

Point Beach Nuclear Plant
SIMULATOR EXERCISE GUIDE (SEG)

Appendix D

Scenario Outline

Form ES-D-1

Facility: Point Beach Scenario No.: 1 Op-Test No.: 2011301

Examiners: D. McNeil Operators: _____
R. Walton _____
D. Reeser _____

Initial Conditions: 100% reactor power per OP-2A, Normal Power Operation

Turnover: G01 Emergency Diesel Generator is OOS in day 3 of a planned 5 day maintenance outage. G02 Emergency Diesel Generator is aligned to 1A05 and 2A05 in accordance with OI-35A, Standby Emergency Power Alignment. P-38A, MDAFW Pump is Out of Service in day 1 of a planned 2 day outage for seal replacement. The plant is under a severe weather watch for the next 4 hours. AOP-13C, Severe Weather Conditions is in effect. IT 07G, Service Water Valves (Quarterly) is scheduled to be performed immediately after shift turnover.

Event No.	Malfunction No.	Event Type*	Event Description
1		N-BOP N-SRO	Conduct IT-07G SW Valve Stroke Time Test
2		C-RO C-SRO	'C' Charging Pump Failure
3		I-BOP I-SRO TS-SRO	S/G 'B' Level Transmitter ILT-471 Fails High
4		I-RO I-SRO TS-SRO	Pressurize Pressure Channel PT-431 Fails High
5		C-BOP C-SRO TS-SRO	'B' Steam Generator Tube Leak
6		R-RO N-SRO N-BOP	Conduct Rx Plant Shutdown
7		M-ALL	'B' Steam Generator Tube Rupture
8		C-BOP	'B' Stuck Open Atmospheric Steam Dump Valve

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

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SITE: POINT BEACH

SEG # PBN LOI NRC 005E

SEG TITLE: 2011 ILT NRC EXAM SCENARIO #1

REV. # 0

PROGRAM: INITIAL LICENSE TRAINING

#: PBN LOI TPD

COURSE: N/A

#: N/A

TOTAL TIME: 2.0 HOURS

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QUANTITATIVE ATTRIBUTES (Use this form for Evaluations only.)

Malfunctions:

Before EOP Entry:

1. 1P-2C Charging Pump failure
2. 1LT-471 'B' S/G Level Transmitter fails high
3. 1PT-431 Pressurizer Pressure transmitter fails high

After EOP Entry:

1. 'B' Steam Generator Atmospheric fails open

Abnormal Events:

1. Steam Generator Tube Leak

Major Transients:

1. 'B' Steam Generator Tube Rupture

Critical Tasks:

1. **E-2 A: Isolate the faulted steam generator before transition out of EOP-2.**
2. **E-3 A: Isolate feedwater flow into and steam flow from the ruptured SG before a transition to ECA-3.1 occurs.**

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SCENARIO OVERVIEW:

INITIAL CONDITIONS:

1. This scenario can be run from the following Standard (Specific) IC sets:
 - IC-95, created from IC-02
2. The following equipment is OOS:
 - G01 EDG is OOS
 - P-38A MDAFW Pump is OOS
 - P-38B MDAFW Pump, 1P-29 TDAFW Pump, G02, G03, G04 EDG's are protected equipment
 - Red dot on G01 alarm windows C02 D 2-5 and 2-6.
 - Red dot on P-38A OOS alarm windows C01A 2-8 and 2-10.

SEQUENCE OF EVENTS:

Event 1: Conduct IT-07G Service Water Valves (Quarterly)

- Crew conducts testing on SW-2891 and SW-2890 per IST request for increased frequency testing per IT-07G.

Event 2: 'C' Charging Pump fails

- RO starts 'B' Charging Pump and restores PZR Level
- SRO enters AOP-1D CVCS malfunction to address failure
- SRO addresses Technical Requirements Manual for failure.

Event 3: 'B' SG Level Transmitter LT-471 fails high

- BOP recognizes failure and takes manual control of FRV
- SRO Enters AOP-2B Feedwater Malfunction and AOP-24 Instrument Malfunction
- SRO Addresses Technical Specifications

Event 4: Pressurizer Pressure channel PT-431 fails high

- RO identifies malfunction, takes manual control and restores pressure

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- SRO enters AOP-24 to address malfunction
- RO shifts pressure control to auto per ARB
- SRO addresses Technical Specifications

Event 5: 'B' Steam Generator Tube Leak

- Crew recognizes tube leak
- SRO enters AOP-3 Steam Generator Tube Leak
- SRO addresses Technical Specifications

Event 6: Rapid Power Reduction Unit 1

- SRO enters AOP-17A to reduce power on the unit due to SGTL

Event 7: Steam Generator Tube Rupture

- Crew recognizes SGTR and trips the unit
- SRO enters EOP network

Event 8: 'B' Steam Generator Atmospheric fails open

- Crew recognizes failed valve and isolates locally

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SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<p>INITIAL CONDITIONS: Standard IC-95 from IC-02</p> <p>Unit 1</p> <ul style="list-style-type: none"> • Mode: 1 • Burnup: 10,000 MWD/MTU • Power: 100% • Boron: 774 ppm (MOL) • Temperature: NOT • Pressure: NOP • Xenon: Equilibrium • Rods: Bank D @ 220 steps • Generator: ≈530 Mwe <p>Unit 2</p> <ul style="list-style-type: none"> • Mode: 1 • Burnup: 500 MWD/MTU • Power: 100% • Boron: 1280 ppm (BOL) • Temperature: NOT • Pressure: NOP • Xenon: Equilibrium • Rods: Bank D @ 220 steps • Generator: ≈ 530 Mwe 		

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	<p><u>Event 1: Conduct IT-07G SW Valve Stroke Test</u></p> <p><u>Communications:</u> TH AO will be contacted to locally verify valve position. Report OPEN or CLOSED to match what the board operator sees.</p> <p><u>Communications:</u> Cue that the 4th licensed operator will make the required log entry</p> <p>End of evolution: Proceed to next event at Lead Examiner discretion.</p>	<p>Crew</p> <p>BOP</p> <p>SRO/BOP</p> <p>BOP</p> <p>SRO</p>	<p>Crew briefs evolution prior to coming into simulator.</p> <p>Verifies at least one SW pump operating in South and North headers</p> <p>Enters TSAC 3.7.8.C and logs completion of RA Strokes SW-2891 and SW-2890 and records data.</p> <p>Review data recorded by BOP and exit TSAC as required per IT-07G.</p>

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	<p>Event 2: 'C' Charging Pump Fails</p> <p>Communication: When sent out to investigate Charging pump and associated breaker, inform control room breaker is tripped on overcurrent and motor is hot to the touch.</p> <p>Communication: If sent to check charging pump relief, wait 2 minutes and report charging reliefs on Unit 1 are NOT lifting</p> <p>Communication: If requested, OS2 will follow up with OI-35C, 480v Electrical Load Conservation due to 1P-2A and 1P-2B Charging Pumps running.</p> <p>End of evolution: Proceed to next event at Lead Examiner discretion.</p>	<p>SRO</p> <p>RO</p> <p>SRO</p>	<p>When 'C' charging pump trips, enter AOP-1D, CVCS Malfunction.</p> <p>Checks RCS Leak not in progress Continuous action (CA)</p> <p>Addresses Foldout page and notes.</p> <p>Determines Chg Pump trip and goes to Step 3.</p> <p>Check any charging pump running – 'A' should be running.</p> <p>Check Charging Flow Stable – Should answer yes.</p> <p>Check Charging Pump relief not lifted – no indication of lifting relief. May dispatch AO.</p> <p>Check VCT Level – Should be > 17%</p> <p>Check Charging System response: Should start 'B' Charging Pump and adjust lab seals using CV-142. May place 'C' charging pump in pullout.</p> <p>Requests DCS Notification.</p> <p>Refers to TRM for Charging Pump requirements (TRM requirements are met with two pumps operable).</p>

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	<p>Event 3: 'B' S/G Level Transmitter LT-471 fails high</p> <p>If the crew is slow to take manual control of the feedwater regulating valve and thus initiates a manual or auto reactor trip, immediately insert the SGTR.</p> <p>NOTE: IF asked for guidance, the Shift Manager will state OS2 will prepare the required paperwork per 0-SOP-IC-001 YELLOW to remove LT-471 from service. Prompt OS1 to complete additional actions while OS2 prepares the paperwork.</p>	<p>BOP</p> <p>SRO RO BOP</p> <p>SRO</p>	<p>Identifies the failed instrument by channel indicating high, S/G level alarms, actual level lowering on the unaffected channels or the feedwater regulating valve going shut.</p> <p>Implements AOP-2B, Feedwater System Malfunction</p> <p>Maintain Reactor Power < 100%</p> <p>Check Feedwater Regulating Valve response normal. – No, so take RNO actions and then enter AOP-24</p> <p>Identify failed instrument.</p> <p>Check if failed instrument is controlling, the BOP should determine LT-471 is controlling channel.</p> <p>Establish manual control as desired. BOP takes manual control of "B" Feedwater Regulating Valve.</p> <p>Return affected parameters to normal.</p> <p>Determine if failed instrument affects RTO (LT-471 doesn't)</p>

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	<p>Event 4: Pressurizer Pressure PT-431 Fails High</p> <p>If the crew is slow to take manual control of the spray valves and thus initiates a manual or auto reactor trip, immediately insert the SGTR.</p> <p>NOTE: IF asked for guidance, the Shift Manager will state OS2 will prepare the required paperwork per 0-SOP-IC-001 BLUE to remove PT-431 from service. Prompt OS1 to complete additional actions while OS2 prepares the paperwork.</p> <p>Communication: IF OS1 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.</p>	<p>RO</p> <p>SRO</p> <p>RO</p> <p>SRO/BOP</p>	<p>Recognizes PT-431 failing high causing spray valves to open lowering RCS pressure.</p> <p>Enters AOP 24 for instrument malfunction.</p> <p>Identify failed instrument.</p> <p>Check if failed instrument is controlling, the RO should determine PT-431 is controlling.</p> <p>Establish manual control as desired. RO takes manual control of HC-431 and controls Pressurizer pressure manually.</p> <p>Return affected parameters to normal.</p> <p>Determine if failed instrument affects RTO, which PT-431 does not (alternate channels).</p> <p>If RCS pressure gets <2205 PSIG, then LCO 3.4.1 is not met.</p>

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	<p><u>Event 5 (cont): 'B' Steam Generator Tube Leak</u></p> <p><u>Communications:</u> SM will be asked to notify DCS and implement E-Plan</p> <p><u>Communications:</u> If asked, the SM can let OS1 know he will take care of limited plant evacuation using EPIP 6.1.</p>	<p>RO</p> <p>SRO</p> <p>RO/BOP</p> <p>RO</p> <p>SRO</p>	<p>Check PZR Pressure – Stable or trending to program</p> <p>Check Rx Makeup control – proper concentration, armed and in auto.</p> <p>Notify DCS, Chem and communicate E-plan need to SM.</p> <p>Identify Leaking SG – uses High Main Steam Line alarm to identify 'B' SG as leaking.</p> <p>Determine Leak Rate – RO should be able to determine leak rate using charging/letdown balance. Otherwise, SRO requests performance of CAMP 014 from chemistry or OI-55 to determine rate.</p> <p>Addresses note regarding TS leakage requirement and recognizes violation of TS 3.4.13.</p> <p>Checks RX shutdown required – leakage clearly exceeds 75 GPD and requires a shutdown.</p> <p>Addresses caution regarding time clock and RMS alarm.</p> <p>(CA STEP) Determines action based on step 10 of AOP-3.</p> <ul style="list-style-type: none"> □ Leak is > 75GPD and has risen more than 30 GPD over the last hour. Power to be reduced to <50% in one hour and in MODE 3 in following 2 hours. <p>Enters AOP-17A, Rapid Power Reduction.</p>

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	<p><u>Event 6 (cont): Rapid Power Reduction Unit 1</u></p> <p><u>Communication:</u> When requested, TH AO start 1P-99A and B SGFP Seal Water Pumps</p> <p>Per Lead Evaluator, the SGTL malfunction will increase from 0.4 to 7 ramped in over 120 seconds. The 'B' Steam Generator Atmospheric Dump valve will fail open on reactor trip.</p> <p>End of evolution: Proceed to next event at Lead Examiner discretion.</p>	<p>BOP</p> <p>RO</p> <p>BOP</p> <p>SRO</p> <p>BOP</p>	<p>(CA STEP) Check SG levels – controlling in Auto</p> <p>(CA STEP) Maintain T_{avg} – Checks T_{avg} within limits</p> <p>Check MFW Seal Water Pumps Running - Contacts U1 Turbine Operator to Start 1P-99A and B.</p> <p>Determines endpoint is MODE 3.</p> <p>May transfer auxiliary loads.</p>

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	<p><u>Event 7 and 8: 'B' Steam Generator Tube Rupture with Atmospheric Dump Valve failed open</u></p>	<p>Crew</p> <p>RO</p>	<p>Recognizes increased leak rate and uses fold out page/continuous action guidance from AOP-3 to trip the reactor.</p> <p>Inserts Manual Trip to trip the reactor. RO inserts manual SI and CI also and carries out Immediate Actions of EOP-0.</p> <p>Verify Reactor Trip – RTBs open, bottom lights all lit, IRPIs on bottom, Flux lowering.</p> <p>Verify Turbine Trip – Turbine Stop Valves both shut:</p> <ul style="list-style-type: none"> <input type="checkbox"/> SL and SR lights lit OR. <input type="checkbox"/> Turbine Stop Valves Two Closed Alarm OR <input type="checkbox"/> Turbine Valves Bistable both lit.

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	<u>Event 7 and 8: 'B' Steam Generator Tube Rupture with Atmospheric Dump Valve failed open (cont'd)</u>	BOP	<ul style="list-style-type: none"> ○ If the 'B' S/G Atmospheric Dump Valve has not been noted, then the crew might maintain AFW flow to the ruptured "B" S/G per the Fold Out Page for ruptured S/G as needed in order to get level above 29%.
		RO	<p>Performs Attachment A. All conditions normal except for P-38A MDAFW Pump is OOS.</p> <p>Verifies Secondary Heat Sink - >29% in at least one SG. Adjusts AFW flow to 'A' SG as desired to maintain level.</p> <p>Verify RCP Seal Cooling – Lab seals on both RCPs should be >20".</p> <p>(CA STEP) Verify RCS Temp Control – RNO actions taken for the uncontrolled cooldown. Ensure not dumping steam.</p>
		BOP	<p>Lower AFW to 'A' S/G (but ensure at least 200 gpm). Ensure MSIVs are shut.</p>
		RO	<p>Check PZR PORVs both shut.</p> <p>Check Normal spray valves both shut.</p> <p>Check Aux spray valve shut.</p> <p>Check if RCPs should remain running (they should)</p>

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	<p><u>Event 7 and 8: 'B' Steam Generator Tube Rupture with Atmospheric Dump Valve failed open (cont'd)</u></p> <p>If not previously accomplished, the crew may have the 'B' S/G Atmospheric Dump Valve isolated locally here. If not, then step 7 explicitly checks the valve shut.</p> <p>Once isolated, the crew should complete the actions of EOP-2 and transition to EOP-3, although an acceptable alternative is to use EOP-0.0 Rediagnosis to transition to EOP-3.</p>	<p>SRO</p> <p>BOP</p> <p>BOP</p> <p>SRO</p> <p>SRO/RO</p> <p>BOP</p> <p>Crew</p>	<p>Direct STA to monitor CSFSTs.</p> <p>(CA STEP) Verify Containment Sump Recirc not required – RWST level should still be over 90%.</p> <p>Check if Secondary System is intact – 'B' SG pressures should be noted as lowering uncontrollably.</p> <p>Transition to EOP-2</p> <p>Review notes and foldout page information. Crew should determine that the A S/G is available for cooldown.</p> <p>Check RCS temperature. The RNO directs stop dumping steam and control AFW flow.</p> <p>Isolate MSIV's. (will have isolated previously)</p> <p><input type="checkbox"/> Determines that 1MS-236, MSIV bypass valve is shut under admin control.</p> <p>Check if any S/G NOT faulted. ('A' is intact).</p>

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	<p><u>Event 7 and 8: 'B' Steam Generator Tube Rupture with Atmospheric Dump Valve failed open (cont'd)</u></p> <p>CRITICAL TASK: E-2 – A: Isolate the faulted SG before transition out of EOP-2.</p> <p>The intent is that the crew has taken actions to isolate feed to the 'B' S/G prior to shutting the Atmospheric Dump Valve isolation valve. They will then have to decide whether to re-establish feeding in EOP-3 if level is not >29% by then.</p>	<p>Crew</p> <p>BOP</p> <p>BOP</p> <p>SRO</p> <p>BOP</p>	<p>Identify faulted S/G. Crew determines B S/G is faulted</p> <p>Reset LOFWTT – depresses LOFWTT reset pushbutton and alarm reset buttons to clear LOFWTT alarm.</p> <p>Isolate Feedwater to faulted S/G.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Ensure 'B' FWRV and Bypass Valves are shut <input type="checkbox"/> P-38B AFW Pump is stopped and taken to pullout <input type="checkbox"/> 1AF-4000 TAFP discharge to 'B' S/G and AF-4021 'B' MDAFP discharge to 'B' S/G taken to manual and shut. <p>(Unit 2 will be in TSAC 3.7.5.d when placing P-38B in pullout [2 MDAFW Pumps OOS].)</p> <p>Isolate flow from S/G.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Ensure 1MS-2015, 'A' ADV shut – is failed open. <input type="checkbox"/> Shuts 1MS-2019, TDAFW supply if still open. <input type="checkbox"/> Shuts 1MS-5959 and 2045 SGBD isolations if open. <input type="checkbox"/> Dispatches AO to shut 1MS-237 and 238 locally, should remind AO that the SG is ruptured and rad levels may be elevated.

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	<u>Event 7 and 8:</u> 'B' Steam Generator Tube Rupture with Atmospheric Dump Valve failed open (cont'd)	BOP	Check CST level.
		RO	Check RMS normal
		BOP/ SRO	'B' SG has indications of a rupture (high radiation, rising level after the atmospheric dump valve is isolated).
		SRO	Transition to EOP-3.
		Crew	Addresses Cautions and notes regarding identification and isolation of ruptured SG, Chem Sampling and Fold Out Page.
			Reviews Fold Out Page – None of the items on the Fold Out Page should require action at this time.
		RO	(CA STEP) Check if RCPs should remain running – RCPs should remain running.
		BOP/RO	Identify Ruptured SG – identifies 'B' as ruptured.

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	<p><u>Event 7 and 8: 'B' Steam Generator Tube Rupture with Atmospheric Dump Valve failed open (cont'd)</u></p> <p><u>Communication:</u> When the PAB AO is contacted, insert Trigger 14 to shut 1MS-237 and report both valves shut, 1MS-238 is not modeled on Simulator.</p> <p>CRITICAL TASK E3-A: Isolate feedwater flow into, and steam flow from the ruptured SG before a transition to ECA-3.1 occurs.</p>	<p>RO/BOP</p> <p>BOP</p> <p>BOP</p> <p>BOP</p> <p>SRO</p>	<p>Shut MSIV on ruptured SG – 1MS-2017 is already shut.</p> <p>Reset Loss of FW Turbine Trip – previously done</p> <p>Minimize Steam Dump from Ruptured SG:</p> <ul style="list-style-type: none"> □ 1HC-478 in auto at 1050 □ 1MS-2015, 'A' ADV shut – is failed open □ Shuts 1MS-2019, TDAFW supply – previously shut □ 1MS-236, MSIV bypass valve – previously addressed <p>Isolate flow from ruptured SG:</p> <ul style="list-style-type: none"> □ 1MS-5959 and 2045 SGBD previously addressed. □ 1MS-237 and 238 isolation valves previously addressed <p>(CA STEP) Check if Feed Flow to Ruptured SG should be stopped – level in 'B' SG may be >29%, thus BOP will secure P-38B MDAFW pump (in pullout) and shut AF-4021 and 1AF-4000 to secure feed from MDAFWP and TDAFWP. Should recognize impact on Unit 2 and inform U2 operator of action. (TSAC 3.7.5.D).</p>

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	<u>Event 7 and 8: 'B' Steam Generator Tube Rupture with Atmospheric Dump Valve failed open (cont'd)</u>	Crew	Verify Ruptured SG not needed for cooldown – checks 'A' SG available for cooldown and 'B' MSIV shut.
		BOP	Check ruptured SG pressure >430 psig – should be well above 430 psig in 'B' SG.
		RO/SRO	Determine Target Core Exit Temp: RO reports pressure in ruptured SG, which will vary depending on timing of isolating the Atmospheric Dump Valve. SRO determines target temperature.
		Crew	Addresses notes prior to step 11 concerning cooldown rate and RCP trip criteria. Cooldown RCS to Target Temperature
		RO	Lock in SI Signal – manually actuates SI and CI and trips SI bistables in racks behind control boards. Then SI is reset.
		BOP	'A' MSIV is shut, open 1MS-2016 'A' ADV fully in manual.
		RO	Check PORVs and Block Valves – PORVs should be shut and block valves open with power.
			RO

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	<p><u>Event 7 and 8: 'B' Steam Generator Tube Rupture with Atmospheric Dump Valve failed open (cont'd)</u></p> <p>Once action has been taken to start the cooldown, the scenario can be terminated at Lead Evaluators discretion.</p>	<p>BOP</p> <p>SRO</p> <p>BOP</p> <p>RO</p>	<p>(CA STEP) Stabilize intact SG level – direction to maintain SG level 29-65% during cooldown.</p> <p>Addresses caution regarding loss of offsite power.</p> <p>Reset SI, CI and 1B-03 and 1B-04 Lockouts – performs resets on rear of C01 panel.</p> <p>Check 4160 Safeguards buses both energized from offsite – verifies buses energized from 1X04.</p> <p>Reestablish IA to Containment:</p> <ul style="list-style-type: none"> <input type="checkbox"/> -Starts second IA compressor on C01 Rear. <input type="checkbox"/> -Checks IA pressure – should be 100 PSIG. <input type="checkbox"/> -Opens IA-3047, listening for click of IA relay and sets timer for reminder to do the same for IA-3048. <p>(CA STEP) Check if RHR pumps should be stopped – checks RCS pressure >425 psig and stops both RHR pumps and monitors RCS pressure.</p>

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	<p>EOP 0 Attachment A</p> <p>Unit 2 will enter TSAC 3.7.8.F when SW-2907 and 2908 are opened.</p> <p><u>Communication:</u> When contacted the PAB AO should report that SW-LW-61 and 62 radwaste SW isolation valves are both shut.</p>	BOP	<p>Verify feedwater isolation.</p> <p>Verify containment isolation.</p> <p>Verify AFW actuation. Since P-38B is OOS, will ensure that the TDAFWP is running.</p> <p>Check SI pumps running.</p> <p>Check RHR pumps running.</p> <p>Check only 1 CCW pump running.</p> <p>Verify Service Water System alignment. BOP should contact the PAB to check 2 local valves.</p> <p>Verify containment accident cooling.</p> <p>Check CR ventilation in accident mode.</p> <p>Check if main steam lines can remain open.</p> <p>Verify proper SI valve alignment.</p>

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	<p>When the conditions are stabilized or at discretion of lead instructor/evaluator</p> <p>End the scenario by placing the simulator in freeze</p> <p>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.</p>		<p>Crew:</p> <ul style="list-style-type: none"> • No debrief or critique due to this being an evaluated scenario.

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1.0 PLANT CONDITIONS:

	UNIT 1	UNIT 2
Time in core life (MWD/MTU):	10,000	500
Reactor power (%):	100%	100%
Boron concentration (ppm):	774 ppm	1280 ppm
Rod height (CBD @):	CBD @ 220	CBD @ 220

2.0 TECHNICAL SPECIFICATION ACTION CONDITIONS IN EFFECT:

<u>TSAC</u>	<u>Description</u>	<u>Reason</u>
TSAC 3.7.5.C	Restore motor driven AFW pump system to OPERABLE status within 7 days.	P-38A, MDAFP, is Out of Service in day 1 of a planned 2 day outage for seal replacement.

3.0 EQUIPMENT OUT OF SERVICE:

- G01 EDG is OOS in day 3 of a planned 5 day outage for maintenance.
- P-38A, MDAFP, is Out of Service in day 1 of a planned 2 day outage for seal replacement.

4.0 PLANNED EVOLUTIONS:

- IT 07G Service Water Valves (Quarterly) will be performed at the start of the shift in order to stroke SW-2891, South SW Hdr Xconn Valve and SW-2890, North SW Hdr Xconn Valve to provide data for increased frequency testing per the IST Engineer. Stroke testing of the other valves (SW-2870 / SW-2869) and seat flushing is not required. An AO is standing by locally at the valves.

5.0 TURNOVER INFORMATION:

- Safety Monitor is Green.
- G02 EDG is aligned to 1A05 and 2A05 4160 Safeguards busses accordance with OI-35A, Standby Emergency Power Alignment.
- There are 2 crews of Maintenance folks in working G01 EDG and P-38A MDAFW Pump.

Point Beach Nuclear Plant
SIMULATOR EXERCISE GUIDE (SEG)

- P-38B MDAFW Pump, 1P-29 TDAFW Pump, G02, G03, G04 EDGs are protected equipment.
- The plant is under severe weather watch for the next 4 hours. AOP-13C, Severe Weather Conditions, is in effect.
- Clock time is **real time** and you have the normal shift complement.
- IT 07G Service Water Valves (Quarterly) has been prepared for partial use with an AO standing by already briefed.

Facility: <u>Point Beach</u>		Scenario No.: <u>2</u>		Op-Test No.: <u>2011301</u>
Examiners: <u>D. McNeil</u>		Operators: _____		
<u>R. Walton</u>		_____		
<u>D. Reeser</u>		_____		
Initial Conditions: <u>Unit 1 is at 28% reactor power, Chemistry hold per OP-1C, Startup to Power Operation Unit 1, Step 5.120.3 has just been cleared.</u>				
Turnover: <u>G01 Emergency Diesel Generator is Out of Service in day 3 of a planned 5 day maintenance outage. G02 Emergency Diesel Generator is aligned to 1A05 and 2A05 in accordance with OI-35A, Standby Emergency Power Alignment. 1P-15B, SI Pump is Out of Service in day 1 of a planned 2 day outage for seal replacement. The plant is under a severe weather watch for the next 4 hours. AOP-13C, Severe Weather Conditions is in effect. Shifting of 1P-28A and B SGFP's, for post-maintenance testing, is scheduled to be performed immediately after shift turnover, followed by a load escalation from 28% power to ~47% power (at 15% per hour) per OP-1C, Startup to Power Operation Unit 1.</u>				
Event No.	Malf. No.	Event Type*	Event Description	
1		N-BOP N-SRO	Shift Steam Generator Feed Pumps	
2		R-RO N-SRO	Increase Reactor Power from 28% at the Normal Rate.	
3		I-BOP I-SRO TS-SRO	Turbine First Stage Pressure Instrument PT-485 Fails Low.	
4		I-RO I-SRO TS-SRO	Pressurizer Level Instrument LT-428 Fails Low.	
5		N-BOP N-SRO	Restore normal letdown	
6		C-BOP C-SRO TS-SRO	Power Operated Relief Valve 1RC-430 Seat Leakage.	
7		M- ALL	Steam Line Break Upstream of the Unit 1 'A' MSIV.	
8		M-ALL	Reactor Trip Breakers Fail to Open (ATWS)	
9		C-BOP	Train 'A' ESF Sequencer Fails to Actuate.	
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor				

**Point Beach Nuclear Plant
SIMULATOR EXERCISE GUIDE (SEG)**

SITE:	POINT BEACH	SEG #	PBN LOI NRC 006E
SEG TITLE:	2011 ILT NRC EXAM SCENARIO #2	REV. #	0
PROGRAM:	INITIAL LICENSE TRAINING	#:	PBN LOI TPD
COURSE:	N/A	#:	N/A

TOTAL TIME: 2.0 HOURS

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
SIMULATOR EXERCISE GUIDE (SEG)**

Guide Requirements

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
SIMULATOR EXERCISE GUIDE (SEG)**

QUANTITATIVE ATTRIBUTES

Malfunctions:

Before EOP Entry:

1. 1PT-485 Turbine First Stage Pressure fails low
2. 1LT-428 Pressurizer Level transmitter fails Low
3. PORV 1RC-430 Seat Leakage

After EOP Entry:

1. ATWS Reactor Trip Breakers fail to open
2. Train A ESF Sequencer fails to operate

Abnormal Events:

1. Steam Leak upstream 'A' MSIV

Major Transients:

1. 'A' Steam Line Break

Critical Tasks:

1. **E-2 A Isolate the faulted SG before completion of scenario.**
2. **FR-S.1—C: Insert negative reactivity into the core by at least one of the following methods before completing the immediate action steps of CSP-S.1:**
 - **Insert control rods**

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
SIMULATOR EXERCISE GUIDE (SEG)**

SCENARIO OVERVIEW:

INITIAL CONDITIONS:

1. This scenario can be run from the following Standard (Specific) IC sets:
 - IC-96, created from IC-05
2. The following equipment is OOS:
 - G01 EDG is OOS
 - 1P-15B Safety Injection Pump is OOS
 - 1P-15A Safety Injection Pump, G02, G03, G04 EDG's are protected equipment
 - Red dot on G01 alarm windows C02 D 2-5 and 2-6.
 - Red dot on 1P-15A alarm window C01 1B 3-5.

SEQUENCE OF EVENTS:

Event 1: Shift S/G Main Feed Pumps

- Crew shifts operating SGFP's per OP-13A for PMT.

Event 2: Increase power normal rate from 28%

- Crew raises power per OP-1C at 15%/hr rate.

Event 3: 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 and AOP-24 Instrument Malfunction
- SRO Addresses Technical Specifications

Event 4: Pressurizer Level channel LT-428 fails Low

- RO identifies malfunction, takes manual control
- Crew enters AOP-1D CVCS Malfunction and AOP-24 to address failure
- SRO addresses Technical Specifications

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
SIMULATOR EXERCISE GUIDE (SEG)**

Event 5: Restore normal Letdown

- RO restores Letdown per AOP-1D CVCS Malfunction
- RO restores charging back to automatic

Event 6: Power Operated Relief Valve 1RC-430 Seat Leakage

- Crew recognizes leakage from safety or relief valves
- Crew determines which valve is leaking and isolates it
- SRO addresses Technical Specifications

Event 7: Steam Line break upstream Unit 1 'A' MSIV

- Crew recognizes steam leak
- SRO enters AOP-2A Secondary Coolant Malfunction
- Crew determines plant trip required and SRO enters EOP network

Event 8: Reactor Trip Breakers fail to open (ATWS)

- RO recognizes failure of reactor trip breakers in EOP-0
- SRO enters CSP-S-1 ATWS
- Crew addresses faulted S/G

Event 9: Train 'A' ESF Sequencer fails to actuate

- BOP recognizes failure while implementing Attachment A in CSP-S.1 and starts equipment as directed

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
SIMULATOR EXERCISE GUIDE (SEG)**

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<p>INITIAL CONDITIONS: Standard IC-96 from IC-05</p> <p>Unit 1</p> <ul style="list-style-type: none"> • Mode: 1 • Burnup: 7500 MWD/MTU • Power: 28% • Boron: 1099 ppm (MOL) • Temperature: NOT • Pressure: NOP • Xenon: Equilibrium • Rods: Bank D @ 167 steps • Generator: ≈145 Mwe <p>Unit 2</p> <ul style="list-style-type: none"> • Mode: 1 • Burnup: 14960 MWD/MTU • Power: 100% • Boron: 16 ppm (EOL) • Temperature: NOT • Pressure: NOP • Xenon: Equilibrium • Rods: Bank D @ 220 steps • Generator: ≈ 530 Mwe 		

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
SIMULATOR EXERCISE GUIDE (SEG)

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.”)		<ul style="list-style-type: none"> • G01 EDG and 1P-15B (OOS tag) • Protected equipment tags for 1P-15A, G02, G03, G04 EDG's • Red dot on alarm windows C02 D 2-5, 2-6 and C01 1B 3-5.
	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.		
	<p><u>Event 1: Shift S/G Main Feed Pumps</u></p> <p><u>Communications:</u> TH AO will be contacted to locally check status of SGFP's prior to start and ensure all personnel are clear.</p> <p><u>End of evolution:</u> Proceed to next event at Lead Examiner discretion.</p>	Crew	Crew briefs evolution per OP-13A prior to evolution Shifts SGFP's per OP-13A to complete PMT run

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
SIMULATOR EXERCISE GUIDE (SEG)**

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<p><u>Event 2:</u> Increase power normal rate from 28%</p> <p>NOTE: If asked S/G B/B is 15/15 Klbs/sg directly to the tank.</p> <p>End of evolution: Proceed to next event at Lead Examiner discretion.</p>	<p>Crew</p> <p>RO</p>	<p>Briefing on power ascension may be performed in classroom prior to beginning of the scenario</p> <p>Withdraws rods and/or Dilute in addition to adjusting steam demand as needed to establish power increase</p>

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
SIMULATOR EXERCISE GUIDE (SEG)**

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<p>Event 4: Pressurizer Level channel LT-428 fails Low</p> <p>NOTE: AOP-1D gives guidance on stabilizing plant with loss of Letdown as well as restoring it. AOP-24 gives generic guidance to take manual control as needed for the failure. The ARB guidance (ARB 1C04 1C 1-3) is used to DEFEAT Blue LT-428 so Letdown can be restored as well as Automatic Charging.</p> <p>Communication: IF asked for guidance, the Shift Manager will state OS2 will prepare the required paperwork per 0-SOP-IC-001 BLUE to remove LT-428 from service. Prompt OS1 to complete additional actions while OS2 prepares the paperwork.</p> <p>Communication: IF OS1 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.</p>	<p>RO</p> <p>RO/BOP</p> <p>SRO</p> <p>RO</p>	<p>Acknowledges PZR High/Lo Level alarm and informs Crew. RO recommends going to minimum charging due to loss of Letdown</p> <p>RO/BOP address the ARB's for alarms associated with the PZR Level failure</p> <p>Directs entry into AOP-1D CVCS Malfunction or AOP-24 Instrument Failure</p> <p>AOP 24 action:</p> <p>Identify failed instrument</p> <p>Check if failed instrument is controlling, the RO should determine LT-428 is controlling</p> <p>Establish manual control as desired. RO takes manual control of charging</p> <p>Return affected parameters to normal</p> <p>Determine if failed instrument affects RTO, which LT-428 does not</p> <p>Remove instrument from service per 0-SOP-IC-001</p>

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
SIMULATOR EXERCISE GUIDE (SEG)**

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<p>Event 4: Pressurizer Level channel LT-428 fails Low (cont'd)</p> <p>NOTE: AOP-1D gives guidance on stabilizing plant with loss of Letdown as well as restoring it. AOP-24 gives generic guidance to take manual control as needed for the failure. The ARB guidance (ARB 1C04 1C 1-3) is used to DEFEAT Blue LT-428 so Letdown can be restored as well as Automatic Charging</p> <p>Intent is to NOT take the instrument OOS per 0-SOP-IC-001-Blue, shift to auto control per ARB is desired.</p>	<p>RO/BOP</p> <p>SRO</p> <p>RO</p> <p>SRO</p> <p>RO</p> <p>Crew</p> <p>SRO</p>	<p>Address the level condition with the ARB's. - Controlling channel can be changed over per ARB to return affected parameters to Automatic</p> <p>AOP-1D actions: (CA STEP) Check RCS Leak NOT in progress</p> <p>Determine CVCS Malfunction – Loss of Letdown go to Step 48</p> <p>Reduce charging to minimum</p> <p>Check if Letdown can be restored (see next event)</p> <p>Address Technical Specifications for LT-428 using 0-SOP-IC-002</p> <p>TSAC 3.3.1.A enter table 3.3.1-1 item 8 immediately. Take LT-428 to trip within 1 hour per 3.3.1.K</p> <p>TSAC 3.3.3 PAM may be referenced, only 2 PZR level transmitters are required. (no action needed)</p>

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
SIMULATOR EXERCISE GUIDE (SEG)**

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<p><u>Event 7: Steam Line break upstream Unit 1 'A' MSIV</u></p> <p>NOTE: Exceeding 1# inside containment exceeds parametric value, TS lists 2# as the max pressure before not meeting LCO 3.6.4 and the need to enter a TSAC.</p>	<p>Crew</p> <p>SRO</p> <p>BOP</p> <p>RO</p> <p>Crew</p>	<p>Crew determines leakage into containment is Secondary vice Primary</p> <p>Enter AOP-2A Secondary Coolant Leak</p> <p>(CA STEP) Determine Secondary leakage Not Hazardous to Personnel or Equipment</p> <p>(CA STEP) Maintain Plant Within Limits</p> <p>(CA STEP) Maintain RCS Tavg</p> <p>Crew determines CA Step 1 applies and attempts to trip the Unit</p>

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
SIMULATOR EXERCISE GUIDE (SEG)**

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<p><u>Event 8: Reactor Trip Breakers fail to open (ATWS)</u></p> <p><u>CRITICAL TASK: Insert Negative Reactivity into the core before completing Immediate Action Steps of CSP-S.1</u></p> <p><u>Communication:</u> When the TH AO is contacted to locally open the trip breakers it will take 2 minutes to transit to the Rod Drive Room. If the ATWS is announced over the gaitronics the TH AO will report to the Rod Drive Room in 2 minutes.</p>	<p>RO</p> <p>BOP</p> <p>RO</p> <p>Crew</p> <p>BOP</p> <p>SRO</p> <p>BOP</p>	<p>Attempts to trip reactor using 1C04 pushbuttons. Attempts to trip reactor using C01 pushbuttons Directs BOP to deenergize 1B01 and 1B02</p> <p>Deenergizes 1B01. 1B02 will not deenergize</p> <p>Announces entry into CSP-S.1 and begins driving control rods in</p> <p>Directs BOP to trip turbine manually</p> <p>Announces ATWS and contacts AO to go to Unit 1 Rod Drive Room</p> <p>Trips turbine manually, verifies turbine tripped</p> <p>Addresses Fold Out Page</p> <p>Verifies AFW actuation: checks both MDAFW pumps running, checks TDAFW pump running if SG levels <25% [57%]</p> <p>Aligns Charging suction to RWST: Open 1CV-112B, Closes 1CV-112A</p> <p>Establishes Emergency Boration: Establish Max Charging, Start BATP, Open 1CV-350, Emergency Borate Valve</p>

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
SIMULATOR EXERCISE GUIDE (SEG)**

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<u>Event 9: Train 'A' ESF Sequencer fails to actuate</u>	BOP	Actions to start Train 'A' equipment can be initiated after Immediate Actions are taken AND verified. Crew will try to manually actuate SI with no success. Each piece of equipment in Train 'A' will be manually started per CSP-S.1 Attachment A (see next page for event response).

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
SIMULATOR EXERCISE GUIDE (SEG)**

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<p>CSP-S.1 Attachment A</p> <p>Communication: When contacted the PAB AO should report that SW-LW-61 and 62 radwaste SW isolation valves are both shut.</p>	BOP	<p>Verify Safeguards Busses Energized</p> <p>Verify feedwater isolation</p> <p>Verify containment isolation</p> <p>Check SI pumps running-No manually start 'A' pump</p> <p>Check RHR pumps running-No manually start 'A' pump</p> <p>Check only 1 CCW pump running</p> <p>Verify Service Water System alignment. BOP should contact the PAB to check 2 local valves</p> <p>Verify containment accident cooling-No start fans</p> <p>Check CR ventilation in accident mode</p> <p>Check if main steam lines can remain open. -No</p> <p>(CA STEP) Verify containment spray not required – Yes take actions to single up trains</p> <p>(CA STEP) Check 4160 Safeguards Busses BOTH energized by Offsite Power</p>

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
SIMULATOR EXERCISE GUIDE (SEG)**

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<p>When the conditions are stabilized or at discretion of lead instructor/evaluator</p> <p>End the scenario by placing the simulator in freeze</p> <p>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.</p>		<p>Crew:</p> <ul style="list-style-type: none"> • No debrief or critique due to this being an evaluated scenario.

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
SIMULATOR EXERCISE GUIDE (SEG)**

1.0 PLANT CONDITIONS:

	UNIT 1	UNIT 2
Time in core life (MWD/MTU):	7500	14960
Reactor power (%):	28%	100%
Boron concentration (ppm):	1099 ppm	16 ppm
Rod height (CBD @):	CBD @ 167	CBD @ 220

2.0 TECHNICAL SPECIFICATION ACTION CONDITIONS IN EFFECT:

<u>TSAC</u>	<u>Description</u>	<u>Reason</u>
TSAC 3.5.2.A One ECCS train inoperable	A.1 Restore train to OPERABLE status within 72 hours	Seal replacement

3.0 EQUIPMENT OUT OF SERVICE:

- G01 EDG is in day 3 of a planned 5 day maintenance outage.
- 1P-15B Safety Injection Pump is in day 1 of a 2 day planned maintenance outage for seal replacement.

4.0 PLANNED EVOLUTIONS:

- Immediately following turnover you are to shift Main Feed Pumps on Unit 1 for Post Maintenance Testing (PMT) per OP-13A Secondary System Startup Step 5.17. There is an AO standing by and already briefed on the evolution.
- Following the shifting of Main Feed Pumps you are to continue with the load escalation (at 15% per hour) to approximately 47% per OP-1C Startup to Power Operation Unit 1 starting with Step 5.123. TH and PAB AO's have been briefed on their responsibilities per Step 5.122.

5.0 TURNOVER INFORMATION:

- Safety Monitor is Green.
- G02 EDG is aligned to 1A05 and 2A05 4160 Safeguards busses in accordance with OI-35A, Standby Emergency Power Alignment.
- G02, G03 and G04 EDG's are protected equipment.
- 1P-15A Safety Injection Pump is protected equipment.

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
SIMULATOR EXERCISE GUIDE (SEG)

- There are 2 crews of Maintenance folks in working G01 EDG and 1P-15A SI Pump.
- There is a severe thunderstorm watch for the area for the next 4 hours. AOP-13C, Severe Weather Conditions, is in effect.
- Unit 1 rods are in AUTO and Xenon is stable.
- Unit 1 was is in a 28% chemistry hold for sulfates per NP 3.2.3 Secondary Water Chemistry.
- P-41 Common Vacuum Priming Pump is aligned to Unit 1. Waterbox levels are low in the sightglass and the AO's are monitoring them.
- Clock time is **real time** and you have the normal shift complement.

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
SIMULATOR EXERCISE GUIDE (SEG)**

Facility: Point Beach Nuclear Station

Scenario No.: 3

Op-Test No.: 2011301

Examiners: D. McNeil
R. Walton
D. Reeser

Operators:

Initial Conditions: Unit 1 is at 49% reactor power, both trains of Feed and Condensate are running per OP-1C, Startup to Power Operation Unit 1.

Turnover: G01 Emergency Diesel Generator is Out of Service in day 3 of a planned 5 day maintenance outage. G02 Emergency Diesel Generator is aligned to 1A05 and 2A05 in accordance with OI-35A, Standby Emergency Power Alignment. P-38B, MDAFW Pump is Out of Service in day 1 of a planned 2 day outage for seal replacement. The plant is under a severe weather watch for the next 4 hours. AOP-13C, Severe Weather Conditions is in effect. Continued load escalation from 49% power to ~74% power (at 15% per hour) per OP-1C, Startup to Power Operation Unit 1, is scheduled to be performed immediately after shift turnover.

Event No.	Malf. No.	Event Type*	Event Description
1		R-RO N-SRO N-BOP	Normal Up-Power
2		I-RO I-SRO TS-SRO	T _{hot} Instrument TE-401A Fails High
3		C-BOP C-SRO TS-SRO	'A' CCW Pump Shaft Seizes w/Failure of 'B' CCW Pump to Auto Start
4		I-BOP I-SRO TS-SRO	Controlling SG Pressure Channel PT-478 Fails High
5		M-RO M-SRO	Small RCS Leak in 'A' RCS Loop Degrading to Large Break
6		M-ALL	Large Break LOCA
7		I-BOP	Failure of SI to Auto-Actuate
8		C-BOP	Failure of Containment Accident Fan W-1A1 to Auto-Start
9		C-BOP	Failure of SI-852A to Auto-Open

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

**Point Beach Nuclear Plant
SIMULATOR EXERCISE GUIDE (SEG)**

SITE: POINT BEACH

SEG # PBN LOI NRC 007E

SEG TITLE: 2011 ILT NRC EXAM SCENARIO #3

REV. # 0

PROGRAM: INITIAL LICENSE TRAINING

#: PBN LOI TPD

COURSE: N/A

#: N/A

TOTAL TIME: 2.0 HOURS

Point Beach Nuclear Plant
SIMULATOR EXERCISE GUIDE (SEG)

**Related PRA
Information:**

Initiating Event with Core Damage Frequency:

Large LOCA CDF 3.4E-08

Important Components:

Low Head SI 0.4% CDF

Component Cooling Water 2.1% CDF

ESFAS 0.2% CDF

Important Operator Actions with Task Number:

Operator fails to align for LHR

Operator Fails to Start CCW Pumps

**Point Beach Nuclear Plant
SIMULATOR EXERCISE GUIDE (SEG)**

QUANTITATIVE ATTRIBUTES (Use this form for Evaluations only.)

Malfunctions:

Before EOP Entry:

1. 1TE-401A That instrument fails High
2. 1PT-478 Controlling SG Level transmitter fails High
3. Running CCW Pump trips with no Auto start of standby CCW Pump

After EOP Entry:

1. Failure of Safety Injection to Auto initiate
2. Failure of 1W1A1 Accident Fan to Auto start
3. Failure of 1SI-852A to Auto open

Abnormal Events:

1. Small RCS leak

Major Transients:

1. Large Break LOCA

Critical Tasks:

1. **E0-D** **Manually actuate at least one train of SIS-actuated safeguards before transition out of EOP-0**
2. **ES-1.3-A** **Transfer to cold leg recirculation by establishing an ECCS flowpath prior to depleting the RWST (9%)**

**Point Beach Nuclear Plant
SIMULATOR EXERCISE GUIDE (SEG)**

SCENARIO OVERVIEW:

INITIAL CONDITIONS:

1. This scenario can be run from the following Standard (Specific) IC sets:
 - IC-97, created from IC-04
2. The following equipment is OOS:
 - G01 EDG is OOS
 - P-38B MDAFW Pump is OOS
 - P-38A MDAFW Pump, 1P-29 TDAFW Pump, G02, G03, G04 EDG's are protected equipment
 - Red dot on G01 alarm windows C02 D 2-5 and 2-6.
 - Red dot on P-38A OOS alarm windows C01A 2-8 and 2-10.

SEQUENCE OF EVENTS:

Event 1: Normal Up-Power

- Crew raises power 15%/hr per OP-1C Startup to Power Operation

Event 2: TE-401A Thot fails High

- Crew responds to malfunction and places Rods/Charging/Condenser Steam Dumps in manual
- SRO enters AOP-6C Uncontrolled Rod Motion and AOP-24 Response to Instrument Malfunction
- SRO addresses Technical Specifications

Event 3: 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

**Point Beach Nuclear Plant
SIMULATOR EXERCISE GUIDE (SEG)**

Event 4: SG Pressure channel PT-478 fails High

- BOP recognizes failure and takes manual control of MFRV and SG Atmospheric
- SRO enters AOP-24 Instrument Malfunction and may enter AOP-2B Feedwater System Malfunction
- SRO addresses Technical Specifications

Event 5: Small RCS leak in 'A' loop

- Crew identifies and quantifies the RCS leak
- SRO enters AOP-1A Reactor Coolant Leak
- SRO addresses Technical Specifications

Event 6: Large Break LOCA

- Crew recognizes leakage is much worse and plant trips
- SRO enters EOP-0 Reactor Trip or Safety Injection

Event 7: Failure of Safety Injection to Auto Initiate

- Crew recognizes failure and manually initiates SI and CI

Event 8: Failure of 1W-1A1 Accident Fan to Auto start

- BOP recognizes failure and manually starts fan

Event 9: Failure of 1SI-852A to Auto Open

- BOP recognizes failure and manually opens valve

**Point Beach Nuclear Plant
SIMULATOR EXERCISE GUIDE (SEG)**

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<p>INITIAL CONDITIONS: Standard IC-97 from IC-04</p> <p>Unit 1</p> <ul style="list-style-type: none"> • Mode: 1 • Burnup: 800 MWD/MTU • Power: 49% • Boron: 1594 ppm (BOL) • Temperature: NOT • Pressure: NOP • Xenon: Equilibrium • Rods: Bank D @ 188 steps • Generator: ≈145 Mwe <p>Unit 2</p> <ul style="list-style-type: none"> • Mode: 1 • Burnup: 8800 MWD/MTU • Power: 100% • Boron: 696 ppm (EOL) • Temperature: NOT • Pressure: NOP • Xenon: Equilibrium • Rods: Bank D @ 184 steps • Generator: ≈ 530 Mwe 		

**Point Beach Nuclear Plant
SIMULATOR EXERCISE GUIDE (SEG)**

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<p>Event 2: TE-401A That fails High</p> <p>Communications: SM may be requested to contact I&C to troubleshoot and repair TE-401A.</p> <p>Communications: If requested by OS1 inform them OS2 will be preparing the 0-SOP-IC-001 RED to remove 1TE-401A from service.</p>	<p>RO</p> <p>SRO</p> <p>RO</p> <p>RO</p> <p>BOP</p> <p>RO</p>	<p>Recognizes instrument failure for the Red channel Tcold. Recommends placing rods to MANUAL.</p> <p>SRO acknowledged recommendation and alarms. Enter AOP 6C for uncontrolled rod motion.</p> <p>Check rod motion required – take rods to manual (CA STEP) Maintain RCS Tave</p> <p>Check RCS Tave at or trending to program – Crew should discuss current temperature and a plan on how to restore it.</p> <p>Charging may be taken to manual. With the unit at a reduced power program level will be raised to the full power setting based on the circuit selecting auctioneered high Tave.</p> <p>Condenser Steam Dumps may be shifted to steam pressure control mode per Alarm Response Procedure actions. (1C03 1E2 4-2)</p> <p>Check control rods above insertion limits (CA STEP) Verify AFD within limits</p>

**Point Beach Nuclear Plant
SIMULATOR EXERCISE GUIDE (SEG)**

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<p>T-401A, Red Tcold Fails High (cont'd)</p> <p>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.</p> <p>NOTE: Intent is to NOT take the instrument out of service per 0-SOP-IC 001 RED.</p> <p>End of evolution: Proceed to next event at Lead Examiner discretion.</p>	<p>RO</p> <p>SRO</p> <p>SRO</p> <p>SRO</p>	<p>Check rod motion due to instrument failure</p> <p>Enter AOP-24 Response to Instrument Malfunction.</p> <p>Identify failed instrument</p> <p>Check if failed instrument is controlling channel</p> <p>Establish manual control as required</p> <p>Return affected parameters to desired values</p> <p>Using Attachment A verify failed instrument does not affect PPCS RTO</p> <p>Remove failed instrument from service per 0-SOP-IC-001-RED</p> <p>Review Technical Specifications. LCO 3.3.1 Instrumentation Table 3.3.1-1 items 5 and 6.</p> <p>LCO 3.3.2 ESFAS Instrumentation Table 3.3.2-1 item 4d-3.</p>

**Point Beach Nuclear Plant
SIMULATOR EXERCISE GUIDE (SEG)**

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<p>Event 3: Running CCW Pump Shaft Seizure with failure of Standby CCW Pump to Auto start.</p> <p>Communications: If asked, the PAB AO reports the 'A' CCW Pump inboard motor bearing is hot to the touch.</p> <p>Communications: If asked, the PAB AO will report nothing unusual with the 'B' CCW Pump discharge pressure indicator, it reads 125 psig locally.</p> <p>Communications: If asked, the TH AO will report the 'A' CCW Pump breaker has tripped on overcurrent.</p> <p>NOTE: Crew may elect to place 1P-11A in pullout to clear 'Motor Breaker Trip' alarm.</p> <p>End of evolution: Proceed to next event at Lead Examiner discretion.</p>	<p>BOP</p> <p>SRO</p> <p>SRO</p> <p>BOP/RO</p> <p>SRO</p>	<p>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)</p> <p>BOP or RO address ARB's as applicable.</p> <p>Enter AOP 9B CCW malfunction to address the lost CCW Pump. BOP will verify adequate tank level and start 1P-11B CCW Pump.</p> <p>Crew will address surge tank level which will require no action.</p> <p>Crew will address system leakage requiring no action.</p> <p>Chemistry will be requested to analyze CCW.</p> <p>OS1 will ask the SM to call DCS and Emergency Plan.</p> <p>Send AO's out locally to the pump/breaker and discharge pressure indicator to find any problems.</p> <p>Address LCO 3.7.7 CCW and enter 72 hour TSAC 3.7.7.A</p>

**Point Beach Nuclear Plant
SIMULATOR EXERCISE GUIDE (SEG)**

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<p><u>Event 4: SG Pressure channel PT-478 fails High</u></p> <p><u>Communications:</u> SM may be requested to contact I&C to troubleshoot and repair PT-478.</p> <p><u>Communications:</u> If requested by OS1, SM agrees to let Crew take 'B' FRV to auto per ARB guidance by shifting controlling feed flow channels (1C03 1E2 3-5).</p> <p><u>Communications:</u> If requested by OS1 inform them OS2 will be preparing the 0-SOP-IC-001 BLUE to remove 1PT-478 from service.</p> <p><u>NOTE:</u> Crew may enter AOP-2B Feedwater System Malfunction to address feed systems issues. (see next page for actions)</p> <p><u>NOTE:</u> 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.</p>	<p>BOP</p> <p>SRO</p> <p>BOP</p> <p>SRO</p>	<p>Determine PT-478 has failed high and respond to alarms.</p> <p>BOP takes manual control of 'B' MFRV and manually closes 'B' S/S Atmospheric Dump valve.</p> <p>Enter AOP-24 for instrument malfunction.</p> <p>Identify failed instrument</p> <p>Check if failed instrument is controlling</p> <p>Establish manual control as required. – 'B' MFRV to manual and 'B' S/G Atm Stm Dump to manual/closed</p> <p>Return affected parameters to desired values. – 'B' 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. (1C03 1E2 3-5)</p> <p>Using Attachment A determine if PPCS RTO is affected. – RTO not affected.</p> <p>Remove instrument per 0-SOP-IC-001 - BLUE.</p> <p>Intent is to NOT take the instrument out of service per 0-SOP-IC 001 BLUE.</p>

**Point Beach Nuclear Plant
SIMULATOR EXERCISE GUIDE (SEG)**

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<p><u>Event 5: Small RCS leak in 'A' loop RTD Manifold</u></p> <p>The Crew must differentiate between a primary and secondary leak.</p> <p>End of evolution: Proceed to next event at Lead Examiner discretion.</p>	<p>CREW</p> <p>RO</p> <p>SRO</p>	<p>Identifies RMS trends, lowering VCT level and Sump A rising which indicates an RCS leak.</p> <p>Enter AOP 1A RCS leak to stabilize plant parameters.</p> <p>RO controls charging as needed to determine an RCS leak rate.</p> <p>(CA STEP) Check SI not required. Crew should not SI, leak is small.</p> <p>(CA STEP) Check reactor trip not required. Crew should not trip, leak is small.</p> <p>(CA STEP) Check PZR level. RO should take control of charging to restore and maintain Pressurizer level. Letdown isolation should not be needed.</p> <p>Check Pressurizer pressure. RO should have to take no action for this step.</p> <p>Determines LCO 3.4.13 is not met and TSAC 3.4.13.A is entered with 4 hours to reduce leakage.</p>

**Point Beach Nuclear Plant
SIMULATOR EXERCISE GUIDE (SEG)**

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<p>Small RCS leak in 'A' loop RTD Manifold (cont'd)</p> <p><u>Communications:</u> Shift Manager will be asked to notify DCS and implement E-Plan</p> <p><u>NOTE:</u> Steps 7 through 18 are diagnostic and may be performed in any order.</p> <p><u>End of evolution:</u> Proceed to next event at Lead Examiner discretion.</p>	<p>RO</p> <p>SRO</p>	<p>Check make up controls set at desired value</p> <p>OS1 should ask the SM to notify DCS and implement Emergency plan</p> <p><i>Steps 7 through 18 in AOP-1A are diagnostic and can be performed in any order as the SRO determines.</i></p>

**Point Beach Nuclear Plant
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SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<u>Event 6: Large Break LOCA</u>	RO	If there is time determine RCS leak has gotten worse and plant trip is required. Recommend trip of the unit with manual SI/CI per continuous action step 1 of AOP RO should perform EOP 0 immediate actions and verify them with the SRO. RO should perform RNO for step 4 IA's with no SI and Auto signal present – perform manual SI and CI
		CREW	When reviewing foldout page criteria the crew should determine RCP's need to be tripped and adverse containment conditions exist. – SI pump should be manually started with injection verified prior to RCP securing
		SRO	Direct EOP 0 Attachment A to be completed
		RO	Verify secondary heat sink Verify RCP Lab seal D/P

**Point Beach Nuclear Plant
SIMULATOR EXERCISE GUIDE (SEG)**

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<p>Large Break LOCA (cont'd)</p> <p>Communications: STA will be asked to commence monitoring Status Trees, acknowledge request.</p> <p>NOTE: CSP-P.1 will be identified as requiring entry by the STA. Depending on the timing of the notification; the Crew may or may not transition to CSP-P.1. If they do transition prior to transition to EOP 1.3, step 1 of CSP-P.1 sends them back to procedure step in effect.</p>	<p>RO</p> <p>SRO</p> <p>RO</p> <p>SRO</p> <p>BOP</p>	<p>(CA STEP) Verify RCS temperature control. Check PORV's shut. Check Spray valves shut. Check if RCP's should remain running. RCP's should have been secured per foldout page criteria, if not they should be secured here. Start monitoring CSFST's. SRO should direct the STA to perform this function.</p> <p>(CA STEP) Verify containment sump recirc not required. Transition to EOP 1.3 containment sump recirc. Reset SI</p>

**Point Beach Nuclear Plant
SIMULATOR EXERCISE GUIDE (SEG)**

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<p>Large Break LOCA (cont'd)</p> <p>Communication: PAB AO will be contacted to complete Attachment A of EOP 1.3 Transfer to Containment Sump Recirc. Acknowledge request. No follow up report is required because the attachment will not be complete prior to the end of the scenario.</p>	<p>SRO</p> <p>BOP</p> <p>BOP</p> <p>RO</p> <p>BOP</p> <p>RO/BOP</p> <p>BOP</p> <p>RO/BOP</p>	<p>Check RCS break size – stay in EOP 1.3</p> <p>Check if containment sump pH should be adjusted.</p> <p>Check if train A SI flow should be stopped. – stop train A ECCS system– go to step 6</p> <p>(CA STEP) Monitor Core Cooling</p> <p>Direct PAB operator to perform Attachment A</p> <p>Direct unnecessary personnel to evacuate the PAB</p> <p>Check Control Room fans armed</p> <p>Isolate CCW to containment</p> <p>Isolate CCW to NRHX</p> <p>Check SW Pumps 6 running</p> <p>Check SW header a continuous flowpath</p> <p>Establish CCW to RHR HX's</p> <p>Ensure Core Deluge valves are open</p>

**Point Beach Nuclear Plant
SIMULATOR EXERCISE GUIDE (SEG)**

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<p>Large Break LOCA (cont'd)</p> <p>Communication: PAB AO will be contacted to complete step 16.b in EOP 1.3 to locally shut both SI test line return isolation valves. Acknowledge report, wait 2 minutes and then insert trigger 12. Report when valves are shut.</p> <p>Critical Task ES-1.3-A Transfer to cold leg recirculation by establishing an ECCS flowpath prior to depleting the RWST (9%)</p> <p>End of scenario: Lead Evaluator can end evaluation any time after sump recirc line up is established and crew is waiting for RWST level to reach 34%.</p>	<p>RO/BOP</p> <p>SRO</p> <p>BOP</p>	<p>Align SI test lines for recirc</p> <p>Align RHR pump suction valves</p> <p>Check Train A ready for recirculation – yes</p> <p>Check Train B ready for recirculation -yes</p> <p>Check at least 1 train ready for recirculation – yes</p> <p>Note reference for other procedures are now applicable that do not interfere with EOP 1.3</p> <p>Check RWST level \leq 34%</p> <p>NOTE: Crew may have to transition to CSP-P.1 if not done earlier and stop after step 1. The next transition that should occur is 'procedure step in effect' which is EOP-0 Step 14.</p>

**Point Beach Nuclear Plant
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SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<p><u>Event 7:</u> Failure of Safety Injection to Auto Initiate</p> <p><u>Critical Task E0-D</u> Manually actuate at least one train of SIS-actuated safeguards before transition out of EOP-0</p>	BOP	<p>Determine that SI did not auto actuate. Action should be taken during immediate actions step 4 RNO.</p> <p>SI can also be actuated per OM 3.7 which allows taking action if auto actions have failed or attachment A of EOP 0 will actuate SI.</p>
	<p><u>Event 8:</u> Failure of 1W-1A1 Accident Fan to Auto start</p> <p><u>Communication:</u> If an AO is requested to locally check the fan breaker report there is nothing abnormal from the field.</p>	BOP	<p>Determine that 1W-1A1 Accident Fan did not auto start. Action should not be taken to manually start the fan until after immediate actions are completed and verified.</p> <p>This fan can be started per OM 3.7 which allows taking action if auto actions have failed or attachment A of EOP 0 will check this fan in operation.</p>
	<p><u>Event 9:</u> Failure of 1SI-852A to Auto Open</p> <p><u>Communication:</u> If an AO is requested to locally check the valve breaker report there is nothing abnormal from the field.</p>	BOP	<p>Determine that 1SI-852A core deluge did not auto open. Action should not be taken to manually open the valve until after immediate actions are completed and verified.</p> <p>This valve can be opened per OM 3.7 which allows taking action if auto actions have failed or attachment A of EOP 0 or EOP 1.3 Step 15 will check this valve in the proper position.</p>

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SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<p>EOP 0 Attachment A</p> <p><u>Communication:</u> When contacted the PAB AO should report that SW-LW-61 and 62 radwaste SW isolation valves are both shut.</p>	BOP	<p>Verify feedwater isolation.</p> <p>Verify containment isolation</p> <p>Verify AFW actuation.</p> <p>Check SI pumps running.</p> <p>Check RHR pumps running.</p> <p>Check only 1 CCW pump running.</p> <p>Verify Service Water System alignment. BOP should contact the PAB to check 2 local valves.</p> <p>Verify containment accident cooling.</p> <p>Check CR ventilation in accident mode.</p> <p>Check if main steam lines can remain open.</p> <p>Verify proper SI valve alignment.</p>

**Point Beach Nuclear Plant
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SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<p>When the conditions are stabilized or at discretion of lead instructor/evaluator</p> <p>End the scenario by placing the simulator in freeze</p> <p>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.</p>		<p>Crew:</p> <ul style="list-style-type: none"> • No debrief or critique due to this being an evaluated scenario.

**Point Beach Nuclear Plant
SIMULATOR EXERCISE GUIDE (SEG)**

Facility: Point Beach Nuclear Station

Scenario No.: 4

Op-Test No.: 2011301

Examiners: D. McNeil
R. Walton
D. Reeser

Operators: _____

Initial Conditions: Unit 1 is at 100% reactor power per OP-2A, Normal Power Operation.

Turnover: G01 Emergency Diesel Generator is Out of Service in day 3 of a planned 5 day maintenance outage. G02 Emergency Diesel Generator is aligned to 1A05 and 2A05 in accordance with OI-35A, Standby Emergency Power Alignment. P-38B, MDAFW Pump is Out of Service in day 1 of a planned 2 day outage for seal replacement. The plant is under a severe weather watch for the next 4 hours. AOP-13C, Severe Weather Conditions is in effect. Due to planned grid configuration changes, ATC has requested a Unit 1 load reduction to ~92% (<500 MWe). The load reduction (at 15% per hour) per OP-2A, Normal Power Operation Attachment A, Guidelines for Load Changes Less than or equal to 10%, is scheduled to be performed immediately after shift turnover.

Event No.	Malf. No.	Event Type*	Event Description
1		R-RO N-BOP N-SRO	Perform a down-power IAW OP-2A
2		C-BOP C-SRO TS-SRO	Trip of operating Service Water Pump
3		I-RO I-SRO TS-SRO	LT-428, Pressurizer Level Transmitter (controlling channel) fails high
4		C-BOP C-SRO	Loss of Condenser Vacuum
5		M-ALL	Loss of Condenser Vacuum Degrades to Reactor Trip Criteria
6		C-RO	Main Turbine Fails to AUTO & MANUALLY Trip
7		C-BOP	1P-29, Turbine Driven Auxiliary Feedwater Pump Trips on Overspeed
8		C-BOP	P-38A, Motor Driven Auxiliary Feedwater Pump Fails to start
9		M-ALL	Loss of Heat Sink

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

**Point Beach Nuclear Plant
SIMULATOR EXERCISE GUIDE (SEG)**

SITE: POINT BEACH

SEG # PBN LOI NRC 008E

SEG TITLE: 2011 ILT NRC EXAM SCENARIO #4

REV. # 0

PROGRAM: INITIAL LICENSE TRAINING

#: PBN LOI TPD

COURSE: N/A

#: N/A

TOTAL TIME: 2.0 HOURS

**Point Beach Nuclear Plant
SIMULATOR EXERCISE GUIDE (SEG)**

QUANTITATIVE ATTRIBUTES (Use this form for Evaluations only.)

Malfunctions:

Before EOP Entry:

1. Loss of a running Service Water Pump
2. 1LT-428 Controlling Pressurizer Level transmitter fails High

After EOP Entry:

1. Failure of turbine to Auto and Manual trip
2. Failure of P-38A MDAFW Pump to start
3. Overspeed of 1P-29 TDAFW Pump

Abnormal Events:

1. Lowering Main Condenser Vacuum

Major Transients:

1. Loss of Condenser Vacuum
2. Loss of Heat Sink

Critical Tasks:

1. RT-7, When a reactor trip is procedurally called for, initiate a manual reactor trip prior to Main Condenser Vacuum reaching 8 in Hg Abs.
2. FR-H.1 A Restore feedwater flow into at least one steam generator before RCS bleed and feed is required.

**Point Beach Nuclear Plant
SIMULATOR EXERCISE GUIDE (SEG)**

SCENARIO OVERVIEW:

INITIAL CONDITIONS:

1. This scenario can be run from the following Standard (Specific) IC sets:
 - IC-98, created from IC-01
2. The following equipment is OOS:
 - G01 EDG is OOS
 - P-38B MDAFW Pump is OOS
 - P-38A MDAFW Pump, 1P-29 TDAFW Pump, G02, G03, G04 EDG's are protected equipment
 - Red dot on G01 alarm windows C02 D 2-5 and 2-6.
 - Red dot on P-38B OOS alarm windows C01A 2-8 and 2-10.

SEQUENCE OF EVENTS:

Event 1: Normal Down-Power from 100%

- Crew lowers power 15%/hr per OP-2A Normal Power Operation Attachment A

Event 2: Loss of P-32A Service Water Pump

- Crew responds to malfunction and starts additional SW Pump as required
- SRO enters AOP-9A Service Water System Malfunction
- SRO addresses Technical Specifications

Event 3: Pressurizer LT-428 fails High

- Crew recognizes failure and manually takes control of the plant
- SRO Enters AOP-24 Response to Instrument Malfunction
- SRO Addresses Technical Specifications

Event 4: Lowering Main Condenser Vacuum

- Crew recognizes failure and takes actions to restore vacuum
- SRO enters AOP-5A Loss of Main Condenser Vacuum

**Point Beach Nuclear Plant
SIMULATOR EXERCISE GUIDE (SEG)**

Event 5: Loss of Main Condenser Vacuum requiring plant trip

- Crew identifies they cannot control vacuum and trips the unit

Event 6: Turbine fails to Auto and Manual trip

- RO recognizes failure and takes action per EOP-0 Step 2 RNO

Event 7: 1P-29 TDAFW Pump Overspeed trip

- RO or BOP recognize the failure and reports to SRO

Event 8: P-38A MDAFW Pump fails to start

- BOP recognizes failure and manually attempts a start

Event 9: Loss of Heat Sink

- SRO recognizes Loss of Heat Sink and enters CSP-H.1 Loss of Heat Sink Unit 1

**Point Beach Nuclear Plant
SIMULATOR EXERCISE GUIDE (SEG)**

NOTE: Table may be modified as needed to include all scenario time-line items

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<p>INITIAL CONDITIONS: Standard IC-98 from IC-01</p> <p>Unit 1</p> <ul style="list-style-type: none"> • Mode: 1 • Burnup: 400 MWD/MTU • Power: 100% • Boron: 1447 ppm (BOL) • Temperature: NOT • Pressure: NOP • Xenon: Equilibrium • Rods: Bank D @ 220 steps • Generator: ≈530 Mwe <p>Unit 2</p> <ul style="list-style-type: none"> • Mode: 1 • Burnup: 14960 MWD/MTU • Power: 100% • Boron: 16 ppm (EOL) • Temperature: NOT • Pressure: NOP • Xenon: Equilibrium • Rods: Bank D @ 220 steps • Generator: ≈ 530 Mwe 		

**Point Beach Nuclear Plant
SIMULATOR EXERCISE GUIDE (SEG)**

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<p>Event 1: Normal downpower from 100% per OP-2A</p> <p>Communication: When notified, System Control Power System Supervisor acknowledges report of downpower.</p> <p>Communication: If asked, SM prefers you remain on one letdown orifice.</p> <p>Communication: When notified, the Auxiliary Operators Acknowledge the downpower and the PAB AO understands the requirement to monitor S/G blowdown.</p> <p>End of evolution: Proceed to next event at Lead Examiner discretion.</p>	<p>SRO</p> <p>RO/BOP</p> <p>BOP</p> <p>CREW</p>	<p>Crew will brief the down power and reactivity control requirements prior to taking any actions.</p> <p>Record pre-load reduction information in OP 2A Attachment A.</p> <p>An additional letdown orifice may be placed in service.</p> <p>Crew may elect to start 1P-99A and B SGFP Seal Water Injection Pumps.</p> <p>Lower plant load per OP-2A Attachment A and the pre-job briefing.</p> <p>Monitor the plant during the down power and subsequent stabilization.</p>

**Point Beach Nuclear Plant
SIMULATOR EXERCISE GUIDE (SEG)**

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<p>Event 2: Loss of P-32A Service Water Pump</p> <p>Note: Preferred SW Header pressure is 50-65 psig per OI-70. Pressure should be controlled between 50-90 psig.</p> <p>Note: Unit 2 CO may be asked to obtain values on YR-5832.</p> <p>Communication: If TH AO asked, the P32-A SW pump motor is hot to the touch and the breaker is tripped on overcurrent.</p> <p>Communication: If TH AO is dispatched to look at the diesel low flow alarm, inform control room <695 gpm (alarm setpoint) if alarm is in or >695 if alarm is clear.</p> <p>Note: Low SW Header Pressure Alarm is currently clear, but SRO and BOP should recognize that the alarm was the reason AOP was entered and enter RNO column to ensure proper actions were taken.</p> <p>Communication: If TH AO requested, insert trigger 12 to shut SW-10 and report valve shut.</p>	<p>BOP</p> <p>SRO</p> <p>RO/BOP</p> <p>SRO</p> <p>BOP</p> <p>SRO</p>	<p>Announces pump trip and refers to ARB C01 A 3-5 for Low Service Water Header Pressure. May recommend starting an additional SW pump.</p> <p>Acknowledges alarms/concurs with starting additional SW pump. Enters AOP-9A, Service Water Malfunction.</p> <p>Checks Forebay Level > -11 Ft. Checks Pumpbay Level > -11Ft. Checks Annunciator for Screen DP – Clear. Check SW Header Pressure Low Alarm – Clear.</p> <p>Start additional SW pumps to maintain header pressure (likely already done). Place P-32A in Pullout IAW Step 4.d RNO.</p> <p>Direct AO to Shut SW-10, P-32A Discharge Valve. Proceed to Step 9.</p> <p>Notify DCS and address TSACs (listed next page). Request SM check Emergency Plan.</p>

Point Beach Nuclear Plant
SIMULATOR EXERCISE GUIDE (SEG)

SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<p>Event 2: Loss of P-32A Service Water Pump (cont'd)</p> <p>Communication: If TH AO asked, report that RK 31 and 32 have power available.</p> <p>NOTE: Alarm is now clear and crew should proceed to step 5</p> <p>Communication: If TH AO asked to walk down the SW system, report back nothing abnormal has been found.</p> <p>End of evolution: Proceed to next event at Lead Examiner discretion.</p>	<p>BOP</p> <p>SRO</p> <p>BOP</p> <p>Crew</p> <p>SRO</p>	<p>Check Supply Header Integrity – Satisfactory. Check Zurn Strainer Power and Alarms. Ensure SW header valves – Open. Check Component Alarms – Clear. Return to Step 1 of AOP-9A.</p> <p>Check Forebay Level. Check Pumpbay Level.</p> <p>Check Screen Alarm Clear. Check Header Alarm Clear. Check Zurn Strainers – Normal. Check Component Alarms – Clear.</p> <p>Check SW System – Intact. Return to Procedure in effect, exit AOP-9A.</p> <p>Addresses Tech Specs for failure. TSAC 3.7.8.A for BOTH units with 1 SW pump inoperable.</p>

**Point Beach Nuclear Plant
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SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<p>Event 3: Pressurizer Level Transmitter LT-428 fails high</p> <p>NOTE: IF asked for guidance, the Shift Manager will state OS2 will prepare the required paperwork per 0-SOP-IC-001 BLUE to remove LT-428 from service. Prompt OS1 to complete additional actions while OS2 prepares the paperwork.</p> <p>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.</p>	<p>RO</p> <p>RO/BOP</p> <p>SRO</p> <p>RO</p>	<p>Acknowledges PZR High/Lo Level alarm and informs Crew. RO recommends going to manual on charging. Also due to level deviation manual control of PZR pressure may have to take place.</p> <p>RO/BOP address the ARB's for alarms associated with the PZR Level failure.</p> <p>Directs entry into AOP-24 Instrument Failure.</p> <p>AOP 24 action:</p> <p>Identify failed instrument.</p> <p>Check if failed instrument is controlling, the RO should determine LT-428 is controlling.</p> <p>Establish manual control as desired. RO takes manual control of charging.</p> <p>Return affected parameters to normal.</p> <p>Determine if failed instrument affects RTO, which LT-428 does not.</p> <p>Remove instrument from service per 0-SOP-IC-001</p>

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SCENARIO TIME-LINE:

SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<p>Event 4: Lowering Main Condenser Vacuum</p> <p>Communication: If asked, wait 2 minutes then report local air ejector air flow electronic and manometer are both reading at their high limit of 25 SCFM.</p> <p>Communication: If asked to perform Attachment A, wait 3 minutes and have the TH AO report second set of air ejectors are lined up.</p> <p>NOTE: Vacuum malfunction can be slowed or lessened to show vacuum is stable or recovering after the second set of air ejectors is lined up.</p> <p>Communication: If asked, the Shift manager will not recommend placing the priming air ejector in service.</p> <p>Communication: If asked, Shift manager can report he will contact the DCS, PSS, NRC Resident and the Duty Regulatory Services Person.</p> <p>NOTE: Crew may elect to trip the unit when vacuum goes off scale low on the narrow range meters.</p>	<p>BOP</p> <p>SRO</p> <p>RO</p> <p>CREW</p> <p>BOP</p> <p>SRO</p> <p>CREW</p>	<p>Identify that vacuum is lowering in the Main Condenser. Address Low Vacuum alarm when it comes in.</p> <p>Enter AOP 5A for lowering Vacuum.</p> <p>Maintain RCS Tave.</p> <p>Check condenser pressure within limits. - Crew should determine if continued plant operation is allowed and set a limit for when the plant should be taken off line.</p> <p>Check for excessive air in-leakage. - AO should be dispatched to get the local readings.</p> <p>Place all available air ejectors in service. – AO should be dispatched to align second set of air ejectors.</p> <p>Check if Priming Air ejector should be used. – SRO should determine this is not required.</p> <p>Notify DCS, PSS, Regulatory Service Duty Person, and NRC Resident.</p> <p>Reduce Load as necessary per AOP-17A.</p>

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	<p>Event 5: Loss of Main Condenser Vacuum requiring trip</p> <p>NOTE: Adjust the vacuum leak to maximum after the reactor trips.</p> <p>CRITICAL TASK: RT-7 - When a reactor trip is procedurally called for, initiate a manual reactor trip prior to Main Condenser Vacuum reaching 8 in Hg Abs</p> <p>NOTE: Attachment A of EOP-0 will be handed off and the next step will transition Crew to CSP-H.1 at which point a new Attachment A will be completed. Attachment A of EOP-0 will not be performed.</p>	<p>Crew</p> <p>SRO RO</p> <p>Crew SRO</p>	<p>Excessive air in-leakage will cause the backpressure in the condenser to violate the operating curve in AOP-5A thus requiring a plant trip.</p> <p>Enter EOP 0 after reactor trip</p> <p>Verify Reactor Tripped</p> <p>Verify Turbine Tripped (See event 6)</p> <p>Verify Safeguards Busses Energized</p> <p>Check if SI is actuated</p> <p>Verify Foldout Page</p> <p>Verify Automatic Actions per Attachment A.</p>
	<p>Event 6: Main Turbine fails to Auto and Manual trip</p>	<p>RO</p>	<p>Determines the Turbine did not trip.</p> <p>Depress the manual trip button</p> <p>Manually runback the turbine</p> <p>Place the EH Pumps to pullout</p> <p>If turbine still not tripped, then shut both MSIV's</p>

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	<p><u>Event 7:</u> 1P-29 TDAFW Pump fails on Overspeed</p> <p><u>Communication:</u> If TH AO contacted, wait 2 minutes and report the 1P-29 TDAFW Pump Overspeed linkage is broken and on the floor in pieces.</p>	Crew	Crew should notice failure of 1P-29 TDAFW Pump and send an AO to look at resetting pump.
	<p><u>Event 8:</u> P-38A MDAFW Pump fails to start</p> <p><u>Communication:</u> If the TH AO is contacted to look at the pump and/or breaker, wait 2 minutes and report everything appears normal.</p>	BOP	Crew should try to start P-38A and then send an AO to investigate cause of failure.

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SCENARIO TIME-LINE:

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	<p><u>Event 9: Loss of Heat Sink</u></p> <p><u>NOTE:</u> Crew should recognize the need to shift Condenser Steam Dumps to pressure control mode after going to natural circulation.</p> <p><u>NOTE:</u> Crew should determine there is a Heat Sink as long as they have water in the S/G(s) with RCS loop ΔT.</p> <p><u>Communication:</u> When asked, TH AO will acknowledge task to perform CSP-H.1 Attachment B.</p>	<p>Crew</p> <p>BOP</p> <p>RO</p>	<p>Verify Secondary Heat Sink Available – Crew should determine that Heat Sink is NOT available and transition to CSP-H.1.</p> <p>BOP to perform Attachment A per foldout page</p> <p>Check if Secondary Heat Sink is Required – YES</p> <p>Check if RCS Bleed and Feed is required – NO</p> <p>Verify S/G B/D and Sample isolation</p> <p>Check CR for AFW failure</p> <p>Check total Feed Flow >200 gpm – NO</p> <p>Dispatch AO to perform Attachment B</p> <p>Stop BOTH RCP's</p> <p>Check Condensate Pumps – Running</p> <p>(CA Step) Maintain Hotwell Level</p> <p>Check piping INTACT</p> <p>Establish Feedwater flow path</p>

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	<p>CSP-H.1 Attachment A</p> <p>Unit 2 will enter TSAC 3.7.8.F when SW-2907 and 2908 are opened.</p> <p>Communication: When contacted the PAB AO should report that SW-LW-61 and 62 radwaste SW isolation valves are both shut.</p>	BOP	<p>Check Safeguards Busses Energized</p> <p>Verify feedwater isolation</p> <p>Verify containment isolation</p> <p>Check SI pumps running</p> <p>Check RHR pumps running</p> <p>Check only 1 CCW pump running</p> <p>Verify Service Water System alignment. BOP should contact the PAB to check 2 local valves</p> <p>Verify containment accident cooling</p> <p>Check CR ventilation in accident mode</p> <p>Check if main steam lines can remain open</p> <p>(CA STEP) Verify containment spray not required.</p> <p>(CA STEP) Check 4160 Safeguards busses Both Energized by Offsite Power</p>

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	<p>When the conditions are stabilized or at discretion of lead instructor/evaluator</p> <p>End the scenario by placing the simulator in freeze</p> <p>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.</p>		<p>Crew:</p> <ul style="list-style-type: none"> • No debrief or critique due to this being an evaluated scenario.

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1.0 PLANT CONDITIONS:

	UNIT 1	UNIT 2
Time in core life (MWD/MTU):	400	14960
Reactor power (%):	100%	100%
Boron concentration (ppm):	1447 ppm	16 ppm
Rod height (CBD @):	CBD @ 220	CBD @ 220

2.0 TECHNICAL SPECIFICATION ACTION CONDITIONS IN EFFECT:

<u>TSAC</u>	<u>Description</u>	<u>Reason</u>
TSAC 3.7.5.C One motor driven AFW pump system is inoperable in Mode 1, 2 or 3.	C.1 Restore motor driven AFW pump system to OPERABLE status within 7 days <u>AND</u> 10 days of discovery of failure to meet LCO	Seal replacement

3.0 EQUIPMENT OUT OF SERVICE:

- G01 EDG is in day 3 of a planned 5 day maintenance outage.
- P-38B MDAFW Pump is in day 1 of a 2 day planned maintenance outage for seal replacement.

4.0 PLANNED EVOLUTIONS:

Due to planned grid configuration changes, ATC has requested a Unit 1 load reduction to ~92% (<500 MWe). The load reduction (at 15% per hour) IAW OP-2A, Normal Power Operation, Attachment A, Guidelines for Load Changes Less Than or Equal to 10%, is scheduled to be performed immediately after shift turnover.

5.0 TURNOVER INFORMATION:

- Safety Monitor is Green.
- G02 EDG is aligned to 1A05 and 2A05 4160 Safeguards busses per OI-35A, Standby Emergency Power Alignment.
- G02, G03 and G04 EDG's are protected equipment.
- There are 2 crews of Maintenance folks in working G01 EDG and P-38B MDAFW Pump.
- P-38A MDAFW Pump is protected equipment.
- 1P-29 TDAFW Pump is protected equipment.

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- The plant is under severe thunderstorm watch for the next 4 hours. AOP-13C, Severe Weather Conditions, is in effect.
- Clock time is **real time** and you have the normal shift complement.