SIMULATOR EXERCISE GUIDE (SEG)

SITE: POINT BEACH **SEG # PBN LOI NRC**

SEG TITLE: 2012 ILT NRC SCENARIO #1 **REV. # 0**

PROGRAM: INITIAL LICENSE TRAINING **#: PBN LOI TPD**

COURSE: N/A **#: N/A**

TOTAL TIME: 2.0 HOURS

Additional signatures may be added as desired.

Developed by:	**Andrew Zommers** Instructor	**7/27/12**
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Approved by:	**Tom Larson** Training Program Owner	

Retention: Life of Plant
Retain in: Training Program File
Form retained in accordance with record retention schedule identified in NP 1.3.1.

Guide Requirements

Goal of Training:	To have the crew successfully perform/respond to shifting Accident Fans, Pressurizer Level Transmitter failure, RCS leak, Rapid Power Reduction, SBLOCA, and a failure of a Safety Injection Pump. Embedded within these events is the expectation to properly utilize Technical Specifications.
Learning 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.** Evaluators
References:	**1.** OI-72, Containment Air Recirculation System **2.** AOP-1D, Chemical and Volume Control System Malfunction **3.** AOP-1A, Reactor Coolant Leak Unit 1 **4.** 0-SOP-IC-001 – White, Routine Maintenance Procedure Removal of Safeguards or Protection Sensor from Service - White Channels **5.** 0-SOP-IC-002, Technical Specifications LCO-Instrument Cross Reference **6.** AOP-17A Rapid Power Reduction Unit 1 **7.** AOP-24 Response to Instrument Malfunction **8.** AOP-21 PPCS Malfunction **9.** EOP-0 Reactor Trip or Safety Injection Unit 1 **10.** EOP-1 Loss of Reactor or Secondary Coolant Unit 1 **11.** EOP-1.2 Small Break LOCA Unit 1 **12.** ARB 1C04 1C 2-9, Containment or Aux Bldg Vent System Air Flow Low **13.** Alarm Response Books **14.** Technical Specifications and Technical Specifications Bases
Commitments:	None
Evaluation Method:	Simulator performance will be evaluated IAW NUREG 1021.

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Operating Experience:

N/A

Related PRA Information:

Initiating Event with Core Damage Frequency:

Small LOCA 1.2E-07

Important Components:

Reactor Protection 0.3%

ESFAS 0.2%

Important Operator Actions with Task Number:

None

QUANTITATIVE ATTRIBUTES (Use this form for Evaluations only.)

Malfunctions:

Before EOP Entry:

1. 1LT-427 Pressurizer Level Instrument transmitter fails low
2. Loop 'B' RTD Bypass Line leak
3. 1W-3A CRDM Shroud Fan Trips/Rapid downpower

After EOP Entry:

1. 1P-15A SI Pump seized shaft
2. 1P-15B SI Pump failure to auto start
3. MFIV's fail to close

Abnormal Events:

1. 1LT-427 Pressurizer Level Instrument transmitter fails low
2. 20 gpm RCS leak on 'B' RTD loop manifold
3. Rapid Power Reduction

Major Transients:

1. Small Break LOCA

Critical Tasks:

1. **RT-7, When a reactor trip is procedurally called for, initiate a manual reactor trip prior to Pressurizer level reaching 10%**
2. **E-0 – I: Manually start at least one SI pump prior to transition out of EOP-0.**

SCENARIO OVERVIEW:

INITIAL CONDITIONS:

1. This scenario can be run from the following Specific IC set:
   - IC-162, created from IC-03
2. The following equipment is OOS:
   - Line-111 Point Beach to Sheboygan Energy Center is OOS with disconnects open
   - 'B' Main Feedwater Regulating Valve controlling channels shifted to YELLOW
   - 1W-3B, 'B' CRDM Shroud Fan (need OOS tag on Control Board)
   - 1W-3A 'A'CRDM Shroud Fan is Guarded Equipment
   - Red Barrier Tape set up around 1(2) X01 Transformers per AOP-31(Document on White Board behind SM desk)

SEQUENCE OF EVENTS:

Event 1: Shift Accident Fans

- Crew starts 'A' Accident Recirc and Cooling Fans and secures 'B' Accident Recirc and Cooling Fans per OI-72

Event 2: 1LT-427, PZR Level Channel Fails Low

- RO recognizes failure of 1LT-427, PZR Level Channel.
- Crew enters AOP-1D and determines 1LT-427 has failed.
- SRO refers to LCO 3.3.1, LCO 3.3.3, and if applicable LCO 3.4.9.
- Crew should swap PZR controlling channel per ARB and restore Letdown and Charging to normal per AOP.

Event 3: Loop 'B' RTD Bypass Line Leak at 20 GPM RCS Leak

- Loop 'B' RTD bypass line develops a 20 GPM leak
- SRO enters AOP-1A, Reactor Coolant Leak.
- Crew determines that neither SI nor Rx Trip is required and RO raises charging speed to maintain Pressurizer Level.

- Crew enters diagnostic phase of AOP-1A and begins to determine leak location. Crew will possibly isolate Letdown and Charging as part of the diagnostic steps.

Event 4: 1W-3A CRDM Shroud Fan Trips/Rapid Power Reduction

- RO responds to annunciator 1C04 1C 2-9, Containment Vent System Air Flow Low, using ARB
- ARB directs rapid power reduction using AOP-17A, Rapid Power Reduction
- Crew coordinates to lower unit power at 1% per minute with an RCS leak

Event 5: Small Break LOCA (500 gpm)

- Crew recognizes RCS leak has gotten worse
- SRO refers back to continuous action steps and ensures reactor trip and manual SI/CI
- SRO enters EOP network

Event 6: 1P-15A SI Pump Shaft Seizure and 1P-15B SI Pump Fails to Auto Start

- RO recognizes SI pump trip and failure to start
- SRO concurs with RO starting 1P-15B

Event 7: MFIV's fail to Auto close

- BOP recognizes MFIV failure to close
- SRO concurs with BOP closing MFIV's manually

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	INITIAL CONDITIONS: Standard IC-162 from IC-03 Unit 1 • Mode: 1 • Burnup: 8100 MWD/MTU • Power: 73.9% • Boron: 125ppm (BOL) • Temperature: NOT • Pressure: NOP • Xenon: Equilibrium • Rods: Bank D @ 187 steps • Generator: ≈475 MWe Unit 2 • Mode: 1 • Burnup: 1400 MWD/MTU • Power: 26.9% • Boron: 1170 ppm (BOL) • Temperature: NOT • Pressure: NOP • Xenon: Equilibrium • Rods: Bank D @ 143steps • Generator: ≈ 165 MWe		

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	SIMULATOR SET UP (perform set up per the "Simulator Setup Checklist", including entering action items per the "Simulator Input Summary.")		• Line 111 and 1W-3B (OOS tag) • Line 111 disconnects magnets open • Guarded equipment tag for 1W-3A • Red Barrier Tape listed behind SM desk for AOP-31, around 1(2) X01 Transformers • Extra AO name tags • Marked-up copy of AOP-31
	Simulator Pre-brief:		
	COMPLETE TURNOVER: Review applicable current Unit Status Review relevant At-Power Risk status Review current LCOs not met and Action Requirements Verify crew performs walk down of control boards and reviews turnover checklists.		
	<u>Event 1</u>: Shift Containment Fans per OI-72 **End of evolution:** Proceed to next event at Lead Examiner discretion.	SRO BOP	Crew will brief the shifting of containment fans prior to assuming the watch. BOP will start 1W-1A and secure 1W-1B Containment Fans per OI-72.

Retention: Life of Plant
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SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<u>EVENT 2</u>: 1LT-427, PZR Level Transmitter Fails Low.	RO	Acknowledges PZR High/Lo Level alarm and informs Crew. RO recognizes loss of Letdown and recommends going to minimum charging.
		RO/BOP	RO/BOP address the ARB's for alarms associated with the PZR Level failure
	<u>NOTE</u>: AOP-24 may be utilized in addition to AOP-1D. (See next page for AOP-24 actions)	SRO	Directs entry into AOP-1D, CVCS Malfunction or AOP-24 Instrument Failure.
		RO	Verifies no RCS leak in progress.
	LCO 3.4.9 addressed by the SRO if TS value reached.	SRO	Addresses notes prior to step 2 and determines 1LT-427 failure section of AOP should be performed. Continues to step 48.
		RO	RO recognizes PZR Level exceeds TS value of 52% and informs the SRO. (May occur depending on timing of actions, though not likely when starting at 75% power)
	If asked by the SRO, Shift Manager directs defeating the failed PZR level channel per the ARB.	Crew	Crew should swap to different controlling PZR level per ARB 1C04 1C 1-3 Pressurizer Level High or Low
		BOP	Place White PZR level to defeat
		Crew	Restore Letdown and Charging to normal per AOP-1D.

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	1LT-427, PZR Level Transmitter Fails Low. (cont'd) **SM should inform SRO that the 4th license will reference AOP-21.** In order to save scenario time, the package for removing the channel from service will be prepared by the exam team before the scenario and will be provided to the Crew when they ask for it to be prepared. **NOTE:** IF asked for references, the Shift Technical Advisor will provide the following logic diagrams as referenced in 0-SOP-IC-001-WHITE page 19. Sheets #175, #180 and #181 and 0-SOP-IC-002 in its entirety. Per Lead Examiner, once Letdown is restored with charging in manual or auto, proceed to next event.	SRO RO SRO Crew SRO	Crew may enter AOP-24 Response to Instrument Malfunction prior to swapping controlling channels. Identifies 1LT-427 PZR Level as failed instrument. Checks that instrument is controlling channel for PZR Level Program. Ensures that Charging is in manual and minimum. Return affected parameter to desired value – ensures that PZR level is returning to program value. References step regarding performance of AOP-21. Addresses caution regarding currently tripped bistables – this does not apply as no other bistables are tripped. Directs removal of failed instrument IAW 0-SOP-IC-001 WHITE. Restore Charging to Automatic LCO 3.3.1 and LCO 3.3.3 addressed by the SRO. • 3.3.1-1 item 8 PZR water level high • 3.3.3-1 item 14 PZR level is MET

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<u>Event 3</u>: Loop 'A' RTD Bypass Line Leak at 20 GPM Indications of an RCS leak would be 1RE-211/212 radiation monitors in alarm, rising containment humidity, Sump A rising, VCT level lowering and the automatic charging pump speeding up. SRO may address Technical Specifications at this time due to RCS leakage. If TS not addressed here, a scenario follow-up question will be needed. **LCO 3.4.13** is not met due to unidentified leakage exceeding 1 GPM. Continue to next event per Lead Evaluator or determination of leak rate. Ensure charging/letdown is recovered, if it was isolated, prior to downpower. If requested, inform OS1 that the 4th License will perform the OI-55 calculation.	Crew SRO RO SRO SRO	Recognizes indications of leakage inside containment: Rising humidity, Sump 'A' alarm and RMS alarms. Enters AOP-1A, Reactor Coolant Leak. Check SI not required **(CA):** Adequate PZR Level and Subcooling. Check Rx Trip not required **(CA):** Charging Aligned to VCT. Check Pressurizer Level **(CA):** stable or trending to program, Adjusts Charging as needed to maintain PZR level and RCP Lab Seals. Check Pressurizer Pressure: Stable or trending to program. Check Rx Makeup Controls: Set for proper blend, armed and in auto. Request SM notify DCS and implement E-Plan. SRO may Address Tech Specs. Directs performance of steps 7 through 18. These steps include directions to isolate letdown and charging and various other leakage possibilities.

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	EVENT 4: Loss of 1W-3A, Running CRDM Shroud Fan trips / Rapid Power Reduction	RO	Announce failure and refers to Alarm Response Book for Motor Breaker Trip and Containment or Aux Bldg Vent System Air Flow Low.
	Communication: When sent to local breaker for shroud fan, report that the breaker has tripped. If requested to close breaker, report that breaker will not stay closed.	BOP	Inspects PAB/Containment ventilation control station on rear of 1C04 and determines only available CRDM shroud fan has tripped. May attempt restart with SRO concurrence. Should contact AO to look at local breaker for fan. 1W3-A control switch might be placed in pullout to clear control board alarms.
	Communication: If Electrical Maintenance was contacted to look at the breaker, report back it will take several hours to troubleshoot the problem.	SRO	Using guidance in ARB 1C04 1C 2-9, directs rapid power reduction IAW AOP-17A.
		SRO	Announces entry into AOP-17A, Rapid Power Reduction. Determines desired power level and ramp rate and announces to CR – SRO determines that unit be ramped at 1% per minute as directed by ARB.

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	Rapid power reduction continued	SRO	SRO also determines that the unit needs to be taken off line and could direct BOP to set the endpoint at 0% on the turbine. Requests SM to notify PSS.
		RO	Checks Rod control in Auto.
		BOP	Selects Rate Reduction method, likely Operator Auto – 1st Stage IN per the note prior to step 4.
		RO	**(CA STEP)** Commences boration, should refer to ROD 1.3 for power reduction boration and rod bank requirements **(CA STEP)** Check PZR Pressure – Stable or trending to program **(CA STEP)** Check PZR Level – Stable at or trending to program

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	(cont): Rapid Power Reduction Unit 1	BOP	**(CA STEP)** Check SG levels – controlling in Auto
		RO	**(CA STEP)** Maintain T_{avg} – Checks T_{avg} within limits
	Communication: When requested, TH AO start 1P-99A and B SGFP Seal Water Pumps	BOP	Check MFW Seal Water Pumps Running - Contacts U1 Turbine Operator to Start 1P-99A and B.
		SRO	Determines endpoint is MODE 3.
		BOP	May transfer auxiliary loads.
	Per Lead Evaluator, As the leak is unisolable, the Lead Examiner will direct when the team is prepared to make the leak larger and booth operator will increase the leak to 500 GPM over 10 minutes.		

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	Event 5: Small Break LOCA (500 GPM)	Crew RO	Recognizes increased leak rate and uses continuous action guidance from AOP-1A to trip the reactor. Inserts Manual Trip to trip the reactor. RO inserts manual SI and CI also and carries out Immediate Actions of EOP-0. Verify Reactor Trip Verify Turbine Trip Verify Safeguards Buses – At least one 4160 and one 480 V Bus energized. Check if SI is Actuated Verifies Immediate Action steps. Addresses Fold Out Page. -Trip RCPs if conditions are met

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	Small Break LOCA (500 GPM) cont'd	BOP	Performs Attachment A. (actions listed later)
		RO	Verifies Secondary Heat Sink
			Verify RCP Seal Cooling
			(CA STEP) Verify RCS Temp Control
			Ensure MSIVs are shut.
			Check PZR PORVs both shut.
			Check Normal spray valves both shut.
			Check Aux spray valve shut.
			Check if RCPs should remain running
			Start Monitoring CSFST's
			(CA STEP) Verify Sump Recirc not required
			Check if Secondary System intact
			Check if S/G Tubes intact
			Check if RCS is intact inside containment - NO

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	Small Break LOCA (500 GPM) cont'd	SRO	Transition to EOP-1
		RO	Check if RCP's should remain running
		BOP	Check if Secondary System is intact
			(CA STEP) Stabilize intact S/G levels
			Check Secondary System Radiation Normal
		RO	**(CA STEP)** Check PORV and PORV Block Valves
		BOP	Reset SI
			Reset Containment Isolation
			Reset 1B03 and 1B04 lockouts
			Check 4160 Safeguards busses powered
			Re-establish Instrument Air to Containment
		RO	Verify Charging Flow
			Check if SI flow should be terminated
			(CA STEP) Check if Spray should be stopped

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	Small Break LOCA (500 GPM) cont'd	BOP	Check if RHR pumps should be stopped
		RO	Check RCS and S/G pressures
	The 4th License will secure the running EDG's.	BOP	Check if EDG's should be stopped
		Crew	Initiate evaluation of plant status
			Check if RCS is intact outside containment
			Check RHR Pump Room High alarms clear
			Check if RCS cooldown and depressurization required
		SRO	Transition to EOP 1.2 Small Break LOCA
		BOP	**(CA STEP)** Check all AC Busses energized by Offsite
			Ensure Miscellaneous Loads are energized
		RO	Check if RHR Pumps should be stopped
			Verify Charging flow
		BOP	**(CA STEP)** Stabilize intact S/G levels
		RO	Check SI signal status
		BOP	Reset SI

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SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	Small Break LOCA (500 GPM) cont'd **Once action has been taken to start the cooldown, the scenario can be terminated at Lead Evaluators discretion.**		Initiate RCS cooldown to cold shutdown Check RCS subcooling

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	EOP 0 Attachment A Unit 2 will enter TSAC 3.7.8.F when SW-2907 and 2908 are opened. **Communication:** When contacted the PAB AO should report that SW-LW-61 and 62 radwaste SW isolation valves are both shut.	BOP	Verify feedwater isolation – NO, manually shut MFIV's. Verify containment isolation. Verify AFW actuation. Check SI pumps running. Check RHR pumps running. Check only 1 CCW pump running. Verify Service Water System alignment. BOP should contact the PAB to check 2 local valves. Verify containment accident cooling. Check CR ventilation in mode 5. Check if main steam lines can remain open. Verify proper SI valve alignment.

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	EOP 0 Attachment A (cont'd) **Communication:** When contacted, wait 2 minutes and have the AO report CWPH temperature at 65˚F and stable. **Communication:** When contacted, wait 2 minutes and have the PAB AO report SFP temperature at 75˚F and stable with level at 63 feet and stable.	BOP	**(CA STEP)** Verify containment spray not required. Verify SI flow. Stop any boration via the blender in progress **(CA STEP)** Check CSR ventilation operating. **(CA STEP)** Check Computer Room ventilation operating. **(CA STEP)** Ensure Aux Building filter/exhaust fans operating. **(CA STEP)** Check AFW Area ventilation operating. **(CA STEP)** Energize façade Freeze protection at the discretion of Operations Shift Management. **(CA STEP)** Check CWPH temperature. **(CA STEP)** Periodically check the status of SFP cooling.

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	Event 6: 1P-15A SI Pump trip and 1P-15B SI Pump fails to AUTO start **Communications:** If contacted, PAB AO reports seized shaft on 1P-15A SI Pump. **Communications:** If contacted TH AO reports breaker for 1P-15A is tripped on overcurrent. **Communications:** If contacted TH AO reports breaker for 1P-15B is normal and state current position. **CRITICAL TASK: Manually start at least one SI pump prior to transition out of EOP-0 (This task should have been completed during performance of Att. A for EOP-0)**	BOP	RO notices 1P-15A pump trip and failure of 1P-15B to start. After immediate actions 1P-15B can be manually started or during EOP-0 Attachment A guidance will be to start 1P-15B manually.
	End the scenario by placing the simulator in freeze Inform Examinees they are to remain at their stations and cannot discuss the scenario. They are to wait for any follow up questions the examiners may have.		Crew: • No debrief or critique due to this being an evaluated scenario.

SIMULATOR INPUT SUMMARY

Scenario preloads

Relative Order	System Or Panel Drawing	Type	Code	Severity Or Value	Event Trigger	Timing	Description
Preload	SWD	LOA	LOA1SWD001	OPEN			SWYD Line 111 breaker
Preload	SWD	LOA	LOA1SWD002	OPEN			SWYD Line 111 disconnects
Preload	CNM	BKR	BRK1CNM018	6-Fail Cntl Fuse			1W-3B Shroud Fan Breaker
Preload							
Preload							

SIMULATOR INPUT SUMMARY

EVENT 1: Shift Accident Fans per OI-72

Relative Order	System Or Panel Drawing	Type	Code	Severity Or Value	Event Trigger	Timing	Description

Expected Communications

LOAs used

None

SIMULATOR INPUT SUMMARY

EVENT 2: 1LT-427 Pressurizer Level fails LOW

Relative Order	System Or Panel Drawing	Type	Code	Severity Or Value	Event Trigger	Timing	Description
PLE	RCS	XMT	XMT1RCS008A	0	1	20 sec ramp	1LT-427 PZR Level Transmitter

Expected Communications

LOAs used

None

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SIMULATOR INPUT SUMMARY

EVENT 3: 20 GPM RCS leak 'B' Loop RTD manifold

Relative Order	System Or Panel Drawing	Type	Code	Severity Or Value	Event Trigger	Timing	Description
PLE	RCS	MAL	MAL1RCS003F	20	3	120 ramp	Loop 'B' RTD Manifold Leak

Expected Communications

None.

LOAs used

None.

SIMULATOR INPUT SUMMARY

EVENT 4: 1W-3B Shroud Fan trip

Relative Order	System Or Panel Drawing	Type	Code	Severity Or Value	Event Trigger	Timing	Description
PLE	CNM	BKR	BRK1CNM017	1-Trip	5		1W-3A Shroud Fan Breaker
PLE	CFW	LOA	LOA1CFW083	ON	12		1P-99A SGFP Seal Water Pump
PLE	CFW	LOA	LOA1CFW084	ON	12	30 sec delay	1P-99B SGFP Seal Water Pump

Expected Communications

If contacted, the TH AO reports breaker for 1W-3A is tripped and cannot be reset if asked to do so.

LOAs used

Trigger 12 for 1P-99A/B

SIMULATOR INPUT SUMMARY

EVENT 5: Small Break LOCA (500 gpm)

Relative Order	System Or Panel Drawing	Type	Code	Severity Or Value	Event Trigger	Timing	Description
PLE	RCS	MAL	MAL1RCS003F	500		240 ramp	Loop 'B' RTD Manifold Leak Change value of the RCS Leak to 500 GPM

Expected Communications

None

LOAs used

None

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SIMULATOR INPUT SUMMARY

EVENT 6: 1P-15A SI Pump trip and 1P-15B SI Pump fails to AUTO start

Relative Order	System Or Panel Drawing	Type	Code	Severity Or Value	Event Trigger	Timing	Description
Preload	SIS	PMP	PMP1SIS001	2-Shaft Seizure		60 sec delay	1P-15A SI Pump Shaft Seizure
Preload	SIS	BKR	BKR1SIS002	4-Fail to Auto Close			1P-15B SI Pump fail to auto start

Expected Communications:

If contacted, PAB AO reports seized shaft on 1P-15A SI Pump.

If contacted TH AO reports breaker for 1P-15A is tripped on overcurrent.

If contacted TH AO reports breaker for 1P-15B is normal and state current position.

LOAs used:

None

SIMULATOR INPUT SUMMARY

EVENT 7: MFIV's fail to AUTO close

Relative Order	System Or Panel Drawing	Type	Code	Severity Or Value	Event Trigger	Timing	Description
Preload	CFW	VLV	VLV1CFW030A	1-Fail to Auto Close			CF-3124 MFIV fails to auto close
Preload	CFW	VLV	VLV1CFW031A	1-Fail to Auto Close			CF-3125 MFIV fails to auto close

Expected Communications:

If contacted, PAB AO reports actual position of valve with no other abnormal indications.

LOAs used:

None

Attach the following information as necessary:

- Simulator Set-up Checklist (before and after training)
- Pre-evaluation Brief Guide (for evaluations only)
- Post-evaluation Critique (for evaluations only)
- Turnover Log

Historical Record: This SEG was developed for the 2012 NRC ILT Examination.

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1.0 PLANT CONDITIONS:

	UNIT 1	UNIT 2
Time in core life (MWD/MTU):	400	14960
Reactor power (%):	73.9%	26.9%
Boron concentration (ppm):	125 ppm	1170 ppm
Rod height (CBD @):	CBD @ 187	CBD @ 143

2.0 TECHNICAL SPECIFICATION ACTION CONDITIONS IN EFFECT:

TSAC	Description	Reason
None	None	None

3.0 EQUIPMENT OUT OF SERVICE:

- Line 111, Point Beach to Sheboygan Energy Center, is Out of Service for emergent tower repairs.
- 1W-3B Shroud Fan is Out of Service for bearing failure.

4.0 PLANNED EVOLUTIONS:

After shift turnover, start 1W-1A Containment Fans and secure 1W-1B Containment Fans per OI-72.

5.0 TURNOVER INFORMATION:

- Safety Monitor is Green.
- Line 111, Point Beach to Sheboygan Energy Center is OOS for emergent tower repairs.
- AOP-31, Solar Magnetic Disturbance Alert Response, is in effect for both units due to a Kp6 SMD Alert. ATC has notified PBNP that 1X-01 DC Neutral Current (GIC) readings are 32 amps and continuous monitoring is in effect per step 5 and Attachment B. The 4th license is providing the Auxiliary Operators with control room data for Attachment B. ATC is continuing to monitor 2X-01 DC Neutral Current (GIC) readings. Red barrier tape is put up around 1(2) X01 Transformers.
- 1W-3B, Containment Control Rod Shroud Fan, is Out of Service due to bearing failure.
- 1-43/RPI, Rod Position Indication Power Transfer Switch is in Alternate (1Y-02-15) for 1Y-06-21 breaker replacement.
- SG B Feedwater Flow Control and SG B Steam Flow Control Transfer Switches have been selected to Yellow after performance of 1 ICP 02.001 BL, Reactor Protection and Engineered Safety Features Blue Channel Analog 92 Day Surveillance Test.
- Clock time is **real time** and you have the normal shift complement.

Simulator Scenario Development Checklist

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

1.	The scenario contains objectives for the desired tasks and relevant human performance tools.	Yes	No X	
2.	The scenario identifies key parameter response, expected alarms, and automatic actions associated with the induced perturbations. (This action applies to all SEG's new or revised for those on the ANS/ANSI-3.5-1998 standard. This action is NOT applicable for those on the ANS/ANSI-3.5-1985 standard.)	Yes	No	N/A X
3.	The scenario content adequately addresses the desired tasks, through simulator performance, instructor-led training freezes, or both.	Yes X	No	
4.	Plant PRA initiating events, important equipment, and important tasks are identified.	Yes X	No	
5.	Turnover information includes a Daily At Power or Shutdown Safety Risk Assessment.	Yes X	No	N/A
6.	The scenario contains procedurally driven success paths. Procedural discrepancies are identified and corrected before training is given.	Yes X	No	
7.	The scenario guide includes responses for all anticipated communications to simulated personnel outside the Control Room, based on procedural guidance and standard operating practices.	Yes X	No	N/A
8.	The scenario includes related industry experience.	Yes	No	N/A X
9.	Training elements and specific human performance elements are addressed in the scenario critique guide to be used by the critique facilitator. The critique guide includes standards for expected performance.	Yes	No	N/A X

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

Retention: Life of Plant
Retain in: Training Program File
Form retained in accordance with record retention schedule identified in NP 1.3.1.

Simulator Scenario Validation Checklist

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

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

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

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

Comments:_____

_____

_____

_____

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

Retention: Life of Plant
Retain in: Training Program File
Form retained in accordance with record retention schedule identified in NP 1.3.1.

Point Beach Nuclear Plant

PROCEDURE / WORK INSTRUCTION RECORD AND FIELD COPY TRACKING

Record/Field Copy Identification

RECORD

RED - Record Copy; BLACK - Field Copy

Field Copy Number

Procedure / Work Instruction No. **OI-72** Unit **PB1** Revision Number **15**

Procedure / Work Instruction Title **Containment Air Recirculation System** Revision Date **July 5, 2012**

Procedure / Work Instruction Revision Checked and Current; Tracking Checked for Temporary Changes:

By Andrew Zommers Date Today

Record Copy Holder/Location **CO/Control Room**

FIELD COPY DISTRIBUTION			
Copy No.	Holder/Location	Issue Date	Return Date
1			
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10			

NOTE 1: ANY TEMPORARY CHANGES MADE TO THIS PROCEDURE OR WORK INSTRUCTION SHALL BE MADE TO THE RECORD COPY AND ALL OTHER FIELD COPIES THAT HAVE BEEN ISSUED.

NOTE 2: RETURN ALL FIELD COPIES TO THE HOLDER OF THE RECORD COPY UPON PROCEDURE OR WORK INSTRUCTION COMPLETION.

SIMULATOR EXERCISE GUIDE (SEG)

SITE: POINT BEACH **SEG # PBN LOI NRC**

SEG TITLE: 2012 ILT NRC SCENARIO #2 **REV. # 0**

PROGRAM: INITIAL LICENSE TRAINING **#: PBN LOI TPD**

COURSE: N/A **#: N/A**

TOTAL TIME: 2.0 HOURS

Additional signatures may be added as desired.

Developed by:	**Andrew Zommers** Instructor	**7/27/12** Date
Reviewed by:	**Joey Trudeau** Instructor (Simulator Scenario Development Checklist.)	 Date
Validated by:	**Andrew Zommers** Validation Lead Instructor (Simulator Scenario Validation Checklist.)	 Date
Approved by:	**Randy Amundson** Training Supervision	 Date
Approved by:	**Tom Larson** Training Program Owner	 Date

Retention: Life of Plant
Retain in: Training Program File
Form retained in accordance with record retention schedule identified in NP 1.3.1.

Guide Requirements

Goal of Training:	To have the crew successfully perform/respond to loss of CCW Pump, CV-135 oscillations, G01 EDG low air pressure, Solar Magnetic Disturbance requiring rapid downpower, 1PT-485 failure with Rod Motion failure requiring trip, ECA-0.0 and stuck rods. Embedded within these events is the expectation to properly utilize Technical Specifications.
Learning 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.** Evaluators
References:	**1.** AOP-9B Component Cooling Water Malfunction Unit 1 **2.** AOP-1D, Chemical and Volume Control System Malfunction Unit 1 **3.** 0-SOP-IC-001 – White, Routine Maintenance Procedure Removal of Safeguards or Protection Sensor from Service - White Channels **4.** 0-SOP-IC-002, Technical Specifications LCO-Instrument Cross Reference **5.** AOP-6C Uncontrolled Rod Motion Unit 1 **6.** AOP-17A Rapid Power Reduction Unit 1 **7.** AOP-24 Response to Instrument Malfunction **8.** AOP-21 PPCS Malfunction **9.** AOP-31 Solar Magnetic Disturbance Unit 1 **10.** AOP 6C Uncontrolled Rod Motion Unit 1 **11.** EOP-0 Reactor Trip or Safety Injection Unit 1 **12.** EOP-0.1 Reactor Trip Response Unit 1 **13.** ECA 0.0 Loss of All AC Unit 1 **14.** Alarm Response Books **15.** Technical Specifications and associated Bases
Commitments:	None

Evaluation Method:

Simulator performance will be evaluated IAW NUREG 1021.

Operating Experience:

N/A

Related PRA Information:

Initiating Event with Core Damage Frequency:

Transient w/o PCS 7.3E-07
Station Blackout 5.2E-07

Important Components:

Component Cooling Water 2.1% CDF

Important Operator Actions with Task Number:

Operator Fails to Start CCW Pumps
Operator fails to align G04 to 1A06 per ECA 0.0

QUANTITATIVE ATTRIBUTES (Use this form for Evaluations only.)

Malfunctions:

Before EOP Entry:

1. Running CCW Pump trips with no Auto start of standby CCW Pump
2. Failure of CV-135 Letdown Backpressure Controller
3. G02 EDG alarm, low starting air pressure
4. 1PT-485 Turbine First Stage Pressure fails low

After EOP Entry:

1. Bus section 2 lockout with H52-31 H01 to H02 tie breaker failure
2. G01 and G03 EDG failures
3. 3 stuck control rods

Abnormal Events:

1. 'A' CCW Pump Trip
2. 1CV-135 letdown Backpressure controller failure
3. G02 Starting Air Low Pressure
4. Solar Magnetic Disturbance
5. 1PT-485 failure with Rod Control failure

Major Transients:

1. ECA 0.0 Loss of All AC

Critical Tasks:

1. **RT-7, When a reactor trip is procedurally called for, initiate a manual reactor trip prior to 25% Pressurizer Level.**
2. **E-0 – C: SRO/BOP must energize at least one AC emergency bus before placing safeguards equipment in pullout per ECA 0.0.**

SCENARIO OVERVIEW:

INITIAL CONDITIONS:

1. This scenario can be run from the following Specific IC set:
   - IC-161, created from IC-02
2. The following equipment is OOS:
   - Line-111 Point Beach to Sheboygan Energy Center is OOS with disconnects open
   - 'B' Main Feedwater Regulating Valve controlling channels shifted to YELLOW
   - 1W-3B, 'B' CRDM Shroud Fan (need OOS tag on Control Board)
   - 1W-3A 'A'CRDM Shroud Fan is Guarded Equipment
   - Red Barrier Tape set up around 1(2) X01 Transformers per AOP-31 (Document on White Board behind the SM desk)

SEQUENCE OF EVENTS:

Event 1: Running CCW Pump Shaft Seizure with failure of Standby CCW Pump to Auto start.

- Crew recognizes failure and manually starts Standby CCW Pump
- SRO Enters AOP-9B Component Cooling Water System Malfunction
- SRO Addresses Technical Specifications

Event 2: Failure of CV-135 Letdown Backpressure Controller

- RO takes manual control and stabilizes system parameters
- SRO directs crew response with AOP-1D

Event 3: G02 EDG alarm, low starting air pressure

- Crew responds per ARB C02 F 2-1, G-02 Emergency Diesel alarm
- SRO declares G02 OOS
- SRO addresses Technical Specifications

Event 4: Solar Magnetic Disturbance AOP-31/Rapid Power Reduction

- Crew responds to call from AO that neutral current is 65 amps
- AOP-31 directs rapid power reduction using AOP-17A, Rapid Power Reduction
- Crew coordinates to lower unit power at 1% per minute

Event 5: Turbine First Stage Pressure Transmitter PT-485 fails Low

- Crew recognizes failure and takes manual control of rods.
- SRO Enters AOP-6C Uncontrolled Rod Motion
- RO recognizes rod control failure requiring plant trip

Event 6: Failure of BS-2, H52-31, G01, G02, G03 requiring entry into ECA 0.0

- Crew recognizes failures require entry into ECA-0.0
- Crew aligns a safeguards bus via G04

Event 7: 3 stuck rods

- RO recognizes stuck rods during immediate actions
- Attempts another manual trip of reactor
- SRO later determines boration required for stuck rods

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	INITIAL CONDITIONS: Standard IC from IC-02 (IC-161) Unit 1 • Mode: 1 • Burnup: 8100 MWD/MTU • Power: 100% • Boron: 947 ppm (MOL) • Temperature: NOT • Pressure: NOP • Xenon: Equilibrium • Rods: Bank D @ 220 steps • Generator: ≈619 Mwe Unit 2 • Mode: 1 • Burnup: 14960 MWD/MTU • Power: 100% • Boron: 1461 ppm (BOL) • Temperature: NOT • Pressure: NOP • Xenon: Equilibrium • Rods: Bank D @ 220 steps • Generator: ≈ 619 Mwe		

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	SIMULATOR SET UP (perform set up per the "Simulator Setup Checklist", including entering action items per the "Simulator Input Summary.")		• Line 111 and 1W-3B (OOS tag) • Line 111 disconnects magnets open • Guarded equipment tag for 1W-3A • Red Barrier Tape listed behind SM desk for AOP-31, around 1(2) X01 Transformers • Extra AO name tags • Marked-up copy of AOP-31
	Simulator Pre-brief:		
	COMPLETE TURNOVER: Review applicable current Unit Status Review relevant At-Power Risk status Review current LCOs not met and Action Requirements Verify crew performs walk down of control boards and reviews turnover checklists.		

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	Event 1: Running CCW Pump Shaft Seizure with failure of Standby CCW Pump to Auto start.	BOP	BOP identifies the 'A' CCW Pump failure with the 'B' CCW Pump not auto starting. BOP requests from the SRO to start 'B' CCW Pump manually. (1C03 1D 2-6 and 1C03 1D 3-7)
	Communications: If asked, the PAB AO reports the 'A' CCW Pump inboard motor bearing is hot to the touch.		BOP or RO address ARB's as applicable.
	Communications: If asked, the PAB AO will report nothing unusual with the 'B' CCW Pump discharge pressure indicator, it reads 125 psig locally.	SRO	Enter AOP 9B CCW malfunction to address the lost CCW Pump. BOP will verify adequate tank level and start 1P-11B CCW Pump.
	Communications: If asked, the TH AO will report the 'A' CCW Pump breaker has tripped on overcurrent.	Crew	Crew will address surge tank level which will require no action.
	NOTE: Crew may elect to place 1P-11A in pullout to clear 'Motor Breaker Trip' alarm.		Crew will address system leakage requiring no action.
		SRO	Chemistry will be requested to analyze CCW.
			OS1 will ask the SM to call DCS and implement Emergency Plan.
		BOP/RO	Send AO's out locally to the pump/breaker and discharge pressure indicator to find any problems.
	End of evolution: Proceed to next event at Lead Examiner discretion.	SRO	Address LCO 3.7.7 CCW and enter 72 hour TSAC 3.7.7.A

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<u>Event 2:</u> Failure of CV-135 Letdown Backpressure Controller	RO/SRO	RO identifies CV-135 pressure controller malfunction and takes controller to manual to control back pressure.
			Addresses ARB for Letdown High Pressure (1C04 1C 4-6).
		SRO	Enter AOP 1D to address the malfunction and verify actions taken.
		RO	Check RCS leak not in progress.
	<u>Communications:</u> If asked, the PAB AO reports there is nothing abnormal with CV-135.	SRO	Reviews foldout page criteria
		RO	Determine CVCS malfunction – CV-135 pressure control which directs transition to step 36.
	<u>NOTE:</u> AOP-24 may be utilized in addition to AOP-1D. (see next page for AOP-24 actions)		Establish manual control of CV-135 – 250#
		SRO	Request SM to notify DCS and I&C Duty and Call
			The crew will have to keep CV-135 in manual control and discuss how this will be done. (may review step 36 RNO)
	End of evolution: Proceed to next event at Lead Examiner discretion.	BOP	May send out the PAB AO to look at CV-135 locally.

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	Failure of CV-135 Letdown Backpressure Controller (cont'd)	SRO	Crew may also enter AOP-24 Response to Instrument Malfunction.
		RO	CV-135 pressure controller malfunction
			Checks that instrument is controlling channel for PZR Level Program and takes controller to manual to control back pressure.
			Return affected parameter to desired value – ensures that pressure is returning to normal.
		SRO	References step regarding performance of AOP-21.
			Addresses caution regarding currently tripped bistables – this does not apply as no other bistables are tripped.
	End of evolution: Proceed to next event at Lead Examiner discretion.		

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	Event 3: G02 EDG alarm, low starting air pressure **Communication:** When sent out, have the TH1 AO wait 2 minutes and report that G02 south bank air pressure is 190 psig and stable with the north bank 160 psig and slowly lowering. The north bank air compressor is running with one of the bank relief valves leaking by. (ARB C65A C35 P7) **NOTE:** IF asked by the OS1, the Shift Manager will state OS2 will prepare the required paperwork per OI-35A to align G01to 2A05. May ask for Diesel Air Start PID, M-209 Sheet 12. **End of evolution:** Proceed to next event at Lead Examiner discretion.	BOP SRO	Address G02 alarm on panel C02. Dispatches AO to determine local alarm that is in. When the report comes back to Control the SRO should determine that G02 EDG is OOS. LCO 3.8.3 not met, enter TSAC 3.8.3.D immediately and declare G02 OOS for both units. LCO 3.8.1 not met, enter TSAC 3.8.1.E for required standby emergency power sources inoperable for both units. Determine the need to align G01 to both 1A05 and 2A05. Call in Maintenance to troubleshoot and fix.

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	EVENT 4: SMD AOP-31 / Rapid Power Reduction **Communication:** AO at 1X01 Transformers reports that the GSU Neutral Amps are sustained 65 amps for the last 5 minutes. **Communication:** If asked, AO at Unit 2 X01 Transformers reports conditions remain stable.	SRO	Crew is receives a call from AO on Unit 1. Determine that GSU DC Neutral Amps are 65 amps Crew determines rapid downpower per AOP-31 is required. SRO directs rapid power reduction IAW AOP-17A.

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	(cont): Rapid Power Reduction Unit 1	SRO RO BOP RO	Determines desired power level and ramp rate and announces to CR – SRO determines that unit be ramped at 1% per minute as directed by AOP. SRO will direct BOP to set the endpoint at 78% on the turbine. Requests SM to notify PSS. Checks Rod control in Auto. Selects Rate Reduction method, likely Operator Auto – 1st Stage IN per the note prior to step 4. **(CA STEP)** Commences boration, should refer to ROD 1.3 or the reactivity management sheets for power reduction boration and rod bank requirements **(CA STEP)** Check PZR Pressure – Stable or trending to program **(CA STEP)** Check PZR Level – Stable at or trending to program

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	(cont): Rapid Power Reduction Unit 1	BOP	**(CA STEP)** Check SG levels – controlling in Auto
		RO	**(CA STEP)** Maintain T_{avg} – Checks T_{avg} within limits
	Communication: When requested, TH AO start 1P-99A and B SGFP Seal Water Pumps	BOP	Check MFW Seal Water Pumps Running - Contacts U1 Turbine Operator to Start 1P-99A and B.
		SRO	Determines endpoint is <50% - NO.
	End of evolution: Proceed to next event at Lead Examiner discretion.		

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<u>Event 5</u>: Turbine First Stage Pressure Transmitter PT-485 fails Low and rod motion fails requiring plant trip	RO	Identifies inward rod motion, recommends placing rod control in Manual
		SRO	Concurs with recommendation, directs placing rods in Manual
		RO	Rod Motion not responding, recommends reactor trip
	RT-7, When a reactor trip is procedurally called for, initiate a manual reactor trip prior to 25% Pressurizer Level.		Inserts Manual Trip to trip the reactor. Verify Reactor Trip Verify Turbine Trip Verify Safeguards Buses Determine no 4160 and 480 safeguards busses are energized for Unit 1. Try to fast start any EDG's Try to load any running EDG's If power cannot be restored, have the STA start monitoring Unit 1 CSFST's and transition to ECA 0.0.

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	Event 6: Bus Section 2 H52-31, G-01, G-02 and G-03 EDG failures causing entry in ECA 0.0 **Communication**: If asked, wait 2 minutes and the TH AO reports G03 has indications and alarms locally that it oversped. **Communication**: If asked, wait 2 minutes and the TH AO reports G01 output breaker is open and nothing appears abnormal. **Communication**: If asked, wait 2 minutes and the TH AO reports G02 EDG is not running and everything looks normal. **Communication**: If asked, wait 3 minutes and the TH AO can report that H52-31 tie breaker is tripped and there are no other abnormal indications. **NOTE:** Crew may elect to go right to ECA 0.0 without taking any actions per EOP 0 Step 3 RNO. Entry conditions are met.	SRO RO SRO RO/BOP BOP	Enter ECA 0.0 Verify Reactor tripped Verify Turbine tripped Monitor foldout page items Ensure both RCP's - Stopped Maintain RCS inventory – RO and BOP will check various vent valves, sample valves, letdown and PORV's shut. Verify TDAFW Pump operating Check cooling to AFW Pump bearings Check both 4160 VAC busses not energized

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	ECA 0.0 (cont'd) **NOTE:** Additional SW Pumps may be started per ARB to ensure adequate SW header pressure. **Communication**: If the SM is asked, direct OS1 that the 3rd RO will start G05. **Communication**: SM will concur with OS1 recommendations concerning EDG operation (Starting or securing.)	BOP SRO BOP BOP/SRO BOP BOP/SRO BOP SRO	Check Diesels – All Running Check Diesel Status Check H-01 not energized – Start G05 and continue Check 1A-05 not energized Check 1A-05 energized from G01 – breaker won't close go to step 14 Energize 1A-05 from G02 – G02 did not start Check 1A-06 not energized Energize 1A-06 from G03 – cannot be done due to G03 overspeed condition. - Go to step 17. Energize 1A-06 from G04 – Manually shut alternate breaker. Check 480 Vac busses at least one energized – Yes

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	ECA 0.0 (cont'd)	BOP	Verify SW System operation
	E-0 C, SRO/BOP must energize at least one AC emergency bus before placing safeguards equipment in pullout per ECA 0.0	SRO	Return to procedure step in effect, which was EOP 0 step 3 RNO
		SRO	Verify safeguards power is available for at least one(1) 4160 and 480 VAC bus
		RO/BOP	Check if SI is actuated – NO go to EOP-0.1
		SRO	Transition to EOP-0.1
		RO	**(CA STEP)** Verify RCS Temperature Control using Atmospheric Steam Dumps
	Communication: If asked, OS2/4th License will take step 7 RNO action.	BOP	Verify Feedwater Isolation
			Transfer Feedwater Control to the Bypasses
			(CA STEP) Stabilize S/G Levels
			Verify Generator Trip
			Ensure Miscellaneous Electrical Loads are Energized

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	ECA 0.0 (cont'd) **Communication**: If asked, OS2/4th License will take step 7 RNO action. **Communication**: If asked, the PAB AO verifies that 1CV-112 B and C are SHUT and OPEN, respectively **The scenario can be terminated at Lead Evaluators discretion or once action has been taken to start the boration.**	BOP RO	Check All AC Busses Energized by Offsite Power Verify Charging Pump Suction Alignment Verify Charging Flow Check ALL Control Rods Fully Inserted – NO Check Pressurizer Level >12%
	Event 7: 3 stuck rods	RO Crew	Recognizes 3 control rod stuck after reactor trip. May attempt another trip with second set of trip buttons. While in EOP-0.1 recall there are 3 stuck control rods and take actions per the RNO to borate. Take action to borate for 3 stuck rods by adding 2825 gallons of acid for each stuck rod.
	End the scenario by placing the simulator in freeze Inform Examinees they are to remain at their stations and cannot discuss the scenario. They are to wait for any follow up questions the examiners may have.		Crew: • No debrief or critique due to this being an evaluated scenario.

SIMULATOR INPUT SUMMARY

Scenario preloads

Relative Order	System Or Panel Drawing	Type	Code	Severity Or Value	Event Trigger	Timing	Description
Preload	SWD	LOA	LOA1SWD001	OPEN			SWYD Line 111 breaker
Preload	SWD	LOA	LOA1SWD002	OPEN			SWYD Line 111 disconnects
Preload	CNM	BKR	BRK1CNM018	6-Fail Cntl Fuse			1W-3B Shroud Fan Breaker
Preload							
Preload							

SIMULATOR INPUT SUMMARY

EVENT 1: Loss of 1P-11A and failure of 1P-11B to auto start

Relative Order	System Or Panel Drawing	Type	Code	Severity Or Value	Event Trigger	Timing	Description
Preload	CCW	BKR	BKR1CCW002	4-Fail to Auto Close			1P-11B CCW Pump fails to auto start
PLE	CCW	PMP	PMP1CCW001	2-Shaft Seizure	1		1P-11A CCW Pump shaft seizure

Expected Communications

If asked, the PAB AO reports the 'A' CCW Pump inboard motor bearing is hot to the touch.

If asked, the PAB AO will report nothing unusual with the 'B' CCW Pump discharge pressure indicator, it reads 125 psig locally.

If asked, the TH AO will report the 'A' CCW Pump breaker has tripped on overcurrent.

LOAs used

None

SIMULATOR INPUT SUMMARY

EVENT 2: 1CV-135 Letdown Backpressure Controller failure

Relative Order	System Or Panel Drawing	Type	Code	Severity Or Value	Event Trigger	Timing	Description
PLE	CVC	CNH	CNH1CVC014F	50	3		CV-135 controller oscillations in automatic

Expected Communications

If PAB AO is sent out, inform control room there is nothing abnormal at valve 1CV-135 Letdown backpressure control valve

LOAs used

SIMULATOR INPUT SUMMARY

EVENT 3: G02 EDG alarm, low starting air pressure

Relative Order	System Or Panel Drawing	Type	Code	Severity Or Value	Event Trigger	Timing	Description
PLE	G02	ANN	ANN-C02F-B01	0-ON	5		G02 EDG alarm

Expected Communications

When sent out, have the TH1 AO wait 2 minutes and report that G02 south bank air pressure is 190 psig and stable with the north bank 160 psig and slowly lowering. The north bank air compressor is running with one of the bank relief valves is leaking by.

LOAs used

None.

SIMULATOR INPUT SUMMARY

EVENT 4: Solar Magnetic Disturbance requiring rapid plant downpower

Relative Order	System Or Panel Drawing	Type	Code	Severity Or Value	Event Trigger	Timing	Description
PLE	CFW	LOA	LOA1CFW083	ON	14		1P-99A SGFP Seal Water Pump
PLE	CFW	LOA	LOA1CFW084	ON	14	30 sec delay	1P-99B SGFP Seal Water Pump

Expected Communications

- **When requested, TH AO starts 1P-99A and B SGFP Seal Water Pumps (Trigger 14)**
- **AO at 1X01 Transformers reports that the GSU Neutral Amps are sustained 65 amps for the last 5 minutes.**
- **If asked, AO at Unit 2 X01 Transformers reports nothing has changed.**

LOA used Trigger 14 for 1P-99A/B

SIMULATOR INPUT SUMMARY

EVENT 5 1PT-485 First Stage Pressure fails LOW with Rod Motion Failure requiring plant trip

Relative Order	System Or Panel Drawing	Type	Code	Severity Or Value	Event Trigger	Timing	Description
PLE	MSS	XMT	XMT1MSS008A	0	7	30 sec ramp	1PT-485 First Stage Pressure fails low
PLE	CRF	OVR	OVR-CRF009D	ON	7		Rod Control Selector Switch in AUTO
PLE	CRF	OVR	OVR-CRF009D	OFF	7		Rod Control Selector Switch in MAN

Expected Communications

None

LOAs used

None

SIMULATOR INPUT SUMMARY

EVENT 6: Failure of BS-2, H52-31, G01, G02, G03 requiring entry into ECA 0.0

Relative Order	System Or Panel Drawing	Type	Code	Severity Or Value	Event Trigger	Timing	Description
Preload	DSG	MAL	MAL1DSG002B				G03 overspeed during startup
Preload	DSG	BKR	BKR1DSG001	5-fail as is			G01 Output Breaker fail as is 1A52-60
Preload	SWD	BKR	BKR1SWD008	1-trip	9	JCRFTR, 30 sec delay	H52-31 breaker
Preload	DSG	BKR	BKR1DSG004	6-fail close fuse	9		G04 Output Breaker fail to close
PLE	SWD	MAL	MAL1SWD004B		9	JCRFTR, 30 sec delay	345 Bus Section 2 Lockout
PLE	DSG	MAL	MAL2DSG001A				G-02 EDG Failure to Start

SIMULATOR INPUT SUMMARY

Expected Communications:

- **If asked, wait 2 minutes and the TH AO reports G01 appears normal**
- **If asked, wait 2 minutes and the TH AO reports G03 has indications and alarms locally that it oversped.**
- **If asked, wait 2 minutes and the TH AO reports G02 output breaker is open and nothing appears abnormal**
- **If asked, wait 3 minutes and the TH AO can report that H52-31 has tripped and there are no other abnormal indications.**
- **When contacted the PAB AO should report that SW-LW-61 and 62 radwaste SW isolation valves are both shut.**
- **When contacted, wait 2 minutes and have the AO report CWPH temperature is at 65˚F and stable.**
- **When asked PAB AO will be directed to locally shut 1SI-896 and 1SI-856 MOV's.**

LOAs used:

- **None.**

SIMULATOR INPUT SUMMARY

EVENT 7: 3 stuck rods

Relative Order	System Or Panel Drawing	Type	Code	Severity Or Value	Event Trigger	Timing	Description
PLE	CRF	MAL	MAL1CRF001-B6	1-Non Trip	9		Stuck Rod – B6
PLE	CRF	MAL	MAL1CRF001-D10	1-Non Trip	9		Stuck Rod – D10
PLE	CRF	MAL	MAL1CRF001-F12	1-Non Trip	9		Stuck Rod – F12

Expected Communications

None

LOAs used

None

Attach the following information as necessary:

- Simulator Set-up Checklist (before and after training)
- Pre-evaluation Brief Guide (for evaluations only)
- Post-evaluation Critique (for evaluations only)
- Turnover Log

Historical Record: This SEG was developed for the 2012 NRC ILT Examination.

1.0 PLANT CONDITIONS:

	UNIT 1	UNIT 2
Time in core life (MWD/MTU):	400	14960
Reactor power (%):	99.7%	99.4%
Boron concentration (ppm):	947 ppm	1461 ppm
Rod height (CBD @):	CBD @ 220	CBD @ 220

2.0 TECHNICAL SPECIFICATION ACTION CONDITIONS IN EFFECT:

TSAC	Description	Reason
None	None	None

3.0 EQUIPMENT OUT OF SERVICE:

- Line 111, Point Beach to Sheboygan Energy Center, is Out of Service for emergent tower repairs.
- 1W-3B Shroud Fan is Out of Service for bearing failure.

4.0 PLANNED EVOLUTIONS:

- Normal Shift Routine

5.0 TURNOVER INFORMATION:

- Safety Monitor is Green
- Line 111, Point Beach to Sheboygan Energy Center is OOS for emergent tower repairs.
- AOP-31, Solar Magnetic Disturbance Alert Response, is in effect for both units due to a Kp6 SMD Alert. ATC has notified PBNP that 1X-01 DC Neutral Current (GIC) readings are 32 amps and continuous monitoring is in effect per step 5 and Attachment B. The 4th license is providing the Auxiliary Operators with control room data for Attachment B. ATC is continuing to monitor 2X-01 DC Neutral Current (GIC) readings. Red barrier tape is put up around 1(2) X01 Transformers.
- 1W-3B, Containment Control Rod Shroud Fan, is Out of Service due to bearing failure.
- 1-43/RPI, Rod Position Indication Power Transfer Switch is in Alternate (1Y-02-15) for 1Y-06-21 breaker replacement.
- SG B Feedwater Flow Control and SG B Steam Flow Control Transfer Switches have been selected to Yellow after performance of 1 ICP 02.001 BL, Reactor Protection and Engineered Safety Features Blue Channel Analog 92 Day Surveillance Test.
- Clock time is **real time** and you have the normal shift complement.

Simulator Scenario Development Checklist

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

1.	The scenario contains objectives for the desired tasks and relevant human performance tools.	Yes	No X	
2.	The scenario identifies key parameter response, expected alarms, and automatic actions associated with the induced perturbations. (This action applies to all SEG's new or revised for those on the ANS/ANSI-3.5-1998 standard. This action is NOT applicable for those on the ANS/ANSI-3.5-1985 standard.)	Yes	No	N/A X
3.	The scenario content adequately addresses the desired tasks, through simulator performance, instructor-led training freezes, or both.	Yes X	No	
4.	Plant PRA initiating events, important equipment, and important tasks are identified.	Yes X	No	
5.	Turnover information includes a Daily At Power or Shutdown Safety Risk Assessment.	Yes X	No	N/A
6.	The scenario contains procedurally driven success paths. Procedural discrepancies are identified and corrected before training is given.	Yes X	No	
7.	The scenario guide includes responses for all anticipated communications to simulated personnel outside the Control Room, based on procedural guidance and standard operating practices.	Yes X	No	N/A
8.	The scenario includes related industry experience.	Yes	No	N/A X
9.	Training elements and specific human performance elements are addressed in the scenario critique guide to be used by the critique facilitator. The critique guide includes standards for expected performance.	Yes	No	N/A X

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

Retention: Life of Plant
Retain in: Training Program File
Form retained in accordance with record retention schedule identified in NP 1.3.1.

Simulator Scenario Validation Checklist

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

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

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

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

Comments:_____

_____

_____

_____

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

Retention: Life of Plant
Retain in: Training Program File
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SIMULATOR EXERCISE GUIDE (SEG)

SITE: POINT BEACH **SEG # PBN LOI NRC**

SEG TITLE: 2012 ILT NRC SCENARIO #3 **REV. # 0**

PROGRAM: INITIAL LICENSE TRAINING **#: PBN LOI TPD**

COURSE: N/A **#: N/A**

TOTAL TIME: 2.0 HOURS

Additional signatures may be added as desired.

Developed by:	**Andrew Zommers** Instructor	
Reviewed by:	**Joey Trudeau** Instructor (Simulator Scenario Development Checklist.)	
Validated by:	**Andrew Zommers** Validation Lead Instructor (Simulator Scenario Validation Checklist.)	
Approved by:	**Randy Amundson** Training Supervision	
Approved by:	**Tom Larson** Training Program Owner	

Retention: Life of Plant
Retain in: Training Program File
Form retained in accordance with record retention schedule identified in NP 1.3.1.

Guide Requirements

Goal of Training:	To have the crew successfully perform/respond to Starting a second train of feedwater, normal up power from 45%, Pressurizer Pressure Controller fails low, PT-468 fails high, 'B' Steam Line leak inside containment, failure of 'A' Accident Fan to start, and 'B' MSIV fails to close. Embedded within these events is the expectation to properly utilize Technical Specifications.
Learning 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.** Evaluators
References:	**1.** OP-1C, Startup to Power Operation Unit 1 **2.** 0-SOP-IC-001 – White, Routine Maintenance Procedure Removal of Safeguards or Protection Sensor from Service - White Channels **3.** 0-SOP-IC-002, Technical Specifications LCO-Instrument Cross Reference **4.** AOP-24 Response to Instrument Malfunction **5.** AOP-21 PPCS Malfunction **6.** AOP-2A Secondary Coolant Leak Unit 1 **7.** AOP-2B Secondary Malfunction Unit 1 **8.** EOP-0 Reactor Trip or Safety Injection Unit 1 **9.** EOP-2 Faulted Steam Generator Unit 1 **10.** Technical Specifications **11.** Technical Specifications Bases
Commitments:	None
Evaluation Method:	Simulator performance will be evaluated IAW NUREG 1021.

Operating Experience: N/A

Related PRA Information:

Initiating Event with Core Damage Frequency:

SLB/FB in Containment 9.8E-7

Important Components:

Main Steam 1.2% CDF

Important Operator Actions with Task Number:

None

QUANTITATIVE ATTRIBUTES (Use this form for Evaluations only.)

Malfunctions:

Before EOP Entry:

1. 1W-1A Accident Fan fails to start
2. 1PT-468 'A' S/G Pressure Transmitter fa1ls HIGH
3. 1RC-431K Pressurizer Pressure Controller fails LOW
4. 'B' Steam Line leak inside containment

After EOP Entry:

1. Both MSIV fail to auto close

Abnormal Events:

1. 1PT-468 'A' S/G Pressure Transmitter fails HIGH
2. 1RC-431K Pressurizer Pressure Controller fails LOW
3. 'B' Steam Line leak inside containment

Major Transients:

1. 'B' Steam Line Break inside containment

Critical Tasks:

1. **RT-7, When a reactor trip is procedurally called for, initiate a manual reactor trip prior to exceeding 5 psig in containment.**
2. **E-2 A: Isolate the faulted steam generator before transition out of EOP-2.**

SCENARIO OVERVIEW:

INITIAL CONDITIONS:

1. This scenario can be run from the following Specific IC set:
   - IC-163, created from IC-04
2. The following equipment is OOS:
   - Line-111 Point Beach to Sheboygan Energy Center is OOS with disconnects open
   - 'B' Main Feedwater Regulating Valve controlling channels shifted to YELLOW
   - 1W-3B, 'B' CRDM Shroud Fan (need OOS tag on Control Board)
   - 1W-3A 'A'CRDM Shroud Fan is Guarded Equipment.
   - Red Barrier Tape set up around 1(2) X01 Transformers per AOP-31 (Document on White Board behind the SM desk)

SEQUENCE OF EVENTS:

Event 1: Start a Second Feed Train

- Crew starts a second feed train per OP-1C

Event 2: Perform a Normal Up Power from 45%

- Crew performs normal up power per OP-1C

Event 3: 1HC-431K Pressurizer Pressure Controller fails LOW

- RO recognizes spray valve controller failure
- SRO enters AOP-24

Event 4: 1PT-468 'A' S/G pressure Transmitter fails HIGH

- Crew recognizes transmitter failure
- BOP takes manual control of 'A' S/G Atmospheric Steam Dump and 'A' MRFV
- SRO enters AOP-2B and/or AOP-24
- SRO addresses Technical Specifications

Event 5: 'B' Steam Line Leak in containment requiring plant trip

- Crew identifies secondary leak in containment
- SRO enters AOP-2A Secondary Coolant Leak

Event 6: 1W-1A Accident Fan fails to start

- Crew recognizes failure of 1W-1A to start
- SRO addresses Technical Specifications

Event 7: Both MSIV's fails to auto close

- BOP recognizes MSIV's failed to shut when required

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	INITIAL CONDITIONS: Standard IC-163 from IC-04 Unit 1 • Mode: 1 • Burnup: 8100 MWD/MTU • Power: 45.6% • Boron: 1737 ppm (BOL) • Temperature: NOT • Pressure: NOP • Xenon: Equilibrium • Rods: Bank D @ 129 steps • Generator: ≈283 MWe Unit 2 • Mode: 1 • Burnup: 14960 MWD/MTU • Power: 99.6% • Boron: 857 ppm (MOL) • Temperature: NOT • Pressure: NOP • Xenon: Equilibrium • Rods: Bank D @ 220 steps • Generator: ≈ 623 MWe		

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	SIMULATOR SET UP (perform set up per the "Simulator Setup Checklist", including entering action items per the "Simulator Input Summary.")		• Line 111 and 1W-3B (OOS tag) • Line 111 disconnects magnets open • Guarded equipment tag for 1W-3A • Red Barrier Tape listed behind SM desk for AOP-31, around 1(2) X01 Transformers • Extra AO name tags • Marked-up copy of AOP-31
	Simulator Pre-brief:		
	COMPLETE TURNOVER: Review applicable current Unit Status Review relevant At-Power Risk status Review current LCOs not met and Action Requirements Verify crew performs walk down of control boards and reviews turnover checklists.		

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	Event 1: Start Second Feed Train per OP-1C **Communication**: If asked, the TH AO will report that 1CS-182B, 1P-25B-M Cond Pump motor bearing cooling Condensate return to suction, was adjusted for 30 GPM to motor bearing cooler. (Step 5.39.6) **Communication**: If asked, the TH AO will report that 1CS-50 and IA-434 are OPEN. (Step 5.39.9) **Communication:** If asked, the TH AO will report that the supply breaker for the 1P-28B SGFP is RACKED IN with the 125 VDC Trip and Close fuse blocks on. (Step 5.39.9) **Communication:** If asked, the TH AO will report that the Top Case Temp of 305F, Bottom Case Temp of 305F and SGFP Discharge Temp of 305F and all stable for 1P-28B. (Step 5.39.10) **Communication:** If asked, the TH AO will report that the 1P-73A control switch is positioned in AUTO, prior to placing switch to TEST. (Step 5.39.16.b.1) **Communication:** If asked, the TH AO will report that 1P-73A has not restarted and oil pressure is NORMAL at 18 psig and stable.	SRO BOP	Crew will brief the evolution prior to entering the simulator. BOP will start second feed train per OP-1C

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	EVENT 1: (Cont'd) **Communication:** If asked, the TH AO will report that no moisture is dripping from or steam leaving either bracket and the seal outlet temperatures is at 165°F. (Step 5.39.17 a & b) **Communication:** If asked, the TH AO will report that 1TI-3642B indicates 115°F and you will continue to monitor. (Step 5.39.18.b) **End of evolution:** Proceed to next event at Lead Examiner discretion.		
	EVENT 2: Normal Up Power from 45%. Per OP-1C **NOTE:** Once step 5.39.18.b communication is complete, inform crew that one (1) hour has elapsed with stable SGFP oil temperatures and that they are to proceed with power ascension starting at step 5.39.18.d of OP-1C. **End of evolution:** Proceed to next event at Lead Examiner discretion.	Crew RO	Briefing on power ascension may be performed in classroom prior to beginning of the scenario. Withdraws rods and/or Dilute in addition to adjusting steam demand as needed to establish power increase.

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<u>Event 3</u>: 1HC-431K Pressurizer Pressure Controller fails LOW **End of evolution:** Proceed to next event at Lead Examiner discretion.	Crew RO SRO RO	The crew may go to "hold" on the load ramp. Take manual control of 1HC-431K. Ensure controller responds to manual control. Direct entry into AOP-24, "Response to Instrument Malfunctions". Identify Failed Instrument: - RNO go to Step 3 Establish Manual Control: Verify 1HC-431K in manual and turn heaters off. Return Affected Parameter(s) to desired value(s): Crew may restore pressure if not already done

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	EVENT 4: 1PT-468 'A' S/G Pressure Transmitter fails HIGH **Communications:** SM may be requested to contact I&C to troubleshoot and repair PT-468. **Communications:** If requested by OS1, SM agrees to let Crew take 'A' FRV to auto per ARB guidance by shifting controlling feed flow channels (1C03 1E2 2-2 or 3-2). **NOTE**: **Crew may initially enter either AOP-2B or AOP-24** **Communications:** If requested by OS1 inform them OS2 will be preparing the 0-SOP-IC-001 RED to remove 1PT-468 from service. In order to save scenario time, the package for removing the channel from service will be prepared by the exam team before the scenario and will be provided to the Crew when they ask for it to be prepared. **NOTE:** IF asked for references, the Shift Technical Advisor will provide the following logic diagrams as referenced in 0-SOP-IC-001-RED page 29. Sheets #169, #172 and #179 and 0-SOP-IC-002 in its entirety. .	BOP/SRO RO BOP SRO BOP	Acknowledge and respond to receipt of annunciators. Realize feed control issues and S/G Atmospheric opening are due to instrument failure and place affected controllers in Manual. The crew may go to "hold" on the load ramp. Crew enters AOP-2B. **(CA Step)** Maintain Power <100% Determine Secondary malfunction – FRV response Check Feed Regulating Valve Response Place affected controller in manual if desires Stabilize S/G level If transient due to instrument failure go to AOP-24 Crew enters AOP-24 Identify Failed Instrument: Check if failed instrument is a controlling channel: Establish Manual Control

Retention: Life of Plant
Retain in: Training Program File
Form retained in accordance with record retention schedule identified in NP 1.3.1.

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	1PT-468 'A' S/G Pressure Transmitter fails HIGH (cont'd) **NOTE**: Intent is to **NOT** take the instrument out of service per 0-SOP-IC 001 RED **NOTE**: Add logic sheet (#176) for 1FT-464 being OOS concurrent with 1PT-468 **NOTE:** IF SRO determines the need to enter AOP-21 PPCS Malfunction, The Shift Manager should inform OS1 that OS2 will review AOP-21 and take any necessary actions.	BOP SRO	Return Affected Parameter(s) to desired value(s): MFRV may be placed back in auto if ARB guidance is used to swap controlling feed flow channels. Alarm will not be in due to the low power but guidance could still be used Use Attachment A to determine if RTO is affected - RTO not affected Remove failed instrument from service per 0-SOP-IC-001 - RED Return controls to automatic if desired Review 0-SOP-IC-002 Technical Specification LCO-Instruments Cross Reference. 1PT-468 • Table 3.3.1-1 item 14-2 SF/FF Mismatch • Table 3.3.2-1 item 1e SI-Steam Line Pressure-Low • Table 3.3.2-1 item 3c CI-Safety Injection **(no action)** • Table 3.3.2-1 item 4d-2 SLI-Coincident with SI • Table 3.3.2-1 item 4e-2 SLI-Coincident with SI • Table 3.3.2-1 item 5c FI-Safety Injection **(no action)** • Table 3.3.2-1 item 6c AFW-Safety Injection **(no action)** • Table 3.3.3-1 item 17 SG Pressure **(no action)** • Table 3.3.5-1 item 2 CREFS Cont. Isolation **(no action)**

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	EVENT 4: (Cont'd) **End of evolution:** Proceed to next event at Lead Examiner discretion. **NOTE**: Upon initiation of next event, takes about 7 minutes before first PPCS alarm comes in.		1FT-464 • Table 3.3.1-1 item 14-2 SF/FF Mismatch • Table 3.3.2-1 item 4d-1 SLI-High Steam Flow • Table 3.3.2-1 item 4e-1 SLI-High High Steam Flow

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<u>Event 5</u>: 'B' Steam Line Break inside Containment **CRITICAL TASK: RT-7, When a reactor trip is procedurally called for, initiate a manual reactor trip prior to exceeding 5 psig in containment.** **<u>NOTE</u>**: Once the crew attempts to start the 'A' Containment Accident Fan or per Lead Evaluator, raise the severity of the SLB to 2E005 lbm/hr.	Crew SRO RO/BOP BOP Crew SRO RO	Containment humidity will rise, Sump A level will rise, no RMS alarms and reactor power rise. Crew should diagnose a secondary fault inside containment and trip the reactor prior to reaching 5 psig in containment. Enter AOP-2A **(CA STEP)** Determine Secondary Leakage NOT Hazardous to Personnel or Equipment **(CA STEP)** Maintain Plant within limits **(CA STEP)** Maintain RCS Tavg Check Containment Conditions Normal – NO RNO – Start All Containment Accident Fans – NO, Fails to start Make determination that SLB is getting worse, Trip Unit based on CA STEP 1, SRO may direct manual SI and manual CI Enter EOP-0 after reactor trip Verify Reactor Tripped Verify Turbine Tripped Verify Safeguards Busses Energized

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	Steam Line breaks (cont'd)	RO	Check if SI is actuated
		BOP	Isolate Feed Flow to 'B' S/G per Foldout Page
			Perform Attachment A
		RO	Verify Secondary Heat Sink
			Verify RCP Seal cooling
			(CA STEP) Verify RCS Temperature Control
			Check PZR PORV's shut
			Check PZR Spray Valves shut
			Check if RCP's should remain running
			Start monitoring critical safety function status trees
			(CA STEP) Verify containment sump recirc not required
			Check if Secondary System is intact – No
		SRO	Transition to EOP-2
		RO	Check RCS wide range hot leg temperatures stable
		BOP	Isolate both main steam lines
			Check if any S/G not faulted
			Identify Faulted S/G
			Reset Loss of Feedwater Turbine Trip

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	Steam Line breaks (cont'd) **End of evaluation:** Lead evaluator can end scenario any time after the Transition to EOP-1.	BOP RO SRO	Isolate Feed to the Faulted S/G Isolate Flow from the Faulted S/G Check CST Level – Greater than 4 ft Check Secondary System Radiation Normal Transition to EOP-1.

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	Event 6: 1W-1A1 Accident Fan fails to start **NOTE**: If the movement of the scenario is such that the SRO does not verbalize the LCO is not met for the failed Accident Fan, a follow up question after the scenario ends may be required.	BOP SRO	Recognize 1W-1A1 failure to start during performance of AOP-2A. Declare 1W-1A OOS and address Technical Specifications. LCO 3.6.6 NOT MET and TSAC 3.6.6.C entered
	Event 7: Both MSIV's fail to auto close	BOP	After immediate actions the Crew may notice both MSIV's are still open. If the Crew does not notice either Attachment A of EOP-0 or EOP-2 actions will try to shut the MSIV's.

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	EOP-0 Attachment A Unit 2 will enter TSAC 3.7.8.F when SW-2907 and 2908 are opened. **Communication:** When contacted the PAB AO should report that SW-LW-61 and 62 Radwaste SW isolation valves are both shut.	BOP	Verify Feedwater isolation. Verify Containment isolation. Verify AFW actuation. Check SI pumps running. Check RHR pumps running. Check only 1 CCW pump running. Verify Service Water System alignment. BOP should contact the PAB to check 2 local valves. Verify Containment Accident Cooling. Check CR Ventilation in mode 5. Check if Main Steam lines can remain open. NO Verify proper SI valve alignment.

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	EOP 0 Attachment A (cont'd) **Communication:** When contacted, wait 2 minutes and have the AO report CWPH temperature at 70˚F and stable. **Communication:** When contacted, wait 2 minutes and have the PAB AO report SFP temperature at 75˚F and stable with level at 63 feet and stable.	BOP	**(CA STEP)** Verify Containment Spray not required. Verify SI flow. Stop any boration via the blender in progress **(CA STEP)** Check CSR ventilation operating. **(CA STEP)** Check Computer Room ventilation operating. **(CA STEP)** Ensure Aux Building filter/exhaust fans operating. **(CA STEP)** Check AFW Area ventilation operating. **(CA STEP)** Energize façade Freeze protection at the discretion of Operations Shift Management. **(CA STEP)** Check CWPH temperature. **(CA STEP)** Periodically check the status of SFP cooling.

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	End the scenario by placing the simulator in freeze Inform Examinees they are to remain at their stations and cannot discuss the scenario. They are to wait for any follow up questions the examiners may have.		Crew: • No debrief or critique due to this being an evaluated scenario.

SIMULATOR INPUT SUMMARY

Scenario preloads

Relative Order	System Or Panel Drawing	Type	Code	Severity Or Value	Event Trigger	Timing	Description
Preload	SWD	LOA	LOA1SWD001	OPEN			SWYD Line 111 breaker
Preload	SWD	LOA	LOA1SWD002	OPEN			SWYD Line 111 disconnects
Preload	CNM	BKR	BRK1CNM018	6-Fail Cntl Fuse			1W-3B Shroud Fan Breaker

SIMULATOR INPUT SUMMARY

EVENT 1: Start Second Feed Train per OP-1C

Relative Order	System Or Panel Drawing	Type	Code	Severity Or Value	Event Trigger	Timing	Description
PLE	CFW	LOA	LOA1CFW079	OFF	12		1P-73A AC Lube oil pump for SGFP B
							Also need to place back to auto after using trigger 12

Expected Communications

- **If asked, the TH AO will report that 1CS-182B, 1P-25B-M Cond Pump motor bearing cooling Condensate return to suction, was adjusted for 30 GPM to motor bearing cooler. (Step 5.39.6)**
- **If asked, the TH AO will report that 1CS-50 and IA-434 are OPEN. (Step 5.39.9)**
- **If asked, the TH AO will report that the supply breaker for the 1P-28B SGFP is RACKED IN with the 125 VDC Trip and Close fuse blocks on. (Step 5.39.9)**
- **If asked, the TH AO will report that the Top Case Temp of 83F, Bottom Case Temp of 85F and SGFP Discharge Temp of 92F and all stable for 1P-28B. (Step 5.39.10)**
- **If asked, the TH AO will report that the 1P-73A control switch is positioned in AUTO, prior to placing switch to TEST. (Step 5.39.16.b.1)**
- **If asked, the TH AO will report that 1P-73A has not restarted and oil pressure is NORMAL at 18 psig and stable.**
- **If asked, the TH AO will report that no moisture is dripping from or steam leaving either bracket and the seal outlet temperatures is at 165°F. (Step 5.39.17 a & b)**
- **If asked, the TH AO will report that 1TI-3642B indicates 115°F and you will continue to monitor. (Step 5.39.18.b)**

LOAs used

- **When order to place 1P-73A test switch to TEST, initiate Trigger 12 then return switch position back to AUTO.**

SIMULATOR INPUT SUMMARY

EVENT 2: Raise power per OP-1C from 45%

Relative Order	System Or Panel Drawing	Type	Code	Severity Or Value	Event Trigger	Timing	Description

Expected Communications

None

LOAs used

None

Retention: Life of Plant
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Form retained in accordance with record retention schedule identified in NP 1.3.1.

SIMULATOR INPUT SUMMARY

EVENT 3: 1HC-431K Pressurizer Pressure Controller fails LOW

Relative Order	System Or Panel Drawing	Type	Code	Severity Or Value	Event Trigger	Timing	Description
PLE	PCS	CNH	CNH1PCS009E	0	1	15 sec ramp	431K PZR Pressure Controller failure

Expected Communications

None.

LOAs used

None.

Retention: Life of Plant
Retain in: Training Program File
Form retained in accordance with record retention schedule identified in NP 1.3.1.

SIMULATOR INPUT SUMMARY

EVENT 4: 1PT-468 'A' S/G Pressure Transmitter fails HIGH

Relative Order	System Or Panel Drawing	Type	Code	Severity Or Value	Event Trigger	Timing	Description
PLE	SGN	MAL	MAL1SGN015A	1400	3	15 sec ramp	PT-468 fails HIGH

Expected Communications

None

LOAs used

None

Retention: Life of Plant
Retain in: Training Program File
Form retained in accordance with record retention schedule identified in NP 1.3.1.

SIMULATOR INPUT SUMMARY

EVENT 5 'B' Steam Line leak inside Containment

Relative Order	System Or Panel Drawing	Type	Code	Severity Or Value	Event Trigger	Timing	Description
PLE	SGN	MAL	MAL1SGN003B	3000	5	60 sec ramp	B steam leak inside containment (6.5 min to humidity alarm)
PLE	SGN	MAL	MAL1SGN003B	2E005		240 sec ramp	Change B steam leak inside containment PLE
PLE	SGN	LOA	LOA1SGN025	0	14		1MS-237 AFP/ Radwaste Steam

Expected Communications

- **If actions are directed for the AO to go near the steam lines near containment, inform control room you cannot gain access. Monitor 'B' S/G status, when the S/G is blown down, then actions can be performed, report only residual steam.**
- **When contacted the PAB AO should report that SW-LW-61 and 62 Radwaste SW isolation valves are both shut.**
- **When contacted, wait 2 minutes and have the AO report CWPH temperature at 70˚F and stable.**
- **When contacted, wait 2 minutes and have the PAB AO report SFP temperature at 75 ˚F and stable with level at 63 feet and stable**

LOA used Trigger 14 to shut 1MS-237. 1MS-238 is not modeled.

SIMULATOR INPUT SUMMARY

EVENT 6: 1W-1A Accident Fan fails to start

Relative Order	System Or Panel Drawing	Type	Code	Severity Or Value	Event Trigger	Timing	Description
Preload	CNM	BKR	BKR1CNM001	5-Fail as is			1W-1A Accident Fan breaker fail as is

Expected Communications:

LOAs used:

Retention: Life of Plant
Retain in: Training Program File
Form retained in accordance with record retention schedule identified in NP 1.3.1.

SIMULATOR INPUT SUMMARY

EVENT 7: Both MSIV's fail to auto close

Relative Order	System Or Panel Drawing	Type	Code	Severity Or Value	Event Trigger	Timing	Description
Preload	PPL	BST	BST1PPL068	1-fail as is			TC401A fails as is
Preload	PPL	BST	BST1PPL069	1-fail as is			TC402D fails as is
Preload	PPL	BST	BST1PPL070	1-fail as is			TC403D fails as is
Preload	PPL	BST	BST1PPL058	1-fail as is			Cont High Pressure fails as is
Preload	PPL	BST	BST1PPL062	1-fail as is			Cont High Pressure fails as is
Preload	PPL	BST	BST1PPL014	1-fail as is			Cont High Pressure fails as is
Preload	PPL	BST	BST1PPL016	1-fail as is			Cont High Pressure fails as is

Expected Communications:

None

LOAs used:

None

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Attach the following information as necessary:

- Simulator Set-up Checklist (before and after training)
- Pre-evaluation Brief Guide (for evaluations only)
- Post-evaluation Critique (for evaluations only)
- Turnover Log

Historical Record: This SEG was developed for the 2012 NRC ILT Examination.

1.0 PLANT CONDITIONS:

	UNIT 1	UNIT 2
Time in core life (MWD/MTU):	400	14960
Reactor power (%):	45.6%	99.6%
Boron concentration (ppm):	1737 ppm	857 ppm
Rod height (CBD @):	CBD @ 129	CBD @ 220

2.0 TECHNICAL SPECIFICATION ACTION CONDITIONS IN EFFECT:

TSAC	Description	Reason
None	None	None

3.0 EQUIPMENT OUT OF SERVICE:

- Line 111, Point Beach to Sheboygan Energy Center, is Out of Service for emergent tower repairs.
- 1W-3B Shroud Fan is Out of Service for bearing failure.

4.0 PLANNED EVOLUTIONS:

After shift turnover, start a second train of feedwater per OP-1C Startup to Power Operation Step 5.39.4.

Once the second feed train is started raise power at 15% per hour up to 75% power.

5.0 TURNOVER INFORMATION:

- Safety Monitor is Green.
- Line 111, Point Beach to Sheboygan Energy Center is OOS for emergent tower repairs.
- AOP-31, Solar Magnetic Disturbance Alert Response, is in effect for both units due to a Kp6 SMD Alert. ATC has notified PBNP that 1X-01 DC Neutral Current (GIC) readings are 32 amps and continuous monitoring is in effect per step 5 and Attachment B. The 4th license is providing the Auxiliary Operators with control room data for Attachment B. ATC is continuing to monitor 2X-01 DC Neutral Current (GIC) readings. Red barrier tape is put up around 1(2) X01 Transformers.
- 1W-3B, Containment Control Rod Shroud Fan, is Out of Service due to bearing failure.
- 1-43/RPI, Rod Position Indication Power Transfer Switch is in Alternate (1Y-02-15) for 1Y-06-21 breaker replacement.
- SG B Feedwater Flow Control and SG B Steam Flow Control Transfer Switches have been selected to Yellow after performance of 1 ICP 02.001 BL, Reactor Protection and Engineered Safety Features Blue Channel Analog 92 Day Surveillance Test.
- Clock time is **real time** and you have the normal shift complement.

Simulator Scenario Development Checklist

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

1.	The scenario contains objectives for the desired tasks and relevant human performance tools.	Yes	No X	
2.	The scenario identifies key parameter response, expected alarms, and automatic actions associated with the induced perturbations. (This action applies to all SEG's new or revised for those on the ANS/ANSI-3.5-1998 standard. This action is NOT applicable for those on the ANS/ANSI-3.5-1985 standard.)	Yes	No	N/A X
3.	The scenario content adequately addresses the desired tasks, through simulator performance, instructor-led training freezes, or both.	Yes X	No	
4.	Plant PRA initiating events, important equipment, and important tasks are identified.	Yes X	No	
5.	Turnover information includes a Daily At Power or Shutdown Safety Risk Assessment.	Yes X	No	N/A
6.	The scenario contains procedurally driven success paths. Procedural discrepancies are identified and corrected before training is given.	Yes X	No	
7.	The scenario guide includes responses for all anticipated communications to simulated personnel outside the Control Room, based on procedural guidance and standard operating practices.	Yes X	No	N/A
8.	The scenario includes related industry experience.	Yes	No	N/A X
9.	Training elements and specific human performance elements are addressed in the scenario critique guide to be used by the critique facilitator. The critique guide includes standards for expected performance.	Yes	No	N/A X

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

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Simulator Scenario Validation Checklist

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

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

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

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

Comments:_____

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

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