

Facility: Prairie Island		Scenario No.: 1		Op-Test No.: 1,2,4	
Examiners: _____		Operators:			
_____		1. a			
_____		2. b			
		3. c			
Initial Conditions: 100% Power, BOC, Standard IC "A"					
Turnover: Breaker 16-10 and 11 TD AFW Pump OOS					

Event No.	Malf. No.	Event Type*	Event Description
1	RD0916	I	Failed RPI Rod G7 (AOP)
2	TC03	C	Turbine Control Valve Cycling (AOP) (Reactivity for RO)
3	CL01A	C	11 Cooling Water Pump Trip
3	CL03	C	121 Cooling Water Pump Fails to Autostart
3	CL02A	C	12 Cooling Water Pump Fails to Autostart
3	CL02B	C	22 Cooling Water Pump Fails to Autostart
4	DI-46038C Close	C	Isolation of CL to Unit 1 Turbine Building
5	MS01B	M	12 SG Steamline Break in Containment (Inserts on Rx Trip)
5	FW34B	C	12 AFWP Auto Start Failure
5	SI05A/B	C	Both SI Pumps Fail to Autostart
5	RP06	C	MSIVs Fail to Auto Close

	<h2>SIMULATOR EXERCISE GUIDE (SEG)</h2>
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SITE: PRAIRIE ISLAND

SEG # 2005 NRC SCENARIO 1

SEG TITLE: RPI FAILURE/TURB LOAD CYCLING/ LOSS OF COOLING WATER PUMP, LOSS OF TURBINE BUILDING COOLING WATER HEADER/STEAM LINE BREAK IN CONTAINMENT

#: SCEN 1 **REV. #** 0

PROGRAM: INITIAL LICENSED OPERATOR **#:** P8100

COURSE: INITIAL LICENSED OPERATOR **#:** P8100

TOTAL TIME: 2 HOURS

Developed by:	Travis Ouret <i>Instructor</i>	3/16/05 <i>Date</i>
Reviewed by:	 <i>Instructor</i>	 <i>Date</i>
Validated by:	 <i>Validation Lead Instructor</i>	 <i>Date</i>
Approved by:	 <i>Training Supervision</i>	 <i>Date</i>

Guide Requirements

Goal of Training:

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

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

Learning Objectives:

1. Diagnose and take corrective actions for a failed RPI per C47, SP1319, and C5 AOP5
2. Diagnose and take corrective actions for cycling turbine load per C23 AOP2
3. Respond to a Loss of Cooling Water Header pressure per C47.
4. Diagnose and take corrective actions for a Cooling Water Valve Closure per C47 and 1E-0.
5. Diagnose and take corrective actions for a steam line break inside containment per 1E-0, 1E-2, 1E-1, and 1ES-0.2.

Prerequisites:

None

Training Resources:

1. Full Scope Simulator
2. Operations Management Representative
3. Lead Evaluator
4. Human Performance Evaluator
5. Comment Recorder
6. Booth Operator (Primary Communicator)
7. Backup Communicator

References:

1. C47013:0407
2. C47013:0507
3. C5AOP4
4. C5 AOP5
5. C23 AOP2
6. C47020-0204
7. C47020-0106
8. C47020-0304
9. 1E-0
10. FRZ.1
11. 1E-2
12. 1E-1
13. 1ES-0.2

14. F3-2

Commitments:

None

**Evaluation
Method:**

This is an evaluation scenario for the 2005 ILT NRC Exam, this scenario is based on P9160S-002 Evaluation #24.

**Operating
Experience:**

None - Evaluation Scenario

**Related PRA
Information:**

Initiating Event with Core Damage Frequency:

Normal transient (4%)

Important Components:

11 and 12 AFW pumps

11 and 12 SI pumps

Important Operator Actions with Task Number:

None

QUANTITATIVE ATTRIBUTES (Use this form for Evaluations only.)

Malfunctions:

Before EOP Entry:

1. Failed IRPI
2. Turbine CVs Cycling
3. Loss of 11 Cooling Water Pump
4. Turbine Building Cooling Water Valve Closure

After EOP Entry:

1. 12 AFW pump auto start failure
2. Steam line break inside containment
3. SI system fails to respond to 'S' signal
4. MSIV auto closure failure

Abnormal Events:

1. C5 AOP5; Misaligned Rod, Stuck Rod, RPI Failure
2. C23 AOP2; Malfunction of the EH Control System

Major Transients:

1. Loss Cooling Water to Turbine Building Components
2. Steam line break inside containment

Critical Tasks:

1. Manually start a SI pump prior to transitioning out of E-0.
2. Establish and maintain minimum required FW flow to the SGs prior to transitioning out of E-0.
3. Isolate the faulted steam generator prior to transitioning out of E-2.

SCENARIO OVERVIEW:

INITIAL CONDITIONS:

1. This evaluation can be run from IC-32 (IC-A).
 - Reactor Power is 100%, BOC
 - RCS Boron Concentration 1283 ppm.
 - Adding 10 Gallons Reactor Makeup 3-4 times per shift.
2. The following additional equipment is OOS:
 - 11 TD AFW Pump
 - Breaker 16-10

SEQUENCE OF EVENTS:

Event 1: Failed rod position indicator

- Rod G-7 RPI fails to 0 steps causing a rod at bottom alarm.
- Reactor power and T_{avg} remain normal.
- The RPI is declared inoperable.
- Action is taken to verify position of the affected rod.

Event 2: Turbine CV cycling

- As the CVs cycle, turbine load fluctuates—causing primary and secondary system perturbations.
- Action to take manual control of the turbine to stop the fluctuations.

Event 3: Loss of 11 Cooling Water Pump

- 12, 22 and 121 fail to Auto Start
- Action to manually start 121 Cooling Water Pump

Event 4: Turbine Building Cooling Water Valve Closure

- The Cooling Water Supply Valve to the Turbine Building Closes
- Action is taken to Trip the Reactor and Turbine
- Action to manually STOP equipment cooled by Cooling Water

Event 5: Steam line break inside containment

- When the crew trips the reactor a break develops in the steam line from 12 SG.
- The only available AFW pump fails to auto start. A manual start is required.

2005 NRC SCENARIO 1, RPI FAILURE/TURB LOAD CYCLING/ LOSS OF COOLING WATER PUMP, LOSS OF TURBINE BUILDING COOLING WATER HEADER/STEAM LINE BREAK IN CONTAINMENT, REV. 0

- Low pressure in 12 SG results in more AFW flow to that SG. This also results in low AFW pump discharge pressure. Throttling of AFW to 12 SG is required to ensure AFW reaches 11 SG and to prevent tripping the pump.
- Containment humidity, temperature, and pressure increase.
- SG pressure decrease and containment pressure increase cause a 'S' signal.
- The SI system does not respond to the 'S' signal. SI pumps must be manually started.
- 12 SG must be isolated by the crew.

TASKS ASSOCIATED WITH SIMULATOR EXERCISE(S):

This is an evaluation scenario and as such, tasks are not credited for training and therefore not listed here.

NOTE:

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<p>INITIAL CONDITIONS (IC-32):</p> <p>Standard IC- A</p> <p>Mode: 1</p> <p>Exposure: BOC</p> <p>Power: 100%</p> <p>Boron: (CB): 1283 ppm</p> <p>Temperature: 560°F</p> <p>Pressure: 2235 psig</p> <p>Xenon: At Equilibrium</p> <p>Rods: Bank D step counters at 218, all others at 228</p> <ul style="list-style-type: none"> Generator: 561 Mwe 		

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	1. SIMULATOR SET UP a. Perform set up per the "Simulator Setup Checklist" for IC-A, including entering actions items per the "Simulator Input Summary." b. Perform set up attached to this guide		
	2. SIMULATOR SET UP a. Reset the simulator to IC-32. b. Place the simulator in RUN. c. Enter the malfunctions, remotes, and overrides, as specified by the "Simulator Input Summary", to cause the following pre-existing conditions (Relative Order 0) : 1) 12 MDAFW pump auto start fails 2) 11 and 12 SI pumps fail to auto start 3) MSIVs fail to auto close		
	3. COMPLETE TURNOVER: a. "UNIT 1 LPEO / PEO TURNOVER LOG" 1) Use Standard IC-A Turnover sheet b. Verify crew performs walk down of control boards and the reviews turnover checklists.		

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
<u>vent 1</u> E	<p>4. <u>WHEN</u> the crew has assumed the duty and at the discretion of the Lead Evaluator, enter the failed RPI for rod G-7 (Relative Order of 1, Trigger 1).</p> <p>a. <u>IF</u> directed to perform a flux map per SP-1319, <u>THEN</u> reply that you will get started right away.</p> <p>b. Allow the crew to hold a brief.</p>	<p>LEAD / RO</p> <p>LEAD / RO</p> <p>RO</p> <p>SS</p> <p>SS</p>	<p>C47013:0407 ROD AT BOTTOM</p> <ul style="list-style-type: none"> Refer to C5 AOP4 (May go directly to C5 AOP5) <p>C47013:0507 ROD DEVIATION/SEQUENCING</p> <ul style="list-style-type: none"> Verify cause using ERCS "RODS" Initiate SP-1319 <p>1C5AOP4 Dropped Rod</p> <ul style="list-style-type: none"> Confirm rod NOT dropped and refer to 1C5AOP5 <p>1C5 AOP5, Misaligned Rod, Stuck Rod, and/or RPI Failure</p> <ul style="list-style-type: none"> Notify Ops Manager and NRC Resident Inspector Diagnose the symptoms are indicative of a failed RPI. Refer to T.S.3.1.7 Condition A (Verify rod position once per 8 hours) Direct SP-1319 to be performed.
<u>vent 2</u> E	<p>5. After the crew has adequately addressed Technical Specifications for the failed RPI and initiated action to verify rod position, and at the discretion of the Lead Evaluator, enter the Turbine Load cycling malfunction. (Relative Order of 2, Trigger 2).</p>	<p>LEAD</p> <p>SS</p> <p>RO</p>	<p>C23 AOP2 Malfunction of EH Control System</p> <ul style="list-style-type: none"> Place turbine in MANUAL Notify System Engineer and/or WIN Team Maintain Tave at Tref and power <100%

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
E vent 3	<p>6. After the Crew has placed the Turbine in Manual and at the discretion of the Lead Evaluator, ENTER the malfunction to trip 11 Cooling Water Pump. (Relative Order 3, Trigger 3)</p> <p>a. If asked to investigate Loss of 11 Cooling Water pump, report breaker 13-8 has a 50-G flag.</p> <p>b. If asked the check the low pressure auto start setpoints of the 11 and 22 diesel cooling water pumps, report both low pressure auto start setpoints were found set at 52 psig.</p> <p>c. NOTE: The low pressure auto start of the pumps is 70 psig.</p> <p>d. <u>IF</u> the turbine CV cycling has not resulted in a sufficient reactivity change for RO evaluation, <u>THEN</u> the crew should be allowed to initiate a power reduction prior to continuing to the next event. The SM can direct the SS to initiate the power reduction per 3.0.3 if required.</p>	LEAD	<p>C47020-0204, Loop A Cooling Water LO Press</p> <p>C47020-0205, Loop B Cooling Water LO Press</p> <ul style="list-style-type: none"> • Verify Pressure low • Start available pumps as necessary <ul style="list-style-type: none"> ○ Crew may start any pump
		LEAD	<p>C47020-0106 11 Cooling Water Pump Locked Out</p> <ul style="list-style-type: none"> • Verify Cooling Water Header Pressure restored to Normal • Start 12 Diesel Driven CL Pump • OR • Start 121 CL Pump
		SS	<p>Tech Specs</p> <ul style="list-style-type: none"> • Enter LCO 3.7.8 Condition A due to failure of the low pressure auto start of 11 and 22 diesel cooling water pumps at 70 psig. • Enter LCO 3.0.3, there is not a condition describing both cooling water pumps failing to auto start. <p>If the crew elects to investigate the low pressure setpoint this action may be delayed until the report is received.</p>

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 5	<p>8. <u>WHEN</u> the reactor is tripped, <u>THEN</u> verify that the Steam line break has automatically entered.</p> <p>a. If not, ENTER the Steam line break (<i>Relative Order 0, Trigger 13</i>)</p> <p>9. During 1E-0:</p> <p>a. If requested, report that all category 1 vent doors are closed.</p> <p>b. If requested, report all Turbine Building roof exhausters are stopped.</p> <p>c. If requested to isolate Unit 1 MSR's per Attachment J, perform the following:</p> <ol style="list-style-type: none"> 1) Bring up the CAEP Window 2) Click on OPEN File 3) Click on Attachment J-E0 .cae 4) Click on Run button 5) After 12.5 minutes, Report that Unit 1 MSR's are isolated per 1E-0 Attachment J. <p>d. <u>IF</u> the LEAD is performing Attachment L, <u>THEN</u> it may be turned over when step 7 of attachment is complete. <u>IF</u> an extra operator is performing attachment L, <u>THEN</u> it may NOT be turned over.</p>	<p>RO/LRO</p> <p>Crew</p> <p>LRO</p> <p>Crew</p> <p>RO</p> <p>CREW</p>	<p>1E-0, Reactor Trip or Safety Injection</p> <ul style="list-style-type: none"> • Perform Immediate actions from memory. • Verify immediate actions. • Verify component alignment per Attachment L. <ul style="list-style-type: none"> - Manually start SI pump(s) (<i>Critical Task</i>)¹ - Manually start AFW Pump (<i>Critical Task</i>)² • Check AFW status and RCS temperature (steps 6 & 7) <ul style="list-style-type: none"> • Maintain >200 gpm total AFW flow, but throttle as necessary to limit cooldown. • Maintain AFW discharge pressure > 900 psig • Close both MSIV's due to RCS cooldown <ul style="list-style-type: none"> • May also be done by lead during performance of Attachment L. • Trip RCP's if trip criteria is met. • Diagnose a Faulted SG and transition to E-2.³ <p>1. <i>Manually start at least one SI pump prior to transitioning out of E-0.</i></p> <p>2. <i>Establish and maintain minimum required FW flow to the SGs prior to transitioning out of E-0.</i></p> <p>An orange path in containment may exist, requiring transition to FR-Z.1.</p>

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	10. IF containment conditions exist, crew may have to transition to FR-Z.1	Crew	FRZ.1, Response to High Containment Pressure <ul style="list-style-type: none"> • Verify CI valves closed • Verify CS running • Check CFCU's running in SLOW to the Dome • Check CL pressure both loops >65 psig. • Verify MSIV's closed • Identify 12 SG as faulted. • Isolate Feed flow to 12 SG • Transition to 1E-2.
	11. Allow crew to complete actions of 1E-2 as necessary.	Crew	1E-2: Faulted Steam Generator Isolation ¹ <ul style="list-style-type: none"> • Close/verify 12 MSIV is closed • Verify 11 SG NOT faulted • Isolate AFW to 12 SG (Critical Task)² • Verify steam supply to TDAFP from 12 SG closed • Transition to E-1 <p>1. If transition to FR-Z.1 was required, THEN generator would have been isolated in that procedure.</p> <p>2. To fulfill Critical Task requirements, SG must be isolated prior to transition out of E-2.</p>

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	12. Allow crew to complete actions of 1E-1 as necessary.		<p>1E-1: Loss of Reactor or Secondary Coolant</p> <ul style="list-style-type: none"> • Maintain 11 SG AFW > 200 GPM until SG level >5% NR [50% WR], then maintain level 5 –50% NR [50 – 59% WR]. • Reset SI • Reset CI • Establish IA to containment. • Check if SI can be terminated, if so transition to ES-0.2.^{3,4} • Check if SG is still blowing down <p>3. <i>SI termination is listed on the information page of E-1.</i></p> <p>4. <i>The scenario may be terminated when SI is verified as not required.</i></p>
	13. Allow crew to complete actions of ES-0.2 as necessary.		<p>1ES-0.2: SI Termination</p> <ul style="list-style-type: none"> • Place AMSAC in Pull to Lock • Rest AMSAC • Verify if charging flow is established. • Stop RHR and SI pumps

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<p>14. <u>WHEN</u> the crew verifies SI is not required and / or at the discretion of the Lead Evaluator, place the simulator in freeze.</p> <p>a. Do not reset the simulator until the Lead Evaluator has consented</p>	Crew	Assemble near fire detection panel while evaluators consult

SIMULATOR INPUT SUMMARY

Relative Order	System Or Panel Drawing	Type	Code	Severity Or Value	Event Trigger	Timing	Description
0	SIMFW08	Malfunction	FW34B				12 MDAFW pump auto start fails
0	SIMRP02	Malfunction	SI05A				11 SI pumps fail to auto start
0	SIMRP02	Malfunction	SI05B				12 SI pumps fail to auto start
0	SIMRP02	Malfunction	RP06				MSIVs fail to auto close
0	SIMMS01A	Malfunction	MS01B	40	13		12 SG steam line break
0	EVENT TRIGGER	EVENT ACTION	Rdc0001a<20		13		Enter trigger 13 when RPI for E3 <20 steps
1	SIMRD02	Malfunction	RD0916		1		G7 RPI fails to 0
2	SIMTC01	Malfunction	TC03	20	2	120 Ramp	Turbine CV Cycling
3		Malfunction	CL01A		3		Trip 11 CL Pump
3		Malfunction	CL03		3		121 CL Pump fails to Auto Start
3		Malfunction	CL02A		3		12 CLPump fails to Auto Start
3		Malfunction	CL02B		3		22 CL Pump fails to Auto Start

SIMULATOR INPUT SUMMARY

Relative Order	System Or Panel Drawing	Type	Code	Severity Or Value	Event Trigger	Timing	Description
4		Override DI	DI-46038C Close	ON	4	180 Seconds	Close MV-32031
4		Override DI	DI-46038O Open	OFF	4	180 Seconds	Close MV-32031
4		Override DO	LO-46038B	ON	4	180 Seconds	MV-32031 Blue Light ON
4		Annun Malf	M47020:0304W	Cry Wolf	4	180 Seconds	MV-32031 Annunciator

SIMULATOR SETUP CHECKLIST

Before Training

- _____ Setup Simulator per Standard IC-A Checklist
- _____ Protected equipment label placed on 12 AFW Pump
- _____ Procedures to be used during scenario are cleaned of any place keeping marks
 - C47013-0407
 - C47013-0507
 - C5AOP4
 - C5 AOP5
 - C23 AOP2
 - C47007-0101
 - C47007-0303
 - C47020-0106
 - C47020-0304
 - C47020-0204
 - LCO 3.7.8
 - LCO 3.0.3
 - 1E-0
 - FRZ.1
 - 1E-2
 - 1E-1
 - 1ES-0.2
 - F3-2
- _____ Shift Manager procedures are cleaned of any place keeping marks
 - 1E-0
 - 1E-1
 - 1E-2
 - 1ES-0.2
 - FR-Z.1
 - LCO 3.7.8
 - LCO 3.0.3

After Training for the Day

- _____ Headsets turned off and put away
- _____ Procedures cleaned off and put away
- _____ Simulator Reset to IC-10 or next IC to be used
- _____ Simulator placed in DORT if simulator will not be used again that day
- _____ Protected equipment tag removed
- _____ Information Tags removed and put away
- _____ If last scenario of the day, ensure all exam material removed from simulator and stand down from exam security per form PITC-220, if NRC exam.

ENTION: 7 Days

UNIT 1 LPEO / PEO TURNOVER LOG

TE: DAY/NIGHT SHIFT: Day

T 1 VENT OPENINGS: 64 ft² SYSTEM CONDITION: GREEN

SAFEGUARDS EQUIPMENT OOS/TECH SPEC REQUIRED ACTION STATEMENTS	
MD AFW Pump is OOS as of 1200 yesterday for trip throttle valve replacement	
PROTECTED EQUIPMENT	
MD AFW Pump	
RAD MONITORS OOS	ANNUNCIATORS OOS
ne	None
OUTSTANDING SP'S	FIRE DET / PROT EQP IMPAIRMENTS
ne	None
OTHER EQUIPMENT OOS / STATUS	
aker 16-10, the cubicle is damaged and the breaker is removed. BATP is OOS for seal replacement	
MAJOR EQUIPMENT REPAIRED / RETURNED TO SERVICE	
ne	
OPERATIONAL PLANS FOR COMING SHIFT	
ute with 10 gal RMU 1 to 2 times per shift for temperature control	
NEW PROCEDURES / INSTRUCTIONS	
ne	

WATCHSTANDERS LPEO: OURET, TRAVIS

PEO: KEMPKE, JOHN

LPEO Relieved By: Time: Date:

PEO Relieved By: Time: Date:

CB WALKDOWN → LPEO: Time:

→ PEO: Time:

Facility: Prairie Island	Scenario No.: 2	Op-Test No.: 2, 3	
Examiners: _____ _____ _____	Operators: 1. a 2. b 3. c		
Initial Conditions: 100% Power, BOC, Standard IC "A"			
Turnover: Breaker 16-10 and 11 TD AFW Pump OOS Start 13 Charging Pump and stop 12 Charging Pump in preparation for isolation of 12 Charging			
Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N	Swap from 11-12 Chg to 11-13 Chg in service
2	RX206	I	PRZR Level controlling channel fails Low
3	N/A	C	10-Bank Oil Leakage reported, requiring transfer of one safeguards 4160V bus to alternate source in anticipation of loss (AOP)
4	47012-0203	C	High Vibration on 12 RCP (AOP) (Power reduction required)
5	RC03B	M	12 RCP Shaft Shear
6	TC06	C	Turbine Auto Trip Failure (Note: Events 5-8 required to reduce SG inventory enough to cause loss of heat sink post trip)
6	RP06	C	MSIV Auto Closure Failure
6	TC01A	C	Turbine Left Stop Valve Closure Failure
6	TC14C	C	Turbine CV-3 Fails As Is
7	FW27B	C	FCV 476 (12 Main Feed Reg) Fails Closed on Trip
8	ED02B	C	Bus 12 Auto Transfer Failure
9	FW32	M	MD AFW Pump Trip on Start- Loss of Heat Sink

	<h2 style="margin: 0;">SIMULATOR EXERCISE GUIDE (SEG)</h2>
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SITE: PRAIRIE ISLAND

SEG # 2005 NRC SCENARIO 2

SEG TITLE: PZR LVL LOW/IMMINENT LOSS OF
10 BANK XFMR/RCP VIB HI/RCP
SHAFT SHEAR/LOSS OF FW #: SCEN 2 REV. # 0

PROGRAM: INITIAL LICENSED OPERATOR #: P8100

COURSE: INITIAL LICENSED OPERATOR #: P8100

TOTAL TIME: 2 HOURS

Developed by:	J. Kempkes <i>Instructor</i>	 <i>Date</i>
Reviewed by:	 <i>Instructor</i>	 <i>Date</i>
Validated by:	 <i>Validation Lead Instructor</i>	 <i>Date</i>
Approved by:	 <i>Training Supervision</i>	 <i>Date</i>

Guide Requirements

Goal of Training:

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

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

Learning Objectives:

1. Swap running Charging pumps per 1C12.1.
2. Diagnose and perform corrective actions for a pressurizer level channel failure high per 1C51.
3. Diagnose and perform corrective action for an imminent loss of 10 Bank Transformer per 1C20.3 AOP7 and 1C20.5.
4. Diagnose and perform corrective action for RCP hi vibration per C47 and C1.4/C1.4 AOP1.
5. Diagnose and perform corrective action for a RCP shaft shear with automatic turbine trip failure per 1E-0.
6. Diagnose and perform corrective action for a loss of secondary heat sink per C28.1 and FR-H.1.

Prerequisites:

None

Training Resources:

1. Full Scope Simulator
2. Operations Management Representative
3. Lead Evaluator
4. Human Performance Evaluator
5. Comment Recorder
6. Booth Operator (Primary Communicator)
7. Backup Communicator

References:

1. 1C51
2. C47
3. C12.1 AOP3
4. C1.4/C1.4 AOP1
5. 1E-0
6. 1C12.1

Commitments:

None

**Evaluation
Method:**

This is an evaluation scenario for the 2005 ILT NRC Exam, this scenario is based on P9160S-002 Evaluation #27.

**Operating
Experience:**

None – Evaluation Scenario

**Related PRA
Information:**

Initiating Event with Core Damage Frequency:

Loss of secondary heat removal, which contributes 2% to the CDF.

Important Components:

AFW pumps

Important Operator Actions with Task Number:

None

QUANTITATIVE ATTRIBUTES (Use this form for Evaluations only.)

Malfunctions:

Before EOP Entry:

1. Pressurizer Level Instrument failure.
2. Imminent failure of 10 bank transformer.
3. RCP high vibration and shaft shear.

After EOP Entry:

1. Bus 12 M to R auto transfer failure.
2. Turbine Trip failure
3. AFW pump trip.

Abnormal Events:

1. C20.3 AOP7 Electric Power System Operating Restrictions and Limitations Loss of 10 Transformer.

Major Transients:

RCP Shaft Shear/Turbine Trip Failure

Loss of Heat Sink

Critical Tasks:

1. Manually trip the turbine prior to reaching a RED path on Pressurized Thermal Shock.
2. Establish feedwater flow to at least 1 SG before RCS bleed and feed is required.

SCENARIO OVERVIEW:
INITIAL CONDITIONS:

1. This Evaluation can be run from the following Requalification Exam Scenario Standard (Specific) IC sets:
 - IC-A 100% power
2. The following equipment is OOS:
 - Breaker 16-10, Bus Tie to Bus 26
 - 11 AFW Pump

SEQUENCE OF EVENTS:

Normal Operation: Swap Running Charging Pumps

- Per report from the field, Crew swaps running Charging pumps from 12 to 13 per 1C12.1

Event 1: Pressurizer level controlling channel failure low

- The charging pump in AUTO goes to maximum speed.
- Letdown is isolated and heaters deenergized
- A new controlling channel is selected.
- Charging pump speed is returned to automatic
- Letdown is restored using excess letdown.

Event 2: 10 Bank Transformer Oil Leak

- The Unit 2 Turbine Building Operators report a large leak from a crack at the base of 10 Transformer.
- Bus 15 is transferred from the 1RY to the CT11 source in anticipation of the loss of the transformer.

Event 3: 12 RCP high vibrations, #1 seal failure and shaft shear

- A vibration of 10.5 mils requires a controlled shutdown.
- The crew starts a power reduction per 1C1.4 or 1C1.4 AOP1.
- The RCP shaft shears causing a loss of RCS flow.
- The turbine fails to trip automatically, thus requiring closure of the control valves OR MSIV isolation.

Event 4: Loss of Secondary Heat Sink

- 11 MFW pump trips because of the turbine trip.
- 12 MFW pump trips because Bus 12 fails to auto transfer 30 seconds after the trip.
- 12 AFW pump locks out causing a loss of secondary heat sink.
- 21 AFW pump cannot be cross-connected.
- Main feedwater or condensate flow can be used to restore feedwater flow to the steam generators per FR-H.1.

TASKS ASSOCIATED WITH SIMULATOR EXERCISE(S):

This is an evaluation scenario and as such, tasks are not credited for training and therefore are not listed here.

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	INITIAL CONDITIONS (IC): <ul style="list-style-type: none"> • Standard IC-A (IC-32- sim setup per standard IC guide) • Mode: 1 • Exposure: BOC • Power: 100% • Boron: (CB): 1283 ppm • Temperature: 560 • Pressure: 2235 • Xenon: Stable • Rods: CBD@228 • Generator: 570 Mwe 		
	1. SIMULATOR SET UP <ul style="list-style-type: none"> a. Reset the simulator to IC-32. b. Place the simulator in RUN. 2. Enter the malfunctions, remotes, and overrides, as specified by the "Simulator Input Summary", to cause the following pre-existing conditions <i>(Relative Order 0)</i> : <ul style="list-style-type: none"> a. Turbine Auto Trip Failure b. MSIV Auto Trip Failure c. MD AFW Pump Trip on Start d. Bus 12 Auto Transfer Failure e. Turbine Stop Valve Fails to Close 3. Complete the "Simulator Setup Checklist".		
	4. COMPLETE TURNOVER: <ul style="list-style-type: none"> a. "UNIT 1 LPEO / PEO TURNOVER LOG" b. Verify crew performs walk down of control boards and the reviews turnover checklists. 	CREW	Review the 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 0	<p>5. When the crew has assumed the duty and at the discretion of the Lead Evaluator report as the Aux Building Operator, "12 Charging pump belt is frayed and recommend swapping from 12 to 13 charging pump."</p> <p>a. If asked, report the desurger has been verified pressurized per section 5.13.</p>	RO	<p>1C12.1, Section 5.4</p> <ul style="list-style-type: none"> • Verify desurger pressurized. • Transfer 11 Charging Pump to MANUAL. • Verify 13 Charging Pump in MANUAL/minimum. • Reduce 11 Chg speed to get ~6.5 gpm seal inj • Verify chg pressure <2400 psig • Start 13 Chg Pump • Adjust seal inj to ~9.5 gpm, <2550 psig charging • Stop 12 Chg Pump • Adjust seal injection back to 8.0 gpm • Transfer 11 Charging Pump to AUTOMATIC
Event 1	<p>6. When 13 charging pump is running and at the discretion of the Lead Evaluator, enter the malfunction to cause the controlling channel of pressurizer level to fail low. (Relative Order 1, Trigger 1)</p> <p>7. If desired by evaluators, trip the bistable on request. (Relative Order 2, Trigger 2)</p>	<p>RO</p> <p>Lead/ RO</p> <p>Lead/ RO</p>	<p>47012-0607, Pressurizer Lo-Lo level</p> <ul style="list-style-type: none"> • Verify all pressurizer heaters deenergized • Verify letdown is isolated <p>47012-0507</p> <ul style="list-style-type: none"> • Verify level low on 1L-428 only • Verify heaters ON • Take manual control of the charging pump speed to maintain level at program. • Refer to C51 <p>C51.3 Pressurizer Level 1L-428 - low</p> <ul style="list-style-type: none"> • Operate heaters manually if desired. • Take manual control of the charging pump speed to maintain level at program. • Select position 2-1 on pressurizer level control selector switch. • Restore pressurizer heaters for normal operation. • Return charging pump back to auto. • Switch pressurizer level recorder to another channel.

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
		SS Lead	Refer to T.S.3.3.1 Condition A and Table 3.3.1-1 Function 9 (6 hr LCO for B/S tripping). Trip bistable ILC-428A. Initiate work order on the failed channel. Make appropriate log entries.
Event 2	<p>8. When excess letdown is in service and charging is restored and at the discretion of the Lead Evaluator, Call as the Turbine Building Operator and report the following: "An oil leak is in progress from 10 bank transformer, through a crack at the base on the north side. About fifty gallons of oil is already on the ground."</p> <p>9. IF the Shift Supervisor enters D14.3 AOP1 OIL SPILL, as the Shift Manager direct "Unit 2 will complete D14.3 AOP1."</p> <p>10. IF TSO or Engineering is contacted, recommend isolation of the transformer from the System Control Center once plant loads are shifted to alternate sources using plant procedures. NOTE: IF C20.3 AOP7 is not entered based on the imminent loss, transfer of Bus 15 to CT11 per normal procedures is adequate.</p> <p>11. WHEN realignment of Unit 2 buses is addressed, reply "Bus 25 is already on 2RY and Unit 2 operators will transfer Bus 26 to 2RY per 2C20.5."</p>	<p>SS Lead</p> <p>SS Lead</p> <p>Lead</p> <p>SS</p>	<p>Direct entry to C20.3 AOP7 based on imminent loss of 10 Transformer. C20.3 AOP7</p> <ul style="list-style-type: none"> Verifies auto actions have NOT occurred as transformer has not locked out yet. Contacts Transmission System Operator (TSO) to report oil leak. Contacts Technical Engineering for assistance. Verify/transfer Unit 2 safeguard buses to 2RY. Transfer Bus 15 to CT11 per 1C20.5 section 5.15. <ul style="list-style-type: none"> Bkr 15-7 to MANUAL Sync scope to CT11 Verify voltages matched and synchronized Announce transfer/stand clear Bus 15 Close breaker 15-7 CT11 source and trip breaker 15-3 1RY source within 5 seconds Verify bus voltage on meter and mimic light Sync scope to OFF Bkr 15-7 to AUTO Place 1RY source breakers to buses 15/16 in MANUAL and PULLOUT <p>Technical Specifications</p> <ul style="list-style-type: none"> 3.8.1 Condition A (7 days, plus perform SP 1118 within 1 hour and every 8 hours thereafter)

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	12. WHEN 1RY source breakers to Bus 15 are in PULLOUT and the evaluators concur, continue with the next event.		

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 3	13. WHEN 1RY source breakers to Bus 15 are in PULLOUT and at the discretion of the Lead Evaluator Enter the 12 RCP Vibration Alarm and ERCS overrides (Relative Order 3, Trigger #3)	RO	47012-0203 <ul style="list-style-type: none"> Determine RCP vibration using ERCS GRPDIS "RCPVIBES" Determine shaft vibration requires a controlled shutdown.
	14. WHEN directed, report "12 RCP shaft vibration is 10.5 mils and stable."	SS	Unit Power Reduction (option selected by SS)
	15. IF asked for direction on rate of load decrease or chosen rate is 1%/min or less, reply as the RCP System Engineer, "12 RCP should be shutdown within the next hour based on current vibration."	Lead/ RO	1C1.4 Power Operation option <ul style="list-style-type: none"> Determine nuclear engineering notification is not required as BOC, >400 ppm boron and no load follow history. Predict reactivity for power change using C1 Figures and Curves for reactivity balance, or Figure C1-32. Conduct prejob brief. Notify the Duty Chemist of the load decrease. Pressurizer heaters to ON Set desired load rate and final load on EH controls. Borate or insert rods to cause Tav_g decrease. Start turbine load reduction in AUTO. Borate and move rods to maintain Tav_g/Tref within 1.5°F, Delta I within band, and rods above the RIL. C1.4 AOP1 Option <ul style="list-style-type: none"> Verify control systems in AUTO Reduce turbine load in AUTO <ul style="list-style-type: none"> Select desired load rate Verify in IMP IN Set desired load on setter Depress GO Borate the RCS to maintain rods above the RIL and Delta I within limits

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 4	<p>16. WHEN 5% power reduction has been achieved and at the discretion of the Lead Evaluator, Enter the 12 RCP Shaft Shear (Relative Order 4, Trigger #4). Then DELETE Relative Order 3 RCP vibration alarms. (Relative Order #3a)</p> <p>NOTE: It is expected that the turbine trip will occur before SI actuates on excessive cooldown. IF SI actuates, additional steps are included in the expected student responses for E-0 actions until transition to FR-H.1 is directed.</p> <p>NOTE: If SG WR level is >50% in either SG when AFW status is checked, E-0 actions will continue until decay heat causes sufficient inventory loss to reach RED path criteria for heat sink.</p> <p>17. During 1E-0:</p> <ol style="list-style-type: none"> If requested, report that all category 1 vent doors are closed. If requested, report all Turbine Building roof exhausters are stopped. If requested to isolate Unit 1 MSR's per Attachment J, perform the following: <ol style="list-style-type: none"> Bring up the CAEP Window Click on OPEN File Click on Attachment J-E0 .cae Click on Run button After 12.5 minutes, Report that Unit 1 MSR's are isolated per 1E-0 Attachment J. 	<p>SS RO</p> <p>Lead</p> <p>Lead RO</p> <p>SS</p> <p>Lead RO</p> <p>SS</p>	<ul style="list-style-type: none"> Direct entry to 1E-0 Verify reactor trip <ul style="list-style-type: none"> Trip/bypass breakers OPEN Flux decreasing RPIs at 0 Rod bottom lights LIT Verify Turbine Trip (critical task) <ul style="list-style-type: none"> Note: turbine will not automatically trip and when manually tripped the left stop valves will not close. The MSIV's will not auto close. Manually trip turbine using CB pushbutton <ul style="list-style-type: none"> Manually close CV's IF NOT, manually close MSIV's Verify both safeguards buses energized Verify SI not actuated or required <ul style="list-style-type: none"> Both SG pressures >530 psig Pzr Press >1830 psig Containment pressure <3.5 psig Transition to 1ES-0.1 Reactor Trip Recovery IF Red Path exists on CSF for Heat Sink, Transition to 1FR-H.1. <p>IF SI has actuated:</p> <ol style="list-style-type: none"> Perform E-0 Att. L (see attached procedure section) Check AFW Status <ul style="list-style-type: none"> Total AFW flow <200 gpm Attempt/verify 12 AFW start (allowable per ARP if SG pressure is <700 psig, but will lock out on restart. If SG pressure high will not be allowed to start.) IF wide range level is <50% on both SGs, transition to FR-H.1.

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 5	<p>18.During Loss of Heat Sink (1FR-H.1)</p> <p>19.IF asked to check breaker 16-3, report a 51A overcurrent flag is present.</p> <p>20.IF asked to cross connect 21 AFW pump to Unit 1, wait 5 minutes and report 21 AFW pump failed to start.</p>	<p>RO</p> <p>Lead</p>	<ul style="list-style-type: none"> • Verify RCS pressure >SG pressure • Verify hot leg temperature >350°F • Verify secondary heat sink exists <ul style="list-style-type: none"> ○ Either WR SG level >9% ○ Pzr Pressure <2335 psig • Attempt to restore AFW flow <ul style="list-style-type: none"> ○ Close SG Blowdown Isolation valves ○ Determine 12 AFWP locked out ○ Attempt to restore AFW flow <p>47010-0107 12 AFWP LOCKED OUT</p> <ul style="list-style-type: none"> ○ IF SG pressures both >700 psig: <ul style="list-style-type: none"> • Dispatch operator to breaker 16-3 • Notify electrical department • Notify SS that 12 AFWP cannot be started. ○ IF NOT, <ul style="list-style-type: none"> • Verify CST level >5000 gal • Close 12 AFWP discharge valves to 11/12 SGs • 12 AFWP to MANUAL • CS-46425 to TRIP to reset the lockout (verify alarm clears) • CS-46425 to START (will immediately lock out) • Perform actions above for both >700 psig ○ Verify AFW flow <200 gpm ○ Dispatch operator to locally restore AFW ○ Stop 11 RCP

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 6a	<p>23. Reactor Trip Recovery 1ES-0.1</p> <p>NOTE: IF Safety Injection has actuated, perform tasks of Event 6b instead</p> <p>NOTE: WHEN cold leg temperatures are under control and evaluator concurs, terminate the scenario.</p>	<p>SS Lead</p> <p>RO</p>	<ul style="list-style-type: none"> • Verify reactor trip has been announced • Steam dump to STM PRESS mode or (MSIVs closed) SG PORVs to 71.8% • Check RCS cold leg temperatures stable/trending to 547°F <ul style="list-style-type: none"> ○ IF NOT, stop dumping steam, verify SGB isolation valves closed, and reduce feed flow to just above 200 gpm until NR SG level is >5% in one SG ○ IF cooldown continues, close MSIVs/Bypass valves and reduce SG PORV setpoints to 71.8%
Event 6b	<p>24. Reactor Trip or Safety Injection (Cont) and SI Termination</p> <p>NOTE: Only performed if SI is actuated during previous events.</p>	<p>SS LEAD</p>	<ul style="list-style-type: none"> • Return to procedure/step in effect (1E-0 Step 7) • Check RCS cold leg temperatures stable/trending to 547°F <ul style="list-style-type: none"> ○ IF NOT, stop dumping steam, verify SGB isolation valves closed, and reduce feed flow to just above 200 gpm until NR SG level is >5% in one SG ○ IF cooldown continues, close MSIVs/Bypass valves and reduce SG PORV setpoints to 71.8% • Check PORVs and Spray Valves CLOSED • Verify RCP's stopped • Check SGs not faulted (none depressurizing uncontrollably) • Check SGs not ruptured (radiation monitors normal) • Check RCS intact (containment radiation/pressure/Sump B level normal) • Verify SI can be terminated

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
		SS Lead	<ul style="list-style-type: none"> ○ Subcooling >20°F ○ Total FW flow >200 gpm OR >5% NR SG level ○ RCS pressure >2000 psig, stable/increasing ○ Pressurizer level >7%
		RO Lead	<ul style="list-style-type: none"> • Transition to 1ES-0.2 SI Termination
			1ES-0.2 SI TERMINATION
			<ul style="list-style-type: none"> • Reset SI, CI • Verify instrument air to containment • Block/reset AMSAC/DSS • Establish at least one charging pump running per 1C12.1 • Stop SI and RHR pumps
	25. <u>WHEN</u> both SI Pumps are turned off and / or at the discretion of the Lead Evaluator, place the simulator in freeze. a. Do not reset the simulator until the Lead Evaluator has consented	Crew	Assemble near fire detection panel while evaluators consult

SIMULATOR INPUT SUMMARY							
Relative Order	System Or Panel Drawing	Type	Code	Severity Or Value	Event Trigger	Timing	Description
0		MFS	TC06				Turbine Auto Trip Failure
0	SIMS01A	MFS	RP06				MSIV Auto Closure Failure
0	SIMS01B	MFS	TC01A				CV-31182 Left Turbine Stop Valve Fails to Close
0	SIMFW08	MALF	FW32				MD AFW pump trip on start
0	SIMED07	MALF	ED02B				Bus 12 1R transformer breaker 12-1 fails to close
1	SIMRP03A	SYS OVRD	RX206	0	1		PRZR level (charging pump speed) controller 24043 (LT-428)
2		Remote	RP119	Trip	2		Trip LC-428A
3	C1-C2	ANN MALF	M47012:0203W	CRY WOLF	3	Delay 200 sec	11 or 12 RCP high vibration alarm

SIMULATOR INPUT SUMMARY							
Relative Order	System Or Panel Drawing	Type	Code	Severity Or Value	Event Trigger	Timing	Description
3		ERCS PT OVRD	CP-1Y0771A	9.0	3	Start Value 5 Ramp 300 sec	12 RCP frame vibration monitor (horizontal)
3		ERCS PT OVRD	CP-1Y0772A	7.5	3	Start Value 5 Ramp 300 sec	12 RCP frame vibration monitor (vertical)
3		ERCS PT OVRD	CP-1Y0773A	10.5	3	Start Value 8 Ramp 300 sec	12 RCP shaft vibration monitor (horizontal)
3		ERCS PT OVRD	CP-1Y0774A	8.1	3	Start Value 5 Ramp 300 sec	12 RCP shaft vibration monitor (vertical)
3a	C1-C2	ANN MALF	M47012:0203W	DELETE			11 or 12 RCP high vibration alarm
3a		ERCS PT OVRD	CP-1Y0771A	DELETE			12 RCP frame vibration monitor (horizontal)
3a		ERCS PT OVRD	CP-1Y0772A	DELETE			12 RCP frame vibration monitor (vertical)
3a		ERCS PT OVRD	CP-1Y0773A	DELETE			12 RCP shaft vibration monitor (horizontal)
3a		ERCS PT OVRD	CP-1Y0774A	DELETE			12 RCP shaft vibration monitor (vertical)

SIMULATOR INPUT SUMMARY							
Relative Order	System Or Panel Drawing	Type	Code	Severity Or Value	Event Trigger	Timing	Description
4	SIMRC05B	MALF	RC03B		4	Delay 7 Seconds	12 RCP shaft shear (free wheel impeller)
4			TC-14C		4		CV-3 Fails as is
4			FW27B		4		FCV 476 Fails Closed on Trip
5		RF	FW126	Local	5		11 FWP Discharge Valve Control Switch
5		RF	FW129	Open	5		11 FWP Discharge Valve Open Pushbutton
6		RF	FW127	Local	6		12 FWP Discharge Valve Control Switch
6		RF	FW131	Open	6		12 FWP Discharge Valve Open Pushbutton

SIMULATOR SETUP CHECKLIST Standard IC-A

Before Training

- _____ Simulator Setup Checklist for IC-A completed
- _____ Procedures to be used during scenario are cleaned of any place keeping marks
 - C47012-0203, 11 or 12 RCP Hi Vibration
 - C47012-0507, PRZR Level Deviation
 - C47012-0607, PRZR Lo-Lo Level Heater Off and Letdown Secured
 - 1C12.1, Letdown, Charging, and Seal Water Injection - Unit 1
 - 1C51.3, Pressurizer Level IL-428 - Low
 - 1E-0, Reactor Trip or Safety Injection
 - 1FR-H.1, Response to Loss of Secondary Heat Sink
 - F3-2, Classifications of Emergencies
 - T.S. LCO 3.3.1 Condition A, and Table 3.3.1-1 Function 9
 - T.S. LCO 3.4.14
 - T.S. LCO 3.8.1 Condition A
 - C20.3 AOP7
 - 1C1.4
 - 1C1.4 AOP1
 - C51.3
 - 1ES-0.1
 - C47010-0107

After Training for the Day

- _____ Information Tags removed and put away
- _____ Signs/placards removed and put away unless normal simulator configuration
- _____ Instructor station returned to normal with all books, paper, and etc. put away
- _____ Headsets turned off and put away
- _____ 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

RETENTION: 7 Days

UNIT 1 LPEO / PEO TURNOVER LOG

DATE:

DAY/NIGHT SHIFT: Day

CAT 1 VENT OPENINGS: 64 ft²

SYSTEM CONDITION: GREEN

<u>SAFEGUARDS EQUIPMENT OOS/TECH SPEC REQUIRED ACTION STATEMENTS</u>	
11 TD AFW Pump is OOS as of 1200 yesterday for trip throttle valve replacement	
<u>PROTECTED EQUIPMENT</u>	
12 MD AFW Pump	
<u>RAD MONITORS OOS</u>	<u>ANNUNCIATORS OOS</u>
None	None
<u>OUTSTANDING SP'S</u>	<u>FIRE DET / PROT EQP IMPAIRMENTS</u>
None	None
<u>OTHER EQUIPMENT OOS / STATUS</u>	
Breaker 16-10, the cubicle is damaged and the breaker is removed. 12 BATP is OOS for seal replacement	
<u>MAJOR EQUIPMENT REPAIRED / RETURNED TO SERVICE</u>	
None	
<u>OPERATIONAL PLANS FOR COMING SHIFT</u>	
Dilute with 10 gal RMU 1 to 2 times per shift for temperature control	
<u>NEW PROCEDURES / INSTRUCTIONS</u>	
None	

WATCHSTANDERS LPEO: OURET, TRAVIS

PEO: KEMPKE, JOHN

LPEO Relieved By: _____ Time: _____ Date: _____

PEO Relieved By: _____ Time: _____ Date: _____

CB WALKDOWN → LPEO: _____ Time: _____

→ PEO: _____ Time: _____

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

Facility: Prairie Island	Scenario No.: 6	Op-Test No.: 1, 2
Examiners: _____	Operators:	
_____	1. a	
_____	2. b	
	3. c	
Initial Conditions: 2% Power Prior to Turbine Roll in 1C1.2 Startup		
Turnover: No Equipment OOS, Raise power to 6% per 1C1.2		

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R	Raise power to 6% per 1C1.2
2	DI-46296O Off	C	Regen HX Charging Line Outlet FCV fails CLOSED (AOP)
3	RX 225	I	Steam Header Pressure fails LOW
4	CH121 8	N	Fire in the Aux Building (requires hot short actions for CC, AFW)
5	RC10	C	Pressurizer Surge Line Leakage 11 gpm (AOP)
6	RC10	M	Large Break LOCA- Surge Line Shear
6	RH01A	C	11 RHR Pump Lockout on Start
6	RH02B	C	12 RHR Pump Fails to Start in Auto

	<h2>SIMULATOR EXERCISE GUIDE (SEG)</h2>
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SITE: PRAIRIE ISLAND

SEG # 2005 NRC SCENARIO 6

SEG TITLE: LOSS OF REGEN HX/ STEAM HEADER
PRESSURE FAILURE/PLANT FIRE/RCS
LEAK/LBLOCA WITH RHR FAILURE #: SCEN 6 **REV. #** 0

PROGRAM: INITIAL LICENSED OPERATOR #: P8100

COURSE: INITIAL LICENSED OPERATOR #: P8100

TOTAL TIME: 2 HOURS

Developed by:	J. Kempkes <i>Instructor</i>	3/11/05 <i>Date</i>
Reviewed by:	 <i>Instructor</i>	 <i>Date</i>
Validated by:	 <i>Validation Lead Instructor</i>	 <i>Date</i>
Approved by:	 <i>Training Supervision</i>	 <i>Date</i>

Guide Requirements

Goal of Training:

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

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

Learning Objectives:

1. Raise reactor power from 2% to 6% in preparation for turbine roll per 1C1.2.
 2. Respond to a regenerative heat exchanger outlet valve failing CLOSED per 1C12.1 AOP2, Loss of Charging Flow to the Regen HX.
 3. Diagnose and Respond to a Steam Line Header Pressure Instrument failure.
 4. Respond to a fire in the vicinity of the RHR pits per C47, F5 App D and F5 App A.
 5. Respond to an RCS leak in containment per 1C4 AOP1.
 6. Respond to a Large Break LOCA from the Pressurizer Surge Line per 1E-0 and 1E-1.
 7. (If necessary) Respond to a Containment High Pressure condition per 1FR-Z.1.
-

Prerequisites: None

Training Resources:

1. Full Scope Simulator
 2. Operations Management Representative
 3. Lead Evaluator
 4. Human Performance Evaluator
 5. Comment Recorder
 6. Booth Operator (Primary Communicator)
 7. Backup Communicator
-

References:

1. 1C1.2 Startup Operation
 2. 1C12.1 AOP2, Loss of Charging Flow to the Regen HX
 3. F5 Appendix A Fire Strategies
 4. F5 Appendix D Effect of Fire Outside the Control Room
 5. 1C4 AOP1 RCS Leak
 6. 1E-0 Reactor Trip or Safety Injection
 7. 1E-1 Loss of Reactor or Secondary Coolant
-

Commitments:	None
Evaluation Method:	This is an evaluation scenario for the 2005 ILT NRC Exam, this is a new scenario.
Operating Experience:	None – Evaluation Scenario
Related PRA Information:	<u>Initiating Event with Core Damage Frequency:</u> Large Break LOCA 1.2% <u>Important Components:</u> 12 AFWP RHR Pumps

QUANTITATIVE ATTRIBUTES (Use this form for Evaluations only.)

Malfunctions:

Before EOP Entry:

1. Loss of Charging to Regen HX
2. Steam Header Pressure Fails Low
3. RCS Leak

After EOP Entry:

1. 12 RHR Pump Start Failure/11 RHR Pump Lockout on Start

Abnormal Events:

1. Regen HX Outlet Valve Fails Closed
2. Fire in Aux Building
3. RCS Leak

Major Transients:

Large Break LOCA

Critical Tasks:

1. Direct a power reduction to MODE 3 within 1 hour of determining RCS leakage is in excess of 10 gpm.
2. Start at least one RHR pump prior to reaching a RED condition on the Core Cooling CSF.

SCENARIO OVERVIEW:

INITIAL CONDITIONS:

1. Conditions based on IC-6, except reactor power is reduced to between .5 and 2% (IC starts at 6% prior to turbine roll). Procedure 1C1.2 is in progress with the step 5.12 SM Hold having just been signed off.
2. 11 and 22 Component Cooling pumps are in service.

SEQUENCE OF EVENTS:

Event 1: Raise Reactor Power to approximately 6%

- Rods are withdrawn to raise Tav_g and increase steam flow through the steam dumps.

Event 2: Regen HX Charging Line Outlet CV fails CLOSED

- CV-31328 fails CLOSED, causing greatly reduced charging flow and high charging pressure/charging relief lift.
- Letdown is isolated and excess letdown placed in service per 1C12.1 AOP2.

Event 3: Steam Header Pressure fails low

- Action to place Steam Dumps in Manual or reduce the setpoint of the PORVs
- Reactivity transient will occur

Event 4: Fire in the Auxiliary Building

- Fire Detection Zone 8 alarms (695' Aux Building)
- Fire is in the vicinity of Unit 1 RHR Pits.
- 12 CC pump is started and 12 AFWP placed in LOCAL per F5 App D.

Event 5: RCS Leak

- An 11 gpm (approx) RCS leak develops on the Pressurizer Surge Line.
- Previous malfunctions prevent start of additional charging pumps, so excess letdown flow is reduced or stopped.
- Leak is NOT isolable and is determined to be located in containment.
- Technical Specifications require unit shutdown.

Event 6: Large Break LOCA

- The pressurizer surge line shears causing a LBLOCA.
- Neither RHR pump autostarts on the SI.

TASKS ASSOCIATED WITH SIMULATOR EXERCISE(S):

This is an evaluation scenario and as such, tasks are not credited for training and therefore are not listed here.

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<p>INITIAL CONDITIONS (IC):</p> <ol style="list-style-type: none"> 1. Initialize simulator to IC-6 (or exam IC) and allow ERCS to come up. <ol style="list-style-type: none"> a. IF using IC-6, perform the following: <ol style="list-style-type: none"> 1) Insert rods to reduce reactor power to between 0.5 and 2% and stable. 2) Enter malfunctions and triggers. • Mode: 2 • Exposure: ZBC • Power: 2% • Boron: (CB): 1850 ppm • Temperature: 552 • Pressure: 2235 • Xenon: Zero • Rods: As required • Generator: Offline 	(RO/LO /SRO)	
	<ol style="list-style-type: none"> 2. SIMULATOR SET UP <ol style="list-style-type: none"> a. Reset the simulator to IC-6. b. Place the simulator in RUN. 3. Enter the malfunctions, remotes, and overrides, as specified by the "Simulator Input Summary", to cause the following pre-existing conditions (Relative Order 0): <ol style="list-style-type: none"> a. 11 RHR pump locks out b. 12 RHR pump fails to Auto Start 4. Pull out 1C1.2 and sign through step 5.12 SM Hold. 5. Complete the "Simulator Setup Checklist". 		

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	6. COMPLETE TURNOVER: a. "UNIT 1 LPEO / PEO TURNOVER LOG" (should be provided with the scenario IC) b. Verify crew performs walk down of control boards and the reviews turnover checklists.	CREW	Review the following with the offgoing operator: <ul style="list-style-type: none">• 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
			CLOSE letdown isolation valves Place charging pumps in MANUAL speed control. Place Excess letdown in service.

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 3	<p>10. <u>WHEN</u> the crew has placed Excess Letdown in service and / or at the discretion of the Lead Evaluator, enter the Steam Header Pressure PT-484 Instrument failure low. (Relative Order 3, Trigger 3)</p> <p>a. If asked as I&C to trouble shoot the failed Instrument, report an I&C Technician will be in the Control Room in 1 hour.</p> <p>NOTE: There are no alarms associated with this malfunction. The operators will see the Steam Dumps close, RCS Temp increasing and Reactor power decreasing.</p>	<p>Crew</p> <p>LEAD</p> <p>LEAD</p> <p>RO</p> <p>RO</p>	<p><u>Plant Stabilization Actions</u></p> <p>Control the Steam Dump in Manual</p> <p>OR</p> <p>Adjust the PORV setpoint to 1005 psig</p> <p>Control Reactor Power</p> <p>Control Tave</p>
Event 4	<p>11. <u>WHEN</u> the crew has stabilized Reactor Power and Tave and / or at the discretion of the Lead Evaluator, enter the Zone 8 Fire Alarm (Relative Order 4, Trigger 4)</p> <p>WHEN called as Aux Building Operator, wait 2 minutes then call back and report a fire in progress on the north end of 11 RHR pit, involving consumables and staged equipment, and could not be extinguished with one portable extinguisher.</p> <p>Two minutes after the Fire page, come up on the radio as the Fire Brigade Chief and receive a turnover on the fire report.</p> <p>Inform the SS that "Unit 2 will perform classification and notification."</p> <p>WHEN directed, place 12 AFWP in LOCAL (Relative Order 4a, Trigger 5)</p>	<p>LEAD</p> <p>SS</p> <p>Lead</p> <p>SS</p>	<p><u>47022-0601 FIRE ALARM</u></p> <p>Determine fire alarm is in ZONE 8 Aux Bldg 695'</p> <p>Page Aux Building Operator</p> <p>Actuate the fire alarm</p> <p>Announce the fire and simulate fire brigade auto paging</p> <p>Notify the Red Wing Fire Department</p> <p>Establish radio communication with the Fire Brigade Chief</p> <p>Consult Att A of ARP</p> <p>Start 12 CC pump per F5 App D</p> <p>Direct local control of 12 AFWP per F5 App D</p> <p>Reset fire panel</p> <p>Verify auto starts of fire pumps</p> <p>Notify Security of RWFD arrival</p> <p>Notify Fire Protection/Industrial Safety</p> <p>Consult Technical Specifications for inoperability of 12 AFWP while in LOCAL (3.7.5 Cond B, 72 hours)</p>

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<p>WHEN 12 CC pump is started AND local control of 12 AFWP is completed, report "Fire is OUT and damage is limited to material in storage area."</p> <p>As the Unit 2 SS report, "Unit 2 will take over the actions for the fire."</p> <p>One minute later, DELETE the fire alarm malfunction (Relative Order 4b)</p>		

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 5	<p>12. <u>WHEN</u> the crew has assumed the Tech Spec for 12 AFW pump and / or at the discretion of the Lead Evaluator, enter the 11 gpm RCS Leak (Relative Order 5, Trigger 6)</p> <p>Note: The high radiation alarm takes 5 minutes to come in.</p>	<p>RO</p> <p>SS</p> <p>LEAD/SS</p> <p>LEAD</p> <p>RO</p> <p>LEAD</p>	<p>Note lowering pressurizer level and adjust charging or excess letdown flow to stabilize.</p> <p><u>47012-0508 Pressurizer Hi/Lo Pressure</u></p> <p>Check pressure low.</p> <p>Verify all pressurizer heaters ON</p> <p>Verify both pressurizer PORVs closed</p> <p>Verify aux spray valve closed</p> <p>Verify pressurizer pressure control operating in AUTO</p> <p>Refer to TS 3.4.1 (DNB) if <2190 psig RCS pressure</p> <p>Initiate RCS leakrate using ERCS 'LEAK' program</p> <p><u>47022-0108 Train B High Radiation</u></p> <p>Determine alarm is 1R-11/1R-12</p> <p><u>1C4 AOP1 RCS LEAK</u></p> <p>*Continuous action* Verify RCS inventory can be maintained by available charging flow. IF NOT, trip the reactor, initiate SI and exit C4 AOP1.</p> <p>Determine location of leak using Figure 1. (Containment radiation monitors and humidity will change)</p> <p>Remove excess letdown from service and recalculate leakrate.</p> <p>Close CV-31198 Charging FCV and recalculate leakrate</p> <p>Isolate charging to the RCP seals:</p> <ul style="list-style-type: none"> Verify both RCP TBHX CC valves open

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
		LEAD	<ul style="list-style-type: none"> • Stop the running charging pump and recalculate leakrate • Restore seal injection by restarting charging pump once determined leak not isolated
		SS	<ul style="list-style-type: none"> • When the leak location is unidentified: <ul style="list-style-type: none"> ○ Refer to LCO 3.4.14 Condition A for total leakage not within limit of 10 gpm. ○ Action to reduce leakage less than 10 gpm within 4 hours. • When the leak location is identified: <ul style="list-style-type: none"> ○ Refer to LCO 3.4.14 Condition C ○ Action to direct/recognize a power reduction to Mode 3 is required within 6 hours. ○ (CRITICAL TASK) • Notify Operations Manager and Resident Inspector of entry to C4 AOP1
Event 6	13. <u>WHEN</u> the crew has addressed the Tech Spec for RCS leak and / or at the discretion of the Lead Evaluator, enter the Large Break LOCA (increase	SS RO	<u>1E-0 Reactor Trip or Safety Injection</u> <ul style="list-style-type: none"> • Direct entry to 1E-0 • Verify reactor trip

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<p>RC10 severity to 100%) (Relative Order 6).</p> <p>14. 1E-0 Implementation</p> <p>a. If requested, report that all category 1 vent doors are closed.</p> <p>b. If requested, report all Turbine Building roof exhausters are stopped.</p> <p>c. If requested to isolate Unit 1 MSR's per Attachment J, perform the following:</p> <ol style="list-style-type: none"> 1) Bring up the CAEP Window 2) Click on OPEN File 3) Click on Attachment J-E0 .cae 4) Click on Run button <p>15. After 12.5 minutes, Report that Unit 1 MSR's are isolated per 1E-0 Attachment J</p> <p>NOTE: IF directed to investigate, report 11 RHR pump has a 51A overcurrent flag and an 86 lockout flag.</p> <p>NOTE: IF directed to repair, report after 30 minutes the motor failed its megger and must be replaced, ETR 12 hours.</p> <p>NOTE: IF directed to locally start 12 AFWP, wait 2 minutes and enter DI-5151802 START (Relative Order 7, Trigger 7)</p>	<p>Lead</p> <p>Lead</p> <p>RO</p> <p>Lead</p> <p>RO</p>	<ul style="list-style-type: none"> ○ Trip/bypass breakers OPEN ○ Flux decreasing ○ RPIs at 0 ○ Rod bottom lights LIT ● Verify Turbine Trip ● Verify both safeguards buses energized ● Verify SI actuated <p>Note: RCP trip criteria should be checked and RCP's stopped. For a LBLOCA, this is not a critical task.</p> <ul style="list-style-type: none"> ● Perform E-0 Att. L (see attached procedure section) <ul style="list-style-type: none"> ○ Start 12 RHR pump (Critical Task) ○ Manually actuate Containment Spray if >23 psig ● Check AFW Status (>200 gpm and >900 psig) <ul style="list-style-type: none"> ○ Locally start 12 AFWP if necessary ● Check RCS Cold Leg Temp <ul style="list-style-type: none"> ○ Verify no steam dump in progress ○ Throttle AFW flow to just above 200 gpm unless either SG is >50% WR, then it may be throttled further or stopped ○ Verify both MSIV's closed (ctmt press auto close) ● Check Pzr PORVs and spray valves closed

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	(E-0 continued)	RO	<ul style="list-style-type: none"> • Check/verify RCP's stopped • Check SG's not faulted <ul style="list-style-type: none"> ◦ RO should use steam tables, SS may use ERCS plot 'SGTEMP' • Check SG's not ruptured <ul style="list-style-type: none"> ◦ R-15, R-19, R-51, R-52 normal • Check RCS intact <ul style="list-style-type: none"> ◦ Containment radiation R-2, 7, 11, 12 high ◦ Containment pressure abnormal
		SS	<ul style="list-style-type: none"> • Transition to 1E-1
	16. E-1 Loss of Reactor or Secondary Coolant 17. If asked as Unit 2, report Unit 2 will unload diesel generators as required.	RO Lead	<ul style="list-style-type: none"> • Verify RCP's stopped • Verify SGs not faulted • Control AFW flow to maintain 50-59% WR SG
		RO Lead	<ul style="list-style-type: none"> • Check secondary radiation NORMAL • Check Pzr PORV's/blocks closed • Reset SI • Reset CI • Open Instrument Air to Ctmt valves
		RO	<ul style="list-style-type: none"> • Verify offsite power to safeguards buses • Establish at least 1 charging pump running • Verify SI cannot be terminated • Verify SI pump cannot be stopped
		SS	<ul style="list-style-type: none"> • Verify RCS and SG pressures stable (no loop) • Stop unloaded DG's (D1/D2) NOTE: May be done by Unit 2 operators

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	18. <u>WHEN</u> the crew verifies SI can not be stopped and /or at the discretion of the Lead Evaluator, place the simulator in freeze. a. Do not reset the simulator until the Lead Evaluator has consented	Crew	Assemble near fire detection panel while evaluators consult

SIMULATOR INPUT SUMMARY							
Relative Order	System Or Panel Drawing	Type	Code	Severity Or Value	Event Trigger	Timing	Description
0	SIMRH01	MALF	RH01A				11 RHR pump lockout on start
0	SIMRH01	MALF	RH02B				12 RHR pump fails to start in AUTO
2	C1-C26	OVRD DI	DI-46296O OPEN	OFF	2		Regen HX outlet valve CV-31328 fails CLOSED
3	D1-D5	REMOTE	RX225	1	3		Steam Header Pressure Fails LOW (PT-484)
4	FDP-4	REMOTE	CH121	8	4		Zone 8 Fire Alarm
4a	SIMFW08	OVRD DI	DI-51517 LOCAL	ON	5		12 AFWP local control
4b	FDP-4	REMOTE	CH121	DELETE			Zone 8 Fire Alarm
5	SIMRC03	MALF	RC10	0.011	6		RCS Leak 11 GPM- Surge Line

SIMULATOR INPUT SUMMARY							
Relative Order	System Or Panel Drawing	Type	Code	Severity Or Value	Event Trigger	Timing	Description
6	SIMRC03	MALF	RC10	100			Pzr Surge Line Shear
7	SIMFW08	OVRD DI	DI-5151802 START	ON	7		Local start 12 AFWP

SIMULATOR SETUP CHECKLIST

Before Training

- _____ Simulator in "Training Load"
 - _____ Step counters "ON"
 - _____ Alarm sound "ON"
 - _____ Recorder power "ON"
 - _____ Simulator Reset to correct IC (malfunctions, remotes, and overrides for Relative Order 0 conditions and conditions actuated by event triggers entered per "Simulator Input Summary")
 - _____ High Flux at Shutdown alarm placards updated to: 5000 cps
 - _____ Control Valve position placard on Turbine Panel updated to: CV-1 @ 0, CV-2 @ 0, CV-3 @ 0, and CV-4 @ 0
 - _____ Feedwater Reg Valve placard updated to: A @ 0/0, B @ 0/0
 - _____ ZBC Δ I sheet displayed on C panel
 - _____ Boric Acid/RMU integrators set to: BA: 3, RMU: 10, and reset
 - _____ Placard on CVCS Letdown panel updated: boron: 1850
 - _____ Turbine reference/setter positions: 0/0
 - _____ Reactivity Guidance placard updated to: BA: 3 gal, RMU: 67 gal
 - _____ Chart recorders operating and forwarded (Paperless 'messages' not flashing red)
 - _____ ERCS driven recorders are on-scale
 - _____ All ERCS terminals operating
 - _____ ERCS alarm screen up and reset
 - _____ ERCS Group Displays update rate entered (5 seconds)
 - _____ ERCS TPM screen displayed, NIS selected
 - _____ Δ I displayed on ERCS single point display #1 (1U1613A)
 - _____ Pens/Paper/Markers available on the simulator
 - _____ Turnover sheet/LCO log/PRA sheet/Protected Equipment sheet available
 - _____ Procedures to be used during scenario are cleaned of any place keeping marks
- 47015-0205
47015-0408
47015-0509
47022-0601
Tech Spec 3.7.5 Condition B
Tech Spec 3.4.1
47012-0508
47022-0108
1C1.2 Startup Operation
1C12.1 AOP2, Loss of Charging Flow to the Regen HX
F5 Appendix A Fire Strategies

F5 Appendix D Effect of Fire Outside the Control Room

1C4 AOP1 RCS Leak

1E-0 Reactor Trip or Safety Injection

1E-1 Loss of Reactor or Secondary Coolant

Log in on floor PCs using user ID: <pitrgsim> (password is the same as user ID)

Magnetic placards in place:

- 11 BA TANK "Lined Up For Service"
- 11 BA PUMP "Lined Up To 11 BA Tank"
- CC TO SFP MV-32115 "In Service"
- Blowdown 46470 "SGB To CDSR"

After Training for the Day

Information Tags removed and put away

Signs/placards removed and put away unless normal simulator configuration

Floor PCs logged off

All books, note pads, and calculators put away

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

Headsets turned off and put away

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

ERCS computer restored to normal

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

Recorder power "OFF"

RETENTION: 7 Days

UNIT 1 LPEO / PEO TURNOVER LOG

DATE:

DAY/NIGHT SHIFT: Day

CAT 1 VENT OPENINGS: 64 ft²

SYSTEM CONDITION: GREEN

<u>SAFEGUARDS EQUIPMENT OOS/TECH SPEC REQUIRED ACTION STATEMENTS</u>	
None	
<u>PROTECTED EQUIPMENT</u>	
None	
<u>RAD MONITORS OOS</u>	<u>ANNUNCIATORS OOS</u>
None	None
<u>OUTSTANDING SP'S</u>	<u>FIRE DET / PROT EQP IMPAIRMENTS</u>
None	None
<u>OTHER EQUIPMENT OOS / STATUS</u>	
12 BATP OOS, seal replacement	
<u>MAJOR EQUIPMENT REPAIRED / RETURNED TO SERVICE</u>	
None	
<u>OPERATIONAL PLANS FOR COMING SHIFT</u>	
Start up in progress, continue with 1C1.2 at step 5.12. Increase power to 6% for Turbine roll.	
<u>NEW PROCEDURES / INSTRUCTIONS</u>	
None	

WATCHSTANDERS LPEO: OURET, TRAVIS

PEO: KEMPKE, JOHN

LPEO Relieved By: _____ Time: _____ Date: _____

PEO Relieved By: _____ Time: _____ Date: _____

CB WALKDOWN → LPEO: _____ Time: _____

→ PEO: _____ Time: _____

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

Facility: Prairie Island	Scenario No.: 7	Op-Test No.: 3, 4
Examiners: _____	Operators:	
_____	1. a	
_____	2. b	
	3. c	
Initial Conditions: IC-26 Critical following App C1B startup, 10 ⁻⁸ A, critical data taken		
Turnover: No equipment OOS		

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R	Raise reactor power to .5-2% per 1C1.2 Unit Startup.
2	FW32	C	12 AFWP Lockout
3	DI-46068	C	121 CR Chiller Breaker Trip
3	DI-46076	C	122 CR Chiller Auto start failure
3	47022-0302	C	121 CR Chiller Tripped annunciator
4	SG01A	C	Steam Generator Tube Leak (AOP)
5	ED14	M	Loss of Offsite Power (Rx Trip)
5	ED09E	C	Bus 15 Lockout
6	DI-46523	C	22 Diesel Cooling Water Pump start failure
7	SG02A	M	11 SG Steam Generator Tube Rupture (SI) (Causes Loop B CL isolation and loss of pressure)

	<h2 style="margin: 0;">SIMULATOR EXERCISE GUIDE (SEG)</h2>
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SITE: PRAIRIE ISLAND

SEG # 2005 NRC SCENARIO 7

SEG TITLE: RAISE REACTOR POWER, 12 AFW PUMP
LOCKOUT, LOSS OF CONTROL ROOM
CHILLERS, SG TUBE LEAK, SGTR WITH
LOSS OF COOLING WATER #: SCEN 7 REV.# 0

PROGRAM: INITIAL LICENSED OPERATOR #: P8100

COURSE: INITIAL LICENSED OPERATOR #: P8100

TOTAL TIME: 1.5 HOURS

Developed by:	J. Kempkes <i>Instructor</i>	3/14/05 <i>Date</i>
Reviewed by:	<i>Instructor</i> <i>(See page 10, Simulator Development Checklist.)</i>	<i>Date</i>
Validated by:	<i>Validation Lead Instructor</i> <i>(See page 11, Simulator Validation Checklist.)</i>	<i>Date</i>
Approved by:	<i>Training Supervision</i>	<i>Date</i>

Guide Requirements

Goal of Training:

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

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

Learning Objectives:

1. Raise reactor power to the POAH per 1C1.2.
 2. Respond to loss of 12 AFW pump at lower power per C47.
 3. Respond to loss of CR Chillers per C37 and Tech Specs.
 4. Diagnose and respond to tube leakage into 11 SG per 1C4 AOP2 and C47.
 5. Respond to a Steam Generator Tube Rupture with Loss of Offsite Power/Bus 15 lockout per 1E-0 and 1E-3.
 6. Respond to a loss of Train B Cooling Water Header per C47 and C35 AOP1.
-

Prerequisites: None

Training Resources:

1. Full Scope Simulator
 2. Operations Management Representative
 3. Lead Evaluator
 4. Human Performance Evaluator
 5. Comment Recorder
 6. Booth Operator (Primary Communicator)
 7. Backup Communicator
-

References:

1. C47
 2. 1C14 AOP2
 3. 1C4 AOP2
 4. 1E-0
 5. 1ES-0.1
 6. 1E-3
 7. C35 AOP1
-

Commitments:

None

**Evaluation
Method:**

This is an evaluation scenario for the 2005 ILT NRC Exam, this is a new scenario.

**Operating
Experience:**

None – Evaluation Scenario

**Related PRA
Information:**

Initiating Event with Core Damage Frequency:

Steam Generator Tube Rupture (18%)

Loss of Cooling Water (2%)

Important Components:

121 Cooling Water Pump

QUANTITATIVE ATTRIBUTES (Use this form for Evaluations only.)

Malfunctions:

Before EOP Entry:

1. 11 RCP Thermal Barrier Heat Exchanger leak
2. 11 SG Tube Leak

After EOP Entry:

1. Loss of Offsite Power
2. Lockout of Safeguards 4160V Bus 15
3. Failure of 22 Cooling Water Pump

Abnormal Events:

1. CC Leakage into RCS
2. SG Tube Leak

Major Transients:

Loss of Offsite Power

Steam Generator Tube Rupture

Critical Tasks:

1. Restore Train B cooling water prior to lockout of D2
2. Cooldown and depressurize the RCS and terminate SI prior to 11 SG going water solid.

SCENARIO OVERVIEW:

INITIAL CONDITIONS:

1. Initialize the simulator to IC-26:
 - Startup in progress per 1C1.2 at step 5.9.17, reactor power 10^{-8} A, Appendix C1B was just completed
 - Next step is to increase power to the POAH
2. No equipment is OOS:

SEQUENCE OF EVENTS:

Event 1: Raise Reactor Power to the POAH

- Per 1C1.2

Event 2: Lockout of 12 AFW pump

- 12 AFW pump locks out requiring action to start 11 TD AFW pump

Event3: Loss of Control Room Chillers

- Loss of 121 CR Chiller with 122 CR Chiller failure to auto start
- Action to shutdown IAW LCO 3.0.3.
- Chiller restored prior to commencing unit shutdown

Event 4: Steam Generator Tube Leak

- A 50 gpd tube leak develops on 11 SG.
- R-19 is used due to MSIV's being Closed.
- Leakage is estimated per Duty Chemist.
- Action Level 2 is entered (>30, <75 gpd leakage)

Event 5: Loss of Offsite Power with Bus 15 Lockout and Loss of Cooling Water

- Offsite power is lost and Bus 15 locks out.
- 22 DDCLP fails to start.

Event 6: Steam Generator Tube Rupture

- After transfer to 1ES-0.1 Reactor Trip Recovery, a SGTR occurs on 11 SG.
- 1E-0 is reentered following manual or automatic SI actuation.
- Loop A CL Pressure is lost on SI.
- 121 Cooling Water Pump must be aligned to Loop A.
- 1E-3 is used to isolate 11 SG and terminate SI.

TASKS ASSOCIATED WITH SIMULATOR EXERCISE(S):

This is an evaluation scenario and as such, tasks are not credited for training and therefore are not listed here.

SCENARIO TIME-LINE:

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	INITIAL CONDITIONS (IC-26): <ul style="list-style-type: none">• IC-26• Mode: 2• Exposure: ZBC• Power: 10⁻⁸A• Boron: (CB): 1850 ppm• Temperature: 549 F• Pressure: 2235• Xenon: 0• Rods: Manual• Generator: Offline		
	1. SIMULATOR SET UP <ul style="list-style-type: none">a. Reset the simulator to IC-26.b. Place the simulator in RUN. 2. Enter the malfunctions, remotes, and overrides, as specified by the “Simulator Input Summary”, to cause the following pre-existing conditions (Relative Order 0) : <ul style="list-style-type: none">a. 122 CR Chiller auto start failure. 3. Pull out 1C1.2 and sign off step up to and including 5.9.16.		
	4. Complete the “Simulator Setup Checklist”.		
	5. COMPLETE TURNOVER: <ul style="list-style-type: none">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 offgoing operator: <ul style="list-style-type: none">• Unit 1 LPEO / PEO Turnover log Walk down the control boards and ask questions as appropriate.

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SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 3	<p>8. WHEN the crew manually started 11 TD AFW pump and / or at the discretion of the Lead Evaluator, THEN, enter the loss of Control Room Chillers. (Relative order 2, Trigger 2).</p> <p>a. If ask to investigate 121 CR Chiller, wait 2 minutes and report as the Aux building operator, 121 CR Chiller has tripped on high motor temperature.</p> <p>b. Report as Unit 2, Unit 2 will take C37.9 AOP 1 and C37.9 AOP 2 and address Unit 2 Tech Specs.</p> <p>c. After the Crew enters LCO 3.0.3 and at the discretion of the Lead Evaluator DELETE 122 CR Chiller auto start malfunction (Relative Order 2a) and report as the WIN team, the 122 CR chiller auto start relay has been repaired and you recommend starting the chiller.</p>	<p>LEAD/ SS</p> <p>SS</p>	<p>C47022-0302, 121 CR Water Chiller Tripped</p> <ul style="list-style-type: none"> • Enter LCO 3.7.11 • Refer to C37.11 AOP 1 • Determine cause of trip locally <p>C37.11 AOP 1, Loss of Safeguards Chilled Water</p> <ul style="list-style-type: none"> • Enter to LCO 3.7.11 Condition E • Requires entry into LCO 3.0.3 due to both trains of safeguards cooling lost. • Action to be in MODE 3 within 7 hours <p>Crew may or may not:</p> <ul style="list-style-type: none"> • Refer to C37.9 AOP 1 • Refer to C37.9 AOP 2 <p>After 122 CR Chiller is restarted,</p> <ul style="list-style-type: none"> • Enter LCO 3.7.11 Condition A. • Action to restore 121 CR chiller in 30 days.

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SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
<u>vent 5</u>	10. After the Crew determines Action Level 2 is appropriate and / or at the discretion of the Lead Evaluator, THEN enter the Loss of Offsite Power with Bus 15 Lockout and Loss of Cooling Water (Relative Order 4, Trigger 4) . a. If asked to investigate Bus 15 Lockout, Report Bus 15 has a 50G Flag b. If asked to investigate 22 Cooling Water pump, report, 22 Cooling Water Pump has an air leak and will not be able to be started.	RO LEAD	1E-0, Reactor Trip or Safety Injection <ul style="list-style-type: none"> • Verify Reactor Trip • Verify Turbine Trip • Verify Both Safeguards Busses energized • Check if SI is actuated • Transition to 1ES-0.1, Reactor Trip Recovery
	11. 1E-0 Implementation a. If requested, report that all category 1 vent doors are closed. b. If requested, report all Turbine Building roof exhausters are stopped. c. If requested to isolate Unit 1 MSR's per Attachment J, perform the following: 1) Bring up the CAEP Window 2) Click on OPEN File 3) Click on Attachment J-E0 .cae 4) Click on Run button 5) After 12.5 minutes, Report that Unit 1 MSR's are isolated per 1E-0 Attachment J 12. When the Crew transitions to 1ES-0.1, and at the discretion of the Lead Evaluator, ENTER the Steam Generator Tube Rupture. (Relative Order 5, Trigger 5) .	SS RO LEAD RO RO LEAD / RO RO LEAD	1ES-0.1, Reactor Trip Recovery <ul style="list-style-type: none"> • Announce Unit 1 Reactor Trip • Transfer Steam Dump to Pressure Mode • Check RCS Temperature stable at 547F • Check Cooling Water Header Pressures greater than 75 psig • Check Feedwater Status <ul style="list-style-type: none"> ○ RCS Temp ○ MFRV Closes ○ Total AFW Flow greater than 200gpm • Verify all rods inserted • Check Pressurizer level greater than 15% • Verify Charging and Letdown in service • Check Pressurizer pressure greater than 1830psig • Manually actuate SI and transition to 1E-0, Reactor Trip or Safety Injection. <p>NOTE: The transition to 1E-0 can be made at step 9 on PZR Pressure or from the Info Page based on PZR level less than 5%.</p>

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<p>13. 1E-0 implementation, continued.</p> <p>NOTE: The Lead will be investigating the loss of Cooling Water Header pressure while the RO Continues with the EOP</p>	<p>RO</p> <p>LEAD</p> <p>RO</p> <p>RO</p>	<p>1E-0, Reactor Trip or Safety Injection</p> <ul style="list-style-type: none"> • Verify Reactor Trip • Verify Turbine Trip • Verify Both Safeguards Busses energized • Check if SI is actuated • Perform Attachment L <ul style="list-style-type: none"> ○ Cooling Water Pressure will be low ○ Enter C35 AOP1, Loss of Pumping Capacity or Supply Header with SI. • Check Total AFW flow greater than 200 gpm • Check RCS temperature stable or trending to 547F • Check PZR PORV's Closed • Check PZR Spray valves Closed • Check if RCPS should be stopped. • Check if SG are not Faulted • Check if SG Tubes are not ruptured <ul style="list-style-type: none"> ○ Transition to 1E-3, Steam Generator Tube Rupture

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	14. C35 AOP 1 implementation	LEAD	C35 AOP1, Loss of Pumping Capacity or Supply Header with SI <ul style="list-style-type: none"> Place 121 Cooling Water Pump in PULLOUT Reset SI Close MV-32036, 121 CLG WTR HDR VLV C OR Close MV-32037, 121 CLG WTR HDR VLV D Open V-32036, 121 CLG WTR HDR VLV C Open MV-32037, 121 CLG WTR HDR VLV D Start 121 Cooling Water Pump <p style="text-align: center;">CRITICAL TASK</p>
	15. 1E-3 implementation	LEAD / RO	1E-3, Steam Generator Tube Rupture <ul style="list-style-type: none"> Check if RCPs should be stopped Identify Ruptured SG <ul style="list-style-type: none"> Determine 11 SG is Ruptured Isolate Flow from 11 SG <ul style="list-style-type: none"> Verify PORV setpoint is 75% Check PORV Closed Closed Steam Supply from 11 SG to TD AFW pump Verify 11 SG blowdown valves are closed Close 11 SG MSIV and Bypass Stop Feed flow to 11 SG Rest SI Check 11 SG pressure greater than 210psig Initiate RCS Cooldown Dump steam to the from 12 SG PORV Stop Cooldown when reach required CETC temp

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
		LEAD / RO	<ul style="list-style-type: none"> • Check 12 SG Level – Control level 5-50% • Check PZR PORVS Closed • Check Block valves – at least one open • Reset SI • Reset Containment Isolation • Establish Instrument Air to Containment • Stop both RHR Pumps • Check Charging Pumps – at least one running • Align Charging to RWST • Establish Max Charging flow • Check 11 SG pressure stable or increasing • Check RCS Subcooling – greater than 40F • Depressurize RCS using PORV • Check if SI flow should be terminated <ul style="list-style-type: none"> ○ RCS Subcooling – greater than 20 ○ Total feed flow – greater than 200 gpm ○ RCS pressure stable or increasing ○ PZR level – greater than 7% • Stop Both SI Pumps <p style="text-align: center;">CRITICAL TASK</p>
	16. <u>WHEN</u> the crew stops the SI Pump in 1E-3 and / or at the discretion of the Lead Evaluator, place the simulator in freeze. a. Do not reset the simulator until the Lead Evaluator has consented		Assemble near fire detection panel while evaluators consult

SIMULATOR INPUT SUMMARY							
Relative Order	System Or Panel Drawing	Type	Code	Severity Or Value	Event Trigger	Timing	Description
0		Override DI	DI-46076 ST START	OFF			122 CR Chiller Auto Start Failure
1		Malfunction	FW32		1		12 AFW Pump Lockout
2			C47022:0302	Cry Wolf	2		121 CR Chiller Trip
2		Override DI	DI-46068 PTL	ON	2		121 CR Chiller Breaker Trip
2a		Override DI	DI-46076 ST START	DELETE			122 CR Chiller Auto Start Failure
3		Malfunction	SG01A	.001	3		11 SG Tube Leak 50 gpd
3		Malfunction	RM15	35	3	120 Sec Ramp	R-19 Miscalibration, raise setpoint >500 CPM
4		Malfunction	ED14		4		Loss of Offsite Power
4		Malfunction	ED09E		4		Bus 15 Lockout
4		Override DI	DI-46523P PTL	ON	4		22 CL Pump Failure

SIMULATOR INPUT SUMMARY							
Relative Order	System Or Panel Drawing	Type	Code	Severity Or Value	Event Trigger	Timing	Description
5		Malfunction	SG02A	10	5	120 Sec Ramp	Steam Generator Tube Rupture-11 SG, 300 gpm
6		Remote	MS-138	CLOSE	6		MV-32016 close without power

SIMULATOR SETUP CHECKLIST

Before Training

- _____ Simulator in "Training Load"
- _____ Step counters "ON"
- _____ Alarm sound "ON"
- _____ Recorder power "ON"
- _____ Simulator Reset to correct IC (malfunctions, remotes, and overrides for Relative Order 0 conditions and conditions actuated by event triggers entered per "Simulator Input Summary")
- _____ High Flux at Shutdown alarm placards updated to: 5000 cps-
- _____ Control Valve position placard on Turbine Panel updated to: CV-1 @ 0, CV-2 @ 0, CV-3 @ 0, and CV-4 @ 0
- _____ Feedwater Reg Valve placard updated to: A @ 0/0, B @ 0/0
- _____ ZBC Δ I sheet displayed on C panel
- _____ Boric Acid/RMU integrators set to: BA: 3, RMU: 10, and reset
- _____ Placard on CVCS Letdown panel updated: boron: 1850
- _____ Turbine reference/setter positions: 0/0
- _____ Reactivity Guidance placard updated to: BA: 3 gal, RMU: 67 gal
- _____ Chart recorders operating and forwarded (Paperless 'messages' not flashing red)
- _____ ERCS driven recorders are on-scale
- _____ All ERCS terminals operating
- _____ ERCS alarm screen up and reset
- _____ ERCS Group Displays update rate entered (5 seconds)
- _____ ERCS TPM screen displayed, NIS selected
- _____ Δ I displayed on ERCS single point display #1 (1U1613A)
- _____ Pens/Paper/Markers available on the simulator
- _____ Turnover sheet/LCO log/PRA sheet/Protected Equipment sheet available
- _____ Procedures to be used during scenario are cleaned of any place keeping marks
 - 1C1.2
 - C47010-0107
 - LCO 3.7.5 Condition B
 - LCO 3.0.4
 - 1C28.1
 - C37.11 AOP 1
 - C37.9 AOP 1
 - C37.9 AOP 2
 - LCO 3.7.11 Condition A.
 - LCO 3.0.3

- C47022-0108
- C47048 1R-19
- 1C4 AOP2
- 1E-0
- 1ES-0.1
- C35 AOP1
- 1E-3

_____ Log in on floor PCs using user ID: <pitrgsim> (password is the same as user ID)

_____ Magnetic placards in place:

- 11 BA TANK "Lined Up For Service"
- 11 BA PUMP "Lined Up To 11 BA Tank"
- CC TO SFP MV-32115 "In Service"
- Blowdown 46470 "SGB To CDSR"
- Protected equipment signs on:

After Training for the Day

- _____ Information Tags removed and put away
- _____ Signs/placards removed and put away unless normal simulator configuration
- _____ Floor PCs logged off
- _____ All books, note pads, and calculators put away
- _____ Instructor station returned to normal with all books, paper, and etc. put away
- _____ Headsets turned off and put away
- _____ Simulator reset to IC-10 unless another IC will be used for further training
- _____ ERCS computer restored to normal
- _____ Simulator placed in DORT if simulator will not be used again that day
- _____ Recorder power "OFF"

RETENTION: 7 Days

UNIT 1 LPEO / PEO TURNOVER LOG

DATE:

DAY/NIGHT SHIFT: Day

CAT 1 VENT OPENINGS: 64 ft²

SYSTEM CONDITION: GREEN

<u>SAFEGUARDS EQUIPMENT OOS/TECH SPEC REQUIRED ACTION STATEMENTS</u>	
None	
<u>PROTECTED EQUIPMENT</u>	
None	
<u>RAD MONITORS OOS</u>	<u>ANNUNCIATORS OOS</u>
None	None
<u>OUTSTANDING SP'S</u>	<u>FIRE DET / PROT EQP IMPAIRMENTS</u>
None	None
<u>OTHER EQUIPMENT OOS / STATUS</u>	
None	
<u>MAJOR EQUIPMENT REPAIRED / RETURNED TO SERVICE</u>	
None	
<u>OPERATIONAL PLANS FOR COMING SHIFT</u>	
Continue with Unit Startup. Raise Power to the POAH per 1C1.2.	
<u>NEW PROCEDURES / INSTRUCTIONS</u>	
None	

WATCHSTANDERS LPEO: OURET, TRAVIS

PEO: KEMPKE, JOHN

LPEO Relieved By: _____ Time: _____ Date: _____

PEO Relieved By: _____ Time: _____ Date: _____

CB WALKDOWN → LPEO: _____ Time: _____

→ PEO: _____ Time: _____

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