pens/Notepads/Markers available on the simulator.

Simulator Setup:

NOTE: The time between simulator reset and placing simulator in RUN should be minimized to reduce the difference between the ERCS time and actual time.

1. If an IC is already created for this scenario, then **go to Step 3**.
2. If an IC is NOT created for this scenario, then **create** as follows:
   a. Reset the Simulator to **IC-9** and **place** in RUN.
   b. **Place** 12 MD AFW Pump Out of Service as follows:
      1) **Place** CS-46439, 12 MD AFWP, in MANUAL.
      2) **Place** CS-46425, 12 MD AFWP, in PULLOUT.
      3) **Close** MV-32281 & MV-32382.
   c. **Transfer** Bus 15 power to CT11 as follows:
      1) **Place** CS-46909, BKR 15-7 MAN/AUTO, to MANUAL.
      2) **Place** CS-46951, BKR 15-3 MAN/AUTO, to MANUAL.
      3) **Place** CS-46906, BUS 15 SYNCH SEL SW, to CT11.
      4) **Close** BKR 15-7 using CS-46955.
      5) **Trip** BKR 15-3 using CS-46953.
      6) **Place** CS-46909, BKR 15-7 MAN/AUTO, to AUTO.
      7) **Place** CS-46951, BKR 15-3 MAN/AUTO, to AUTO.
      8) **Place** CS-46906, BUS 15 SYNCH SEL SW, to OFF.
   d. **Place** simulator in FREEZE.
   e. If desired, **save** to available IC.
   f. **Go** to step 4.
3. **Reset** the Simulator to **IC-246** or IC created from Step 2.
4. **Place** the simulator in RUN.
5. If available, **run** schedule file **PI-ILT-NRC-1801S.sch** as follows:
   a. **Locate** schedule file.
   b. **Open** schedule file by double clicking it.
   c. **Run** the schedule file by pressing the “Stopped” button on the toolbar.
   d. **Verify** the schedule file is running.
6. If schedule file is NOT available, then **insert** malfunctions, remotes, and overrides, as specified by the Simulator Input Summary.
7. If desired, **start** Scenario Based Testing Data Collection Program.
8. **Markup** steps 6.16.1 through 6.16.3 of 1C20.5 as complete.
9. **Complete** the "Simulator Setup Checklist” on next page.

SIMULATOR SETUP CHECKLIST

Before Scenario

_____ Simulator Status:

___ 1. "Training Load" ___ 2. Step counters "NOT USED"
___ 3. Alarm sound "ON" ___ 4. Steps 1 – 8 on previous page complete
___ 5. Speed: “REAL” ___ 6. Simulator running in desired IC

_____ **Delete** memory on Yokogawa Model DX1000 recorders by cycling Recorder Power.

_____ Verify Schedule File/Summary matches Simulator Input Summary page in the SEG.

_____ Verify Event File matches Simulator Event Summary page in SEG.

_____ Verify that control rod step counters on C panel and ERCS RBU **CBD @ 218**.

_____ Boric Acid/RMU integrators set to: **BA: 0, RMU: 10**, and reset.

_____ **BOC ΔI** sheet displayed on C panel.

_____ **BOC Reactivity Briefing** sheet available at Reactor Operator Desk.

_____ Verify Boric Acid and Reactor Makeup Controllers are set properly:

___ 1. 1HC-110: **29.8%**
___ 2. 1HC-111: **44.7%**

_____ **Update or Verify** SEG specific Control Board Placards**:**

___ 1. CVCS panel placard:
   a. RCS boron – **1367 ppm**.
   b. RCS H_2 – **45 cc/kg**.
   c. Turbine Reference Value and Mode – **matched with DEHC**.

___ 2. Shift Reactivity Guidance placard:
   a. BA: **4.5 gallons**
   b. RMU: **67 gallons**
   c. Dilutions **NONE**

___ 3. EAL Classification Placard **CLEANED** and **placed** on side of SS desk.

___ 4. LCO Timer **CLEANED.**

_____ SEG specific **Magnetic Placards** in place:

___1. NONE

_____ SEG specific or Protected Equipment **Pink Status Control Tags** in place:

___1. CS-46424, 11 TD AFW PUMP

_____ SEG specific or Out of Service **Yellow Caution Tags** are in place:

___1. CS-46425, 12 MD AFW PUMP

Pre-Scenario Checklist continued:

_____ ERCS driven recorders are on-scale (RCS temperature scaled **555º F to 565º F**).

_____ ERCS alarm screen operating and alarms **reset**.

_____ All ERCS terminals operating and set as follows:

CONF	**VARS**	R02	**Alarm Summary Page**
CONE1	**Group OP31_U1**	R03	**AFD**
CONC	**SAS (XS11)**	R04	**TPM**
CONG1	**Group QP CCDATA**	R05	**QP LOADFOLL**
ERCS-R01	**Group RADMON_U1**	R06	**Alarm Summary Page**

_____ ERCS single point displays:

CONB	**1T0499A**	**1U1613A**
CONE2	**1Q0340A**	**1V4501A**

_____ ERCS TPM set (**Calorimetric - Auto Scaling - LEFM**).

_____ Verify that copy machine and printers are loaded with paper.

_____ Pens/Paper/Markers available on the simulator.

_____ Set Turbine Control HMI Displays as follows:

___ 1. U1 E-H Turb Cont STA 2 (48087) to **Control Valve Overview**
___ 2. U1 Turb Aux Cont (48088) to **Turb Overview**
___ 3. U1 E-H Turb Cont STA 1 (48086) to **On Line Control**
___ 4. DEHC alarms **cleared**.

_____ YELLOW turnover sheets 1-9 available.

_____ Electronic PINGP 577 forms and TABS **closed** on both LAN connected PCs.

_____ Board-mounted EAL Tables are **cleaned**.

_____ Headsets turned on as necessary.

_____ Procedure checklist **completed**. See following page.

_____ Peer Check performed for simulator setup.

PROCEDURE CHECKLIST

NOTE: The following procedures will be used during this session. Verify the procedures are free of place keeping marks before starting the session and after the session are complete.

Before 1st / 2nd	After 1st / 2nd	
/	/	1C1.4 AOP1, RAPID POWER REDUCTION UNIT 1
/	/	1C5 AOP1, UNCONTROLLED ROD MOTION
/	/	1C12.5, UNIT 1 BORON CONCENTRATION CONTROL
/	/	1C20.5, UNIT 1 – 4.16KV SYSTEM
/	/	1C28.1, AUXILIARY FEEDWATER SYSTEM UNIT 1
/	/	1C51.3, TAVG LOOP 1B 1T-403 - HIGH
/	/	
/	/	C7 AOP1, PLANT STABILIZATION
/	/	C47010-0101, 11 FEEDWATER PUMP LOCKED OUT
/	/	C47010-0401, 11 FEEDWATER PUMP MOTOR STATOR HI TEMP
/	/	C47015-0408, LTDN FLOW HI TEMP
/	/	
/	/	1E-0, REACTOR TRIP OR SAFETY INJECTION
/	/	1ES-0.1, REACTOR TRIP RECOVERY
/	/	
/	/	1E-CAS, UNIT 1 CONTINUOUS ACTION & INFO PAGE SUMMARY
/	/	
/	/	EAL Board
/	/	
/	/	1FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK
/	/	
/	/	LAMINATE COPY OF 1C5, SECTION 5.5
/	/	LAMINATE COPY OF 1C12.5, SECTIONS 5.8 & 5.9
/	/	LAMINATE COPY OF 1C12.5, SECTION 5.10
/	/	
/	/	REACTIVITY BRIEFING SHEET - BOC
/	/	
/	/	SWI O-28, NOTIFICATION OF OPS MNGR & NRC RESIDENT INSPECTOR
/	/	
/	/	TS LCO 3.3.1
/	/	TS LCO 3.3.1 BASES
/	/	TS LCO 3.3.2
/	/	TS LCO 3.3.2 BASES
/	/	

Post-Scenario Checklist

_____
_____ Computer generated PINGP 577 cleared.

_____ Procedure checklist completed. See previous page.

_____ Remove Pink Status Control Tags from the following equipment:
___ 1. CS-46424, 11 TD AFW PUMP

_____ Magnetic placards removed:
___ 1. NONE

_____ Remove Yellow Caution Tags from the following equipment:
___ 1. CS-46425, 12 MD AFW PUMP

_____ Board-mounted EAL Table is cleaned.

_____ All books, note pads, and calculators put away.

End Of Day Checklist

_____ Signs/placards removed and put away unless normal simulator configuration.

_____ If desired, floor PCs logged off if simulator will not be used again that day.

_____ Instructor station returned to normal with all books, paper, and etc. put away.

_____ Headsets turned off and put away if simulator will not be used again that day.

_____ Simulator reset to IC-10 unless another IC will be used for further training.

_____ Simulator placed in DORT if simulator will not be used again that day.

_____ Verify the following placards are erased:

- CVCS panel
- Shift Reactivity Guidance
- LCO Timer
- NRC Authentication Code

RETENTION: 7 Days

UNIT 1 LPEO / PEO TURNOVER LOG

DATE: DAY/NIGHT SHIFT: Day

CAT 1 VENT OPENINGS: 0 ft^2 **SYSTEM CONDITION: GREEN**

SAFEGUARDS EQUIPMENT OOS/TECH SPEC REQUIRED ACTION STATEMENTS

1. 12 MD AFW Pump is OOS for corrective maintenance to the motor.
   - TS LCO 3.7.5 Condition B was entered with 48 hours remaining.

2. N51 and N52 displays are OOS.
   - TS LCO 3.3.3 Condition A was entered with 23 days remaining.
   - TS LCO 3.3.3 Condition D was entered with 5 days remaining.
   - N51 and N52 counts can be viewed in ERCS.

PROTECTED EQUIPMENT

11 TD AFW Pump

RAD MONITORS OOS	ANNUNCIATORS OOS
NONE	NONE
OUTSTANDING SP'S	**FIRE DET / PROT EQP IMPAIRMENTS**
NONE	NONE

OTHER EQUIPMENT OOS / STATUS

• Exposure: BOC • Power: 100% • Boron: (CB): 1367 ppm • Temperature: 560°F	• Pressure: 2235 psig • Xenon: Equilibrium • Rods: "D" @ 218 • Generator: 580 MW	

MAJOR EQUIPMENT REPAIRED / RETURNED TO SERVICE

NONE

OPERATIONAL PLANS FOR COMING SHIFT

- Perform a pre-job brief for transferring power on Bus 15 from CT11 to 1RY per section 6.16 of 1C20.5.
- Steps 6.16.1 through 6.16.3 of 1C20.5 are complete.
- Maintenance on Bus 15 1RY Source Breaker is complete and has been returned to service.
- A designated operator is stationed at the G-Panel to monitor Bus Phase Currents and perform actions of "Bus 15 Sequencer Channel Alert" and "Bus 16 Sequencer Channel Alert" Alarm Response Procedures.
- The designated operator is NOT one of the examinees.
- The BOP will conduct the activity to transfer power on Bus 15 from CT11 to 1RY.
- This activity is to be performed after shift turnover is complete.
- After Bus 15 is transferred to 1RY, then secure the designated operator at the G-Panel.
- C20.3, Security Analysis, has already been performed for all lineups. The crew should NOT perform this.

NEW PROCEDURES / INSTRUCTIONS

NONE

Simulator Scenario Development Checklist

Mark with an X Yes or No for any of the following. If the answer is No, include justification for the no answer or the corrective action needed to correct the discrepancy after the item.

1.	The scenario contains objectives for the desired tasks and relevant human performance tools.	Yes **X**	No
2.	The scenario identifies key parameter response, expected alarms, and automatic actions associated with the induced perturbations.	Yes **X**	No
3.	The scenario content adequately addresses the desired tasks, through simulator performance, instructor-led training freezes, or both.	Yes **X**	No
4.	Plant PRA initiating events, important equipment, and important tasks are identified.	Yes **X**	No
5.	Turnover information includes a Daily At Power or Shutdown Safety Risk Assessment. *PRA software not installed on Simulator computers.*	Yes	No **X**
6.	The scenario contains procedurally driven success paths. Procedural discrepancies are identified and corrected before training is given.	Yes **X**	No
7.	The scenario guide includes responses for all anticipated communications to simulated personnel outside the Control Room, based on procedural guidance and standard operating practices. Include estimated completion times and/or notes for use of time compression.	Yes **X**	No
8.	The scenario includes related industry experience. SOER, SER and similar OE recommendations are clearly identified and fully addressed.*	Yes	No **X**
9.	The scenario guide incorporates verification of Operator Fundamental application.*	Yes	No **X**
10.	Training elements and specific human performance elements are addressed in the scenario critique guide to be used by the critique facilitator. The critique guide includes standards for expected performance.*	Yes	No **X**
11.	For evaluations, it has been verified that without operator action the critical tasks will be failed.	Yes **X**	No

Developer and Reviewer: Once checklist is completed and deficiencies are corrected, sign the cover page.

* For evaluations these items may be marked NO without justification.

PI-ILT-NRC-1801S, 2018 ILT NRC SIMULATOR EVALUATION #1, REV. 0

Simulator Scenario Validation Checklist

Mark with an X Yes or No for any of the following. If the answer is No, include an explanation after the item.

		Yes	No
1.	The desired initial conditions agreed with the reference plant with respect to reactor status, plant configuration, and system operation.	**X**	
2.	The simulator operated in real time during conduct of validation.	**X**	
3.	The simulator demonstrated expected plant response to operator input and to normal, transient, and accident conditions.	**X**	
4.	The simulator permitted use of the reference plant's procedures. The scenario was completed without procedural exceptions, simulator performance exceptions, or deviation from the scenario sequence.	**X**	
5.	The simulator did not "fail to cause" or "unexpectedly cause" any first principle alarm or primary automatic action.	**X**	
6.	Observable changes in parameters relevant to the scenario corresponded in trend and direction to reference plant's expected response.	**X**	
7.	All malfunctions and other instructor interface items were functional and demonstrated the expected reference plant's response to the initiating cause.	**X**	
8.	All malfunctions and other instructor interface items were initiated in the same sequence described within the simulator scenario.	**X**	
9.	The scenario satisfies the learning or examination objectives without any significant simulator performance issues, or deviations from the approved scenario sequence.	**X**	
10.	Simulator fidelity has been demonstrated to be adequate for this scenario.	**X**	

Discrepancies noted (Check "none" or list items found) ☒ None
SMAR = Simulator Action Request

SMAR:_____ SMAR:_____ SMAR:_____ SMAR:_____

Comments:_____

Validator: Sign the cover page only after noted discrepancies are corrected or compensatory actions are taken to ensure quality training.

Validation Personnel		
Name	Job Title / Qualification	Validation Position
Martin Cabiro	Operations SRO	Shift Supervisor
Monte Strain	Operations RO	Balance of Plant
Jim Kapsh	Operations RO	Operator At the Controls
Fred Collins	NRC Exam Developer	Lead Evaluator
Justin Hasner	Operations Instructor	Booth Driver

ATTACHMENT 1

SBT EXAM DATA COLLECTION

- **BEFORE SCENARIO**
  - START menu
  - SBT Report
  - File
  - OPEN
  - Select file type ".tis"
    - (FILE LOCATION: sim data (X:) / TRex_PI / LIGHTNING / SBT
  - Select SBT.tis
  - OPEN or double click
  - Check TAM log & verify no cycling switches
  - Run scenario

- **AFTER SCENARIO**
  - FREEZE on Simulator
  - Click GREEN arrow to generate report
  - Enter the following:
    - (NAME is not required)
    - Test Title (1801 ILT NRC SBT Group x)
    - Report Name (same as test title)
  - Click the "…" button to right of Report Name field.
  - Select location where file is to be saved (on Locker G3 flash drive)
  - Enter file name (same as report name) & SAVE
  - Click GENERATE, verify file location, and close "html" file
  - START menu
  - COMPARE IT
  - Click "+" ADD
  - Select ".csv" file from previously saved location
  - OPEN or double click
  - Click GREEN "COMPARE" button
  - Wait for spreadsheet to populate and then save in desired location
  - Close spreadsheet, COMPARE IT, and SBT Report
  - Verify all 3 files are saved in proper location

Facility: PRAIRIE ISLAND Scenario No.: 2 Op-Test No.: PI-ILT-NRC-1802

Examiners: Operators: Shift Supervisor
Lead Reactor Operator
Reactor Operator

Initial Conditions:

Reactor Power at 90%, Boron Concentration at 858 ppm, RCS temperature at 558°, RCS pressure at 2235 psig, Xenon at equilibrium, Bank D rods at 208, Generator Power at 525 Mw.

D2 Diesel Generator is out of service. T.S. LCO 3.8.1 Condition B was entered with 9 days remaining. D1 Diesel Generator has been evaluated for common cause failure and has been determined to be OPERABLE. D1, 11 TD AFW Pump, 11 RHR Pump, 11 SI Pump, 11 CC Pump, 12 CL WTR Pump, 121 CR Air Supply Fan, 121 CR Chiller & Pump, and 121 CR Clean up Fan are protected. SP 1118 was completed 1 hour ago and is due in 5 hours.

Turnover:

Swap 11 & 12 EH oil pumps

Event No.	Malf. No.	Event Type*	Event Description
1		N (BOP, SRO)	SWAP EH OIL PUMPS
2		I (ATC, BOP, SRO) TS(SRO)	PRZR LEVEL WHITE CHANNEL FAILS LOW
3		I (ATC, SRO) TS(SRO)	FIRST STAGE PRESSURE FAILS LOW
4		M (ALL)	LOSS OF ALL AC
5		C (BOP, SRO)	D1 FAILS TO AUTO START
6		C (ATC, SRO)	11 TD AFW PUMP FAILS TO AUTO START
7		C (ATC, SRO)	STUCK ROD AFTER RX TRIP REQUIRES BORATION

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

Xcel Energy

SIMULATOR EXERCISE GUIDE (SEG)

SITE: PRAIRIE ISLAND **SEG # PI-ILT-NRC-1802S**

SEG TITLE: 2018 ILT NRC SIMULATOR EVALUATION #2 **REV. # 0**

PROGRAM: INITIAL LICENSE OPERATOR TRAINING #: FL-ILT

COURSE: INITIAL LICENSE OPERATOR TRAINING #: FL-ILT

TOTAL TIME: 2.0 HOURS

Additional site-specific signatures may be added as desired.

Developed by:	**Fredrick Collins**	**2/11/2018**
	Instructor	*Date*
Reviewed by:	**Justin Hasner**	**6/14/2018**
	Instructor	*Date*
	(Simulator Scenario Development Checklist.)	
Validated by:	**Justin Hasner**	**6/14/218**
	Validation Lead Instructor	*Date*
	(Simulator Scenario Validation Checklist.)	
Approved by:	**Shawn Sarrasin**	
	Training Supervision	*Date*

Guide Requirements

Evaluation Objectives:

Evaluate the crew's ability to:

1. Swap EH Oil Pumps per 1C23.

Evaluate the crew's ability to diagnose and respond to:

2. Pressurizer Level Instrument failing low per 1C51.2.
3. First Stage Pressure Instrument failing low per 1C5 AOP1 and 1C51.2.
4. Loss of All Onsite and Offsite Power per 1E-0 and 1ECA-0.0.
5. Failure of D1 EDG to automatically start per 1ECA-0.0.
6. Failure of 11 TD AFW Pump to automatically start per 1ECA-0.0.
7. Stuck rod requiring boration per 1ES-0.1.

Training Resources:

1. Full Scope Simulator
2. NRC Evaluation Team
3. Booth Operator (Backup Communicator)
4. Primary Communicator

Related PRA Information:

Initiating Event with Core Damage Frequency:
Loss of Offsite Power (20.3%)

Important Components:
11 TD AFW PMP
D1 DSL GEN

Important Operator Actions with Task Number:
CRO 000 055 05 01 000 – Loss of Offsite and Onsite Power
CRO 062 ATI 00 00 017 – Energize a Dead 4.16KV Bus

QUANTITATIVE ATTRIBUTES

Malfunctions:

Before EOP Entry:

1. 1L-427, White Channel Pressurizer Level Transmitter, fails LOW.
2. 1PT-485, Turbine First Stage Pressure Transmitter, fails LOW.

After EOP Entry:

1. D1 Emergency Diesel Generator fails to start automatically.
2. 11 TD AFW Pump fails to start automatically.
3. Rod G-11 fails to insert after reactor trip.

Abnormal Events:

1. Instrument Failure Guide.

Major Transients:

1. Loss of All Onsite and Offsite AC Power

Critical Tasks:

1. PI-CT-6: Energize at least one AC emergency bus when safeguards equipment is required to perform its safety function or prior to ORANGE or RED path on Core Cooling CSF.
2. PI-CT-11: During a Station Blackout, establish Auxiliary Feedwater flow to the Steam generators to prevent both Steam Generators from reaching DRYOUT conditions.

CRITICAL TASK SHEET

Number:	PI-CT-6
Critical Task:	Energize at least one AC emergency bus when safeguards equipment is required to perform its safety function or prior to ORANGE or RED path on Core Cooling CSF.
Safety Significance:	Failure to energize an AC emergency bus when an AC power source is available unnecessarily makes safeguards equipment unavailable when needed.
Plant Conditions:	• Loss of Bus 15 AND Bus 16. • At least one source is available to supply power to Bus 15 or Bus 16.
Cues:	• Bus 15 and bus 16 is de-energized. • All source breakers to buses 15 and 16 are open or tripped.
Performance Indicator:	• Manipulation of controls to establish one safeguards bus powered from an available source.
Feedback:	• Bus 15 or 16 is energized.

CRITICAL TASK SHEET

Number:	PI-CT-11
Critical Task:	During a Station Blackout, establish Auxiliary Feed Water flow to the Steam Generators to prevent both Steam Generators from reaching DRYOUT conditions.
Safety Significance:	With insufficient feed water flow, the Steam Generators dry out, causing an RCS pressure increase that opens the pressurizer PORVs. The open PORVs create a small break LOCA that challenges the Core Cooling CSF. Failure to maintain an adequate heat sink will result in degradation of the Fuel Clad Barrier and RCS Barrier.
Plant Conditions:	• Loss of Offsite Power. • Loss of Bus 15 AND Bus 16. • 11 TD AFW Pump fails to automatically start. • 11 TD AFW Pump is capable of being started from the Control Room.
Cues:	• 11 TD AFW Pump not running. • One or more Steam Generator NR Levels drop below 13%. • Indications of a Station Blackout.

Performance Indicator:	• 11 TD AFW Pump selector switch placed in MANUAL.
	• 11 TD AFW Pump hand switch momentarily placed in START.
	
	NOTES:
	• Steam Generator dry out indicated by BOTH of the following:
	  ○ Wide Range Level <13% [17%] AND
	  ○ SG Pressure rapidly lowering or completely depressurized.

Feedback:	• Increasing water level in at least one Steam Generator. • Feed water flow into at least one SG.

SCENARIO OVERVIEW:

INITIAL CONDITIONS:

- Exposure: MOC
- Power: 90% power
- Boron: (CB): 858 ppm
- Temperature: 558°F
- Pressure: 2235 psig
- Xenon: Xe Equilibrium
- Rods: "D" @ 208
- Generator: 525 MW

EQUIPMENT OOS

- N51 and N52 Displays
- D2 Diesel Generator OOS

SEQUENCE OF EVENTS:

Event 1: Swap Running EH Oil Pumps

- 11 EH Oil pump is running.
- The crew will start 12 EH Oil pump and stop 11 EH Oil pump per 1C23.

Event 2: 1L-427, White Interlock Channel Pressurizer Level, fails LOW.

- PRZR Level White (Interlock) Channel 1L-427 will fail low.
- The crew will place PRZR level control in RED-BLUE (1-3).
- The Shift Supervisor will enter TS LCO 3.3.1 Conditions A & K.

Event 3: First Stage Pressure Instrument fails LOW

- Rods will automatically step in.
- The crew will place rod control in manual per 1C5 AOP1.
- The crew will perform actions per 1C51.2.
- The SS will enter TS LCO 3.3.1 Conditions A and R.

Event 4: Loss of All AC Power

- The reactor will trip upon loss of all AC due to loss of flow.
- The crew will enter 1E-0 then transition to 1ECA-0.0.
- D2 is out of service and Bus 25 will lock out. The crew will have to manually start D1 and place D1 EDG on Bus 15 to restore power to a U1 safeguards bus.

Event 5: D1 fails to start automatically

- The crew will manually start D1 per 1ECA-0.0.

Event 6: 11 TD AFW pump fails to start automatically

- The crew will manually start 11 TD AFW pump per 1ECA-0.0.

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	SIMULATOR PRE-BRIEF: • The Simulator Pre-Brief is conducted prior to the crew entering the simulator. **COMPLETE TURNOVER:** • "UNIT 1 LPEO / PEO TURNOVER LOG." • 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" • 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	**Booth Operator / Communicator:** 1. After the crew has assumed the duty, they will swap running EH Oil pumps per 1C23 and pre-job brief. 2. If directed as the Outplant Operator to verify proper EH Oil Pump operation, then wait 2 minutes and report back that the pump is loading and unloading properly.	BOP	**<u>1C23, UNIT 1 TURBINE CONTROL SYSTEM</u>** • Station an operator at the EH Oil Skid. • If swapping from 11 EH Oil pump to 12 EH Oil pump, then perform the following: o Start 12 EH Oil Pump by placing CS-46385, 12 EH OIL PUMP, to START. o Locally verify proper pump operation. • Stop 11 EH Oil Pump by placing CS-46384, 11 EH OIL PUMP, in STOP.

EVENT 2	**Booth Operator / Communicator:**
	1. After the crew has swapped EH oil pumps, and/or at the discretion of the Lead Evaluator, enter:
	Trigger 1, PRZR Level Intlk (White) Channel fails LOW.
	
	2. If contacted as Duty RP, then acknowledge report of letdown being secured.
	3. If contacted as Duty RP, then acknowledge report of letdown being restored.
	4. If contacted as I&C to trip bistables, inform the crew two I&C Technicians will be available in 45 minutes.
	5. If contacted as the Operations Management, acknowledge the report of the failure, and agree to make other SWI O-28 notifications to the NRC, Duty Station Manager, etc.
	6. 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.
	
	Plant Response:
	1. Letdown automatically isolates.
	2. PRZR heaters de-energize.
	3. PRZR level rises.
	4. Annunciator 47012-0607 will alarm
	
	Note: The crew may leave PRZR level control in manual until level has returned to the normal band. It is not necessary to wait before moving on to the next event.
		ATC
		
		ATC
		
		BOP
		
		BOP
			C47012-0607, PRZR LO-LO LVL HEATERS OFF AND LETDOWN SECURED
			• Determine PRZR level is slowly rising.
			• Verify all PRZR heaters are off.
			• Verify Letdown is isolated.
			• **Place** charging pump speed control in manual and control pressurizer level.
			• Refer to 1C51.2.
			
			1C51.2, PRESSURIZER LEVEL 1L-427 – LOW
			• **Place** PRZR heaters in off.
			• **Select** position 1-3 (RED-BLUE) on PRZR Level Control Selector switch.
			• Restore pressurizer heaters.
			• **Restore** Letdown per 1C12.1.
			• Ensure PRZR Level Recorder not selected to White channel.
			
			1C12.1, LETDOWN, CHARGING, AND SEAL WATER INJECTION – UNIT 1
			• **Notify** Duty RP tech normal LD is being returned to service.
			• **Place** 1HC-130, LTDN TEMP CONT, in MANUAL and **OPEN** to 50%.
			• **Place** 1HC-135A, LTDN PRESS CONT, in MANUAL and **OPEN** to about 50%.
			• **Position** CV-31204, LTDN DIVERT TO PURIF, to the DIVERT position, using CS-46167.
			• **Establish** charging to the regen HX as follows:
			  ○ **Adjust** 1HC-142, CHG LINE FLOW CONT, AND the inservice charging pump speed.
			  ○ **Verify** sufficient charging to prevent flashing of LD.
			• **OPEN** CV-31339, LTDN LINE CNTMT ISOL, using CS-46166.
			• **OPEN** the loop B LD isolation valves:
			  ○ CV-31226, LETDOWN LINE ISOL, CS-46165

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
			○ CV-31255, LETDOWN LINE ISOL, CS-46133 • **OPEN** the desired LD orifice isolation valve while adjusting1HC-135A so the 600 psig LD relief doesn't lift and the desired flow rate is obtained. ○ CV-31325, LETDOWN ORIFICE ISOL 40 GPM, CS-46170 ○ CV-31326, LETDOWN ORIFICE ISOL 40 GPM, CS-46171 • **Return** 1HC-135A and 1HC-130 to AUTO per C7. The SS will **enter** the following TS LCOs: • **3.3.1 Condition A:** ○ Enter conditions referenced in Table 3.3.1-1 IMMEDIATELY. • **3.3.1 Condition K:** ○ Place channel in trip in 6 HOURS. OR ○ Reduce thermal power to <P-7 & P-8 in 12 HOURS.
		SS	

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
EVENTS 3 & 4	**Booth Operator / Communicator:** 1. After the crew has restored letdown and addressed Tech Specs, and/or at the discretion of the Lead Evaluator, enter: **Trigger 2, 1ST Stage Pressure Instrument Failure.** 2. If contacted as the Operations Management, acknowledge the report of the failure, and agree to make other notifications to the NRC, Duty Station Manager, etc. as asked. 3. If contacted as I&C to trip bistables, inform the crew two I&C Technicians will be available in 45 minutes. 4. If contacted as the FIN Team Supervisor or RCS Engineer, inform the crew that you will write a work order and investigate. **Plant Response:** 1. Control Rods automatically step IN. 2. Tavg will lower due to rod movement. 3. The following annunciators will alarm: a. 47011-0405, FW CONTROL SYSTEM TROUBLE. b. 47013-0305, AUCTIONEERED TAVG-TREF DEVIATION, PRZR SAFETY VALVE LINE A OR B HI TEMP ***NOTE: No selector switch for alternate channel. Operator must use Figure C1-5 to determine appropriate T_{avg}/T_{ref} value for current power level.***	ATC SS ATC BOP SS	**C7 AOP 1, PLANT STABILIZATION** • Check generator load stable. • Place rod bank selector switch to manual. • Check rod motion stopped. • Go to 1C5 AOP1, step 4. **1C5 AOP1, UNCONTROLLED ROD MOTION** • Check for failed instrument. • Go to 1C51.2. **1C51.2, TURBINE 1ST STAGE PRESSURE 1P-485-LOW** • **Place** rod control in manual. • **Control** Tave at value appropriate for power level. • **Place** one steam dump interlock bypass to OFF. • **Place** steam dump in pressure mode. • Verify steam dump valves are CLOSED. • Verify zero output on steam dump controller. • **Return** steam dump interlock bypass to ON. • Verify SG level control operating properly in AUTO. The SS will **enter** the following TS LCOs: • **3.3.1 Condition A** o Reference Table 3.3.1-1 Function 16.b.2 • **3.3.1 Condition R** o Verify P-7 is in required state in 1 hour OR o Be in Mode 2 in 7 hours. • **TRM 3.3.4 Condition A** o Reference TRM Table 3.3.4-1 Function 3 o Trip Bistables (no six hour requirement).

EVENTS 5, 6, 7, & 8	**Booth Operator / Communicator:** 1. When the crew restored Tavg to Tref and addressed Tech Specs OR commenced a rapid load reduction, and/or at the discretion of the Lead Evaluator, then enter: **Trigger 3, Loss of All AC.** 2. Wait 1 minute and announce over PA, "Attention all plant personnel, Unit 2 Reactor Trip. Unit 2 Reactor Trip". 3. If contacted as an out-plant operator to report seal injection flow, then wait 3 minutes and report to the control room seal injection flow as indicated on **THUNDERVIEW-SIMVC02.** 4. If contacted as an out-plant operator to investigate the D1 Local Alarm, report that it is due to C55300-0105, Stand-By Lube Oil System Trouble alarm. 5. If contacted as an out-plant operator to establish communications with the CR to throttle AFW flow, then wait 2 minutes and report via handheld radio that you are in the AFW Pump room standing by to throttle AFW flow. 6. Throttle AFW flow as necessary using the following remotes: a. **FW134** – 11 AFW Pump to 11 SG (MV-32238) b. **FW135** – 11 AFW Pump to 12 SG (MV-32239) c. **FW136** – 12 AFW Pump to 11 SG (MV-32381) d. **FW137** – 12 AFW Pump to 12 SG (MV-32382) **NOTE** ***It takes approximately 3 minutes for AFW MVs to fully close after the remote has been entered. Ensure MV shows closed on Thunderview prior to telling crew the valve is closed.***	ATC / BOP / SS ATC / SS BOP	**1E-0, REACTOR TRIP OR SAFETY INJECTION** • Verify reactor is tripped. • Verify the Main Turbine is tripped. • Determine both Safeguards buses NOT energized. • Transition to 1ECA-0.0. **1ECA-0.0, LOSS OF ALL SAFEGUARDS AC POWER** • Check PRZR PORVs CLOSED. • Check Letdown isolation valves CV-31255 & CV-31226 CLOSED. • Check Excess Letdown isolation valve CV-31330 CLOSED. • Determine AFW flow is NOT greater than 200 gpm. ○ **Start** 11 TDAFW Pump. • Announce Unit 1 reactor trip. • Determine CL header pressure greater than 25 psig. • Determine Bus 15 IS available. • Start D1 diesel generator. • Place BKR 15-2 MAN/AUTO switch to MANUAL • Place synchroscope select switch to 'D1' • Close BKR 15-2. • Verify Bus 15 energized. • Start one charging pump. • Return to 1E-0, step 3. **1E-0, REACTOR TRIP OR SAFETY INJECTION** • Determine Bus 15 energized. • Determine SI is NOT actuated nor required. • Transition to 1ES-0.1.
EVENTS 5, 6, 7, & 8 cont.	**CRITICAL TASKS** • Energize at least one AC emergency bus when safeguards equipment is required to perform its safety	ATC / SS	**1ES-0.1, REACTOR TRIP RECOVERY** • Transfer steam dump to STM PRESS mode. • Check RCS cold leg temps at 547°F. • Check CL header pressure greater than 75 psig.

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	function or prior to ORANGE or RED path on Core Cooling CSF. • During a Station Blackout, establish Auxiliary Feedwater flow to the Steam generators to prevent both Steam Generators from reaching DRYOUT conditions. **Plant Response:** 1. Reactor and turbine trip. 2. Bus 15 de-energizes. 3. Bus 25 LOCKS OUT. 4. Multiple annunciators associated with loss of power.		• Notify TBO to perform Att. J. • Determine AFW flow to SGs greater than 200 gpm. • Determine all control rods NOT fully inserted. ○ **Borate 400 gallons due to CBD stuck rod G11**
END	Once the crew has **restored power to Bus 15, transitioned to 1ES-0.1, and begun a 400 gallon boration**, and/or at the discretion of the Lead Evaluator, then place the simulator in FREEZE. Inform the crew that training has the duty.		
	Booth Operator: *Collect SBT data per Attachment 1.*		

SIMULATOR INPUT SUMMARY

@Time	Event	Action	Description
00:00:00		Insert override DI-46930P to True	D2 OOS
00:00:00		Insert override DI-46930ST to False	D2 OOS
00:00:00		Insert override LO-4693001 to Off	D2 OOS
00:00:00		Insert override LO-4693002 to Off	D2 OOS
00:00:00		Insert malfunction DG07A	D1 EMERGENCY AUTO START FAILURE
	1	Insert malfunction RX205 from 31.19020 to 0 on event 1	1 PRZR (CHNL II-WHI) LVL XMTR (1LT-427)
	2	Insert malfunction RX226 from 465.18799 to 0 on event 2	1 TURB 1ST STAGE STM (CHNL II-WHI) P XMTR (1PT-485)
	3	Insert malfunction ED14 on event 3	LOSS OF ALL OFFSITE AC POWER
	3	Insert malfunction ED09G on event 3	LOSS OF 4160V BUS #25
	3	Insert malfunction FW34A on event 3	AUX FW PUMP #11 (TURBINE DRIVEN) FAILS TO START AUTOMATICALLY
	3	Insert malfunction RD06I on event 3	STUCK ROD G-11 - CBD
	3	Insert override DI-46950C to False on event 3	BKR 15-2 AUTO CLOSE FAILURE
	3	Insert override DI-46950T to True on event 3	BKR 15-2 AUTO CLOSE FAILURE
	4	Remove override DI-46950C to False on event 4	CLOSE
	4	Remove override DI-46950T to True on event 4	TRIP

SIMULATOR EVENT SUMMARY

Event ID	Description	Code
4	RESTORE BKR 15-2	HWZDGU6948!=1

Simulator Setup:

Beginning of Day:

___ 1. If it is the first scenario of the day, then perform a **shutdown** and **restart** of the floor PCs that are connected to the LAN.

___ 2. **Log in** on floor PCs with user ID & password: <pitrgsim>

___ 3. **Update** or **Verify** Control Room Placards:
   a. NRC Code Placard:
      i. NRC Current Authentication Code **A4YP**.
      ii. Today's Date.
   b. High Flux at Shutdown Alarm Setpoint placards: **5000 cps**.
   c. Feedwater regulating valve position placard **set to current values**.
   d. Recommended SG Blowdown flow **set to current values**.

___ 4. Verify **Current** Plant Status Magnetic Placards are in Place:
   a. Blowdown 46470 "**SGB to CDSR**"
   b. H2 in VCT Space
   c. 11 BA TANK "Lined Up for Service"
   d. 11 BA PUMP "Lined Up to 11 BA Tank"
   e. 12 BA PUMP "Lined Up to 11 BA Tank"
   f. CC to SFP MV-32115 "In Service"
   g. CC to SFP MV-32117 "In Service"

___ 5. Current Plant **Pink Status Control Tags** in place:
   a. CS-46540, 22 CC WTR PUMP
   b. CS-46572, 121 SFP HX INLT

___ 6. Current Plant **Yellow Caution Tags** in place:
   a. NONE

___ 7. Verify that copy machine and printers are loaded with **YELLOW BORDER** paper.

___ 8. Pens/Notepads/Markers available on the simulator.

Simulator Setup:

NOTE: The time between simulator reset and placing simulator in RUN should be minimized to reduce the difference between the ERCS time and actual time.

___ 1. If this is the first scenario of the day, then **perform** Beginning of Day checklist on previous page.

___ 2. **Reset** the Simulator to **IC-244**.

___ 3. If IC-244 is not available, then **perform** the following:

a. **Reset** the Simulator to IC-21.

b. **Place** CS-46930, D2 DIESEL GENERATOR, in PULL TO LOCK.

c. **Place** CS-46921, BUS 16 SOURCE FROM D2, in PULL TO LOCK

d. **Place** CS-46911, D2 DSL GEN EXCITER CONTROL SEL SW, in MANUAL.

___ 4. **Place** the simulator in RUN.

___ 5. If available, **run** schedule file **PI-ILT-NRC-1802S.sch** as follows:

a. **Locate** schedule file.

b. **Open** schedule file by double clicking it.

c. **Run** the schedule file by pressing the “Stopped” button on the toolbar.

d. **Verify** the schedule file is running.

___ 6. If schedule file is NOT available, then **insert** malfunctions, remotes, and overrides, as specified by the Simulator Input Summary.

___ 7. If available, **run** event file **PI-ILT-NRC-1802.evt** as follows:

a. **Locate** event file.

b. **Open** event file by double clicking file.

___ 8. If event file is NOT available, then enter event codes as specified by Simulator Event Summary.

___ 9. If desired, **start** Scenario Based Testing Data Collection Program per Attachment 1.

___ 10. **Complete** the "Simulator Setup Checklist” on next page

SIMULATOR SETUP CHECKLIST

Pre-Scenario Checklist:

_____ Simulator Status:

___1. "Training Load"
___2. Alarm sound ON
___3. Speed: REAL
___4. Step counters: NOT USED
___5. Simulator running in IC-244.
___6. Steps 1 – 9 on previous page complete.

_____ **Delete** memory on Yokogawa Model DX1000 recorders by cycling Recorder Power.

_____ Verify Schedule File/Summary matches Simulator Input Summary page in the SEG.

_____ Verify that control rod step counters on C panel and ERCS RBU **CBD @ 208**.

_____ Boric Acid/RMU integrators set to: **BA: 0, RMU: 10**, and reset.

_____ **MOC ΔI** sheet displayed on C panel.

_____ **MOC Reactivity Briefing** sheet available at Reactor Operator Desk.

_____ Verify Boric Acid and Reactor Makeup Controllers are set properly:

___ 1. 1HC-110: **19.8%**
___ 2. 1HC-111: **44.7%**

_____ **Update or Verify** SEG specific Control Board Placards**:**

___ 1. CVCS panel placard:
   a. RCS boron – **858 ppm**.
   b. RCS H_2 – **45 cc/kg**.
   c. Turbine Reference Value and Mode – **matched with DEHC**.
___ 2. Shift Reactivity Guidance placard:
   a. BA: **2.7 gallons**
   b. RMU: **67 gallons**
   c. Dilutions: **10 gal RMU, 1-2 times per shift**
___ 3. EAL Classification Placard **CLEANED** and **placed** on side of SS desk.
___ 4. LCO Timer **CLEANED.**

_____ SEG specific **Magnetic Placards** in place:

___1. **D2 DSL GEN OOS** signs on the **G, A, C, & E** panels.

_____ SEG specific or Protected Equipment **Pink Status Control Tags** in place:

___1. CS-46424, 11 TD AFWP
___2. CS-46184, 11 RHR PUMP
___3. CS-46178, 11 SI PUMP
___4. CS-46053, 12 CLG WTR PUMP
___5. CS-46036, 11 CC PUMP
___6. CS-46067, 121 CR AIR SUPPLY FAN
___7. CS-46068, 121 CR CHILLER & PUMP
___8. CS-46066, 121 CR CLEAN UP FAN
___9. CS-46935, D1 DIESEL GENERATOR

_____ SEG specific or Out of Service **Yellow Caution Tags** are in place:

___1. CS-46930, D2 DIESEL GENERATOR, to PULL TO LOCK.
___2. CS-46921, BUS 16 SOURCE FROM D2 to PULL TO LOCK.

Pre-Scenario Checklist continued:

_____ ERCS driven recorders are on-scale (RCS temperature scaled **555º F to 565º F**).

_____ ERCS alarm screen operating and alarms **reset**.

_____ All ERCS terminals operating and set as follows:

CONF	**VARS**	R02	**Alarm Summary Page**
CONE1	**Group OP31_U1**	R03	**AFD**
CONC	**SAS (XS11)**	R04	**TPM**
CONG1	**Group QP CCDATA**	R05	**QP LOADFOLL**
ERCS-R01	**Group RADMON_U1**	R06	**Alarm Summary Page**

_____ ERCS single point displays:

CONB	**1T0499A**	**1U1613A**
CONE2	**1Q0340A**	**1V4501A**

_____ ERCS TPM set (**Calorimetric - Auto Scaling - VENT**).

_____ Set Turbine Control HMI Displays as follows:

___ 1. U1 E-H Turb Cont STA 2 (48087) to **Control Valve Overview**
___ 2. U1 Turb Aux Cont (48088) to **Turb Overview**
___ 3. U1 E-H Turb Cont STA 1 (48086) to **Off Line Control**
___ 4. DEHC alarms **cleared**.

_____ Verify DEHC **VPL set ~0.1 to 0.2 above** current valve position (not on limiter).

_____ YELLOW turnover sheets 1-9 available.

_____ Electronic PINGP 577 forms and TABS **closed** on both LAN connected PCs.

_____ Board-mounted EAL Tables are **cleaned**.

_____ Headsets turned on as necessary.

_____ Procedure checklist **completed**. See following page.

_____ Peer Check performed for simulator setup.

PROCEDURE CHECKLIST:

NOTE: The following procedures will be used during this session. Verify the procedures are free of place keeping marks before starting the session and after the session are complete.

Before 1st / 2nd	After 1st / 2nd	
/	/	1C5 AOP1, UNCONTROLLED ROD MOTION
/	/	1C23, UNIT 1 TURBINE CONTROL SYSTEM
/	/	1C51.2, PRESSURIZER LEVEL 1L-427 – LOW
/	/	1C51.2, TURBINE 1ST STAGE PRESSURE 1P-485 – LOW
/	/	
/	/	C7 AOP1, PLANT STABILIZATION
/	/	
/	/	C47012-0607, PRZR LO-LO LVL HEATERS OFF AND LETDOWN SECURED
/	/	
/	/	1E-0, REACTOR TRIP OR SAFETY INJECTION
/	/	1ECA-0.0, LOSS OF ALL SAFEGUARDS AC POWER
/	/	1ES-0.1, REACTOR TRIP RECOVERY
/	/	
/	/	1E-CAS, UNIT 1 CONTINUOUS ACTION & INFO PAGE SUMMARY
/	/	
/	/	EAL Board
/	/	
/	/	LAMINATE COPY OF 1C5, SECTION 5.5
/	/	LAMINATE COPY OF 1C12.5, SECTIONS 5.8, 5.9, & 5.10
/	/	
/	/	REACTIVITY BRIEFING SHEET - MOC
/	/	
/	/	SWI O-28, NOTIFICATION OF OPS MNGR & NRC RESIDENT INSPECTOR
/	/	
/	/	T.S. LCO 3.3.1
/	/	T.S. LCO BASES 3.3.1
/	/	T.S. TRM 3.3.4
/	/	
/	/	
/	/	
/	/	
/	/	
/	/	
/	/	

Post-Scenario Checklist

_____ EOOS computer is cleared of information added during the scenario.

_____ Computer generated PINGP 577 cleared.

_____ Procedure checklist completed. See previous page.

_____ Remove Pink Status Control Tags from the following equipment:

___ 1. CS-46424, 11 TDAFWP
___ 2. CS-46184, 11 RHR PUMP
___ 3. CS-46178, 11 SI PUMP
___ 4. CS-46053, 12 CLG WTR PUMP
___ 5. CS-46036, 11 CC PUMP
___ 6. CS-46067, 121 CR AIR SUPPLY FAN
___ 7. CS-46068, 121 CR CHILLER & PUMP
___ 8. CS-46066, 121 CR CLEAN UP FAN
___ 9. CS-46935, D1 DIESEL GENERATOR

_____ Magnetic placards removed:

___ 1. D2 DSL GEN OOS signs on the G, A, C, and E panels.
___ 2. EAL Classification Placard from Control Board.

_____ Remove Yellow Caution Tags from the following equipment:

___ 1. CS-46930, D2 DIESEL GENERATOR
___ 2. CS-46921, BUS 16 SOURCE FROM D2

_____ Board-mounted EAL Table is cleaned.

_____ All books, note pads, and calculators put away.

_____ **Verify** SYNCHROSCOPE handle on Unit 1 G Panel restored.

End Of Day Checklist

_____ Signs/placards removed and put away unless normal simulator configuration.

_____ If desired, floor PCs logged off if simulator will not be used again that day.

_____ Instructor station returned to normal with all books, paper, and etc. put away.

_____ Headsets turned off and put away if simulator will not be used again that day.

_____ Simulator reset to IC-10 unless another IC will be used for further training.

_____ Simulator placed in DORT if simulator will not be used again that day.

_____ Verify the following placards are erased:

- CVCS panel
- Shift Reactivity Guidance
- LCO Timer
- NRC Authentication Code

RETENTION: 7 Days

UNIT 1 LPEO / PEO TURNOVER LOG

DATE: DAY/NIGHT SHIFT: Day

CAT 1 VENT OPENINGS: 0 ft^2 **SYSTEM CONDITION: GREEN**

SAFEGUARDS EQUIPMENT OOS/TECH SPEC REQUIRED ACTION STATEMENTS

1. N51 and N52 displays are OOS.
   - TS LCO 3.3.3 Condition A was entered with 23 days remaining.
   - TS LCO 3.3.3 Condition D was entered with 5 days remaining.
   - N51 and N52 counts can be viewed in ERCS.
2. D2 DIESEL GENERATOR is out of service for corrective maintenance.
   - TS 3.8.1 Condition B was entered with 9 days remaining.
   - Expected return to service in 24 hours.
   - D1 DIESEL GENERATOR has been evaluated for common cause failure and has been determined to be OPERABLE

PROTECTED EQUIPMENT

11 TD AFW PUMP	12 CLG WATER PUMP	121 CR CLEAN UP FAN
11 RHR PUMP	D1 DIESEL GENERATOR	SFP COOLING
11 SI PUMP	121 CR AIR SUPPLY FAN	
11 CC PUMP	121 CR CHILLER & PUMP	

RAD MONITORS OOS	ANNUNCIATORS OOS
NONE	NONE

OUTSTANDING SP'S	FIRE DET / PROT EQP IMPAIRMENTS
NONE	NONE

OTHER EQUIPMENT OOS / STATUS

• Exposure: MOC • Power: 90% • Boron: (CB): 858 ppm • Temperature: 558°F	• Pressure: 2235 psig • Xenon: Xe Equilibrium • Rods: "D" @ 208 • Generator: 525 MW	

MAJOR EQUIPMENT REPAIRED / RETURNED TO SERVICE

NONE

OPERATIONAL PLANS FOR COMING SHIFT

- Prior to entering the simulator, perform a Pre-Job Brief for the following:
  - Swap EH oil pumps per 1C23.
- After taking the duty, swap running EH oil pumps per 1C23 and pre-job brief.

NEW PROCEDURES / INSTRUCTIONS

Reactor power is at 90% power following load increase. Holding at 90% per TSO request. Xe at equilibrium.
SP 1118 was performed 1 hour ago and is due again in 5 hours.

PI-ILT-NRC-1802S, 2018 ILT NRC SIMULATOR EVALUATION #2, REV. 0

Simulator Scenario Development Checklist

Mark with an X Yes or No for any of the following. If the answer is No, include justification for the no answer or the corrective action needed to correct the discrepancy after the item.

		Yes	No
1.	The scenario contains objectives for the desired tasks and relevant human performance tools.	**X**	
2.	The scenario identifies key parameter response, expected alarms, and automatic actions associated with the induced perturbations.	**X**	
3.	The scenario content adequately addresses the desired tasks, through simulator performance, instructor-led training freezes, or both.	**X**	
4.	Plant PRA initiating events, important equipment, and important tasks are identified.	**X**	
5.	Turnover information includes a Daily At Power or Shutdown Safety Risk Assessment. *Justification: PRA software not installed on Sim computers.*		**X**
6.	The scenario contains procedurally driven success paths. Procedural discrepancies are identified and corrected before training is given.	**X**	
7.	The scenario guide includes responses for all anticipated communications to simulated personnel outside the Control Room, based on procedural guidance and standard operating practices. Include estimated completion times and/or notes for use of time compression.	**X**	
8.	The scenario includes related industry experience. SOER, SER and similar OE recommendations are clearly identified and fully addressed.*		**X**
9.	The scenario guide incorporates verification of Operator Fundamental application.*		**X**
10.	Training elements and specific human performance elements are addressed in the scenario critique guide to be used by the critique facilitator. The critique guide includes standards for expected performance.*		**X**
11.	For evaluations, it has been verified that without operator action the critical tasks will be failed.	**X**	

Developer and Reviewer: Once checklist is completed and deficiencies are corrected, sign the cover page.

* For evaluations these items may be marked NO without justification.

PI-ILT-NRC-1802S, 2018 ILT NRC SIMULATOR EVALUATION #2, REV. 0

Simulator Scenario Validation Checklist

Mark with an X Yes or No for any of the following. If the answer is No, include an explanation after the item.

		Yes	No
1.	The desired initial conditions agreed with the reference plant with respect to reactor status, plant configuration, and system operation.	**X**	
2.	The simulator operated in real time during conduct of validation.	**X**	
3.	The simulator demonstrated expected plant response to operator input and to normal, transient, and accident conditions.	**X**	
4.	The simulator permitted use of the reference plant's procedures. The scenario was completed without procedural exceptions, simulator performance exceptions, or deviation from the scenario sequence.	**X**	
5.	The simulator did not "fail to cause" or "unexpectedly cause" any first principle alarm or primary automatic action.	**X**	
6.	Observable changes in parameters relevant to the scenario corresponded in trend and direction to reference plant's expected response.	**X**	
7.	All malfunctions and other instructor interface items were functional and demonstrated the expected reference plant's response to the initiating cause.	**X**	
8.	All malfunctions and other instructor interface items were initiated in the same sequence described within the simulator scenario.	**X**	
9.	The scenario satisfies the learning or examination objectives without any significant simulator performance issues, or deviations from the approved scenario sequence.	**X**	
10.	Simulator fidelity has been demonstrated to be adequate for this scenario.	**X**	

Discrepancies noted (Check "none" or list items found) ☒ None
SMAR = Simulator Action Request

SMAR:_____ SMAR:_____ SMAR:_____ SMAR:_____

Comments:_____

Validator: Sign the cover page only after noted discrepancies are corrected or compensatory actions are taken to ensure quality training.

Validation Personnel		
Name	Job Title / Qualification	Validation Position
John DuBose	SRO	SS
Mark Haren	RO	LEAD
Chris Olson	RO	RO
Fredrick Collins	NRC Exam Developer	Floor Instructor
Justin Hasner	Senior Ops Instructor	Booth Driver

ATTACHMENT 1

SBT EXAM DATA COLLECTION

- **BEFORE SCENARIO**
  - START menu
  - SBT Report
  - File
  - OPEN
  - Select file type ".tis"
    - (FILE LOCATION: sim data (X:) / TRex_PI / LIGHTNING / SBT
  - Select SBT.tis
  - OPEN or double click
  - Check TAM log & verify no cycling switches
  - Run scenario

- **AFTER SCENARIO**
  - FREEZE on Simulator
  - Click GREEN arrow to generate report
  - Enter the following:
    - (NAME is not required)
    - Test Title (1802 ILT NRC SBT Group x)
    - Report Name (same as test title)
  - Click the "…" button to right of Report Name field.
  - Select location where file is to be saved (on Locker G3 flash drive)
  - Enter file name (same as report name) & SAVE
  - Click GENERATE, verify file location, and close "html" file
  - START menu
  - COMPARE IT
  - Click "+" ADD
  - Select ".csv" file from previously saved location
  - OPEN or double click
  - Click GREEN "COMPARE" button
  - Wait for spreadsheet to populate and then save in desired location
  - Close spreadsheet, COMPARE IT, and SBT Report
  - Verify all 3 files are saved in proper location

Facility: PRAIRIE ISLAND Scenario No.: 3 Op-Test No.: PI-ILT-NRC-1803

Examiners: Operators: Shift Supervisor
Lead Reactor Operator
Reactor Operator

Initial Conditions:

Reactor Power at $1x10^{-8}$ amps, Boron Concentration at 1346 ppm, RCS temperature at 547°F, RCS pressure at 2235 psig, Xenon free prior to startup, Bank D rods at 135 steps, Generator Power at 0 MW. Backup pressurizer heaters are ON. Two 40 GPM letdown orifices are in service.

No equipment out of service.

Turnover:

Raise reactor power to the point of adding heat.

Secure 12 MD AFW Pump.

Event No.	Malf. No.	Event Type*	Event Description
1		R (ATC) N (SRO)	RAISE POWER TO THE POAH
2		N (BOP, SRO)	SECURE 12 MD AUXILIARY FEEDWATER PUMP
3		I (ATC, SRO) TS (SRO)	CONTROLLING PRZR LEVEL CHANNEL FAILS HIGH
4		C (BOP, SRO) TS (SRO)	'B' PRZR PORV LEAKAGE
5		M (ALL)	12 STEAM GENERATOR TUBE RUPTURE
6		C (BOP, SRO)	SI PUMPS FAIL TO START AUTOMATICALLY
7		C (BOP, SRO)	CTMT ISOLATION RELAY AUTO ACTUATION FAILURE

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

Xcel Energy

SIMULATOR EXERCISE GUIDE (SEG)

SITE: PRAIRIE ISLAND **SEG # PI-ILT-NRC-1803S**

SEG TITLE: 2018 ILT NRC SIMULATOR EVALUATION #3 **REV. # 0**

PROGRAM: INITIAL LICENSE OPERATOR TRAINING #: FL-ILT

COURSE: INITIAL LICENSE OPERATOR TRAINING #: FL-ILT

TOTAL TIME: 2.0 HOURS

Additional site-specific signatures may be added as desired.

Developed by:	**Fredrick Collins**	**1/7/2018**
	Instructor	*Date*
Reviewed by:	**Justin Hasner**	**6/7/2018**
	Instructor	*Date*
	(Simulator Scenario Development Checklist.)	
Validated by:	**Justin Hasner**	**6/7/218**
	Validation Lead Instructor	*Date*
	(Simulator Scenario Validation Checklist.)	
Approved by:	**Shawn Sarrasin**	
	Training Supervision	*Date*

Guide Requirements

Evaluation Objectives:

Evaluate the crew's ability to:

1. Raise Reactor Power to the POAH per 1C1.2-M2.
2. Secure 12 MDAFW Pump per 1C28.1.

Evaluate the crew's ability to diagnose and respond to:

3. Pressurizer Level Instrument failing high per 1C51.3.
4. Pressurizer PORV Leakage per C47012.
5. 12 Steam Generator Tube Rupture per 1E-0 & 1E-3.
6. Failure of SI Pumps to automatically start per 1E-0.
7. CTMT Isolation relay automatic actuation failure per 1E-0.

Training Resources:

1. Full Scope Simulator
2. NRC Evaluation Team
3. Booth Operator (Backup Communicator)
4. Primary Communicator

Related PRA Information:

Initiating Event with Core Damage Frequency:
SGTR (3.8%)

Important Components:
12 MD AFW PMP
11 SI PMP
12 SI PMP

Important Operator Actions with Task Number:
CRO 301 004 06 01 000 – Operator fails to diagnose SGTR and close ruptured SG MSIV and AFW flow from MCR.
CRO 301 004 06 01 000 – Operator fails to C/D and depressurize RCS for a SGTR before SG overfill.

QUANTITATIVE ATTRIBUTES

Malfunctions:

Before EOP Entry:

1. 1L-428, Blue Channel Pressurizer Level Transmitter, fails HIGH.
2. Pressurizer PORV, PCV 431C, Leakage.

After EOP Entry:

1. Train A and B Safety Injection Pumps fail to automatically start.
2. CTMT Isolation Train A relay fails to automatically actuate after SI Signal.

Abnormal Events:

1. Instrument Failure Guide.
2. AOP for RCS leakage.

Major Transients:

1. 12 Steam Generator Tube Rupture

Critical Tasks:

1. PI-CT-20: Establish at least 250 psid between the ruptured SG and intact SG prior to depressurizing the RCS.
2. PI-CT-21: Stop the RCS cooldown before an ORANGE or RED path in Integrity CSF occurs.
3. PI-CT-22: Depressurize the RCS to meet SI termination criteria before overfilling the ruptured Steam Generator.
4. PI-CT-23: Secure feed flow to the ruptured Steam Generator and terminate Safety Injection before overfilling the ruptured Steam Generator.

CRITICAL TASK SHEET

Number:	PI-CT-20
Critical Task:	Establish at least 250 psid between the ruptured SG and intact SG prior to depressurizing the RCS.
Safety Significance:	Securing steam flow from the ruptured Steam Generator and cooling down the RCS with the intact Steam Generator establishes a pressure differential between the ruptured and non-ruptured Steam Generators. This allows RCS depressurization to minimize primary-to-secondary leakage.
Plant Conditions:	• Reactor tripped. • Safety Injection actuated. • SGTR from only one Steam Generator. • Non ruptured Steam Generator remains intact. • LOCA to containment not occurring. • Steam flow from ruptured Steam Generator is capable of being secured.
Cues:	• Secondary radiation levels are NOT normal. • Steam Generator NR level increasing in an uncontrolled manner.
Performance Indicator:	• Performing the following as necessary to establish at least a 250 psid between ruptured SG and intact SG: o Securing and/or reducing steam loads from the ruptured SG. o If necessary, cooling down the RCS by: ▪ Dumping steam to the condenser from the intact SG ONLY. ▪ Manually opening the intact SG PORV ONLY. NOTE: • If Attachment B is used to secure steam flow from the Steam Generator instead of closing the MSIV and Bypass, then RCS cooldown using steam dumps would most likely constitute a failure.
Feedback:	• Stable or increasing pressure in the ruptured SG. • Ruptured Steam Generator pressure is at least 250 psig above intact Steam Generator pressure.

CRITICAL TASK SHEET

Number:	PI-CT-21
Critical Task:	Stop the RCS cooldown before an ORANGE or RED path in Integrity CSF occurs.
Safety Significance:	Excessive rate of RCS cooldown creates large thermal stresses on the reactor vessel. Large thermal stresses on the vessel lead to initiation and growth of a small flaw into a larger crack. Growth or extension of such a flaw leads to a loss of vessel integrity.
Plant Conditions:	• LOCA to containment not occurring. • SGTR in progress. • An operator initiated RCS cooldown in progress.

Cues:	• RCS cooldown in progress from one of the following:
	  ○ Steam Dump to condenser.
	  ○ SG PORV
	• RCS temperature lowering.

Performance Indicator:	• Securing the cool down by manipulating one of the following: • Steam Dump controller. • SG PORV controller.
Feedback:	• RCS temperature stops lowering.

Number:	PI-CT-22
Critical Task:	Depressurize the RCS to meet SI termination criteria before overfilling the ruptured Steam Generator.
Safety Significance:	A SGTR allows radioactive RCS inventory to leak into the SG. As a result, the SG inventory, radioactivity, and pressure increase. If the primary-to-secondary leakage is not stopped, the SG will overfill causing water release through the SG PORV or SG Safety. This can cause an un-isolable fault from the ruptured SG and significantly increase the radioactive release to the public.
Plant Conditions:	• SGTR from only one Steam Generator. • Ruptured Steam Generator pressure is at least 250 psig above intact Steam Generator pressure.
Cues:	• Stable or increasing pressure in the ruptured SG. • Ruptured Steam Generator pressure is at least 250 psig above intact Steam Generator pressure.
Performance Indicator:	• Pressurizer Spray valve(s) or Pressurizer PORV(s) opened and closed as necessary to establish SI termination criteria prior to overfilling the Steam Generator. • The Steam Generator is considered overfilled if BOTH conditions below exist: o 30 minutes has elapsed since indications of a SGTR were available. o Ruptured SG Narrow Range Level has reached 100%.
Feedback:	RCS depressurization is stopped when one of the following is met: • RCS sub-cooling is greater than 21°F [40°F]. • Secondary Heat Sink available: o Total feed flow to intact SG greater than 200 GPM. -OR- o Intact SG NR level greater than 7% [WR 50%]. • RCS pressure stable or increasing. • Pressurizer level greater than 8% [27%]

Number:	PI-CT-23
Critical Task:	Secure feed flow to the ruptured Steam Generator and terminate Safety Injection before overfilling the ruptured Steam Generator.
Safety Significance:	A SGTR allows radioactive RCS inventory to leak into the SG. As a result, the SG inventory, radioactivity, and pressure increase. If the primary-to-secondary leakage is not stopped, the SG will overfill causing water release through the SG PORV or SG Safety. This can cause an un-isolable fault from the ruptured SG and significantly increase the radioactive release to the public.
Plant Conditions:	• SGTR from only one Steam Generator.
Cues:	• Feed flow is established to the ruptured Steam Generator. • SI termination criteria are met.

Performance Indicator:	• Close/Secure the following valves/pumps aligned to the ruptured Steam Generator (as necessary):
	  ○ AFW Pump Discharge Valve(s)
	  ○ AFW Pump(s)
	  ○ Main and Bypass Feed Water valve(s)
	  ○ MFW Pump(s)
	• Stopping all running SI Pumps
	• The Steam Generator is considered overfilled if BOTH conditions below exist:
	• 30 minutes has elapsed since indications of a SGTR were available.
	• Ruptured SG Narrow Range Level has reached 100%.

Feedback:	• Feed flow to the ruptured Steam Generator is secured. • Safety Injection flow is secured.

SCENARIO OVERVIEW:

INITIAL CONDITIONS:

- Exposure: MOC
- Power: $1x10^{-8}$ amps
- Boron: (CB): 1346 ppm
- Temperature: 547°F
- Pressure: 2235 psig
- Xenon: Xe Free
- Rods: "D" @ 135
- Generator: 0 MW

EQUIPMENT OOS

- N51 and N52 Displays

SEQUENCE OF EVENTS:

Event 1: Raise Reactor Power to the Point of Adding Heat

- Reactor power is at 1 x 10^{-8} amps.
- Rods will be stepped out to establish a positive startup rate.
- Power will rise to between 0.5% and 2%.

Event 2: Secure 12 MDAFW Pump

- The crew will stop 12 MD AFW Pump per 1C28.1 and place in AUTO.

Event 3: 1L-428, Blue Interlock Channel Pressurizer Level, fails HIGH.

- PRZR Level Controlling Channel 1L-428 will fail high.
- The crew will place charging in manual to control PRZR level at setpoint.
- The crew will place PRZR level control in WHITE-RED (2-1) and return PRZR level control to AUTO.
- The Shift Supervisor will enter TS LCO 3.3.1 Conditions A & K.

Event 4: PRZR PORV Leakage

- PORV PCV-431C will develop seat leakage & PRZR Relief Line temperatures will rise.
- The crew will respond per C47012 & isolate the leak using MV-32195.
- The Shift Supervisor will enter TS LCO 3.4.11 Condition A.

Event 5: 12 Steam Generator Tube Rupture

- 12 SG level will rise, RCS pressure and PRZR level will lower.
- Condenser air ejector radiation will alarm before failing off-scale high.
- The crew will isolate 12 SG, C/D and depressurize the RCS, and stop both SI pumps.

Event 6: 11 & 12 safety Injection Pumps Fail to Start Automatically

- Both SI pumps will fail to start on SI actuation.
- The crew will start both SI pumps manually.

Event 7: CTMT Isolation Relay Fails to Automatically Actuate

- CTMT Isolation Train A fails to actuate on SI actuation.
- The crew will manually actuate CI and/or manually align components.

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	SIMULATOR PRE-BRIEF: • The Simulator Pre-Brief is conducted prior to the crew entering the simulator. **COMPLETE TURNOVER:** • "UNIT 1 LPEO / PEO TURNOVER LOG." • 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" • Walk-down the control boards and ask questions as appropriate
EVENT 1	**Booth Operator / Communicator:** 1. After the crew has assumed the duty, they will raise power to the Point of Adding Heat per pre-job brief. **Plant Response:** 1. IR power will rise. 2. Tavg and PRZR level will rise. 3. PR power will come on scale.	ATC / SS	**<u>1C1.2-M2, UNIT 1 STARTUP TO MODE 2:</u>** • Raise reactor power to the point of adding heat using manual rod control or boron concentration change. • When one or more intermediate range indicates greater than 1 x 10^{-9} amps, then verify ERCS is in Mode 2, STARTUP. • Using ERCS display XS02 and C41, verify the Subcritcality CSF Activation Status is INACTIVE. • Maintain reactor power between 0.5 and 2.0%.

SCENARIO TIME-LINE:

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

EVENT 2	**Booth Operator / Communicator:**
	1. After the crew has raised power to the Point of Adding Heat, they will secure 12 MD AFW Pump per pre-job brief.
	2. When directed as an out-plant operator to verify 12 MD AFW Pump has stopped, CV-31154 has closed, and Auxiliary lube oil pump is running, then wait approximately 2 minutes and report 12 MD AFW Pump is stopped, CV-31154 is closed, and Auxiliary lube oil pump is running. (1C28.1 steps 5.4.5 A, B, & C)
	3. When directed as an out-plant operator to stop 12 MD AFW Pump Aux Lube Oil Pump, then wait approximately 3 minutes and report Aux Lube Oil Pump has been stopped. (1C28.1 step 5.4.6)
	4. If contacted as the duty chemist, acknowledge 12 MD AFW Pump has been stopped.
		BOP	**1C28.1, AUXILIARY FEEDWATER SYSTEM UNIT 1:**
			• CLOSE MV-32381, 12 MD AFWP TO 11 STM GEN, using CS-46316.
			• CLOSE MV-32382, 12 MD AFWP TO 12 STM GEN, using CS-46317.
			• Stop 12 MD AFW Pump using CS-46425.
			• Direct an out-plant operator to verify locally:
			  ○ 12 MD AFW Pump has stopped.
			  ○ CV-31154, 12 MD AFW PMP RECIRC/L-O CLG CV, has CLOSED.
			  ○ Auxiliary lube oil pump is running.
			• Direct an out-plant operator to locally stop 12 MD AFW Pump Aux Lube Oil Pump when 12 MD AFW Pump stops rotating.
			• OPEN MV-32381, 12 MD AFWP TO 11 STM GEN, using CS-46316.
			• OPEN MV-32382, 12 MD AFWP to 12 STM GEN, using CS-46317.
			• Independently verify MV-32381 and MV-32382 are OPEN.
			• Verify SI Not Ready panel light 44102-B9, 12 AFW DISCH VLV CLOSED, is NOT LIT, indicating the discharge valves are OPEN.
			• Place CS-46439, 12 MD AFWP selector switch in “AUTO”.
			• Independently verify CS-46439 in AUTO.
			• Notify the Duty Chemist that 12 MD AFW Pump has been stopped.

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
EVENT 3	**Booth Operator / Communicator:** 1. After the crew has stopped 12 MD AFW pump and/or at the discretion of the Lead Evaluator, enter: **Trigger 1, PRZR Level Control (Blue) Channel fails HIGH.** 2. If contacted as I&C to trip bistables, inform the crew two I&C Technicians will be available in 45 minutes. 3. If contacted as the Operations Management, acknowledge the report of the failure, and agree to make other notifications to the NRC, Duty Station Manager, etc. as asked. 4. 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. **Plant Response:** 1. 1L-428 will indicate off scale high. 2. The following annunciators will be received: a. 47012-0307, PRZR HI LVL CHANNEL ALERT b. 47012-0407, PRZR HI LVL	ATC ATC BOP ATC SS	**C47012-0307, PRZR HI LVL CHANNEL ALERT:** • Check pressurizer level. • Control level in manual. • If channel failed, then refer to 1C51. **1C51.3, PRESSURIZER LEVEL 1L-428 – HIGH:** • **Place** charging pump speed control in MANUAL and adjust PRZR level to setpoint. • **Select** position “2-1” (RED-BLUE) on PRZR Level Control switch, CS-46291. • **Return** one charging pump speed control to AUTO. • **Ensure** PRZR level recorder not selected to blue channel. The SS will **evaluate but not enter** the following TS LCOs due to inapplicability in MODE 2: • **3.3.1 Condition A:** o Enter conditions referenced in Table 3.3.1-1 IMMEDIATELY. • **3.3.1 Condition K:** o Place channel in trip in 6 HOURS. OR o Reduce thermal power to <P-7 & P-8 in 12 HOURS.

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
EVENT 4	**Booth Operator / Communicator:** 1. After the crew has placed PRZR level control in R-B and addressed Tech Specs, and/or at the discretion of the Lead Evaluator, enter: **Trigger 2, PRZR PORV B, PCV-431C, Leakage.** 2. If contacted as the Operations Management, acknowledge the report of the failure, and agree to make other notifications to the NRC, Duty Station Manager, etc. as asked. 3. If contacted as the FIN Team Supervisor or RCS Engineer, inform the crew that you will write a work order and investigate. **Plant Response:** 1. Temperature rises on PRZR Safeties. 2. PRZR PORV outlet temperature rises. 3. The following annunciators will be received: a. 47012-0109, b. 47012-0506, PRZR POWER RELIEF LINE HI TEMP c. 47012-0509, d. 47012-0606, PRZR SAFETY VALVE LINE A OR B HI TEMP	BOP SS	**C47012-0506, PRZR POWER RELIEF LINE HI TEMP:** • Check PRZR relief line temperature. • Check PRZR pressure. • **Isolate** CV-31231 by **CLOSING** MV-32195, PRZR RELIEF ISOL, using CS-46263. • Determine CV-31231 is the leaking PORV and leave MV-32195 closed. • Refer to 1C4 AOP1. • Refer to Tech Spec LCO 3.4.11. **1C4 AOP1, REACTOR COOLANT LEAK:** • Determine the reactor does NOT need to be tripped. • Use ERCS LEAK-1 to determine leak rate. • Determine leak location and isolate. The SS will **enter** the following TS LCO: • **3.4.11 Condition A:** o Close and maintain power to associated block valve in 1 HOUR. The SS will evaluate the following LCO but should not enter based on IDENTIFIED RCS leakage <10 gallons. • **3.4.14 Condition A:** o Reduce leakage to within limits in 4 HOURS.

EVENTS 5, 6, & 7	**Booth Operator / Communicator:**
	1. When the crew has isolated the leaking PORV and addressed Tech Specs, and/or at the discretion of the Lead Evaluator, then enter:
	Trigger 3, 12 SG Tube Rupture.
	2. Upon hearing the announcement of Reactor Trip, or when called as the Turbine Building Operator to isolate the Unit 1 MSRs per Attachment J, then open and run schedule file **E-0_Att-J.sch** located in ***X:\\Trex_PI\Lightning\Schedule\EOPs***. When the isolation is complete, inform the crew the MSR's are isolated.
	3. Upon hearing the announcement of Safety Injection, or when called as the Turbine Building Operator to secure the Turbine Building Roof Exhausters, wait 2 minutes and report the Turbine Building Roof Exhausters are all secured.
	4. If contacted as RP or Duty Chemist to sample for primary-to-secondary leakage, then wait 2 minutes and report cation column frisks indicate high activity on 12 SG and reading background on 11 SG.
	5. If Control Room personnel ask if Unit 2 personnel are available to perform Attachment L, then inform the Control Room that Unit 2 personnel are NOT available for performing Attachment L.
	6. If Control Room personnel ask for status of Unit 2 Cooling Water/Chilled Water lineup, then inform the Control Room that Unit 2 Cooling Water/Chilled Water valves are in their safeguards positions.
	
	CRITICAL TASKS
	• *Establish at least 250 psid between the ruptured SG and intact SG prior to depressurizing the RCS.*
		ATC
		
		ATC / BOP / SS
			1E-0, REACTOR TRIP OR SAFETY INJECTION:
			• **Verify** reactor is tripped.
			• **Verify** both Safeguards buses energized.
			• **Verify** SI actuated due to inability to maintain pressurizer level above 5%.
			• **Perform** Attachment L (see SEG page 15).
			• **Check** AFW status.
			• **Check** RCS Tavg trending to 547°F.
			• **Check** PRZR PORVs and Spray valves closed.
			• **Determine** RCP trip criteria are NOT met.
			• **Determine** SGs are NOT faulted.
			• **Determine** SG Tubes are ruptured based on increasing SG level with no AFW flow.
			• **Go to** 1E-3.
			
			1E-3, STEAM GENERATOR TUBE RUPTURE:
			• **Determine** RCPs should NOT be stopped.
			• **Identify** 12 SG as the ruptured SG.
			• **Isolate** flow from ruptured SG:
			  • 12 SG PORV in AUTO at 75%.
			  • 12 SG PORV closed.
			  • Close 12 SG steam supply to 11 TD AFWP.
			  • Verify 12 SG Blowdown valves closed.
			  • Close 12 MSIV and bypass valve.
			• **Determine** 12 SG narrow range level is >7%.
			• **Stop** feed flow to 12 SG.
			• **Reset** SI.
			• **Determine** 12 SG pressure >290 psig.
			• **Initiate** RCS Cooldown:

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	• *Stop the RCS cooldown before an ORANGE or RED path in Integrity CSF occurs.* • *Depressurize the RCS to meet SI termination criteria before overfilling the ruptured Steam Generator.* • *Secure feed flow to the ruptured Steam Generator and terminate Safety Injection before overfilling the ruptured Steam Generator.* **NOTE:** *The Steam Generator is considered overfilled if BOTH conditions below exist:* • *30 minutes has elapsed since indications of a SGTR were available.* • *Ruptured SG Narrow Range Level has reached 100%.* **Plant Response:** 1. Reactor and turbine trip. 2. 12 SG level rises rapidly. 3. High condenser air ejector radiation. 4. RCS & PRZR pressure lower. **NOTE** ***The BOP will have to perform the following to align safeguards components for SI:***		• Determine required CETC temperature. • Check steam dump to condenser available. • Start one condensate pump. • Establish steam dump to condenser. • Dump steam to the condenser from intact SG at the maximum rate. When RCS temperature is <540°F, place SD transfer switches to BYPASS INTERLOCK. • Stop cooldown when CETCs less than required temperature. • Maintain CETCs less than required temperature. • **Check** 11 SG NR level greater than 7%. • **Control** feed flow to maintain between 18% and 50%. • **Check** power available to PRZR block valves and at least one open. • **Verify** PRZR PORVs closed. • Reset SI. • **Reset** CI. • **Establish** Instrument Air to CTMT. • **Stop** RHR pumps. • **Establish** charging flow. • **Check** 12 SG pressure stable or increasing. • **Determine** RCS subcooling greater than 40°F. • **Depressurize** RCS to minimize break flow & refill PRZR: • Determine normal PRZR spray available.

SCENARIO TIME-LINE:

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

CS #	COMPONENT	DESIRED CONDITION
(Normally Aligned in Att. L)		
46064	MV-32115, 122 SFP HX INLT HDR MV B	CLOSED
DEHC	CV-31079 thru CV-31082 (TURBINE DRAIN VALVES)	OPEN
46338	STEAM DUMP MODE	STM PRESS
46018	11 CFCU	SLOW
46019	13 CFCU	SLOW
(Align Due to Malfunctions)		
46235	RCDT GAS ANALY HDR ISOL	CLOSED
46339	A SG BD ISOL, MV-32044	CLOSED
46968	B SG BD ISOL, MV-32043	CLOSED
46054	1 CTMT VACUUM TRN A CV-31621	CLOSED
46178	11 SI PUMP	RUNNING
46179	12 SI PUMP	RUNNING

BOP

- **Spray** PRZR with maximum spray until PRZR level greater than 75%.
- **Close** spray valves.
- **Determine** SI pumps can be stopped.
- **Stop** 11 & 12 SI pumps.

1E-0 Attachment L: SI Alignment Verification:

- **Verify** Safeguards Component Alignment
  - See table on page 15
- **Close** MV-32115, 122 SFP HX INLT HDR MV B
- Check Cooling Water Header Pressures
- Check If Main Steamlines Are required to be isolated
- Verify SI & RHR Flow
- Check RCP Cooling
- Verify Generator Breakers – OPEN
- Verify All Heater Drain Pumps – STOPPED
- Verify Main Feedwater Alignment
- Verify All Condensate Pumps - STOPPED
- **Verify** Unit 1 Cooling Water/Chilled Water Alignment
- Verify 11 Safeguards Screenhouse Ventilation lineup
- Verify Control Room Ventilation Alignment
- Verify Unit 2 Cooling/Chilled Water Alignment
- Verify 21 Safeguards Screenhouse Ventilation lineup
- Verify 11 and 12 Battery Charger Operation is normal
- Verify Battery Room temps less than 84°F
- Check status of Spent Fuel Cooling

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
			• Check Status of Notifications • **Notify** SS Of Any Discrepancies
END	Once the crew has **stopped SI pumps**, and/or at the discretion of the Lead Evaluator, then place the simulator in FREEZE. Inform the crew that training has the duty.		
	Booth Operator: *Collect SBT data per Attachment 1.*		

SIMULATOR INPUT SUMMARY

@Time	Event	Action	Description
00:00:00		Insert malfunction SI05A	SAFETY INJECTION PUMP #11 FAILS TO START AUTOMATICALLY
00:00:00		Insert malfunction SI05B	SAFETY INJECTION PUMP #12 FAILS TO START AUTOMATICALLY
00:00:00		Insert malfunction RP22	FAILURE OF CI TRAIN A RELAY (CI11X) TO ACTUATE
	1	Insert malfunction RX206 from 22.00000 to 100.00000 on event 1	1 PRZR (CHNL III-BLU) LVL XMTR (1LT-428)
	2	Insert malfunction RC22B to 13.00000 on event 2	PRESSURIZER POWER OPERATED RELIEF VALVE PCV-431C LEAKAGE
	3	Insert malfunction SG02B to 6.5.00000 on event 3	STEAM GENERATOR #12 TUBE RUPTURE

Simulator Setup:

Beginning of Day:

___ 1. If it is the first scenario of the day, then perform a **shutdown** and **restart** of the floor PCs that are connected to the LAN.

___ 2. **Log in** on floor PCs with user ID & password: <pitrgsim>

___ 3. **Update** or **Verify** Control Room Placards:

a. NRC Code Placard:

i. NRC Current Authentication Code **A4YP**.

ii. Today's Date.

b. High Flux at Shutdown Alarm Setpoint placards: **5000 cps**.

c. Feedwater regulating valve position placard **set to current values**.

d. Recommended SG Blowdown flow **set to current values**.

___ 4. Verify **Current** Plant Status Magnetic Placards are in Place:

a. Blowdown 46470 "**SGB to RIVER**"

b. H2 in VCT Space

c. 11 BA TANK "Lined Up for Service"

d. 11 BA PUMP "Lined Up to 11 BA Tank"

e. 12 BA PUMP "Lined Up to 11 BA Tank"

f. CC to SFP MV-32115 "In Service"

g. CC to SFP MV-32117 "In Service"

___ 5. Current Plant **Pink Status Control Tags** in place:

a. CS-46540, 22 CC WTR PUMP

b. CS-46572, 121 SFP HX INLT

___ 6. Current Plant **Yellow Caution Tags** in place:

a. NONE

___ 7. Verify that copy machine and printers are loaded with **YELLOW BORDER** paper.

___ 8. Pens/Notepads/Markers available on the simulator.

Simulator Setup:

NOTE: The time between simulator reset and placing simulator in RUN should be minimized to reduce the difference between the ERCS time and actual time.

CAUTION: A reactivity and temperature transient will occur if 1HC-484, MAIN STM HDR PRESS (STM DUMP), is NOT set to ~71.8% when the simulator is taken to RUN. 1HC-484 has an error of +/- of ~2%. Validation data and conversations with Sim Engineer suggests dial should be closer to 70% to avoid transiet.

___ 1. If this is the first scenario of the day, then **perform** Beginning of Day checklist on previous page.

___ 2. If an IC is already created for this scenario, then **go** to Step 4.

___ 3. If an IC is NOT created for this scenario, then **create** as follows:

a. **Reset** the simulator to IC-18.
b. **Verify** 1HC-484, MAIN STM HDR PRESS (STM DUMP), set point is set to 71.8% +/- 2%.
c. **Place** the simulator in RUN.
d. **Verify** RCS Tavg stabilized at 549°F.
e. **Verify** RCP Seal Injection at 8 gpm and charging flow balanced with letdown.
f. **Adjust** rods as necessary to establish reactor power at 1 x 10-8 amps and stable.
g. **Insert** Remote SG100 to CW.
h. For 12 MD AFW Pump, **perform** the following:
    i. **Close** MV-32381, 12 MD AFWP TO 11 STM GEN, using CS-46316.
    ii. **Close** MV-32382, 12 MD AFWP TO 12 STM GEN, using CS-46317.
    iii. **Place** CS-46439, 12 MD AFWP, to MANUAL.
    iv. **Start** 12 MD AFWP using CS-46425.
    v. **Throttle** MV-32381 and MV-32382 to establish 25 gpm to each SG.
i. **Take** the following to PULLOUT:
    i. CS-46362, 4.16KV BUS 11 1M XFMR (BKR 11-4).
    ii. CS-46363, 4.16KV BUS 12 1M XFMR (BKR 12-4).
    iii. CS-46364, 4.16KV BUS 13 1M XFMR (BKR 13-9).
    iv. CS-46365, 4.16KV BUS 14 1M XFMR (BKR 13-9).
j. **OPEN** SV-33341, AIR EJCTR LOOP SEAL DRN, using CS-46403.
k. **Verify** TPM is set to NIS.
l. If time permits, **run** simulator for approximately 30 minutes.
m. **Place** simulator in FREEZE.
n. If desired, **save** to IC-241 or to another available IC.
o. **Go** to step 4.

Simulator Setup cont.:

___ 4. **Reset** the Simulator to **IC-241** or other IC created from Step 3.

___ 5. **Verify** 1HC-484, MAIN STM HDR PRESS (STM DUMP), set point is set to 71.8%.

___ 6. **Place** the simulator in RUN.

___ 7. If available, **run** schedule file **PI-ILT-NRC-1803S.sch** as follows:

a. Locate schedule file.

b. Open schedule file by double clicking it.

c. Run the schedule file by pressing the “Stopped” button on the toolbar.

d. Verify the schedule file is running.

___ 8. If schedule file is NOT available, then **insert** malfunctions, remotes, and overrides, as specified by the Simulator Input Summary.

___ 9. If desired, **start** Scenario Based Testing Data Collection Program per Attachment 1.

___ 10. **Markup** sections 5.1 – 5.6.9 of 1C1.2 – BOP as complete.

___ 11. **Markup** sections 5.1 – 5.4.1 of 1C1.2 – M2 as complete

___ 12. **Complete** the "Simulator Setup Checklist” on next page.

SIMULATOR SETUP CHECKLIST

Pre-Scenario Checklist:

_____ Simulator Status:

___1. "Training Load"
___2. Alarm sound ON
___3. Speed: REAL
___4. Step counters: NOT USED
___5. Simulator running in IC-241.
___6. Steps 1 – 11 on previous page complete.

_____ **Delete** memory on Yokogawa Model DX1000 recorders by cycling Recorder Power.

_____ Verify Schedule File/Summary matches Simulator Input Summary page in the SEG.

_____ Verify that control rod step counters on C panel and ERCS RBU **CBD @ 135**.

_____ Boric Acid/RMU integrators set to: **BA: 0, RMU: 10**, and reset.

_____ **MOC ΔI** sheet displayed on C panel.

_____ **MOC Reactivity Briefing** sheet available at Reactor Operator Desk.

_____ Verify Boric Acid and Reactor Makeup Controllers are set properly:

___ 1. 1HC-110: **31.0%**
___ 2. 1HC-111: **44.7%**

_____ **Update or Verify** SEG specific Control Board Placards**:**

___ 1. CVCS panel placard:
   a. RCS boron – **1346 ppm**.
   b. RCS H_2 – **45 cc/kg**.
   c. Turbine Reference Value and Mode – **0**.

___ 2. Shift Reactivity Guidance placard:
   a. BA: **0 gallons**
   b. RMU: **0 gallons**
   c. Dilutions @ n/a

___ 3. EAL Classification Placard **CLEANED** and **placed** on side of SS desk.

___ 4. LCO Timer **CLEANED.**

_____ SEG specific **Magnetic Placards** in place:

___1. NONE

_____ SEG specific or Protected Equipment **Pink Status Control Tags** in place:

___1. NONE

_____ SEG specific or Out of Service **Yellow Caution Tags** are in place:

___1. NONE

Pre-Scenario Checklist continued:

_____ ERCS driven recorders are on-scale (RCS temperature scaled **545º F to 555º F**).

_____ ERCS alarm screen operating and alarms **reset**.

_____ All ERCS terminals operating and set as follows:

CONF	**VARS**	R02	**Alarm Summary Page**
CONE1	**Group OP31_U1**	R03	**AFD**
CONC	**SAS (XS11)**	R04	**TPM**
CONG1	**Group QP CCDATA**	R05	**QP LOADFOLL**
ERCS-R01	**Group RADMON_U1**	R06	**Alarm Summary Page**

_____ ERCS single point displays:

CONB	**1T0499A**	**1U1613A**
CONE2	**1Q0340A**	**1V4501A**

_____ ERCS TPM set (**NIS - Auto Scaling - Venturi**).

_____ Set Turbine Control HMI Displays as follows:

___ 1. U1 E-H Turb Cont STA 2 (48087) to **Control Valve Overview**

___ 2. U1 Turb Aux Cont (48088) to **Turb Overview**

___ 3. U1 E-H Turb Cont STA 1 (48086) to **Off Line Control**

___ 4. DEHC alarms **cleared**.

_____ YELLOW turnover sheets 1-9 available.

_____ Electronic PINGP 577 forms and TABS **closed** on both LAN connected PCs.

_____ Board-mounted EAL Tables are **cleaned**.

_____ Headsets turned on as necessary.

_____ Procedure checklist **completed**. See following page.

_____ Peer Check performed for simulator setup.

PROCEDURE CHECKLIST:

NOTE: The following procedures will be used during this session. Verify the procedures are free of place keeping marks before starting the session and after the session are complete.

Before 1st / 2nd	After 1st / 2nd	
/	/	1C1.2-M2, UNIT 1 STARTUP TO MODE 2
/	/	1C4 AOP1, REACTOR COOLANT LEAK
/	/	1C28.1, AUXILIARY FEEDWATER SYSTEM UNIT 1
/	/	1C51.3, PRESSURIZER LEVEL 1L-428 – HIGH
/	/	
/	/	C47012-0109,
/	/	C47012-0307, PRZR HI LVL CHANNEL ALERT
/	/	C47012-0407, PRZR HI LVL
/	/	C47012-0506, PRZR POWER RELIEF LINE HI TEMP
/	/	C47012-0509,
/	/	C47012-0606, PRZR SAFETY VALVE LINE A OR B HI TEMP
/	/	
/	/	1E-0, REACTOR TRIP OR SAFETY INJECTION
/	/	1E-0, ATT. L, SI ALIGNMENT VERIFICATION
/	/	1E-3, STEAM GENERATOR TUBE RUPTURE
/	/	1E-CAS, UNIT 1 CONTINUOUS ACTION & INFO PAGE SUMMARY
/	/	
/	/	EAL Board
/	/	
/	/	LAMINATE COPY OF 1C5, SECTION 5.5
/	/	LAMINATE COPY OF 1C12.5, SECTIONS 5.8 & 5.9
/	/	LAMINATE COPY OF 1C12.5, SECTION 5.10
/	/	
/	/	REACTIVITY BRIEFING SHEET - MOC
/	/	
/	/	SWI O-28, NOTIFICATION OF OPS MNGR & NRC RESIDENT INSPECTOR
/	/	
/	/	
/	/	T.S. LCO 3.3.1
/	/	T.S. LCO BASES 3.3.1
/	/	T.S. LCO 3.4.11
/	/	T.S. LCO BASES 3.4.11
/	/	T.S. LCO 3.4.14
/	/	T.S. LCO BASES 3.4.14

Post-Scenario Checklist

_____ EOOS computer is cleared of information added during the scenario.

_____ Computer generated PINGP 577 cleared.

_____ Procedure checklist completed. See previous page.

_____ Remove Pink Status Control Tags from the following equipment:
___ 1. NONE

_____ Magnetic placards removed:
___ 1. NONE

_____ Remove Yellow Caution Tags from the following equipment:
___ 1. NONE

_____ Board-mounted EAL Table is cleaned.

_____ All books, note pads, and calculators put away.

End Of Day Checklist

_____ Signs/placards removed and put away unless normal simulator configuration.

_____ If desired, floor PCs logged off if simulator will not be used again that day.

_____ Instructor station returned to normal with all books, paper, and etc. put away.

_____ Headsets turned off and put away if simulator will not be used again that day.

_____ Simulator reset to IC-10 unless another IC will be used for further training.

_____ Simulator placed in DORT if simulator will not be used again that day.

_____ Verify the following placards are erased:

- CVCS panel
- Shift Reactivity Guidance
- LCO Timer
- NRC Authentication Code

RETENTION: 7 Days

UNIT 1 LPEO / PEO TURNOVER LOG

DATE: DAY/NIGHT SHIFT: Day

CAT 1 VENT OPENINGS: 0 ft^2 **SYSTEM CONDITION: GREEN**

SAFEGUARDS EQUIPMENT OOS/TECH SPEC REQUIRED ACTION STATEMENTS

1. N51 and N52 displays are OOS.
    - TS LCO 3.3.3 Condition A was entered with 23 days remaining.
    - TS LCO 3.3.3 Condition D was entered with 5 days remaining.
    - N51 and N52 counts can be viewed in ERCS.

PROTECTED EQUIPMENT

RAD MONITORS OOS	ANNUNCIATORS OOS
NONE	NONE
OUTSTANDING SP'S	**FIRE DET / PROT EQP IMPAIRMENTS**
NONE	NONE

OTHER EQUIPMENT OOS / STATUS

• Exposure: MOC • Power: 1x10^{-8} amps (MODE 2) • Boron: (CB): 1346 ppm • Temperature: 547°F	• Pressure: 2235 psig • Xenon: Xe Free prior to startup • Rods: "D" @ 135 • Generator: 0 MW	• Two 40 GPM Letdown Orifices are in service. • Backup Pressurizer Heaters are ON.

MAJOR EQUIPMENT REPAIRED / RETURNED TO SERVICE

NONE

OPERATIONAL PLANS FOR COMING SHIFT

- Prior to entering the simulator, perform a Pre-Job Brief for the following:
    - Raising reactor power to the POAH per section 5.4 of 1C1.2 – M2.
    - Securing 12 MDAFW Pump per step 5.6.10.A of 1C1.2-BOP and section 5.4 of 1C28.1.
        - Out-plant operator is already briefed on evolution.
- After turnover, raise Reactor Power to the POAH.
- After Reactor Power is at the POAH, secure 12 MDAFW Pump and place in AUTO.
- Sections 5.1 – 5.6.9 of 1C1.2 – BOP, UNIT 1 BALANCE OF PLANT SYSTEMS STARTUP, are complete.
- Sections 5.1 – 5.4.1 of 1C1.2 – M2, UNIT 1 STARTUP TO MODE 2, are complete.

NEW PROCEDURES / INSTRUCTIONS

Once reactor power is at POAH, maintain reactor power between 0.5% and 2.0% (MODE 2).

PI-ILT-NRC-1803S, 2018 ILT NRC SIMULATOR EVALUATION #3, REV. 0

Simulator Scenario Development Checklist

Mark with an X Yes or No for any of the following. If the answer is No, include justification for the no answer or the corrective action needed to correct the discrepancy after the item.

		Yes	No
1.	The scenario contains objectives for the desired tasks and relevant human performance tools.	**X**	
2.	The scenario identifies key parameter response, expected alarms, and automatic actions associated with the induced perturbations.	**X**	
3.	The scenario content adequately addresses the desired tasks, through simulator performance, instructor-led training freezes, or both.	**X**	
4.	Plant PRA initiating events, important equipment, and important tasks are identified.	**X**	
5.	Turnover information includes a Daily At Power or Shutdown Safety Risk Assessment. *Justification: PRA software not installed on Sim computers.*		**X**
6.	The scenario contains procedurally driven success paths. Procedural discrepancies are identified and corrected before training is given.	**X**	
7.	The scenario guide includes responses for all anticipated communications to simulated personnel outside the Control Room, based on procedural guidance and standard operating practices. Include estimated completion times and/or notes for use of time compression.	**X**	
8.	The scenario includes related industry experience. SOER, SER and similar OE recommendations are clearly identified and fully addressed.*		**X**
9.	The scenario guide incorporates verification of Operator Fundamental application.*		**X**
10.	Training elements and specific human performance elements are addressed in the scenario critique guide to be used by the critique facilitator. The critique guide includes standards for expected performance.*		**X**
11.	For evaluations, it has been verified that without operator action the critical tasks will be failed.	**X**	

Developer and Reviewer: Once checklist is completed and deficiencies are corrected, sign the cover page.

* For evaluations these items may be marked NO without justification.

PI-ILT-NRC-1803S, 2018 ILT NRC SIMULATOR EVALUATION #3, REV. 0

Simulator Scenario Validation Checklist

Mark with an X Yes or No for any of the following. If the answer is No, include an explanation after the item.

		Yes	No
1.	The desired initial conditions agreed with the reference plant with respect to reactor status, plant configuration, and system operation.	**X**	
2.	The simulator operated in real time during conduct of validation.	**X**	
3.	The simulator demonstrated expected plant response to operator input and to normal, transient, and accident conditions.	**X**	
4.	The simulator permitted use of the reference plant's procedures. The scenario was completed without procedural exceptions, simulator performance exceptions, or deviation from the scenario sequence.	**X**	
5.	The simulator did not "fail to cause" or "unexpectedly cause" any first principle alarm or primary automatic action.	**X**	
6.	Observable changes in parameters relevant to the scenario corresponded in trend and direction to reference plant's expected response.	**X**	
7.	All malfunctions and other instructor interface items were functional and demonstrated the expected reference plant's response to the initiating cause.	**X**	
8.	All malfunctions and other instructor interface items were initiated in the same sequence described within the simulator scenario.	**X**	
9.	The scenario satisfies the learning or examination objectives without any significant simulator performance issues, or deviations from the approved scenario sequence.	**X**	
10.	Simulator fidelity has been demonstrated to be adequate for this scenario.	**X**	

Discrepancies noted (Check "none" or list items found) ☒ None
SMAR = Simulator Action Request

SMAR:_____ SMAR:_____ SMAR:_____ SMAR:_____

Comments:_____

Validator: Sign the cover page only after noted discrepancies are corrected or compensatory actions are taken to ensure quality training.

Validation Personnel		
Name	Job Title / Qualification	Validation Position
Jeff Human	SM / SRO	SS
Jason Snyder	SS / SRO	LEAD
Mike Helland	RO / RO	RO
Fredrick Collins	NRC Exam Developer	Floor Instructor
Justin Hasner	Senior Ops Instructor	Booth Driver

ATTACHMENT 1

SBT EXAM DATA COLLECTION

- **BEFORE SCENARIO**
  - START menu
  - SBT Report
  - File
  - OPEN
  - Select file type ".tis"
    - (FILE LOCATION: sim data (X:) / TRex_PI / LIGHTNING / SBT
  - Select SBT.tis
  - OPEN or double click
  - Check TAM log & verify no cycling switches
  - Run scenario

- **AFTER SCENARIO**
  - FREEZE on Simulator
  - Click GREEN arrow to generate report
  - Enter the following:
    - (NAME is not required)
    - Test Title (1803 ILT NRC SBT Group x)
    - Report Name (same as test title)
  - Click the "…" button to right of Report Name field.
  - Select location where file is to be saved (on Locker G3 flash drive)
  - Enter file name (same as report name) & SAVE
  - Click GENERATE, verify file location, and close "html" file
  - START menu
  - COMPARE IT
  - Click "+" ADD
  - Select ".csv" file from previously saved location
  - OPEN or double click
  - Click GREEN "COMPARE" button
  - Wait for spreadsheet to populate and then save in desired location
  - Close spreadsheet, COMPARE IT, and SBT Report
  - Verify all 3 files are saved in proper location

Facility: PRAIRIE ISLAND Scenario No.: 4 Op-Test No.: PI-ILT-NRC-1804

Examiners: Operators: Shift Supervisor
Lead Reactor Operator
Reactor Operator

Initial Conditions:

Reactor Power at 60%, Boron Concentration 217 ppm, RCS temperature 554°, RCS pressure 2235 psig, Xenon at equilibrium, Bank D rods at 178 steps, Generator power at 336 Mw.

11 TD AFW Pump is out of service. T.S. LCO3.7.5 Condition B entered with 48 hours remaining. 12 MD AFW Pump is protected.

Turnover:

Place a 2nd 40 gpm Letdown orifice in service in preparation for reactor up power.

Raise reactor power to 60%.

Event No.	Malf. No.	Event Type*	Event Description
1		N (BOP, SRO)	PLACE 2nd LETDOWN ORIFICE IN SERVICE
2		R (ATC) N (SRO)	RAISE RX POWER FROM 60% TO 70%
3		I (ATC, SRO) TS (SRO)	CONTROLLING PRZR PRESS CH FAILS LOW
4		C (BOP, SRO) TS (SRO)	SI ACCUMULATOR LEAKAGE
5		M (ALL)	LBLOCA, w/ TRANSFER to RECIRCULATION
6		C (BOP, SRO)	RHR PUMPS FAIL TO AUTO START
7		C (BOP, SRO)	SI TO CC RELAY ACTUATION FAILURE
8		C (ATC, SRO)	12 MDAFWP AUTO START FAILURE

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

Xcel Energy

SIMULATOR EXERCISE GUIDE (SEG)

SITE: PRAIRIE ISLAND **SEG # PI-ILT-NRC-1804S**

SEG TITLE: 2018 ILT NRC SIMULATOR EVALUATION #4 **REV. # 0**

PROGRAM: INITIAL LICENSE OPERATOR TRAINING #: FL-ILT

COURSE: INITIAL LICENSE OPERATOR TRAINING #: FL-ILT

TOTAL TIME: 2.0 HOURS

Additional site-specific signatures may be added as desired.

Developed by:	**Fredrick Collins** *Instructor*	**1/28/2018** *Date*
Reviewed by:	**Justin Hasner** *Instructor* *(Simulator Scenario Development Checklist.)*	**6/7/2018** *Date*
Validated by:	**Justin Hasner** *Validation Lead Instructor* *(Simulator Scenario Validation Checklist.)*	**6/7/2018** *Date*
Approved by:	**Shawn Sarrasin** *Training Supervision*	 *Date*

Guide Requirements

Evaluation Objectives:

Evaluate the crew's ability to:

1. Place a Second Letdown Orifice in Service per 1C12.1.
2. Raise Reactor Power from 60% to 70% per 1C1.4.

Evaluate the crew's ability to diagnose and respond to:

3. Pressurizer Pressure Instrument failing Low per 1C51.3.
4. SI Accumulator Leakage per 1C18.
5. Large Break LOCA & Transfer to Recirc per 1E-1 & 1ES-1.2.
6. Failure of RHR Pumps to automatically start per 1E-0.
7. SI to CC relay automatic actuation failure per 1E-0.
8. 12 MDAFW Pump automatic start failure per 1E-0.

Training Resources:

1. Full Scope Simulator
2. NRC Evaluation Team
3. Booth Operator (Backup Communicator)
4. Primary Communicator

Related PRA Information:

Initiating Event with Core Damage Frequency:
LOCA (14.3%)

Important Components:
11 CC PMP
12 CC PMP
12 MD AFW PMP
11 RHR PMP
12 RHR PMP

Important Operator Actions with Task Number:
CRO 008 ATI 00 00 007 – Operator fails to perform initial actions of C14 AOP1 upon Loss of CC.

QUANTITATIVE ATTRIBUTES

Malfunctions:

Before EOP Entry:

1. 1PT-431, Blue Channel Pressurizer Pressure Transmitter, fails LOW.
2. 11 Safety Injection Accumulator Relief Valve Leakage.

After EOP Entry:

1. Train A and B RHR Pumps fail to automatically start.
2. SI to Component Cooling relay signal fails to automatically actuate.

Abnormal Events:

1. Instrument Failure Guide.
2. ARP/C Procedure for SI Accumulator leakage.

Major Transients:

1. LBLOCA w/ Transfer to Recirc

Critical Tasks:

1. PI-CT-13: Manually start at least one CC Pump within 60 minutes of plant conditions being met for this critical task to apply.
2. PI-CT-24: Transfer to cold leg recirculation and establish ECCS recirculation flow before an ORANGE or RED path in Core Cooling CSF occurs.

CRITICAL TASK SHEET

Number:	PI-CT-13
Critical Task:	Manually start at least one CC Pump within 60 minutes of plant conditions being met for this critical task to apply.
Safety Significance:	Operation of the ECCS injection pumps without Component Cooling Water could lead to pump failure or damage. This would result in a degraded emergency core cooling system (ECCS) capacity. USAR 6 (Table 6.2-8a) requires that at least one CC pump is running prior to transferring to recirculation for CETC cooling. While there are many factors that determine the actual time to CETC rising above 700°F, the time limit on this critical task is sufficient for an examinee to recognize that a CC pump is needed, not running, and to take appropriate action to remedy the deficiency.
Plant Conditions:	• Safety Injection. • Both Component Cooling Water Pumps are NOT running. • At least one Component Cooling Water Pump can be started from the Control Room.
Cues:	• Indication that Safety Injection actuated. • "SI ACTIVE" lights are NOT lit for both CC Pumps. • Component Cooling Water Discharge pressure reads zero. • Component Cooling Water Low Flow alarms to ECCS Pumps.

Performance Indicator:	• Starting one or both CC Pumps by operating the following switches:
	  ○ CS-46036, 11 CC WTR PUMP.
	  ○ CS-46037, 12 CC WTR PUMP.

Feedback:	• "SI ACTIVE" lights are LIT for at least one CC Pump. • Component Cooling Water Low Flow alarm clears for at least one train of Safeguards components.

CRITICAL TASK SHEET

Number:	PI-CT-24
Critical Task:	Transfer to cold leg recirculation and establish ECCS recirculation flow before an ORANGE or RED path in Core Cooling CSF occurs.
Safety Significance:	If the ECCS system is not transferred to recirculation mode, a loss of the ECCS pumps will occur when RWST level is lost. Subsequently, if recirculation is not established, a loss of water inventory in the core will occur and fuel temperatures will rise. This will result in damage to the fuel cladding barrier.
Plant Conditions:	• Large Break LOCA inside Containment. • RWST level is less than 33%. • Containment level greater than 2.25 feet OR Sump B level greater than 82%. • At least one train of ECCS recirculation equipment is available and can be operated from the Control Room.
Cues:	• SI Actuation. • RWST level less than 33%. • Containment Level greater than 2.25 feet. • Sump B level greater than 82%.
Performance Indicator:	• Manipulation of the following controls, as required, to align at least one train of ECCS to cold leg recirculation: o Close RWST to RHR Isolation Valve. o Close at least one SI Test Line to RWST Valve. o Open CC to RHR HX. o Open Sump B to RHR Isolation Valve. o Restart RHR Pump.
Feedback:	• RHR flow for the train aligned for recirculation.

SCENARIO OVERVIEW:

INITIAL CONDITIONS:

- Exposure: EOC
- Power: 60%
- Boron: (CB): 217 ppm
- Temperature: 554°F
- Pressure: 2235 psig
- Xenon: Xe Equilibrium
- Rods: "D" @ 178
- Generator: 336 MW

EQUIPMENT OOS

- N51 and N52 Displays
- 11 TDAFW Pump

SEQUENCE OF EVENTS:

Event 1: Place 2nd Letdown Orifice in Service

- Initially, there is only 1 40 gpm letdown orifice & 2 charging pumps in service.
- There are already two charging pumps running.
- The crew will place a second 40 gpm letdown orifice in service per 1C12.1.

Event 2: Unit 1 Load Increase from 60% to 70% Power

- The crew will place rods in manual, perform alternate dilutions, and operate the turbine the raise load per 1C1.4 and the briefed reactivity plan.

Event 3: Controlling Pressurizer Pressure Channel fails LOW

- 1PT-431 fails low.
- Both spray valves close and PRZR heaters energize.
- The crew will take manual control of PRZR pressure and select WHITE/RED on selector switch.
- The Shift Supervisor will address TS LCO 3.3.1 and TS LCO 3.3.2.

Event 4: SI Accumulator Relief Valve Leakage

- 11 SI Accumulator pressure will lower and low pressure annunciator will be received.
- The crew will raise pressure in 11 SI Accumulator per 1C18.
- The Shift Supervisor will address TS LCO 3.5.1 and TS LCO 3.6.3.

Event 5: Large Break Loss of Coolant Accident

- A large break LOCA occurs on the B Hot Leg. The reactor will trip and the crew will enter 1E-0.
- Containment Pressure rises, RCS pressure and Pressurizer level rapidly lowers.
- The crew will transition into and out of 1FR-P.1 when a red path in integrity CSF occurs.
- The crew will diagnose a Loss of Coolant Accident, trip RCPs, and transition to 1E-1.

Event 5: Transfer to Cold Leg Recirculation:

- RWST level will lower due to RHR, Charging, and CS flow.
- The crew will transfer one train of RHR to low head recirc per 1ES-1.2.

Event 6: 11 & 12 RHR Pumps Fail to Start Automatically

- Both RHR pumps will fail to start on SI actuation.
- The crew will start both RHR pumps manually.

Event 7: Loss of Component Cooling

- After the Safety Injection, both Component Cooling Water Pumps will fail to automatically start.
- The crew will manually start Component Cooling Water Pumps per Attachment L of 1E-0.

Event 8: 12 MDAFW Pump Automatic start Failure

- The 12 MDAFW pump will fail to automatically start after SI is actuated.
- The crew will manually start the 12 MDAFW pump per 1E-0.

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	SIMULATOR PRE-BRIEF: • The Simulator Pre-Brief is conducted prior to the crew entering the simulator. **COMPLETE TURNOVER:** • "UNIT 1 LPEO / PEO TURNOVER LOG." • 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" • 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	**Booth Operator / Communicator:**
	1. After the crew has assumed the duty, they will place a second 40 gpm letdown orifice in service per section 6.10 of 1C12.1.
	2. If contacted as the RP Tech or Duty Chemist, acknowledge a 2nd letdown orifice is being placed in service and implement radiation surveys per PINGP 1841.
	3. If contacted as the Duty Chemist, acknowledge purification flow has been raised.
		BOP	**1C12.1, LETDOWN, CHARGING, AND SEAL WATER INJECTION – UNIT 1:**
			• Notify RP Tech that an additional letdown orifice is being placed into service.
			• Determine steps 6.10.2 through 6.10.8 are not applicable due to two charging pumps already running.
			• Place 11 Charging Pump in manual speed control.
			• Establish approximately 70 gpm charging flow to the Regen HX by:
			  ○ Increasing charging pump speed.
			  ○ Maintain 8 gpm seal injection to each RCP.
			• Place 1HC-135A, LTDN PRESS CONT, in MANUAL.
			• Using 1HC-135A, lower letdown heat exchanger outlet pressure to approximately 200 psig.
			• Open CV-31325, LETDOWN ORIFICE 40 GPM, using CS-46170.
			• Return 1HC-135A, LTDN PRESS CONT, to AUTO.
			• Transfer one (1) of the inservice charging pumps from MANUAL to AUTOMATIC speed control per C7.
			• Notify the Duty Chemist that purification flow has been raised

EVENT 2	**Booth Operator / Communicator:**
	1. After the crew has placed a 2nd 40 gpm letdown orifice in service, they will raise reactor power to 70% per 1C1.4.
	2. If contacted as the duty chemist, acknowledge Unit 1 power will be raised from 60% to 70%.
	
	NOTE
	It is NOT intended to wait for the plant to reach 70% power prior to proceeding to the next event. Once the Lead Evaluator is satisfied with the reactivity manipulation, proceed to Event 3.
		ATC / SS	**1C1.4, UNIT 1 POWER OPERATION:**
			• Notify Duty Chemist of the load increase.
			• Verify ERCS TPM Power Source is NIS power.
			• Place CS-46280, ROD BANK SELECTOR, in "MANUAL".
			• Using the "On Line Control" screen:
			  o Select LOAD.
			  o Select 0.5% demand rate.
			• Verify the "VPL" control is not Red.
			• Raise the "VPL" to 101% using the "Valve Limiter" pop-up screen.
			• Set the "Target" setting to the desired Load using "On Line Control" screen "Target" increase/decrease controls.
			• Initiate an alternate dilution of the RCS per 1C12.5.
			• When Tave shows an increase, then select the "Go" control using the "On Line Control" screen.
			• Adjust the alternate dilution rate or perform alternate dilutions per 1C12.5 to maintain Tave and Tref with the desired ±1.5°F band
			
			1C12.5, UNIT 1 BORON CONCENTRATION CONTROL
			• Verify 1YIC-111, RX MU WTR TO BLENDER BATCH INTEGRATOR, is reset.
			• Set 1YIC-111, RX MU WTR TO BLENDER BATCH INTEGRATOR, to quantity desired. _____ gal
			• Place CS-46300, MAKE-UP MODE SELECTOR, to "ALT DIL".
			• Place CS-46454, BA BLENDER TO VCT INLT CV-31201, to "CLOSE".
			• If desired, then adjust 1HC-111, RX MU WTR TO BLENDER FLOW CONT, set point to desired flow rate or place in "MANUAL" adjusted for desired flow rate.
			• Momentarily place CS-46457, BORIC ACID MAKE-UP CONTROL, to "START", to initiate dilution.

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
			• When the desired quantity of makeup has been added, then verify automatic makeup stopped as indicated by CS-46457, BORIC ACID MAKE-UP CONTROL, green light LIT. • If additional alternate dilution is desired, then return to step 2. • Verify CS-46454, BA BLENDER TO VCT INLT CV-31201, is selected to “AUTO”. • Verify 1HC-111, RX MU WTR TO BLENDER FLOW CONT, is in “AUTO” set to 45%. • Place CS-46300, MAKE-UP MODE SELECTOR, to “AUTO”. • Momentarily place CS-46457, BORIC ACID MAKE-UP CONTROL, to “START”. • Reset the RMU integrator

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
EVENT 3	**Booth Operator / Communicator:** 1. After the crew has stopped the load increase at 70% and/or at the discretion of the Lead Evaluator, enter: **Trigger 1, PRZR Press (Blue) Channel fails LOW.** 2. If contacted as I&C to trip bistables, inform the crew two I&C Technicians will be available in 45 minutes. 3. If contacted as the Operations Management, acknowledge the report of the failure, and agree to make other notifications to the NRC, Duty Station Manager, etc. as asked. 4. 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. **Plant Response:** 1. 1P-431 will indicate off scale low. 2. PRZR spray valves close. 3. PRZR Pressure rises. 4. Tavg rises. 5. The following annunciators are received: a. 47012-0108, PRZR LO PRESS SI CHANNEL ALERT. b. 47012-0408, PRZR HI/LO PRESS CHANNEL ALERT	ATC ATC / BOP SS	**<u>C47012-0108, PRZR LO PRESS SI CHANNEL ALERT:</u>** • Check PRZR pressure. • Verify all heaters on. • Verify sprays closed. • If necessary, then control pressure in manual. • Refer to 1C51.3. **<u>1C51.3, PRESSURIZER PRESSURE 1P-431 – LOW:</u>** • If the Blue channel is selected on the PRZR Pressure Control Selector Switch, then: o Place PRZR Press Cont in MANUAL and stabilize o Select 2-1 (WHITE/RED) on channel sel sw o When press returned to normal w/ no deviation from setpoint, then return to automatic. • Verify PRZR Press Rec. not selected to Blue channel. • The SS will enter the following TS LCOs: • **3.3.1 Condition A** o Reference Table 3.3.1-1 immediately. • **3.3.1 Condition E** o Place channel in trip in 6 hours OR o Be in Mode 3 in 12 hours • **3.3.1 Condition K** o Place channel in trip in 6 hours OR o Reduce thermal power to <P-7/P-8 in 12 hours • **3.3.2 Condition A** o Reference Table 3.3.2-1 immediately. • **3.3.2 Condition D** o Place channel in trip in 6 hours OR o Be in Mode 3 in 12 hours AND o Be in Mode 4 in 18 hours • Trip bistables

EVENT 4	**Booth Operator / Communicator:** 1. After the crew has placed PRZR level control in R-B and addressed Tech Specs, and/or at the discretion of the Lead Evaluator, enter: **Trigger 2, SI Accumulator Relief Valve Leakage.** **NOTE:** ***SI Accumulator malfunction takes approx. 5 minutes to alarm. Consider entering trigger while crew is completing previous event.*** 2. When contacted by Control Room via hand-held radio: *a. When directed to set CV-31241 to control 800-825#, then wait one minute and report completion.* b. *When directed to open NG-1-1, then wait one minute and report completion.* 3. If contacted as the Operations Management, acknowledge the report of the failure, and agree to make other notifications to the NRC, Duty Station Manager, etc. as asked. 4. If contacted as the FIN Team Supervisor, inform the crew that you will write a work order and investigate. 5. When the crew has raised pressure in 11 SI Accumulator, then enter **Trigger 12** to remove malfunction. **Plant Response:** 1. 11 SI Accumulator pressure lowers. 2. The following annunciator will be received: a. 47018-0203, 11 ACCUMULATOR HI/LO PRESS	BOP SS	**C47018-0203, 11 SI ACCUMULATOR HI/LO PRESS:** • Check pressure high or low. • If pressure is low, then **raise** pressure per 1C18. **1C18, ENGINEERED SAFEGUARDS SYTEM UNIT 1:** • In the Gas House, set CV-31241 to control at 800 to 825 psig. • Open NG-1-1. • Verify CV-31242 is closed using 1HC-945 at 0 position. • **Enter** TS LCO 3.6.3 Conditions A & B**.** • **Open** CV-31441 using CS-46219. • **Open** CV-31440 using CS-46212. • When accumulator pressure reaches 750 psig, then **close** CV-31440. • **Close** CV-31441. • **Exit** TS LCO 3.6.3 Conditions A & B**.** The SS will **enter** the following TS LCO: • **3.5.1 Condition B:** ○ Restore accumulator to OPERABLE status in 24 HOURS.
EVENTS 5, 6, 7, & 8	**Booth Operator / Communicator:**	ATC BOP	**1E-0, REACTOR TRIP OR SAFETY INJECTION:** • **Verify** reactor is tripped.

EVENTS 5, 6, 7, & 8 cont.	1. When the crew has raised pressure in the 11 SI Accumulator and addressed Tech Specs, and/or at the discretion of the Lead Evaluator, then enter: **Trigger 3, LBLOCA.** 2. Upon hearing the announcement of Reactor Trip, or when called as the Turbine Building Operator to isolate the Unit 1 MSRs per Attachment J, then open and run schedule file **E-0_Att-J.sch** located in ***X:\\Trex_PI\Lightning\Schedule\EOPs***. When the isolation is complete, inform the crew the MSR's are isolated. 3. Upon hearing the announcement of Safety Injection, or when called as the Turbine Building Operator to secure the Turbine Building Roof Exhausters, wait 2 minutes and report the Turbine Building Roof Exhausters are all secured. 4. If Control Room personnel ask if Unit 2 personnel are available to perform Attachment L, then inform the Control Room that Unit 2 personnel are NOT available for performing Attachment L. **Plant Response:** 1. RCS pressure lowers. 2. Pressurizer Level lowers. 3. RCS Leak rate rises. 4. Containment Pressure rises. **CRITICAL TASKS** • Manually start at least one CC Pump within 60 minutes of plant conditions being met for this critical task to apply.	ATC SS ATC / BOP / SS	• **Verify** main turbine. • **Verify** both Safeguards buses energized. • **Verify** SI actuated due to inability to maintain pressurizer level above 5%. • **Perform** Attachment L (see SEG page 16). • **Start** 12 MD AFW Pump. • **Check** RCS Tavg trending to 547°F. • **Check** PRZR PORVs and Spray valves closed. • **Stop** both RCPs. • **Determine** SGs are NOT faulted. • **Determine** SG tubes are NOT ruptured. • **Determine** RCS is NOT intact due to Containment pressure rising. • **Go to** 1E-1. **1E-1, LOSS OF REACTOR OR SECONDARY COOLANT:** • **STOP** both RCPs. • **Determine** SGs are NOT faulted. • **Check** intact SG levels. • **Control** feed flow to maintain WR 50% - 64%. • **Check** secondary radiation is normal. • **Check** power to PRZR PORV block valves available. • **Check** PRZR PORVs are closed. • **Check** at least one PRZR PORV block valve is open. • **Reset** SI and Containment Isolation. • **Establish** Instrument Air to Containment. • **Check** charging pumps powered from offsite power. • **Check** at least one charging pump is running.

EVENTS 5, 6, 7, & 8 cont.	• Transfer to cold leg recirculation and establish ECCS recirculation flow before an ORANGE or RED path in Core Cooling CSF occurs. **Booth Operator / Communicator:** 1. If Control Room personnel ask if Unit 2 personnel are available to secure Diesel Generators and/or Safeguards Cooling Water Pumps, then inform the Control Room that Unit 2 personnel WILL secure the Diesel Generators and/or Safeguards Cooling Water Pumps. 2. If Control Room personnel ask for status of Battery Room Temperatures, then inform the Control Room that Battery Room temperatures are 74°F. 3. If Control Room personnel ask for status of Spent Fuel Cooling, then inform the Control Room that Spent Fueling level and temperature are normal. 4. If Control Room personnel ask for status of Unit 2 Cooling Water/Chilled Water lineup, then inform Crew Unit 2 Cooling Water/Chilled Water valves are in their Safeguards position. 5. When called as the Auxiliary Building Operator to open RD-4-6 and 2RD-4-2, report that these valves are open. 6. When requested to perform Attachment K, then wait 2 minutes and perform the following: a. Enter **Trigger 13, Att. K Out-Plant Actions.** b. Inform CR when all actions are complete **NOTE**	ATC / BOP / SS	• **Determine** SI should NOT be terminated. • **Determine** RHR pumps should NOT be stopped. • **Check** if DGs and SG CL pumps should be stopped. • **Determine** Train A available for recirc. • **Start** all CTMT dome recirc fans. • **Open** one train of CR alt outside air dampers. • **Align** CFCU CLG water rad monitors. • **Stop** SFP ventilation. • **Notify** ABO to perform 1ES-1.2 Att. K. • When RWST level less than 33%, then **GO TO** 1ES-1.2. **1ES-1.2, TRANSFER TO RECIRCULATION:** • **Notify** ABO to perform ATTACHMENT K. • **Reset** SI. • **Reset** Containment Spray. • **Stop** safeguards pumps for train going to recirc. • **Close** RWST to RHR isolation valve. • **Close** SI Test Line to RWST MV-32202 & MV-32203 • **Verify** RHR to Reactor Vessel Injection valve alignment: MV-32064 & MV-32065 OPEN • **Align** CC to RHR HX for RHR train going to recirc. • **Check** CTMT level greater than 2.25 feet. • **Check** if RHR suction can be aligned to CTMT sump. • **Check** if second CS pump can be stopped. • **Stop** SFP Ventilation System. • **Place selected** RHR in recirculation operation: o **Verify** Sump B to RHR isolation valves are FULL OPEN. o **Start** RHR Pump.

EVENTS 5, 6, 7, & 8 cont.

The BOP will have to perform the following to align safeguards components for SI:

CS #	COMPONENT	DESIRED CONDITION
(Normally Aligned in Att. L)		
46064	MV-32115, 122 SFP HX INLT HDR MV B	CLOSED
DEHC	CV-31079 thru CV-31082 (TURBINE DRAIN VALVES)	OPEN
46338	STEAM DUMP MODE	STM PRESS
46018	11 CFCU	SLOW
46019	13 CFCU	SLOW
(Align Due to Malfunctions)		
46425	12 MDAFW PUMP (ATC)	RUNNING
46184	11 RHR PUMP	RUNNING
46185	12 RHR PUMP	RUNNING
46036	11 CC PUMP	RUNNING
46037	12 CC PUMP	RUNNING
46029	11 CC HX OUTL XOVR ISOL	CLOSED
46032	12 CC HX OUTL XOVR ISOL	CLOSED

BOP

- **Check** for low head recirc:
  - RCS pressure less than 275 psig [575psig]
  - RHR flow greater than 1000 gpm
  - Stop RHR & charging pumps aligned to RWST

1E-0 Attachment L: SI Alignment Verification:

- **Verify** Safeguards Component Alignment
  - See table on page 16
- **Close** MV-32115, 122 SFP HX INLT HDR MV B
- Check Cooling Water Header Pressures
- Check If Main Steamlines Are required to be isolated
- Verify SI & RHR Flow
- Check RCP Cooling
- Verify Generator Breakers – OPEN
- Verify All Heater Drain Pumps – STOPPED
- **Open** turbine drain valves
- Verify Main Feedwater Alignment
- Verify All Condensate Pumps - STOPPED
- **Place** Steam Dump in "STM PRESS" Mode
- **Verify** Unit 1 Cooling Water/Chilled Water Alignment
- Verify 11 Safeguards Screenhouse Ventilation lineup
- Verify Control Room Ventilation Alignment
- Verify Unit 2 Cooling/Chilled Water Alignment
- Verify 21 Safeguards Screenhouse Ventilation lineup
- Verify 11 and 12 Battery Charger Operation is normal
- Verify Battery Room temps less than 84°F
- Check status of Spent Fuel Cooling

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
			• Check Status of Notifications • **Notify** SS Of Any Discrepancies
END	Once the crew has **placed one train of RHR in Low Head Recirculation**, and/or at the discretion of the Lead Evaluator, then place the simulator in FREEZE. Inform the crew that training has the duty.		
	Booth Operator: *Collect SBT data per Attachment 1.*		

SIMULATOR INPUT SUMMARY

@Time	Event	Action	Description
00:00:00		Insert override DI-46424P to True	11 TD AFWP OOS
00:00:00		Insert override DI-46424ST to False	11 TD AFWP OOS
00:00:00		Insert malfunction RH02A	RESIDUAL HEAT REMOVAL PUMP #11 FAILS TO START AUTOMATICALLY
00:00:00		Insert malfunction RH02B	RESIDUAL HEAT REMOVAL PUMP #12 FAILS TO START AUTOMATICALLY
00:00:00		Insert malfunction RP11	FAILURE OF SI TO CC SIGNAL TO ACTUATE
00:00:00		Insert malfunction CC02A	COMPONENT COOLING WATER PUMP #11 FAILS TO START AUTOMATICALLY
00:00:00		Insert malfunction CC02B	COMPONENT COOLING WATER PUMP #12 FAILS TO START AUTOMATICALLY
00:00:00		Insert malfunction FW34B	AUX FW PUMP #12 (MOTOR DRIVEN) FAILS TO START AUTOMATICALLY
	1	Insert malfunction RX202 from 2235.02002 to 1500.00000 on event 1	1 PRZR (CHNL III-BLU) P XMTR (1PT-431)
	2	Insert malfunction SI08A on event 2	SI ACCUMULATOR #11 RELIEF VALVE LEAKAGE
	12	Delete malfunction SI08A on event 12	SI ACCUMULATOR #11 RELIEF VALVE LEAKAGE
	3	Insert malfunction RC06B to 100.00000 on event 3	! LOCA - HOT LEG (B LOOP)
	13	Insert remote WD104 after 5 to ANN_SMP on event 13	11 RHR PIT SMP PMP DSCH VLV WL-87-1
	13	Insert remote WD105 after 10 to ANN_SMP on event 13	12 RHR PIT SMP PMP DSCH VLV WL-87-2
	13	Insert remote SI107 after 120 to NORMAL on event 13	RHR PUMPS TO 11 SI PUMP BKR (1K1-E2)
	13	Insert remote SI108 after 180 to NORMAL on event 13	RHR PUMPS TO 12 SI PUMP BKR (1KA2-D1)

Simulator Setup:

Beginning of Day:

___ 1. If it is the first scenario of the day, then perform a **shutdown** and **restart** of the floor PCs that are connected to the LAN.

___ 2. **Log in** on floor PCs with user ID & password: <pitrgsim>

___ 3. **Update** or **Verify** Control Room Placards:
   a. NRC Code Placard:
      i. NRC Current Authentication Code **A4YP**.
      ii. Today's Date.
   b. High Flux at Shutdown Alarm Setpoint placards: **5000 cps**.
   c. Feedwater regulating valve position placard **set to current values**.
   d. Recommended SG Blowdown flow **set to current values**.

___ 4. Verify **Current** Plant Status Magnetic Placards are in Place:
   a. Blowdown 46470 "**SGB to CDSR**"
   b. H2 in VCT Space
   c. 11 BA TANK "Lined Up for Service"
   d. 11 BA PUMP "Lined Up to 11 BA Tank"
   e. 12 BA PUMP "Lined Up to 11 BA Tank"
   f. CC to SFP MV-32115 "In Service"
   g. CC to SFP MV-32117 "In Service"

___ 5. Current Plant **Pink Status Control Tags** in place:
   a. CS-46540, 22 CC WTR PUMP
   b. CS-46572, 121 SFP HX INLT

___ 6. Current Plant **Yellow Caution Tags** in place:
   a. NONE

___ 7. Verify that copy machine and printers are loaded with **YELLOW BORDER** paper.

___ 8. Pens/Notepads/Markers available on the simulator.

Simulator Setup:

NOTE: The time between simulator reset and placing simulator in RUN should be minimized to reduce the difference between the ERCS time and actual time.

___ 1. If this is the first scenario of the day, then **perform** Beginning of Day checklist on previous page.

___ 2. **Reset** the Simulator to **IC-242**.

___ 3. If IC-242 is not available, then **perform** the following:

a. **Reset** the Simulator to IC-8 and **place** in RUN.

b. **Place** the following equipment in the listed condition:

1) CS-46424, 11 TD AFWP, to PULL TO LOCK.

2) CS-46438, 11 TD AFWP, to MANUAL.

___ 4. **Place** the simulator in RUN.

___ 5. If available, **run** schedule file **PI-ILT-NRC-1804S.sch** as follows:

a. **Locate** schedule file.

b. **Open** schedule file by double clicking it.

c. **Run** the schedule file by pressing the “Stopped” button on the toolbar.

d. **Verify** the schedule file is running.

___ 6. If schedule file is NOT available, then **insert** malfunctions, remotes, and overrides, as specified by the Simulator Input Summary.

___ 7. If desired, **start** Scenario Based Testing Data Collection Program per Attachment 1.

___ 8. **Mark up** 1C1.4, Unit 1 Power Operation, as follows:

a. Step 2.1 signed complete.

b. Step 2.2.1 signed N/A.

c. 2.2.2 is signed as complete.

d. 5.1.1 – 5.1.6 signed complete.

e. 5.1.7 is blank.

f. 5.1.8 A, B, & C signed N/A.

___ 9. **Complete** the "Simulator Setup Checklist” on next page.

SIMULATOR SETUP CHECKLIST

Pre-Scenario Checklist:

_____ Simulator Status:

___1. "Training Load"
___2. Alarm sound ON
___3. Speed: REAL
___4. Step counters: NOT USED
___5. Simulator running in IC-242.
___6. Steps 1 – 8 on previous page complete.

_____ **Delete** memory on Yokogawa Model DX1000 recorders by cycling Recorder Power.

_____ Verify Schedule File/Summary matches Simulator Input Summary page in the SEG.

_____ Verify that control rod step counters on C panel and ERCS RBU **CBD @ 178**.

_____ Boric Acid/RMU integrators set to: **BA: 0, RMU: 10**, and reset.

_____ **EOC ΔI** sheet displayed on C panel.

_____ **EOC Reactivity Briefing** sheet available at Reactor Operator Desk.

_____ Verify Boric Acid and Reactor Makeup Controllers are set properly:

___ 1. 1HC-110: **4.0%**
___ 2. 1HC-111: **44.7%**

_____ **Update or Verify** SEG specific Control Board Placards**:**

___ 1. CVCS panel placard:
   a. RCS boron – **217 ppm**.
   b. RCS H_2 – **45 cc/kg**.
   c. Turbine Reference Value and Mode – **280**.
___ 2. Shift Reactivity Guidance placard:
   a. BA: **0.67 gallons**
   b. RMU: **67 gallons**
   c. Dilutions: **per reactivity plan**
___ 3. EAL Classification Placard **CLEANED** and **placed** on side of SS desk.
___ 4. LCO Timer **CLEANED.**

_____ SEG specific **Magnetic Placards** in place:

___1. NONE

_____ SEG specific or Protected Equipment **Pink Status Control Tags** in place:

___1. CS-46425, 12 MDAFWP

_____ SEG specific or Out of Service **Yellow Caution Tags** are in place:

___1. CS-46424, 11 TD AFWP
___2. CS-46438, 11 TD AFWP
___3. CS-46127, 11 MAIN STM TO 11 TD AFWP MV-32016
___4. CS-46128, 12 MAIN STM TO 11 TS AFWP MV-32017
___5. CS-46314, 11 TD AFWP TO 11 STM GEN MV-32238
___6. CS-46315, 11 TD AFWP TO 12 STM GEN MV-32239

Pre-Scenario Checklist continued:

_____ ERCS driven recorders are on-scale (RCS temperature scaled **555º F to 565º F**).

_____ ERCS alarm screen operating and alarms **reset**.

_____ All ERCS terminals operating and set as follows:

CONF	**VARS**	R02	**Alarm Summary Page**
CONE1	**Group OP31_U1**	R03	**AFD**
CONC	**SAS (XS11)**	R04	**TPM**
CONG1	**Group QP CCDATA**	R05	**QP LOADFOLL**
ERCS-R01	**Group RADMON_U1**	R06	**Alarm Summary Page**

_____ ERCS single point displays:

CONB	**1T0499A**	**1U1613A**
CONE2	**1Q0340A**	**1V4501A**

_____ ERCS TPM set (**Calorimetric - Auto Scaling - Venturi**).

_____ Set Turbine Control HMI Displays as follows:

___ 1. U1 E-H Turb Cont STA 2 (48087) to **Control Valve Overview**
___ 2. U1 Turb Aux Cont (48088) to **Turb Overview**
___ 3. U1 E-H Turb Cont STA 1 (48086) to **Off Line Control**
___ 4. DEHC alarms **cleared**.

_____ Verify DEHC **VPL set ~0.1 to 0.2 above** current valve position (not on limiter).

_____ YELLOW turnover sheets 1-9 available.

_____ Electronic PINGP 577 forms and TABS **closed** on both LAN connected PCs.

_____ Board-mounted EAL Tables are **cleaned**.

_____ Headsets turned on as necessary.

_____ Procedure checklist **completed**. See following page.

_____ Peer Check performed for simulator setup.

PROCEDURE CHECKLIST:

NOTE: The following procedures will be used during this session. Verify the procedures are free of place keeping marks before starting the session and after the session are complete.

Before 1st / 2nd	After 1st / 2nd	
/	/	C47012-0108, PRZR LO PRESS SI CHANNEL ALERT
/	/	C47018-0203, 11 ACCUMULATOR HI/LO PRESS
/	/	
/	/	1C1.4, UNIT 1 POWER OPERATION
/	/	1C12.1, LETDOWN, CHARGING, AND SEAL WATER INJECTION-UNIT1
/	/	1C12.5, UNIT 1 BORATION CONCENTRATION CONTROL
/	/	1C14 AOP1, LOSS OF COMPONENT COOLING
/	/	1C18, ENGINEERED SAFEGUARDS SYSTEM UNIT 1
/	/	1C51.3, PRESSURIZER PRESS 1P-431 – LOW
/	/	
/	/	1E-0, REACTOR TRIP OR SAFETY INJECTION
/	/	1E-0, ATT. L, SI ALIGNMENT VERIFICATION
/	/	1E-1, LOSS OF REACTOR OR SECONDARY COOLANT
/	/	
/	/	1E-CAS, UNIT 1 CONTINUOUS ACTION & INFO PAGE SUMMARY
/	/	
/	/	1ES-1.2, TRANSFER TO RECIRCULATION
/	/	
/	/	EAL Board
/	/	
/	/	1FR-P.1, RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION
/	/	
/	/	LAMINATE COPY OF 1C5, SECTION 5.5
/	/	LAMINATE COPY OF 1C12.5, SECTIONS 5.8, 5.9, & 5.10
/	/	
/	/	REACTIVITY BRIEFING SHEET - EOC
/	/	
/	/	T.S. LCO 3.3.1
/	/	T.S. LCO BASES 3.3.1
/	/	T.S. LCO 3.3.2
/	/	T.S. LCO BASES 3.3.2
/	/	T.S. LCO 3.5.1
/	/	T.S. LCO BASES 3.5.1
/	/	T.S. LCO 3.6.3
/	/	T.S. LCO BASES 3.6.3

Post-Scenario Checklist

_____ EOOS computer is cleared of information added during the scenario.

_____ Computer generated PINGP 577 cleared.

_____ Procedure checklist completed. See previous page.

_____ Remove Pink Status Control Tags from the following equipment:
___ 1. CS-46425, 12 MD AFWP

_____ Magnetic placards removed:
___ 1. NONE

_____ Remove Yellow Caution Tags from the following equipment:
___ 1. CS-46424, 11 TD AFWP
___ 2. CS-46438, 11 TD AFWP
___ 3. CS-46127, 11 MAIN STM TO 11 TD AFWP MV-32016
___ 4. CS-46128, 12 MAIN STM TO 11 TS AFWP MV-32017
___ 5. CS-46314, 11 TD AFWP TO 11 STM GEN MV-32238
___ 6. CS-46315, 11 TD AFWP TO 12 STM GEN MV-32239

_____ Board-mounted EAL Table is cleaned.

_____ All books, note pads, and calculators put away.

End Of Day Checklist

_____ Signs/placards removed and put away unless normal simulator configuration.

_____ If desired, floor PCs logged off if simulator will not be used again that day.

_____ Instructor station returned to normal with all books, paper, and etc. put away.

_____ Headsets turned off and put away if simulator will not be used again that day.

_____ Simulator reset to IC-10 unless another IC will be used for further training.

_____ Simulator placed in DORT if simulator will not be used again that day.

_____ Verify the following placards are erased:
- CVCS panel
- Shift Reactivity Guidance
- LCO Timer
- NRC Authentication Code

RETENTION: 7 Days

UNIT 1 LPEO / PEO TURNOVER LOG

DATE: DAY/NIGHT SHIFT: Day

CAT 1 VENT OPENINGS: 0 ft^2 **SYSTEM CONDITION: GREEN**

SAFEGUARDS EQUIPMENT OOS/TECH SPEC REQUIRED ACTION STATEMENTS

1. N51 and N52 displays are OOS.
   - TS LCO 3.3.3 Condition A was entered with 23 days remaining.
   - TS LCO 3.3.3 Condition D was entered with 5 days remaining.
   - N51 and N52 counts can be viewed in ERCS.
2. 11 TD AFW Pump is OOS for corrective maintenance on the pump.
   - TS LCO 3.7.5 Condition B was entered with 48 hours remaining.

PROTECTED EQUIPMENT

12 MDAFW Pump

RAD MONITORS OOS	ANNUNCIATORS OOS
NONE	NONE

OUTSTANDING SP'S	FIRE DET / PROT EQP IMPAIRMENTS
NONE	NONE

OTHER EQUIPMENT OOS / STATUS

• Exposure: EOC • Power: 60% • Boron: (CB): 217 ppm • Temperature: 554°F	• Pressure: 2235 psig • Xenon: Xe Eq • Rods: "D" @ 178 • Generator: 336 MW	• One 40 GPM Letdown Orifice is in service. • Backup Pressurizer Heaters are ON.

MAJOR EQUIPMENT REPAIRED / RETURNED TO SERVICE

NONE

OPERATIONAL PLANS FOR COMING SHIFT

- Prior to entering the simulator, perform a Pre-Job Brief for the following:
  - Place 2nd Letdown orifice in service per 1C12.1.
  - Raise reactor power to 70% per 1C1.4 and provided reactivity plan.
    - Reactor was operating at 100% power for greater than 72 hours prior to load decrease.
    - No fuel has been moved.
- After turnover, place 2nd letdown orifice in service and perform load increase.

NEW PROCEDURES / INSTRUCTIONS

Once reactor power is at 70%, maintain 70% per TSO request.

Reactivity Plan

1. Load INCREASE from 60% to 70%.

2. Current conditions:

Power level:	60% (336 MW)
Xenon:	Equilibrium
Control Rod Position:	Bank D @ 178 steps
Boron Concentration:	217 ppm
Core Exposure:	19000 MWD/MTU

3. Reactivity Plan:

Target:	Turbine Load: 406 MW (70%)
Rate:	0.25% /minute
Control Mode:	FSP control with Rod Control in MANUAL
Boration/Dilution:	2739 gallons ALTERNATE DILUTION
Final Control Rod Position:	Bank D @ 188 steps

4. Reactivity Prediction:

Change in Power Defect:	-200 pcm (Figure C1-7A)
Differential Boron Worth:	-7.25 pcm/ppm (Figure C1-11A)
Differential Rod Worth:	-5.85 pcm/step (Figure C1-4A)
Calculated RCS PPM change:	-19.3 ppm (140 pcm ÷ -7.25 pcm/ppm)
Calculated Rod Step change:	10 steps (+60 pcm ÷ -5.85 pcm/step)

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Simulator Scenario Development Checklist

Mark with an X Yes or No for any of the following. If the answer is No, include justification for the no answer or the corrective action needed to correct the discrepancy after the item.

		Yes	No
1.	The scenario contains objectives for the desired tasks and relevant human performance tools.	**X**	
2.	The scenario identifies key parameter response, expected alarms, and automatic actions associated with the induced perturbations.	**X**	
3.	The scenario content adequately addresses the desired tasks, through simulator performance, instructor-led training freezes, or both.	**X**	
4.	Plant PRA initiating events, important equipment, and important tasks are identified.	**X**	
5.	Turnover information includes a Daily At Power or Shutdown Safety Risk Assessment. *Justification: PRA software not installed on Sim computers.*		**X**
6.	The scenario contains procedurally driven success paths. Procedural discrepancies are identified and corrected before training is given.	**X**	
7.	The scenario guide includes responses for all anticipated communications to simulated personnel outside the Control Room, based on procedural guidance and standard operating practices. Include estimated completion times and/or notes for use of time compression.	**X**	
8.	The scenario includes related industry experience. SOER, SER and similar OE recommendations are clearly identified and fully addressed.*		**X**
9.	The scenario guide incorporates verification of Operator Fundamental application.*		**X**
10.	Training elements and specific human performance elements are addressed in the scenario critique guide to be used by the critique facilitator. The critique guide includes standards for expected performance.*		**X**
11.	For evaluations, it has been verified that without operator action the critical tasks will be failed.	**X**	

Developer and Reviewer: Once checklist is completed and deficiencies are corrected, sign the cover page.

* For evaluations these items may be marked NO without justification.

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Simulator Scenario Validation Checklist

Mark with an X Yes or No for any of the following. If the answer is No, include an explanation after the item.

		Yes	No
1.	The desired initial conditions agreed with the reference plant with respect to reactor status, plant configuration, and system operation.	**X**	
2.	The simulator operated in real time during conduct of validation.	**X**	
3.	The simulator demonstrated expected plant response to operator input and to normal, transient, and accident conditions.	**X**	
4.	The simulator permitted use of the reference plant's procedures. The scenario was completed without procedural exceptions, simulator performance exceptions, or deviation from the scenario sequence.	**X**	
5.	The simulator did not "fail to cause" or "unexpectedly cause" any first principle alarm or primary automatic action.	**X**	
6.	Observable changes in parameters relevant to the scenario corresponded in trend and direction to reference plant's expected response.	**X**	
7.	All malfunctions and other instructor interface items were functional and demonstrated the expected reference plant's response to the initiating cause.	**X**	
8.	All malfunctions and other instructor interface items were initiated in the same sequence described within the simulator scenario.	**X**	
9.	The scenario satisfies the learning or examination objectives without any significant simulator performance issues, or deviations from the approved scenario sequence.	**X**	
10.	Simulator fidelity has been demonstrated to be adequate for this scenario.	**X**	

Discrepancies noted (Check "none" or list items found) ☒ None
SMAR = Simulator Action Request

SMAR:_____ SMAR:_____ SMAR:_____ SMAR:_____

Comments:_____

Validator: Sign the cover page only after noted discrepancies are corrected or compensatory actions are taken to ensure quality training.

Validation Personnel		
Name	Job Title / Qualification	Validation Position
Jason Snyder	SS / SRO	SS
Jim Kapsh	RO / RO	LEAD
Mike Helland	RO / RO	RO

ATTACHMENT 1

SBT EXAM DATA COLLECTION

- **BEFORE SCENARIO**
  - START menu
  - SBT Report
  - File
  - OPEN
  - Select file type ".tis"
    - (FILE LOCATION: sim data (X:) / TRex_PI / LIGHTNING / SBT
  - Select SBT.tis
  - OPEN or double click
  - Check TAM log & verify no cycling switches
  - Run scenario

- **AFTER SCENARIO**
  - FREEZE on Simulator
  - Click GREEN arrow to generate report
  - Enter the following:
    - (NAME is not required)
    - Test Title (1804 ILT NRC SBT Group x)
    - Report Name (same as test title)
  - Click the "…" button to right of Report Name field.
  - Select location where file is to be saved (on Locker G3 flash drive)
  - Enter file name (same as report name) & SAVE
  - Click GENERATE, verify file location, and close "html" file
  - START menu
  - COMPARE IT
  - Click "+" ADD
  - Select ".csv" file from previously saved location
  - OPEN or double click
  - Click GREEN "COMPARE" button
  - Wait for spreadsheet to populate and then save in desired location
  - Close spreadsheet, COMPARE IT, and SBT Report
  - Verify all 3 files are saved in proper location