NEXTera ENERGY NUCLEAR FLEET	SIMULATOR EXERCISE GUIDE	SEG

SITE: **Point Beach** **Revision #:** **0**

LMS ID: **PBN LOI NRC 15E** **LMS Rev. Date:**

SEG TITLE: **2017 NRC Exam Scenario 1**

SEG TYPE: ☐ **Training** ☒ **Evaluation**

PROGRAM: ☐ **LOCT** ☒ **LOIT** ☐ **Other:**

DURATION: **90 minutes**

Developed by: _____ _____
Instructor/Developer Date

Reviewed by: _____ _____
Instructor (Instructional Review) Date

Validated by: _____ _____
SME (Technical Review) Date

Approved by: _____ _____
Training Supervision Date

Approved by: _____ _____
Training Program Owner (Line) Date

Facility: Point Beach Scenario No.: 1 Op-Test No.: 2017

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: Unit 1 is at approximately 100%. Unit 2 is on ice melt. 1PT-950, Loop B Containment Pressure has been removed from service. Repairs are expected to be complete during the upcoming refueling outage. 1W-3B, Control Rod Shroud Fan is OOS due to imminent motor failure.

Turnover: Normal Shift routine. Lower power utilizing OP 3A, Power Operation to Hot Standby at 30%/hr in preparation for refueling outage

Event No.	Malf. No.	Event Type*	Event Description
1	XMT1CNM014A	I-BOP I-SRO TS-SRO	1PT-947, Loop A Containment Pressure Transmitter fails low
2	CNH1CFW003F	I-BOP I-SRO	1PC-2273, Feedwater Heater Emergency Bypass Valve Controller oscillates in automatic
3	XMT1AFW005A	TS-SRO	0LT-4040, T-24A CST Level Transmitter fails low
4	ANN-C02D-A09	R-RO N-BOP R-SRO	1X01, Main Transformer loss of cooling (rapid down power)
5	CNH1PCS004F	C-RO C-SRO	1P-2A, Auto Charging Pump controller oscillation failure
6	MAL1RCS001	M-ALL	Large Break LOCA
7	BKR1RHR001 MOT1RHR002	C-BOP	1P-10A, RHR pump fails to start in Auto 1P-10B, RHR pump trips upon starting
8	RLY1PPL020 RLY1PPL021	C-BOP	Containment Spray fails to actuate, manual alignment required.

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

SIMULATOR EXERCISE GUIDE REQUIREMENTS

Terminal Objective

Given specific plant conditions, the students will be able to respond to the failures listed below in accordance with plant procedures:

1. 1PT-947, Loop B Containment Pressure Transmitter failing low / removing from service
2. 1PC-2273, Feedwater Heater Emergency Bypass Valve Controller oscillating in automatic only
3. 0LT-4040 Condensate Storage Tank Level transmitter fails low
4. 1X-01, Main Transformer loss of cooling
5. Auto charging pump controller oscillating in automatic only
6. Instantaneous Large Break LOCA
7. RHR pump failures
   a. 1P-10A, RHR pump failing to auto start
   b. 1P-10B, RHR pump tripping
8. Containment Spray failing to actuate

Embedded within these events is the expectation to properly utilize Technical Specifications.

Enabling Objectives:

None

Prerequisites:

1. Simulator available
2. Students enrolled in Initial License Program

Training Resources:

1. Floor Instructor as Shift Manager / Shift Technical Advisor
2. Simulator Booth Operator
3. Communicator
4. NRC Evaluators

References:

1. 0-SOP-IC-001 BLUE, Routine Maintenance Procedure Removal Of Safeguards Or Protection Sensor From Service – Blue Channels
2. 0-SOP-IC-002, Technical Specifications LCO – Instrument Cross Reference
3. AOP-1D Unit 1, Chemical And Volume Control System Malfunction
4. AOP-2B Unit 1, Feedwater System Malfunction
5. AOP-17A Unit 1, Rapid Power Reduction
6. AOP-24, Response to Instrument Malfunctions
7. ARP C02 D 1-9, 1X-01 Main Trans Loss Of Cooling
8. ARP C01 A 2-9, T-24A or B Condensate Storage Tanks – Level High or Low
9. CSP-P.1 Unit 1, Response To Imminent Pressurized Thermal Shock Condition
10. EOP-0 Unit 1, Reactor Trip Or Safety Injection

11. EOP-1 Unit 1, Loss Of Reactor Or Secondary Coolant
12. EOP-1.3 Unit 1, Transfer To Containment Sump Recirculation, Low Head Injection
13. OM 3.7, AOP And EOP Procedure Usage For Response To Plant Transients
14. OP-3A Unit 1, Power Operation To Hot Standby Unit 1
15. RMS Alarm Setpoint And Response Book
16. Technical Specifications

Protected Content: **None**

Evaluation Method: Simulator performance will be evaluated in accordance with NUREG 1021.

Operating Experience: N/A

Risk Significant Operator Actions: HEP-RHR-EOP13-LL, OPS FAIL TO ALIGN SI FLOR LOW CONT SUMP RECIRC (LLOCA/MLOCA), FV: 4.46E-03

UPDATE LOG: Indicate in the following table any minor changes or major revisions (as defined in TR-AA-230-1003) made to the material after initial approval. Or use separate Update Log form TR-AA-230-1003-F16.

#	DESCRIPTION OF CHANGE	REASON FOR CHANGE	AR/TWR#	PREPARER REVIEWER	DATE DATE
Rev. 0	Developed for 2017 NRC ILT Exam.				

OVERVIEW / SEQUENCE OF EVENTS

OVERVIEW

- Unit 1 is at approximately 100% EOL, Unit 2 is on ice melt.
  - 1PT-950, Loop B Containment Pressure has been removed from service. Repairs are expected to be complete during the upcoming refueling outage.
  - 1W-3B, Control Rod Shroud Fan is OOS due to imminent motor failure.
- Normal Shift routine will be to lower power at 30%/hr utilizing OP-3A Unit 1, Power Operation To Hot Standby Unit 1.
- Events:
  - 1PT-947, Loop A Containment Pressure Transmitter fails low
  - 1PC-2273, Feedwater Heater Emergency Bypass Valve Controller oscillates in automatic
  - 0LT-4040 Condensate Storage Tank Level transmitter fails low
  - 1-X01, Main Transformer loss of cooling
  - 1HC-428A, 1P-2A, Charging Pump Hand Controller oscillates in auto
  - Large Break LOCA
  - RHR pump malfunctions
    - 1P-10A, RHR Pump fails to auto start
    - 1P-10B, RHR Pump trips
  - Containment Spray fails to actuate

- Terminate the scenario when crew has completed Step 21 of EOP-1.3 Unit 1, Transfer To Containment Sump Recirculation – Low Head Injection and is waiting for RWST level to lower to 34%.

SEQUENCE OF EVENTS

Event #	Description
1.	**1PT-947, Loop A Containment Pressure Transmitter fails low** Once the crew has taken the shift, 1PT-947, Loop A Containment Pressure Transmitter fails low. • The crew should implement AOP-24, Response to Instrument Malfunctions and take the channel out of service in accordance with 0-SOP-IC-001 BLUE, ROUTINE MAINTENANCE PROCEDURE REMOVAL OF SAFEGUARDS OR PROTECTION SENSOR FROM SERVICE. • Address Technical Specifications.
2.	**1PC-2273, Feedwater Heater Emergency Bypass Valve Controller oscillates in automatic** • After identifying the malfunction, the crew may shift 1PC-2273, Feedwater Heater Emergency Bypass Valve Controller to manual to mitigate the transient per OM 3.7, AOP and EOP Procedure Usage for Response to Plant Transients • The crew should implement AOP-2B Unit 1, Feedwater System Malfunction and lower turbine load to maintain reactor power less than 100% in accordance with AOP-17A Unit 1, Rapid Power Reduction if required. • The crew may reference and or implement AOP-24, Response to Instrument Malfunctions.
3.	**0LT-4040 Condensate Storage Tank T-24A Level Transmitter fails low** • The crew should reference ARP C01 A 2-9 and ARB C01 A 3-9 for the failed level transmitter and determine the applicable Technical Specification's Required Actions.
4.	**1-X01, Main Transformer loss of cooling** Unit 1, 1X-01, Main Transformer "B" phase incurs a loss of cooling as indicated by annunciator C02 D 1-9, 1X-01 Main Trans Loss of Cooling. • The crew should implement ARP C02 D1-9, 1X-01 Main Trans Loss of Cooling and based on field reports, begin ramping the unit off-line in accordance with AOP-17A Unit 1, Rapid Power Reduction.
5.	**1HC-428A, 1P-2A, Charging Pump Hand Controller oscillates in auto** During the load reduction, 1HC-428A, 1P-2A, Charging Pump Hand Controller oscillates in auto. • The should take manual control of 1HC-428A, 1P-2A Charging Pump Hand Controller and implement AOP-1D Unit 1, Chemical and Volume Control System Malfunction. • The crew may implement/reference AOP-24, Response to Instrument Malfunctions (not required).

6.	**Large Break LOCA** • The crew should implement EOP-0 Unit 1, Reactor Trip or Safety Injection, EOP-1 Unit 1, Loss of Reactor or Secondary Coolant and EOP-1.3 Unit 1, Transfer To Containment Sump Recirculation, Low Head Injection.

7.	**RHR pump malfunctions: 1P-10A, RHR Pump fails to auto start and 1P-10B, RHR Pump trips**
	• The crew should address the failures by starting 1P-10A, RHR Pump:
	  • After EOP-0 Unit 1 Immediate Actions are complete in accordance with OM 3.7, AOP And EOP Procedure Usage For Response To Plant Transients
	  OR
	  • EOP-0 Unit 1, ATTACHMENT A, AUTOMATIC ACTION VERIFICATION Step A3.b.RNO.

8.	**Containment Spray fails to actuate**
	• The crew should address the failures by aligning the Containment Spray System:
	  • After EOP-0 Unit 1 Immediate Actions are complete in accordance with OM 3.7, AOP And EOP Procedure Usage For Response To Plant Transients
	  OR
	  • EOP-0 Unit 1, ATTACHMENT A, AUTOMATIC ACTION VERIFICATION Step A12.a.RNO.

STOP	Terminate the scenario when crew has completed Step 21 of EOP-1.3 Unit 1, Transfer To Containment Sump Recirculation – Low Head Injection and is waiting for RWST level to lower to 34%.

SIMULATOR SET UP INSTRUCTIONS

Perform simulator set up per the site specific Simulator Setup Checklist.

General Instructions

Simulator Setup Instructions:

- Load **IC-3** and go to run
- Open the saved Event and Schedule files from the secure drive:
- Verify all commands listed in table below are contained in the Schedule File
- Insert the setup malfunction(s)
- Reposition bistable switches for: **1PT-950, Loop B Containment Pressure Transmitter**
- Make any necessary adjustments or corrections
- Freeze the simulator and save to scenario specific IC
- Re-initialize into saved IC and go to run
- Open and start the Event and Schedule files
- Open and start InSight and Alarm files for data collection
- Run the scenario real time
- Save InSight, Event, Alarm, Schedule Files to the secure drive and collect procedure markups for SBT
- Complete TR-AA-23001008-F01 Scenario Based Testing (SBT) Checklist

Multiple Use:

- Load saved IC and go to run
- Open the saved Event and Schedule files:
- Start the Schedule File
- Walk down the control boards to ensure plant conditions accurately reflect the scenario's initial conditions
- Make any necessary adjustments or corrections
- Update documentation if required
- Resave if required
- Turnover to the crew

SIMULATOR – SCENARIO SETUP:

Setup: 1PT-950, Loop B Containment Pressure Transmitter is out of service / 1W-3B, CTL Rod Drive Shroud Fan

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
XMT1CNM017A	1-PT950 LOOP B CONT PRESSURE XMTR FIXED OUTPUT				00 :00 :00	-	90	**Preload**

Simulator Setup:

1. Place OOS magnet at PT-950, Containment Pressure
2. Place a RED dot on C01 B 1-5, U1 Containment Pressure Channel Alert
3. Place 1W-3B CS in pull-out, install OOS magnet.
4. Install an orange Guarded magnet at 1W-3A.

SIMULATOR MALFUNCTIONS:

Event 1: / 1P-947, Loop A Containment Pressure Transmitter fails low

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
XMT1CNM014A	1-PT947 LOOP A CONT PRESSURE XMTR FIXED OUTPUT	00 :00 :00	00 :00 :00	1	00 :00 :00	-	-6	**SETUP**

Expected field communications:

1. None

Event 2: 1PC-2273, Feedwater Heater Emergency Bypass Valve Controller oscillates in automatic

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
CNH1CFW003F	1-PC2273 FW HTR EMER BYPASS VLV CNTRL OSC AUTO ONLY	00 :00 :00	00 :01 :00	5	00 :00 :00	-	90	**PLE**

Expected field communications:

1**.** IF directed to locally monitor Feedwater Heater level, THEN report #2 Feedwater Heater level is (was) low and that the level control system is responding in automatic to restore level.

With the controller in automatic:

- **IF** an operator is dispatched to locally investigate 1CS-2273, Feedwater Heater Emergency Bypass Valve, **THEN** after two minutes report that the valve is cycling open and close in response to the air signal being supplied.

With the controller in manual:

- **IF** an operator is dispatched to locally investigate 1CS-2273, Feedwater Heater Emergency Bypass Valve, **THEN** after two minutes report that the valve is stable (matching the control room's indication).

If directed to investigate Hydrogen Pannel alarm, report alarm is due to low pressure, caused by the secondary temperature transient. Reset the local alarm using LOA1MGA001

Event 3: 0LT-4040 Condensate Storage Tank T-24A Level Transmitter fails low

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
XMT1AFW005A	0-LT4040 COND STOR TK T24A LEVEL FIXED OUTPUT	00 :00 :00	00 :00 :03	11	00 : 00 :00	-	0	**PLE**

Expected Communications:

1. **IF** an AO is sent to locally investigate 0LT-4040, wait two minutes and **THEN** report that there doesn't seem to be anything out-of-normal locally.

Event 4: 1X-01, Main Transformer loss of cooling

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
ANN-C02D-A09	MAIN TRANS 1X01 LOSS OF COOLING	00 :00 :00	-	9	00 :00 :00	-	ON	**PLE**
LOA1CFW083	1-P99A SGFP SEAL WATER INJECT PUMP C.S.	00 :01 :00	-	11	00 :00 :00	-	ON	**PLE**
LOA1CFW084	1-P99B SGFP SEAL WATER INJECT PUMP C.S.	00 :01 :10	-	11	00 :00 00	-	ON	**PLE**

Expected field communications:

1. **IF** an AO is directed to locally investigate 1X-01, Main Transformer; wait two minutes and **THEN** report breaker 8MN in the Cooler Control Cabinet for phase B is in the tripped condition and none of the cooling units are running.
2. **IF** an AO is directed to locally start 1P-99A and 1P-99B, Main Feed Pump Seal Water Pumps; insert **Trigger 11** and **THEN** report when they are running.
3. **WHEN** the AO is directed to monitor transformer temperatures **THEN** report as follows:
   - Phase B initial temperatures: Oil = 35°C, Winding = 55°C
   - Phase B Temperatures rise about 1°C every 5 minutes
   - Phase A and C temperatures are stable, same initial temperature as B.

Event 5: 1HC-428A, 1P-2A, Charging Pump Hand Controller oscillates in auto

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
CNH1PCS004F	1-HC428A P-2A CHARGE PUMP SPEED HAND CTLR OSC AUTO ONLY	00 :00 :00	00 :00 :10	13	00 :00 :00	-	100	**PLE**

Expected field communications:

1. **IF** the PAB AO is directed to check that there are no charging pump relief valves lifting on unit 1; wait two minutes and **THEN** report that no charging pump relief valves on are lifting Unit 1.

Event 6: Large Break LOCA

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
MAL1RCS001	DBA LOCA	00 :00 :00	00 :00 :00	15	00 :00 :00	-	HOT LEG A	**PLE**
LOA1SWS048	0-SW-322 1HX-12A CC HTEXCH OUTLET	00 :04 :00	00 :00 :30	17	00 :00 :00	-	0.4	**When directed by crew**
LOA1CCW018	1-CC-744B BA EVAP HX-8A RETURN STOP VALVE	00 :07 :00	00 :00 :30	17	00 :00 :00	-	0	**When directed by crew**
LOA1CCW016	1-CC-740A NON-REGEN HX-3A&B INLET VALVE	00 :01 :00	00 :00 :30	17	00 :00 :00	-	0	**When directed by crew**
LOA1CCW021	1-CC-750A SEAL STR HX-5 INLET VALVE	00 :02 :30	00 :00 :30	17	00 :00 :00	-	0	**When directed by crew**
LOA1SIS030	1-SI-897A HANDWHEEL GAG	00 :01 :00	00 :00 :30	19	00 :00 :00	-	0	**When directed by crew**
LOA1SIS031	1-SI-897B HANDWHEEL GAG	00 :02 :00	00 :00 :30	19	00 :00 :00	-	0	**When directed by crew**

Expected field communications:

1. **WHEN** directed to locally check RW Service Water valves, LW-61 and 62, **THEN** report both valves are shut.
2. **WHEN** directed to locally check CW pump house temperature <105 ºF, wait 3 minutes and **THEN** report the temperature is 72 ºF and stable.
3. **WHEN** directed to locally check G03/G04 Switchgear Room temperature <95 ºF, wait 3 minutes and **THEN** report the temperature is 75 ºF and stable.
4. **IF** directed to periodically check the status of spent fuel cooling, wait 5 minutes and **THEN** report Spent Fuel Pool level is 63 feet, pool temperature is 67 ºF and both are stable.
5. **WHEN** directed to perform Attachment A of EOP-1.3; insert **trigger 17**, wait for the valves to finish stroking and **THEN** report that the CCW alignment is complete.
6. **WHEN** directed to locally shut 1SI-897A and B, SI Test Line Return Isolation AOVs; insert **trigger 19**, wait for the valves to finish stroking, and **THEN** report the valves are closed.

Event 7: RHR pump malfunctions: 1P-10A, RHR Pump fails to auto start and 1P-10B, RHR Pump trips

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
BKR1RHR001	1-B5212A P-10A RH REMOVAL PUMP CKTBKR	00 :00 :00	-	-	00 :00 :00	-	FAIL AUTO CL	**PRELOAD**
MOT1RHR002	P-10B RH RESIDUAL HEAT REMOVAL PUMP	00 :00 :00	-	-	00 :00 :00	-	WINDING GROUND	**PRELOAD**

Expected field communications:

1. **IF** the PAB AO is directed to check 1P-10B, RHR Pump; wait two minutes and **THEN** report that the motor is not running, discolored, hot to the touch and smells acrid. **IF** asked; **THEN** report that there is no fire.
2. **IF** an AO is directed to locally investigate breaker 1B52-21A on 1B-04 for 1P-10B, RHR Pump; wait two minutes and **THEN** report that breaker has tripped on overcurrent.

Event 8: Containment Spray fails to actuate

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
RLY1PPL020	1-CS-10X TRAIN "A" CONT SPRAY AUXILIARY	00 :00 :00	-	-	00 :00 :00	-	FAIL AS IS	**PRELOAD**
RLY1PPL021	1-CS-20X TRAIN "B" CONT SPRAY AUXILIARY	00 :00 :00	-	-	00 :00 :00	-	FAIL AS IS	**PRELOAD**

Expected field communications:

1. None

BRIEF / TURNOVER INFORMATION

- Conduct simulator crew pre-scenario brief using TR-AA-230-1007-F06, Simulator Instructor Pre-Exercise Checklist.
- Brief the scenario evaluators
- Brief surrogates using TR-AA-230-1007-F11, Surrogate Brief Checklist, if necessary.
- Crew Shift Turnover Information: See Attached

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Crew takes the watch: _____	**Normal Shift routine will be to lower power utilizing OP-3A Unit 1, Power Operation To Hot Standby Unit 1.**	CREW	Implements **OP-3A Unit 1, Power Operation To Hot Standby Unit 1,** starting at Step 5.1.9.
Event 1: **1PT-947, Loop A Containment Pressure Transmitter fails low** **Start: _____**	**Trigger 1** [XMT1CNM017A, 1-PT-947 LOOP A CONT PRESSURE XMTR FIXED OUTPUT, Value = -6, Ramp = 0 sec] After completion of crew turnover and the examinees have assumed the watch, insert **Trigger 1** to cause 1PT-947, Loop A Containment Pressure Transmitter to fail low. **Plant Response:** 1PT-947, Loop A Containment Pressure Transmitter fails low bringing in a containment pressure PPCS Alarm. **Cues:** 1C20 D 2-1, PPCS Priority Alarm Containment Pressure PPCS Alarm **Expected Communications:** None **Instructor Note:** If the crew decides to NOT remove the failed containment pressure channel from service, have the Shift Manager provide a cue directing the crew to take action to remove it from service.	BOP OS BOP OS BOP	The crew responds to the containment pressure alarm and diagnoses that alarm being due to an instrument failure. Implements **AOP-24, Response to Instrument Malfunctions** 1. Identify Failed Instrument 2 Check If Failed Instrument Is A Controlling Channel 3. Establish Manual Control As Required 4. Return Affected Parameter(s) To Desired Value(s) 5. Using Attachment A, PPCS PARAMETERS USED TO CALCULATE REACTOR THERMAL OUTPUT, Verify That Failed Instrument Is NOT An Input To RTO 6. Remove Failed Instrument Channel From Service Per 0-SOP-IC-001, ROUTINE MAINTENANCE PROCEDURE REMOVAL OF SAFEGUARDS OR PROTECTION SENSOR FROM SERVICE 7. Return Controls To Automatic If Desired 8. Check Failure For Technical Specification Or TRM Applicability 9. Return To Procedure And Step In Effect Implements **0-SOP-IC-001 BLUE, ROUTINE MAINTENANCE PROCEDURE REMOVAL OF SAFEGUARDS OR PROTECTION SENSOR FROM SERVICE** 1. In cabinet C-115, place the following bistable trip switches in the "TRIP" position (toggle switch up) and check expected response • SAFEGUARD ACTUATION (P/947) • CONTAINMENT SPRAY LOGIC (P/947) 2. Remove from scan PPCS point ID PT947, CNMT LR PRESS BLU.

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
	Continuation Criteria: Once the crew has completed taking the channel out of service per 0-SOP-IC-001 BLUE and has addressed Technical Specifications, or at the discretion of the Lead Examiner, proceed with the next event.	OS	Reference Technical Specifications **Technical Specifications:** **Reference 0-SOP-IC-002:**

Table 3.3.2-1 Item 1c item 2c item 3c item 4d-2 item 4e-2 item 5c item 6c	D. One channel inoperable	D.1 Place channel in trip OR D.2.1 Be on MODE 3 AND D.2.2 Be in MODE 4	1 hour 7 hours 13 hours
Table 3.3.5-1 item 2			

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE

Event 2: 1PC-2273, Feedwater Heater Emergency Bypass Valve Controller oscillates in automatic
 	
Start: _____
	Trigger 5 [CHN1CFW003F, 1-PC2273 FW HTR EMER BYPASS VLV CNTRL OSC AUTO ONLY = 90; Ramp = 00:01:00]
	
	Insert **Trigger 5** to cause 1PC-2273, Feedwater Heater Emergency Bypass Valve Controller to oscillate in automatic.
	
	Plant Response:
	1PC-2273, Feedwater Heater Emergency Bypass Valve Controller output oscillates (90% of scale), 1CS-2273, Feedwater Heater Emergency Bypass Valve indication shows intermediate (Red and Green lights lit, rise in reactor power, SG A and B level deviations with corresponding annunciators for SG A and B level deviations.
	
	Cues:
	• 1PC-2273, Feedwater Heater Emergency Bypass Valve Controller output oscillates (90% of scale)
	• 1CS-2273, Feedwater Heater Emergency Bypass Valve indication shows intermediate (Red and Green lights lit)
	• Reactor power rises
	• SG A and B level deviated from normal program band
	• Annunciators:
	  • 1C03 1E2 1-2, Steam Generator A Level Setpoint Deviation/Trouble
	  • 1C03 1E2 1-5, Steam Generator B Level Setpoint Deviation/Trouble
	  • 1C03 1F 3-1, LP Feedwater Heater 1, 2, or 3 Level Low
		BOP
		
		OS1
		
		OATC
		
		BOP
			Identifies 1PC-2273, Feedwater Heater Emergency Bypass Valve Controller malfunction by indicated 1PC-2273, Feedwater Heater Emergency Bypass Valve Controller output oscillating (90% of scale), 1CS-2273, Feedwater Heater Emergency Bypass Valve indication showing intermediate (Red and Green lights lit), rise in reactor power, SG A and B level deviations with corresponding annunciators for SG A and B level deviations. May take manual control of 1PC-2273, Feedwater Heater Emergency Bypass Valve Controller to mitigate the transient.
			
			Implements **AOP-2B Unit 1, Feedwater System Malfunction**
			Monitor Foldout Page
			1. Maintain Reactor Power Less Than or Equal to 100%
			  RNO: Reduce power per AOP-17A Unit 1, Rapid Power Reduction as necessary to maintain reactor power less than or equal to 100%.
			2. Determine the Secondary System Malfunction AND go to the appropriate step (16)
			16. Perform the following:
			  a. Check Main Feed Pump Suction Pressure – GREATER THAN 190 PSIG
			  b. Check LP Feedwater Heater Bypass Valve - SHUT
			  RNO: Perform the following:
			  1) IF 1CS-2273 open due to controller malfunction, THEN perform the following:
			  a) Ensure LP feedwater heater bypass controller set at 25 psig below main feed pump suction pressure in auto
			  • 1PC-2273
			  b) IF controller will NOT operate in auto, THEN place controller in manual and place LP feedwater heater bypass valve in desired position.
			  c. Return to Step 2
			3. Check Plant Conditions – STABLE
			4. Check Secondary System Alignment – NORMAL
			5. Check Change in Reactor Power – LESS THAN 15% IN ANY ONE HOUR
			6. Notify the DSM

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
	The crew should implement AOP-2B Unit 1, Feedwater System Malfunction, and lower turbine load to maintain reactor power less than 100%. Prompt action by the crew to take manual control of 1CS-2273 may eliminate the need to take action to reduce turbine load. If the overpower condition is recognized before the crew has diagnosed the secondary malfunction, the crew may enter AOP-17A first to address the overpower condition. **IF** the crew discusses returning to full power, **THEN** monitor for proper reactivity control implementation and supervisor oversight. **Expected Communications:** • **IF** directed to locally monitor Feedwater Heater level, **THEN** report #2 Feedwater Heater level is (was) low and that the level control system is responding in automatic to restore level. **With the controller in automatic:** • **IF** an operator is dispatched to locally investigate 1CS-2273, Feedwater Heater Emergency Bypass Valve, **THEN** after two minutes report that the valve is cycling open and close in response to the air signal being supplied. **With the controller in manual:** • **IF** an operator is dispatched to locally investigate 1CS-2273, Feedwater Heater Emergency Bypass Valve, **THEN** after two minutes report that the valve is stable (matching the control room's indication). **Continuation Criteria:** After the crew has addressed the 1CS-2273 failure per AOP-2B Unit 1, or at the discretion of the Lead Examiner, continue on with the next event.	OS OS OATC BOP OATC/BOP OATC OATC	7. Return to Procedure and Step in Effect Implements **AOP-17A Unit 1, Rapid Power Reduction** (if necessary) 1. Check Power – GREATER THAN 100% 2. Reduce Load – LESS THAN 100% a. Manually insert control rods 10 steps to initially lower RCS temperature. b. **WHEN** control rod movement has started, **THEN** reduce turbine load. 1) Select Turbine Manual. 2) Reduce turbine load by 2% by pulsing "GV Down" pushbutton. c. Commence Boration per shiftly reactivity brief. ▪ Set quantity on boric acid flow counter, YIC-110A ▪ Set flow rate on boric acid flow controller, HC-110 ▪ Place reactor makeup mode selector in BORATE ▪ Place reactor makeup control switch to START d. **IF** NI power is still greater 100%, **THEN** reduce turbine load in 1% increments and adjust rods as necessary until less than 100%. e. Return control rods to auto. f. **IF** less than 100% **AND** additional load reduction is required, **THEN** Go to Step 3. RNO Perform the following: 1) Restore Tavg-Tref differential to <1°F using rod control in manual. 2) Return affected controls to automatic per Shift Management. • Turbine controls • Rod Control 2) Go to Procedure and Step In Effect.

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 3: **0LT-4040 Condensate Storage Tank T-24A Level Transmitter fails low** Start: _____	**Trigger 7** [XMT1AFW005A, 0-LT4040 COND STOR TK T24A LEVEL FIXED OUTPUT, VALUE = 0, RAMP = 3 sec] Insert **Trigger 7** to cause 0LT-4040 Condensate Storage Tank T-24A Level Transmitter to fail low. **Plant Response:** Indicated tank level goes to 0%. **Cues:** • C01 A 2-9, T-24A or B Condensate Storage Tanks – Level High or Low • C01 A 3-9, T-24A or B Condensate Storage Tanks Level Low-Low • PPCS: L-4040 CST LVL A low **Expected Communications:** • **IF** an AO is sent to locally investigate 0LT-4040 T-24A Condensate Storage Tank Level Transmitter, wait two minutes and **THEN** report that there doesn't seem to be anything out-of-normal locally. **Continuation Criteria:** One the crew has addressed Technical Specifications, or at the discretion of the Lead Examiner, continue with the next event.	BOP OS	CO Identifies the failed level channel for T-24A Condensate Storage Tank, dispatches an AO to investigate and references ARP C01 A 2-9, T-24A or B Condensate Storage Tanks – Level High or Low and ARB C01 A 3-9, T-24A or B Condensate Storage Tanks Level Low-Low. Reference Technical Specifications **Technical Specifications:** 3.3.3 Post Accident Monitoring (PAM) Instrumentation is not met (2 required channels). **CONDITION** / **REQUIRED ACTION** / **COMPLETION TIME** A. One or more Functions with one required channel inoperable. / A.1 Restore required channel to OPERABLE status. / 30 days

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 4: **1-X01, Main Transformer loss of cooling** **Start:** _____	**Trigger 9** [ANN-C02D-A09, MAIN TRANS 1X01 LOSS OF COOLING = ON] Insert **Trigger 9** to override on the annunciator for C02 D 1-9, 1X-01 Main Tran Loss of Cooling. **Plant Response:** Annunciator only. **Cues:** • C02 D 1-9, 1X-01 Main Tran Loss of Cooling Outside air temperature for this scenario is 24°F (-4.44°C). Per the table using a conservative temperature of 0°C, time to get the unit off-line should be 2.6 hours. **Expected Communications:** **WHEN** an AO is directed to locally investigate 1X-01, Main Transformer; wait two minutes and **THEN** report breaker 8MN in the Cooler Control Cabinet for phase B is in the tripped condition and none of the cooling units are running. Breaker 8MN will not reset if attempted. **WHEN** the AO is directed to monitor transformer temperatures **THEN** report as follows: • Phase B initial temperatures: Oil = 35°C, Winding = 55°C • Phase B Temperatures rise about 1°C every 5 minutes • Phase A and C temperatures are stable, same initial temperature as B. **SM Cue:** If asked, recommend a 1%/min ramp rate.	BOP OS	Acknowledge the alarm and refer to Alarm Response Procedure for C02 D 1-9, 1X-01 Main Tran Loss of Cooling. Implements ARP C02 D 1-9, 1X-01 Main Tran Loss of Cooling 3.1 **DISPATCH** AO to validate alarm for the affected Main Transformer(s) and **PERFORM** the following: • **CHECK** cooler fan operation • **CHECK** oil cooler operation • **CHECK** local alarm panel 3.2 **INSTRUCT** AO to perform the following for affected transformer(s): 3.2.1 Continuously **MONITOR** Winding and Oil temperature indicators and **REPORT** temperature changes to Control Room. 3.2.2 **CONTINUE** attempts to restore cooling at each affected transformer using the flowing steps as applicable: a. **CHECK** affected Transformer Phase Cooling Control Cabinet(s) for alarms b. **OPEN** affected Cooling Control Cabinet(s) and **CHECK** for tripped Main Power Supply breaker 8MN. h. IF no cooling banks can be started, THEN immediately TAKE Main Generator OFF-LINE AND DE-ENERGIZE Main Transformer based on loading and ambient temperature as follows: 1. **REFER** to AOP-17A Unit 1, Rapid Power Reduction **AND REDUCE** power at a rate determined by Shift Management

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
	Continuation Criteria: When the crew begins reducing load per AOP-17A, Rapid Power Reduction, or at the discretion of the Lead Examiner, continue with the next event.	OS OATC/BOP OS OATC/BOP	Implements **AOP-17A Unit 1, Rapid Power Reduction** 1. Check Power – GREATER THAN 100% 3. Determine Desired Power Level Or Condition To Be Met • Control Room Supervisor announce desired power level or condition using less than or equal to 3%/min ramp rate. 4. Commence Boration As Necessary to Target Load a. Set boric acid flow totalizer to desired quantity b. Set boric acid flow controller to desired flow rate c. If desired, start second boric acid transfer pump d. Place Reactor Makeup Mode Selector Switch to Borate. e. Place Reactor Makeup Control Switch to Start 5. Select Turbine Rate And Reduce Load ○ Operator Automatic Load Rate Control a. Ensure EH controls are set for Operator Auto b. Ensure “First Stage In” is selected c. **IF** first stage pressure is unavailable, **THEN** select “First Stage Out” d. Ensure the appropriate load rate is selected on load rate thumb-wheel e. Select target end-point on reference control f. **WHEN** temperature reduction of at least 0.5°F is observed on Tavg-Tref indicator, **THEN** depress “GO” push-button g. Continue with next step

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
	Expected Communications: **IF** an AO is directed to locally start 1P-99A and 1P-99B, Main Feed Pump Seal Water Pumps; insert **Trigger 11** and **THEN** report when they are running.	OS OATC/BOP	6. Notify Power System Supervisor (PSS) Of Load Reduction 7. Check Rod Control System – IN AUTO 8. Energize Pressurizer Backup Heaters 9. Check PZR Pressure – CONTROLLING IN AUTO 10. Check PZR Level – CONTROLLING IN AUTO 11. Check Steam Generator Level – CONTROLLING IN AUTO 12. Ensure Main Feed Pump Seal Water Pump – RUNNING ○ 1P-99A ○ 1P-99B 13. Maintain RCS Tavg: • Greater than 540°F • Less than 577°F • Within 7°F of program Tavg 14. Check AFD – WITHIN LIMITS: ○ PPCS Screen “AFD PLOT” ○ ROD 1.2, HFP EQUIL DELTA FLUX 15. Control MSR temperatures – LESS THAN 500°F ○ HC-2085 16. Determine Desired End-Point – LESS THAN 60% TURBINE LOAD

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 5: **1HC-428A, 1P-2A, Charging Pump Hand Controller oscillates in auto** **Start:** _____	**Trigger 13:** [CNH1PCS004F, P-2A CHARGE PUMP SPEED HAND CTLR OSC AUTO ONLY, Value = 100] Insert **Trigger 13** to cause 1P-2A, Charging Pump Speed to oscillate between minimum and maximum flow while in automatic. **Plant Response:** 1P-2A, Charging Pump Speed will oscillate between minimum and maximum flow while in automatic. **Cues:** • 1C04 1C 1-8, Charging Pump Speed Control Trouble • 1C03 1D 2-1, 1P-1A or B RCP LABYR Seal dP Low • 1HSC-428A, 1P-2A Charging Pump Speed Hand Controller output oscillating between 0 and 100% output. **Expected Communications:** • **IF** the PAB AO is directed to check that there are no charging pump relief valves lifting on Unit 1; wait two minutes and **THEN** report that Unit 1 charging pump relief valves are NOT lifting.	OATC OS OATC	Acknowledges the annunciator and identifies 1HSC-428A, 1P-2A Charging Pump Speed Hand Controller output oscillating between 0 and 100% output and takes manual control to stabilize pump speed and pressurizer level. Implements **AOP-1D Unit 1, Chemical and Volume Control System Malfunctions** 1. Check RCS Leak – NOT IN PROGRESS 2. Determine CVCS Malfunction: • **IF** any of the following is true, **THEN** go to Step 3 • Any charging pump – TRIPPED **OR** • Any charging pump – NOT OPERATING PROPERLY **OR** • Any charging pump controller – Not RESPONDING PROPERLY 3. Check Any Charging Pump – RUNNING 4. Check Charging Flow – STABLE RNO: Perform the following: a. Place running charging pumps – IN MANUAL b. **IF** charging flow **NOT** stable, **THEN** stop all charging pumps and go to Step 10 5. Check Charging Pump Relief – NOT LIFTED 6. Check Charging Pump Suction Supply – ADEQUATE 7. Check Charging System Response: • Desired Charging Pumps – RUNNING • Labyrinth seal ΔP – GREATER THAN 20 INCHES • Letdown line pressure – STABLE • PZR Level – STABLE AT OR TRENDING TO PROGRAM LEVEL 8. Notify Duty Station Manager 9. Return to Procedure And Step In Effect

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
	Continuation Criteria: When the crew has addressed the failure per AOP-1D Unit 1 or AOP-24, and is pursuing returning the system to automatic, or at the discretion of the Lead Examiner, continue with the next event.	OS OATC BOP	May implement **AOP-24, Response to Instrument Malfunctions** 1. Identify Failed Instrument RNO: **IF** a controller has failed, **THEN** go to Step 3 3. Establish Manual Control as Required: o Place affected controller in manual OR o Place any affected equipment controls in manual 4. Return Affected Parameter(s) To Desired Value(s) 5. Using Attachment A, PPCS PARAMETERS USED TO CALCULATE REACTOR THERMAL OUTPUT, Verify That Failed Instrument Is NOT An Input To RTO. 6. Remove Failed Instrument Channel From Service Per 0-SOP-IC-001, ROUTINE MAINTENANCE PROCEDURE REMOVAL OF SAFGUARDS OR PROTECTION SENSOR FROM SERVICE RNO: **IF** failed instrument channel can **NOT** be removed from service **OR** is **NOT** addressed in 0-SOP-IC-001, **THEN** perform the following: a. **IF** failed channel can **NOT** be removed from service, **THEN** inform SM of failed channel status. 7. Return Controls To Automatic If Desired 8. Check Failure For Technical Specification Or TRM Applicability 9. Return To Procedure And Step In Effect

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 6: **Large Break LOCA** **Start:** _____	**Trigger 15:** [MAL1RCS001, DBA LOCA HOT LEG A] Insert **Trigger 15** to cause a Large Break LOCA. 1P-10A, RHR Pump fails to auto start and 1P-10B, RHR Pump trips**.** **Plant Response:** Rapid depressurization of RCS, automatic SI actuation. **Cues:** • Rapid drop in RCS pressure • Auto SI	OATC OS OATC BOP	DIAGNOSE a large break LOCA event. Implements **EOP-0, Unit 1 Reactor Trip or Safety Injection** 1. Verify Reactor Trip 2. Verify Turbine Trip 3. Verify Power to AC Safeguards Buses 4. Check if SI is Actuated a. Any SI annunciators LIT b. Both trains of SI - Actuated RNO: Manually actuate both trains of SI and CI
Event 7: **RHR pump malfunctions: 1P-10A, RHR Pump fails to auto start and 1P-10B, RHR Pump trips** **Event 8:** **Containment Spray fails to actuate**	**Preloads:** [BKR1RHR001, 1-B5212A P-10A RH Removal Pump CKTBKR, Fail Auto Close] [MOT1RHR002, P-10B RH Removal Pump, Winding Ground] **Preloads:** [RLY1PPL020, 1-CS-10X TRAIN 'A' CONT SPRAY AUXILIARY, Fail As Is] [RLY1PPL021, 1-CS-20X TRAIN 'B' CONT SPRAY AUXILIARY, Fail As Is]	BOP	**NOTE:** **Following immediate actions, CREW may manually start RHR and realign the Containment Spray system in accordance with OM 3.7, AOP And EOP Procedure Usage For Response To Plant Transients.**

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
	Expected Communications: • **IF** the PAB AO is directed to check 1P-10B, RHR Pump; wait two minutes and **THEN** report that the motor is not running, discolored, hot to the touch and smells acrid. **IF** asked; **THEN** report that there is no fire. • **IF** an AO is directed to locally investigate breaker 1B52-21A on 1B-04 for 1P-10B, RHR Pump; wait two minutes and **THEN** report that breaker has tripped on overcurrent.	OATC BOP OATC	**EOP-0 continued ...** Monitor Foldout Page Criteria: **RCP Trip Criteria** **IF** both conditions listed below occur, **THEN** trip both RCPs: • RCS subcooling - LESS THAN [36 ºF] 26 ºF • SI Pumps - AT LEAST ONE RUNNING AND CAPABLE OF DELIVERING FLOW 5. Perform ATTACHMENT A, Automatic Action Verification while continuing with this procedure 6. Verify AFW pumps – Running 7. Check RCP Seal Cooling 8. Check RCS Temperatures 9. Check PZR PORVs and Spray Valves 10. Check if RCPs should be stopped 11. Check if SGs are NOT Faulted 12. Check if SG Tubes are NOT Ruptured 13. Check if RCS is Intact RNO: Go to EOP-1 UNIT 1, LOSS OF REACTOR OR SECONDARY COOLANT
	The LOCA / SI injection will result in meeting a Critical Safety Function INTEGRITY RED path condition. Depending on when this condition is identified, the crew may enter, then immediately exit CSP-P.1, Response to Imminent Pressurized Thermal Shock Condition, at Step 1. **STA CUE**: Identify and report the INTEGRITY Critical Safety Function RED path when appropriate. Status tree monitoring to commence following completion of Step A14 of EOP-0 Attachment A.		**IF** an INTEGRITY Critical Safety Function RED path is identified and reported to the OS prior to the crew implementing EOP-1.3, **THEN** the crew should implement **CSP-P.1, Response to Imminent Pressurized Thermal Shock Condition.** 1. Check RCS pressure – GREATER THAN [450 PSIG] 325 PSIG. RNO: **IF** RHR flow is greater than 550 gpm, **THEN** return to procedure and step in effect.

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
	EOP-0 Unit 1, Attachment A **Expected Communications:** • **WHEN** directed to locally check shut RW Service Water valves, LW-61 and 62, **THEN** report both valves are closed. • **WHEN** directed to locally check CW pump house temperature <105 ºF, wait 3 minutes and **THEN** report the temperature is 72 ºF and stable. • **WHEN** directed to locally check G03/G04 Switchgear Room temperature <95 ºF, wait 3 minutes and **THEN** report the temperature is 75 ºF and stable. • **IF** directed to periodically check the status of spent fuel cooling, wait 5 minutes and **THEN** report Spent Fuel Pool level is 63 feet, pool temperature is 67 ºF and both are stable.	BOP	**EOP-0 Unit 1, Attachment A, Automatic Action Verification** A1 Verify Feedwater isolation A2 Verify Containment Isolation * ***CT-5, Manually start at least one Low-Head ECCS Pump*** A3 Verify ECCS Pumps RUNNING a. SI Pumps – BOTH RUNNING **b. RHR Pumps – BOTH RUNNING** **RNO WHEN SI sequence is complete, THEN manually start RHR pumps** A4 Verify Service Water Pumps RUNNING A5 Verify Containment Accident Cooling Units RUNNING A6 Verify Component Cooling Water Pumps – ONLY ONE RUNNING A7 Check If Main Steam Lines Can Remain Open A8 Verify Containment Spray Not required a. Containment pressure recorder – HAS REMAINED LESS THAN 25 psig RNO Perform the following: 1) Check containment spray actuated: • Annunciator {C01 B 2-6}, CONTAINMENT SPRAY, lit **IF** containment spray has **NOT** actuated, **THEN** manually actuate containment spray. A9 Verify ECCS Flow A10 Verify AFW valve alignment – PROPER EMERGENCY ALIGNMENT A11 Verify Proper ECCS Valve Alignment

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
		BOP	***CT-3, Manually actuate containment cooling*** A12 Check Containment Spray NOT ACTUATED RNO Check containment spray alignment **1. Ensure all containment spray pump discharge MOVs are open** **2. Ensure at least one containment spray pump is running** **3. IF two containment spray pumps are running, THEN place one containment spray pump in pull out** **4. WHEN containment spray has been actuated for GREATER THAN two minutes, THEN ensure spray additive educator suction valve is open on running train** A13 Stop any boration via the blender in progress A14 Ensure the Auxiliary Building Filter/Exhaust Fans – OPERATING A15 Verify Service Water System Alignment A16 Check Miscellaneous Valves – SHUT A17 Check Control Room Ventilation A18 Check Cable Spreading Room Ventilation System – OPERATING A19 Check Computer Room Ventilation System – OPERATING A20 Check AFW Recirc fans – ONE RUNNING A21 Check Circulating Water Pump House Temperature Less Than 105°F A22 Check G03/G04 Switchgear Room Temperature less than 95°F A23 Periodically check status of spent fuel cooling

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
		OS	Implements **EOP-1, Loss of Reactor or Secondary Coolant** Monitor Foldout Page criteria: **Containment Sump Recirculation Switchover Criteria** **IF** either condition below is satisfied, **THEN** Go to EOP-1.3, TRANSFER TO CONTAINMENT SUMP RECIRCULATION - LOW HEAD INJECTION ○ RWST level - LESS THAN 60% **OR** ○ RCS pressure less than [450 psig] 325 psig AND RHR flow greater than 550 gpm
	Expected Communications: • **WHEN** directed to perform Attachment A of EOP-1.3; insert **trigger 17**, wait for the valves to finish stroking and **THEN** report that the CCW alignment is complete.	OS BOP OATC BOP	Implements **EOP-1.3 Unit 1, Transfer to Containment Sump Recirculation - Low Head Injection** 1 Reset SI 2 Check RCS Break Size 3 Align CCW per ATTACHMENT A, LOCAL ALIGNMENT OF COMPONENT COOLING WATER While Continuing With The Procedure 4 Direct Unnecessary Personnel To Evacuate The PAB 5 Check if Containment Sump pH Must Be Adjusted 6 Check if Train 'A' SI Flow Should Be Stopped a. Check Train 'B; RHR injection flow - GREATER THAN 550 GPM a. RNO Go to Step 7 7 Check if Train 'B' SI Flow Should Be Stopped a. Check Train 'A; RHR injection flow - GREATER THAN 550 GPM b. Stop train 'B' SI pump and place in pull out c. Stop train 'B' RHR pump and place in pull out 8 Monitor Core Cooling a. Maintain core exit thermocouple temperatures - LESS THAN 700º F 9 Evaluate Control Room Conditions: a. Check Control Room RMS high alarms - CLEAR • 1RE-101 • 1RE-235

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
	Expected Communications: • **WHEN** directed to locally shut 1SI-897A and B, SI Test Line Return Isolation AOVs; insert **trigger 19**, wait for the valves to finish stroking, and **THEN** report the valves are closed.	BOP	10 Isolate Component Cooling Flow To Containment a. Check RCPs - BOTH STOPPED b. Shut containment equipment CC supply header isolation valve: • 1CC-719 11 Isolate Component Cooling Flow to Non-Regenerative Heat Exchanger 12 Check Service Water Pumps - SIX RUNNING 13 Check Service Water Ring Header - CONTINUOUS FLOWPATH ESTABLISHED 14 Establish Component Cooling Flow To RHR Heat Exchangers: a. Ensure component cooling pumps - AT LEAST ONE RUNNING b. Open only one RHR heat exchanger shell side inlet valve: ○ 1CC-738A ○ 1CC-738B c. Start second component cooling pump d. Open second RHR heat exchanger shell side inlet valve: ○ 1CC-738A ○ 1CC-738B 15 Ensure RV Injection MOVs - BOTH OPEN 16 Align SI Test Lines For Recirculation a. Check containment spray discharge valves - AT LEAST ONE OPEN IN EACH TRAIN • Train A ○ 1SI-860A ○ 1SI-860B (preferred) • Train B ○ 1SI-860C ○ 1SI-860D (preferred) b. Locally shut both SI test line return isolation AOVs: • 1SI-897A • 1SI-897B

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
	Termination Criteria: Terminate the scenario when crew has completed Step 21 of EOP-1.3 Unit 1, Transfer To Containment Sump Recirculation – Low Head Injection and is waiting for RWST level to lower to 34% or at the discretion of the Lead Examiner.	BOP	17 Align RHR Sump Suction Valves a. Open train A RHR pump suction from containment sump B isolation valve: • 1SI-850A b. Open train B RHR pump suction from containment sump B isolation valve • 1SI-850B 18 Check Train 'A' - READY FOR RECIRCULATION 19 Check Train 'B' - READY FOR RECIRCULATION 20 Check Battery Chargers Supplying DC Buses - ENERGIZED 21 Check RHR Trains - At Least One Ready For Recirculation ○ Train A OR ○ Train B 22 Check RWST Level - LESS THAN OR EQUAL TO 34% RNO: Perform the following: a. **WHEN** RWST level is less than or equal to 34%, **THEN** immediately return to this procedure and continue with Step 23. b. Implement Critical Safety Procedures and continue with Procedure And Step In Effect.

***** END OF SCENARIO *****

QUANTITATIVE ATTRIBUTES

(Use this form for NRC/INPO Evaluations only as required to document associated quantitative information.)

Malfunctions:

Before EOP Entry:

- 1PT-947, Loop A Containment Pressure Transmitter fails high
- 1PC-2273, Feedwater Heater Emergency Bypass Valve Controller oscillates in automatic
- 0LT-4040, Condensate Tank T-24A Level Transmitter fails low
- 1-X01, Main Transformer loss of cooling
- 1HC-428A, 1P-2A, Charging Pump Hand Controller oscillates in auto

After EOP Entry:

- RHR pump malfunctions
  - 1P-10A, RHR Pump fails to auto start
  - 1P-10B, RHR Pump trips
- Containment Spray fails to actuate

Abnormal Events:

- 1PT-947, Loop A Containment Pressure Transmitter fails high
- 1PC-2273, Feedwater Heater Emergency Bypass Valve Controller oscillates in automatic
- 0LT-4040, Condensate Tank T-24A Level Transmitter fails low
- 1-X01, Main Transformer loss of cooling
- 1HC-428A, 1P-2A, Charging Pump Hand Controller oscillates in auto

Major Transients:

- Large Break LOCA

Critical Tasks:

1.	CT-3	Manually actuate containment cooling
2.	CT-5	Manually Start at Least One Low-Head ECCS Pump

CT-3	Manually actuate containment cooling
Applicable ERG Version	LP
Applicable ERG	E-0, ECA-0.2, FR-Z.1

Critical Task:

Manually actuate at least one Containment Spray pump before an extreme (RED path) challenge develops to the containment CSF.

Plant Conditions:

- Containment cooling is required but the minimum required complement of containment cooling equipment is not automatically actuated (instrument failure is not the cause of the requirement for containment cooling)
- The minimum required complement of containment cooling equipment can be manually actuate from the control room

Cues:

- Indication and/or annunciation that containment cooling is required (containment pressure > 25 psig)
- Indication and/or annunciation that Containment Spray is not actuated

Performance Indicator:

Manipulation of controls as required to actuate at least one Containment Spray Pump

Feedback:

- Indication and/or annunciation that at least one Containment Spray pump is running

CT-5	Manually Start at Least One Low-Head ECCS Pump
Applicable ERG Version	HP, LP
Applicable ERG	E-0, ECA-0.2

Critical Task:

Manually start at least one low-head ECCS pump before transition out of EOP-0

Plant Conditions:

- Large-break LOCA
- Reactor trip
- SI
- RCS pressure below the shutoff head of the low-head ECCS pumps
- Both low-head ECCS pumps fail to automatically start upon SI
- At least one low-head ECCS pump can be started provided that manual action is taken as necessary

Cues:

- Indication and/or annunciation that low-head ECCS pumped injection is required
  - SI actuation
  - RCS pressure below the shutoff head of the low-head ECCS pumps

AND

- Indication and/or annunciation that no low-head ECCS pump is injecting into the core
  - Control switch indication that the circuit breakers or contactors for both low-head ECCS pumps are open
  - All low-head ECCS pump discharge pressure indicators read zero
  - All flow rate indicators for low-head pumped injection read zero

Performance Indicator:

Manipulation of controls as required to start at least one low-head ECCS pump

- Control switch indication that the circuit breaker for at least one low-head ECCS pump is closed

Feedback:

Indication and/or annunciation that at least one low-head ECCS pump is injecting

- Flow rate indication of injection from at least one low-head ECCS pump

1.0 Plant Conditions:

	Unit 1	Unit 2
Time in Core Life (MWD/MTU):	*19,400*	
Reactor Power:	*100%*	
Boron Concentration:	*11 ppm*	
Rod Height:	*CBD @ 220*	

2.0 Equipment Out of Service:

- 1PT-950, U1C High Range Pressure Transmitter
- 1W-3B, Control Rod Shroud Fan is OOS due to imminent motor failure.

3.0 Technical Specification LCOs NOT Met and Action Conditions in Effect:

LCO NOT Met	TSAC	Required Actions	Completion Time
3.3.2	A. One or more Functions with one or more channels or trains inoperable.	A.1 Enter the Condition referenced in Table 3.3.2-1 for the channel(s) or train(s).	Immediately
	D. One channel inoperable	D.1 Place channel in trip OR D.2.1 Be in MODE 3 AND D.2.2 Be in MODE 4	1 hour 7 hours 13 hours

4.0 Planned Evolutions:

- Normal Shift routine will be to lower power at 30%/hr utilizing OP-3A Unit 1, Power Operation To Hot Standby Unit 1.

5.0 Common:

- Safety Monitor is Green
- Today is Sunday, clock time is real time and you have a normal shift complement.
- Unit 2 is on ice melt

NEXTera ENERGY NUCLEAR FLEET	SIMULATOR EXERCISE GUIDE	SEG

SITE: **Point Beach** **Revision #:** **0**

LMS ID: **PBN LOI NRC 16E** **LMS Rev. Date:**

SEG TITLE: **2017 NRC Exam Scenario 2**

SEG TYPE: ☐ **Training** ☒ **Evaluation**

PROGRAM: ☐ **LOCT** ☒ **LOIT** ☐ **Other:**

DURATION: **90 minutes**

Developed by: _____ _____
Instructor/Developer Date

Reviewed by: _____ _____
Instructor (Instructional Review) Date

Validated by: _____ _____
SME (Technical Review) Date

Approved by: _____ _____
Training Supervision Date

Approved by: _____ _____
Training Program Owner (Line) Date

Facility: _Point Beach_____ Scenario No.: _2_____ Op-Test No.: _2017____

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: _Unit 1 is in OP 1C, Startup to Power Operation, at approximately 29% post chemistry hold coming out of a forced outage. At Chemistry's request 'B" Train of Main Feed and Condensate have been running for 5 minutes for iron flushing. 1W-3B, Control Rod Shroud Fan is OOS due to imminent motor failure. 1PT-950, Loop B Containment Pressure has been removed from service. Repairs are expected to be complete during the upcoming refueling outage._____

Turnover: Secure 1P-28B, SGFP and 1P-25B, Condensate Pump. Raise power to 50%._____

_____

Event No.	Malf. No.	Event Type*	Event Description
1		N-BOP N-SRO	Secure SG Feed Pump and Condensate Pump
2		R-RO N-BOP R-SRO	Raise power to 50%
3	XMT1SGN001A	I-BOP I-SRO TS-SRO	1FI-464, SG Steam Flow fails slowly high
4	XMT1MSS009A	I-BOP I-SRO TS-SRO	1PT-486, Turbine First Stage Pressure fails low
5	MAL1RCP001B	C-RO C-SRO	1P-1B, RCP Seal leak develops, which degrades requiring reactor trip
6	MAL1RCS003F	M-ALL	Small Break LOCA from RTD Bypass Line occurs on reactor trip
7	MAL1PPL001A MAL1PPL001B	C-RO	Reactor fails to trip (CSP-S.1, Response to Nuclear Power Generation/ATWS)
8	MOT1SIS001 BKR1SIS002	C-BOP	1P-15A, SI Pump trips upon starting 1P-15B, SI Pump fails to start in Auto

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

SIMULATOR EXERCISE GUIDE REQUIREMENTS

Terminal Objective

Given specific plant conditions, the students will be able to respond to the failures listed below in accordance with plant procedures:

- 1FT-464, SG Steam Flow Transmitter fails high (no auto shift to single element)
- PT-486, Turbine First Stage Pressure fails low
- 1P-1B, Reactor Coolant Pump seal leak develops, then degrades to trip criteria
- Small Break LOCA
- Reactor fails to trip (ATWS)
- Safety Injection Pump failures
  - 1P-15A, Safety Injection pump trips upon starting
  - 1P-15B, Safety Injection pump fails to auto start

Embedded within these events is the expectation to properly utilize Technical Specifications.

Enabling Objectives:

None

Prerequisites:

1. Simulator available
2. Students enrolled in Initial License Program

Training Resources:

1. Floor Instructor as Shift Manager / Shift Technical Advisor
2. Simulator Booth Operator
3. Communicator
4. NRC Evaluators

References:

1. 0-SOP-IC-001 Blue, Routine Maintenance Procedure Removal Of Safeguards Or Protection Sensor From Service – Blue Channels
2. 0-SOP-IC-001 Red, Routine Maintenance Procedure Removal Of Safeguards Or Protection Sensor From Service – Red Channels
3. 0-SOP-IC-002, Technical Specifications LCO – Instrument Cross Reference
4. OP 1C, Startup to Power Operation Unit 1
5. AOP-1B Unit 1, Reactor Coolant Pump Malfunction
6. AOP-2B, Feedwater System Malfunction
7. AOP-24, Response to Instrument Malfunctions
8. ARP 1C03 1E2 3-2, Steam Generator A Feed Water Flow Channel Alert
9. ARP 1C03 1E2 4-2, Tavg Steam Dump Channel Alert
10. CSP-S.1 Unit 1, Response to Nuclear Power Generation / ATWS
11. EOP-0 Unit 1, Reactor Trip Or Safety Injection

12. EOP-1 Unit 1, Loss Of Reactor Or Secondary Coolant
13. OM 3.7, AOP And EOP Procedure Usage For Response To Plant Transients
14. Technical Specifications

Protected Content: **None**

Evaluation Method: Simulator performance will be evaluated in accordance with NUREG 1021.

Operating Experience: N/A

Risk Significant Operator Actions: HEP-ODA-EOP12-05, FAILURE TO COOLDOWN AN DEPRESSURIZE RS FO LONG TERM COOLING BY SECONDARY STEA, FV: 3.86E-02

UPDATE LOG: Indicate in the following table any minor changes or major revisions (as defined in TR-AA-230-1003) made to the material after initial approval. Or use separate Update Log form TR-AA-230-1003-F16.

#	DESCRIPTION OF CHANGE	REASON FOR CHANGE	AR/TWR#	PREPARER REVIEWER	DATE DATE
Rev. 0	Developed for 2017 NRC ILT Exam.				

OVERVIEW / SEQUENCE OF EVENTS

OVERVIEW

- Unit 1 is in OP 1C Unit 1, Startup to Power Operation Unit 1 at approximately 28% post chemistry hold coming out of a forced outage. At Chemistry's request, 'B' Train of main feed and condensate pumps have been running for 5 minutes for iron flushing.
  - Secure 1P-28B, Main Feedwater Pump and 1P-25B, Condensate Pump.
  - Raise power to 50% in accordance with OP 1C Unit 1, Startup to Power Operation Unit 1.
- OOS Equipment
  - 1PT-950, Loop B Containment Pressure has been removed from service. Repairs are expected to be complete during the upcoming refueling outage.
  - 1W-3B, Control Rod Shroud Fan is OOS due to imminent motor failure.

- Events
  - 1FT-464, 1HX-1A SG Steam Flow Transmitter fails high (no auto shift to single element)
  - 1PT-486, Turbine First Stage pressure transmitter fails low
  - 1P-1B, Reactor Coolant Pump seal leak develops, then degrades to trip criteria
  - Small Break LOCA
  - Reactor fails to trip (ATWS)
  - Safety Injection Pump failures
    - 1P-15A, Safety Injection pump trips upon starting
    - 1P-15B, Safety Injection pump fails to auto start

- Terminate the scenario when crew has completed Step 13 of EOP-1 Unit 1, Loss of Reactor or Secondary Coolant.

SEQUENCE OF EVENTS

ALL TIMES IN THIS SCENARIO ARE APPROXIMATE

Event #	Description
1.	Secure 1P-28B, Main Feedwater Pump and 1P-25B, Condensate Pump
2.	Raise power to 50% (or per Lead Examiner) in accordance with OP 1C Unit 1, Startup to Power Operation Unit 1.
3.	1FT-464, 1HX-1A SG Steam Flow Transmitter fails high (no auto shift to single element) • The crew should respond by taking 1FIC-466A, 1 HX-1A Primary Flow Indicating Controller to manual and controlling steam generator level. • The crew should implement AOP-24, Response to Instrument Malfunctions and 0-SOP-IC-001 Red, Routine Maintenance Procedure Removal of Safeguards or Protection Sensor from Service – Red Channels to shift to a new controlling channel and take the flow transmitter out of service. • The crew may implement ARP 1C03 1E2 2-2, Steam Generator A Feed Water Flow High to shift to a new controlling channel.

4.	1PT-486, Turbine First Stage Pressure Transmitter fails low
	• The crew should implement :
	  • ARP 1C03 1E2 4-2, Tavg Steam Dump Channel Alert and realign the condenser steam dump system for continued operation.
	  • AOP-24, Response to Instrument Malfunction and 0-SOP-IC-001 Blue, Routine Maintenance Procedure Removal of Safeguards or Protection Sensor from Service – Blue Channels to take the transmitter out of service
	  • Technical Specifications for the failed channel

5.	1P-1B, Reactor Coolant Pump seal leak develops, then degrades requiring a reactor trip • Unit conditions degrade such that AOP-1B Unit 1, Foldout Page criteria are met and a transition to Step 18 to trip the unit and secure the pump is warranted.
6.	Small Break LOCA from RTD bypass line • Will result in a Safety Injection signal

7.	Reactor fails to trip (ATWS) • Upon failure of the reactor to trip from the control room, the crew should transition from AOP-1B Unit 1/EOP-0 Unit 1, Reactor Trip or Safety injection to CSP-S.1 Unit 1, Response to Power Generation / ATWS. • After completing the actions in CSP-S.1 Unit 1, the crew should transition back to EOP-0 Unit 1, Step 1 RNO. • Concurrent with the implementation of EOP-0 Unit 1, the crew should complete the remainder of AOP-1B Unit 1 Step 18 which was suspended when entering CSP-S.1Unit 1. • The crew should complete the actions of EOP-0 Unit 1 and transition to EOP-1 Unit 1, Loss Of Reactor Or Secondary Coolant and then to EOP-1.2 Unit 1, Post LOCA Cooldown and Depressurization to address the Small Break LOCA.
8.	Safety Injection Pump failures: 1P-15A, Safety Injection pump trips upon starting and 1P-15B, Safety Injection pump fails to auto start • Following immediate actions of EOP-0 Unit 1, The crew may manually start a Safety Injection Pump in accordance with OM 3.7, AOP And EOP Procedure Usage For Response To Plant Transients, otherwise pump start is addressed in EOP-0 Unit 1, Attachment A, Step A3.a.RNO .
STOP	Terminate the scenario when crew has completed Step 9 of EOP-1 Unit 1, Loss of Reactor or Secondary Coolant.

SIMULATOR SET UP INSTRUCTIONS

Perform simulator set up per the site specific Simulator Setup Checklist.

General Instructions

Simulator Setup Instructions:

- Load **IC-7** and go to run
- Open the saved Event and Schedule files from the secure drive:
- Verify all commands listed in table below are contained in the Schedule File
- Insert the setup malfunction(s)
- Reposition bistable switches for: **1PT-950, Loop B Containment Pressure Transmitter**
- Make any necessary adjustments or corrections
- Freeze the simulator and save to scenario specific IC
- Re-initialize into saved IC and go to run
- Open and start the Event and Schedule files
- Open and start InSight and Alarm files for data collection
- Run the scenario real time
- Save InSight, Event, Alarm, Schedule Files to the secure drive and collect procedure markups for SBT
- Complete TR-AA-23001008-F01 Scenario Based Testing (SBT) Checklist

Multiple Use:

- Load saved IC and go to run
- Open the saved Event and Schedule files:
- Start the Schedule File
- Walk down the control boards to ensure plant conditions accurately reflect the scenario's initial conditions
- Make any necessary adjustments or corrections
- Update documentation if required
- Resave if required
- Turnover to the crew

SIMULATOR – SCENARIO SETUP:

Setup: 1PT-950, Loop B Containment Pressure Transmitter is out of service

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
XMT1CNM017A	1-PT950 LOOP B CONT PRESSURE XMTR FIXED OUTPUT				00 :00 :00	-	90	**Preload**

Simulator Setup:

1. Place OOS magnet at PT-950, Containment Pressure
2. Place a RED dot on C01 B 1-5, U1 Containment Pressure Channel Alert
3. Place 1W-3B CS in pull-out, install OOS magnet.
4. Install an orange Guarded magnet at 1W-3A.

SIMULATOR MALFUNCTIONS:

Event 1: Secure 1P-28B, Main Feedwater Pump and 1P-25B, Condensate Pump.
Event 2: Raise power to 50% in accordance with OP 1C Unit 1, Startup to Power Operation Unit 1.

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
LOA1CFW079	1-P73A 1P-28B SGFP AC LUBE OIL PUMP CS	-	-	11	`-	-	ON	**Directed from Crew**

Expected field communications:

1. [5.31.17.c] 1P-73A-CS, P-73A SGFP AC Lube Oil Pump Local Stl Station is ON. **(Trigger 11)**
2. [5.31.17.c.3)] Lowering suction flow at 1FI-2188, 1P-28B SGFP Suction Flow Indicator.
3. [5.31.17.d.2)] 1P-25B, Condensate pump is stopped and not rotating backwards.

Event 3: 1FT-464, 1HX-1A SG Steam Flow Transmitter fails high (no auto shift to single element)

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
XMT1SGN001A	1-FT464 LOOP A STEAM FLOW FIXED OUTPUT	00 :00 :00	00 :00 :45	1	00 :00 :00	-	2.0	**PLE**

Expected field communications:

1. None

Event 4: 1PT-486, Turbine First Stage Pressure Transmitter fails low

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
XMT1MSS009A	1-PT486 FIRST STAGE PRESSURE XMTR FIXED OUTPUT	00 :00 :00	00 :00 :05	3	00 :00 :00	-	0	**PLE**

Expected field communications:

1. **IF** and AO is dispatched to locally investigate 1PT-486, Turbine First Stage Pressure Transmitter, wait two minutes and **THEN** report that locally there doesn't seem to anything out of normal.

Event 5: 1P-1B, Reactor Coolant Pump seal leak develops, then degrades to trip criteria

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
MAL1RCP001B	RCP #1 SEAL FAILURE PUMP B	00 :00 :00	00 :05 :00	5	00 :00 :00	-	5	**PLE**
LOA1CVC048	1-CV-300B P-1B RCP SEAL INJ THROTTLE	00 :00 :00	00 :00:00	-	00 :00 :00	-	Per Crew Direct.	**When directed by the Crew**
MAL1RCP001B	RCP #1 SEAL FAILURE PUMP B	00 :00 :00	00 :01 :00	7	00 :00 :00	5	300	**PLE**

Expected field communications:

1. **IF** the PAB AO is dispatched to monitor Unit 1 Reactor Coolant Drain Tank level; call up Instructor Station Drawing 1WPS1 and **THEN** report as indicated. The change in RCDT level should indicate a <1% change in 5 minutes.
2. **IF** the PAB AO is directed to throttle 1CV-300B, 1P-1B RCP Seal Injection Throttle Valve; coordinate with the Control Room and **THEN** make adjustments using **LOA1CVC048, 1-CV-300B P-1B RCP SEAL INJ THROTTLE** as directed.

Event 6: Small Break LOCA

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
MAL1RCS003F	RTD BYPASS LINE LEAK LOOP B COMMON	00 :00 :00	00 :00 :30	9 Cond			75	1C04 Trip pushbuttons [X14I055A == 1 | X14I057A == 1]

Expected field communications:

1. None

Event 7: Reactor fails to trip (ATWS)

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
MAL1PPL001A	REACTOR TRIP BREAKER 52/RTA FAILURE	00 :00 :00	-	-	00 :00 00	-	Fails to Open	**PRELOAD**
MAL1PPL001B	REACTOR TRIP BREAKER 52/RTB FAILURE	00 :00 :00	-	-	00 :00 :00	-	Fails to Open	**PRELOAD**

Expected field communications:

1. **FOLLOWING** the PA announcement for ATWS or when directed to locally open the reactor trip breakers, allow 2 minutes for travel to the Rod Drive Room and **THEN** report to the control room. **WHEN** directed to open the Unit 1 reactor trip breakers change MAL1PPL001A and MAL1PPL001B to Trip and **THEN** report the reactor trip breakers are open

Event 8: Safety Injection Pump failures: 1P-15A, Safety Injection pump trips upon starting and 1P-15B, Safety Injection pump fails to auto start

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
MOT1SIS001	1-P15A SAFETY INJECTION PUMP	00 :00 :00	-	-	00 :00 :00	-	Winding Ground	**PRELOAD**
BKR1SIS002	1-A5285 P-15B SAFETY INJ PUMP CKTBKR	00 :00 :00	-	-	00 :00 :00	-	Failauto cl	**PRELOAD**

Expected field communications:

1. **WHEN** directed to locally check RW Service Water valves, LW-61 and 62, **THEN** report both valves are shut.
2. **WHEN** directed to locally check CW pump house temperature <105 ºF, wait 3 minutes and **THEN** report the temperature is 72 ºF and stable.
3. **WHEN** directed to locally check G03/G04 Switchgear Room temperature <95 ºF, wait 3 minutes and **THEN** report the temperature is 75 ºF and stable.
4. **IF** directed to periodically check the status of spent fuel cooling, wait 5 minutes and **THEN** report Spent Fuel Pool level is 63 feet, pool temperature is 67 ºF and both are stable.
5. **IF** an AO is dispatched to locally investigate 1P-15A, Safety Injection pump, wait 2 minutes and **THEN** report that the motor is hot to the touch and there is a faint acrid smell in the area. There is no fire.
6. **IF** an AO is dispatched to locally investigate breaker 1A52-59, Pwr to 1P-15A, Safety Injection Pump, wait 2 minutes and **THEN** report the breaker has tripped.

BRIEF / TURNOVER INFORMATION

- Conduct simulator crew pre-scenario brief using TR-AA-230-1007-F06, Simulator Instructor Pre-Exercise Checklist.
- Brief the scenario evaluators
- Brief surrogates using TR-AA-230-1007-F11, Surrogate Brief Checklist, if necessary.
- Crew Shift Turnover Information: See Attached

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 1: **Secure 1P-28B, Main Feedwater Pump and 1P-25B, Condensate Pump.** **Start:** _____	**Unit 1 is in OP 1C, Startup to Power Operation Unit 1, at approximately 28% post chemistry hold coming out of a forced outage. At Chemistry's request, train 'B' main feedwater and condensate pumps have been run for 5 minutes for iron flushing.** **Expected Communications:** • [5.31.17.c] 1P-73A-CS, P-73A SGFP AC Lube Oil Pump Local Stl Station is ON. **(Trigger 11)** • [5.31.17.c.3)] Lowering suction flow at 1FI-2188, 1P-28B SGFP Suction Flow Indicator. • [5.31.17.c..6] MFP coastdown SAT • [5.31.17.d.2)] 1P-25B, Condensate pump is stopped and not rotating backwards.	CREW	Implements **OP 1C Unit 1, Startup to Power Operation Unit 1** 5.31.17 **WHEN** a minimum of 5 minutes of flushing is obtained on the train of main feed and condensate, **THEN DETERMINE** main feed and condensate train to be secured as follows: a. **ENSURE** 1PC-2273, Low Pressure Heater Bypass Pressure Controller, SET to 190 psig b. N/A c. **IF** 1P-28B, Steam Generator Feed Pump, will be STOPPED, **THEN PERFORM** the following: 1) **POSITION** 1P-73A,-CS, P-73A SGFP AC Lube Oil Pump Local Ctl Station, to ON. 2) **SHUT** 1CS-2189, 1P-28B SGFP Discharge MOV by positioning 1CS2189-CS, 1P-28B SGFP Discharge MOV control switch, to CLOSE. 3) **MONITOR** 1CS-2189 closure and decreasing suction flow at 1FI-2188, 1P-28B SGFP Suction Flow Indicator. 4) **BEFORE** 1CS-2189 reaches fully SHUT, **THEN HOLD** 1CS-2189-CS in CLOSE position. 5) **ENSURE** 1CS-2188, 1P-28B SGFP Mini Recirc Flow Control, begins modulating OPEN 6) **STOP** 1P-28B by positioning 1P-28B-CS, 1P-28B Steam Generator Feed Pump Control Switch, to STOP. 7) **RELEASE** 1CS-2189-CS. 8) **OBSERVE** 1CS-2188 goes fully SHUT, **THEN POSITION** 1P-28B-CS to PULLOUT. d. **STOP** a Condensate Pump 1) **POSITION** selected condensate pump control switch in **PULLOUT**. Remaining pump control switch may be marked N/A: 2) Locally **ENSURE** pump selected in STEP 5.3.17.d.1) has stopped (**NOT** rotating backwards) 3) **RETURN** condensate pump control switch in PULLOUT, to AUTO. Remaining pump control switch may be marked N/A:

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
			5.31.18 **NOTIFY** Chemistry MFP / Cond pump bump is complete. 5.32 **WHEN** directed by Shift Management, **THEN PLACE** an additional feed train in service as follows: Deferred to 50% - 60% power

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 2: **Raise power to 50% in accordance with OP 1C Unit 1, Startup to Power Operation Unit 1.** **Start:** _____	**Raise power to 50% in accordance with OP 1C Unit 1, Startup to Power Operation Unit 1.** **Expected Communication: SM** • If necessary, prompt the crew to continue with the power ascension. • If requested, report that NP 2.1.5 notifications have been completed. **Continuation Criteria:** Once the crew has raised reactor power about 3% to 5%. Or at the discretion of the Lead Examiner, continue to the next event.		5.33 Restriction For Continued Load Escalation 5.33.1 **IF** Step 5.27 was performed, **THEN BEFORE** continued load escalation, **PERFORM** the following: a. **DETERMINE** magnitude and rate of continued load escalation and **RECORD** below: (15%/hr) b. **INITIATE** notification of continued load escalation in accordance with NP 2.1.5, Electrical Communications, Switchyard Access and Work Planning. 5.33.2 **WHEN** power is approximately 35%, **THEN CHECK** the following indications: 5.34 Load Escalation 5.34.1 **NOTIFY** Turbine Hall Operator to monitor the following: 5.34.2 **NOTIFY** Primary Auxiliary Building (PAB) Operator, to **PERFORM** the following: 5.34.3 **IF** determined necessary by Operations Shift Management, **THEN LOWER** the PPCS constants for SG Blowdown Flow by 5 KLBS/hr. 5.34.4 **IF** required, **THEN PLACE** an additional Letdown Orifice in service. 5.35.1 **IF** Step 5.32 was performed, **THEN ENSURE** one hour has elapsed beyond the time recorded in Step 5.32.2. 5.35.2 **WHEN** Reactor Engineering activities are complete, **THEN RESUME** power escalation, observing any other required Reactor Engineering hold points. 5.35.3 On 1C03, **ENSURE** 1DTIC-2525, T-23 HDT Differential Temperature Indicator Ctlr, is selected to AUTO 5.35.4 **CONTINUE** load escalation as follows: a. **ENSURE** Governor Valves are off Valve Positon Limiter (VPL) b. **MOVE** Valve Position Limiter (VPL) to its desired position (e.g., 100% value) c. **SELECT** the desired EH Control System mode of Operation and **MARK** mode **NOT** selected N/A: d. **SHIFT** to the selected rate recorded ins Step 5.33.1.a.

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
			5.36 Continuous Action During Power Increase 5.36.1 **MAINTAIN** controls in AUTO as practicable 5.36.2 **MAINTAIN** Control Banks within the insertion, sequence, and overlap limits specified in the COLR. LCO 3.1.6 5.36.3 **MAINTAIN** Tavg within 1.5°F of Tref 5.36.4 **ADJUST** Power Range NIS as directed by 1-TS-RE-001, Power Level Determination Unit 1 5.36.5 **MAINTAIN** VARS OUT while keeping the null meter zeroed. 5.36.6 **MAINTAIN** the controller setpoint for the LP Feed Water Heater Bypass Valve (1CS-2273, LP FWH Bypass Press Controller) at 25 psig below SG Feed Pump suction pressure 5.36.7 **MONITOR** FWH/MSR high level alarms to check the dump valves control level 5.36.8 **MONITOR** Ice Melt operations as necessary. 5.36.9 **IF** required, **THEN CONTINUE OPENING** MSR Control Valves using manual operation of controller 1HX-2085 at the rate of less than or equal to 25°F per 30 minutes. 5.36.10 **WHEN** power is approximately 35%, **THEN CHECK** the following: OP 5B Blender Operation / Dilution / Boration, Attachment C, Alternate Dilution 4.1 ESTIMATE the amount of water addition 4.2 SET desired quantity on YIC-111A, Reactor Makeup Water Flow Counter 4.3 SET desired flow rate on HC-111, Reactor Makeup Water Flow Controller 4.4 IF desired to place all dilution flow to the charging pump suction, THEN CLOSE CV-110C, Z-1 BA Blender to VCT FCV. 4.5 PLACE Reactor Makeup Mode Selector Switch in ALT DIL 4.6 PLACE Reactor Makeup Control Switch to START.

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 3: **1FT-464, 1HX-1A SG Steam Flow Transmitter fails high (no auto shift to single element)** **Start:** _____	**Trigger 1** [XMT1SG001A, 1-FT464 LOOP A STEAM FLOW FIXED OUTPUT, RAMP = 00 :00 :20, VALUE = 2.0] Insert **Trigger 1** to cause 1FT-464, 1HX-1A SF Steam Flow Transmitter to fail high (no auto shift to single element. **Plant Response:** 1HX-1A Steam Generator level deviates bringing in alarms for 1C03 1E2 1-2, Steam Generator A Level Setpoint Deviation / Trouble and 1C03 1E2 2-2, Steam Generator A Feed Water Flow High. The Steam Generator Water Level Control System - level dominant system response then drives affected steam generator level back to normal level. **Cues:** • 1C03 1E2 1-2, Steam Generator A Level Setpoint Deviation / Trouble • 1C03 1E2 3-2, Steam Generator A Feed Water Flow Channel Alert • 1FI-464 increasing to 2E6 PPH. **Expected Communications:** None The crew may elect to exercise the ARP to switch controlling channels prior to implementing 0-SOP-IC-001 Red, Routine Maintenance Procedure Removal Of Safeguards Or Protection Sensor From Service – Red Channels.	BOP OS1 BOP OS1 BOP	Acknowledges alarms, identifies 1FT-464, 1HX-1A SG Steam Flow Transmitter has failed to a higher value and references the ARPs. Implements **AOP-24, Response to Instrument Malfunctions** 1. Identify Failed Instrument 2 Check If Failed Instrument Is A Controlling Channel 3. Establish Manual Control As Required 4. Return Affected Parameter(s) To Desired Value(s) 5. Using Attachment A, PPCS PARAMETERS USED TO CALCULATE REACTOR THERMAL OUTPUT, Verify That Failed Instrument Is NOT An Input To RTO 6. Remove Failed Instrument Channel From Service Per 0-SOP-IC-001, ROUTINE MAINTENANCE PROCEDURE REMOVAL OF SAFEGUARDS OR PROTECTION SENSOR FROM SERVICE 7. Return Controls To Automatic If Desired 8. Check Failure For Technical Specification Or TRM Applicability 9. Return To Procedure And Step In Effect May implement **AOP-2B, Feedwater System Malfunction** 1. Maintain Reactor Power Less Than Or Equal To 100% 2. Determine The Secondary System Malfunction And Go To the Appropriate Step 12. Perform The Following For Feed Regulating Valves: a. Check Feed Regulating Valve Response – NORMAL RNO a. Perform the following: 1) Place the affected feedwater regulating valve controller to manual or single element control. 2) Match feed flow to steam flow 3) Stabilize steam generator level. 4) IF transient caused by instrument failure, THEN defeat failed instrument per AOP-24, RESPONSE TO INSTRUMENT MALFUNCTIONS.

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
		BOP	Implements **0-SOP-IC-001 Red, Routine Maintenance Procedure Removal Of Safeguards Or Protection Sensor From Service – Red Channels** Remove from Service **NOTE: Steps 1 through 4 may be N/A'd if both transfer switches are already in "WHITE."** 1. **PLACE** Feedwater Regulating Valve in MANUAL: FIC-466A, HX-1A Primary Flow Indicating Controller **NOTE: Controlling channel will be FT-465.** 2. **PLACE** SG A Steam Flow Control Transfer Switch to "465" (WHITE). **NOTE: Controlling change will be FT-467.** 3. **PLACE** SG A Feedwater Flow Control Transfer Switch to "467" (WHITE). 4. **PLACE** Feedwater Regulating Valve Controller in AUTO unless directed otherwise by Shift Management: FIC-466A, HX-1A Primary Flow Indicating Controller 5. In cabinet C-112, **PLACE** the following bistable trip switches in the "TRIP" positon (toggle switch up) and **CHECK** expected response.

BISTABLE SWITCHES TO TRIP CABINET C-112	PROVING LAMP	BISTABLE LAMP LIT	ANNUNCIATOR LIT
HIGH TRIP (F/464)	(Note 1)	HI STM FLO LINE A FC464A	NONE
HI HI TRIP (F/464)	Lit Unless Failed High	HI HI STM FLO LINE A FC464B	1CO3 1D 3-10
SF<FWF (F/466)	LIT Unless Indicated Feed Flow is .8x106 Greater than Steam Flow	NONE	1CO3 1E2 2-2
SF>FWF (F/466)	LIT Unless Indicated Feed Flow is .8x106 Greater than Feed Flow	STM FW FLOW DAE FC466C	1CO3 1E2 3-2
NOTE 1: Proving lamp will be lit IF indicated steam flow is BELOW the High Stream Flow per STPT 2.2 section 1.2.1.			

6. REMOVE from scan PPCS point ID FT466V, SA A-1 SF RED.

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
		OS	Reference Technical Specifications **Technical Specifications:**

	A. One or more functions with one or more required channels or trains inoperable.	A.1 Enter the condition referenced in Table 3.3.1-1 for the channel(s) or train(s)	Immediately
Table 3.3.1-1 item 14-2 SF/FF Mismatch	D. One channel inoperable	D.1 Place channel in trip OR D.2 Be in MODE 3	1 hour 7 hours
Table 3.3.2-1 item 4d-1 SLI-High Steam Flow	D. One channel inoperable	D.1 Place channel in trip OR D.2.1 Be in MODE 3 AND D2.2 Be in MODE 4	1 hour 7 hours 13 hours
Table 3.3.2-1 item 4e-1 SLI-High Steam Flow	D. One channel inoperable	D.1 Place channel in trip OR D.2.1 Be in MODE 3 AND D2.2 Be in MODE 4	1 hour 7 hours 13 hours

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
	Continuation Criteria: Once the crew has • Switched controlling channels • Placed the FRV in auto, AND • Addressed technical specifications or at the discretion of the Lead Examiner, continue with the next event.	OS1 BOP	Implement **ARP 1C03 1E2 3-2, Steam Generator A Feed Water Flow Channel Alert** 3.4 **IF** alarm is due to an instrument failure, **THEN PERFORM** the following to select an operable control channel unless directed otherwise by Shift Management: 3.4.1 **IF** an of the following transmitters is failed, **THEN PERFORM** Steps 3.4.1.a through 3.4.1.e: • 1FT-464, Steam Flow Loop A a. **IF** 1PT-468, Steam Generator Pressure Loop A has failed, **THEN ENSURE** 1HC-468, SG A Atmospheric Steam Dump Controller in “MANUAL.” b. **PLACE** 1FIC-466A, 1HX-1A Primary Flow Indicating Controller in “MANUAL.” c. **PLACE** SG A Feedwater Flow Control Transfer Switch, to “467” (WHITE). d. **PLACE** SG A Steam Flow Control Transfer Switch, to “465” (WHITE). e. **PLACE** 1FIC-466A, 1HX-1A Primary Flow Indicating Controller in “AUTO” unless directed otherwise by Shift Management.

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 4: **1PT-486, Turbine First Stage Pressure Transmitter fails low** **Start:** _____	**Trigger 3** [XMT1MSS009A, 1-PT486 FIRST STAGE PRESSURE XMTR FIXED OUTPUT, VALUE = 0, RAMP = 5 sec] Insert **Trigger 3** to cause 1PT-486, Turbine First Stage Pressure Transmitter to fail low. **Plant Response:** Arms condenser steam dumps and alarms annunciator 1C03 1E2 4-2, Tavg Steam Dump Channel Alert. **Cues:** • 1C03 E2 4-2, Tavg Steam Dump Channel Alert • 1PI-486, Turbine First Stage (STM DUMP) Pressure Indicator reads 0 psig **Expected Communications:** • **IF** and AO is dispatched to locally investigate 1PT-486, Turbine First Stage Pressure Transmitter, wait two minutes and **THEN** report that locally there doesn't seem to anything out of normal.	BOP	Acknowledges alarm and references ARP 1C03 1E2 4-2, Tavg Steam Dump Channel Alert. Implements **ARP 1C03 1E2 4-2, Tavg Steam Dump Channel Alert** 3.1 **CHECK** condition of steam dump system 3.2 **CHECK** to see if steam dump required, Tavg→Tref with turbine runback or trip. 3.3 **IF** the alarm is due to an instrument failure, **AND** it is desired to defeat the failed channel, **THEN PERFORM** the following unless directed otherwise by shift management: 3.3.1 **PLACE** the Condenser Steam Dump Controller 1HFC-484 in "MANUAL", **AND ENSURE** controller output is ZERO on C03. 3.3.2 **PLACE** the Steam Dump Mode Selector Switch in "MANUAL" on C03. 3.3.3 **PLACE** the Condenser Steam Dump controller 1HFC-484 on C03 in "AUTO" as follows, unless directed by Shift Management: a. **LOWER** the controller AUTO set point to 50 psig above the current Main Steam header pressure. b. **PLACE** the controller in AUTO. c. **RETURN** the controller to the original AUTO set point. 3.4 **REFERENCE** AOP-6C, Uncontrolled Motion of RCCAs

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
	Continuation Criteria: Once the crew has taken action per ARP and /or AOP-24 to address CSDs and addressed Technical Specifications, or at the discretion of the Lead Examiner, continue with the next event.	OS1 BOP	Implements **AOP-24, Response to Instrument Malfunctions** 1. Identify Failed Instrument 2 Check If Failed Instrument Is A Controlling Channel 3. Establish Manual Control As Required 4. Return Affected Parameter(s) To Desired Value(s) 5. Using Attachment A, PPCS PARAMETERS USED TO CALCULATE REACTOR THERMAL OUTPUT, Verify That Failed Instrument Is NOT An Input To RTO 6. Remove Failed Instrument Channel From Service Per 0-SOP-IC-001, ROUTINE MAINTENANCE PROCEDURE REMOVAL OF SAFEGUARDS OR PROTECTION SENSOR FROM SERVICE 7. Return Controls To Automatic If Desired 8. Check Failure For Technical Specification Or TRM Applicability 9. Return To Procedure And Step In Effect
		OS1	Reference Technical Specifications **Technical Specifications:** RPS LCO 3.3.1 is not met (3.3.1 item 17b-2)

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one or more required channels or trains inoperable.	A.1 Enter the Condition referenced in Table 3.3.1-1 for the channel(s) or train(s).	Immediately
S. One or more channel(s) inoperable.	S.1 Verify interlock is in required state for existing conditions. OR S.2 Be in MODE 2	1 hour 7 hours

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 5: **1P-1B, Reactor Coolant Pump seal leak develops** **Start:** _____	**Trigger 5** [MAL1RCP001B, RCP#1 SEAL FAILURE PUMP B, RAMP = 00 :05 :00, VALUE = 5] After the crew has stabilized the plant and has exited the applicable AOPs, insert **Trigger 5** to ramp in a ~5 gpm #1 seal leak on 1P-1B, Reactor Coolant Pump. **Plant Response:** Leak off flow will increase. Alarms for RCP No. 1 Seal Water Flow High or Low, Lab Seal ΔP Low, RCP Lab Seal Water or Bearing Temperature High and RCP #1 RCP Seal Water Outlet Temperature High. The affected RCP seal and bearing temperatures increase. The seal outlet temperatures increase. The seal ΔP lowers or is negative. **Cues:** • 1C03 1D 2-1, 1P-1A or B RCP Labyr Seal Delta P low • 1C03 1D 3-3, 1P-1B RCP No. 1 Seal Water Flow High or Low	OATC OS1 OATC/BOP	Acknowledges alarms and identifies that 1P-1B, RCP is the affected pump based on alarms and available indications. Implements **AOP-1B, Reactor Coolant Pump Malfunction** Monitors Fold out Page 1. Check Annunciator P-1A&B RP VIBRATION ALARM – CLEAR • 1C04 1C 1-5 2. Check Annunciator 1TR-2001 TEMPERATURE MONITOR ALARM – CLEAR • 1C04 1C 3-10 3. Check Annunciator 1P-1A OER B RCP UPPER OR LOWER SUMP OIL LEVEL HIGH OR LOW – CLEAR • 1C04 1D 3-11 4. Check RCP No. 1 Seal Leakage – GREATER THAN 0.8 gpm 5. Check RCP No. 1 Seal Leakage – LESS THAN 6 gpm • 1FR-177 RNO **IF** seal outlet temperature is rising, **THEN** go to Step 18. ○ 1TI-182 for RCP B **IF** RCP No. 2 seal leakage greater than 2 gpm, **THEN** go to Step 18. ○ RCDT level change greater than 2% in 3 ½ minutes. ○ Standpipe level high alarm ○ 1C03 1D 1-3 for RCP B 6. Verify RCP Seal Cooling: a. Labyrinth seal ΔP – GREATER THAN 20 inches • 1PI-124 for RCP B RNO Perform the following: 1) Adjust seal injection throttle valves and charging flow control valve as necessary to establish a positive labyrinth seal ΔP ○ 1CV-300B for RCP B ○ 1HC-142 2) **IF** positive labyrinth seal ΔP can **NOT** be established **AND** component cooling water can **NOT** be maintained greater than 21 gpm, **THEN** go to Step 18.

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
	Expected Communications: • **IF** the PAB AO is dispatched to monitor Unit 1 Reactor Coolant Drain Tank level; call up Instructor Station Drawing 1WPS1 and **THEN** report as indicated. The change in RCDT level should indicate a <1% change in 5 minutes. • **IF** the PAB AO is directed to throttle 1CV-300B, 1P-1B RCP Seal Injection Throttle Valve; coordinate with the Control Room and **THEN** make adjustments using **LOA1CVC048, 1-CV-300B P-1B RCP SEAL INJ THROTTLE** as directed. **Continuation Criteria:** When the crew has completed Step 9 of AOP-1B Unit 1, Reactor Coolant Pump Malfunction, or at the discretion of the Lead Examiner continue with the next event.	BOP	b. Component cooling RCP thermal barrier – NORMAL 1) Thermal barrier outlet AOV – OPEN • 1CC-761B for RCP B 2) RCP Cooling water flow low alarm – CLEAR • 1C03 1D 1-5 for RCP B c. RCP component cooling return temperature alarm – CLEAR • 1C03 1D 2-4 7. Check RCP Related Firework Panel Alarms – CLEAR 8. Check RCP No 2 Seal Indications – NORMAL • Annunciator 1P-1B RCP STANDPIPE LEVEL HIGH – CLEAR • 1C03 1D 1-3 • RCP No. 2 seal leakage – LESS THAN OR EQUAL TO 0.5 gpm • RCP No. 1 seal leakage flow has remained stable ○ 1FR-175 ○ 1FR-177 9. Check RCP Seal Injection Temperatures – NORMAL • Annunciator VCT TEMPERATURE HIGH – CLEAR • 1C04 1C 3-7 • VCT outlet temperature – LESS THAN 130°F • 1TI-140 10. Determine RCP Seal Status: • RCP No. 1 and No. 2 combined seal leakage – BETWEEN 0.8 gpm AND 6 gpm • RCP No. 2 seal leakage – LESS THAN 1.1 gpm RNO Perform the following a. Shutdown per OP-3A, POWER OPERATION TO HOT STANDBY

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 5a: **1P-1B, Reactor Coolant Pump seal leak degrades requiring a reactor trip** **Start:** _____ **Event 6: Small Break LOCA**	**Trigger 7** [MAL1RCP001B, RCP#1 SEAL FAILURE PUMP B, RAMP = 00 :05 :00, VALUE = 300] **Trigger 9** [MAL1RCS003F, RTD BYPASS LINE LEAK LOOP B COMMON, Value = 75] After the crew has completed Step 9 of AOP-1B Unit 1, Reactor Coolant Pump Malfunction, insert **Trigger 7** such that the seal leak degrades requiring a reactor trip. **Trigger 9** will insert a RTD Bypass line leak (Small Break LOCA) when the reactor trip pushbuttons are depressed. **Plant Response:** The affected RCP seal and bearing temperatures increase. The seal outlet temperatures increase. The seal ΔP lowers or is negative. Pressurizer pressure and level begin to lower. **Cues:** • 1C03 1D 1-1, 1P-1A or B RCP Labyr Seal Water Inlet or Bearing Temp High • 1C03 1D 3-1, 1P-1A or B RCP No. 1 Seal Water Outlet Temperature High • 1C03 1D 4-1, 1P-1B RCP No. 1 Seal Delta P Low • Rising 1P-1B, RCP seal inlet, outlet and bearing temperatures as indicated on 1TI-125 and 1TI-182. • Indications of a Small Break LOCA **Expected Communications:** None	OATC/OS1 OATC OATC/BOP	Recognizes degrading plant conditions and AOP-1B Unit 1, Foldout Page RCP trip criteria and goes to Step 18. ○ RCP No. 1 Seal leakage ○ Greater than 6 gpm with seal water outlet temperature rising ○ Less than 0.8 gpm with seal water outlet temperature rising 18. Secure Affected RCP a. Trip the reactor **NOTE: The pending ATWS will interrupt performance of Step 18 and should not be completed until exit of CSP-S.1 Unit 1, Response to Nuclear Power Generation / ATWS and return to EOP-0 Unit 1, Reactor Trip or Safety Injection.** b. Stabilize the plant using EOPs while continuing with this procedure c. Trip affected RCP d. Check at least one RCP running e. Shut associated PZR normal spray valve ○ 1RC-431B for RCP B f. Check affected RCP has been tripped for 3 minutes g. Shut affected RCP No. 1 seal water return MOV ○ 1CV-270B for RCP B h. Check RCP seal water bypass control valve shut • 1CV-386 19. Return to Procedure And Step In Effect

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 7: **Reactor fails to trip (ATWS)** **Start:** _____	**PRELOAD:** [MAL1PPL001A, REACTOR TRIP BREAKER 52/RTA FAILURE, VALUE = Fails to Open] [MAL1PPL001B, REACTOR TRIP BREAKER 52/RTB FAILURE, VALUE = Fails to Open] **Plant Response:** The reactor will not trip from the control room. The crew will have to take actions IAW CSP-S.1, Subcriticality procedure and open the RTBs locally. **Cues:** • RTBs NOT open • PR NIs greater than 5% **Expected Communications:** **FOLLOWING** the PA announcement for ATWS or when directed to locally open the reactor trip breakers, allow 2 minutes for travel to the Rod Drive Room and **THEN** report to the control room. **WHEN** directed to open the Unit 1 reactor trip breakers change MAL1PPL001A and MAL1PPL001B to Trip and **THEN** report the reactor trip breakers are open. NOTE: If necessary, delay reporting the AO is in the Rod Drive Room to allow the crew to initiate emergency boration.	OS1 OATC OS1 OATC	DIRECT a reactor trip IMPLEMENTS **EOP-0 Unit 1, Reactor Trip or Safety Injection** 1. Verify Reactor Trip RNO: Manually trip reactor: • Train A • Train B **IF** reactor power is greater than or equal to 5% OR intermediate range SUR is positive, **THEN** Go to CSP-S.1 UNIT 1, RESPONSE TO NUCLEAR POWER GENERATION / ATWS. ENTER **CSP-S.1, Response to Nuclear Power Generation / ATWS** ***CT-52 Insert negative reactivity into the core*** 1. Verify Reactor Trip RNO: Manually trip reactor **IF** reactor will **NOT** trip, **THEN** allow control rods to insert automatically until rod speed is less than 36 STEPS/MINUTE, **THEN** manually insert control rods 2. Verify Turbine Trip Monitor Foldout Page Criteria: 3. Verify AFW Pumps – RUNNING a. Motor-Driven Pump – RUNNING RNO: **WHEN** SI sequence is complete, **THEN** manually start motor-driven AFW pump. b. Turbine-Driven Pump - RUNNING RNO: Open both steam supply valves to turbine-driven AFW pump • 1MS-2020 • 1MS-2019

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
		BOP	4. Initiate Emergency Boration of RCS: 5. Check if the Following Trips have Occurred: a. Reactor – TRIPPED RNO: Dispatch operator to locally open trip and bypass breakers in rod control room. b. Turbine - TRIPPED 6. Check If Reactor is Subcritical: a. Power range channels - Less than 5%; RNO: OBSERVE CAUTIONS PRIOR TO STEP 7. Go to Step 7 b. Intermediate range channels – NEGATIVE STARTUP RATE RNO: OBSERVE CAUTIONS PRIOR TO STEP 7. Go to Step 7 c. OBSERVE CAUTION PRIOR TO STEP 15. Go to Step 15
		OATC	**CAUTION: Boration should continue to obtain adequate shutdown margin during subsequent actions.** 15. Ensure Emergency Boration Is Proper For Current Plant Conditions 16. Return To Procedure And Step In Effect
		BOP	

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 8: **Safety Injection Pump failures: 1P-15A, Safety Injection pump trips upon starting and 1P-15B, Safety Injection pump fails to auto start**	**PRELOAD:** [MOT1SIS001, 1-P15A SAFETY INJECTION PUMP, Winding Ground] [BKR1SIS002, 1-A5285 P-15B SAFETY INJ PUMP CKTBKR, Failautocl] **Expected Communications:** • **IF** an AO is dispatched to locally investigate 1P-15A, Safety Injection pump, wait 2 minutes and **THEN** report that the motor is hot to the touch and there is a faint acrid smell in the area. There is no fire. • **IF** an AO is dispatched to locally investigate breaker 1A52-59, Pwr to 1P-15A, Safety Injection Pump, wait 2 minutes and **THEN** report the breaker has tripped.	OS1 OATC BOP BOP OATC	Implements **EOP-0, Unit 1 Reactor Trip or Safety Injection** 1. Verify Reactor Trip 2. Verify Turbine Trip 3. Verify Power to AC Safeguards Buses 4. Check if SI is Actuated a. Any SI annunciators LIT b. Both trains of SI - Actuated RNO: Manually actuate both trains of SI and CI **NOTE: Following immediate actions, CREW may manually start a Safety Injection Pump in accordance with OM 3.7, AOP And EOP Procedure Usage For Response To Plant Transients.** **NOTE: The ATWS interrupted performance of AOP-1B Unit 1. Step 18 and should now be completed upon the return to EOP-0 Unit 1, Reactor Trip or Safety Injection.** Monitor Foldout Page Criteria: **RCP Trip Criteria** **IF** both conditions listed below occur, **THEN** trip both RCPs: • RCS subcooling - LESS THAN [40 ºF] 31 ºF • SI Pumps - AT LEAST ONE RUNNING AND CAPABLE OF DELIVERING FLOW 5. Perform ATTACHMENT A, Automatic Action Verification while continuing with this procedure 6. Verify AFW pumps – Running 7. Check RCP Seal Cooling 8. Check RCS Temperatures 9. Check PZR PORVs and Spray Valves 10. Check if RCPs should be stopped 11. Check if SGs are NOT Faulted 12. Check if SG Tubes are NOT Ruptured 13. Check if RCS is Intact RNO: Go to EOP-1 UNIT 1, LOSS OF REACTOR OR SECONDARY COOLANT

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
	EOP-0 Unit 1, Attachment A **Expected Communications:** • **WHEN** directed to locally check shut RW Service Water valves, LW-61 and 62, **THEN** report both valves are closed. • **WHEN** directed to locally check CW pump house temperature <105 ºF, wait 3 minutes and **THEN** report the temperature is 72 ºF and stable. • **WHEN** directed to locally check G03/G04 Switchgear Room temperature <95 ºF, wait 3 minutes and **THEN** report the temperature is 75 ºF and stable. • **IF** directed to periodically check the status of spent fuel cooling, wait 5 minutes and **THEN** report Spent Fuel Pool level is 63 feet, pool temperature is 67 ºF and both are stable.	BOP	**EOP-0 Unit 1, Attachment A, Automatic Action Verification** A1 Verify Feedwater isolation A2 Verify Containment Isolation ***CT-6, Establish flow from at least one high-head SI pump*** A3 Verify ECCS Pumps RUNNING a. SI Pumps – BOTH RUNNING RNO **WHEN** SI sequence is complete, **THEN** manually start SI pumps b. RHR Pumps – BOTH RUNNING A4 Verify Service Water Pumps RUNNING A5 Verify Containment Accident Cooling Units RUNNING A6 Verify Component Cooling Water Pumps – ONLY ONE RUNNING A7 Check If Main Steam Lines Can Remain Open A8 Verify Containment Spray Not required a. Containment pressure recorder – HAS REMAINED LESS THAN 25 psig A9 Verify ECCS Flow A10 Verify AFW valve alignment – PROPER EMERGENCY ALIGNMENT A11 Verify Proper ECCS Valve Alignment A12 Check Containment Spray NOT ACTUATED A13 Stop any boration via the blender in progress A14 Ensure the Auxiliary Building Filter/Exhaust Fans – OPERATING A15 Verify Service Water System Alignment A16 Check Miscellaneous Valves – SHUT A17 Check Control Room Ventilation A18 Check Cable Spreading Room Ventilation System – OPERATING A19 Check Computer Room Ventilation System – OPERATING A20 Check AFW Recirc fans – ONE RUNNING A21 Check Circulating Water Pump House Temperature Less Than 105°F A22 Check G03/G04 Switchgear Room Temperature less than 95°F A23 Periodically check status of spent fuel cooling

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
	Termination Criteria: Terminate the scenario when crew has completed Step 13 of EOP-1 Unit 1, Loss of Reactor or Secondary Coolant or at the discretion of the Lead Examiner.	OS1 BOP	Implements **EOP-1 Unit 1, Loss of Reactor or Secondary Coolant** 1. Check If RCPs Should Be Stopped 2. Check If SGs Are **NOT** Faulted 3. Check Intact SG Level 4. Check Secondary Radiation 5. Check PZR PORV and Block Valves 6. Reset SI 7. Reset Isolation and Lockout Signals 8. Establish Instrument Air to Containment a. Check instrument air header pressure – GREATER THAN 80 PSIG b. Open instrument air containment isolation valves one at a time • 1IA-3047 • 1IA-3048 9. Check Power Supply To Charging Pumps 10. Check If Charging Flow Has Been Established 11. Check If ECCS Flow Should Be Terminated RNO: Go to Step 12. 12. Check If Containment Spray Should Be Stopped 13. Check If RHR Pumps Should Be Stopped a. Check RCS pressure 1) Pressure - GREATER THAN [450 PSIG] 325 PSIG 2) Pressure - STABLE OR RISING RNO: Go to Step 14

***** END OF SCENARIO *****

QUANTITATIVE ATTRIBUTES

(Use this form for NRC/INPO Evaluations only as required to document associated quantitative information.)

Malfunctions:

Before EOP Entry:

- 1FT-464, 1HX-1A SG Steam Flow Transmitter fails high (no auto shift to single element)
- 1PT-486, Turbine First Stage Pressure Transmitter fails low
- 1P-1A, Reactor Coolant Pump seal leak

After EOP Entry:

- Small Break LOCA from RTD By-pass Line
- Reactor fails to trip (ATWS)
- Safety Injection Pump failures
  - 1P-15A, Safety Injection pump trips upon starting
  - 1P-15B, Safety Injection pump fails to auto start

Abnormal Events:

- 1FT-464, 1HX-1A SG Steam Flow Transmitter fails high (no auto shift to single element)
- 1PT-486, Turbine First Stage Pressure Transmitter fails low
- 1P-1A, Reactor Coolant Pump seal leak

Major Transients:

- Small Break LOCA
- ATWS

Critical Tasks:

1. CT-6 Establish flow from at least one high-head SI pump
2. CT-52 Insert negative reactivity into the core

CT-6	Establish flow from at least one high-head SI pump
Applicable ERG Version	LP
Applicable ERG	E-0, ECA-0.2

Critical Task:

Establish flow from at least one Safety Injection pump before transition out of E-0

Plant Conditions:

- Reactor trip
- SI
- Small-break LOCA
- RCS pressure below high-head ECCS pumps shutoff head
- LP Plants:
  - Both Safety Injection pumps fail to start automatically
  - At least one SI pump can be started provided that manual action is taken as necessary

Cues:

- Indication and/or annunciation that SI pump injection is required
  - SI actuation
  - RCS pressure below the shutoff head of the SI pump

AND

- Indication and/or annunciation that no SI pump is injecting into the core
  - Control switch indication that the circuit breaker or contactors for both SI pumps are open
  - All SI pump discharge pressure reads zero
  - All flow rate indicators for SI pump injection read zero

Performance Indicator:

Manipulation of controls as required to establish flow from at least one SI pump

- Control switch indication that the circuit breaker or contactor for at least one SI pump
- Flow rate indication of injection from at least one SI pump

Feedback:

- Indication and/or annunciation that at least one SI pump is injecting
- Flow rate indication of injection from at least one SI pump

CT-52	Insert negative reactivity into the core
Applicable ERG Version	LP
Applicable ERG	FR-S.1

Critical Task:

Insert negative reactivity into the core by inserting control rods prior to completion of immediate actions.

Plant Conditions:

ATWS (Indication exists that the reactor is not tripped and that a manual reactor trip is not effective.)

Cues:

- Indication of ATWS

AND

- Indication that the reactor is not tripped and that a manual reactor trip is not effective

Performance Indicator:

Manipulation of controls in the control room as required to initiate the insertion of negative reactivity into the core

- For scenarios in which it is possible for the crew to insert control rods:
  - Group and individual rod position indication systems show control rods moving inward
  - Control rod banks sequentially reach core bottom (unless RTBs opened locally)

Feedback:

- Indication of a negative SUR on the intermediate range of the excore NIS
- Indication of less than 5% power on the power range of the excore NIS

1.0 Plant Conditions:

	Unit 1	Unit 2
Time in Core Life (MWD/MTU):	*1005*	
Reactor Power:	*28%*	
Boron Concentration:	*1874 ppm*	
Rod Height:	*CBD @ 152*	

2.0 Equipment Out of Service:

- 1PT-950, Loop B Containment Pressure has been removed from service. Repairs are expected to be complete during the upcoming refueling outage.
- 1W-3B, Control Rod Shroud Fan is OOS due to imminent motor failure.

3.0 Technical Specification LCOs NOT Met and Action Conditions in Effect:

LCO NOT Met	TSAC	Required Actions	Completion Time
3.3.2	A. One or more Functions with one or more channels or trains inoperable.	A.1 Enter the Condition referenced in Table 3.3.2-1 for the channel(s) or train(s).	Immediately
	D. One channel inoperable	D.1 Place channel in trip OR D.2.1 Be in MODE 3 AND D.2.2 Be in MODE 4	1 hour 7 hours 13 hours

4.0 Planned Evolutions:

- Secure Train ‘B’ main feed and condensate pumps.
- Raise power to 50% utilizing OP-1C Unit 1, Startup to Power Operation Unit 1.

5.0 Common:

- Safety Monitor is Green
- Today is Sunday, clock time is real time and you have a normal shift complement.

NEXTera ENERGY NUCLEAR FLEET	SIMULATOR EXERCISE GUIDE	SEG

SITE: **Point Beach** **Revision #:** **0**

LMS ID: **PBN LOI NRC 16E** **LMS Rev. Date:**

SEG TITLE: **2017 NRC Exam Scenario 2** **Note: modified to reflect "as-run" test conditions during session #2 of this scenario on 5/10/17.**

SEG TYPE: ☐ **Training** ☒ **Evaluation**

PROGRAM: ☐ **LOCT** ☒ **LOIT** ☐ **Other:**

DURATION: **90 minutes**

Developed by: _____ _____
Instructor/Developer Date

Reviewed by: _____ _____
Instructor (Instructional Review) Date

Validated by: _____ _____
SME (Technical Review) Date

Approved by: _____ _____
Training Supervision Date

Approved by: _____ _____
Training Program Owner (Line) Date

Facility: _Point Beach_____ Scenario No.: _2_**(Session #2)**___ Op-Test No.: _2017____

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: _Unit 1 is in OP 1C, Startup to Power Operation, at approximately 29% post chemistry hold coming out of a forced outage. At Chemistry's request 'B" Train of Main Feed and Condensate have been running for 5 minutes for iron flushing. 1W-3B, Control Rod Shroud Fan _ is OOS due to imminent motor failure. 1PT-950, Loop B Containment Pressure has been removed from service. Repairs are expected to be complete during the upcoming refueling outage._____

Turnover: Secure 1P-28B, SGFP and 1P-25B, Condensate Pump. Raise power to 50%._____

_____

Event No.	Malf. No.	Event Type*	Event Description
1		N-BOP N-SRO	Secure SG Feed Pump and Condensate Pump
2		R-RO N-BOP R-SRO	Raise power to 50%
3	XMT1SGN001A	I-BOP I-SRO TS-SRO	1FI-464, SG Steam Flow fails slowly high
4	XMT1MSS009A	**N/A**	**(event not run; simulator issue resulted in reactor trip before event)**
5	MAL1RCP001B	**N/A**	**(event not run; simulator issue resulted in reactor trip before event)**
6	MAL1RCS003F	M-ALL	Small Break LOCA from RTD Bypass Line occurs on reactor trip
7	MAL1PPL001A MAL1PPL001B	C-RO	Reactor fails to trip (CSP-S.1, Response to Nuclear Power Generation/ATWS)
8	MOT1SIS001 BKR1SIS002	C-BOP	1P-15A, SI Pump trips upon starting 1P-15B, SI Pump fails to start in Auto

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

SIMULATOR EXERCISE GUIDE REQUIREMENTS

Terminal Objective

Given specific plant conditions, the students will be able to respond to the failures listed below in accordance with plant procedures:

- 1FT-464, SG Steam Flow Transmitter fails high (no auto shift to single element)
- PT-486, Turbine First Stage Pressure fails low
- 1P-1B, Reactor Coolant Pump seal leak develops, then degrades to trip criteria
- Small Break LOCA
- Reactor fails to trip (ATWS)
- Safety Injection Pump failures
  - 1P-15A, Safety Injection pump trips upon starting
  - 1P-15B, Safety Injection pump fails to auto start

Embedded within these events is the expectation to properly utilize Technical Specifications.

Enabling Objectives:

None

Prerequisites:

1. Simulator available
2. Students enrolled in Initial License Program

Training Resources:

1. Floor Instructor as Shift Manager / Shift Technical Advisor
2. Simulator Booth Operator
3. Communicator
4. NRC Evaluators

References:

1. 0-SOP-IC-001 Blue, Routine Maintenance Procedure Removal Of Safeguards Or Protection Sensor From Service – Blue Channels
2. 0-SOP-IC-001 Red, Routine Maintenance Procedure Removal Of Safeguards Or Protection Sensor From Service – Red Channels
3. 0-SOP-IC-002, Technical Specifications LCO – Instrument Cross Reference
4. OP 1C, Startup to Power Operation Unit 1
5. AOP-1B Unit 1, Reactor Coolant Pump Malfunction
6. AOP-2B, Feedwater System Malfunction
7. AOP-24, Response to Instrument Malfunctions
8. ARP 1C03 1E2 3-2, Steam Generator A Feed Water Flow Channel Alert
9. ARP 1C03 1E2 4-2, Tavg Steam Dump Channel Alert
10. CSP-S.1 Unit 1, Response to Nuclear Power Generation / ATWS
11. EOP-0 Unit 1, Reactor Trip Or Safety Injection

12. EOP-1 Unit 1, Loss Of Reactor Or Secondary Coolant
13. OM 3.7, AOP And EOP Procedure Usage For Response To Plant Transients
14. Technical Specifications

Protected Content: **None**

Evaluation Method: Simulator performance will be evaluated in accordance with NUREG 1021.

Operating Experience: N/A

Risk Significant Operator Actions: HEP-ODA-EOP12-05, FAILURE TO COOLDOWN AN DEPRESSURIZE RS FO LONG TERM COOLING BY SECONDARY STEA, FV: 3.86E-02

UPDATE LOG: Indicate in the following table any minor changes or major revisions (as defined in TR-AA-230-1003) made to the material after initial approval. Or use separate Update Log form TR-AA-230-1003-F16.

#	DESCRIPTION OF CHANGE	REASON FOR CHANGE	AR/TWR#	PREPARER REVIEWER	DATE DATE
Rev. 0	Developed for 2017 NRC ILT Exam.				

OVERVIEW / SEQUENCE OF EVENTS

OVERVIEW

- Unit 1 is in OP 1C Unit 1, Startup to Power Operation Unit 1 at approximately 28% post chemistry hold coming out of a forced outage. At Chemistry's request, 'B' Train of main feed and condensate pumps have been running for 5 minutes for iron flushing.
  - Secure 1P-28B, Main Feedwater Pump and 1P-25B, Condensate Pump.
  - Raise power to 50% in accordance with OP 1C Unit 1, Startup to Power Operation Unit 1.
- OOS Equipment
  - 1PT-950, Loop B Containment Pressure has been removed from service. Repairs are expected to be complete during the upcoming refueling outage.
  - 1W-3B, Control Rod Shroud Fan is OOS due to imminent motor failure.

- Events
  - 1FT-464, 1HX-1A SG Steam Flow Transmitter fails high (no auto shift to single element)
  - 1PT-486, Turbine First Stage pressure transmitter fails low
  - 1P-1B, Reactor Coolant Pump seal leak develops, then degrades to trip criteria
  - Small Break LOCA
  - Reactor fails to trip (ATWS)
  - Safety Injection Pump failures
    - 1P-15A, Safety Injection pump trips upon starting
    - 1P-15B, Safety Injection pump fails to auto start

- Terminate the scenario when crew has completed Step 13 of EOP-1 Unit 1, Loss of Reactor or Secondary Coolant.

SEQUENCE OF EVENTS

ALL TIMES IN THIS SCENARIO ARE APPROXIMATE

Event #	Description
1.	Secure 1P-28B, Main Feedwater Pump and 1P-25B, Condensate Pump
2.	Raise power to 50% (or per Lead Examiner) in accordance with OP 1C Unit 1, Startup to Power Operation Unit 1.
3.	1FT-464, 1HX-1A SG Steam Flow Transmitter fails high (no auto shift to single element) • The crew should respond by taking 1FIC-466A, 1 HX-1A Primary Flow Indicating Controller to manual and controlling steam generator level. • The crew should implement AOP-24, Response to Instrument Malfunctions and 0-SOP-IC-001 Red, Routine Maintenance Procedure Removal of Safeguards or Protection Sensor from Service – Red Channels to shift to a new controlling channel and take the flow transmitter out of service. • The crew may implement ARP 1C03 1E2 2-2, Steam Generator A Feed Water Flow High to shift to a new controlling channel.

4.	1PT-486, Turbine First Stage Pressure Transmitter fails low
	• The crew should implement :
	  • ARP 1C03 1E2 4-2, Tavg Steam Dump Channel Alert and realign the condenser steam dump system for continued operation.
	  • AOP-24, Response to Instrument Malfunction and 0-SOP-IC-001 Blue, Routine Maintenance Procedure Removal of Safeguards or Protection Sensor from Service – Blue Channels to take the transmitter out of service
	  • Technical Specifications for the failed channel

5.	1P-1B, Reactor Coolant Pump seal leak develops, then degrades requiring a reactor trip • Unit conditions degrade such that AOP-1B Unit 1, Foldout Page criteria are met and a transition to Step 18 to trip the unit and secure the pump is warranted.
6.	Small Break LOCA from RTD bypass line • Will result in a Safety Injection signal

7.	Reactor fails to trip (ATWS) • Upon failure of the reactor to trip from the control room, the crew should transition from AOP-1B Unit 1/EOP-0 Unit 1, Reactor Trip or Safety injection to CSP-S.1 Unit 1, Response to Power Generation / ATWS. • After completing the actions in CSP-S.1 Unit 1, the crew should transition back to EOP-0 Unit 1, Step 1 RNO. • Concurrent with the implementation of EOP-0 Unit 1, the crew should complete the remainder of AOP-1B Unit 1 Step 18 which was suspended when entering CSP-S.1Unit 1. • The crew should complete the actions of EOP-0 Unit 1 and transition to EOP-1 Unit 1, Loss Of Reactor Or Secondary Coolant and then to EOP-1.2 Unit 1, Post LOCA Cooldown and Depressurization to address the Small Break LOCA.
8.	Safety Injection Pump failures: 1P-15A, Safety Injection pump trips upon starting and 1P-15B, Safety Injection pump fails to auto start • Following immediate actions of EOP-0 Unit 1, The crew may manually start a Safety Injection Pump in accordance with OM 3.7, AOP And EOP Procedure Usage For Response To Plant Transients, otherwise pump start is addressed in EOP-0 Unit 1, Attachment A, Step A3.a.RNO .
STOP	Terminate the scenario when crew has completed Step 9 of EOP-1 Unit 1, Loss of Reactor or Secondary Coolant.

SIMULATOR SET UP INSTRUCTIONS

Perform simulator set up per the site specific Simulator Setup Checklist.

General Instructions

Simulator Setup Instructions:

- Load **IC-7** and go to run
- Open the saved Event and Schedule files from the secure drive:
- Verify all commands listed in table below are contained in the Schedule File
- Insert the setup malfunction(s)
- Reposition bistable switches for: **1PT-950, Loop B Containment Pressure Transmitter**
- Make any necessary adjustments or corrections
- Freeze the simulator and save to scenario specific IC
- Re-initialize into saved IC and go to run
- Open and start the Event and Schedule files
- Open and start InSight and Alarm files for data collection
- Run the scenario real time
- Save InSight, Event, Alarm, Schedule Files to the secure drive and collect procedure markups for SBT
- Complete TR-AA-23001008-F01 Scenario Based Testing (SBT) Checklist

Multiple Use:

- Load saved IC and go to run
- Open the saved Event and Schedule files:
- Start the Schedule File
- Walk down the control boards to ensure plant conditions accurately reflect the scenario's initial conditions
- Make any necessary adjustments or corrections
- Update documentation if required
- Resave if required
- Turnover to the crew

SIMULATOR – SCENARIO SETUP:

Setup: 1PT-950, Loop B Containment Pressure Transmitter is out of service

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
XMT1CNM017A	1-PT950 LOOP B CONT PRESSURE XMTR FIXED OUTPUT				00 :00 :00	-	90	**Preload**

Simulator Setup:

1. Place OOS magnet at PT-950, Containment Pressure
2. Place a RED dot on C01 B 1-5, U1 Containment Pressure Channel Alert
3. Place 1W-3B CS in pull-out, install OOS magnet.
4. Install an orange Guarded magnet at 1W-3A.

SIMULATOR MALFUNCTIONS:

Event 1: Secure 1P-28B, Main Feedwater Pump and 1P-25B, Condensate Pump.
Event 2: Raise power to 50% in accordance with OP 1C Unit 1, Startup to Power Operation Unit 1.

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
LOA1CFW079	1-P73A 1P-28B SGFP AC LUBE OIL PUMP CS	-	-	11	`-	-	ON	**Directed from Crew**

Expected field communications:

1. [5.31.17.c] 1P-73A-CS, P-73A SGFP AC Lube Oil Pump Local Stl Station is ON. **(Trigger 11)**
2. [5.31.17.c.3)] Lowering suction flow at 1FI-2188, 1P-28B SGFP Suction Flow Indicator.
3. [5.31.17.d.2)] 1P-25B, Condensate pump is stopped and not rotating backwards.

Event 3: 1FT-464, 1HX-1A SG Steam Flow Transmitter fails high (no auto shift to single element)

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
XMT1SGN001A	1-FT464 LOOP A STEAM FLOW FIXED OUTPUT	00 :00 :00	00 :00 :45	1	00 :00 :00	-	2.0	**PLE**

Expected field communications:

1. None

Event 4: 1PT-486, Turbine First Stage Pressure Transmitter fails low

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
XMT1MSS009A	1-PT486 FIRST STAGE PRESSURE XMTR FIXED OUTPUT	00 :00 :00	00 :00 :05	3	00 :00 :00	-	0	**PLE**

Expected field communications:

1. **IF** and AO is dispatched to locally investigate 1PT-486, Turbine First Stage Pressure Transmitter, wait two minutes and **THEN** report that locally there doesn't seem to anything out of normal.

Event 5: 1P-1B, Reactor Coolant Pump seal leak develops, then degrades to trip criteria

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
MAL1RCP001B	RCP #1 SEAL FAILURE PUMP B	00 :00 :00	00 :05 :00	5	00 :00 :00	-	5	**PLE**
LOA1CVC048	1-CV-300B P-1B RCP SEAL INJ THROTTLE	00 :00 :00	00 :00:00	-	00 :00 :00	-	Per Crew Direct.	**When directed by the Crew**
MAL1RCP001B	RCP #1 SEAL FAILURE PUMP B	00 :00 :00	00 :01 :00	7	00 :00 :00	5	300	**PLE**

Expected field communications:

1. **IF** the PAB AO is dispatched to monitor Unit 1 Reactor Coolant Drain Tank level; call up Instructor Station Drawing 1WPS1 and **THEN** report as indicated. The change in RCDT level should indicate a <1% change in 5 minutes.
2. **IF** the PAB AO is directed to throttle 1CV-300B, 1P-1B RCP Seal Injection Throttle Valve; coordinate with the Control Room and **THEN** make adjustments using **LOA1CVC048, 1-CV-300B P-1B RCP SEAL INJ THROTTLE** as directed.

Event 6: Small Break LOCA

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
MAL1RCS003F	RTD BYPASS LINE LEAK LOOP B COMMON	00 :00 :00	00 :00 :30	9 Cond			75	1C04 Trip pushbuttons [X14I055A == 1 | X14I057A == 1]

Expected field communications:

1. None

Event 7: Reactor fails to trip (ATWS)

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
MAL1PPL001A	REACTOR TRIP BREAKER 52/RTA FAILURE	00 :00 :00	-	-	00 :00 00	-	Fails to Open	**PRELOAD**
MAL1PPL001B	REACTOR TRIP BREAKER 52/RTB FAILURE	00 :00 :00	-	-	00 :00 :00	-	Fails to Open	**PRELOAD**

Expected field communications:

1. **FOLLOWING** the PA announcement for ATWS or when directed to locally open the reactor trip breakers, allow 2 minutes for travel to the Rod Drive Room and **THEN** report to the control room. **WHEN** directed to open the Unit 1 reactor trip breakers change MAL1PPL001A and MAL1PPL001B to Trip and **THEN** report the reactor trip breakers are open

Event 8: Safety Injection Pump failures: 1P-15A, Safety Injection pump trips upon starting and 1P-15B, Safety Injection pump fails to auto start

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
MOT1SIS001	1-P15A SAFETY INJECTION PUMP	00 :00 :00	-	-	00 :00 :00	-	Winding Ground	**PRELOAD**
BKR1SIS002	1-A5285 P-15B SAFETY INJ PUMP CKTBKR	00 :00 :00	-	-	00 :00 :00	-	Failauto cl	**PRELOAD**

Expected field communications:

1. **WHEN** directed to locally check RW Service Water valves, LW-61 and 62, **THEN** report both valves are shut.
2. **WHEN** directed to locally check CW pump house temperature <105 ºF, wait 3 minutes and **THEN** report the temperature is 72 ºF and stable.
3. **WHEN** directed to locally check G03/G04 Switchgear Room temperature <95 ºF, wait 3 minutes and **THEN** report the temperature is 75 ºF and stable.
4. **IF** directed to periodically check the status of spent fuel cooling, wait 5 minutes and **THEN** report Spent Fuel Pool level is 63 feet, pool temperature is 67 ºF and both are stable.
5. **IF** an AO is dispatched to locally investigate 1P-15A, Safety Injection pump, wait 2 minutes and **THEN** report that the motor is hot to the touch and there is a faint acrid smell in the area. There is no fire.
6. **IF** an AO is dispatched to locally investigate breaker 1A52-59, Pwr to 1P-15A, Safety Injection Pump, wait 2 minutes and **THEN** report the breaker has tripped.

BRIEF / TURNOVER INFORMATION

- Conduct simulator crew pre-scenario brief using TR-AA-230-1007-F06, Simulator Instructor Pre-Exercise Checklist.
- Brief the scenario evaluators
- Brief surrogates using TR-AA-230-1007-F11, Surrogate Brief Checklist, if necessary.
- Crew Shift Turnover Information: See Attached

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 1: **Secure 1P-28B, Main Feedwater Pump and 1P-25B, Condensate Pump.** **Start:** _____	**Unit 1 is in OP 1C, Startup to Power Operation Unit 1, at approximately 28% post chemistry hold coming out of a forced outage. At Chemistry's request, train 'B' main feedwater and condensate pumps have been run for 5 minutes for iron flushing.** **Expected Communications:** • [5.31.17.c] 1P-73A-CS, P-73A SGFP AC Lube Oil Pump Local Stl Station is ON. **(Trigger 11)** • [5.31.17.c.3)] Lowering suction flow at 1FI-2188, 1P-28B SGFP Suction Flow Indicator. • [5.31.17.c..6] MFP coastdown SAT • [5.31.17.d.2)] 1P-25B, Condensate pump is stopped and not rotating backwards.	CREW	Implements **OP 1C Unit 1, Startup to Power Operation Unit 1** 5.31.17 **WHEN** a minimum of 5 minutes of flushing is obtained on the train of main feed and condensate, **THEN DETERMINE** main feed and condensate train to be secured as follows: a. **ENSURE** 1PC-2273, Low Pressure Heater Bypass Pressure Controller, SET to 190 psig b. N/A c. **IF** 1P-28B, Steam Generator Feed Pump, will be STOPPED, **THEN PERFORM** the following: 1) **POSITION** 1P-73A,-CS, P-73A SGFP AC Lube Oil Pump Local Ctl Station, to ON. 2) **SHUT** 1CS-2189, 1P-28B SGFP Discharge MOV by positioning 1CS2189-CS, 1P-28B SGFP Discharge MOV control switch, to CLOSE. 3) **MONITOR** 1CS-2189 closure and decreasing suction flow at 1FI-2188, 1P-28B SGFP Suction Flow Indicator. 4) **BEFORE** 1CS-2189 reaches fully SHUT, **THEN HOLD** 1CS-2189-CS in CLOSE position. 5) **ENSURE** 1CS-2188, 1P-28B SGFP Mini Recirc Flow Control, begins modulating OPEN 6) **STOP** 1P-28B by positioning 1P-28B-CS, 1P-28B Steam Generator Feed Pump Control Switch, to STOP. 7) **RELEASE** 1CS-2189-CS. 8) **OBSERVE** 1CS-2188 goes fully SHUT, **THEN POSITION** 1P-28B-CS to PULLOUT. d. **STOP** a Condensate Pump 1) **POSITION** selected condensate pump control switch in **PULLOUT**. Remaining pump control switch may be marked N/A: 2) Locally **ENSURE** pump selected in STEP 5.3.17.d.1) has stopped (**NOT** rotating backwards) 3) **RETURN** condensate pump control switch in PULLOUT, to AUTO. Remaining pump control switch may be marked N/A:

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
			5.31.18 **NOTIFY** Chemistry MFP / Cond pump bump is complete. 5.32 **WHEN** directed by Shift Management, **THEN PLACE** an additional feed train in service as follows: Deferred to 50% - 60% power

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 2: **Raise power to 50% in accordance with OP 1C Unit 1, Startup to Power Operation Unit 1.** **Start:** _____	**Raise power to 50% in accordance with OP 1C Unit 1, Startup to Power Operation Unit 1.** **Expected Communication: SM** • If necessary, prompt the crew to continue with the power ascension. • If requested, report that NP 2.1.5 notifications have been completed. **Continuation Criteria:** Once the crew has raised reactor power about 3% to 5%. Or at the discretion of the Lead Examiner, continue to the next event.		5.33 Restriction For Continued Load Escalation 5.33.1 **IF** Step 5.27 was performed, **THEN BEFORE** continued load escalation, **PERFORM** the following: a. **DETERMINE** magnitude and rate of continued load escalation and **RECORD** below: (15%/hr) b. **INITIATE** notification of continued load escalation in accordance with NP 2.1.5, Electrical Communications, Switchyard Access and Work Planning. 5.33.2 **WHEN** power is approximately 35%, **THEN CHECK** the following indications: 5.34 Load Escalation 5.34.1 **NOTIFY** Turbine Hall Operator to monitor the following: 5.34.2 **NOTIFY** Primary Auxiliary Building (PAB) Operator, to **PERFORM** the following: 5.34.3 **IF** determined necessary by Operations Shift Management, **THEN LOWER** the PPCS constants for SG Blowdown Flow by 5 KLBS/hr. 5.34.4 **IF** required, **THEN PLACE** an additional Letdown Orifice in service. 5.35.1 **IF** Step 5.32 was performed, **THEN ENSURE** one hour has elapsed beyond the time recorded in Step 5.32.2. 5.35.2 **WHEN** Reactor Engineering activities are complete, **THEN RESUME** power escalation, observing any other required Reactor Engineering hold points. 5.35.3 On 1C03, **ENSURE** 1DTIC-2525, T-23 HDT Differential Temperature Indicator Ctlr, is selected to AUTO 5.35.4 **CONTINUE** load escalation as follows: a. **ENSURE** Governor Valves are off Valve Positon Limiter (VPL) b. **MOVE** Valve Position Limiter (VPL) to its desired position (e.g., 100% value) c. **SELECT** the desired EH Control System mode of Operation and **MARK** mode **NOT** selected N/A: d. **SHIFT** to the selected rate recorded ins Step 5.33.1.a.

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
			5.36 Continuous Action During Power Increase 5.36.1 **MAINTAIN** controls in AUTO as practicable 5.36.2 **MAINTAIN** Control Banks within the insertion, sequence, and overlap limits specified in the COLR. LCO 3.1.6 5.36.3 **MAINTAIN** Tavg within 1.5°F of Tref 5.36.4 **ADJUST** Power Range NIS as directed by 1-TS-RE-001, Power Level Determination Unit 1 5.36.5 **MAINTAIN** VARS OUT while keeping the null meter zeroed. 5.36.6 **MAINTAIN** the controller setpoint for the LP Feed Water Heater Bypass Valve (1CS-2273, LP FWH Bypass Press Controller) at 25 psig below SG Feed Pump suction pressure 5.36.7 **MONITOR** FWH/MSR high level alarms to check the dump valves control level 5.36.8 **MONITOR** Ice Melt operations as necessary. 5.36.9 **IF** required, **THEN CONTINUE OPENING** MSR Control Valves using manual operation of controller 1HX-2085 at the rate of less than or equal to 25°F per 30 minutes. 5.36.10 **WHEN** power is approximately 35%, **THEN CHECK** the following: OP 5B Blender Operation / Dilution / Boration, Attachment C, Alternate Dilution 4.1 ESTIMATE the amount of water addition 4.2 SET desired quantity on YIC-111A, Reactor Makeup Water Flow Counter 4.3 SET desired flow rate on HC-111, Reactor Makeup Water Flow Controller 4.4 IF desired to place all dilution flow to the charging pump suction, THEN CLOSE CV-110C, Z-1 BA Blender to VCT FCV. 4.5 PLACE Reactor Makeup Mode Selector Switch in ALT DIL 4.6 PLACE Reactor Makeup Control Switch to START.

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 3: **1FT-464, 1HX-1A SG Steam Flow Transmitter fails high (no auto shift to single element)** **Start:** _____	**Trigger 1** [XMT1SG001A, 1-FT464 LOOP A STEAM FLOW FIXED OUTPUT, RAMP = 00 :00 :20, VALUE = 2.0] Insert **Trigger 1** to cause 1FT-464, 1HX-1A SF Steam Flow Transmitter to fail high (no auto shift to single element. **Plant Response:** 1HX-1A Steam Generator level deviates bringing in alarms for 1C03 1E2 1-2, Steam Generator A Level Setpoint Deviation / Trouble and 1C03 1E2 2-2, Steam Generator A Feed Water Flow High. The Steam Generator Water Level Control System - level dominant system response then drives affected steam generator level back to normal level. **Cues:** • 1C03 1E2 1-2, Steam Generator A Level Setpoint Deviation / Trouble • 1C03 1E2 3-2, Steam Generator A Feed Water Flow Channel Alert • 1FI-464 increasing to 2E6 PPH. **Expected Communications:** None The crew may elect to exercise the ARP to switch controlling channels prior to implementing 0-SOP-IC-001 Red, Routine Maintenance Procedure Removal Of Safeguards Or Protection Sensor From Service – Red Channels.	BOP OS1 BOP OS1 BOP	Acknowledges alarms, identifies 1FT-464, 1HX-1A SG Steam Flow Transmitter has failed to a higher value and references the ARPs. Implements **AOP-24, Response to Instrument Malfunctions** 1. Identify Failed Instrument 2 Check If Failed Instrument Is A Controlling Channel 3. Establish Manual Control As Required 4. Return Affected Parameter(s) To Desired Value(s) 5. Using Attachment A, PPCS PARAMETERS USED TO CALCULATE REACTOR THERMAL OUTPUT, Verify That Failed Instrument Is NOT An Input To RTO 6. Remove Failed Instrument Channel From Service Per 0-SOP-IC-001, ROUTINE MAINTENANCE PROCEDURE REMOVAL OF SAFEGUARDS OR PROTECTION SENSOR FROM SERVICE 7. Return Controls To Automatic If Desired 8. Check Failure For Technical Specification Or TRM Applicability 9. Return To Procedure And Step In Effect May implement **AOP-2B, Feedwater System Malfunction** 1. Maintain Reactor Power Less Than Or Equal To 100% 2. Determine The Secondary System Malfunction And Go To the Appropriate Step 12. Perform The Following For Feed Regulating Valves: a. Check Feed Regulating Valve Response – NORMAL RNO a. Perform the following: 1) Place the affected feedwater regulating valve controller to manual or single element control. 2) Match feed flow to steam flow 3) Stabilize steam generator level. 4) IF transient caused by instrument failure, THEN defeat failed instrument per AOP-24, RESPONSE TO INSTRUMENT MALFUNCTIONS.

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
		BOP	Implements **0-SOP-IC-001 Red, Routine Maintenance Procedure Removal Of Safeguards Or Protection Sensor From Service – Red Channels** Remove from Service **NOTE: Steps 1 through 4 may be N/A'd if both transfer switches are already in "WHITE."** 1. **PLACE** Feedwater Regulating Valve in MANUAL: FIC-466A, HX-1A Primary Flow Indicating Controller **NOTE: Controlling channel will be FT-465.** 2. **PLACE** SG A Steam Flow Control Transfer Switch to "465" (WHITE). **NOTE: Controlling change will be FT-467.** 3. **PLACE** SG A Feedwater Flow Control Transfer Switch to "467" (WHITE). 4. **PLACE** Feedwater Regulating Valve Controller in AUTO unless directed otherwise by Shift Management: FIC-466A, HX-1A Primary Flow Indicating Controller 5. In cabinet C-112, **PLACE** the following bistable trip switches in the "TRIP" positon (toggle switch up) and **CHECK** expected response.

BISTABLE SWITCHES TO TRIP CABINET C-112	PROVING LAMP	BISTABLE LAMP LIT	ANNUNCIATOR LIT
HIGH TRIP (F/464)	(Note 1)	HI STM FLO LINE A FC464A	NONE
HI HI TRIP (F/464)	Lit Unless Failed High	HI HI STM FLO LINE A FC464B	1CO3 1D 3-10
SF<FWF (F/466)	LIT Unless Indicated Feed Flow is .8x106 Greater than Steam Flow	NONE	1CO3 1E2 2-2
SF>FWF (F/466)	LIT Unless Indicated Feed Flow is .8x106 Greater than Feed Flow	STM FW FLOW DAE FC466C	1CO3 1E2 3-2
NOTE 1: Proving lamp will be lit IF indicated steam flow is BELOW the High Stream Flow per STPT 2.2 section 1.2.1.			

6. REMOVE from scan PPCS point ID FT466V, SA A-1 SF RED.

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
		OS	Reference Technical Specifications **Technical Specifications:**

	A. One or more functions with one or more required channels or trains inoperable.	A.1 Enter the condition referenced in Table 3.3.1-1 for the channel(s) or train(s)	Immediately
Table 3.3.1-1 item 14-2 SF/FF Mismatch	D. One channel inoperable	D.1 Place channel in trip OR D.2 Be in MODE 3	1 hour 7 hours
Table 3.3.2-1 item 4d-1 SLI-High Steam Flow	D. One channel inoperable	D.1 Place channel in trip OR D.2.1 Be in MODE 3 AND D2.2 Be in MODE 4	1 hour 7 hours 13 hours
Table 3.3.2-1 item 4e-1 SLI-High Steam Flow	D. One channel inoperable	D.1 Place channel in trip OR D.2.1 Be in MODE 3 AND D2.2 Be in MODE 4	1 hour 7 hours 13 hours

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
	Continuation Criteria: Once the crew has • Switched controlling channels • Placed the FRV in auto, AND • Addressed technical specifications or at the discretion of the Lead Examiner, continue with the next event.	OS1 BOP	Implement **ARP 1C03 1E2 3-2, Steam Generator A Feed Water Flow Channel Alert** 3.4 **IF** alarm is due to an instrument failure, **THEN PERFORM** the following to select an operable control channel unless directed otherwise by Shift Management: 3.4.1 **IF** an of the following transmitters is failed, **THEN PERFORM** Steps 3.4.1.a through 3.4.1.e: • 1FT-464, Steam Flow Loop A a. **IF** 1PT-468, Steam Generator Pressure Loop A has failed, **THEN ENSURE** 1HC-468, SG A Atmospheric Steam Dump Controller in "MANUAL." b. **PLACE** 1FIC-466A, 1HX-1A Primary Flow Indicating Controller in "MANUAL." c. **PLACE** SG A Feedwater Flow Control Transfer Switch, to "467" (WHITE). d. **PLACE** SG A Steam Flow Control Transfer Switch, to "465" (WHITE). e. **PLACE** 1FIC-466A, 1HX-1A Primary Flow Indicating Controller in "AUTO" unless directed otherwise by Shift Management.

Note: AOP-2B, Feedwater System Malfunction, step 17.a requires checking Steam Generator level less than 78%. Since a simulator malfunction during this session resulted in a loss of the ability to manually control feedwater flow to the affected steam generator, this resulted in a transition to the step 17.a RNO column. The expected actions for the crew per the procedure then became:
-Shut affected feedwater regulating bypass valve.
-Trip the reactor.
-Stabilize plant using EOPs while continuing with procedure.
-Shut affected MSIV.
-Shut affected feedwater isolation valve.
-Stop both main feed pumps.

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
Start: _____ **Event 6: Small Break LOCA**	**Note: the following malfunction was inserted following the crew's actions in event 3.** **Trigger 9** [MAL1RCS003F, RTD BYPASS LINE LEAK LOOP B COMMON, Value = 75] **Trigger 9** will insert a RTD Bypass line leak (Small Break LOCA) when the reactor trip pushbuttons are depressed. **Plant Response:** Pressurizer pressure and level begin to lower. **Cues:** • Indications of a Small Break LOCA **Expected Communications:** None		

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 7: **Reactor fails to trip (ATWS)** **Start:** _____	**PRELOAD:** [MAL1PPL001A, REACTOR TRIP BREAKER 52/RTA FAILURE, VALUE = Fails to Open] [MAL1PPL001B, REACTOR TRIP BREAKER 52/RTB FAILURE, VALUE = Fails to Open] **Plant Response:** The reactor will not trip from the control room. The crew will have to take actions IAW CSP-S.1, Subcriticality procedure and open the RTBs locally. **Cues:** • RTBs NOT open • PR NIs greater than 5% **Expected Communications:** **FOLLOWING** the PA announcement for ATWS or when directed to locally open the reactor trip breakers, allow 2 minutes for travel to the Rod Drive Room and **THEN** report to the control room. **WHEN** directed to open the Unit 1 reactor trip breakers change MAL1PPL001A and MAL1PPL001B to Trip and **THEN** report the reactor trip breakers are open. NOTE: If necessary, delay reporting the AO is in the Rod Drive Room to allow the crew to initiate emergency boration.	OS1 OATC OS1 OATC	DIRECT a reactor trip IMPLEMENTS **EOP-0 Unit 1, Reactor Trip or Safety Injection** 1. Verify Reactor Trip RNO: Manually trip reactor: • Train A • Train B **IF** reactor power is greater than or equal to 5% OR intermediate range SUR is positive, **THEN** Go to CSP-S.1 UNIT 1, RESPONSE TO NUCLEAR POWER GENERATION / ATWS. ENTER **CSP-S.1, Response to Nuclear Power Generation / ATWS** ***CT-52 Insert negative reactivity into the core*** 1. Verify Reactor Trip RNO: Manually trip reactor **IF** reactor will **NOT** trip, **THEN** allow control rods to insert automatically until rod speed is less than 36 STEPS/MINUTE, **THEN** manually insert control rods 2. Verify Turbine Trip Monitor Foldout Page Criteria: 3. Verify AFW Pumps – RUNNING a. Motor-Driven Pump – RUNNING RNO: **WHEN** SI sequence is complete, **THEN** manually start motor-driven AFW pump. b. Turbine-Driven Pump - RUNNING RNO: Open both steam supply valves to turbine-driven AFW pump • 1MS-2020 • 1MS-2019

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
		BOP	4. Initiate Emergency Boration of RCS: 5. Check if the Following Trips have Occurred: a. Reactor – TRIPPED RNO: Dispatch operator to locally open trip and bypass breakers in rod control room. b. Turbine - TRIPPED 6. Check If Reactor is Subcritical: a. Power range channels - Less than 5%; RNO: OBSERVE CAUTIONS PRIOR TO STEP 7. Go to Step 7 b. Intermediate range channels – NEGATIVE STARTUP RATE RNO: OBSERVE CAUTIONS PRIOR TO STEP 7. Go to Step 7 c. OBSERVE CAUTION PRIOR TO STEP 15. Go to Step 15
		OATC	**CAUTION: Boration should continue to obtain adequate shutdown margin during subsequent actions.** 15. Ensure Emergency Boration Is Proper For Current Plant Conditions 16. Return To Procedure And Step In Effect
		BOP	

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 8: **Safety Injection Pump failures: 1P-15A, Safety Injection pump trips upon starting and 1P-15B, Safety Injection pump fails to auto start**	**PRELOAD:** [MOT1SIS001, 1-P15A SAFETY INJECTION PUMP, Winding Ground] [BKR1SIS002, 1-A5285 P-15B SAFETY INJ PUMP CKTBKR, Failautocl] **Expected Communications:** • **IF** an AO is dispatched to locally investigate 1P-15A, Safety Injection pump, wait 2 minutes and **THEN** report that the motor is hot to the touch and there is a faint acrid smell in the area. There is no fire. • **IF** an AO is dispatched to locally investigate breaker 1A52-59, Pwr to 1P-15A, Safety Injection Pump, wait 2 minutes and **THEN** report the breaker has tripped.	OS1 OATC BOP BOP OATC	Implements **EOP-0, Unit 1 Reactor Trip or Safety Injection** 1. Verify Reactor Trip 2. Verify Turbine Trip 3. Verify Power to AC Safeguards Buses 4. Check if SI is Actuated a. Any SI annunciators LIT b. Both trains of SI - Actuated RNO: Manually actuate both trains of SI and CI **NOTE: Following immediate actions, CREW may manually start a Safety Injection Pump in accordance with OM 3.7, AOP And EOP Procedure Usage For Response To Plant Transients.** **NOTE: The ATWS interrupted performance of AOP-1B Unit 1. Step 18 and should now be completed upon the return to EOP-0 Unit 1, Reactor Trip or Safety Injection.** Monitor Foldout Page Criteria: **RCP Trip Criteria** **IF** both conditions listed below occur, **THEN** trip both RCPs: • RCS subcooling - LESS THAN [40 ºF] 31 ºF • SI Pumps - AT LEAST ONE RUNNING AND CAPABLE OF DELIVERING FLOW 5. Perform ATTACHMENT A, Automatic Action Verification while continuing with this procedure 6. Verify AFW pumps – Running 7. Check RCP Seal Cooling 8. Check RCS Temperatures 9. Check PZR PORVs and Spray Valves 10. Check if RCPs should be stopped 11. Check if SGs are NOT Faulted 12. Check if SG Tubes are NOT Ruptured 13. Check if RCS is Intact RNO: Go to EOP-1 UNIT 1, LOSS OF REACTOR OR SECONDARY COOLANT

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
	EOP-0 Unit 1, Attachment A **Expected Communications:** • **WHEN** directed to locally check shut RW Service Water valves, LW-61 and 62, **THEN** report both valves are closed. • **WHEN** directed to locally check CW pump house temperature <105 ºF, wait 3 minutes and **THEN** report the temperature is 72 ºF and stable. • **WHEN** directed to locally check G03/G04 Switchgear Room temperature <95 ºF, wait 3 minutes and **THEN** report the temperature is 75 ºF and stable. • **IF** directed to periodically check the status of spent fuel cooling, wait 5 minutes and **THEN** report Spent Fuel Pool level is 63 feet, pool temperature is 67 ºF and both are stable.	BOP	**EOP-0 Unit 1, Attachment A, Automatic Action Verification** A1 Verify Feedwater isolation A2 Verify Containment Isolation ***CT-6, Establish flow from at least one high-head SI pump*** A3 Verify ECCS Pumps RUNNING a. SI Pumps – BOTH RUNNING RNO **WHEN** SI sequence is complete, **THEN** manually start SI pumps b. RHR Pumps – BOTH RUNNING A4 Verify Service Water Pumps RUNNING A5 Verify Containment Accident Cooling Units RUNNING A6 Verify Component Cooling Water Pumps – ONLY ONE RUNNING A7 Check If Main Steam Lines Can Remain Open A8 Verify Containment Spray Not required a. Containment pressure recorder – HAS REMAINED LESS THAN 25 psig A9 Verify ECCS Flow A10 Verify AFW valve alignment – PROPER EMERGENCY ALIGNMENT A11 Verify Proper ECCS Valve Alignment A12 Check Containment Spray NOT ACTUATED A13 Stop any boration via the blender in progress A14 Ensure the Auxiliary Building Filter/Exhaust Fans – OPERATING A15 Verify Service Water System Alignment A16 Check Miscellaneous Valves – SHUT A17 Check Control Room Ventilation A18 Check Cable Spreading Room Ventilation System – OPERATING A19 Check Computer Room Ventilation System – OPERATING A20 Check AFW Recirc fans – ONE RUNNING A21 Check Circulating Water Pump House Temperature Less Than 105°F A22 Check G03/G04 Switchgear Room Temperature less than 95°F A23 Periodically check status of spent fuel cooling

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
	Termination Criteria: Terminate the scenario when crew has completed Step 13 of EOP-1 Unit 1, Loss of Reactor or Secondary Coolant or at the discretion of the Lead Examiner.	OS1 BOP	Implements **EOP-1 Unit 1, Loss of Reactor or Secondary Coolant** 1. Check If RCPs Should Be Stopped 2. Check If SGs Are **NOT** Faulted 3. Check Intact SG Level 4. Check Secondary Radiation 5. Check PZR PORV and Block Valves 6. Reset SI 7. Reset Isolation and Lockout Signals 8. Establish Instrument Air to Containment a. Check instrument air header pressure – GREATER THAN 80 PSIG b. Open instrument air containment isolation valves one at a time • 1IA-3047 • 1IA-3048 9. Check Power Supply To Charging Pumps 10. Check If Charging Flow Has Been Established 11. Check If ECCS Flow Should Be Terminated RNO: Go to Step 12. 12. Check If Containment Spray Should Be Stopped 13. Check If RHR Pumps Should Be Stopped a. Check RCS pressure 1) Pressure - GREATER THAN [450 PSIG] 325 PSIG 2) Pressure - STABLE OR RISING RNO: Go to Step 14

***** END OF SCENARIO *****

QUANTITATIVE ATTRIBUTES

(Use this form for NRC/INPO Evaluations only as required to document associated quantitative information.)

Malfunctions:

Before EOP Entry:

- 1FT-464, 1HX-1A SG Steam Flow Transmitter fails high (no auto shift to single element)
- 1PT-486, Turbine First Stage Pressure Transmitter fails low
- 1P-1A, Reactor Coolant Pump seal leak

After EOP Entry:

- Small Break LOCA from RTD By-pass Line
- Reactor fails to trip (ATWS)
- Safety Injection Pump failures
  - 1P-15A, Safety Injection pump trips upon starting
  - 1P-15B, Safety Injection pump fails to auto start

Abnormal Events:

- 1FT-464, 1HX-1A SG Steam Flow Transmitter fails high (no auto shift to single element)
- 1PT-486, Turbine First Stage Pressure Transmitter fails low
- 1P-1A, Reactor Coolant Pump seal leak

Major Transients:

- Small Break LOCA
- ATWS

Critical Tasks:

1. CT-6 Establish flow from at least one high-head SI pump
2. CT-52 Insert negative reactivity into the core

CT-6	Establish flow from at least one high-head SI pump
Applicable ERG Version	LP
Applicable ERG	E-0, ECA-0.2

Critical Task:

Establish flow from at least one Safety Injection pump before transition out of E-0

Plant Conditions:

- Reactor trip
- SI
- Small-break LOCA
- RCS pressure below high-head ECCS pumps shutoff head
- LP Plants:
  - Both Safety Injection pumps fail to start automatically
  - At least one SI pump can be started provided that manual action is taken as necessary

Cues:

- Indication and/or annunciation that SI pump injection is required
  - SI actuation
  - RCS pressure below the shutoff head of the SI pump

AND

- Indication and/or annunciation that no SI pump is injecting into the core
  - Control switch indication that the circuit breaker or contactors for both SI pumps are open
  - All SI pump discharge pressure reads zero
  - All flow rate indicators for SI pump injection read zero

Performance Indicator:

Manipulation of controls as required to establish flow from at least one SI pump

- Control switch indication that the circuit breaker or contactor for at least one SI pump
- Flow rate indication of injection from at least one SI pump

Feedback:

- Indication and/or annunciation that at least one SI pump is injecting
- Flow rate indication of injection from at least one SI pump

CT-52	Insert negative reactivity into the core
Applicable ERG Version	LP
Applicable ERG	FR-S.1

Critical Task:

Insert negative reactivity into the core by inserting control rods prior to completion of immediate actions.

Plant Conditions:

ATWS (Indication exists that the reactor is not tripped and that a manual reactor trip is not effective.)

Cues:

- Indication of ATWS

AND

- Indication that the reactor is not tripped and that a manual reactor trip is not effective

Performance Indicator:

Manipulation of controls in the control room as required to initiate the insertion of negative reactivity into the core

- For scenarios in which it is possible for the crew to insert control rods:
  - Group and individual rod position indication systems show control rods moving inward
  - Control rod banks sequentially reach core bottom (unless RTBs opened locally)

Feedback:

- Indication of a negative SUR on the intermediate range of the excore NIS
- Indication of less than 5% power on the power range of the excore NIS

1.0 Plant Conditions:

	Unit 1	Unit 2
Time in Core Life (MWD/MTU):	*1005*	
Reactor Power:	*28%*	
Boron Concentration:	*1874 ppm*	
Rod Height:	*CBD @ 152*	

2.0 Equipment Out of Service:

- 1PT-950, Loop B Containment Pressure has been removed from service. Repairs are expected to be complete during the upcoming refueling outage.
- 1W-3B, Control Rod Shroud Fan is OOS due to imminent motor failure.

3.0 Technical Specification LCOs NOT Met and Action Conditions in Effect:

LCO NOT Met	TSAC	Required Actions	Completion Time
3.3.2	A. One or more Functions with one or more channels or trains inoperable.	A.1 Enter the Condition referenced in Table 3.3.2-1 for the channel(s) or train(s).	Immediately
	D. One channel inoperable	D.1 Place channel in trip OR D.2.1 Be in MODE 3 AND D.2.2 Be in MODE 4	1 hour 7 hours 13 hours

4.0 Planned Evolutions:

- Secure Train ‘B’ main feed and condensate pumps.
- Raise power to 50% utilizing OP-1C Unit 1, Startup to Power Operation Unit 1.

5.0 Common:

- Safety Monitor is Green
- Today is Sunday, clock time is real time and you have a normal shift complement.

NEXTera ENERGY NUCLEAR FLEET	SIMULATOR EXERCISE GUIDE	SEG

SITE: **Point Beach** **Revision #:** **0**

LMS ID: **PBN LOI NRC 17E** **LMS Rev. Date:**

SEG TITLE: **2017 NRC Exam Scenario 3**

SEG TYPE: ☐ **Training** ☒ **Evaluation**

PROGRAM: ☐ **LOCT** ☒ **LOIT** ☐ **Other:**

DURATION: **90 minutes**

Developed by: _____ _____
Instructor/Developer Date

Reviewed by: _____ _____
Instructor (Instructional Review) Date

Validated by: _____ _____
SME (Technical Review) Date

Approved by: _____ _____
Training Supervision Date

Approved by: _____ _____
Training Program Owner (Line) Date

Facility: _Point Beach_____ Scenario No.: _3_____ Op-Test No.: _2017____

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: _Unit 1 was lowered to approximately 75% at the request of MISO/ATC due to grid stability issues. Grid stability has been restored and the unit is ready to be returned to full power in accordance with OP 1C, Startup to Power Operations. 1P-2B, Charging Pump is OOS and isolated per OI 50, Charging Pump Isolation for pump repairs. 1W-3B, Control Rod Shroud Fan is OOS due to imminent motor failure. 1PT-950, Loop B Containment Pressure has been removed from service. Repairs are expected to be complete during the upcoming refueling outage._____

Turnover: _Commence raising power to 100%_____

_____

Event No.	Malf. No.	Event Type*	Event Description
1	BKR1SWS001	C-BOP C-SRO TS-SRO	P-32A, Service Water Pump trip with reduced head capacity on two running SW pumps
2	XMT1RMS076A	C-BOP C-SRO	1RE-219, SG Blowdown Monitor fails high off scale 1MS-2083, HX-1A SG Sample Isolation Control Valve fails open
3	MAL1RCS008A	R-RO N-BOP R-SRO TS-SRO	SG 'A' Tube Leak approximately 10 gpm (rapid down power)
4	MAL1CCW002A	C-BOP C-SRO TS-SRO	Running CCW Pump seal leak, lowering surge tank (Pumps need to be shifted)
5	MAL1GEN006	M-ALL	Voltage Regulator Trouble leading to a Main Generator Lockout
6	MALCRF001-B6 MALCRF001-B8 MALCRF001-C5 MALCRF001-E11	C-RO	Multiple (4) Stuck Rods post trip
7	MAL1RCS008A	M-ALL	SGTL turns into SGTR
8	CNH1PCS007B CNH1PCS008B	C-RO	Spray valves fail causing use of the PORV for RCS depressurization

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

SIMULATOR EXERCISE GUIDE REQUIREMENTS

Terminal Objective

Given specific plant conditions, the students will be able to respond to the failures listed below in accordance with plant procedures:

- P-32A, Service Water Pump trips with reduced head capacity on P-32B and P-32D.
- 1RE-219, SG Blowdown Monitors fails high off-scale
  - 1MS-2083, 1HX-1A SG Sample Isolation Control Valve fails to auto close.
- 1HX-1A, SG tube leak of approximately 10 gpm.
- The mechanical pump seal for 1P-11A, Component Cooling Water Pump begins leaking at an increased rate that causes a lowering CCW Surge Tank level.
- Main Turbine Generator Voltage Regulator Trouble results in Main Generator Lockout and reactor trip
- Multiple stuck rods post trip
- 1HX-1A SG tube leak increases in size to a steam generator tube rupture
- 1RC-431A and B, PZR Spray Valves fail closed.

Embedded within these events is the expectation to properly utilize Technical Specifications.

Enabling Objectives:

None

Prerequisites:

1. Simulator available
2. Students enrolled in Initial License Program

Training Resources:

1. Floor Instructor as Shift Manager / Shift Technical Advisor
2. Simulator Booth Operator
3. Communicator
4. NRC Evaluators

References:

1. AOP-3 Unit 1, Steam Generator Tube Leak
2. AOP-9A, Service Water System Malfunction
3. AOP-9B Unit 1, Component Cooling System Malfunction
4. AOP-17A Unit 1, Rapid Power Reduction
5. ARB 1C20 C 3-2, Unit 1 SG Blowdown Radiation High
6. EOP-0 Unit 1, Reactor Trip Or Safety Injection
7. EOP-0.1 Unit 1, Reactor Trip Response
8. EOP-3 Unit 1, Steam Generator Tube Rupture
9. OM 3.7, AOP And EOP Procedure Usage For Response To Plant Transients
10. OP 1C, Startup To Power Operation Unit 1
11. RMSARB CI 1RE-219
12. Technical Specifications

Protected Content: **None**

Evaluation Method: Simulator performance will be evaluated in accordance with NUREG 1021 Rev. 9.

Operating Experience: N/A

Risk Significant Operator Actions: HEP-ODC-EOP3-21, Operator fails to cooldown and depressurized the intact SG (SGTR). [FV: 7.19E-05]

UPDATE LOG: Indicate in the following table any minor changes or major revisions (as defined in TR-AA-230-1003) made to the material after initial approval. Or use separate Update Log form TR-AA-230-1003-F16.

#	DESCRIPTION OF CHANGE	REASON FOR CHANGE	AR/TWR#	PREPARER REVIEWER	DATE DATE
Rev. 0	Developed for 2017 NRC ILT Exam.				

OVERVIEW / SEQUENCE OF EVENTS

OVERVIEW

- 1P-2B, Charging Pump, is out of service for mechanical seal replacement. Work is expected to take another 4 hours.
- 1PT-950, Loop B Containment Pressure has been removed from service. Repairs are expected to be complete during the upcoming refueling outage.
- 1W-3B, Control Rod Shroud Fan is OOS due to imminent motor failure.
- Unit 1 was lowered to approximately 75% at the request of MISO/ATC due to grid stability issues. Grid stability has been restored and the unit is ready to be returned to full power in accordance with OP 1C, Startup to Power Operations.
- Commence raising power to 100%.

Events

- P-32A, Service Water Pump trips with reduced head capacity on P-32B and P-32D.
- 1RE-219, SG Blowdown Monitors fails high off-scale.
  - 1MS-2083, 1HX-1A SG Sample Isolation Control Valve fails to auto close.
- 1HX-1A, SG tube leak of approximately 10 gpm.
- The mechanical pump seal for 1P-11A, Component Cooling Water Pump begins leaking at an increased rate that causes a lowering CCW Surge Tank level.
- Main Turbine Generator Voltage Regulator Trouble results in Main Generator Lockout and reactor trip
- Multiple stuck rods post trip
- 1HX-1A SG tube leak increases in size to a steam generator tube rupture
- 1RC-431A and B, PZR Spray Valves fail closed.

Insert brief description of termination criteria.

- When the crew has stopped SI pumps and taken appropriate action(s) per step 30 of EOP-3 Unit 1, Steam Generator Tube Rupture, then verify with the Lead Evaluator, freeze the simulator, and take the shift.

SEQUENCE OF EVENTS

ALL TIMES IN THIS SCENARIO ARE APPROXIMATE

Event #	Description
1.	P-32A, Service Water Pump trips with reduced head capacity on P-32B and P-32D • The crew may start an idle SW pump to clear the low flow alarm. • The crew should respond by implementing AOP-9A, Service Water System Malfunction and referring to Technical Specifications.
2.	1RE-219, SG Blowdown Monitor fails high off-scale. 1MS-2083, 1HX-1A SG Sample Isolation Control Valve fails to auto close. • The crew should reference the RMSARB CI RE219 and take actions to align equipment that did not automatically reposition.
3.	1HX-1A, SG tube leak of approximately 10 gpm. • The crew should implement AOP-3 Unit 1, Steam Generator Tube Rupture, determine a leak rate and reference Technical Specifications. • The crew should make preparations to reduce load in accordance with OP 3A Unit 1, Power Operation to Hot Standby Unit 1 or AOP-17A Unit 1, Rapid Power Reduction.
4.	The mechanical pump seal for 1P-11A, Component Cooling Water Pump begins leaking at an increased rate that causes a lowering CCW Surge Tank level. • The crew should manually start 1P-11B, Component Cooling Water Pump, secure 1P-11A, implement AOP-9B Unit 1, Component Cooling System Malfunction and refer to Technical Specifications
5.	Main Turbine Generator Voltage Regulator Trouble results in Main Generator Lockout and reactor trip • Initially the crew should dispatch an Auxiliary Operator to investigate local alarms. • Once the unit has tripped the crew should respond by implementing EOP-0 Unit 1, Reactor Trip or Safety Injection and EOP-0.1 Unit 1, Reactor Trip Response.
6.	Multiple stuck rods post trip • The crew should borate in accordance with EOP-0.1 Unit 1, Reactor Trip Response.
7.	1HX-1A SG tube leak increases in size to a steam generator tube rupture • After addressing the stuck rods EOP-0.1 Unit 1, plant conditions degrade necessitating a safety injection and return to EOP-0 Unit 1, Step 4 per the Foldout Page Criteria in EOP-0.1 Unit 1. • The crew will then transition from EOP-0 Unit 1 to EOP-3 Unit 1, Steam Generator Tube Rupture to isolate the ruptured generator and cooldown/depressurize the unit to minimize primary to secondary coolant leakage.
8.	1RC-431A and B, PZR Spray Valves fail closed. • Unavailable normal spray will require the crew to use a PORV during the depressurization phase of EOP-3 Unit 1 in order to effectively reduce RCS pressure.
STOP	Terminate the scenario when the crew has stopped SI pumps and taken appropriate action(s) per step 30 of EOP-3 Unit 1,Steam Generator Tube Rupture.

SIMULATOR SET UP INSTRUCTIONS

Perform simulator set up per the site specific Simulator Setup Checklist.

General Instructions

Simulator Setup Instructions:

- Load **IC-4** and go to run
- Open the saved Event and Schedule files from the secure drive:
- Verify all commands listed in table below are contained in the Schedule File
- Insert the setup malfunction(s)
- Reposition bistable switches for: **1PT-950, Loop B Containment Pressure Transmitter**
- Make any necessary adjustments or corrections
- Freeze the simulator and save to scenario specific IC
- Re-initialize into saved IC and go to run
- Open and start the Event and Schedule files
- Open and start InSight and Alarm files for data collection
- Run the scenario real time
- Save InSight, Event, Alarm, Schedule Files to the secure drive and collect procedure markups for SBT
- Complete TR-AA-23001008-F01 Scenario Based Testing (SBT) Checklist

Multiple Use:

- Load saved IC and go to run
- Open the saved Event and Schedule files:
- Start the Schedule File
- Walk down the control boards to ensure plant conditions accurately reflect the scenario's initial conditions
- Make any necessary adjustments or corrections
- Update documentation if required
- Resave if required
- Turnover to the crew

SIMULATOR – SCENARIO SETUP:

SETUP Unit 1 was lowered to approximately 75%, ready to be returned to full power. OOS: 1P-2B, 1W-3B, 1PT-950

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
BKR1CVC006	1-B5213B P-2B CHARGING PUMP CKTBKR	-	-	-	`-	-	Fail Cont Fuse	**Preload**
XMT1CNM017A	1-PT950 LOOP B CONT PRESSURE XMTR FIXED OUTPUT				00 :00 :00	-	90	**Preload**

Simulator set-up:

1. Place 1P-2B CS in pullout
2. OOS-Maint magnet om 1P-2B
3. Orange "Guarded" magnets on 1P-2A and C
4. Place OOS magnet at PT-950, Containment Pressure
5. Place a RED dot on C01 B 1-5, U1 Containment Pressure Channel Alert
6. Place 1W-3B CS in pull-out, install OOS magnet.
7. Install an orange "Guarded" magnet at 1W-3A.

SIMULATOR MALFUNCTIONS:

Event 1: P-32A, Service Water Pump trips with reduced head capacity on P-32B and P-32D

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
BKR1SWS001	1-B5210C P-32A SERVICE WATER PUMP CKTBKR	00 :00 :00	-	1	00 :00 :00	-	Trip	**PLE**
PMP1SWS002C	0-P32B SERVICE WATER PUMP B HEAD CAPACITY	00 :00 :00	-	1	00 :00 :00	-	90	**PLE**
PMP1SWS004C	0-P32D SERVICE WATER PUMP D HEAD CAPACITY	00 :00 :00	-	1	00 :00 :00	-	90	**PLE**
LOA1SWS001	SW-10 P32A SW PUMP DISCH	00 :00 :00	00 :00 :30	3	00 :00 :00	1.0	0	**When directed by the crew**
LOA1CWS023	1C-068A/C-068B LOCAL PANEL ALARM RESET	00 :00 :00	-	5	00 :00 :00	FALSE	TRUE	**When directed by the crew**
LOA2CWS023	2C-069A/C-069B LOCAL PANEL ALARM RESET	00 :00 :05	-	5	00 :00 :00	FALSE	TRUE	**When directed by the crew**

Expected field communications:

1. **IF** an AO is dispatched to locally investigate P-32A, Service Water Pump, wait two minutes and **THEN** report that the pump is not running and the motor is hot to the touch.
2. **IF** an AO is dispatched to locally investigate breaker 1B52-10C, Power to P-32A Service Water Pump, wait two minutes and **THEN** report that breaker has tripped on overcurrent.
3. **WHEN** directed to locally shut SW-10, P-32A Service Water Discharge Isolation, insert **Trigger 3** and **THEN** report when the valve has repositioned.
4. **IF** directed to reset the local control panel alarms for Circ Pumps Cooling Water Flow Low, **THEN** insert **Trigger 5** and report when the panel alarms have been reset.
5. **IF** directed to check power to RK31 and RK32, **THEN** report power is available to RK31 and RK32.
6. IF asked, report SW zurn strainer D/P is normal.

Event 2: 1RE-219, SG Blowdown Monitors fails high off-scale. 1MS-2083, 1HX-1A SG Sample Isolation Control Valve fails to auto close.

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
XMT1RMS076A	1-RE219 SG BLOWDOWN LIQUID RM FIXED OUTPUT	00 :00 :00	00 :00 :05	11	00 :00 :00	400	1.0E+006	**PLE**
VLV1NSS001	1-MS-2083 STM GEN 1A SAMP ISOL VLV 1-V2083	00:00 :00	-	-	00 :00 :00	-	Open	**PRELOAD**
VLV1NSS001	1-MS-2083 STM GEN 1A SAMP ISOL VLV 1-V2083	00 :00 :00	-	13 Cond.	Delete Malf	-	Closed	**When 1MS-2083 is taken to close Cond. = [x01i126c==1]**

Expected field communications:

1. **IF** RP is directed to take Unit 1 main steam line surveys, wait 5 minutes and **THEN** report that both Unit 1A and B main steam lines read background.

Event 3: 1HX-1A, SG tube leak of approximately 10 gpm

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
MAL1RCS008A	STEAM GENERATOR A TUBE RUPTURE	00 :00 :00	00 :00 :00	7	00 :00 :00	0	0.035	**PLE**
LOA1CFW083	1-P99A SFP SEAL WATER INJECT PUMP C.S.	00 :00 :00	-	9	00 :00 :00	AUTO	ON	**When directed by the crew**
LOA1CFW084	1-P99B SGFP SEAL WATER INJECT PUMP C.S.	00 :00 :05	-	9	00 :00 :05	AUTO	ON	**When directed by the crew**

Expected field communications:

1. **IF** RP is requested to perform steam line surveys, **THEN** wait 5 minutes and report:
   - 'A' main steam line is 5 mrem above background.
   - 'B' main steam line is at background.
2. **WHEN** directed to start 1P-99A and 1P-99B SGFP Seal Water Injection Pumps, insert **Trigger 9** and **THEN** report when they are started.

Event 4: The mechanical pump seal for 1P-11A, Component Cooling Water Pump begins leaking at an increased rate that causes a lowering CCW Surge Tank level.

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
MAL1CCW002A	CCW PUMP 11A SEAL FAILURE	00 :00 :00	00 :00 :00	15	00 :00 :00	-	1	**PLE** **1C03 1D 3-6: 1T-12 CC Surge Tank Level High or Low** **20 gal/%**
LOA1CCW031	1-CC-773 T-12 CC SURGE TNK DEMN WTR INLT	00 :00 :00	00 :00 :30	17	00 :00 :00	-	OPEN	**When directed by the crew.** **CLOSE when directed by the crew or adequate level.**
LOA1CCW002	1-CC-723A CC P-11A SUCTION VALVE	00 :01 :00	00 :00 :30	19	00 :00 :00	-	0	**When directed by the crew.**
LOA1CCW004	1-CC-725A CC P-11A DISCHARGE VALVE	00 :01 :30	00: 01:00	19	00 :00 :00	-	0	**When directed by the crew.**

Expected field communications:

1. **WHEN** an AO is dispatched to locally investigate, **THEN** wait two minutes and report that there is excessive seal leakage coming from 1P-11A, CCW pump recommends immediately securing the pump. RP is in the area controlling the leakage.
2. **IF** an AO is directed to locally makeup to 1T-12 CC Surge Tank by cycling 1CC-773, Component Cooling Surge Tank Demin Water Inlet, **THEN** cycle open/close 1CC-773 to maintain tank level between 20% and 60%.
3. **IF** the crew directs the AO to locally isolate 1P-11A, Component Cooling Water Pump, **THEN** insert **TRIGGER 19** and report when the valves are repositioned and the seal leak has subsided.

Event 5: Main Turbine Generator Voltage Regulator trouble results in Main Generator Lockout and reactor trip

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
MAL1GEN006	VOLTAGE REGULATOR FAILURE	00 :00 :00	00 :15 :00	21	00 :00 :00	19.499	25	**PLE**
OVR-GEN045C	U1 VRC RG AUTO POSITON UNIT 1 VOLTAGE REGULATOR CS	00 :00 :01	-	21	00 :00 :00	-	TRUE	
OVR-GEN045A	U1 VRC RG MAN POSITON UNIT 1 VOLTAGE REGULATOR CS	-	-	-	-	-	FALSE	**PRELOAD**

Expected field communications:

1. **IF** an AO is dispatched to 1E02 to check local annunciator panel ANN2 (on Voltage Regulator Panel), wait two minutes and **THEN** report that the alarm is 'HXL is Limiting.'

Event 6: Multiple stuck rods post trip

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
MAL1CRF001-B6	STUCK ROD B6	00 :00 :00	-	-	00 :00 :00	-	Non-Trippable	**PRELOAD**
MAL1CRF001-B8	STUCK ROD B8	00 :00 :00	-	-	00 :00 :00	-	Non-Trippable	**PRELOAD**
MAL1CRF001-C5	STUCK ROD C5	00 :00 :00	-	-	00 :00 :00	-	Non-Trippable	**PRELOAD**
MAL1CRF001-E11	STUCK ROD E11	00 :00 :00		-	00 :00 :00	-	Non-Trippable	**PRELOAD**

Expected field communications:

1. **WHEN** directed to locally check RW Service Water valves, LW-61 and 62, **THEN** report both valves are shut.
2. **WHEN** directed to locally check CW pump house temperature <105 ºF, wait 3 minutes and **THEN** report the temperature is 72 ºF and stable.
3. **WHEN** directed to locally check G03/G04 Switchgear Room temperature <95 ºF, wait 3 minutes and **THEN** report the temperature is 75 ºF and stable.
4. **IF** directed to periodically check the status of spent fuel cooling, wait 5 minutes and **THEN** report Spent Fuel Pool level is 63 feet, pool temperature is 67 ºF and both are stable.

Event 7: 1HX-1A SG tube leak increases in size to a steam generator tube rupture

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
MAL1RCS008A	STEAM GENERATOR A TUBE RUPTURE	00 :00 :00	00 :00 :00	23	00 :00 :00	0	0.4	**PLE**
LOA1SGN023	1-MS-235 P-29 AFP & RADWASTE STM ISOL	00 :00 :00	00 :00 :00	25	00 :00 :00	1.0	0	**When directed by the crew.**

Expected field communications:

1. **WHEN** directed to shut 1MS-235, AFP Radwaste Steam Isolation and 1MS-228, Main Steam Trap Header Isolation, wait 5 minutes **THEN** insert **Trigger 25** and report when the valves are closed.

Event 8: 1RC-431B, PZR Spray Valve B Loop fails closed.

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
CNH1PCS008B	1-HC431H 1-PCV431B SPRAY VALVE HAND CTLR FIXED AUTO/MAN	00 :00 :00	00 :00 :00	23	00 :00 :00	-	0	**PLE**
CNH1PCS007B	1-HC431C 1-PCV431A SPRAY VALVE HAND CTLR FIXED AUTO/MAN	00 :00 :00	00 :00 :00	23	00 :00 :00	-	0	**PLE**

Expected field communications:

1. None

BRIEF / TURNOVER INFORMATION

- Conduct simulator crew pre-scenario brief using TR-AA-230-1007-F06, Simulator Instructor Pre-Exercise Checklist.
- Brief the scenario evaluators
- Brief surrogates using TR-AA-230-1007-F11, Surrogate Brief Checklist, if necessary.
- Crew Shift Turnover Information: See Attached

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
Commence raising power to 100% **Start: _____**	**Unit 1 was lowered to approximately 75% at the request of MISO/ATC due to grid stability issues. Grid stability has been restored and the unit is ready to be returned to full power in accordance with OP 1C, Startup to Power Operations.** **Commence raising power to 100%.** **Expected Communications:** • None Note: The crew should take action to prepare the power ascension, but they may not actually initiate the power change.	CREW	Implements **OP 1C, Startup to Power Operation Unit 1,** at Step 5.44, "Power Level At Between 75% And 85% Requirements"

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE

Event 1:
P-32A, Service Water Pump trips with reduced head capacity on P-32B and P-32D
 	
Start: _____
	Trigger 1 [BKR1SWS001, 1-B5210C P-32A SERVICE WATER PUMP CKTBKR, VALUE = TRIP] [PMP1SWS002C, 0-P32B SERVICE WATER PUMP B HEAD CAPACITY, VALUE = 90] [PMP1SWS004C, 0-P32D SERVICE WATER PUMP D HEAD CAPACITY, VALUE = 90]
	
	After completion of crew turnover and the examinees have assumed the watch, insert **Trigger 1** to cause P-32A, Service Water Pump to trip with reduced head capacity on P-32B and P-32D.
	
	Plant Response:
	This malfunction causes indicated North and South Service Water pressures to lower and brings in the corresponding North or South Service Water Header Pressure Low Alarm.
	
	Cues:
	• Indicated North and South Service Water pressures lower
	• Annunciators include:
	  • C01A 3-5, North or South Service Water header Pressure Low
	  • C01 B 3-4, U1 Motor Breaker Trip
		BOP
		
		OS1
		BOP
			Identifies the event by low SW header pressure, loss of P-32A SW Pump. Starts additional SW pumps to restore pressure to >50 psig. Dispatches operators to walk down the system for potential leaks.
			
			Implements **AOP-9A, Service Water System Malfunction**
			1. Check Forebay Level – GREATER THAN -11.5 FEET
			2. Check Pumpbay Level – GREATER THAN -11.5 FEET
			3. Check Annunciator Traveling Screen Differential Level High Alarm – CLEAR
			4. Check North or South Service Water Header Pressure Low Alarm – Clear
			  a. Start service water pumps - MAINTAIN PRESSURE BETWEEN 50 PSIG AND 90 PSIG
			  d. **IF** Any Service Water Pumps Tripped OR Recently Stopped, **THEN** ensure affected pump is in pullout and locally shut associated pump discharge valve
			  ○ SW-10 for P-32A
			  e. Go to Step 9
			9. Notify Duty Station Manager and Enters Applicable TSACs
			10. Check if Emergency Plan Should be Implemented per EPIP 1.2, Emergency Classification
			11. Check Supply Header Integrity
			12. Check Zurn Strainer – Normal
			13. Ensure Service Water Header Valves – OPEN
			14. Check Component Alarms – Clear
			15. OBSERVE NOTE PRIOR TO STEP 1 and Return to Step 1
			
			Repeat steps 1-4
			
			5. Check Zurn Strainer – NORMAL
			6. Check component alarms – CLEAR
			7. Check Service Water System – INTACT
			8. Return to Procedure And Step In Effect

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
	Expected Communications: • **IF** an AO is dispatched to locally investigate P-32A, Service Water Pump, wait two minutes and **THEN** report that the pump is not running and the motor is hot to the touch. • **IF** an AO is dispatched to locally investigate breaker 1B52-10C, Power to P-32A Service Water Pump, wait two minutes and **THEN** report that breaker has tripped on overcurrent. • **WHEN** directed to locally shut SW-10, P-32A Service Water Discharge Isolation, insert **Trigger 3** and **THEN** report when the valve has repositioned. • **IF** directed to check power to RK31 and RK32, **THEN** report power is available to RK31 and RK32. • IF asked, report SW zurn strainer D/P is normal. • **IF** directed to reset the local control panel alarms for Circ Pumps Cooling Water Flow Low, **THEN** insert **Trigger 5** and report when the panel alarms have been reset. **Continuation Criteria:** Once the crew has completed the actions of AOP-9A, Service Water Malfunction and addressed Technical Specifications, or at the discretion of the Lead Examiner, continue with the next event.		Reference Technical Specifications **Technical Specifications:** SW System TLCO 3.7.7.D is not met – one SW pump inoperable and requirements of Table 3.7.7-2 not met. LCO 3.7.8, Service Water System is not met. CONDITION: A. One SW pump inoperable AND Both units in MODE 1, 2, 3, or 4. — REQUIRED ACTION: A.1 Restore SW pump to OPERABLE status. — COMPLETION TIME: 7 days AND 14 days from discovery of failure to meet the LCO

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 2: **1RE-219, SG Blowdown Monitors fails high off-scale. Sample Isolation Control Valve fails to auto close.** **Start:** _____	**Trigger 11** [XMT1RMS076A, 1-RE219 SG BLOWDOWN LIQUID RM FIXED OUTPUT, VALUE =1.0e+006, RAMP = 5 SEC] Insert **Trigger 11** to cause 1RE-219, SG Blowdown Monitors to fail high off-scale. 1MS-2083, 1HX-1A SG Sample Isolation Control Valve will fail to auto close. **Plant Response:** High Alarm 1C20 C 3-2, Unit 1 SG Blowdown Radiation High automatically shuts. • MS-5958, "A" SG blowdown isolation • MS-5959, "B" SG blowdown isolation • MS-2083, "A" SG sample isolation (fails) • MS-2084, "B" SG sample isolation • MS-2040, Blowdown Tank Outlet Cont Vlv **Cues:** • 1C20 C-3-2, Unit 1 SG Blowdown Radiation High **Expected Communications:** • IF RP is directed to take Unit 1 main steam line surveys, wait 5 minutes and THEN report that both Unit 1A and B main steam lines read background.	OATC OS1 OATC/BOP OS1/BOP	Acknowledges annunciator 1C20 C 3-2, Unit 1 SG Blowdown Radiation High, references applicable ARB and RMSASRB CI 1RE-219. Implements **ARB 1C20 C 3-2, Unit 1 SG Blowdown Radiation High** 6.1 Follow actions specified in the Radiation Monitoring System Alarm Setpoint and Response Book (RMSARB) for SG blowdown monitor 1RE-219. 6.2 Refer to EPIP's for potential classification issues. 7.1 High alarm automatically shuts 7.1.1 MS-5958, "A" SG blowdown isolation 7.1.2 MS-5959, "B" SG blowdown isolation 7.1.3 MS-2040, SG blowdown tank outlet 7.1.4 MS-2083, "A" SG sample isolation 7.1.5 MS-2084, "B" SG sample isolation Implements **RMSARB CI 1RE-219** 1. Ensure the following valves are shut a) MS-5958, 1HX-1A SG Blowdown Isolation b) MS-5959, 1HX-1B SG Blowdown Isolation c) MS-2040, SG Blowdown Tank Outlet Control d) **MS-2083, 1HX-1A SG Sample Isolation Control** (fails to auto close, manually closed by operator) e) MS-2084, 1HX-1B SG Sample Isolation Control 2. Compare channel to available redundant indication: a) 1RE-222, Unit 1 steam generator blowdown tank radiation alarm b) 1RE-215, Unit 1 air ejector radiation alarm c) RE-225, Combined air ejector radiation alarm d) 1RE-231, Unit 1 steam line "A" radiation alarm e) 1RE-232, Unit 1 steam line "B" radiation alarm f) 1RE-229, Unit 1 service water overboard radiation alarm. 3. Refer to appropriate AOP: a) AOP-1A Unit 1, Reactor Coolant Leak b) AOP-3 Unit 1, Steam Generator Tube Leak c) AOP-4A Unit 1, High Effluent Activity 4. Refer to CTS 15.3.1.D.4 {ITS 3.4.13} 5. **IF** the High Alarm is received, **AND** the cause is other than known testing or know movements of radioactive materials through the area, **THEN** NOTIFY RP Supervision (Duty & Cal, if off normal hours).

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
	(Minimum operable channels per ODCM Table 6-2, Radioactive Liquid Effluent Monitoring Instrumentation are met.) **Continuation Criteria:** Once 1MS-2083, 1HX-1A SG Sample Isolation Control Valve is shut and the crew has addressed the ARB and RMSASRB actions for 1RE-219, or at the discretion of the Lead Examiner, continue with the next event.		**Failure Alarm** Operator Response: Refer to generic response section. If this channel becomes inoperable, refer to the Offsite Dose Calculation Manual (ODCM) **IF** this channel becomes INOPERABLE, **AND** redundant RMS channels are OOS (i.e., RE-225, RE-215, or RE-231/232), **THEN** a Priority 2 work order shall be written to restore RMS for primary to secondary leakage monitoring **AND** NP 3.2.4 referenced. **Generic RMS Alarm Response Guidelines** 2.1 Check on system Server, SS, to see if the alarm is HIGH or FAIL. If alarm is HIGH: 2.1.1 **IF** the HIGH Alarm is received, **AND** the cause is other than known testing or known movements of radioactive materials through the area, **THEN** NOTIFY RP supervision (Duty & Call, if off normal hours). 2.1.2 See alert responses. 2.1.3 If HiGH alarm is from an area monitor, ensure that affected areas are properly posted per RP procedures. 2.1.4 If HIGH alarm is from a process monitor with a control function: a) Check that the control function has actuated, e.g., discharge valve shuts, ventilation dampers shifts, etc. b) If control function has not actuated, initiate the control function manually. Identify the problem and correct it prior to attempting to return the channel to normal operation. 2.1.5 If the HIGH alarm is from a process monitor without a control function: identify the cause of the alarm. 2.1.6 Effluent pathways that have a monitor above its Alert alarm setpoint for at least one ten minute period should be sampled to determine Emergency Plan initiation/classification based on NUUREG 1022 reporting requirements. Ensure samples are collected at the time of the event.

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 3: **1HX-1A, SG tube leak of approximately 10 gpm** **Start:** _____	**Trigger 7** [MAL1RCS008A, STEAM GENERATOR A TUBE RUPTURE, VALUE = 0.035]	OATC	Identifies lowering pressurizer level, increased auto charging pump speed and increasing RMS.

	Once, insert **Trigger 7** to cause a 1HX-1A, SG tube leak of approximately 10 gpm
	
	Plant Response:
	RMS alarms coincident with lowering RCS inventory.
	
	Cues:
	• 1C20C 1-2 U1 Stm Line A Radiation High
	• Lowering PZR level
	• Rising Secondary Radiation / Alarms:
	  • Stm Line Radiation
	  • Air Ejector exhaust
	
	Expected Communications:
	• **IF** RP is requested to perform steam line surveys, **THEN** wait 5 minutes and report:
	  • 'A' main steam line is 5 mrem above background.
	  • 'B' main steam line is at background.
		OS1
		OATC
			Implements **AOP-3 Unit 1, Steam Generator Tube Leak**
			1. Check Safety Injection Not Required
			2. Check Reactor Trip Not Required
			3. Check PZR Level - STABLE AT OR TRENDING TO PROGRAM
			RNO: IF PZR level trending lower, THEN perform the following:
			a. Control charging and letdown to maintain PZR level
			b. **IF** PZR level continues to lower, **THEN** isolate letdown.
			4. Check PZR Pressure - STABLE AT OR TRENDING TO DESIRED PRESSURE
			5. Check Reactor Makeup Control
			6. Notify DSM, Chemistry, And Implement The Emergency Plan
			7. Identify Leaking SG
			8. Determine Leak Rate *(~10 gpm)*
			9. Check Reactor Shutdown Required
			10. Determine Action Response Based on SG Leakage:
			• Reduce Power to ≤ 50% in 1 hour and Mode 3 in the next two hours.
			11. Place the Unit In MODE 3
			12. Notify Chemistry Of Leak Rate And Rate Of Change
			13. Monitor Leakage Every 15 Minutes
			14. Direct Radiation Protection To Perform Exposure And Contamination Evaluations

		BOP	15. Check Leaking SG - IDENTIFIED 16. Adjust Affected SG Atmospheric Steam Dump Controller To 1050 psig ○ 1HC-468 for A SG 17. Isolate Blowdown on Affected Steam Generator ○ A SG • 1MS-5958 • 1MS-2042

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
		OS1	18. Shut Affected Steam Generator Sample Isolation Valve ○ 1MS-2083 for A SG 19. Ensure Condensate Storage Tank Isolated from Condenser Hotwell a. Ensure condenser reject isolation valve SHUT • 1CS-113 20. Locally Align Low Pressure Trap Header to Condenser ... Evaluates Technical Specifications and determines that LCO 3.4.13 for RCS Operational Leakage is NOT met; AOP-3 actions will satisfy Required Actions and Completion Times of the LCO.

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required action and associated completion time of Condition A not met OR Pressure boundary LEAKAGE exists OR Primary to secondary LEAKAGE not within limits	B.1 Be in MODE 3 AND B.2 Be in MODE 5	6 hours 36 hours

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
	Expected Communications: • **WHEN** directed by crew to start 1P-99A and 1P-99B, MFP Seal Water Injection Pumps, wait 1 minute **THEN** insert **Trigger 9**, and report the pumps started. **Continuation Criteria:** Once the crew has reduced load by 3% to 5%, or at the discretion of the Lead Examiner, continue to the next event.	OS1 OATC BOP OATC	IMPLEMENT **AOP-17A Unit 1, Rapid Power Reduction** 3. Check Power – GREATER THAN 100% RNO Go To Step 3 4. Determine Desired Power Level or Condition to Be Met 5. Commence Boration As Necessary To Target Load. • Set quantity on boric acid flow counter, YIC-110A • Set flow rate on boric acid flow controller, HC-110 • Place reactor makeup mode selector in BORATE • Place reactor makeup control switch to START 6. Select Rate Reduction Rate And Reduce Load: 7. Notify Power System Supervisor (PSS) Of Load Reduction 8. Check Rod Control System – IN AUTO 9. Energize pressurizer backup heaters. 10. Check PZR Pressure Controlling – IN AUTO 11. Check PZR Level Controlling – IN AUTO 12. Check Steam Generator Level Controlling – IN AUTO 13. Ensure Main Feed Pump Seal Water Pump – RUNNING 14. Maintain RCS Tavg: 15. Check AFD – WITHIN LIMITS OF ROD 1.2, HFP EQUIL DELTA FLUX. 16. Determine Desired End-Point – LESS THAN 50% TURBINE LOAD

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 4: **The mechanical pump seal for 1P-11A, Component Cooling Water Pump begins leaking at an increased rate that causes a lowering CCW Surge Tank level.** **Start:** _____	**Trigger 15** [MAL1CCW002A, CCW PUMP 11A SEAL FAILURE, VALUE = 1] Insert **Trigger 15** to cause 1P-11A, Component Cooling Water Pump seal failure **Plant Response:** Inventory is lost (out of) the CCW System resulting in lowering 1T-12 CC Surge Tank. Indicated level on 1LI-618B lowers and annunciator 1C03 1D 3-6, 1T-12 CC Surge Tank Level High or Low alarms at 45% level lowering. Aux Building Sump -19 Ft. P-40A and P-40B Run Time Meters will begin to indicate as they cycle on and off to accommodate the CCW leakage draining to the -19 FT sump. **Cues:** • Lowering CC Surge Tank level as indicated on indicator 1LI-618B • Annunciator 1C03 1D 3-6, 1T-12 CC Surge Tank Level High or Low **Expected Communications:** • **WHEN** an AO is dispatched to locally investigate, **THEN** wait two minutes and report that there is excessive seal leakage coming from 1P-11A, CCW pump and recommends immediately securing the pump. RP is in the area controlling the leakage. • **IF** an AO is directed to locally makeup to 1T-12 CC Surge Tank by cycling 1CC-773, Component Cooling Surge Tank Demin Water Inlet, **THEN** cycle open/close 1CC-773 to maintain tank level between 20% and 60%. (Trigger 17 opens 1CC-773)	BOP OS1 BOP	Identifies lowering 1T-12 CC Surge Tank level and references ARB 1C03 1D 3-6, 1T-12 CC Surge Tank Level High or Low Implements **AOP-9B Unit 1, Component Cooling System Malfunction** 1. Check Component Cooling Pumps – AT LEAST ONE RUNNING 2. Maintain Surge Tank Level a. Check surge tank level – LOWERING b. Start reactor makeup water pump aligned for RMW services c. Ensure component cooling surge tank vent – OPEN d. Cycle emergency makeup valve to maintain level – BETWEEN 20% AND 60% f. Identify and isolate leak per ATTACHMENT A, LEAK ISOLATION FOR LOWERING SURGE TANK LEVEL, while continuing with this procedure. g. Check component cooling surge tank level – STABLE RNO WHEN leak isolated, THEN: a) Shut surge tank makeup valve. b) Stop reactor makeup water pump. 3. Check Surge Tank Level – GREATER THAN 10% 4. Check Component Cooling System For In-leakage 5. Check Reactor Trip – NOT REQUIRED 6. Check RHR Status 7. Request Chemistry Analyze Component Cooling Water 8. Notify DSM And Implement Emergency Plan 9. Return To Procedure And Step In Effect Attachment A A1 Isolate Leakage Out Of Component Cooling System Using One Of The Following: (Step A2) A2 System Leakage To Atmosphere a. Inspect system piping to identify the source of the leak. b. Isolate the leak • 1P-11A to Pull-out • Direct pump suction and discharge isolation valves SHUT c. Return to 2.g (main body).

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
	Communications (cont.) • **IF** the crew directs the AO to locally isolate 1P-11A, Component Cooling Water Pump, **THEN** insert **TRIGGER 19** and report when the valves are repositioned and the seal leak has subsided. **Instructor Note:** If the crew starts to implement AOP-12A, the SM should notify the crew that the Unit 2 OS will be implementing AOP-12A. **Continuation Criteria:** After 1P-11B, Component Cooling Water Pump has been started, 1P-11A secured and Technical Specifications addressed, or at the discretion of the Lead Examiner, continue with the next event.	CREW	Reference Technical Specifications **Technical Specifications:** CCW LCO 3.7.7 is not met.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One CC pump inoperable	A.1 Restore CC pump to OPERABLE status.	72 hours AND 144 hours from discovery of failure to meet the LCO

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 5: **Main Turbine Generator Voltage Regulator Trouble results in Main Generator Lockout and reactor trip** **Start:** _____	**Trigger 21** [MAL1GEN006, VOLTAGE REGULATOR FAILURE, VALUE = 25, RAMP = 15 min.] Insert **Trigger 21** to cause a voltage regulator failure which results in a generator lockout and reactor trip. **Plant Response:** The regulator failure will cause VARs to increase. Operators may recognize the failure and attempt to select manual voltage control. In Automatic Control the malfunction severity is set for a high voltage, an over excitation trip will occur. Over excitation and voltage regulator trouble will alarm. The turbine generator and reactor trip. Turbine speed increases to 1900 rpm as crossover steam dumps open to limit speed. **Cues:** • C01 1A 1-3, Unit 1 Voltage Regulator Alert • C01 1A 3-1, Unit 1 TG-01 or X-01 Over-Excitation • C01 1A 4-4, Unit 1 Voltage Regulator Trouble. **Expected Communications:** • **IF** an AO is dispatched to 1E02 to check local annunciator panel ANN2 (on Voltage Regulator Panel), wait two minutes and **THEN** report that the alarm is 'HXL is Limiting.' **Instructor Note**: If the reactor does not automatically trip on the turbine trip, direct the booth operator to insert a reactor trip using MAL1PPL001A, Reactor Trip Breaker 52/RTA.	BOP OS1 OATC	Identifies rising generator volts and outward VARs. References ARP C01 A 1-3, Unit 1 Voltage Regulator Alert and dispatches an AO to investigate. May direct a reactor trip. Implements **EOP-0 Unit 1, Reactor Trip or Safety Injection** 1. Verify Reactor Trip Identifies stuck rods B6, B8, C5, E11 by IRPI and non-lit rod bottom lights. RNO Manually trip reactor • Train A • Train B 2. Verify Turbine Trip 3. Verify Power to AC Safeguards Buses 4. Check if SI is Actuated a. Any SI annunciators LIT RNO **IF** SI is **NOT** required, **THEN** go to EOP-0.1 Unit 1, Reactor Trip Response.

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 6: **Multiple stuck rods post trip**	**PRELOAD:** [MAL1CRF001-B6, B8, C5, E11, STUCK ROD B6, B8, C5, E11, VALUE = Non-Trippable] **Plant Response:** Non-Trippable rods will not move under any circumstance **Cues:** Rods B6, B8, C5 and E11 will remain at their original position and rod bottom lights will not be lit upon reactor trip. **Expected Communications:** None **Continuation Criteria:** Once the crew has addressed the stuck rods by initiating a boration, or at the discretion of the Lead Examiner, continue with the next event.	OATC BOP BOP OATC	Implements **EOP-0.1 Unit 1, Reactor Trip Response** 1. Check RCS Temperatures: a. Condenser Steam Dumps – AVAILABLE • Place Steam Dump Mode Selector in MANUAL b. RCS Temperature ○ With any RCP running: • RCS average temperature – STABLE AT OR TRENDING TO 547°F **OR** ○ With No RCP running • RCS wide range cold leg temperatures – STABLE AT OR TRENDING TO 547°F 2. Check Feedwater Status a. Main feedwater regulating control valves – BOTH SHUT • 1FIC-466A • 1FIC-476A b. Transfer feedwater control to bypass regulating valves: 1) Check main feedwater pumps – AT LEAST ONE RUNNING 2) Control feedwater flow using regulating bypass valves • 1CS-480 • 1CS-481 3) Maintain both SG levels – BETWEEN 32% AND 63% 4) Reset Loss of Feedwater Turbine Trip 5) Stop any running AFW pumps. 3. Verify All Control Rods – FULLY INSERTED RNO **IF** two or more control rods are **NOT** fully inserted, **THEN** initiate emergency boration: a. Record initial level for in service BAST b. Perform the following to adjust charging flow: 1) Control charging pump speed as necessary to maintain flow GREATER THAN OR EQUAL TO 60 GPM. 2) Control charging line flow controller as necessary to maintain labyrinth seal ΔP GREATER THAN 20 inches

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
		OATC/BOP	c. Start one boric acid transfer pump: ○ 1P-4A ○ 1P-4B d. Open emergency borate valve: • 1CV-350 e. Borate 2825 gallons for each control rod not fully inserted. • Use TLB-5, BORIC ACID STORAGE TANKS to determine BAST level change f. **WHEN** emergency boration is complete, **THEN** control charging as necessary to establish desired charging flow. g. **IF** emergency boration can **NOT** be established, **THEN** perform boration per OP 5B, BLENDER OPERATION / DILUTION / BORATION, while continuing with this procedure.

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
Event 7: **1HX-1A SG tube leak increases in size to a steam generator tube rupture** **Start:** _____	**Trigger 23** [MAL1RCS008A, STEAM GENERATOR A TUBE RUPTURE, VALUE = 0.4] Inset **Trigger 23** to increase steam generator tube leak to a tube rupture. **Plant Response:** RCS inventory will rapidly lower, RCS pressure and subcooling lower. **Cues:** • Rapidly Lowering PZR level	OS1 BOP	Plant conditions degrade; exercises EOP-0.1 Unit 1 Foldout Page criteria and returns to **EOP-0 Unit 1, Reactor Trip or Safety Injection Step 4.** **EOP-0 Unit 1, Reactor Trip or Safety Injection** FOP: Faulted S/G Isolation Criteria IF any S/G pressure trending lower in an uncontrolled manner OR and S/G completely depressurized, THEN the following may be performed: • Isolate feed flow to faulted S/G • Maintain total feed flow greater than or equal to 230 gpm until narrow range level in at least one S/G is greater than [51%] 32% 4. Check If SI Is Actuated 5. Perform ATTACHMENT A, Automatic Action Verification while continuing with this procedure 6. Verify AFW pumps – Running 7. Check RCP Seal Cooling 8. Check RCS Temperatures 9. Check PZR PORVs and Spray Valves 10. Check if RCPs should be stopped 11. Check if SGs are NOT Faulted 12. Check if SG Tubes are NOT Ruptured RNO: Go to EOP-3 UNIT 1, STEAM GENERATOR TUBE RUPTURE

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
	EOP-0 Unit 1, Attachment A **Expected Communications:** • **WHEN** directed to locally check shut RW Service Water valves, LW-61 and 62, **THEN** report both valves are closed. • **WHEN** directed to locally check CW pump house temperature <105 ºF, wait 3 minutes and **THEN** report the temperature is 72 ºF and stable. • **WHEN** directed to locally check G03/G04 Switchgear Room temperature <95 ºF, wait 3 minutes and **THEN** report the temperature is 75 ºF and stable. • **IF** directed to periodically check the status of spent fuel cooling, wait 5 minutes and **THEN** report Spent Fuel Pool level is 63 feet, pool temperature is 67 ºF and both are stable.	BOP	**EOP-0 Unit 1, Attachment A, Automatic Action Verification** A1 Verify Feedwater isolation A2 Verify Containment Isolation A3 Verify ECCS Pumps RUNNING A4 Verify Service Water Pumps RUNNING A5 Verify Containment Accident Cooling Units RUNNING A6 Verify Component Cooling Water Pumps – ONLY ONE RUNNING A7 Check If Main Steam Lines Can Remain Open A8 Verify Containment Spray Not required a. Containment pressure recorder – HAS REMAINED LESS THAN 25 psig A9 Verify ECCS Flow A10 Verify AFW valve alignment – PROPER EMERGENCY ALIGNMENT A11 Verify Proper ECCS Valve Alignment A12 Check Containment Spray NOT ACTUATED A13 Stop any boration via the blender in progress A14 Ensure the Auxiliary Building Filter/Exhaust Fans – OPERATING A15 Verify Service Water System Alignment A16 Check Miscellaneous Valves – SHUT A17 Check Control Room Ventilation A18 Check Cable Spreading Room Ventilation System – OPERATING A19 Check Computer Room Ventilation System – OPERATING A20 Check AFW Recirc fans – ONE RUNNING A21 Check Circulating Water Pump House Temperature Less Than 105°F A22 Check G03/G04 Switchgear Room Temperature less than 95°F A23 Periodically check status of spent fuel cooling

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
	Expected Communications: • **WHEN** directed to shut 1MS-235, AFP Radwaste Steam Isolation and 1MS-228, Main Steam Trap Header Isolation, wait 5 minutes **THEN** insert **Trigger 25** and report when the valves are closed.	OS1 BOP	Implements **EOP-3, Unit 1 Steam Generator Tube Rupture** 1. Check If RCPs Should Be Stopped 2. Identify Ruptured SG(s) ***CT-18 Isolate feedwater flow into and steam flow from the ruptured SG before a transition to ECA-3.1 occurs.*** 3. Isolate Flow From Ruptured SG a. **IF** SG A is ruptured, **THEN** isolate SG A: 1) Shut 1MS-2018 MSIV 2) 1MS-234 MSIV Bypass 3) Ensure 1MS-2016 – SHUT 4) Ensure 1HC-468 "A" ADV Controller – SET TO 1050 psig 5) Shut 1MS-2020, TDAFWP Steam supply 6) Ensure SG blowdown is isolated ○ 1MS-5958 – SHUT ○ 1MS-2042 – SHUT 7) Locally shut the following: ○ 1MS-235 1P-29/Radwaste Isolation ○ 1MS-228 Main Steam Trap Isolation 4. Check Ruptured SG(s) Level: a. Level - GREATER THAN [51%] 32% RNO: Maintain feed flow to ruptured SG(s) unit level is greater than [51%] 32% Continue with Step 5. b. **IF** SG A is ruptured, **THEN** Stop feed flow to ruptured SG A: 1) Place in manual and shut 1AF-4074A 2) Ensure 1AF-4001 TDAFW flow control Valve - SHUT 3) Ensure AF-4023 SSG supply valve - SHUT 5. Check Ruptured SG(s) Pressure – GREATER THAN 590 PSIG

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
		BOP	6. Initiate RCS cooldown a. Check SI signal status: 1) ANY Auto SI signal - IN RNO: Block SI 2) *Reset SI* b. Determine required core exit temperature:

Ruptured S/G Press (psig)	CET (º F)
>1100	515
1000 to 1099	500
900 to 999	490

c. Dump steam to condenser from intact SG at maximum rate
d. Check core exit TCs - LESS THAN REQUIRED TEMPERATURE
e. Stop RCS cooldown
f. Maintain core exit TCs - LESS THAN REQUIRED TEMPERATURE
7. Check Intact SG Level
8. Check PZR PORVs And Block Valves
9. Check SI Signal Status
10. Reset Isolation And Lockout Signals
11. Establish Instrument Air To Containment
12. Check If RHR Pumps Should Be Stopped:
a. RHR pumps – ANY RUNNING WITH SUCTION ALIGNED TO RWST
b. RCS pressure – GREATER THAN [450 PSIG] 325 psig
c. Stop both RHR pumps and place in auto
13. Establish Charging Flow
a. Charging Pumps - AT LEAST ONE RUNNING
b. Align charging pump suction to RWST
c. Establish maximum charging flow
14. Check If RCS Cooldown Should Be Stopped
15. Check Ruptured SG Pressure STABLE OR RISING
16. Check RCS Subcooling Based On core Exit Thermocouples - GREATER THAN [94ºF] 55 ºF

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 8: **1RC-431A and B, PZR Spray Valves fail closed.**	**Trigger 23** [CNH1PCS008B, 1-HC431H 1-PCV431B SPRAY VALVE HAND CTLR FIXED AUTO/MAN, VALUE = 0] [CNH1PCS007B, 1-HC431C 1-PCV431A SPRAY VALVE HAND CTLR FIXED AUTO/MAN, VALUE = 0] **Trigger 23** (inserted for the SGTR) causes 1PCV-431A and B, Spray valves to fail closed in auto and manual.	OATC	17. Depressurize RCS To Minimize Break Flow And Refill PZR a. Normal PZR spray – AVAILABLE RNO- OBSERVE CAUTIONS AN NOTE PRIOR TO STEP 18 and go to Step 18. 18. Depressurize RCS Using PZR PORV To Minimize Break Flow and Refill PZR: a. At least one PZR PORV – AVAILABLE b. Open one PORV until any of the following conditions satisfied: ○ Both of the following: 1) RCS pressure - LESS THAN RUPTURED SG PRESSURE 2) PZR level - GREATER THAN [32%] 13% **OR** ○ PZR level greater than [62%] 68% **OR** ○ RCS subcooling based on core exit TCs - LESS THAN [74ºF] 35ºF c. Shut PZR PORV d. Go to Step 20 e. OBSERVE CAUTION PRIOR TO STEP 21 and go to Step 21. 20. Check RCS Pressure – RISING:

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
		BOP/OATC	***CT-21 Terminate SI before the SG goes water solid (simulator out of limits alarm) and control RCS pressure and makeup flow so that primary and secondary inventory are stable before the end of the scenario.*** 21. Check If ECCS Flow Should Be Terminated a. RCS subcooling based on core exit thermocouples - GREATER THAN [74ºF] 35ºF b. Secondary Heat Sink: ○ Intact SG level - GREATER THAN [51%] 32% **OR** ○ Total feed flow to SGs - GREATER THAN OR EQUAL TO 230 GPM AVAILABLE c. RCS pressure - STABLE OR RISING d. PZR level - GREATER THAN [32%] 13% 22. Stop Both SI Pumps And Place In Auto 23. Establish Charging Flow 24. Ensure Adequate RCS Depressurization a. Check normal spray – AVAILABLE RNO – Go to Step 25 25. Verify SI flow is Not Required: a. RCS subcooling based on core exit thermocouples - GREATER THAN [74º F] 35º F. b. PZR level - GREATER THAN [32%] 13% 26. Check Reactor Makeup Control: a. Ensure MCCs - ENERGIZED • 1B-31, 1B52-14C, train A • B-43, 1B52-21C, train B b. Makeup set for greater than 2800 ppm c. VCT level - GREATER THAN 17% d. Ensure makeup armed and in auto

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
		OATC	27. Check if Letdown can be established a. PZR level - GREATER THAN [44%] 24% b. Establish Letdown 1) Open letdown line containment isolation valves: • 1CV-371A • 1CV-371 2) Open RCS loop B cold leg letdown isolation valve: • 1RC-427 3) Ensure component cooling flow to non-regenerative heat exchanger – ESTABLISHED • 1HC-130 4) Ensure charging flow - AT LEAST 21 GPM 5) Adjust backpressure as necessary and open letdown isolation valves to establish letdown flow: ○ 1CV-200A ○ 1CV-200B ○ 1CV-200C 28. Align Charging Pump Suction To VCT: a. VCT level - GREATER THAN 17% b. Open VCT outlet to charging pump suction MOV: • 1CV-112C c. Shut RWST to charging pump suction MOV: • 1CV-112B 29. Check If SI Accumulators Should Be Isolated: a. RCS pressure - LESS THAN 1075 psig RNO: **WHEN** RCS pressure is less than 1075 psig **THEN** do Steps 29.b, 29.c, 29.d, and 29.e. Observe CAUTION prior to Step 30 and continue with Step 30

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
End: _____	**Termination Criteria:** Terminate the scenario when the crew has stopped SI pumps and taken appropriate action(s) per step 30 of EOP-3 Unit 1, or at the discretion of the Lead Evaluator. .	OS1	30. Control RCS Pressure And Charging To Minimize Leakage a. Perform appropriate action(s) from table below and use ATTACHMENT B handout as desired:

PZR LEVEL	RUPTURED SG LEVEL		
	RISING	LOWERING	OFF SCALE HIGH
LESS THAN OR EQUAL TO [44%] 24%	Raise charging flow Depressurize RCS using Step 29.b	Raise charging flow	Raise charging flow Maintain RCS and ruptured SG pressures equal
BETWEEN [44%] 24% AND 50%	Depressurize RCS using Step 29.b	Turn on PZR heaters	Maintain RCS and ruptured SG pressures equal
BETWEEN 50% AND [62%] 68%	Depressurize RCS using Step 29.b Reduce charging flow	Turn on PZR heaters	Maintain RCS and ruptured SG pressures equal
GREATER THAN OR EQUAL TO [62%] 68%	Reduce charging flow	Turn on PZR heaters	Maintain RCS and ruptured SG pressures equal

b. Use normal PZR spray as necessary to depressurize RCS per table in Step 30a.

RNO: **IF** letdown is in service **THEN** use auxiliary spray

***** END OF SCENARIO *****

QUANTITATIVE ATTRIBUTES

(Use this form for NRC/INPO Evaluations only as required to document associated quantitative information.)

Malfunctions:

Before EOP Entry:

- P-32A, Service Water Pump trips with reduced head capacity on P-32B and P-32D
- 1HX-1A, SG tube leak
- 1RE-219, SG Blowdown Monitors fails high
  - 1MS-2083, 1HX-1A SG Sample Isolation Control Valve fails to auto close.
- 1P-11A, Component Cooling Water Pump mechanical seal leak
- Main Generator Lockout (Voltage Regulator Trouble)

After EOP Entry:

- Multiple stuck rods (4) post trip
- 1HX-1A SG steam generator tube rupture
- 1RC-431A and B, PZR Spray Valves fail closed

Abnormal Events:

- P-32A, Service Water Pump trips with reduced head capacity on P-32B and P-32D
- 1HX-1A, SG tube leak of approximately 10 gpm
- 1RE-219, SG Blowdown Monitors fails high off-scale
  - 1MS-2083, 1HX-1A SG Sample Isolation Control Valve fails to auto close
- 1P-11A, Component Cooling Water Pump mechanical seal leak

Major Transients:

- 1HX-1A SG steam generator tube rupture

Critical Tasks:

1. CT-18 Isolate ruptured SG
2. CT-21 Terminate SI/control RCS pressure and makeup

CT-18	Isolate ruptured SG
Applicable ERG Version	LP
Applicable ERG	E-3

Critical Task:

Isolate feedwater flow into and steam flow from ruptured SG before a transition to ECA-3.1

Plant Conditions:

- SGTR
- Reactor trip
- SI

Cues:

- Indication and/or annunciation of SGTR in one SG
  - Increasing SG water level
  - radiation

AND

- Indication and/or annunciation of reactor trip

AND

- Indication and/or annunciation of SI

Performance Indicator:

Manipulation of controls as required to isolate the ruptured SG

- Main steam isolation valve position lamps indicate closed
- Main steam isolation bypass valve position lamps indicate closed
- PORV setpoint adjusted to ERG Footnote O.03
- Blowdown isolation valve position lamps indicate closed
- Steam isolation valve to TDAFW pump position lamps indicate closed
- AFW valve position lamps and/or indicators indicate closed
- Feedwater isolation valve position lamps indicated closed

Feedback:

- Indication of stable or increasing pressure in the ruptured SG
- Indication of decreasing or zero feedwater flow rate in the ruptured SG

CT-21	Terminate SI/control RCS pressure and makeup
Applicable ERG Version	LP
Applicable ERG	E-3, ES-3.1, ES-3.2, ES-3.3, ECA-3.3

Critical Task:

CT-21 Terminate SI before the SG goes water solid (simulator out of limits alarm) and control RCS pressure and makeup flow so that primary and secondary inventory are stable before the end of the scenario.

Plant Conditions:

- SGTR
- SI
- Ruptured SG identified and isolated
- RCS cooldown to target temperature completed
- RCS depressurization completed
- SI termination criteria met

Cues:

- Indication and/or annunciation of SGTR in one SG
  - Increasing SG water level
  - Radiation

AND

- Indication and/or annunciation of reactor trip and SI

AND

- Indication that RCS is cooldown to the target temperature

AND

- Indication that RCS depressurization is completed

AND

- Indication that SI termination criteria met

Performance Indicator:

Manipulation of controls as required to

- Terminate SI
  - All high-head ECCS pumps breaker position lamps indicate open
- Control RCS pressure and makeup flow
  - Indication that the charging flow control valve is at the appropriate position (open, closed, or throttled)

  OR
  - Indication that charging pump speed is increasing or decreasing as appropriate

  OR
  - PRZR heater beaker position lamp(s) or current indicator shows appropriate position/current change (open or close/increase or decrease

  OR
  - PRZR spray valve(s) position lamp(s)/indicator shows appropriate change (open or close)

Feedback:

- Indication of high-head ECCS flow rate decreasing or zero
- Indication of increasing or decreasing RCS pressure
- Indication of increasing or decreasing makeup flow to the RCS

1.0 Plant Conditions:

	Unit 1	Unit 2
Time in Core Life (MWD/MTU):	*9005*	
Reactor Power:	*75%*	
Boron Concentration:	*1179 ppm*	
Rod Height:	*CBD @ 175*	

2.0 Equipment Out of Service:

- 1P-2B, Charging Pump, is out of service for mechanical seal replacement. Work is expected to take another 4 hours.
- 1PT-950, Loop B Containment Pressure has been removed from service. Repairs are expected to be complete during the upcoming refueling outage.
- 1W-3B, Control Rod Shroud Fan is OOS due to imminent motor failure.

3.0 Technical Specification LCOs NOT Met and Action Conditions in Effect:

LCO NOT Met	TSAC	Required Actions	Completion Time
3.3.2	A. One or more Functions with one or more channels or trains inoperable.	A.1 Enter the Condition referenced in Table 3.3.2-1 for the channel(s) or train(s).	Immediately
	D. One channel inoperable	D.1 Place channel in trip OR D.2.1 Be in MODE 3 AND D.2.2 Be in MODE 4	1 hour 7 hours 13 hours

4.0 Planned Evolutions:

- Unit 1 was lowered to approximately 75 % (1339 MWT) at the request of MISO/ATC due to grid stability issues. Grid stability has been restored and the unit is ready to be returned to full power in accordance with OP 1C, Startup to Power Operations.
- Commence raising power to 100%.

5.0 Common:

- Safety Monitor is Green
- Today is Sunday, clock time is real time and you have a normal shift complement.

NEXTera ENERGY NUCLEAR FLEET	SIMULATOR EXERCISE GUIDE	SEG

SITE: **Point Beach** **Revision #:** **0**

LMS ID: **PBN LOI NRC 18E** **LMS Rev. Date:**

SEG TITLE: **2017 NRC Exam Scenario 4**

SEG TYPE: ☐ **Training** ☒ **Evaluation**

PROGRAM: ☐ **LOCT** ☒ **LOIT** ☐ **Other:**

DURATION: **90 minutes**

Developed by: _____ _____
Instructor/Developer Date

Reviewed by: _____ _____
Instructor (Instructional Review) Date

Validated by: _____ _____
SME (Technical Review) Date

Approved by: _____ _____
Training Supervision Date

Approved by: _____ _____
Training Program Owner (Line) Date

Facility: _Point Beach_____ Scenario No.: _4_____ Op-Test No.: _2017____

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: _Unit 1 is at approximately 100%. 1LT-112 VCT Level Transmitter has failed low, I&C expect repairs to be completed within the hour and returned to service by the end of shift. 1W-3B, Control Rod Shroud Fan is OOS due to imminent motor failure._____

Turnover: Start 1P-27A, Heater Drain Tank Pump, and secure 1P-27C Heater Drain Tank Pump per OP 2A, Normal Power Operations, Attachment M, in preparations for maintenance. Lower power utilizing OP 3A, Power Operation to Hot Standby, in preparation for TS 3, Main Turbine Stop and Governor Valve with Turbine Trip (Biannual)

Event No.	Malf. No.	Event Type*	Event Description
1		N-BOP N-SRO	Shift Heater Drain Tank Pumps, start 1P-27A, secure 1P-27C
2		R-RO N-BOP R-SRO	Down Power for TS-3
3	MAL1NIS007C	I-RO I-SRO TS-SRO	NI-43, PR NI fails low fast enough to cause outward rod motion near 12-15 steps/min.
4	XMT1SGN012A	I-BOP I-SRO TS-SRO	1LT-471, SG Level fails low slowly (Manual SG level control)
5	XMT1CVC020A See SEG	I-RO I-SRO TS-SRO	1LT-141, VCT Level Transmitter fails low, causing an auto shift to the RWST. (Manual reactor trip required) The first set of Reactor Trip push buttons fails to cause a reactor trip, but the second set used is successful
6	MAL1SGN003B	M-ALL	Steam Generator Fault in Containment on Reactor Trip
7	PMP1AFW004 PMP1AFW002	C-BOP	1P-53, Motor Driven Auxiliary Feedwater Pump sheared shaft and 1P-29, Turbine Driven Auxiliary Feedwater Pump trips on over speed (CSP-H.1, Response to Loss of Secondary Heat Sink)

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

SIMULATOR EXERCISE GUIDE REQUIREMENTS

Terminal Objective

Given specific plant conditions, the students will be able to respond to plant evolution and failures listed below in accordance with plant procedures:

1. Shift Heater Drain Pumps
2. Lower Power utilizing OP 3A Unit 1, Power Operation to Hot Standby Unit 1 for TS-3, Main Turbine Stop and Governor Valves with Turbine Trip Test (Biannual) Unit 1
3. 1N-43, Power Range Nuclear Instrument fails low
4. 1LT-471, SG Level Transmitter fails low
5. 1LT-141, VCT Level Transmitter fails low
6. 1HX-1B SG faults to containment upon reactor trip
7. Reactor trip breakers fails to auto open; reactor trip push buttons on 1C04 do not work
8. Auxiliary Feedwater malfunctions
   - 1P-53, Motor-Driven AFW Pump – sheared shaft
   - 1P-29, Turbine-Driven AFW Pump – trips on overspeed

Embedded within these events is the expectation to properly utilize Technical Specifications.

Enabling Objectives:

None

Prerequisites:

1. Simulator available
2. Students enrolled in Initial License Program

Training Resources:

1. Floor Instructor as Shift Manager / Shift Technical Advisor
2. Simulator Booth Operator
3. Communicator
4. NRC Evaluators

References:

1. 0-SOP-IC-001 Blue, Routine Maintenance Procedure Removal Of Safeguards Or Protection Sensor From Service – Blue Channels
2. 0-SOP-IC-001 Yellow, Routine Maintenance Procedure Removal Of Safeguards Or Protection Sensor From Service – Yellow Channels
3. 0-SOP-IC-002, Technical Specifications LCO – Instrument Cross Reference
4. AOP-1D Unit 1, Chemical And Volume Control System Malfunction
5. AOP-2B Unit 1, Feedwater System Malfunction
6. AOP-6C, Uncontrolled Motion of RCCAs
7. AOP-24, Response to Instrument Malfunctions
8. CSP-H.1 Unit 1, Response to Loss of Secondary Heat Sink
9. EOP-0 Unit 1, Reactor Trip Or Safety Injection
10. EOP-1 Unit 1, Loss Of Reactor Or Secondary Coolant
11. EOP-1.1 Unit 1, SI Termination
12. EOP-2 Unit 1, Faulted Steam Generator Isolation
13. OM 3.7, AOP And EOP Procedure Usage For Response To Plant Transients
14. OP 2A UNIT 1, Normal Power Operation Unit 1
15. OP 3A Unit 1, Power Operation to Hot Standby Unit 1
16. Technical Specifications

Protected Content: **None**

Evaluation Method: Simulator performance will be evaluated in accordance with NUREG 1021

Operating Experience: N/A

Risk Significant Operator Actions: HEP-COG CSPH1, OPERATORS FAIL TO DIAGNOSE LOSS OF SECONDARY HEAT SINK. [Fv = 6.59E-02]

UPDATE LOG: Indicate in the following table any minor changes or major revisions (as defined in TR-AA-230-1003) made to the material after initial approval. Or use separate Update Log form TR-AA-230-1003-F16.

#	DESCRIPTION OF CHANGE	REASON FOR CHANGE	AR/TWR#	PREPARER REVIEWER	DATE DATE
Rev. 0	Developed for 2017 NRC ILT Exam.				

OVERVIEW / SEQUENCE OF EVENTS

OVERVIEW

Insert brief description of what will occur during this simulator exercise.

- Unit 1 is at approximately 100%.
- 1W-3B, Control Rod Shroud Fan is OOS due to imminent motor failure.
- 1LT-112, VCT Level Transmitter has failed low
  - 1CV-112A is in “TO VCT” position and VCT level is being manually controlled between 17% and 78% per AOP-1D
  - I&C expect repairs to be completed within the hour and returned to service by the end of the shift.
- Start 1P-27A, Heater Drain Tank Pump and secure 1P-27C, Heater Drain Tank Pump per OP-2A Attachment M, in preparation for maintenance.
- Lower Power utilizing OP 3A Unit 1, Power Operation to Hot Standby Unit 1 for TS-3, Main Turbine Stop and Governor Valves with Turbine Trip Test (Biannual) Unit 1
- Malfunctions
  - 1N-43, Power Range Nuclear Instrument fails low
  - 1LT-471, SG Level Transmitter fails low
  - 1LT-141, VCT Level Transmitter fails low
  - Reactor trip breakers fails to auto open; first set of reactor trip push buttons attempted do not work
  - 1HX-1B SG faults to containment upon reactor trip
  - Auxiliary Feedwater malfunctions
    - 1P-53, Motor-Driven AFW Pump – sheared shaft
    - 1P-29, Turbine-Driven AFW Pump – trips on overspeed

Termination criteria.

- Terminate the scenario when crew has completed Step 5 of EOP-1.1 Unit 1, SI Termination.

SEQUENCE OF EVENTS

ALL TIMES IN THIS SCENARIO ARE APPROXIMATE

Event #	Description
1.	Start 1P-27A, Heater Drain Tank Pump and secure 1P-27C, Heater Drain Tank Pump per OP-2A Attachment M, in preparation for maintenance
2.	Lower Power utilizing OP 3A Unit 1, Power Operation to Hot Standby Unit 1 for TS-3, Main Turbine Stop and Governor Valves with Turbine Trip Test (Biannual) Unit 1
3.	1NI-43, Power Range Nuclear Instrument fails low (outward rod motion at or near 12-15 steps/min) • The crew should respond by taking rods to manual to stop unwanted outward rod motion. • The crew should implement AOP-24, Response to Instrument Malfunctions and 0-SOP-IC-001 Blue, Routine Maintenance Procedure Removal of Safeguards or Protection Sensor from Service – Blue Channels to shift to a new controlling channel and take the nuclear instrument out of service.

4.	1LT-471, SG Level Transmitter fails low
	• The crew should:
	  • Take 1FIC-476A to Manual or shift the controller to single element.
	  • Implement AOP-2B Unit 1, Feedwater System Malfunction, AOP-24, Response to Instrument Malfunction and 0-SOP-IC-001 Yellow, Routine Maintenance Procedure Removal of Safeguards or Protection Sensor from Service – Yellow Channels take the channel out of service.
	  • Refer to Technical Specifications for the failed channel

5.	1LT-141, VCT Level Transmitter fails low • The crew should implement AOP-1D Unit 1, Chemical and Volume Control System Malfunctions, and trip the unit per the Foldout page criteria in response to the CVC system aligning the RWST and the charging pump suction source. • When the manual reactor trip is attempted the first set of pushbuttons will not work, the reactor will trip when the second set of pushbuttons are depressed. • Refer to Technical Requirements Manual for failed VCT level channels.
6.	1HX-1B SG faults to containment upon reactor trip • The crew should transition from EOP-0 Unit 1, Reactor Trip or Safety Injection to EOP-2 Unit 1, Faulted Steam Generator Isolation to isolate the faulted 1HX-1B Steam Generator.

7.	Auxiliary Feedwater malfunctions
	• 1P-53, Motor-Driven AFW Pump – sheared shaft
	• 1P-29, Turbine-Driven AFW Pump – trips on overspeed
	  • The crew should respond to the loss of auxiliary feedwater by transitioning form EOP-0 Unit 1, Reactor Trip or Safety Injection to CSP-H.1 Unit 1, Response to Loss of Secondary Heat Sink.
	  • Restoration of AFW will be from 2P-53, Motor-Driven AFW Pump through cross connects Unit 1 and Unit 2 AF-192 and by resetting the OS trip of 1P-29, Turbine Driven AFW Pump.

STOP	Terminate the scenario when the crew has completed Step 5 of EOP-1.1 Unit 1, SI Termination.

SIMULATOR SET UP INSTRUCTIONS

Perform simulator set up per the site specific Simulator Setup Checklist.

General Instructions

Simulator Setup Instructions:

- Load **IC-2** and go to run
- Open the saved Event and Schedule files from the secure drive:
- Verify all commands listed in table below are contained in the Schedule File
- Insert the setup malfunction(s)
- Reposition bistable switches for:
- Make any necessary adjustments or corrections
- Freeze the simulator and save to scenario specific IC
- Re-initialize into saved IC and go to run
- Open and start the Event and Schedule files
- Open and start InSight and Alarm files for data collection
- Run the scenario real time
- Save InSight, Event, Alarm, Schedule Files to the secure drive and collect procedure markups for SBT
- Complete TR-AA-23001008-F01 Scenario Based Testing (SBT) Checklist

Multiple Use:

- Load saved IC and go to run
- Open the saved Event and Schedule files:
- Start the Schedule File
- Walk down the control boards to ensure plant conditions accurately reflect the scenario's initial conditions
- Make any necessary adjustments or corrections
- Update documentation if required
- Resave if required
- Turnover to the crew

SIMULATOR – SCENARIO SETUP:

Setup: 1LT-112, VCT Level Transmitter failed low

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
XMT1CVC019A	1-LT112 VCT LEVEL FIXED OUTPUT	00 :00 :00	00 :00 :00		00 :00 :00	-	0	**SETUP**

Simulator Setup:

1. Place an OOS magnet at VCT level recorder
2. Take auto makeup to STOP
3. Position 1VC-112A to VCT
4. Place 1W-3B CS in pull-out, install OOS magnet.
5. Install an orange Guarded magnet at 1W-3A.

SIMULATOR MALFUNCTIONS:

Event 1: Start 1P-27A, Heater Drain Tank Pump and secure 1P-27C, Heater Drain Tank Pump per OP-2A Attachment M, in preparation for maintenance

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
-	-	-	-	-	-	-	-	**-**

Expected field communications:

1. **IF** asked about pre-start checks for 1P-27A, Heater Drain Tank Pump, **THEN** report that they were completed satisfactorily and the pump is ready for start.
2. **REPORT** that 1P-27A, Heater Drain Tank Pump start was normal.
3. **REPORT** that 1P-27C, Heater Drain Tank Pump coast down was normal, the pump is stopped and is not rotating backwards.

Event 2: Lower Power utilizing OP 3A Unit 1, Power Operation to Hot Standby Unit 1 for TS-3

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
LOA1CFW083	1-P99A SFP SEAL WATER INJECT PUMP C.S.	00 :00 :00	-	1	00 :00 :00	AUTO	ON	**When directed by the crew**
LOA1CFW084	1-P99B SGFP SEAL WATER INJECT PUMP C.S.	00 :00 :05	-	1	00 :00 :05	AUTO	ON	**When directed by the crew**

Expected field communications:

1. **WHEN** directed to start 1P-99A and 1P-99B SGFP Seal Water Injection Pumps, insert **Trigger 1** and **THEN** report when they are started.

Event 3: 1NI-43, Power Range Nuclear Instrument fails low (outward rod motion at or near 12-15 steps/min)

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
MAL1NIS007C	P.R. CHANNEL N43 HIGH VOLTAGE FAILURE	00 :00 :00	00 :00 :27	3	00 :00 :00	-	300	**PLE**

Expected field communications:

2. None

Event 4: 1LT-471, SG Level fails low

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
XMT1SGN012A	1-LT471 STM GEN B NR LEVEL FIXED OUTPUT	00 :00 :00	00 :01 :30	5	00 :00 :00	64	19	**PLE**

Expected field communications:

1. None

Event 5: 1LT-141, VCT Level Transmitter fails low, reactor trip with failed pushbuttons

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
XMT1CVC020A	1-LT141 VCT LEVEL FIXED OUTPUT	00 :00 :00	00 :00 :05	7	00 :00 :00	-	0	**PLE**
MAL1PPL001A	REACTOR TRIP BREAKER 52/RTA FAILURE	00 :00 :00	-	-	00 :00 :00	-	Fails_To_ Open	**PRELOAD**
MAL1PPL001B	REACTOR TRIP BREAKER 52/RTB FAILURE	00 :00 :00	-	-	00 :00 :00	-	Fails_To_ Open	**PRELOAD**
MAL1PPL001B	REACTOR TRIP BREAKER 52/RTB FAILURE			15 Cond			Trip	et_array(16) & et_array(17)
MAL1PPL001A	REACTOR TRIP BREAKER 52/RTA FAILURE			15 Cond			Trip	et_array(16) & et_array(17)
	1C04 REACTOR TRIP A **OR** B PUSHBUTTON			16 Cond				x14i057a == 1 | x14i055a == 1
	C01 REACTOR TRIP A **OR** B PUSHBUTTON			17 Cond				x01i142a == 1 | x01i141a == 1

Expected field communications:

1. **IF** an AO is dispatched to locally investigate LT-141, VCT Level Transmitter, wait two minutes and **THEN** report that locally there doesn't seem to anything out of normal.

Event 6: 1HX-1B SG faults to containment upon reactor trip

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
MAL1SGN003B	SG B MAIN STEAM LINE BREAK INSIDE CNMT	00 :00 :00	00 :05 :00	9 Cond.	00 :00 :00	-	2.5E5	**PRELOAD Cond. = Reactor Trip**
LOA1SGN025	1-MS-237 P-29 AFP & RADWASTE STEM ISOL	00:00:00	00 :00 :00	19	00 :00 :00	-	0	**When directed by the crew**

Expected field communications:

1. **WHEN** directed to locally check RW Service Water valves, LW-61 and 62, **THEN** report both valves are shut.
2. **WHEN** directed to locally check CW pump house temperature <105 ºF, wait 3 minutes and **THEN** report the temperature is 72 ºF and stable.
3. **WHEN** directed to locally check G03/G04 Switchgear Room temperature <95 ºF, wait 3 minutes and **THEN** report the temperature is 75 ºF and stable.
4. **IF** directed to periodically check the status of spent fuel cooling, wait 5 minutes and **THEN** report Spent Fuel Pool level is 63 feet, pool temperature is 67 ºF and both are stable.
5. **WHEN** directed to locally shut 1MS-237, 1P-29 AFP/Radwaste Steam Isolation and 1MS-238, Main Steam Trap Isolation, insert **Trigger 19** and **THEN** report completed when the valve has repositioned.

Event 8: Auxiliary Feedwater malfunctions: 1P-53, Motor-Driven AFW Pump – sheared shaft and 1P-29, Turbine-Driven AFW Pump – trips on overspeed

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
MAL1AFW001	AUX FWP TURBINE OVERSPEED	00 :00 :00	-	9	00 :03 :00	-	-	**PRELOAD**
PMP1AFW004	1-P53 AUXILIARY FEEDWATER PUMP	00 :00 :00	-	-	00 :00 :00	-	Shaft Break	**PRELOAD**
BKR1AFW001	1-B5212C P-38A AUX SG FEED PUMP CKTBKR	00 :00 :00	-	-	00 :00 :00	-	Failasis	**PRELOAD**
PMP1AFW002	0-P38B AUXILIARY FEEDWATER PUMP	00 :00 :00	-	-	00 :00 :00	-	Shaft Seizure	**PRELOAD**
LOA1AFW051	1-AF-192 U1 AFW CROSS CONNECT	00 :00 :00	-	11	00 :00 :00	-	1.0	**When directed by the crew**
LOA2AFW016	2-AF-192 U2 AFW CROSS CONNECT	00 :00 :00	-	11	00 :00 :00	-	1.0	**When directed by the crew**
LOA1SGN033	1-TV-2082R 2082 OVERSPEED TRIP RESET	00 :00 :00	-	13	00 :00 :00	-	RESET	**When directed by the crew**

Expected field communications:

Note: The intended sequence for the restoration of feed is first from 2P-53 via unit cross-connect valves then second from 1P-29 by resetting the OS trip mechanism.

1. **IF** an AO is dispatched to locally investigate 1P-29, Turbine-Driven AFW Pump, wait two minutes and **THEN** report that the pump has tripped on overspeed and the overspeed trip mechanism is intact.
2. WHEN directed by the crew to reset 1P-29 OS trip mechanism, THEN report that while attempting to reset the mechanism will not latch and that you are going to continue to try to get it reset.
2. **IF** an AO is dispatched to locally investigate 1P-53, Motor-Driven AFW Pump, wait two minutes and **THEN** report that the motor is turning, but is no longer connected to the pump (shaft break). He recommends securing the pump motor.
3. **WHEN** directed by the crew, insert **Trigger 11**, wait two minutes and **THEN** report that Unit 1 and Unit 2 AF-192, AFW Cross-connect Valves are open.
4. **AFTER** the crew has commenced feeding from U2 AFW, Insert **TRIGGER 13, THEN** report the OS trip reset. (verify MAL1AFW001 is deleted)

BRIEF / TURNOVER INFORMATION

- Conduct simulator crew pre-scenario brief using TR-AA-230-1007-F06, Simulator Instructor Pre-Exercise Checklist.
- Brief the scenario evaluators
- Brief surrogates using TR-AA-230-1007-F11, Surrogate Brief Checklist, if necessary.
- Crew Shift Turnover Information: See Attached

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 1: **Start 1P-27A, Heater Drain Tank Pump and secure 1P-27C** **Start:** _____	**Start 1P-27A, Heater Drain Tank Pump and secure 1P-27C, Heater Drain Tank Pump per OP-2A Attachment M, in preparation for maintenance.** **Expected Communications:** • **IF** asked about pre-start checks for 1P-27A, Heater Drain Tank Pump, **THEN** report that they were completed satisfactorily and the pump is ready for start. • **REPORT** that 1P-27A, Heater Drain Tank Pump start was normal. • **REPORT** that 1P-27C, Heater Drain Tank Pump coast down was normal, is stopped and is not rotating backwards.	OS1 BOP	Implements **OP 2A Unit 1, Normal Operation, ATTACHMENT M,** 4.1 **START** a Heater Drain Tank Pump as follows: 4.1.1 **SELECT** a HDT Pump to be STARTED and CHECK applicable box below. 4.1.2 **ENSURE** the following Prestart Checks for Pump selected in Attachment M, Step 4.1.1 have been COMPLETED IN ACCORDANCE with OP 13A Unit 1, Secondary Systems Startup Unit 1: 4.1.3 **START** Pump selected in Attachment M, Step 4.1.1 and **CHECK** applicable box below: 4.2 **STOP** a Heater Drain Tank Pump as follows: 4.2.1 **SELECT** HDT Pump to be SECURED and **CHECK** applicable box below. 4.2.2 **STOP** HDT Pump selected in Attachment M Step 4.21. 4.2.3 **IF** indications exist that HDT Pump is rotating backward, **THEN SHUT** the associated Pump Discharge Valve and **CHECK** applicable box below:

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 2: **Lower Power utilizing OP 3A Unit 1, Power Operation to Hot Standby Unit 1 for TS-3** **Start:** _____	**Lower Power utilizing OP 3A Unit 1, Power Operation to Hot Standby Unit 1 for TS-3** **Expected Communications:** None **Continuation Criteria:** After the crew has reduced power 3% to 5%, or at the discretion of the Lead Examiner, continue to the next event.	OS1	Implements **OP 3A Unit 1, Power Operation to Hot Standby Unit 1** 5.1.9 **MAKE** notification of load reduction in accordance with NP 2.1.5, Electrical Communications, Switchyard Access and Work Planning 5.1.10 **NOTIFY** Auxiliary Operators (AOs) to monitor the following during load reduction… 5.1.11 **IF** returning to full load **THEN RECORD** positon of Valve Position Limiter (VPL AND Governor Valves for subsequent return to full load 5.1.12 **IF** load reduction is to take turbine off line, **THEN RUN** a review of points “Scan Removed”, “Alarm Check Removed”, and “Limit Check Removed” on PPCS, **AND MAINTAIN** in Control Operator’s notebook. 5.1.13 **SET** PPCS trends as desired 5.1.14 **IF** desired, **THEN PLACE** an additional LETDOWN Orifice in service 5.1.15 **ENERGIZE** backup heaters to recirc Pressurizer for boron, as required. 5.2 Beginning Load Reduction 5.2.1 **ESTIMATE** amount of boron/rod motion needed for desired load change, and **REFER** to PPCS Xenon program for timing estimates ▪ Set quantity on boric acid flow counter, YIC-110A ▪ Set flow rate on boric acid flow controller, HC-110 ▪ Place reactor makeup mode selector in BORATE ▪ Place reactor makeup control switch to START

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
	Expected Communications: • **WHEN** directed to start 1P-99A and 1P-99B SGFP Seal Water Injection Pumps, insert **Trigger 1** and **THEN** report when they are started.	BOP	5.2.2 **PERFORM** the following to be begin reducing load: a. **RECORD** time in Narrative Log b. **ENSURE** EH Control in OPER AUTO c. **IF** Turbine control is on Valve Positon Limiter (VPL), **THEN TRANSFER** turbine control from VPL as follows:… d. **IF** Turbine control is in **1st STG OUT** mode, **AND** is required to go to **1st STG IN**, **AND** Reactor power is less than 97%, **THEN PRESS 1st STG IN** pushbutton to shift Turbine control to **1st STG IN** mode e. **PRESS** Reference Control (lower) pushbutton to set terminal load (SETTER) consistent with target load in accordance with Step 5.1.1 f. **SET** desired ramp rate (Consistent with Step 5.1.7), using thumbwheel g. **PRESS GO** pushbutton **AND CHECK** REFERENCE display indicates a controlled load reduction at selected rate 5.2.3 **START** SG Feed Pump Seal Water Pumps as required 5.2.4 **IF** unit is to be shutdown or operated at less than or equal to 10% load for greater than 15 minutes, **THEN THROTTLE SHUT** MSR Control Valves using manual operation of controller 1HC-2085, **AND INITIATE** Crossover temperature reduction at a rate of less than or equal to 25°F per 30 minutes 5.2.5 **IF** unit is to remain on line at greater than 10% load, **THEN THROTTLE SHUT** MSR Control valves using manual operation of controller 1HC-2085, MSR Steam Supply Controller (1C03) **AND MAINTAIN** crossover temperature less than 500°F

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
		OATC/BOP	5.3 Performance Requirements During Load Reduction 5.3.1 **MAINTAIN** controls in auto as practicable 5.3.2 **MAINTAIN** Axial Flux Difference (AFD) within limits specified in COLR. 5.3.3 **MAINTAIN** Control banks within the insertion, sequence and overlap limit specified in the COLR 5.3.4 **REFER** to PPCS Xenon program for Xenon follow information 5.3.5 **MAINTAIN** Tavg within 1.5°F of Tref 5.3.6 **ADJUST** Power Range NIS as directed by 1-TS-RE-001, Power Level Determination Unit 1, if required 5.3.7 **MAINTAIN** 345 KV voltage in accordance with OP 2B, 345 KV Transmission System Impacts Upon PBNP Station Operations, section 345 KV Voltage Control 5.3.8 **MAINTAIN** controller setpoint for LP Feedwater Heater Bypass Valve (1CS-2273) at 25 psig below SG Feed Pump suction pressure (except when singling up feed trains in accordance with Step 5.5.2.b 5.3.9 **MONITOR** Ice Melt operations as necessary

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 3: **1NI-43, Power Range Nuclear Instrument fails low (outward rod motion at or near 12-15 steps/min)** **Start:** _____	**Trigger 3** [MAL1NIS007C, P.R. CHANNEL N43 HIGH VOLTAGE FAILURE, RAMP = 27, VALUE = 300] Insert **Trigger 3** to cause 1NI-43, Power Range Nuclear Instrument to fail low (outward rod motion at or near 12-15 steps/min) If practical, start this event with rod control in automatic. **Plant Response:** The voltage fails to the selected value. The detector operates in the ion chamber region. The normal value is 800 volts. At 700 volts decreasing the loss of detector voltage alarms. Alarms for low failure include Power Range Channel Deviation, Power Range Loss Of Detector voltage and Power Range Rod Drop. **Cues:** • 1C04 1A 1-7, Automatic Rod Motion • 1C04 1A 3-2, 1N-41, 42, 43, or 44 Power Range Loss of Det Voltage • 1C04 1A 3-3, Power Range Channel Deviation • 1C04 1A 4-5, Power Range Rod Drop • 1N-43B, 1N-43Power Range Power indicating at a lower value • Outward Rod Motion	OATC OS1	Identifies failing 1NI-43 Power Range Nuclear Instrument and unexpected / unwanted outward rod motion. OATC may take rods to manual after reporting malfunction and attempting to or obtaining concurrence from OS1. Implements **AOP-6C, Uncontrolled Motion Of RCCA(s)** 1. Check Rod Motion – Required RNO Place rod control bank selector switch to – MANUAL 2. Maintain RCS Tavg: 3. Check RCS Tavg – AT <u>OR</u> TRENDING TO Tref RNO **<u>IF</u>** fuel has been conditioned, **<u>THEN</u>** move control rods in manual or adjust turbine load to restore Tavg. 4. Check Control Rods – ABOVE MINIMUM INSERTION LIMIT 5. Verify AFD – WITHIN LIMIT 6. Check Rod Motion Due To Instrument Failure 7. Go to <u>AOP-24, RESPONSE TO INSTRUMENT MALFUNCTIONS</u> Implements **AOP-24, Response to Instrument Malfunctions** 1. Identify Failed Instrument 2 Check If Failed Instrument Is A Controlling Channel 3. Establish Manual Control As Required 4. Return Affected Parameter(s) To Desired Value(s) 5. Using Attachment A, PPCS PARAMETERS USED TO CALCULATE REACTOR THERMAL OUTPUT, Verify That Failed Instrument Is <u>NOT</u> An Input To RTO 6. Remove Failed Instrument Channel From Service Per 0-SOP-IC-001, ROUTINE MAINTENANCE PROCEDURE REMOVAL OF SAFEGUARDS OR PROTECTION SENSOR FROM SERVICE 7. Return Controls To Automatic If Desired 8. Check Failure For Technical Specification Or TRM Applicability 9. Return To <u>Procedure And Step In Effect</u>

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
	Expected Communications: None **Continuation Criteria:** Once the crew has addressed Technical Specifications or at the discretion of the Lead Examiner, continue with the next event.		Prepares to implement **0-SOP-IC-001 Blue, Routine Maintenance Procedure Removal Of Safeguards Or Protection Sensor From Service – Blue Channels**

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE

Reference Technical Specifications

Technical Specifications:

3.2.4 (SR 3.2.4.1, 3.2.4.2) Quad. Power Tilt Ratio	Verify QPTR is within limit by calculation Verify QPTR is within limit using the moveable incore detectors	In accordance with the Surveillance Frequency Program	
Table 3.3.1-1 item 2a Power Range Neutron Flux-High Table 3.3.1-1 item 5 OverTemp Delta T	D. One channel inoperable	D.1 Place channel in trip OR D.2 Be in MODE 3	1 hour 7 hours
Table 3.3.1-1 item 17b-1 PR Neutron Flux P-7 Table 3.3.1-1 item 17c PR Neutron Flux P-8 Table 3.3.1-1 item 17d PR Neutro Flux, P-9	S. One or more channel(s) inoperable	S.1 Verify interlock is in required state for existing conditions. OR S.2 Be in MODE 2	1 hour 7 hours
Table 3.3.1-1 item 17e PR Neutron Flux, P-10	R. One or more channel(s) inoperable	R.1 Verify interlock is in required state for existing unit conditions OR R.2 Be in MODE 3	1 hour 7 hours

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 4: **1LT-471, SG Level fails low** **Start:** _____	**Trigger 5** [XMT1SGN012A, 1-LT471 STM GEN B NR LEVEL FIXED OUTPUT, VALUE = 19, RAMP = 90 sec] Insert **Trigger 5** to cause 1LT-471, 1HX-1B SG Narrow Range Level Transmitter to fail low. **Plant Response:** The controlling channel lowers to 19%. The SGWLC system responds by modulating open the affect SG's feedwater regulating valve to restore level to program. Actual level rises to the 78% lockout. **Cues:** • 1C03 1E2 1-5, Steam Generator B Level Setpoint Deviation/Trouble • 1C03 1E2 4-4, Seam Generator B Low-Low Level Channel Alert • 1LI-471 SG B Level (controlling channel lowers to 19%	BOP OS1 BOP	Identifies the failing channel and takes 1FIC-476A, 1HX-1B SG Feedwater Regulating Valve Controller to manual, matches feed flow to steam flow and controls actual level at or near program. Implements **AOP-2B Unit 1, Feedwater System Malfunction** Monitor Foldout Page 1. Maintain Reactor Power Less Than or Equal to 100% 2. Determine the Secondary System Malfunction <u>AND</u> go to the appropriate step (12) 12. Perform The Following For The Feed Regulating Valves: a. Check Feed Regulating Valve Response – NORMAL • 1FIC-476A RNO Perform the following: 1) Place affected feedwater regulating valve controller to manual or single element control ○ 1FIC-476A 2) Match feed flow to steam flow 3) Stabilize steam generator level at programmed level. 4) **<u>IF</u>** transient caused by instrument failure, **<u>THEN</u>** defeat failed instrument per AOP-24, RESPONSE TO INSTRUMENT MALFUNCTIONS 5) Direct I&C to identify and correct cause of failure b. Return to <u>Step 2</u> 3. Check Plant Conditions – STABLE 4. Check Secondary System Alignment – NORMAL 5. Check Change in Reactor Power – LESS THAN 15% IN ANY ONE HOUR 6. Notify the DSM 7. Return To <u>Procedure And Step In Effect</u>

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
	The crew should implement AOP-2B Unit 1, Feedwater System Malfunction, AOP-24, Response to Instrument Malfunctions, and address Technical Specifications **Expected Communications:** None **Continuation Criteria:** After the crew has taken manual control or shifted the controller to single element, stabilized the unit and addressed Technical Specifications, or at the discretion of the Lead Examine, continue on with the next event.	OS1 BOP BOP	Implements **AOP-24, Response to Instrument Malfunctions** 1. Identify Failed Instrument 2 Check If Failed Instrument Is A Controlling Channel 3. Establish Manual Control As Required 4. Return Affected Parameter(s) To Desired Value(s) 5. Using Attachment A, PPCS PARAMETERS USED TO CALCULATE REACTOR THERMAL OUTPUT, Verify That Failed Instrument Is NOT An Input To RTO 6. Remove Failed Instrument Channel From Service Per 0-SOP-IC-001, ROUTINE MAINTENANCE PROCEDURE REMOVAL OF SAFEGUARDS OR PROTECTION SENSOR FROM SERVICE 7. Return Controls To Automatic If Desired 8. Check Failure For Technical Specification Or TRM Applicability 9. Return To Procedure And Step In Effect

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
		CREW	Reference Technical Specifications **Technical Specifications:**

RPS LCO 3.3.1 is not met (3.3.1-1 item 13)

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one or more required channels or trains inoperable.	A.1 Enter the Condition referenced in Table 3.3.1-1 for the channel(s) or train(s).	Immediately
D. One channel inoperable.	D.1 Place channel in trip OR D.2 Be in MODE 3	1 hour 7 hours

RPS LCO 3.3.2 is not met (3.3.2-1 item 5b and 6b)

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one or more required channels or trains inoperable.	A.1 Enter the Condition referenced in Table 3.3.1-1 for the channel(s) or train(s).	Immediately
D. One or more channel(s) inoperable.	D.1 Place channel in trip OR D.2.1 Be in MODE 3 AND D.2.2 Be in MODE 4	1 hour 7 hours 13 hours

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 5: **1LT-141, VCT Level Transmitter fails low** **Reactor trip breakers fail to auto open; first reactor trip push buttons do not work, reactor manually trips on second pushbuttons** **Start:** _____	**Trigger 7** [XMT1CVC020A, 1-LT141 VCT LEVEL FIXED OUTPUT, VALUE = 0, RAMP = 5 sec] Insert **Trigger 7** to cause 1LT-141, VCT Level Transmitter to fail low. **Plant Response:** Charging pump suction shifts from the VCT to the RWST. The reactor trip breakers will not open on an auto signal; the first set of reactor trip push buttons attempted do not work when depressed. The reactor can be tripped from the control room using the second set of reactor trip pushbuttons. **Cues:** • 1C04 1C 1-7, 1T-4 Volume Control Tank Level High Or Low • 1LI-141 on 1LR-112 indicates 0% • 1CV-112C, 1T-4 VCT Outlet to Charging Pump Suction MOV indicates closed • 1CV-112B, 1T-13 RWST to Charging Pump Suction MOV indicates Open • Reactor remains at power until the reactor is tripped. • 52/RTB AND 52/RTB indicate closed until the reactor is tripped. **Expected Communications:** • **IF** an AO is dispatched to locally investigate LT-141, VCT Level Transmitter, wait two minutes and **THEN** report that locally there doesn't seem to anything out of normal.	OATC OS1 OS1 OS1 OATC	Identifies failed channel and references ARB 1C04 1C 1-7, 1T-4 Volume Control Tank Level High Or Low Implements **AOP-1D Unit 1, Chemical and Volume Control System Malfunctions** 1. Check RCS Leak – NOT IN PROGRESS Monitor Foldout Page CHARGING PUMP SUCTION SUPPLY CRITERIA: **IF** charging pump suction is from VCT and VCT level can **NOT** be maintained greater than 8%, **THEN** shift charging pump suction to RWST: a. Open RWST to Charging Pump Suction MOV • 1CV-112B b. Shut VCT Outlet to Charging Pump Suction MOV • 1CV-112C c. Manually trip reactor d. Stabilize plant using EOPs while continuing with this procedure Orders a manual reactor trip. ***CT-1, Manually Trip The Reactor*** OATC depresses the reactor trip pushbuttons at 1C04 – the trip attempt is unsuccessful. Reactor trip pushbuttons at C01 are depressed, resulting in a reactor trip. Reference Technical Requirements Manual: TRM Table 3.3.1-1 Item 7, VCT Level 1 required channel not in service. **CONDITION** / **REQUIRED ACTION** / **COMPLETION TIME** A. One or more required Functions non-functional. — A.1 Enter condition referenced in TRM Table 3.3.1-1 for the Function(s). — Immediately C. One or more Functions non-functional as per required action A.1 and referenced in TRM Table 3.3.1-1 — C.1 Initiate action to restore function(s) to FUNCTIONAL status. . — Immediately

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
	Continuation Criteria: If the crew decides to NOT manually trip the reactor, THEN with Lead Examiner concurrence, initiate the faulted SG event. (The faulted SG will result in an auto SI; the reactor will not automatically trip. A manual reactor trip will still be required, CT-1)		
Event 6: **1HX-1B SG faults to containment upon reactor trip** **Start:** _____	**Trigger 9** [MAL1SGN003B, SG B MAIN SEAM LINE BEAK INSIDE CNMT, VALUE 2.5E5, RAMP = 300 sec] **Trigger 9** is conditional upon a reactor trip. 1HX-1B SG faults to containment. Reactor trip breakers fail to auto open; reactor trip push buttons on 1C04 do not work. **Plant Response:** Containment humidity, temperature, pressure and sump level will increase and alarm. Safety Injection and Containment Isolation actuate. Condensate, feedwater and Heater Drain Pumps trip. Main Steam Isolation valves close. Containment Spray actuates. The steam generator will blow dry. Operator action is necessary to secure feedwater to the faulted SG. **Cues:** • Indicated steam flow on 1HX-1B Steam Generator • Degrading containment conditions; containment humidity, temperature, pressure and sump level will increase and alarm.	OS1 OATC	Implements **EOP-0 Unit 1, Reactor Trip or Safety Injection** 1. Verify Reactor Trip RNO Manually trip reactor 2. Verify Turbine Trip 3. Verify Power to AC Safeguards Buses 4. Check if SI is Actuated Monitor Foldout Page Criteria: **Faulted SG Isolation Criteria** **IF** any SG pressure trending lower in an uncontrolled manner **OR** any SG completely depressurized, **THEN** the following may be performed: a. Isolate feed flow to faulted SG b. Maintain total feed flow greater than or equal to 230 gpm until narrow range level in at least one SG is greater than [51%] 32%.

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 7: Auxiliary Feedwater malfunctions: 1P-53, Motor-Driven AFW Pump – sheared shaft and 1P-29, Turbine-Driven AFW Pump – trips on overspeed	**Plant Response:** Loss of main and auxiliary feedwater results in lowering steam generator levels. **Cues:** • 1MS-2082 1P-29 AFP LOW SU/OVRSPD TRIP VALVE PLOSITON – Amber Light – ON • 1FI-4002, 1P-29 AFP DISCHARGE FLOW indicates zero • 1PI-4005, 1P-29 AFP DISCH PRESS indicates zero • 1FI-4073, 1P-53 AFP TOTAL DISCHARGE FLOW indicates zero • 1PI-4071, 1P-53 AFP DISCH PRESSURE indicates zero	BOP	5. Perform ATTACHMENT A, Automatic Action Verification while continuing with the procedure 6. Verify AFW Pumps – RUNNING a. Motor-driven pump - RUNNING b. Turbine-driven pump - RUNNING RNO: Manually open both steam supply valves to turbine-driven pump **IF** AFW flow NOT established, **THEN** perform the following: 1) Place Stripping Logic Override Switch to the OVERRIDE position. 2) Start Standby Steam Generator feed pump (s): 3) Verify valve alignment: a) Open Unit 1 valve(s): AF-4023, train A AF-4021, train B b) Ensure Unit 2 valves - SHUT AF-4022, train A AF-4020, train B c) Manually align valve(s) as necessary to establish flow greater than or equal to 230 gpm. AF-4012, train A AF-4019, train B c. Verify total AFW – GREATER THAN 230 gpm RNO **IF** SG level is less than [51%] 32% in both SGs, **THEN** perform the following: 1) Manually align valve(s) as necessary to establish flow greater than or equal to 230 gpm. 2) **IF** AFW flow greater than or equal to 230 gpm can **NOT** be established, **THEN** go to CSP-H.1 Unit 1, RESPONSE TO LOSS OF SECONDARY HEAT SINK.

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
	Expected Communications: **Note: The intended sequence for the restoration of feed is first from 2P-53 via unit cross-connect valves, then second from 1P-29 by resetting the OS trip mechanism.** **For 1P-29:** • **IF** an AO is dispatched to locally investigate 1P-29, Turbine-Driven AFW Pump, wait until the crew has entered CSP-H.1 and **THEN** report that the pump has tripped on overspeed and the overspeed trip mechanism is intact. • **WHEN** directed by the crew to reset 1P-29 OS trip mechanism, **THEN** report that while attempting to reset the mechanism will not latch and that you are going to continue to try to get it reset. • **AFTER** the crew has commenced feeding from U2 AFW, Insert **TRIGGER 13, THEN** report the OS trip reset. (verify MAL1AFW001 is deleted) • **IF** an AO is dispatched to locally investigate 1P-53, Motor-Driven AFW Pump, wait two minutes and **THEN** report that the motor is turning, but is no longer connected to the pump (shaft break). He recommends securing the pump motor. • **WHEN** directed by the crew, insert **Trigger 11**, wait two minutes and **THEN** report that Unit 1 and Unit 2 AF-192, AFW Cross-connect Valves are open.	OS1 BOP BOP	IMPLEMENT **CSP-H.1 Unit 1, Loss of Heat Sink** 1. Check If Secondary Heat Sink Is Required: 2. Check If RCS Bleed And Feed Is Required: RNO: Perform the following: 1) Monitor bleed and feed conditions 2) If any bleed and feed condition occurs, then do steps 2.b and 2.c 3) Observe the caution prior to Step 3 and continue with Step 3 3. Establish Feed Flow From TDAFW Pump a. Check TDAFW Pump available: 1) Suction pressure trip – NOT ACTUATED 2) Overspeed trip – NOT ACTUATED **RNO**: Go to Attachment A, RESET/OVER-RIDE AFW PUMP TRIPS, to reset trips AND continue with Step 4. (Steps below) 4. Establish Feed Flow From MDAFP a. Check MDAFP available 1) Suction pressure trip not actuated 2) 1A06 available b. Start 1P-53 c. Ensure MDAFP valves – PROPERLY ALIGNED d. Check total feed flow – GREATER THAN 230 gpm **RNO**: Go to Step 5 5. Establish Feed Flow From Standby SSG Pumps a. Check SSG Pumps available b. Place stripping override switches to override c. Start SSG Pumps **RNO**: Go to Step 6 6. Establish Feed Flow From Unit 2 MDAFP 1) Locally open MDAFP cross connects 2) Start 2P-53 3) **Ensure Unit 1 MDAFP valves – PROPERLY ALIGNED** • **Set Unit 1 MDAFW Pump discharge Flow controller to desired flow.** 4) Check total feed flow – GREATER THAN 230 gpm. 5) Go to Step 7

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
		BOP	7. Check S/G Blowdown And Sample Isolation: 8. Check Total Feed Flow to S/Gs – GREATER THAN OR EQUAL TO 230 gpm 9. Determine Procedure Transition: o **IF** Feed and Bleed is **NOT** in progress, **THEN** return to procedure and step in effect
		BOP	**Attachment A Reset / Over-ride AFW Pump Trips** A2 Reset turbine Driven AFW Pump Overspeed Trip If Necessary 2. Open Low Suction / Overspeed Trip Valve From Control Room: 1) Check annunciator 1C03 1D 1-11, Unit 1 Governor Trouble - NOT LIT 2) Place 1MS-2082, !P-29 Low Suction / Overspeed trip valve reset operator to “CLOSE” 3) Check 1MS-2082, !P-29 Low Suction / Overspeed trip valve reset operator – CLOSED 4) Place 1MS-2082, !P-29 Low Suction / Overspeed trip valve reset operator to “OPEN” 5) Check 1MS-2082, !P-29 Low Suction / Overspeed trip valve reset operator – OPEN **CT-43: Establish feedwater flow to at least one SGs before bleed and feed is required**

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
		BOP	**EOP-0 continued …** 7. Check RCP Seal Cooling 8. Check RCS Temperatures 9. Check PZR PORVs and Spray Valves 10. Check if RCPs should be stopped 11. Check if SGs are NOT Faulted RNO Go to EOP-2 UNIT 1, FAULTED STEAM GENERATOR ISOLATION
		OS1	Implement **EOP-2 Unit 1, Faulted Steam Generator Isolation** CAUTIONS: • One SG must be maintained available for RCS cooldown. • If any faulted SG is not needed for RCS cooldown, it should remain isolated during subsequent recovery actions.
		BOP	1. Check Main Steam Isolation a. Any MSIV valve - OPEN b. Check Main Steamline Isolation Signal - NOT ACTUATED 2. Check If Any SG Is Not Faulted 3. Identify Faulted SG

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
	Expected Communications: • **WHEN** directed to locally shut 1MS-237, 1P-29 AFP/Radwaste Steam Isolation and 1MS-238, Main Steam Trap Isolation, insert **Trigger 19** and **THEN** report completed when the valve has repositioned.	BOP	4. Isolate Faulted SG a. Ensure feedwater isolation valves – SHUT ○ 1CS-3125 for SG B b. Ensure MDAFW valve – SHUT ○ SG B • 1AF-4074B c. Ensure AUX FEEDWATER TURBINE-DRIVEN valve – SHUT ○ SG B • 1AF-4000 d. SSG supply valve – SHUT ○ SG B • AF-4021 e. Isolate flow from faulted SG: 1) Ensure atmospheric steam dump valve – SHUT ○ 1MS-2015 for SG B 2) Shut steam supply to turbine-driven AFW pump – SHUT ○ 1MS-2019 for SG B 3) Ensure SG blowdown isolation valves – SHUT ○ SG B • 1MS-5959 • 1MS-2045 4) Locally shut 1P-29 AFP/Radwaste Steam isolation ○ 1MS-237 for SG B 5) Locally shut main steam trap isolation ○ 1MS-238 for SG B

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
		BOP	5. Check CST Level - GREATER THAN 4 FEET 6. Check Secondary Radiation a. Request Chemistry to periodically sample both SGs for activity b. Request local surveys of main steam lines c. Secondary system radiation monitor levels - NORMAL ▪ Condenser Air Ejector ▪ 1RE-215 ▪ RE-225 ▪ SG Blowdown ▪ 1RE-219 ▪ 1RE-222 ▪ Main Steam Lines ▪ 1RE-232 for SG B d. Secondary activity samples and surveys – Normal (When available) 7. Go to EOP-1 UNIT 1, LOSS OF REACTOR OR SECONDARY COOLANT

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
	EOP-0 Unit 1, Attachment A **Expected Communications:** • **WHEN** directed to locally check shut RW Service Water valves, LW-61 and 62, **THEN** report both valves are closed. • **WHEN** directed to locally check CW pump house temperature <105 ºF, wait 3 minutes and **THEN** report the temperature is 72 ºF and stable. • **WHEN** directed to locally check G03/G04 Switchgear Room temperature <95 ºF, wait 3 minutes and **THEN** report the temperature is 75 ºF and stable. • **IF** directed to periodically check the status of spent fuel cooling, wait 5 minutes and **THEN** report Spent Fuel Pool level is 63 feet, pool temperature is 67 ºF and both are stable.	BOP	**EOP-0 Unit 1, Attachment A, Automatic Action Verification** A1 Verify Feedwater isolation A2 Verify Containment Isolation A3 Verify ECCS Pumps RUNNING A4 Verify Service Water Pumps RUNNING A5 Verify Containment Accident Cooling Units RUNNING A6 Verify Component Cooling Water Pumps – ONLY ONE RUNNING A7 Check If Main Steam Lines Can Remain Open A8 Verify Containment Spray Not required a. Containment pressure recorder – HAS REMAINED LESS THAN 25 psig RNO Perform the following: 1) Check containment spray actuated: • Annunciator {C01 B 2-6}, CONTAINMENT SPRAY, lit **IF** containment spray has **NOT** actuated, **THEN** manually actuate containment spray. A9 Verify ECCS Flow A10 Verify AFW valve alignment – PROPER EMERGENCY ALIGNMENT A11 Verify Proper ECCS Valve Alignment A12 Check Containment Spray NOT ACTUATED via the blender in progress A14 Ensure the Auxiliary Building Filter/Exhaust Fans – OPERATING A15 Verify Service Water System Alignment A16 Check Miscellaneous Valves – SHUT A17 Check Control Room Ventilation A18 Check Cable Spreading Room Ventilation System – OPERATING A19 Check Computer Room Ventilation System – OPERATING A20 Check AFW Recirc fans – ONE RUNNING A21 Check Circulating Water Pump House Temperature Less Than 105°F A22 Check G03/G04 Switchgear Room Temperature less than 95°F A23 Periodically check status of spent fuel cooling

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE

End: _____	**Termination Criteria:**
	Terminate the scenario when crew has completed Step 5 of EOP-1.1 Unit 1, SI Termination or at the discretion of the Lead Examiner.
		OS1
		
		OS1
		BOP
			Implements **EOP-1 Unit 1, Loss of Reactor or Secondary Coolant**
			
			Monitor Foldout Page Criteria:
			SI Termination Criteria
			IF all conditions below occur, **THEN** go to EOP-1.1, SI TERMINATION:
			• RCS Subcooling based on core exit thermocouples - GREATER THAN [74 ºF] 35 ºF
			• Secondary heat sink available:
			  ○ Any Intact SG level - GREATER THAN [51%] 32%
			  OR
			  ○ Total feed flow to intact SGs - GREATER THAN OR EQUAL TO 230 GPM
			• RCS pressure - GREATER THAN [1850 PSIG] 1725 PSIG
			• RCS pressure - STABLE OR RISING
			• PZR Level - GREATER THAN [32%] 13%
			
			Implements **EOP-1.1 Unit 1, SI Termination**
			1. Reset SI
			2. Reset Isolation And Lockout Signals
			3. Establish Instrument Air To Containment
			4. Check If Charging Flow Has Been Established
			5. Stop ECCS Pumps And Place In Standby:
			  a. Stop both SI pumps and place in auto:
			  • 1P-15A
			  • 1P-15B
			  b. RHR pumps - ANY RUNNING WITH SUCTION ALIGNED TO RWST
			  c. Stop both RHR pumps and place in auto:
			  • 1P-10A
			  • 1P-10B

***** END OF SCENARIO *****

QUANTITATIVE ATTRIBUTES

(Use this form for NRC/INPO Evaluations only as required to document associated quantitative information.)

Malfunctions:

Before EOP Entry:

- 1N-43, Power Range Nuclear Instrument fails low
- 1LT-471, SG Level Transmitter fails low
- 1LT-141, VCT Level Transmitter fails low

After EOP Entry:

- 1HX-1B SG faults to containment upon reactor trip
- Reactor trip breakers fails to auto open; reactor trip push buttons on 1C04 or C01 do not work
- Auxiliary Feedwater malfunctions
  - 1P-53, Motor-Driven AFW Pump – sheared shaft
  - 1P-29, Turbine-Driven AFW Pump – trips on overspeed

Abnormal Events:

- 1N-43, Power Range Nuclear Instrument fails low
- 1LT-471, SG Level Transmitter fails low
- 1LT-141, VCT Level Transmitter fails low

Major Transients:

- 1HX-1B SG faults to containment upon reactor trip
- Auxiliary Feedwater malfunctions (Loss of Heat Sink)
  - 1P-53, Motor-Driven AFW Pump – sheared shaft
  - 1P-29, Turbine-Driven AFW Pump – trips on overspeed

Critical Tasks:

1.	CT-1	Manually trip the reactor
2.	CT-43	Establish feedwater flow to at least one SGs before bleed and feed is required

CT-1	Manually trip the reactor
Applicable ERG Version	LP
Applicable ERG	

Critical Task:

Manually trip the reactor from the control room before completing immediate actions in EOP-0

Plant Conditions:

- Reactor greater than 5% power
- Plant parameters exist that should result in automatic reactor trip but reactor does not automatically trip
    - First set of reactor trip pushbuttons fail to trip the reactor
- Reactor can be tripped manually from control room

Cues:

- Indication and/or annunciation that plant parameter exist that should result in automatic reactor trip but reactor does not automatically trip

Performance Indicator:

Manipulation of control room reactor trip switches as required to trip the reactor

- Reactor trip and bypass breakers indicate open

Feedback:

Indications of reactor trip

- Control rods at bottom of core
- Neutron flux decreasing

CT-43	Establish feedwater flow to SGs before bleed and feed is required
Applicable ERG Version	HP, LP
Applicable ERG	FR-H.1

Critical Task:

Establish feedwater flow to at least one SGs before bleed and feed is required.

Plant Conditions:

- Extreme (RED path) challenge to the heat sink CSF
- Plant conditions require SGs as heat sinks
- AFW flow is not sufficient and cannot be increased
- Feedwater flow is available but not established from any of the following:
  - Main feedwater pumps
  - Condensate pumps
  - Plant-specific alternate source (Unit 2 AFW)
- Indication that RCS bleed and feed is not required
- Reactor trip and SI

Cues:

Extreme (RED path) challenge to the heat sink CSF
AND
Indication that RCS pressure remains above the pressure of all SGs
AND
Indication that RCS temperature is above the temperature for placing the RHR system in service
AND
Indication and/or annunciation that no AFW flow is available after repeated attempts to establish
AND
Indication that RCS bleed and feed is not required

Performance Indicator:

Manipulation of controls as required to establish feedwater flow into at least one SG

Feedback:

- Indication of feedwater flow into at least one SG
- Indication of increasing water level in at least one SG

1.0 Plant Conditions:

	Unit 1	Unit 2
Time in Core Life (MWD/MTU):	*9005*	
Reactor Power:	*100%*	
Boron Concentration:	*1078 ppm*	
Rod Height:	*CBD @ 220*	

2.0 Equipment Out of Service:

- 1LT-112 VCT Level Transmitter
- 1W-3B, Control Rod Shroud Fan

3.0 Technical Specification LCOs NOT Met and Action Conditions in Effect:
None

4.0 Planned Evolutions:

- Unit 1 is at approximately 100% EOL.
- 1LT-112, VCT Level Transmitter has failed low
  - 1CV-112A is in “TO VCT” position and VCT level is being manually controlled between 17% and 78% per AOP-1D
  - I&C expect repairs to be completed within the hour and returned to service by the end of the shift.
- Start 1P-27A, Heater Drain Tank Pump and secure 1P-27C, Heater Drain Tank Pump per OP-2A Attachment M, in preparation for maintenance.
- Lower Power utilizing OP 3A Unit 1, Power Operation to Hot Standby Unit 1 for TS-3, Main Turbine Stop and Governor Valves with Turbine Trip Test (Biannual) Unit 1

5.0 Common:

- Safety Monitor is Green
- Today is Sunday, clock time is real time and you have a normal shift complement.

NEXTera ENERGY NUCLEAR FLEET	SIMULATOR EXERCISE GUIDE	SEG

SITE: **Point Beach** **Revision #:** **0**

LMS ID: **PBN LOI NRC 18E** **LMS Rev. Date:**

SEG TITLE: **2017 NRC Exam Scenario 4** **Note: modified to reflect "as-run" test conditions during sessions #1 and #2 of this scenario on 5/9/17.**

SEG TYPE: ☐ **Training** ☒ **Evaluation**

PROGRAM: ☐ **LOCT** ☒ **LOIT** ☐ **Other:**

DURATION: **90 minutes**

Developed by: _____ _____
Instructor/Developer Date

Reviewed by: _____ _____
Instructor (Instructional Review) Date

Validated by: _____ _____
SME (Technical Review) Date

Approved by: _____ _____
Training Supervision Date

Approved by: _____ _____
Training Program Owner (Line) Date

Facility: _Point Beach_____ Scenario No.: 4_**(Sessions #1 and #2)** Op-Test No.: _2017____

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: _Unit 1 is at approximately 100%. 1LT-112 VCT Level Transmitter has failed low, _ I&C expect repairs to be completed within the hour and returned to service by the end of shift. 1W-3B, Control Rod Shroud Fan is OOS due to imminent motor failure._____ _____

Turnover: Start 1P-27A, Heater Drain Tank Pump, and secure 1P-27C Heater Drain Tank Pump____ per OP 2A, Normal Power Operations, Attachment M, in preparations for maintenance. Lower power utilizing OP 3A, Power Operation to Hot Standby, in preparation for TS 3, Main Turbine Stop and Governor Valve with Turbine Trip_(Biannual)

_____ _____

Event No.	Malf. No.	Event Type*	Event Description
1		N-BOP N-SRO	Shift Heater Drain Tank Pumps, start 1P-27A, secure 1P-27C
2		R-RO N-BOP R-SRO	Down Power for TS-3
3	MAL1NIS007C	I-RO I-SRO TS-SRO	NI-43, PR NI fails low fast enough to cause outward rod motion near 12-15 steps/min.
4	XMT1SGN012A	I-BOP I-SRO TS-SRO	1LT-471, SG Level fails low slowly (Manual SG level control)
5	XMT1CVC020A See SEG	I-RO I-SRO TS-SRO	1LT-141, VCT Level Transmitter fails low, causing an auto shift to the RWST. (Manual reactor trip required) The first set of Reactor Trip push buttons fails to cause a reactor trip, but the second set used is successful
6	MAL1SGN003B	M-ALL	Steam Generator Fault in Containment on Reactor Trip
7	PMP1AFW004 PMP1AFW002	C-BOP	1P-53, Motor Driven Auxiliary Feedwater Pump sheared shaft and 1P-29, Turbine Driven Auxiliary Feedwater Pump trips on over speed (CSP-H.1, Response to Loss of Secondary Heat Sink)

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

SIMULATOR EXERCISE GUIDE REQUIREMENTS

Terminal Objective

Given specific plant conditions, the students will be able to respond to plant evolution and failures listed below in accordance with plant procedures:

1. Shift Heater Drain Pumps
2. Lower Power utilizing OP 3A Unit 1, Power Operation to Hot Standby Unit 1 for TS-3, Main Turbine Stop and Governor Valves with Turbine Trip Test (Biannual) Unit 1
3. 1N-43, Power Range Nuclear Instrument fails low
4. 1LT-471, SG Level Transmitter fails low
5. 1LT-141, VCT Level Transmitter fails low
6. 1HX-1B SG faults to containment upon reactor trip
7. Reactor trip breakers fails to auto open; reactor trip push buttons on 1C04 do not work
8. Auxiliary Feedwater malfunctions
   - 1P-53, Motor-Driven AFW Pump – sheared shaft
   - 1P-29, Turbine-Driven AFW Pump – trips on overspeed

Embedded within these events is the expectation to properly utilize Technical Specifications.

Enabling Objectives:

None

Prerequisites:

1. Simulator available
2. Students enrolled in Initial License Program

Training Resources:

1. Floor Instructor as Shift Manager / Shift Technical Advisor
2. Simulator Booth Operator
3. Communicator
4. NRC Evaluators

References:

1. 0-SOP-IC-001 Blue, Routine Maintenance Procedure Removal Of Safeguards Or Protection Sensor From Service – Blue Channels
2. 0-SOP-IC-001 Yellow, Routine Maintenance Procedure Removal Of Safeguards Or Protection Sensor From Service – Yellow Channels
3. 0-SOP-IC-002, Technical Specifications LCO – Instrument Cross Reference
4. AOP-1D Unit 1, Chemical And Volume Control System Malfunction
5. AOP-2B Unit 1, Feedwater System Malfunction
6. AOP-6C, Uncontrolled Motion of RCCAs
7. AOP-24, Response to Instrument Malfunctions
8. CSP-H.1 Unit 1, Response to Loss of Secondary Heat Sink
9. EOP-0 Unit 1, Reactor Trip Or Safety Injection
10. EOP-1 Unit 1, Loss Of Reactor Or Secondary Coolant
11. EOP-1.1 Unit 1, SI Termination
12. EOP-2 Unit 1, Faulted Steam Generator Isolation
13. OM 3.7, AOP And EOP Procedure Usage For Response To Plant Transients
14. OP 2A UNIT 1, Normal Power Operation Unit 1
15. OP 3A Unit 1, Power Operation to Hot Standby Unit 1
16. Technical Specifications

Protected Content: **None**

Evaluation Method: Simulator performance will be evaluated in accordance with NUREG 1021

Operating Experience: N/A

Risk Significant Operator Actions: HEP-COG CSPH1, OPERATORS FAIL TO DIAGNOSE LOSS OF SECONDARY HEAT SINK. [Fv = 6.59E-02]

UPDATE LOG: Indicate in the following table any minor changes or major revisions (as defined in TR-AA-230-1003) made to the material after initial approval. Or use separate Update Log form TR-AA-230-1003-F16.

#	DESCRIPTION OF CHANGE	REASON FOR CHANGE	AR/TWR#	PREPARER REVIEWER	DATE DATE
Rev. 0	Developed for 2017 NRC ILT Exam.				

OVERVIEW / SEQUENCE OF EVENTS

OVERVIEW

Insert brief description of what will occur during this simulator exercise.

- Unit 1 is at approximately 100%.
- 1W-3B, Control Rod Shroud Fan is OOS due to imminent motor failure.
- 1LT-112, VCT Level Transmitter has failed low
  - 1CV-112A is in “TO VCT” position and VCT level is being manually controlled between 17% and 78% per AOP-1D
  - I&C expect repairs to be completed within the hour and returned to service by the end of the shift.
- Start 1P-27A, Heater Drain Tank Pump and secure 1P-27C, Heater Drain Tank Pump per OP-2A Attachment M, in preparation for maintenance.
- Lower Power utilizing OP 3A Unit 1, Power Operation to Hot Standby Unit 1 for TS-3, Main Turbine Stop and Governor Valves with Turbine Trip Test (Biannual) Unit 1
- Malfunctions
  - 1N-43, Power Range Nuclear Instrument fails low
  - 1LT-471, SG Level Transmitter fails low
  - 1LT-141, VCT Level Transmitter fails low
  - Reactor trip breakers fails to auto open; first set of reactor trip push buttons attempted do not work
  - 1HX-1B SG faults to containment upon reactor trip
  - Auxiliary Feedwater malfunctions
    - 1P-53, Motor-Driven AFW Pump – sheared shaft
    - 1P-29, Turbine-Driven AFW Pump – trips on overspeed

Termination criteria.

- Terminate the scenario when crew has completed Step 5 of EOP-1.1 Unit 1, SI Termination.

SEQUENCE OF EVENTS

ALL TIMES IN THIS SCENARIO ARE APPROXIMATE

Event #	Description
1.	Start 1P-27A, Heater Drain Tank Pump and secure 1P-27C, Heater Drain Tank Pump per OP-2A Attachment M, in preparation for maintenance
2.	Lower Power utilizing OP 3A Unit 1, Power Operation to Hot Standby Unit 1 for TS-3, Main Turbine Stop and Governor Valves with Turbine Trip Test (Biannual) Unit 1
3.	1NI-43, Power Range Nuclear Instrument fails low (outward rod motion at or near 12-15 steps/min) • The crew should respond by taking rods to manual to stop unwanted outward rod motion. • The crew should implement AOP-24, Response to Instrument Malfunctions and 0-SOP-IC-001 Blue, Routine Maintenance Procedure Removal of Safeguards or Protection Sensor from Service – Blue Channels to shift to a new controlling channel and take the nuclear instrument out of service.

4.	1LT-471, SG Level Transmitter fails low
	• The crew should:
	  • Take 1FIC-476A to Manual or shift the controller to single element.
	  • Implement AOP-2B Unit 1, Feedwater System Malfunction, AOP-24, Response to Instrument Malfunction and 0-SOP-IC-001 Yellow, Routine Maintenance Procedure Removal of Safeguards or Protection Sensor from Service – Yellow Channels take the channel out of service.
	  • Refer to Technical Specifications for the failed channel

5.	1LT-141, VCT Level Transmitter fails low • The crew should implement AOP-1D Unit 1, Chemical and Volume Control System Malfunctions, and trip the unit per the Foldout page criteria in response to the CVC system aligning the RWST and the charging pump suction source. • When the manual reactor trip is attempted the first set of pushbuttons will not work, the reactor will trip when the second set of pushbuttons are depressed. • Refer to Technical Requirements Manual for failed VCT level channels.
6.	1HX-1B SG faults to containment upon reactor trip • The crew should transition from EOP-0 Unit 1, Reactor Trip or Safety Injection to EOP-2 Unit 1, Faulted Steam Generator Isolation to isolate the faulted 1HX-1B Steam Generator.

7.	Auxiliary Feedwater malfunctions
	• 1P-53, Motor-Driven AFW Pump – sheared shaft
	• 1P-29, Turbine-Driven AFW Pump – trips on overspeed
	  • The crew should respond to the loss of auxiliary feedwater by transitioning form EOP-0 Unit 1, Reactor Trip or Safety Injection to CSP-H.1 Unit 1, Response to Loss of Secondary Heat Sink.
	  • Restoration of AFW will be from 2P-53, Motor-Driven AFW Pump through cross connects Unit 1 and Unit 2 AF-192 and by resetting the OS trip of 1P-29, Turbine Driven AFW Pump.

STOP	Terminate the scenario when the crew has completed Step 5 of EOP-1.1 Unit 1, SI Termination.

SIMULATOR SET UP INSTRUCTIONS

Perform simulator set up per the site specific Simulator Setup Checklist.

General Instructions

Simulator Setup Instructions:

- Load **IC-2** and go to run
- Open the saved Event and Schedule files from the secure drive:
- Verify all commands listed in table below are contained in the Schedule File
- Insert the setup malfunction(s)
- Reposition bistable switches for:
- Make any necessary adjustments or corrections
- Freeze the simulator and save to scenario specific IC
- Re-initialize into saved IC and go to run
- Open and start the Event and Schedule files
- Open and start InSight and Alarm files for data collection
- Run the scenario real time
- Save InSight, Event, Alarm, Schedule Files to the secure drive and collect procedure markups for SBT
- Complete TR-AA-23001008-F01 Scenario Based Testing (SBT) Checklist

Multiple Use:

- Load saved IC and go to run
- Open the saved Event and Schedule files:
- Start the Schedule File
- Walk down the control boards to ensure plant conditions accurately reflect the scenario's initial conditions
- Make any necessary adjustments or corrections
- Update documentation if required
- Resave if required
- Turnover to the crew

SIMULATOR – SCENARIO SETUP:

Setup: 1LT-112, VCT Level Transmitter failed low

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
XMT1CVC019A	1-LT112 VCT LEVEL FIXED OUTPUT	00 :00 :00	00 :00 :00		00 :00 :00	-	0	**SETUP**

Simulator Setup:

1. Place an OOS magnet at VCT level recorder
2. Take auto makeup to STOP
3. Position 1VC-112A to VCT
4. Place 1W-3B CS in pull-out, install OOS magnet.
5. Install an orange Guarded magnet at 1W-3A.

SIMULATOR MALFUNCTIONS:

Event 1: Start 1P-27A, Heater Drain Tank Pump and secure 1P-27C, Heater Drain Tank Pump per OP-2A Attachment M, in preparation for maintenance

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
-	-	-	-	-	-	-	-	**-**

Expected field communications:

1. **IF** asked about pre-start checks for 1P-27A, Heater Drain Tank Pump, **THEN** report that they were completed satisfactorily and the pump is ready for start.
2. **REPORT** that 1P-27A, Heater Drain Tank Pump start was normal.
3. **REPORT** that 1P-27C, Heater Drain Tank Pump coast down was normal, the pump is stopped and is not rotating backwards.

Event 2: Lower Power utilizing OP 3A Unit 1, Power Operation to Hot Standby Unit 1 for TS-3

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
LOA1CFW083	1-P99A SFP SEAL WATER INJECT PUMP C.S.	00 :00 :00	-	1	00 :00 :00	AUTO	ON	**When directed by the crew**
LOA1CFW084	1-P99B SGFP SEAL WATER INJECT PUMP C.S.	00 :00 :05	-	1	00 :00 :05	AUTO	ON	**When directed by the crew**

Expected field communications:

1. **WHEN** directed to start 1P-99A and 1P-99B SGFP Seal Water Injection Pumps, insert **Trigger 1** and **THEN** report when they are started.

Event 3: 1NI-43, Power Range Nuclear Instrument fails low (outward rod motion at or near 12-15 steps/min)

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
MAL1NIS007C	P.R. CHANNEL N43 HIGH VOLTAGE FAILURE	00 :00 :00	00 :00 :27	3	00 :00 :00	-	300	**PLE**

Expected field communications:

2. None

Event 4: 1LT-471, SG Level fails low

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
XMT1SGN012A	1-LT471 STM GEN B NR LEVEL FIXED OUTPUT	00 :00 :00	00 :01 :30	5	00 :00 :00	64	19	**PLE**

Expected field communications:

1. None

Event 5: 1LT-141, VCT Level Transmitter fails low, reactor trip with failed pushbuttons

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
XMT1CVC020A	1-LT141 VCT LEVEL FIXED OUTPUT	00 :00 :00	00 :00 :05	7	00 :00 :00	-	0	**PLE**
MAL1PPL001A	REACTOR TRIP BREAKER 52/RTA FAILURE	00 :00 :00	-	-	00 :00 :00	-	Fails_To_ Open	**PRELOAD**
MAL1PPL001B	REACTOR TRIP BREAKER 52/RTB FAILURE	00 :00 :00	-	-	00 :00 :00	-	Fails_To_ Open	**PRELOAD**
MAL1PPL001B	REACTOR TRIP BREAKER 52/RTB FAILURE			15 Cond			Trip	et_array(16) & et_array(17)
MAL1PPL001A	REACTOR TRIP BREAKER 52/RTA FAILURE			15 Cond			Trip	et_array(16) & et_array(17)
	1C04 REACTOR TRIP A **OR** B PUSHBUTTON			16 Cond				x14i057a == 1 | x14i055a == 1
	C01 REACTOR TRIP A **OR** B PUSHBUTTON			17 Cond				x01i142a == 1 | x01i141a == 1

Expected field communications:

1. **IF** an AO is dispatched to locally investigate LT-141, VCT Level Transmitter, wait two minutes and **THEN** report that locally there doesn't seem to anything out of normal.

Event 6: 1HX-1B SG faults to containment upon reactor trip

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
MAL1SGN003B	SG B MAIN STEAM LINE BREAK INSIDE CNMT	00 :00 :00	00 :05 :00	9 Cond.	00 :00 :00	-	2.5E5	**PRELOAD Cond. = Reactor Trip**
LOA1SGN025	1-MS-237 P-29 AFP & RADWASTE STEM ISOL	00:00:00	00 :00 :00	19	00 :00 :00	-	0	**When directed by the crew**

Expected field communications:

1. **WHEN** directed to locally check RW Service Water valves, LW-61 and 62, **THEN** report both valves are shut.
2. **WHEN** directed to locally check CW pump house temperature <105 ºF, wait 3 minutes and **THEN** report the temperature is 72 ºF and stable.
3. **WHEN** directed to locally check G03/G04 Switchgear Room temperature <95 ºF, wait 3 minutes and **THEN** report the temperature is 75 ºF and stable.
4. **IF** directed to periodically check the status of spent fuel cooling, wait 5 minutes and **THEN** report Spent Fuel Pool level is 63 feet, pool temperature is 67 ºF and both are stable.
5. **WHEN** directed to locally shut 1MS-237, 1P-29 AFP/Radwaste Steam Isolation and 1MS-238, Main Steam Trap Isolation, insert **Trigger 19** and **THEN** report completed when the valve has repositioned.

Event 8: Auxiliary Feedwater malfunctions: 1P-53, Motor-Driven AFW Pump – sheared shaft and 1P-29, Turbine-Driven AFW Pump – trips on overspeed

MALFUNCTION No.	MALFUNCTION TITLE	DELAY	RAMP	ET	DELETE IN	INITIAL VALUE	FINAL VALUE	NOTES
MAL1AFW001	AUX FWP TURBINE OVERSPEED	00 :00 :00	-	9	00 :03 :00	-	-	**PRELOAD**
PMP1AFW004	1-P53 AUXILIARY FEEDWATER PUMP	00 :00 :00	-	-	00 :00 :00	-	Shaft Break	**PRELOAD**
BKR1AFW001	1-B5212C P-38A AUX SG FEED PUMP CKTBKR	00 :00 :00	-	-	00 :00 :00	-	Failasis	**PRELOAD**
PMP1AFW002	0-P38B AUXILIARY FEEDWATER PUMP	00 :00 :00	-	-	00 :00 :00	-	Shaft Seizure	**PRELOAD**
LOA1AFW051	1-AF-192 U1 AFW CROSS CONNECT	00 :00 :00	-	11	00 :00 :00	-	1.0	**When directed by the crew**
LOA2AFW016	2-AF-192 U2 AFW CROSS CONNECT	00 :00 :00	-	11	00 :00 :00	-	1.0	**When directed by the crew**
LOA1SGN033	1-TV-2082R 2082 OVERSPEED TRIP RESET	00 :00 :00	-	13	00 :00 :00	-	RESET	**When directed by the crew**

Expected field communications:

Note: The intended sequence for the restoration of feed is first from 2P-53 via unit cross-connect valves then second from 1P-29 by resetting the OS trip mechanism.

1. **IF** an AO is dispatched to locally investigate 1P-29, Turbine-Driven AFW Pump, wait two minutes and **THEN** report that the pump has tripped on overspeed and the overspeed trip mechanism is intact.
2. WHEN directed by the crew to reset 1P-29 OS trip mechanism, THEN report that while attempting to reset the mechanism will not latch and that you are going to continue to try to get it reset.
2. **IF** an AO is dispatched to locally investigate 1P-53, Motor-Driven AFW Pump, wait two minutes and **THEN** report that the motor is turning, but is no longer connected to the pump (shaft break). He recommends securing the pump motor.
3. **WHEN** directed by the crew, insert **Trigger 11**, wait two minutes and **THEN** report that Unit 1 and Unit 2 AF-192, AFW Cross-connect Valves are open.
4. **AFTER** the crew has commenced feeding from U2 AFW, Insert **TRIGGER 13, THEN** report the OS trip reset. (verify MAL1AFW001 is deleted)

BRIEF / TURNOVER INFORMATION

- Conduct simulator crew pre-scenario brief using TR-AA-230-1007-F06, Simulator Instructor Pre-Exercise Checklist.
- Brief the scenario evaluators
- Brief surrogates using TR-AA-230-1007-F11, Surrogate Brief Checklist, if necessary.
- Crew Shift Turnover Information: See Attached

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 1: **Start 1P-27A, Heater Drain Tank Pump and secure 1P-27C** **Start:** _____	**Start 1P-27A, Heater Drain Tank Pump and secure 1P-27C, Heater Drain Tank Pump per OP-2A Attachment M, in preparation for maintenance.** **Expected Communications:** • **IF** asked about pre-start checks for 1P-27A, Heater Drain Tank Pump, **THEN** report that they were completed satisfactorily and the pump is ready for start. • **REPORT** that 1P-27A, Heater Drain Tank Pump start was normal. • **REPORT** that 1P-27C, Heater Drain Tank Pump coast down was normal, is stopped and is not rotating backwards.	OS1 BOP	Implements **OP 2A Unit 1, Normal Operation, ATTACHMENT M,** 4.1 **START** a Heater Drain Tank Pump as follows: 4.1.1 **SELECT** a HDT Pump to be STARTED and CHECK applicable box below. 4.1.2 **ENSURE** the following Prestart Checks for Pump selected in Attachment M, Step 4.1.1 have been COMPLETED IN ACCORDANCE with OP 13A Unit 1, Secondary Systems Startup Unit 1: 4.1.3 **START** Pump selected in Attachment M, Step 4.1.1 and **CHECK** applicable box below: 4.2 **STOP** a Heater Drain Tank Pump as follows: 4.2.1 **SELECT** HDT Pump to be SECURED and **CHECK** applicable box below. 4.2.2 **STOP** HDT Pump selected in Attachment M Step 4.21. 4.2.3 **IF** indications exist that HDT Pump is rotating backward, **THEN SHUT** the associated Pump Discharge Valve and **CHECK** applicable box below:

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 2: **Lower Power utilizing OP 3A Unit 1, Power Operation to Hot Standby Unit 1 for TS-3** **Start:** _____	**Lower Power utilizing OP 3A Unit 1, Power Operation to Hot Standby Unit 1 for TS-3** **Expected Communications:** None **Continuation Criteria:** After the crew has reduced power 3% to 5%, or at the discretion of the Lead Examiner, continue to the next event.	OS1	Implements **OP 3A Unit 1, Power Operation to Hot Standby Unit 1** 5.1.9 **MAKE** notification of load reduction in accordance with NP 2.1.5, Electrical Communications, Switchyard Access and Work Planning 5.1.10 **NOTIFY** Auxiliary Operators (AOs) to monitor the following during load reduction… 5.1.11 **IF** returning to full load **THEN RECORD** positon of Valve Position Limiter (VPL AND Governor Valves for subsequent return to full load 5.1.12 **IF** load reduction is to take turbine off line, **THEN RUN** a review of points “Scan Removed”, “Alarm Check Removed”, and “Limit Check Removed” on PPCS, **AND MAINTAIN** in Control Operator’s notebook. 5.1.13 **SET** PPCS trends as desired 5.1.14 **IF** desired, **THEN PLACE** an additional LETDOWN Orifice in service 5.1.15 **ENERGIZE** backup heaters to recirc Pressurizer for boron, as required. 5.2 Beginning Load Reduction 5.2.1 **ESTIMATE** amount of boron/rod motion needed for desired load change, and **REFER** to PPCS Xenon program for timing estimates ▪ Set quantity on boric acid flow counter, YIC-110A ▪ Set flow rate on boric acid flow controller, HC-110 ▪ Place reactor makeup mode selector in BORATE ▪ Place reactor makeup control switch to START

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
	Expected Communications: • **WHEN** directed to start 1P-99A and 1P-99B SGFP Seal Water Injection Pumps, insert **Trigger 1** and **THEN** report when they are started.	BOP	5.2.2 **PERFORM** the following to be begin reducing load: a. **RECORD** time in Narrative Log b. **ENSURE** EH Control in OPER AUTO c. **IF** Turbine control is on Valve Positon Limiter (VPL), **THEN TRANSFER** turbine control from VPL as follows:… d. **IF** Turbine control is in **1st STG OUT** mode, **AND** is required to go to **1st STG IN**, **AND** Reactor power is less than 97%, **THEN PRESS 1st STG IN** pushbutton to shift Turbine control to **1st STG IN** mode e. **PRESS** Reference Control (lower) pushbutton to set terminal load (SETTER) consistent with target load in accordance with Step 5.1.1 f. **SET** desired ramp rate (Consistent with Step 5.1.7), using thumbwheel g. **PRESS GO** pushbutton **AND CHECK** REFERENCE display indicates a controlled load reduction at selected rate 5.2.3 **START** SG Feed Pump Seal Water Pumps as required 5.2.4 **IF** unit is to be shutdown or operated at less than or equal to 10% load for greater than 15 minutes, **THEN THROTTLE SHUT** MSR Control Valves using manual operation of controller 1HC-2085, **AND INITIATE** Crossover temperature reduction at a rate of less than or equal to 25°F per 30 minutes 5.2.5 **IF** unit is to remain on line at greater than 10% load, **THEN THROTTLE SHUT** MSR Control valves using manual operation of controller 1HC-2085, MSR Steam Supply Controller (1C03) **AND MAINTAIN** crossover temperature less than 500°F

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
		OATC/BOP	5.3 Performance Requirements During Load Reduction 5.3.1 **MAINTAIN** controls in auto as practicable 5.3.2 **MAINTAIN** Axial Flux Difference (AFD) within limits specified in COLR. 5.3.3 **MAINTAIN** Control banks within the insertion, sequence and overlap limit specified in the COLR 5.3.4 **REFER** to PPCS Xenon program for Xenon follow information 5.3.5 **MAINTAIN** Tavg within 1.5°F of Tref 5.3.6 **ADJUST** Power Range NIS as directed by 1-TS-RE-001, Power Level Determination Unit 1, if required 5.3.7 **MAINTAIN** 345 KV voltage in accordance with OP 2B, 345 KV Transmission System Impacts Upon PBNP Station Operations, section 345 KV Voltage Control 5.3.8 **MAINTAIN** controller setpoint for LP Feedwater Heater Bypass Valve (1CS-2273) at 25 psig below SG Feed Pump suction pressure (except when singling up feed trains in accordance with Step 5.5.2.b 5.3.9 **MONITOR** Ice Melt operations as necessary

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 3: **1NI-43, Power Range Nuclear Instrument fails low (outward rod motion at or near 12-15 steps/min)** **Start:** _____	**Trigger 3** [MAL1NIS007C, P.R. CHANNEL N43 HIGH VOLTAGE FAILURE, RAMP = 27, VALUE = 300] Insert **Trigger 3** to cause 1NI-43, Power Range Nuclear Instrument to fail low (outward rod motion at or near 12-15 steps/min) If practical, start this event with rod control in automatic. **Plant Response:** The voltage fails to the selected value. The detector operates in the ion chamber region. The normal value is 800 volts. At 700 volts decreasing the loss of detector voltage alarms. Alarms for low failure include Power Range Channel Deviation, Power Range Loss Of Detector voltage and Power Range Rod Drop. **Cues:** • 1C04 1A 1-7, Automatic Rod Motion • 1C04 1A 3-2, 1N-41, 42, 43, or 44 Power Range Loss of Det Voltage • 1C04 1A 3-3, Power Range Channel Deviation • 1C04 1A 4-5, Power Range Rod Drop • 1N-43B, 1N-43Power Range Power indicating at a lower value • Outward Rod Motion	OATC OS1	Identifies failing 1NI-43 Power Range Nuclear Instrument and unexpected / unwanted outward rod motion. OATC may take rods to manual after reporting malfunction and attempting to or obtaining concurrence from OS1. Implements **AOP-6C, Uncontrolled Motion Of RCCA(s)** 1. Check Rod Motion – Required RNO Place rod control bank selector switch to – MANUAL 2. Maintain RCS Tavg: 3. Check RCS Tavg – AT <u>OR</u> TRENDING TO Tref RNO **<u>IF</u>** fuel has been conditioned, **<u>THEN</u>** move control rods in manual or adjust turbine load to restore Tavg. 4. Check Control Rods – ABOVE MINIMUM INSERTION LIMIT 5. Verify AFD – WITHIN LIMIT 6. Check Rod Motion Due To Instrument Failure 7. Go to <u>AOP-24, RESPONSE TO INSTRUMENT MALFUNCTIONS</u> Implements **AOP-24, Response to Instrument Malfunctions** 1. Identify Failed Instrument 2 Check If Failed Instrument Is A Controlling Channel 3. Establish Manual Control As Required 4. Return Affected Parameter(s) To Desired Value(s) 5. Using Attachment A, PPCS PARAMETERS USED TO CALCULATE REACTOR THERMAL OUTPUT, Verify That Failed Instrument Is <u>NOT</u> An Input To RTO 6. Remove Failed Instrument Channel From Service Per 0-SOP-IC-001, ROUTINE MAINTENANCE PROCEDURE REMOVAL OF SAFEGUARDS OR PROTECTION SENSOR FROM SERVICE 7. Return Controls To Automatic If Desired 8. Check Failure For Technical Specification Or TRM Applicability 9. Return To <u>Procedure And Step In Effect</u>

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
	Expected Communications: None **Continuation Criteria:** Once the crew has addressed Technical Specifications or at the discretion of the Lead Examiner, continue with the next event.		Prepares to implement **0-SOP-IC-001 Blue, Routine Maintenance Procedure Removal Of Safeguards Or Protection Sensor From Service – Blue Channels** **Note: in sessions #1 and #2, the crews continued on and performed steps to remove 1NI-43 from service using the 0-SOP-IC-001 section for "NE-43 Power Range Channel." The procedural actions for accomplishing this included the following:** **- PLACE Rod Control Selector Switch in "MANUAL".** **-On 1C-131 PLACE the Dropped Rod Mode switch in "ALARM BYPASS/TEST" for N-43.** **-On 1C-130 (2C-133) SELECT "BYPASS PR N43" on the following switches: Power Mismatch Bypass and Rod Stop Bypass.** **-On 1C-130 (2C-133) SELECT "N43" on Comparator Channel Defeat Switch.** **-In cabinet C-116, PLACE the following bistable trip switches in the "TRIP" position: OVER TEMP TRIP and (OVER TEMP) ROD STOP.** **-On 1C-131 (2C-132) REMOVE instrument power fuses for N-43.** **-PLACE Rod Control Selector switch in "AUTO".**

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE

Reference Technical Specifications

Technical Specifications:

3.2.4 (SR 3.2.4.1, 3.2.4.2) Quad. Power Tilt Ratio	Verify QPTR is within limit by calculation Verify QPTR is within limit using the moveable incore detectors	In accordance with the Surveillance Frequency Program	
Table 3.3.1-1 item 2a Power Range Neutron Flux-High Table 3.3.1-1 item 5 OverTemp Delta T	D. One channel inoperable	D.1 Place channel in trip OR D.2 Be in MODE 3	1 hour 7 hours
Table 3.3.1-1 item 17b-1 PR Neutron Flux P-7 Table 3.3.1-1 item 17c PR Neutron Flux P-8 Table 3.3.1-1 item 17d PR Neutro Flux, P-9	S. One or more channel(s) inoperable	S.1 Verify interlock is in required state for existing conditions. OR S.2 Be in MODE 2	1 hour 7 hours
Table 3.3.1-1 item 17e PR Neutron Flux, P-10	R. One or more channel(s) inoperable	R.1 Verify interlock is in required state for existing unit conditions OR R.2 Be in MODE 3	1 hour 7 hours

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 4: **1LT-471, SG Level fails low** **Start:** _____	**Trigger 5** [XMT1SGN012A, 1-LT471 STM GEN B NR LEVEL FIXED OUTPUT, VALUE = 19, RAMP = 90 sec] Insert **Trigger 5** to cause 1LT-471, 1HX-1B SG Narrow Range Level Transmitter to fail low. **Plant Response:** The controlling channel lowers to 19%. The SGWLC system responds by modulating open the affect SG's feedwater regulating valve to restore level to program. Actual level rises to the 78% lockout. **Cues:** • 1C03 1E2 1-5, Steam Generator B Level Setpoint Deviation/Trouble • 1C03 1E2 4-4, Seam Generator B Low-Low Level Channel Alert • 1LI-471 SG B Level (controlling channel lowers to 19%	BOP OS1 BOP	Identifies the failing channel and takes 1FIC-476A, 1HX-1B SG Feedwater Regulating Valve Controller to manual, matches feed flow to steam flow and controls actual level at or near program. Implements **AOP-2B Unit 1, Feedwater System Malfunction** Monitor Foldout Page 1. Maintain Reactor Power Less Than or Equal to 100% 2. Determine the Secondary System Malfunction <u>AND</u> go to the appropriate step (12) 12. Perform The Following For The Feed Regulating Valves: a. Check Feed Regulating Valve Response – NORMAL • 1FIC-476A RNO Perform the following: 1) Place affected feedwater regulating valve controller to manual or single element control ○ 1FIC-476A 2) Match feed flow to steam flow 3) Stabilize steam generator level at programmed level. 4) **<u>IF</u>** transient caused by instrument failure, **<u>THEN</u>** defeat failed instrument per AOP-24, RESPONSE TO INSTRUMENT MALFUNCTIONS 5) Direct I&C to identify and correct cause of failure b. Return to <u>Step 2</u> 3. Check Plant Conditions – STABLE 4. Check Secondary System Alignment – NORMAL 5. Check Change in Reactor Power – LESS THAN 15% IN ANY ONE HOUR 6. Notify the DSM 7. Return To <u>Procedure And Step In Effect</u>

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
	The crew should implement AOP-2B Unit 1, Feedwater System Malfunction, AOP-24, Response to Instrument Malfunctions, and address Technical Specifications **Expected Communications:** None **Continuation Criteria:** After the crew has taken manual control or shifted the controller to single element, stabilized the unit and addressed Technical Specifications, or at the discretion of the Lead Examine, continue on with the next event.	OS1 BOP BOP	Implements **AOP-24, Response to Instrument Malfunctions** 1. Identify Failed Instrument 2 Check If Failed Instrument Is A Controlling Channel 3. Establish Manual Control As Required 4. Return Affected Parameter(s) To Desired Value(s) 5. Using Attachment A, PPCS PARAMETERS USED TO CALCULATE REACTOR THERMAL OUTPUT, Verify That Failed Instrument Is NOT An Input To RTO 6. Remove Failed Instrument Channel From Service Per 0-SOP-IC-001, ROUTINE MAINTENANCE PROCEDURE REMOVAL OF SAFEGUARDS OR PROTECTION SENSOR FROM SERVICE 7. Return Controls To Automatic If Desired 8. Check Failure For Technical Specification Or TRM Applicability 9. Return To Procedure And Step In Effect

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
		CREW	Reference Technical Specifications **Technical Specifications:**

RPS LCO 3.3.1 is not met (3.3.1-1 item 13)

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one or more required channels or trains inoperable.	A.1 Enter the Condition referenced in Table 3.3.1-1 for the channel(s) or train(s).	Immediately
D. One channel inoperable.	D.1 Place channel in trip OR D.2 Be in MODE 3	1 hour 7 hours

RPS LCO 3.3.2 is not met (3.3.2-1 item 5b and 6b)

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one or more required channels or trains inoperable.	A.1 Enter the Condition referenced in Table 3.3.1-1 for the channel(s) or train(s).	Immediately
D. One or more channel(s) inoperable.	D.1 Place channel in trip OR D.2.1 Be in MODE 3 AND D.2.2 Be in MODE 4	1 hour 7 hours 13 hours

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 5: **1LT-141, VCT Level Transmitter fails low** **Reactor trip breakers fail to auto open; first reactor trip push buttons do not work, reactor manually trips on second pushbuttons** **Start:** _____	**Trigger 7** [XMT1CVC020A, 1-LT141 VCT LEVEL FIXED OUTPUT, VALUE = 0, RAMP = 5 sec] Insert **Trigger 7** to cause 1LT-141, VCT Level Transmitter to fail low. **Plant Response:** Charging pump suction shifts from the VCT to the RWST. The reactor trip breakers will not open on an auto signal; the first set of reactor trip push buttons attempted do not work when depressed. The reactor can be tripped from the control room using the second set of reactor trip pushbuttons. **Cues:** • 1C04 1C 1-7, 1T-4 Volume Control Tank Level High Or Low • 1LI-141 on 1LR-112 indicates 0% • 1CV-112C, 1T-4 VCT Outlet to Charging Pump Suction MOV indicates closed • 1CV-112B, 1T-13 RWST to Charging Pump Suction MOV indicates Open • Reactor remains at power until the reactor is tripped. • 52/RTB AND 52/RTB indicate closed until the reactor is tripped. **Expected Communications:** • **IF** an AO is dispatched to locally investigate LT-141, VCT Level Transmitter, wait two minutes and **THEN** report that locally there doesn't seem to anything out of normal.	OATC OS1 OS1 OS1 OATC	Identifies failed channel and references ARB 1C04 1C 1-7, 1T-4 Volume Control Tank Level High Or Low Implements **AOP-1D Unit 1, Chemical and Volume Control System Malfunctions** 1. Check RCS Leak – NOT IN PROGRESS Monitor Foldout Page CHARGING PUMP SUCTION SUPPLY CRITERIA: **IF** charging pump suction is from VCT and VCT level can **NOT** be maintained greater than 8%, **THEN** shift charging pump suction to RWST: a. Open RWST to Charging Pump Suction MOV • 1CV-112B b. Shut VCT Outlet to Charging Pump Suction MOV • 1CV-112C c. Manually trip reactor d. Stabilize plant using EOPs while continuing with this procedure Orders a manual reactor trip. ***CT-1, Manually Trip The Reactor*** OATC depresses the reactor trip pushbuttons at 1C04 – the trip attempt is unsuccessful. Reactor trip pushbuttons at C01 are depressed, resulting in a reactor trip. Reference Technical Requirements Manual: TRM Table 3.3.1-1 Item 7, VCT Level 1 required channel not in service. **CONDITION** / **REQUIRED ACTION** / **COMPLETION TIME** A. One or more required Functions non-functional. — A.1 Enter condition referenced in TRM Table 3.3.1-1 for the Function(s). — Immediately C. One or more Functions non-functional as per required action A.1 and referenced in TRM Table 3.3.1-1 — C.1 Initiate action to restore function(s) to FUNCTIONAL status. . — Immediately

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
	Continuation Criteria: If the crew decides to NOT manually trip the reactor, THEN with Lead Examiner concurrence, initiate the faulted SG event. (The faulted SG will result in an auto SI; the reactor will not automatically trip. A manual reactor trip will still be required, CT-1)		
Event 6: **1HX-1B SG faults to containment upon reactor trip** **Start:** _____	**Trigger 9** [MAL1SGN003B, SG B MAIN SEAM LINE BEAK INSIDE CNMT, VALUE 2.5E5, RAMP = 300 sec] **Trigger 9** is conditional upon a reactor trip. 1HX-1B SG faults to containment. Reactor trip breakers fail to auto open; reactor trip push buttons on 1C04 do not work. **Plant Response:** Containment humidity, temperature, pressure and sump level will increase and alarm. Safety Injection and Containment Isolation actuate. Condensate, feedwater and Heater Drain Pumps trip. Main Steam Isolation valves close. Containment Spray actuates. The steam generator will blow dry. Operator action is necessary to secure feedwater to the faulted SG. **Cues:** • Indicated steam flow on 1HX-1B Steam Generator • Degrading containment conditions; containment humidity, temperature, pressure and sump level will increase and alarm.	OS1 OATC	Implements **EOP-0 Unit 1, Reactor Trip or Safety Injection** 1. Verify Reactor Trip RNO Manually trip reactor 2. Verify Turbine Trip 3. Verify Power to AC Safeguards Buses 4. Check if SI is Actuated Monitor Foldout Page Criteria: **Faulted SG Isolation Criteria** **IF** any SG pressure trending lower in an uncontrolled manner **OR** any SG completely depressurized, **THEN** the following may be performed: a. Isolate feed flow to faulted SG b. Maintain total feed flow greater than or equal to 230 gpm until narrow range level in at least one SG is greater than [51%] 32%.

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
Event 7: Auxiliary Feedwater malfunctions: 1P-53, Motor-Driven AFW Pump – sheared shaft and 1P-29, Turbine-Driven AFW Pump – trips on overspeed	**Plant Response:** Loss of main and auxiliary feedwater results in lowering steam generator levels. **Cues:** • 1MS-2082 1P-29 AFP LOW SU/OVRSPD TRIP VALVE PLOSITON – Amber Light – ON • 1FI-4002, 1P-29 AFP DISCHARGE FLOW indicates zero • 1PI-4005, 1P-29 AFP DISCH PRESS indicates zero • 1FI-4073, 1P-53 AFP TOTAL DISCHARGE FLOW indicates zero • 1PI-4071, 1P-53 AFP DISCH PRESSURE indicates zero	BOP	5. Perform ATTACHMENT A, Automatic Action Verification while continuing with the procedure 6. Verify AFW Pumps – RUNNING a. Motor-driven pump - RUNNING b. Turbine-driven pump - RUNNING RNO: Manually open both steam supply valves to turbine-driven pump **IF** AFW flow NOT established, **THEN** perform the following: 1) Place Stripping Logic Override Switch to the OVERRIDE position. 2) Start Standby Steam Generator feed pump (s): 3) Verify valve alignment: a) Open Unit 1 valve(s): AF-4023, train A AF-4021, train B b) Ensure Unit 2 valves - SHUT AF-4022, train A AF-4020, train B c) Manually align valve(s) as necessary to establish flow greater than or equal to 230 gpm. AF-4012, train A AF-4019, train B c. Verify total AFW – GREATER THAN 230 gpm RNO **IF** SG level is less than [51%] 32% in both SGs, **THEN** perform the following: 1) Manually align valve(s) as necessary to establish flow greater than or equal to 230 gpm. 2) **IF** AFW flow greater than or equal to 230 gpm can **NOT** be established, **THEN** go to CSP-H.1 Unit 1, RESPONSE TO LOSS OF SECONDARY HEAT SINK.

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE
	Expected Communications: **Note: The intended sequence for the restoration of feed is first from 2P-53 via unit cross-connect valves, then second from 1P-29 by resetting the OS trip mechanism.** **For 1P-29:** • **IF** an AO is dispatched to locally investigate 1P-29, Turbine-Driven AFW Pump, wait until the crew has entered CSP-H.1 and **THEN** report that the pump has tripped on overspeed and the overspeed trip mechanism is intact. • **WHEN** directed by the crew to reset 1P-29 OS trip mechanism, **THEN** report that while attempting to reset the mechanism will not latch and that you are going to continue to try to get it reset. • **AFTER** the crew has commenced feeding from U2 AFW, Insert **TRIGGER 13, THEN** report the OS trip reset. (verify MAL1AFW001 is deleted) • **IF** an AO is dispatched to locally investigate 1P-53, Motor-Driven AFW Pump, wait two minutes and **THEN** report that the motor is turning, but is no longer connected to the pump (shaft break). He recommends securing the pump motor. • **WHEN** directed by the crew, insert **Trigger 11**, wait two minutes and **THEN** report that Unit 1 and Unit 2 AF-192, AFW Cross-connect Valves are open.	OS1 BOP BOP	IMPLEMENT **CSP-H.1 Unit 1, Loss of Heat Sink** 1. Check If Secondary Heat Sink Is Required: 2. Check If RCS Bleed And Feed Is Required: RNO: Perform the following: 1) Monitor bleed and feed conditions 2) If any bleed and feed condition occurs, then do steps 2.b and 2.c 3) Observe the caution prior to Step 3 and continue with Step 3 3. Establish Feed Flow From TDAFW Pump a. Check TDAFW Pump available: 1) Suction pressure trip – NOT ACTUATED 2) Overspeed trip – NOT ACTUATED **RNO**: Go to Attachment A, RESET/OVER-RIDE AFW PUMP TRIPS, to reset trips AND continue with Step 4. (Steps below) 4. Establish Feed Flow From MDAFP a. Check MDAFP available 1) Suction pressure trip not actuated 2) 1A06 available b. Start 1P-53 c. Ensure MDAFP valves – PROPERLY ALIGNED d. Check total feed flow – GREATER THAN 230 gpm **RNO**: Go to Step 5 5. Establish Feed Flow From Standby SSG Pumps a. Check SSG Pumps available b. Place stripping override switches to override c. Start SSG Pumps **RNO**: Go to Step 6 6. Establish Feed Flow From Unit 2 MDAFP 1) Locally open MDAFP cross connects 2) Start 2P-53 3) **Ensure Unit 1 MDAFP valves – PROPERLY ALIGNED** • **Set Unit 1 MDAFW Pump discharge Flow controller to desired flow.** 4) Check total feed flow – GREATER THAN 230 gpm. 5) Go to Step 7

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
		BOP	7. Check S/G Blowdown And Sample Isolation: 8. Check Total Feed Flow to S/Gs – GREATER THAN OR EQUAL TO 230 gpm 9. Determine Procedure Transition: o **IF** Feed and Bleed is **NOT** in progress, **THEN** return to procedure and step in effect
		BOP	**Attachment A Reset / Over-ride AFW Pump Trips** A2 Reset turbine Driven AFW Pump Overspeed Trip If Necessary 2. Open Low Suction / Overspeed Trip Valve From Control Room: 1) Check annunciator 1C03 1D 1-11, Unit 1 Governor Trouble - NOT LIT 2) Place 1MS-2082, !P-29 Low Suction / Overspeed trip valve reset operator to “CLOSE” 3) Check 1MS-2082, !P-29 Low Suction / Overspeed trip valve reset operator – CLOSED 4) Place 1MS-2082, !P-29 Low Suction / Overspeed trip valve reset operator to “OPEN” 5) Check 1MS-2082, !P-29 Low Suction / Overspeed trip valve reset operator – OPEN **CT-43: Establish feedwater flow to at least one SGs before bleed and feed is required**

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
		BOP	**EOP-0 continued …** 7. Check RCP Seal Cooling 8. Check RCS Temperatures 9. Check PZR PORVs and Spray Valves 10. Check if RCPs should be stopped 11. Check if SGs are NOT Faulted RNO Go to EOP-2 UNIT 1, FAULTED STEAM GENERATOR ISOLATION
		OS1	Implement **EOP-2 Unit 1, Faulted Steam Generator Isolation** CAUTIONS: • One SG must be maintained available for RCS cooldown. • If any faulted SG is not needed for RCS cooldown, it should remain isolated during subsequent recovery actions.
		BOP	1. Check Main Steam Isolation a. Any MSIV valve - OPEN b. Check Main Steamline Isolation Signal - NOT ACTUATED 2. Check If Any SG Is Not Faulted 3. Identify Faulted SG

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
	Expected Communications: • **WHEN** directed to locally shut 1MS-237, 1P-29 AFP/Radwaste Steam Isolation and 1MS-238, Main Steam Trap Isolation, insert **Trigger 19** and **THEN** report completed when the valve has repositioned.	BOP	4. Isolate Faulted SG a. Ensure feedwater isolation valves – SHUT ○ 1CS-3125 for SG B b. Ensure MDAFW valve – SHUT ○ SG B • 1AF-4074B c. Ensure AUX FEEDWATER TURBINE-DRIVEN valve – SHUT ○ SG B • 1AF-4000 d. SSG supply valve – SHUT ○ SG B • AF-4021 e. Isolate flow from faulted SG: 1) Ensure atmospheric steam dump valve – SHUT ○ 1MS-2015 for SG B 2) Shut steam supply to turbine-driven AFW pump – SHUT ○ 1MS-2019 for SG B 3) Ensure SG blowdown isolation valves – SHUT ○ SG B • 1MS-5959 • 1MS-2045 4) Locally shut 1P-29 AFP/Radwaste Steam isolation ○ 1MS-237 for SG B 5) Locally shut main steam trap isolation ○ 1MS-238 for SG B

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
		BOP	5. Check CST Level - GREATER THAN 4 FEET 6. Check Secondary Radiation a. Request Chemistry to periodically sample both SGs for activity b. Request local surveys of main steam lines c. Secondary system radiation monitor levels - NORMAL ▪ Condenser Air Ejector ▪ 1RE-215 ▪ RE-225 ▪ SG Blowdown ▪ 1RE-219 ▪ 1RE-222 ▪ Main Steam Lines ▪ 1RE-232 for SG B d. Secondary activity samples and surveys – Normal (When available) 7. Go to EOP-1 UNIT 1, LOSS OF REACTOR OR SECONDARY COOLANT

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS			
TIME/NOTES	**INSTRUCTOR ACTIVITY**	**POSITION**	**EXPECTED STUDENT RESPONSE**
	EOP-0 Unit 1, Attachment A **Expected Communications:** • **WHEN** directed to locally check shut RW Service Water valves, LW-61 and 62, **THEN** report both valves are closed. • **WHEN** directed to locally check CW pump house temperature <105 ºF, wait 3 minutes and **THEN** report the temperature is 72 ºF and stable. • **WHEN** directed to locally check G03/G04 Switchgear Room temperature <95 ºF, wait 3 minutes and **THEN** report the temperature is 75 ºF and stable. • **IF** directed to periodically check the status of spent fuel cooling, wait 5 minutes and **THEN** report Spent Fuel Pool level is 63 feet, pool temperature is 67 ºF and both are stable.	BOP	**EOP-0 Unit 1, Attachment A, Automatic Action Verification** A1 Verify Feedwater isolation A2 Verify Containment Isolation A3 Verify ECCS Pumps RUNNING A4 Verify Service Water Pumps RUNNING A5 Verify Containment Accident Cooling Units RUNNING A6 Verify Component Cooling Water Pumps – ONLY ONE RUNNING A7 Check If Main Steam Lines Can Remain Open A8 Verify Containment Spray Not required a. Containment pressure recorder – HAS REMAINED LESS THAN 25 psig RNO Perform the following: 1) Check containment spray actuated: • Annunciator {C01 B 2-6}, CONTAINMENT SPRAY, lit **IF** containment spray has **NOT** actuated, **THEN** manually actuate containment spray. A9 Verify ECCS Flow A10 Verify AFW valve alignment – PROPER EMERGENCY ALIGNMENT A11 Verify Proper ECCS Valve Alignment A12 Check Containment Spray NOT ACTUATED via the blender in progress A14 Ensure the Auxiliary Building Filter/Exhaust Fans – OPERATING A15 Verify Service Water System Alignment A16 Check Miscellaneous Valves – SHUT A17 Check Control Room Ventilation A18 Check Cable Spreading Room Ventilation System – OPERATING A19 Check Computer Room Ventilation System – OPERATING A20 Check AFW Recirc fans – ONE RUNNING A21 Check Circulating Water Pump House Temperature Less Than 105°F A22 Check G03/G04 Switchgear Room Temperature less than 95°F A23 Periodically check status of spent fuel cooling

SIMULATOR EXERCISE GUIDE SCENARIO INSTRUCTIONS

TIME/NOTES	INSTRUCTOR ACTIVITY	POSITION	EXPECTED STUDENT RESPONSE

End: _____	**Termination Criteria:**
	Terminate the scenario when crew has completed Step 5 of EOP-1.1 Unit 1, SI Termination or at the discretion of the Lead Examiner.
		OS1
		
		OS1
		BOP
			Implements **EOP-1 Unit 1, Loss of Reactor or Secondary Coolant**
			
			Monitor Foldout Page Criteria:
			SI Termination Criteria
			IF all conditions below occur, **THEN** go to EOP-1.1, SI TERMINATION:
			• RCS Subcooling based on core exit thermocouples - GREATER THAN [74 ºF] 35 ºF
			• Secondary heat sink available:
			  ○ Any Intact SG level - GREATER THAN [51%] 32%
			  OR
			  ○ Total feed flow to intact SGs - GREATER THAN OR EQUAL TO 230 GPM
			• RCS pressure - GREATER THAN [1850 PSIG] 1725 PSIG
			• RCS pressure - STABLE OR RISING
			• PZR Level - GREATER THAN [32%] 13%
			
			Implements **EOP-1.1 Unit 1, SI Termination**
			1. Reset SI
			2. Reset Isolation And Lockout Signals
			3. Establish Instrument Air To Containment
			4. Check If Charging Flow Has Been Established
			5. Stop ECCS Pumps And Place In Standby:
			  a. Stop both SI pumps and place in auto:
			  • 1P-15A
			  • 1P-15B
			  b. RHR pumps - ANY RUNNING WITH SUCTION ALIGNED TO RWST
			  c. Stop both RHR pumps and place in auto:
			  • 1P-10A
			  • 1P-10B

***** END OF SCENARIO *****

QUANTITATIVE ATTRIBUTES

(Use this form for NRC/INPO Evaluations only as required to document associated quantitative information.)

Malfunctions:

Before EOP Entry:

- 1N-43, Power Range Nuclear Instrument fails low
- 1LT-471, SG Level Transmitter fails low
- 1LT-141, VCT Level Transmitter fails low

After EOP Entry:

- 1HX-1B SG faults to containment upon reactor trip
- Reactor trip breakers fails to auto open; reactor trip push buttons on 1C04 or C01 do not work
- Auxiliary Feedwater malfunctions
  - 1P-53, Motor-Driven AFW Pump – sheared shaft
  - 1P-29, Turbine-Driven AFW Pump – trips on overspeed

Abnormal Events:

- 1N-43, Power Range Nuclear Instrument fails low
- 1LT-471, SG Level Transmitter fails low
- 1LT-141, VCT Level Transmitter fails low

Major Transients:

- 1HX-1B SG faults to containment upon reactor trip
- Auxiliary Feedwater malfunctions (Loss of Heat Sink)
  - 1P-53, Motor-Driven AFW Pump – sheared shaft
  - 1P-29, Turbine-Driven AFW Pump – trips on overspeed

Critical Tasks:

1.	CT-1	Manually trip the reactor
2.	CT-43	Establish feedwater flow to at least one SGs before bleed and feed is required

CT-1	Manually trip the reactor
Applicable ERG Version	LP
Applicable ERG	

Critical Task:

Manually trip the reactor from the control room before completing immediate actions in EOP-0

Plant Conditions:

- Reactor greater than 5% power
- Plant parameters exist that should result in automatic reactor trip but reactor does not automatically trip
    - First set of reactor trip pushbuttons fail to trip the reactor
- Reactor can be tripped manually from control room

Cues:

- Indication and/or annunciation that plant parameter exist that should result in automatic reactor trip but reactor does not automatically trip

Performance Indicator:

Manipulation of control room reactor trip switches as required to trip the reactor

- Reactor trip and bypass breakers indicate open

Feedback:

Indications of reactor trip

- Control rods at bottom of core
- Neutron flux decreasing

CT-43	Establish feedwater flow to SGs before bleed and feed is required
Applicable ERG Version	HP, LP
Applicable ERG	FR-H.1

Critical Task:

Establish feedwater flow to at least one SGs before bleed and feed is required.

Plant Conditions:

- Extreme (RED path) challenge to the heat sink CSF
- Plant conditions require SGs as heat sinks
- AFW flow is not sufficient and cannot be increased
- Feedwater flow is available but not established from any of the following:
  - Main feedwater pumps
  - Condensate pumps
  - Plant-specific alternate source (Unit 2 AFW)
- Indication that RCS bleed and feed is not required
- Reactor trip and SI

Cues:

Extreme (RED path) challenge to the heat sink CSF
AND
Indication that RCS pressure remains above the pressure of all SGs
AND
Indication that RCS temperature is above the temperature for placing the RHR system in service
AND
Indication and/or annunciation that no AFW flow is available after repeated attempts to establish
AND
Indication that RCS bleed and feed is not required

Performance Indicator:

Manipulation of controls as required to establish feedwater flow into at least one SG

Feedback:

- Indication of feedwater flow into at least one SG
- Indication of increasing water level in at least one SG

1.0 Plant Conditions:

	Unit 1	Unit 2
Time in Core Life (MWD/MTU):	*9005*	
Reactor Power:	*100%*	
Boron Concentration:	*1078 ppm*	
Rod Height:	*CBD @ 220*	

2.0 Equipment Out of Service:

- 1LT-112 VCT Level Transmitter
- 1W-3B, Control Rod Shroud Fan

3.0 Technical Specification LCOs NOT Met and Action Conditions in Effect:
None

4.0 Planned Evolutions:

- Unit 1 is at approximately 100% EOL.
- 1LT-112, VCT Level Transmitter has failed low
  - 1CV-112A is in “TO VCT” position and VCT level is being manually controlled between 17% and 78% per AOP-1D
  - I&C expect repairs to be completed within the hour and returned to service by the end of the shift.
- Start 1P-27A, Heater Drain Tank Pump and secure 1P-27C, Heater Drain Tank Pump per OP-2A Attachment M, in preparation for maintenance.
- Lower Power utilizing OP 3A Unit 1, Power Operation to Hot Standby Unit 1 for TS-3, Main Turbine Stop and Governor Valves with Turbine Trip Test (Biannual) Unit 1

5.0 Common:

- Safety Monitor is Green
- Today is Sunday, clock time is real time and you have a normal shift complement.