NMC Committed to Nuclear Excellence

SIMULATOR EXERCISE GUIDE (SEG)

SITE: PRAIRIE ISLAND **SEG # 2007 NRC SIMULATOR EVALUATION 1**

SEG TITLE: 2007 NRC SIMULATOR EVALUATION 1 #: 1 REV. # 0

PROGRAM: INITIAL LICENSE OPERATOR TRAINING #: FL-ILT

COURSE: INITIAL LICENSE OPERATOR TRAINING #: FL-ILT

TOTAL TIME: 1.5 HOURS

Additional site-specific signatures may be added as desired.

Developed by:	Bill Markham *Instructor*	03/14/07 *Date*
Reviewed by:	 *Instructor* *(Simulator Scenario Development Checklist.)*	 *Date*
Validated by:	 *Validation Lead Instructor* *(Simulator Scenario Validation Checklist.)*	 *Date*
Approved by:	 *Training Supervision*	 *Date*

Guide Requirements

Goal of Training:

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

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

Learning Objectives:

1. During all plant operating conditions, demonstrate the ability to perform communications, verification practices (STAR and peer checks), procedure use, alarm response, reactivity control, and crew briefs in accordance with Operations Standards and Expectations.
2. Reduce power from 100% to 97% in accordance with 1C1.4.
3. Remove 11 Condensate Pump from service and place 13 Condensate Pump in service per 1C28.3.
4. Diagnose and respond to a 12 CC Pump trip and 11 CC Pump Auto Start failure per 1C47 and 1C14 AOP1.
5. Diagnose and perform corrective actions for a T_{hot} transmitter failure event per C51.
6. Diagnose and respond to a manual and automatic reactor trip failure per 1E-0 and 1FR-S.1.
7. Diagnose and perform corrective actions for a SGTR event per E-3.
8. Diagnose and respond to failures of 11 CC Pump, 12 SI Pump, and 12 AFW Pump to auto Start per 1E-0.
9. Implement emergency plan per F3-2.

Prerequisites:

None

Training Resources:

1. Full Scope Simulator
2. Lead Evaluator
3. Booth Operator
4. Backup Communicator

References:

1. 1C1.4, Power Operation
2. 1C28.3, Section 5.6
3. T.S. 3.7.7
4. T.S. 3.0.3
5. C47020-0102, 12 CC Pump Locked Out
6. C47012-0104, Reactor Coolant System Hi Tavg
7. C47012-0304, Reactor Coolant System Tavg Deviation
8. C47012-0404, Overpower ΔT Channel Alert
9. C47012-0504, Reactor Coolant System Overtemp ΔT Channel

	Alert **10.** C47012-0507, PRZR Lvl Deviation **11.** C47012-0604, Reactor Coolant System ΔT Deviation **12.** C47013-0105, OP ΔT Rod Stop Turbine Runback Channel Alert **13.** C47013-0205, OT ΔT Rod Stop Turbine Runback Channel Alert **14.** C47013-0305, Auctioneered Tavg-Tref Deviation **15.** 1C51.1, Instrument Failure Guide **16.** T.S. LCO 3.3.1 Condition A and Table 3.3.1-1 Function 6, 7 **17.** T.S. LCO 3.3.2 Condition A and Table 3.3.2-1 Function 4d **18.** TRM TLCO 3.3.3 Condition A **19.** 1E-0, Reactor Trip or Safety Injection **20.** 1E-3, Steam Generator Tube Rupture **21.** 1FR-S.1, Response to Nuclear Generation/ATWS
Commitments:	**1.** None
Evaluation Method:	This is an evaluation scenario
Operating Experience:	None - Evaluation Scenario
Related PRA Information:	**Initiating Event with Core Damage Frequency:** Steam Generator Tube Rupture (SGTR) (14.8%) **Important Components:** 11/12 AFW Pumps, 12 SI Pump **Important Operator Actions with Task Number:** Cooldown and depressurize from SGTR before overfill (E-3) (9.7%)

QUANTITATIVE ATTRIBUTES

Normal Evolutions:

1. Reduce power from 100% to 97% for Generator Hydrogen Gas Temperature Control.
2. Remove 11 Condensate Pump from service, Place 13 Condensate Pump in service.

Malfunctions:

Before EOP Entry:

1. 12 CC Pump trip, 11 CC Pump fails to auto-start.
2. Thot transmitter failure
3. ATWS
4. SGTR

After EOP Entry:

1. 12 SI pump auto start failure
2. 12 AFW Pump auto start failure
3. 11 CC Pump auto start failure

Abnormal Events:

1. 12 CC Pump Trip, 11 CC Pump fails to auto-start.
2. 1C51.1, Instrument Failure Guide for Thot Transmitter Failure

Major Transients:

1. ATWS
2. Steam Generator Tube Rupture

Critical Tasks:

1. Add negative reactivity during an ATWS (Rod insertion or boration).
2. Manually start at least one AFW Pump prior to transition out of 1E-0.
3. Manually start at least one SI Pump prior to transition out of 1E-0.
4. Isolate feedwater flow into and steam flow from the ruptured Steam Generator before entry into 1ECA-3.1 is required.
5. Establish and maintain RCS temperature to establish adequate subcooling to preclude transition to 1ECA-3.1 and without causing and extreme (RED) or severe (ORANGE) challenge to the subcriticality and/or integrity CSF.
6. Depressurize the RCS prior to Steam Generator overfill.
7. Terminate Safety Injection prior to Steam Generator overfill.

SCENARIO OVERVIEW:

INITIAL CONDITIONS:

1. This Evaluation will be run with Standard IC-A
   - 100%
2. The following equipment is OOS:
   - 11 TDAFWP
   - 11 SI Pump

SEQUENCE OF EVENTS:

Event 1: Reduce power from 100% to 97%

- A power reduction is required due to maintenance activities.

Event 2: Swap Condensate Pumps

- Maintenance is required on 11 Condensate Pump. The crew must swap 11 and 13 Condensate Pumps per 1C28.3, Section 5.6.

Event 3: 12 CC Pump trips, 11 CC Pump fails to auto-start

- 12 CC Pump trips.
- 11 CC Pump fails to auto-start, requiring the operator to manually start 11 CC Pump to restore flow.
- Due to the 12 CC Pump trip and the 11 CC Pump auto-start failure, the plant is placed in T.S. 3.0.3.

Event 4: T_{hot} instrument fails high

- Control rods automatically insert, requiring operator action
- Charging pump speed increases, requiring operator action
- The affected channel is defeated and control systems are restored to automatic
- Protective bistables are requested to be tripped to satisfy Technical Specifications

Event 5: ATWS

- A 250 gpm rupture develops on 11 SG.
- Pressurizer level cannot be maintained and the crew should attempt to manually trip the reactor.
- The reactor will not trip from the control room requiring an entry into 1FR-S.1.

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Event 6: SG tube rupture on 11 SG

- Following the completion of 1FR-S.1, the crew will respond to the tube rupture per 1E-0 and 1E-3.

Event 7: 12 SI Pump Fails to auto start

- Following the initiation of safety injection, the 12 SI Pump fails to auto start requiring the operator to manually start the pump.

Event 8: 12 AFW Pump Fails to auto start

- Following the reactor trip and safety injection, the 12 MDAFWP will fail to auto start, requiring the operator to manually start the pump.

Event 9: 11 CC Pump Fails to auto start

- 11 CC Pump previously failed to auto start and was manually started when 12 CC Pump tripped earlier in the scenario. It will also fail to auto start on a Safety Injection signal after the Bus 16 load rejection requiring the operator to manually start the pump.

TASKS ASSOCIATED WITH SIMULATOR EXERCISE(S):

N/A

General Expectations

Over the duration of the scenario, monitor crew performance for adherence to the conduct of operations standards and Operations department Standards and Expectations:

- Communications
- Verification Practices (STAR and Peer Checks)
- Procedure Use
- Alarm Response
- Reactivity Control
- Crew Briefs

Performance for adherence to administrative procedural requirements and operations management expectations:

- Reportability of the malfunction or event
- Notifications to the Operations Manager and NRC Resident Inspector per SWI-O-28
- Notification to the Duty Station Manager per operations management request
- Tech Spec implementation; interpretation; and documentation of decision made, actions taken, and the basis for decisions made and actions taken

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	INITIAL CONDITIONS: • Saved IC or IC picked by evaluation lead. • Mode: 1 • Exposure: Per saved IC • Power: 100% • Boron: (CB): Per saved IC • Temperature: ~560°F • Pressure: ~2235 psig • Xenon: Per saved IC • Rods: “D” @ 218 • Generator: Per saved IC		
	1. SIMULATOR SET UP: **a.** Set up the simulator to snapped IC or **b.** Set up the simulator to the standard IC chosen by the Evaluation Lead. 2. Enter the malfunctions, remotes, and overrides, as specified by the "Simulator Input Summary" 3. Complete the "Simulator Setup Checklist" for IC-A. 4. Provide a marked up 1C1.2, ready to perform Section 5.2. 5. Ensure “Protected Equipment” signs are placed on 12 SI Pump and 12 AFW Pump.		
	6. COMPLETE TURNOVER: **a.** “UNIT 1 LPEO / PEO TURNOVER LOG” **b.** PRA Printout **c.** Verify crew performs walk down of control boards and the reviews turnover checklists	Crew	Review the following with the off-going operator: • “Unit 1 LPEO / PEO Turnover Log” • PRA printout • Walk-down the control boards and ask questions as appropriate

Event 1	7. The crew should swap reduce power from 100% to 97% per 1C1.4, Power Operation, Section 5.2. ***Note: The crew must pre-job brief this evolution and also the swap of 11 and 13 Condensate Pumps prior to taking the duty.*** **a. When asked as the Nuclear Engineer, inform the crew that TP1018C, does NOT need to be performed.** **b. If contacted as the Nuclear Engineer, inform them that a Reactivity Prediction is NOT available.** **c. If contacted as the Shift Manager, inform the crew that transferring the Heating System is not required.**	Crew	• *Note: Steps 5.2.1 through 5.2.6 will all be addressed during the pre-job brief.* • Step 5.2.7, Turn on all pressurizer heaters. • Step 5.2.8, Transfer heating system to Unit 2. • Step 5.2.9, The crew should determine that control rods should be left in AUTO. (It is allowed to choose MAN, but not the desired configuration) • Step 5.2.10.A, Select the desired load rate on the Turbine EH Control Panel. • Step 5.2.10.B, Set the desired turbine load on the SETTER display. • Step 5.2.10.C, Initiate a negative reactivity addition by using control rods or boric acid. • Step 5.2.10.D, When Tave shows a decrease, depress the GO pushbutton. • Step 5.2.10.E, Borate as required to maintain Tave within 1.5 F of Tref. • Step 5.2.10.F, Suspend the load decrease, if required. • Step 5.2.11, This step is not applicable. • Step 5.2.12, When all 4 NIS power range channels read less than 100%, then swap TPM to NIS. When reactor power is at 97%, then stabilize the plant.

Event 2	8. When power is reduced to 97%, or at the discretion of the lead evaluator, then the crew should swap condensate pumps per 1C28.3, Section 5.6. ***Note: The crew must pre-brief this evolution and be ready to perform section 5.6 when they enter the simulator.*** **a. When asked as the turbine building operator, inform the crew that cooling water flow is adequate in the sight glass. (Step 5.6.1)** **b. When asked as the turbine building operator, inform the crew that step 5.6.2, the first 2 bullets, step 5.6.3 and step 5.6.4 are complete SAT.** **c. When asked as the turbine building operator, inform the crew that step 5.6.7, 5.6.8 are complete, and all indications are satisfactory.** **d. When asked as the turbine building operator, inform the crew that step 5.6.9 and 5.6.10 is complete.** **e. When asked as the turbine building operator, inform the crew that step 5.6.14 is complete.**		1C28.3, Section 5.6 • Step 5.6.1, Check condensate pump oil cooler cooling water flow (local) • Step 5.6.2, Check gland seal water flow and associated annunciator (local). • Step 5.6.3, Ensure motor bearings have proper oil level (local). • Step 5.6.4, Verify all condensate pump suction valves are OPEN (local). • Step 5.6.5, Place 13 condensate pump selector switch in MAN. • Step 5.6.6, Start 13 condensate pump • Step 5.6.7, Check pump visually for excessive vibration or seal leakage (local) • Step 5.6.8, Check bearing temperatures and motor stator temperatures on ERCS. • Step 5.6.9, Close the discharge vent valve of the running condensate pump (13 Condensate Pump) (local) • Step 5.6.10, Verify 11,12, and 13 heat removal fans have started. • Step 5.6.11 Check header pressure at 440 psig. • Step 5.6.12, Stop 11 Condensate Pump. • Step 5.6.13, If desired, place a condensate pump selector switch in STANDBY. • Step 5.6.14, Open 11 Condensate Pump discharge vent valve (local)

Event 3	9. When the condensate pumps are swapped, and the plant is stabilized, and at the discretion of the Lead Evaluator, enter the malfunction to trip 12 CC Pump. ***(Relative Order 1, Trigger 1)*** **a.** If asked to investigate 12 CC pump, inform the crew that the pump appears normal, but the associated breaker is tripped open and has a 50G ground indication.		• 12 CC Pump will trip and 11 CC Pump will fail to auto-start. • The operator should diagnose the failure of 11 CC Pump to auto-start, and manually start the pump to restore flow. • The crew will receive numerous alarms • 47020-0102,12 CC PUMP LOCKED OUT o Verify the standby pump starts (11 CC Pump should have been manually started. o If component cooling water flow was lost, refer to 1C14 AOP1. o Notify Electrical to check tripped pump motor. o Refer to TS 3.7.7 o Refer to 5AWI 3.6.0 for reportability. o Effect repairs. • 47015-0408, LTDN FLOW HI TEMP (Alarm will come in and then clear as CC flow is restored) o Position CV-31204, LTDN DIVERT TO PURIF, to the VC TANK position. o Verify above automatic action occurs. o Verify sufficient component cooling flow to the letdown heat exchanger. o Check CV-31203, LTDN PRES CONT, controlling. o Reset CV-31204 to demin position when temperature decreases below 130F. • 1C14 AOP1, Loss of Component Cooling, Subsequent Manual Actions o If CC Surge Tank Level cannot be maintained then trip the reactor, trip both RCPs, Isolate letdown, and reduce charging flow to minimum. o If CC Pump Cavitation exists, then stop the affected CC pump and place in PULLOUT. o Verify the CC surge tank level control valve is controlling level.

	10. Trip of 12 CC Pump, continued.		o Verify notifications per SWI O-28 are complete. • The Shift Supervisor should determine that the plant is in TS 3.0.3, due to 12 CC Pump being inoperable due to the lockout, and 11 CC Pump being inoperable due to the failure to auto start.

Event 4	11. When the plant is stabilized, or at the discretion of the lead evaluator, enter the malfunction to cause the red channel of T_{hot} (TE-401A) to fail high ***(Relative Order 2, Event Trigger 2):***
	
	Note: The crew may proceed directly to 1C51.1, Instrument Failure Guide.
	
	a. If asked to trip bistables, report that an I&C technician will report to the control room within one hour.
			The crew should perform plant stabilization actions:
			• Place rod control in MANUAL and maintain Tavg at Tref.
			• Place Charging Pump speed control in MANUAL and maintain pressurizer level.
			47012-0104, RCS Hi Tavg
			• Check RCS Tavg
			• If due to instrument failure then:
			• Place Rod Control in MANUAL
			• Shift Charging Pump control to MANUAL and adjust speed as necessary.
			• Verify steam dumps are not armed.
			• Refer to 1C51, Instrument Failure Guide
			1C51.1, Instrument Failure Guide
			• Place Rod Control in MANUAL and maintain Tavg at Tref.
			• Place Charging Pump speed in MANUAL and maintain pressurizer level.
			• Select the red channel on the Tavg defeat switch and pull out.
			• Return the following to AUTO
			  • Rod control
			  • Charging pump speed control
			  • Steam dump control
			• Document entry into the following Tech Spec requirements as noted by 1C51.1: (All require 6 hours to trip bistables)
			  • T.S. LCO 3.3.1 Condition A and Table 3.3.1-1 Function 6, 7.
			  • T.S. LCO 3.3.2 Condition A and Table 3.3.2-1 Function 4d.
			  • TRM TLCO 3.3.3 Condition A

Event 5,6	12. When the crew has stabilized the plant and taken all actions for the Thot instrument failure, and/or at the discretion of the Lead Evaluator, enter the malfunction to cause a 250 gpm tube rupture on 11 SG with an ATWS. ***(Relative Order 3, Trigger 3)*** 13. 1E-0 and 1FR-S.1 implementation. **a.** ***If asked as the Turbine Building Operator to locally open reactor trip breakers, then delete Malfuctions RP07A and RP07B after 30 seconds.***	Crew	• Approximately a 250 gpm tube rupture will occur in 11 SG. • An ERCS alarm for RCS leak rate will occur. • As the leak will develop quickly, the crew may or may not have time to take actions in 1C4 AOP1, Reactor Coolant Leak. These actions may also be taken as plant stabilization actions. o The crew should increase charging flow and isolate letdown flow as time permits. o The crew should assess the tube rupture and determine the need for a manual reactor trip and manual safety injection. o The manual safety injection will not be accomplished right away due to the ATWS. o An automatic safety injection may occur in 1FR-S.1 • 1E-0, Reactor Trip or Safety Injection. o Verify reactor trip. The crew should attempt both reactor trip switches and the AMSAC/DSS switch. None will work. o Verify reactor power is greater than 5%. o Transition to 1FR-S.1. • 1FR-S.1, Response to Nuclear Power Gen./ATWS. o Verify reactor trip. o If reactor will not trip, verify auto rod insertion is occurring or manually insert control rods. o Verify turbine trip. o Check AFW pumps running. ▪ Start 12 MDAFWP.

Event 5 cont.	14. 1E-0 and 1FR-S.1 implementation, continued. 1) **If asked, as the extra operator, do NOT take Attachment L for performance UNTIL after the crew has started 12 SI Pump, the 12 AFW Pump, and the 12 CC Pump Manually.** **b.** If requested, report that all Category 1 Vent Doors are closed **c.** If requested, report that all turbine building roof exhausters have been stopped **d.** If requested to isolate Unit 1 MSRs per Attachment J, perform the following: 1) Enter the remotes to perform the required valve manipulations ***(Relative Order 4))*** Report that Unit 1 MSRs are isolated per 1E-0, Attachment J **NOTE: Crew must manually start 12 SI Pump by the completion of Attachment L. 12 SI Pump does not have any CC flow but may be started in an emergency per 1C14 AOP1.**	Crew	1FR-S.1, continued. • Initiate normal boration of the RCS at 12 to 15 gpm. **Critical Task: Add negative reactivity during an ATWS (Rod insertion or boration).** • Check if the following trips have occurred: Reactor trip and turbine trip. • Dispatch an operator to locally open reactor trip breakers OR locally open rod drive MG set motor and generator breakers. • Check narrow range levels greater than 5%, control feed flow to maintain levels between 5% and 50%. • Stop Reactor Makeup Pumps • Check for Reactivity Insertion From Uncontrolled Cooldown. • Check no SG pressure decreasing in an uncontrolled manner. • Check RCS temp. stable or increasing. • Check MSIVs and Bypass Valves Closed. • Identify Faulted SG – there is no faulted SG. • Check Core Exit TCs less than 1200F • Verify reactor subcritical. • Return to procedure and step in effect. 1E-0, Reactor Trip or Safety Injection. • Verify reactor trip • Verify turbine trip. • Verify both Safeguards buses energized. • Check if SI is actuated. o By this point, SI will have been either manually or automatically actuated. • Verify status of equipment on Attachment L. • **The crew must start 11 CC Pump manually.** **Critical Task: Manually start 12 SI pump by the completion of Attachment L.**
Event 7,8,9			

Event 5 cont.	15. 1E-0 implementation continued. **NOTE: The transition to 1E-3 may be made based on previously observed R-15 response, if the radiation monitor is not currently in alarm.** **Event 6** 16. 1E-3 Implementation: **a.** If requested, report after 2 minutes, that cation frisk results indicate activity in 11 SG and no activity in 12 SG	Crew	• Verify AFW flow greater than 200 gpm. • Verify AFW pumps discharge pressure is greater than 900 psig. **Critical Task: Manually start 12 MDAFWP prior to transition out of 1E-0.** • Control feed flow to maintain narrow range level between 5% and 50%. Note: The crew may choose to throttle AFW back as much as possible after they have identified the ruptured SG. • Check RCS temperatures stable at or trending to 547F if any RCP running. (RCPs will be running) • Check PRZR PORVs and Spray Valves closed. • Check if RCPs should be stopped. o RCP's do not need to be stopped at this time. • Check if SGs are not faulted. NO faulted SG exists. • Check if SG tubes are not ruptured. o The crew should determine that 11 SG is ruptured and transition to 1E-3. 1E-3, Steam Generator Tube Rupture. • Upon transition, the crew should report all Critical Safety Functions are Green or Yellow with no Orange or Red Paths present. • Check if RCPs should be stopped. • Identify ruptured SG(s) • Determine 11 SG is ruptured • Isolate flow from ruptured SG (11 SG) • Verify 11 SG PORV controller in AUTO at 75%. • Check 11 SG PORV closed. • Close steam supply valve from 11 SG to TDAFW Pump. • Verify 11 SG Blowdown isolation valve closed. • Close 11 SG MSIV and MSIV Bypass Valves. • Check ruptured SG level greater than 5% • Isolate feed flow to the ruptured SG.

	17. 1E-3 implementation, continued.		**Critical Task: Isolate feedwater flow into and steam flow from the ruptured Steam Generator before entry into ECA-3.1 is required.** • Reset SI • Check ruptured SG pressure greater than 210 psig. • Initiate RCS Cooldown. o Determine required CET temperature. o Check one condensate pump running. o Establish steam dump to condenser. o Check condenser permissive satisfied. o Check intact SG MSIV open (12 SG) o Check one Circ Water Pump running. o Dump steam to condenser from 12 SG at Maximum Rate. o When RCS temperature is less than 540F, then momentarily place steam dump transfer switches to BYPASS INTERLOCK. o Core Exit TCs less than required temperature. **Note: The crew is expected to continue with Step 8 while cooling down.** o Stop RCS Cooldown – when proper CET temperature is reached. o Maintain CETs less than required temperature. **Critical Task: Establish and maintain RCS temperature to establish adequate subcooling to preclude transition to ECA-3.1 and without causing and extreme (RED) or severe (ORANGE) challenge to the subcriticality and/or integrity CSF**

			• Check intact SG level
			  o Greater than 5%
			  o 50% NR.
			  o Maintain between 5 and 50% NR Level.
			• Check power to PORV block valves.
			• Check PRZR PORVs closed.
			• Check at least one PORV block valve open.
			• Reset SI
			• Reset Containment Isolation.
			• Establish Instrument Air to Containment
			• Check if RHR pumps should be stopped.
			  o RHR pumps may both be stopped based on RCS pressure.
			• Establish charging flow.
			  o Charging pumps – at least one running.
			  o Align charging pump suction to RWST
			  o Establish maximum flow.
			• Check if RCS cooldown should be stopped.
			  o CET's less than required temp.
			  o Stop cooldown
			  o Maintain CET's less than required temperature.
			• Check 11 SG pressure stable or increasing.
			• Check RCS Subcooling based on CETs greater than 40F.
			• Depressurize the RCS to minimize break flow and refill pressurizer.
			Critical Task: Depressurize the RCS following a SGTR prior to SG overfill.

			o Determine normal PRZR spray is available. o Use normal spray until ▪ RCS pressure is less than ruptured SG pressure AND ▪ PRZR level greater than 7% OR ▪ PRZR level greater than 75% OR ▪ RCS subcooling based on CETs is less than 20F. • Close both pressurizer spray valves • Go to step 21. • Check if SI flow should be terminated. o RCS subcooling based on CETs greater than 20F o Secondary heat sink established. o RCS pressure stable or increasing. o PRZR level greater than 7%. • Secure SI pumps. • **Critical Task: Terminate Safety Injection prior to SG Overfill.**
	18. Emergency Plan Classification - Classify the event per F3-2.	SM	Classify the event as follows: • **ALERT** - Condition **FA.1**
	11. When SI has been terminated, or at the discretion of the Lead Evaluator, place the simulator in **FREEZE.**		

SIMULATOR INPUT SUMMARY							
Relative Order	**System Or Panel Drawing**	**Type**	**Code**	**Severity Or Value**	**Event Trigger**	**Timing**	**Description**
0	SIMSI02	MALF	SI05B				12 SI pump fails to auto start
0	SIMFW08	MALF	FW34B				12 AFW pump fails to auto start
0	SIMRP01	MALF	RP07A				"A" Rx Trip Breaker mechanical failure
0	SIMRP01	MALF	RP07B				"B" Rx Trip Breaker mechanical failure
0		DI	DI-46447B Block	ON			AMSAC Switch To Block
0		DI	DI-46447I Initiate	OFF			Disable AMSAC Switch
0		ANN MALF	M47014:0606B	DISABLE			Disable AMSAC Annunciator
0		ERCS PT	CP-1Y0501D	RESET			Disable AMSAC in Test
0		ERCS PT	CP-1Y0500D	SET			Disable AMSAC Trouble
1	SIM	MALF	CC01B		1		12 CC Pump trip
1	SIM	MALF	CC02A		1		11 CC Pump Fails to Auto -Start
2	SIMRP03B	MALF	RX05A		2		Red channel T_{hot} (TE-401A) fails high
3	SIMSG01	MALF	SG02A	8	3	120 second ramp	250 gpm SGTR on 11 SG
4	SIMMS03A		CAEP				MSR Isolation

SIMULATOR SETUP CHECKLIST

Before Training

_____ Simulator Setup Checklist for IC-A completed

_____ Obtain turnover sheets from IC-A and make 5 copies

_____ Ensure PRA information is updated and available

Procedures to be used during scenario are cleaned of any place keeping marks

_____ 1C1.4
_____ 1C28.3
_____ 1C51.1
_____ 1E-0
_____ 1FR-S.1
_____ 1E-3
_____ T.S. LCO 3.3.1 & Table 3.3.1-1
_____ T.S. LCO 3.3.2 & Table 3.3.2-1
TRM TLCO 3.3.3
_____ SWI O-28
_____ F3-2
_____ F3-2 Wallchart
_____ H24.1
_____

_____ C47012
_____ C47013
_____ C47015
_____ C47010
_____ 1C12.1
_____ 1C12.5 Placard
_____
_____
_____
_____
_____
_____
_____

After Training for the Day

_____ Simulator Setup Checklist for specific IC completed

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	
11 TDAFWP – OOS for Corrective Maintenance. Job duration is 48 hours. **11 SI Pump – OOS for Corrective Maintenance. Job duration is 24 hours.**	
PROTECTED EQUIPMENT	
12 MDAFWP **12 SI Pump**	
RAD MONITORS OOS	**ANNUNCIATORS OOS**
OUTSTANDING SP'S	**FIRE DET / PROT EQP IMPAIRMENTS**
OTHER EQUIPMENT OOS / STATUS	
MAJOR EQUIPMENT REPAIRED / RETURNED TO SERVICE	
OPERATIONAL PLANS FOR COMING SHIFT	
Due to concerns with Generator Cold Gas Temperatures, reduce power from 100% to 97% per 1C1.4, Power Operation, Section 5.2 **Swap 11 and 13 Condensate Pumps per 1C28.3, Section 5.6.**	
NEW PROCEDURES / INSTRUCTIONS	

WATCHSTANDERS LPEO: Schmidt **PEO:** Markham

LPEO Relieved By: _____ **Time:** _____ **Date:** _____

PEO Relieved By: _____ **Time:** _____ **Date:** _____

CB WALKDOWN → LPEO: _____ **Time:** _____

→ PEO: _____ **Time:** _____

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	No
2. The scenario identifies key parameter response, expected alarms, and automatic actions associated with the induced perturbations. (This action applies to all SEG's new or revised for those on the ANS/ANSI-3.5-1998 standard. This action is NOT applicable for those on the ANS/ANSI-3.5-1985 standard.)	Yes	No
3. The scenario content adequately addresses the desired tasks, through simulator performance, instructor-led training freezes, or both.	Yes	No
4. Plant PRA initiating events, important equipment, and important tasks are identified.	Yes	No
5. Turnover information includes a Daily At Power or Shutdown Safety Risk Assessment.	Yes	No
6. The scenario contains procedurally driven success paths. Procedural discrepancies are identified and corrected before training is given.	Yes	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.	Yes	No
8. The scenario includes related industry experience.	Yes	No
9. 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

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

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.

1.	The desired initial condition(s) could be achieved.	Yes	No
2.	All malfunctions and other instructor interface items were functional and responded to support the simulator scenario.	Yes	No
3.	All malfunctions and other instructor interface items were initiated in the same sequence described within the simulator scenario.	Yes	No
4.	All applicable acceptance criteria were met for procedures that were used to support the simulator scenario.	Yes	No
5.	During the simulator scenario, observed changes corresponded to expected plant response.	Yes	No
6.	Did the scenario satisfy the learning or examination objectives without any significant simulator performance issues, or deviations from the approved scenario sequence? If learning objective(s) could not be satisfied, identify the objectives in the Simulator Action Request	Yes	No
7.	Evaluation: The simulator is capable of being used to satisfy learning or examination objectives without exceptions, significant performance discrepancies, or deviation from the approved scenario sequence.	Yes	No

Discrepancies noted (Check “none” or list items found) ☐ None
SMAR = Simulator Action Request

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

Comments:_____

_____

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

SIMULATOR EXERCISE GUIDE (SEG)

SITE: PRAIRIE ISLAND **SEG # 2007 NRC EVALUATION SCENARIO 2**

SEG TITLE: 2007 NRC EVALUATION SCENARIO 2 **#: 2** **REV. # 0**

PROGRAM: INITIAL LICENSE OPERATOR TRAINING **#: FL-ILT**

COURSE: INITIAL LICENSE OPERATOR TRAINING **#: FL-ILT**

TOTAL TIME: 1.5 HOURS

Additional site-specific signatures may be added as desired.

Developed by:	Bill Markham	03/14/07
	Instructor	*Date*
Reviewed by:		
	Instructor (*Simulator Scenario Development Checklist*)	*Date*
Validated by:		
	Validation Lead Instructor (*Simulator Scenario Validation Checklist*)	*Date*
Approved by:		
	Training Supervision	*Date*

Guide Requirements

Goal of Training:

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

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

Learning Objectives:

1. During all plant operating conditions, demonstrate the ability to perform communications, verification practices (STAR and peer checks), procedure use, alarm response, reactivity control, and crew briefs in accordance with Operations Standards and Expectations.
2. Increase power from the POAH to 6% using 1C1.2, Unit 1 Startup Procedure.
3. Diagnose and perform corrective actions for a NIS channel failure (high) per C51.
4. Diagnose and take corrective action for an 11 Charging Pump trip per C47 and C12.1.
5. Diagnose and take corrective action for a report of the Control Room Boundary INOPERABLE per Technical Specifications.
6. Diagnose and take corrective actions for an automatic reactor trip failure per 1E-0.
7. Diagnose and take corrective action for a Containment Isolation Failure per 1E-0.
8. Diagnose and take corrective action for a Feedwater and Condensate Pumps failure to trip per 1E-0.
9. Diagnose a Small RCS LOCA and take corrective actions per 1E-0, 1E-1, and 1ES-1.1.
10. Implement emergency plan per F3-2.

Prerequisites:

1. None

Training Resources:

1. Full Scope Simulator
2. Lead Evaluator
3. Booth Operator
4. Backup Communicator

References:

1. 1C1.2, Unit 1 Startup Procedure
2. 47012-0504 Reactor Coolant System Overtemp ΔT Channel Alert
3. 47013-0101 NIS Power Range Positive Flux Rate Channel Alert
4. 47013-0102 NIS Power Range Hi Setpoint Channel Alert
5. 47013-0103 NIS Power Range Overpower Rod Withdrawal

	Stop **6.** 47013-0203 NIS Power Range Channel Deviation **7.** 47013-0205 OTΔT Rod Stop Turbine Runback Channel Alert **8.** 47013-0403 Computer Alarm Flux Tilt Check Typer **9.** 47013-0503 NIS Power Range Upper Detector High Flux Deviation or Auto Defeat. **10.** 1C51.2 (N42 Failure) **11.** 47015:0103 -11 Charging Pump Overload Trip **12.** H24.1 **13.** Technical Specification 3.2.1 **14.** 1E-0, Reactor Trip and Safety Injection. **15.** 1E-1, Loss of Reactor or Secondary Coolant. **16.** 1ES-1.1, Post LOCA Cooldown and Depressurization. **17.** F3-2, Classifications of Emergencies
Commitments:	**1.** None
Evaluation Method:	This is an evaluation scenario
Operating Experience:	SOER 83-8 Reactor Trip Breaker Failures
Related PRA Information:	**Initiating Event with Core Damage Frequency:** SBLOCA (18%) **Important Components:** Reactor Protection **Important Operator Actions with Task Number:** None

QUANTITATIVE ATTRIBUTES

Normal Evolutions:

1. Increase power from the POAH to 6% using 1C1.2.

Malfunctions:

Before EOP Entry:

1. PR NIS Instrument N42 fails high
2. 11 Charging Pump Trip
3. Automatic Reactor Trip Failure

After EOP Entry:

1. Failure of C Panel Manual Reactor Trip Switch.
2. Containment Isolation Failure.
3. Failure of 11 Condensate Pump to trip on a SI signal.

Abnormal Events:

1. Power Range N-42 Fails High.
2. 11 Charging Pump Trip

Major Transients:

1. Small Break LOCA

Critical Tasks:

1. Manually trip the reactor from the control room during the performance of 1E-0.
2. Perform a manual Containment Isolation so that at least one valve is closed in each penetration before the end of the scenario.

SCENARIO OVERVIEW:

Initial Conditions:

- IC-6: Reactor is at the POAH.

Event 1: Raise reactor power to 6% per 1C1.2.

- The turbine is ready to roll to 1800 rpm. Raise power from the POAH to 6% per 1C1.2, Section 5.12.

Event 2: N-42 fails high

- The channel is removed from service per C51.2

Event 3: Loss of 11 Charging Pump

- 11 charging pump trips on overcurrent
- The crew responds by starting another charging pump and restoring charging flow and seal injection.

Event 4: Report of Control Room Boundary being breached.

- A report will be received in the Control Room that the Control Room Boundary has a previously undetected breach and is INOPERABLE.
- The Shift Supervisor will need to assess the impact per Technical Specifications and determine that the boundary must be restored within 24 hours or both Units will enter Technical Specification 3.0.3.

Event 5: Reactor Fails to Automatically Trip, C Panel Trip Switch Will Not Work

- Due to an RCS Leak that develops into a LOCA, the Reactor must be tripped. The reactor will not automatically trip, and must be manually tripped from the B Panel Trip Switch after the C Panel Trip Switch fails.

Event 6: Small Break LOCA

- A small break LOCA occurs.
- The reactor will not automatically trip and the C panel switch will not work. The reactor must be manually tripped from the B panel trip switch
- The crew responds per 1E-0, 1E-1, and 1ES-1.1.

Event 7: Containment Isolation Failure

- Containment Isolation does not actuate on the Small Break LOCA. The operator must manually actuate Containment Isolation.

Event 8: Feedwater and Condensate Pumps Fails to trip on a Safety Injection Signal

- 11 Condensate Pump fails to trip on a SI signal and must be manually tripped during the performance of 1E-0.
- Both Feedwater Pumps fail to trip on a SI signal and must be manually tripped during the performance of 1E-0.

TASKS ASSOCIATED WITH SIMULATOR EXERCISE(S):

N/A

General Expectations

Over the duration of the scenario, monitor crew performance for adherence to the conduct of operations standards and Operations department Standards and Expectations:

- Communications
- Verification Practices (STAR and Peer Checks)
- Procedure Use
- Alarm Response
- Reactivity Control
- Crew Briefs

Performance for adherence to administrative procedural requirements and operations management expectations:

- Reportability of the malfunction or event
- Notifications to the Operations Manager and NRC Resident Inspector per SWI-O-28
- Notification to the Duty Station Manager per operations management request
- Tech Spec implementation; interpretation; and documentation of decision made, actions taken, and the basis for decisions made and actions taken

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	INITIAL CONDITIONS: • Standard IC-6 (Power must be reduced to between 1 and 2% for this scenario) • Mode: 2 • Power: POAH • Boron: (CB): 1925 ppm • Temperature: ~547°F • Pressure: ~2235 psig • Xenon: Equilibrium • Rods: “D” @ 143 • Generator: Offline	(RO/LO /SRO)	
	1. SIMULATOR SET UP: a. Set up the simulator to snapped IC or b. Set up the simulator to the standard IC chosen by the Evaluation Lead 2. Enter the malfunctions, remotes, and overrides, as specified by the "Simulator Input Summary" 3. Complete the "Simulator Setup Checklist" 4. Mark up 1C1.2, page 80 for SM approval.		

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	5. COMPLETE TURNOVER: a. "UNIT 1 LPEO / PEO TURNOVER LOG" b. PRA Printout c. Verify crew performs walk down of control boards and the reviews turnover checklists	Crew	Review the following with the off-going operator: • "Unit 1 LPEO / PEO Turnover Log" • PRA printout • Walk-down the control boards and ask questions as appropriate
Event 1 **Event 2**	6. ***Note: The students should brief this load change prior to entering the simulator to walk down the boards.*** The turbine is ready to roll up to 1800 rpm, power needs to be increased to 6% using 1C1.2, Section 5.12. 7. When power is stabilized at 6%, or at the discretion of the Lead Evaluator, then enter the N-42 power range NIS failure high malfunction ***(Relative Order 1, Trigger 1)*** ***NOTE: For the crew with 2 I-SRO's, the Lead Evaluator must direct the I-SRO who is "At The Controls", to perform the manipulations at the NI panel, while the surrogate assumes the "At The Controls" position.*** a. If requested as I&C to trip bistables, report that an I&C technician will be available in about 1 hour." b. If contacted as I&C or System Engineer to determine if it is necessary to energize the P-10		• Students should brief this evolution prior to taking the duty. • Increase power using control rods to 6% per 1C1.2. As plant stabilization actions: • Rods are already in MANUAL, therefore no AUTO rod motion will occur. 47013-0101 response • Refer to 1C51, Instrument Failure Guide. 1C51.2 N42 PRNIS fails high • Place rod control in MANUAL, maintain Tave at Tref. (Rods are already in Manual) • Adjust turbine load as necessary. • Refer to the following TS requirements: • Enter T.S. LCO 3.3.1 Condition A and Table 3.3.1-1, Functions 2a,2b,3a,3b,6,16b,16c,16d,16e. • The following actions need to be taken. • Trip bistables listed in 1C51.2 within 6 hours. • Verify P-7, P-8,P-9,P-10 are in the proper state within

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES

	bistable, state that you will write a work order
	c. Continue with the next event when N-42 is removed from service, per 1C51.2, or at the discretion of the Lead Evaluator
			6 hours. (All are already in the proper state)
			• Perform SR 3.2.4.2 within 12 hours and every 12 hours after.
			• Remove N-42 from service as follows:
			  • Place Rod Stop Bypass switch in the N42 position.
			  • Place Power Mismatch Bypass switch in the N42 position.
			  • Place Upper Section Current Comparator Defeat switch in the N42 position and verify the Upper Section Channel Defeat Light is LIT.
			  • Place Lower Section Current Comparator Defeat switch in the N42 position and verify the Lower Section Channel Defeat Light is LIT.
			  • On the Comparator and Rate Drawer, place Comparator Channel Defeat Switch in the N42 position and verify the Comparator Defeat Light is LIT.
			  • At the N42 Power Range B drawer pull the Control and Instrument Power Fuses.
			  • Verify the following annunciators are received.
			  • 47013-0101
			  • 47013-0102
			  • 47013-0201
			  • 47013-0202
			  • 47013-0203
			• Verify the following status lights are lit:
			  • 44178-0206
			  • 44178-0207
			  • 44205-0204
			• Restore Tave to Tref using control rods in one or two

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
			step increments. • Trip and concurrently verify bistables. (Bistables will not be tripped during this scenario) • Log delta-I for operable channels in ½ hour intervals on PINGP 1036. • Verify NR-45 is selected to an operable channel. • Ensure TPM is on NIS, and the remaining channels average is equal to the TPM reading. If not equal change to Calorimetric, and notify the computer group. • Notify Nuclear Engineering to perform SP-1120. • Initiate a Work Request • Verify appropriate Log Entries are made.
Event 3	8. Enter the 11 charging pump overload trip. ***(Relative Order 2, Trigger 2)*** a. If a local investigation of 11 charging pump is requested, wait 1 minute and there is damage to the belt and sheaves. b. If asked to check 13 Charging pump desurger for start of the pump, inform the operator to take 13 charging pump to pull out per C12.1 section 5.13.3 c. After a few minutes, inform the operator: "13 charging pump desurger has been checked and is at 2000 psig, 13 charging pump is ready to be returned to neutral"		C47015:0103 - 11 Charging Pump Overload Trip • Note: 12 charging pump is still running. 13 Charging Pump may be started as a plant stabilization action to maintain seal injection and charging flow to keep pressurizer level stable. With a 2 orifice alignment, 2 charging pumps are required. • Start 13 charging pump using 1C12.1, Section 5.13 • Maintain pressurizer level and seal injection flow • Determine reason for charging pump trip.

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 4	9. When the plant is stabilized following the 11 Charging Pump failure, or at the discretion of the Lead Evaluator, then perform the following: a. Come to the control room as the System Engineering Manager. b. Inform the Shift Supervisor that damage to an inspection door discovered in the CR HVAC ductwork has resulted in Engineering determining that the control room boundary is INOPERABLE.		• The Shift Supervisor should refer to TS 3.7.10, Condition B. • The Shift Supervisor should determine that the control room boundary must be restored to OPERABLE within 24 hours.
Event 5,6,7,8	*10.* When the crew has responded to the report of the Control Room Boundary being INOPERABLE, or at the discretion of the Lead Evaluator, then insert the Small Break LOCA ***(Relative Order 3, Trigger 3)***		• The crew should determine that the leak exceeds the capacity of the charging system and attempt to trip the reactor.

	11. During 1E-0
	a. If asked, perform Attachment J of 1E-0. (Relative Order 5) Wait 5 minutes and report back that the MSR's are isolated and the Turbine Building Roof Exhausters are stopped.
	b. If asked as an extra operator, do NOT take Attachment L until the manual Containment Isolation is performed and the feedwater and condensate pumps are tripped. After this is done, then an extra instructor can complete Attachment L.
			1E-0, Reactor Trip or Safety Injection.
			• Manually trip the reactor.
			  • The C Panel trip switch will NOT work.
			  • The B trip switch will trip the reactor.
			• Verify turbine trip.
			• Check both safeguards buses energized.
			• Check if SI is required.
			  o SI should have been manually or automatically actuated by this time.
			• Verify status of equipment on Attachment L
			• A manual Containment Isolation must be performed.
			Critical Task: Manually actuate/Align CI valves so that at least one valve is closed in each penetration before the end of the scenario.

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES

			Note: Both Feedwater Pumps and 11 Condensate Pump must be tripped during the performance of Attachment L.
			• Verify >200 gpm total AFW flow & AFW pump pressure >900 psig
			• Check SG NR levels greater than 5%.
			• Control feed flow to maintain levels between 5 and 50%.
			• Check RCS temperatures stable at or trending to 547F if any RCP running.
			  • AFW flow may be throttled to 200 gpm at this time since temperature is still trending down.
			  • No steam is being dumped at this time.
			• Check PRZR PORVs and Spray Valves closed.
			• Check if RCPs should be stopped. RCPs do not need to be stopped.
			• Diagnose LOCA and transition to 1E-1.

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
			1E-1, Loss of Reactor or Secondary Coolant. • Check if RCPs should be stopped. (RCPs do not need to be stopped) • Check if SGs are not faulted. (No faulted SG exists.) • Check intact SG levels. • Check Secondary Radiation normal. • Check PORVs closed. • Check Block Valves, at least one open. • Reset SI • Reset Containment Isolation. • Establish Instrument Air to Containment • Check Power Supplies to Charging Pumps – Offsite Power Available. • Check if Charging Flow has been established. • Establish Charging Flow as required. • Check if SI flow should be terminated. • If criteria are met, transition to 1ES-0.2

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	12. If asked as Unit 2, tell the Shift Supervisor that you will stop both D1 and D2 EDGs. ***13.*** If asked as Unit 2, tell the Shift Supervisor that you will secure 12 DDCLP ***(Relative Order 6, Trigger 6)*** 14. Terminate scenario at the direction of the Lead Evaluator (When crew makes transition to 1ES-1.1 or other time at Lead Examiner's discretion).		1E-1 • Check if RHR Pumps should be stopped. • Check RCS pressure stable or decreasing. • Check pressure in both SGs – stable or increasing. • Check if diesel generators should be stopped. • Check if safeguards cooling water pumps should be stopped. • Initiate evaluation of plant status • Verify at least one train or recirculation capability. • Check Aux Bldg Radiation normal. • Start all containment dome recirculation fans. • Check if outside air can be supplied to control room. • Check radiation monitors normal. • Check Aux Bldg steam exclusion not actuated. • Open one train Control Room alternate outside air dampers. • Align CFCU Cooling Water Outlet Radiation Monitor R-16 and R-38. • Check Annulus Sump High Level Alarm OFF • Check if RCS Cooldown and Depressurization is required. • Go to 1ES-1.1
	15. Emergency Plan Classification – Classify the event per F3-2	SM	Classify the event as follows: **Alert** - Condition **SA2.1**

SIMULATOR INPUT SUMMARY							
Relative Order	**System Or Panel Drawing**	**Type**	**Code**	**Severity Or Value**	**Event Trigger**	**Timing**	**Description**
0		MALF	RP19	ON			Cond/FW Failure on SI
0	SIMRP02	MALF	RP05	ON			Containment Isolation Failure
0		MALF	RP02A	ON			Automatic Reactor Trip Failure
0		MALF	RP02B	ON			Automatic Reactor Trip Failure
0		DI	DI-46450RS	ON			Failure of C Panel Trip Switch
0		DI	DI-46450T	OFF			Failure of C Panel Trip Switch
1	SIMNI03	MALF	NI06B	100	1		N-42 Upper Detector HI failure
2	SIMVC01B	MALF	VC04A		2		11 Charging Pump Overload Trip
3	SIRC02A	MALF	RC07A	0.1	3	60 sec ramp	A loop cold leg LOCA
5		CAEP	ATT E-0	Execute			Auto completion of Att J of E-0
6	SIMCL01C	REMOTE	CL107	STOP	6		Local Shutdown 12 DDCLP
6	SIMCL01C	REMOTE	CL108	STOP	6		Local Shutdown 22 DDCLP

SIMULATOR SETUP CHECKLIST Use Standard IC

Before Training

_____ Simulator in Training Load

_____ Step Counters ON

_____ Alarm sound ON

_____ Recorder power ON

_____ 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, CV-4 @ 0

_____ Feedwater Reg Valve placard updated to A @ 8/10, B @ 10/12.

_____ BOC ΔI sheet displayed on C Panel.

_____ Boric Acid/RMU integrators set to BA:3 RMU:10 and reset.

_____ Placard on CVCS Letdown panel updated boron: 1928 ppm

_____ Turbine reference/setter positions: 0/0

_____ Reactivity Guidance placard updated to BA: 4.5 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 TPM screen displayed, NIS

_____ SP data

SP1: Top – 1T0499A

Bottom – 1U1613

SP2: Top- 1Q0430A

Bottom – 1V4501A or 1P0480A

_____ Pens/Paper/Markers available on the simulator

_____ Turnover sheet/LCO log/PRA sheet

_____ Log in on floor PCs using user ID: pitrgsim

_____ 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"

Procedures to be used during scenario are cleaned of any place keeping marks

_____ C12.1
_____ 1C3 AOP3
_____ SWI-O-28
_____ TS 3.2.4
_____ TS SR 3.2.4.2
_____ TRM 3.2.1
_____ H24.1
_____ E-0
_____ E-1
_____ ES-0.2
_____ F3-2
_____ C51.2, N42 Failed High
_____

_____ C47012:0504
_____ C47013:0101
_____ C47013:0102
_____ C47013:0103
_____ C47013:0205
_____ C47013:0401
_____ C47013:0403
_____ C47013:0503
_____ C47015:0103
_____ C47015:0206
_____ C47013:0207
C47015:0306
1C1.2

After Training for the Day

Tags removed and put away

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

Procedures cleaned and put away.

_____ • Use procedure list above.
_____ • All books, note pads, and calculators 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.

UNIT 1 LPEO / PEO TURNOVER LOG

DATE: DAY/NIGHT SHIFT: Day

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

SAFEGUARDS EQUIPMENT OOS/TECH SPEC REQUIRED ACTION STATEMENTS	
None	
PROTECTED EQUIPMENT	
None	
RAD MONITORS OOS	**ANNUNCIATORS OOS**
None	None
OUTSTANDING SP'S	**FIRE DET / PROT EQP IMPAIRMENTS**
None	None
OTHER EQUIPMENT OOS / STATUS	
None	
MAJOR EQUIPMENT REPAIRED / RETURNED TO SERVICE	
None	
OPERATIONAL PLANS FOR COMING SHIFT	
Raise power to 6% per 1C1.2.	
NEW PROCEDURES / INSTRUCTIONS	
None	

WATCHSTANDERS LPEO: Schmidt **PEO:** Markham

LPEO Relieved By: _____ **Time:** _____ **Date:** _____

PEO Relieved By: _____ **Time:** _____ **Date:** _____

CB WALKDOWN → LPEO: _____ **Time:** _____

→ PEO: _____ **Time:** _____

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	No
2.	The scenario identifies key parameter response, expected alarms, and automatic actions associated with the induced perturbations. (This action applies to all SEG's new or revised for those on the ANS/ANSI-3.5-1998 standard. This action is NOT applicable for those on the ANS/ANSI-3.5-1985 standard.)	Yes	No
3.	The scenario content adequately addresses the desired tasks, through simulator performance, instructor-led training freezes, or both.	Yes	No
4.	Plant PRA initiating events, important equipment, and important tasks are identified.	Yes	No
5.	Turnover information includes a Daily At Power or Shutdown Safety Risk Assessment.	Yes	No
6.	The scenario contains procedurally driven success paths. Procedural discrepancies are identified and corrected before training is given.	Yes	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.	Yes	No
8.	The scenario includes related industry experience.	Yes	No
9.	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

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

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.

1.	The desired initial condition(s) could be achieved.	Yes	No
2.	All malfunctions and other instructor interface items were functional and responded to support the simulator scenario.	Yes	No
3.	All malfunctions and other instructor interface items were initiated in the same sequence described within the simulator scenario.	Yes	No
4.	All applicable acceptance criteria were met for procedures that were used to support the simulator scenario.	Yes	No
5.	During the simulator scenario, observed changes corresponded to expected plant response.	Yes	No
6.	Did the scenario satisfy the learning or examination objectives without any significant simulator performance issues, or deviations from the approved scenario sequence? If learning objective(s) could not be satisfied, identify the objectives in the Simulator Action Request	Yes	No
7.	Evaluation: The simulator is capable of being used to satisfy learning or examination objectives without exceptions, significant performance discrepancies, or deviation from the approved scenario sequence.	Yes	No

Discrepancies noted (Check “none” or list items found) ☐ None
SMAR = Simulator Action Request

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

Comments:_____

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

Appendix D, Rev. 9 **Scenario Outline** **Form ES-D-1**

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

Examiners: _____ _____

Operators:
SRO _____
ATC _____
BOP _____

Initial Conditions: Unit 1 is at 24% power. No equipment is out of service.

Turnover: Raise power to 100%

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R (SRO,ATC) N (BOP)	Raise power by 5% per 1C1.4
2	RX202	I (SRO,ATC)	Pressurizer Pressure Instrument Fails High (TS LCO)
3	FW27A	C (SRO,BOP)	Feedwater Flow Control Valve FCV-466 Fails Closed – Must be Manually Reopened
4	NI05D	I (SRO,ATC)	Power Range N44 fails low (TS LCO)
5	TC11A	C (SRO,BOP)	Turbine Fails to Automatically Trip.
6	MS01A	M (ALL)	11 Main Steam Line Break Inside Containment
7	RP08A	C(SRO,BOP)	Failure of Safeguards Actuation Train A to Automatically Actuate.
8	FW25A	C (SRO,BOP)	Feedwater Flow Control Valve FCV-466 Fails to Automatically Close on a FW Isolation Signal

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

SIMULATOR EXERCISE GUIDE (SEG)

SITE : PRAIRIE ISLAND **SEG # 2007 NRC SPARE SCENARIO**

SEG TITLE: 2007 NRC SPARE SCENARIO **# : REV. # 0**

PROGRAM: INITIAL LICENSE OPERATOR TRAINING **# : FL-ILT**

COURSE: INITIAL LICENSE OPERATOR TRAINING **# : FL-ILT**

TOTAL TIME: 1.5 HOURS

Additional site-specific signatures may be added as desired.

Developed by:	**Bill Markham** *Instructor*	**07/09/07** *Date*
Reviewed by:	**Travis Ouret** *Instructor* *(Simulator Scenario Development Checklist)*	**07/09/07** *Date*
Validated by:	**Bill Markham** *Validation Lead Instructor* *(Simulator Scenario Validation Checklist)*	**07/09/07** *Date*
Approved by:	**Travis Ouret** *Training Supervision*	**07/15/07** *Date*

Guide Requirements

Goal of Training:

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

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

Learning Objectives:

1. During all plant operating conditions, demonstrate the ability to perform communications, verification practices (STAR and peer checks), procedure use, alarm response, reactivity control, and crew briefs in accordance with Operations Standards and Expectations.
2. Increase power from 24% to 29% using 1C1.4, Unit 1 Power Operation.
3. Diagnose and perform corrective actions for a Pressurizer Pressure Channel failure (high) per C51.
4. Diagnose and take corrective action for a failed closed Feedwater Regulating Valve per C47.
5. Diagnose and take corrective action for an NIS failure per 1C51.
6. Diagnose and take corrective action for a Main Steam Line Break per 1E-0, 1E-1, and 1E-2.
7. Diagnose and take corrective actions for an automatic turbine trip failure per 1E-0.
8. Diagnose and take corrective action for a failure of Safeguards Actuation Train A to automatically actuate per 1E-0.
9. Diagnose and take corrective action for Feedwater Flow Control Valve FCV-466 failing to close on a FW Isolation signal.

Prerequisites: None

Training Resources:

1. Full Scope Simulator
2. Lead Evaluator
3. Booth Operator
4. Backup Communicator

References:

1. 1C1.4, Unit 1 Power Operation
2. 47012-0408, Pressurizer Hi/Lo Pressure Channel Alert
3. 1C51.3, Instrument Failure Guide.
4. TS 3.3.1, Condition A, Table 3.3.1-1, Functions 6, 8a, 8b

	5. TS 3.3.3, Condition A, Table 3.3.2-1, Function 1d **6.** TS LCO 3.4.1.a **7.** 47010-0601, 11 Main Feed Reg Valve Closed **8.** 47013-0203, PR Channel Deviation **9.** 1C51.4, Instrument Failure Guide **10.** 1E-0, Reactor Trip and Safety Injection. **11.** 1E-1, Loss of Reactor or Secondary Coolant. **12.** 1E-2, Faulted Steam Generator Isolation **13.** 1FR-P.1
Commitments:	**1.** None
Evaluation Method:	This is an evaluation scenario
Operating Experience:	None
Related PRA Information:	**Initiating Event with Core Damage Frequency:** Normal Transient (4%) **Important Components:** Reactor Protection **Important Operator Actions with Task Number:** None

QUANTITATIVE ATTRIBUTES

Normal Evolutions:

1. Increase power from 24% to 29% using 1C1.4, Unit 1 Power Operation.

Malfunctions:

Before EOP Entry:

1. Pressurizer Pressure Instrument (PT-431) Fails High.
2. Feedwater Flow Control Valve FCV-466 Fails Closed.
3. Power Range N44 Fails Low

After EOP Entry:

1. Failure of the Turbine to Automatically Trip.
2. Failure of Safeguards Actuation Train A to Automatically Actuate.
3. Failure of Feedwater Flow Control Valve to Automatically Close.

Abnormal Events:

1. Pressurizer Pressure Instrument Fails High.
2. Closed.Feedwater Flow Control Valve Fails
3. Power Range N44 Fails Low.

Major Transients:

1. Main Steam Line Break.

Critical Tasks:

1. Trip the turbine during the performance of 1E-0.
2. Isolate the faulted steam generator prior to transitioning out of 1E-2.

SCENARIO OVERVIEW:

Initial Conditions:

- The plant is at 24% power. No equipment is out of service.

Event 1: Raise reactor power from 24% to 29% power per 1C1.4.

- The plant is at 24% power and the crew will continue to raise power at 0.5%/minute per 1C1.4, Unit 1 Power Operation.

Event 2: Pressurizer Pressure Instrument (PT-431) Fails High.

- Both Pressurizer Spray Valves open.
- The crew must take the valves to manual and close them.
- The channel is removed from service per C51.2

Event 3: Feedwater Flow Control Valve FCV-466 Fails Closed.

- FCV-466 fails closed.
- The crew can manually reopen the valve from the control board.

Event 4: Power Range N-44 Fails Low.

- Power Range NI N-44 fails low
- The crew will respond per 1C51.4 to remove the instrument from service.

Event 5: Main Steam Line Break

- A Main Steam Line Break in Containment occurs.
- The crew will respond using 1E-0, 1E-2, 1E-1, and 1FR-P.1

Event 6: Turbine Fails to Automatically Trip

- Following the Main Steam Line Break, the Turbine fails to automatically trip.
- The turbine must be tripped from the Control Board.

Event 7: Failure of Safeguards Actuation Train A.

- Safeguards Actuation Train A Fails to automatically actuate.
- The crew must actuate Safeguards Actuation Train A from the Control Board.

Event 8: Feedwater Flow Control Valve FCV-466 Fails to Automatically Close.

- FCV-466 fails to automatically close on a FW Isolation signal and must be manually closed from the control boards.

TASKS ASSOCIATED WITH SIMULATOR EXERCISE(S):

N/A

General Expectations

Over the duration of the scenario, monitor crew performance for adherence to the conduct of operations standards and Operations department Standards and Expectations:

- Communications
- Verification Practices (STAR and Peer Checks)
- Procedure Use
- Alarm Response
- Reactivity Control
- Crew Briefs

Performance for adherence to administrative procedural requirements and operations management expectations:

- Reportability of the malfunction or event
- Notifications to the Operations Manager and NRC Resident Inspector per SWI-O-28
- Notification to the Duty Station Manager per operations management request
- Tech Spec implementation; interpretation; and documentation of decision made, actions taken, and the basis for decisions made and actions taken

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	INITIAL CONDITIONS: • IC-13 • Mode: 1 • Power: 24% • Boron: (CB): 130 ppm • Temperature: 549°F • Pressure: 2235 psig • Xenon: Increasing • Rods: Manual Control • Generator: Online		
	1. SIMULATOR SET UP: a. Set up the simulator to IC-13. 2. Enter the malfunctions, remotes, and overrides, as specified by the "Simulator Input Summary" 3. Complete the "Simulator Setup Checklist" 4. Mark up 1C1.4, through step 5.1.14.		
	5. COMPLETE TURNOVER: a. “UNIT 1 LPEO / PEO TURNOVER LOG” b. PRA Printout c. Verify crew performs walk down of control boards and the reviews turnover checklists	CREW	Review the following with the off-going operator: • “Unit 1 LPEO / PEO Turnover Log” • PRA printout • Walk-down the control boards and ask questions as appropriate

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 1 **Event 2**	6. ***Note: The students should brief this load change prior to entering the simulator to walk down the boards.*** The plant is at 24% power, and ready to increase power to 29% using 1C1.4 Section 5.1.12 7. When power is stabilized at 29%, or at the discretion of the Lead Evaluator, then enter the Pressurizer Pressure Instrument PT-431 high failure. ***(Relative Order 1, Trigger 1)*** a. If requested as I&C to trip bistables, report that an I&C technician will be available in about 1 hour. b. Continue with the next event when PT-431 is removed from service, per 1C51.3, or at the discretion of the Lead Evaluator	CREW	• Students should brief this evolution prior to taking the duty. • Increase power to 29% using control rods and dilutions. As plant stabilization actions: • Both Pressurizer Spray Valves will go full open. The crew must place both spray valves in manual and close OR take the master pressure controller to manual and reduce demand to zero. 47012-0408 response • Check pressurizer pressure high or low • Restore pressure to normal through use of heaters or sprays. • Refer to 1C51, Instrument Failure Guide. 1C51.3 Pressurizer Pressure 1P-431 = High • If the blue channel is selected on the PRZR Pressure Control Selector Switch, then: • Place Pressurizer Pressure Controller in MANUAL and stabilize pressure. • Select position “2-1” (WHITE-RED) on channel selector switch. • When pressure returns to normal with no deviation from setpoint, then return pressure control to automatic. • Verify Pressurizer Pressure Recorder not selected to Blue Channel • Refer to the following TS requirements: • T.S. LCO 3.3.1 Condition A and Table 3.3.1-1, Functions 6, 8a, 8b • T.S. LCO 3.3.2, Condition A and Table 3.3.2-1, Function 1d. • T.S. LCO 3.4.1.a • Initiate Work Request to repair instrument.

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
			• Verify appropriate log entries completed.
Event 3	8. When the plant is stabilized and/or at the discretion of the Lead Evaluator, then enter the malfunction to fail Feedwater Flow Control Valve FCV-466 closed. ***(Relative Order 2, Trigger 2)*** ***NOTE: When the crew takes FCV-466 to manual IMMEDIATELY DELETE TRIGGER 2.*** a. If a local investigation of FCV-466 is requested, wait 1 minute and report that there is nothing unusual about the valve other than it is closed. b. If contacted as the FIN Team Supervisor or Maintenance Supervisor, report that you will write a Work Order and investigate the failure.	CREW	• As a plant stabilization action, the crew should take FCV-466 to manual and restore to its position documented on the FW Control Valve position placard. C47010-0601 – 11 Main FW Reg Valve Closed • If Valve Indicates CLOSED, then take manual control and open valve. • Effect necessary repairs and return system to normal.
Event 4	**9.** When the plant is stabilized following the Feedwater Flow Control Valve FCV-466 failure, and/or at the discretion of the Lead Evaluator, then insert the failure of Power Range N-44 low. ***(Relative Order 3, Trigger 3)*** a. If requested as I&C to trip bistables, report that an I&C technician will be available in about 1 hour." b. If contacted as I&C or System Engineer to determine if it is necessary to energize the P-10 bistable, state that you will write a work order	CREW	As plant stabilization actions: • Rods are already in MANUAL, therefore no AUTO rod motion will occur. 47013-0101 response • Refer to 1C51, Instrument Failure Guide. 1C51.4 N-44 PRNIS fails low • Place rod control in MANUAL, maintain Tave at Tref. (Rods are already in Manual) • Adjust turbine load as necessary. • Refer to the following TS requirements: • Enter T.S. LCO 3.3.1 Condition A and Table 3.3.1-1, Functions 2a,2b,3a,3b,6,16b.1,16c,16d,16e. • The following actions need to be taken. • Trip bistables listed in 1C51.4 within 6 hours. • Verify P-7, P-8,P-9,P-10 are in the proper state within

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES

			6 hours. (All are already in the proper state)
			• Perform SR 3.2.4.2 within 12 hours and every 12 hours after.
			• Remove N-44 from service as follows:
			  • Place Rod Stop Bypass switch in the N44 position.
			  • Place Power Mismatch Bypass switch in the N44 position.
			  • Place Upper Section Current Comparator Defeat switch in the N44 position and verify the Upper Section Channel Defeat Light is LIT.
			  • Place Lower Section Current Comparator Defeat switch in the N44 position and verify the Lower Section Channel Defeat Light is LIT.
			  • On the Comparator and Rate Drawer, place Comparator Channel Defeat Switch in the N44 position and verify the Comparator Defeat Light is LIT.
			  • At the N44 Power Range B drawer pull the Control and Instrument Power Fuses.
			  • At the N44 Power Range A drawer pull the Control and Instrument Power Fuses.
			  • Verify the following annunciators are received.
			  • 47013-0101
			  • 47013-0102
			  • 47013-0201
			  • 47013-0202
			  • 47013-0203
			
			• Verify the following status lights are lit:
			  • 44178-0406
			  • 44178-0407

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
			• 44205-0404 • Restore Tave to Tref using control rods in one or two step increments. • Trip and concurrently verify bistables. (Bistables will not be tripped during this scenario) • Log delta-I for operable channels in ½ hour intervals on PINGP 1036. • Verify NR-45 is selected to an operable channel. • Ensure TPM is on NIS, and the remaining channels average is equal to the TPM reading. If not equal change to Calorimetric, and notify the computer group. • Notify Nuclear Engineering to perform SP-1120 (Not applicable at this power level) • Initiate a work request. • Verify appropriate Log Entries are made.
Event 5,6,7,8	*10.* When the crew has responded to the previous event, or at the discretion of the Lead Evaluator, then insert the main Steam Line Break ***(Relative Order 4, Trigger 4)*** ***Note: The break ramps in over 2 minutes, the crew should assess the situation and should be able to order a manual reactor trip and safety injection prior to the automatic signals occurring.***	CREW	• Diagnose the main steam line break inside containment. • Order a manual reactor trip and safety injection OR respond to an automatic reactor trip and safety injection.
	11. During 1E-0 **a. If asked, perform Attachment J of 1E-0. (Relative Order 5) Wait 5 minutes and report back that the MSR's are isolated and the**	CREW	1E-0, Reactor Trip or Safety Injection. • Verify reactor trip • Manually trip the turbine. ***Critical Task: Trip the turbine during the performance***

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	Turbine Building Roof Exhausters are stopped. **b. If asked as an extra operator, do NOT take Attachment L until the Turbine is tripped, Safeguards Actuation Train A is actuated, and Flow Control Valve FCV-466 is closed.**		***of 1E-0.*** • Verify both safeguards buses energized. • Check if SI is required. o **SI should have been manually or automatically actuated by this time.** • Verify status of equipment on Attachment L • **Safeguards Actuation Train A will have to be manually actuated using the Manual Safety Injection and Manual Containment Isolation pushbuttons.** • **Flow Control Valve FCV-466 will have to be manually closed.** • Verify >200 gpm total AFW flow & AFW pump pressure >900 psig • Check SG NR levels greater than 5%. • Control feed flow to maintain levels between 5 and 50%. • Check RCS temperatures stable at or trending to 547F if any RCP running. • AFW flow may be throttled to 200 gpm at this time since temperature is still trending down. • No steam is being dumped at this time. • Check PRZR PORVs and Spray Valves closed. • Check if RCPs should be stopped. RCP's should be tripped due to low pressure in the RCS. • Diagnose Main Steam Line Break and transition to 1E-2, Faulted Steam Generator

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
			Isolation.
		CREW	1E-2, Faulted Steam Generator Isolation. • Check if MSIV and Bypass Valve on 11 SG – Closed. • Check if either SG is NOT faulted. • Identify Faulted SG – 11 SG • Isolate the faulted SG o Isolate 11 Main Feedline o Isolate AFW Flow o Close Steam Supply to TD AFW Pump o Verify SG PORV – Closed o Verify SGB Isolation Valve – Closed • Check CST level – greater than 10,000 gallons. • Check Secondary Radiation o Initiate periodic activity samples of both SGs. o Secondary Radiation - NORMAL • Go to 1E-1, Loss of Reactor or Secondary Coolant. 1E-1, Loss of Reactor or Secondary Coolant. **Note: A parallel path using 1FR-P.1 is presented beginning on the next page. Depending upon how quickly the crew proceeds through the EOP set, a Red Path on Integrity may occur. If this is the case, follow the 1FR-P.1 response beginning on the next page.** **Note: SI Termination Criteria will be reached during**

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
			the performance of 1E-1, the SS should use the Information Page and transition to 1ES-0.2 SI Termination when all criteria are met. • Check if RCPs should be stopped – RCPs are already stopped. • Check if SGs are not faulted. – 1E-2 has already been performed, so will not transition at this point. • Check intact SG levels o Narrow range levels greater than 5% o Control feed flow to maintain NR levels between 5 and 50%. • Check Secondary Radiation – NORMAL • Check PRZR PORVs and Block Valves • Power available to Block Valves o PRZR PORVs closed. o Block Valves – At least one open. • Reset SI • Reset Containment Isolation • Establish Instrument Air to Containment • Check Power Supply to Charging Pumps – Offsite Power Available. • Check Charging Flow Established. • Check if SI Flow should be terminated. **NOTE: By this time, RCS pressure should have recovered to allow SI termination.**

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
			• Transition to 1ES-0.2, SI Termination. **Alternate path using 1FR–P.1** • Check RCS Temperatures – STABLE OR INCREASING. ▪ Attempt to stop RCS cooldown ▪ Verify SG PORVs closed. ▪ Verify steam dump valves closed. ▪ Control feed flow to non-faulted SG(S) to stop RCS cooldown. ▪ Minimize cooldown from faulted SG(s) ▪ Verify SG MISV and bypass valve closed for each faulted SG. ▪ Close steam supply valve from faulted SG(s) to TD AFW Pump ▪ Isolate all FW to faulted SG unless necessary for RCS temperature control. • Check PRZR PORV Block Valves ▪ Power available to block valves ▪ At least one open. • Check if PRZR PORVs shold be closed. ▪ OPPS is NOT in service, go to step 4d. ▪ Check PRZR pressure less than 2335 psig. ▪ Check PORVs closed. • Check SI Pumps – Any running • Check if SI should be terminated

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
			▪ RCS Subcooling based on CET's greater than 85F ▪ RVLIS – full range indiation greater than 63% if no RCP is running. • Reset SI • Reset Containment Isolation. • Establish IA to Containment • Stop SI and RHR Pumps.
	12. When transition to 1ES-0.2 has been made OR SI Pumps have been stopped in FR-P.1, and/or at the discretion of the Lead Evaluator, then this scenario is complete.	SM	Classify the event as follows: **NONE**

SIMULATOR INPUT SUMMARY							
Relative Order	**System Or Panel Drawing**	**Type**	**Code**	**Severity Or Value**	**Event Trigger**	**Timing**	**Description**
0		MALF	RP08A	ON			Failure of Safeguards Actuation Train A
0		MALF	FW25A	ON			Feedwater Flow Control Vavle FCV-466 Fails to Automatically Close on a FW Isolation Signal
0		MALF	TC11A	ON			Automatic Turbine Trip Failure
1		SYSTEM OVERRIDE	RX202	2500	1		Pressurizer Pressure Instrument PT-431 Fails High
2		MALF	FW27A	ON	2		Feedwater Control Valve FCV-466 Fails Closed
2a		MALF	FW27A	DELETE			Delete FW27A
3		MALF	NI06D	1	3		Power Range N-44 Fails Low
4		MALF	MS01A	50	4	2 min. ramp	11 Main Steam Line Break
5		CAEP	ATT E-0	Execute			Auto completion of Att J of E-0

SIMULATOR SETUP CHECKLIST Use Standard IC

Before Training

_____ Simulator in Training Load

_____ Step Counters ON

_____ Alarm sound ON

_____ Recorder power ON

_____ 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, CV-4 @ 0

_____ Feedwater Reg Valve placard updated to A @ 8/10, B @ 10/12.

_____ BOC $\triangle$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: 129 ppm

_____ Turbine reference/setter positions: 0/0

_____ Reactivity Guidance placard updated to BA: 0.3 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 TPM screen displayed, NIS

_____ SP data

SP1: Top – 1T0499A

Bottom – 1U1613

SP2: Top- 1Q0430A

Bottom – 1V4501A or 1P0480A

_____ Pens/Paper/Markers available on the simulator

_____ Turnover sheet/LCO log/PRA sheet

_____ Log in on floor PCs using user ID: pitrgsim

_____ 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"

Procedures to be used during scenario are cleaned of any place keeping marks

_____ C12.1
_____ 1C3 AOP3
_____ SWI-O-28
_____ TS 3.2.4
_____ TS SR 3.2.4.2
_____ TRM 3.2.1
_____ H24.1
_____ E-0
_____ E-1
_____ ES-0.2
_____ F3-2
_____ C51.4, C51.3
_____ C47010:0601
_____ 1FR-P.1

_____ C47012:0504
_____ C47013:0101
_____ C47013:0102
_____ C47013:0103
_____ C47013:0205
_____ C47013:0401
_____ C47013:0403
_____ C47013:0503
_____ C47015:0103
_____ C47015:0206
_____ C47013:0207
C47015:0306
1C1.4

After Training for the Day

Tags removed and put away

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

_____ Procedures cleaned and put away.

_____ • Use procedure list above.

_____ • All books, note pads, and calculators 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.

UNIT 1 LPEO / PEO TURNOVER LOG

DATE: DAY/NIGHT SHIFT: Day

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

SAFEGUARDS EQUIPMENT OOS/TECH SPEC REQUIRED ACTION STATEMENTS	
None	
PROTECTED EQUIPMENT	
None	
RAD MONITORS OOS	**ANNUNCIATORS OOS**
None	None
OUTSTANDING SP'S	**FIRE DET / PROT EQP IMPAIRMENTS**
None	None
OTHER EQUIPMENT OOS / STATUS	
None	
MAJOR EQUIPMENT REPAIRED / RETURNED TO SERVICE	
None	
OPERATIONAL PLANS FOR COMING SHIFT	
Raise power using 1C1.4	
NEW PROCEDURES / INSTRUCTIONS	
None	

WATCHSTANDERS LPEO: Schmidt **PEO:** Markham

LPEO Relieved By: _____ **Time:** _____ **Date:** _____

PEO Relieved By: _____ **Time:** _____ **Date:** _____

CB WALKDOWN → LPEO: _____ **Time:** _____

→ PEO: _____ **Time:** _____

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	No
2. The scenario identifies key parameter response, expected alarms, and automatic actions associated with the induced perturbations. (This action applies to all SEG's new or revised for those on the ANS/ANSI-3.5-1998 standard. This action is NOT applicable for those on the ANS/ANSI-3.5-1985 standard.)	Yes	No
3. The scenario content adequately addresses the desired tasks, through simulator performance, instructor-led training freezes, or both.	Yes	No
4. Plant PRA initiating events, important equipment, and important tasks are identified.	Yes	No
5. Turnover information includes a Daily At Power or Shutdown Safety Risk Assessment.	Yes	No
6. The scenario contains procedurally driven success paths. Procedural discrepancies are identified and corrected before training is given.	Yes	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.	Yes	No
8. The scenario includes related industry experience.	Yes	No

9. 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

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

2007 NRC SPARE SCENARIO, 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.

1. The desired initial condition(s) could be achieved.	Yes	No
2. All malfunctions and other instructor interface items were functional and responded to support the simulator scenario.	Yes	No
3. All malfunctions and other instructor interface items were initiated in the same sequence described within the simulator scenario.	Yes	No
4. All applicable acceptance criteria were met for procedures that were used to support the simulator scenario.	Yes	No
5. During the simulator scenario, observed changes corresponded to expected plant response.	Yes	No
6. Did the scenario satisfy the learning or examination objectives without any significant simulator performance issues, or deviations from the approved scenario sequence? If learning objective(s) could not be satisfied, identify the objectives in the Simulator Action Request	Yes	No
7. Evaluation: The simulator is capable of being used to satisfy learning or examination objectives without exceptions, significant performance discrepancies, or deviation from the approved scenario sequence.	Yes	No

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.