

Facility: **Point Beach**

Scenario No.: **1**

OP-Test No.: **2003301**

Examiners: _____

Operators: _____

Initial Conditions: Unit 1 is at 100% Power, MOL, equilibrium xenon conditions. Unit 2 is at 100% Power.

Turnover: G-02 EDG is out of service for annual maintenance. It was taken OOS 2 days ago, and is expected to be returned to service in 3 days. G-01 EDG is aligned to 4.16 kV buses 1A-05 and 2A-05 IAW OI-35A.

1P-2C Charging Pump is out of service due to a failed motor bearing. The failure occurred 16 hours ago and has been tagged out for repair.

1P-15A Safety Injection Pump has just been tagged out (4 hours ago) due to high vibration that was identified during In-service Testing. The pump is not available.

Today is Sunday, present clock time is real time. A normal shift complement is available with exception of the 3rd SRO. An RP Tech is on-site along with two mechanics who are working on the diesel. A maintenance crew has just been called in for 1P-15A.

The objective of the shift is to maintain stable plant conditions.

Event No.	Malf. No.	Event Type*	Event Description
1		C – BOP SRO	Service Water Pump Trip.
2		I – RO SRO	Controlling Pressurizer Pressure channel PT-431 fails high.
3		C – RO SRO	1P-2A Charging Pump belt failure.
4		I – All	Turbine First Stage Pressure Transmitter PT-485 fails low.
5		M – All	RCS Leak develops to SBLOCA, requiring reactor trip.
6		C – All	Reactor trip breakers fail to open – (ATWS).
7		C – BOP SRO	Safety Injection Pump 1P-15B fails to start.

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

DYNAMIC EXAM SCENARIO ID#: SES-2003301: #1

SIMULATOR SHIFT TURNOVER:

Per Scenario Outline.

SIMULATOR SCENARIO SET UP

STEP COUNTERS ON	_____
INIT into IC	_____
PBF-6802, Communicator Telephone Log, available	_____
PBF-6801, Simulator Setup Checklist, completed	_____
PBF-6806, Simulator Book Preparation Checklist, completed	_____
PBF-6807, Simulator Scenario Briefing Sheet, completed	_____
TI 9.0 Attachment 1 (Part 1), PBNP Simulator Security Checklist, completed	_____

POINT BEACH NUCLEAR PLANT
TRAINING SIMULATOR EXAM SCENARIO

Revision 0 DRAFT

SCENARIO GUIDE:

1. Initialize to a Unit 1 100% Power IC or saved specific SES IC.
2. Ensure SI Pump 1P-15A control switch is in pullout, suction valve 1SI-896A is shut , and 1SI-866A is shut. Place a danger tag on all components.
3. Ensure Charging Pump 1P-2C control switch is in pullout (1P-2A and 1P-2B should be running with 1P-2A in Automatic). Balance charging/letdown flows as necessary. Place a danger tag on control switch for 1P-2C.
4. Ensure G-01 EDG is aligned to 1A05 and 2A05.
5. Ensure G-02 Mode Selector switch is in Local. Place Danger Tags on the G-02 Mode Selector switch, breaker 1A52-66 control switch, and breaker 2A52-67 control switch. C02 alarms will have to be acknowledged after going to RUN.
6. Preload (or verify preloaded) the following simulator codes:

Initiation Cue	Action or Component Description	Action Tagname	Malf. Value	Ramp Time	Delay Time	Trigger		Verification Performed	
						Event Criteria	Oper. Init. #	Ready	Inserted
PRELOAD	1-SI-896A, SI PUMP SUCTION ISOL (FAIL CONTRL FUSE)	VLV1SIS046	1	-	-	-	-		
PRELOAD	1-SI-866A, 1P15A DISCH STOP CHECK (FAIL CNTRL FUSE)	VLV1SIS035	1	-	-	-	-		
PRELOAD	1B-5220A P-2C CHARGING PUMP CKTBKR (FAIL CNTRL FUSE)	BKR1CVC007	6	-	-	-	-		
PRELOAD	1-EP-1A5259R 1-A05 BKR 59 RACKOUT, 1P15A (RACKOUT)	LOA1EPS102	RACKOUT	-	-	-	-		
PRELOAD	0-P32B SERVICE WATER PUMP B HEAD CAPACITY	PMP1SWS002 C	90	-	-	-	-		

POINT BEACH NUCLEAR PLANT
TRAINING SIMULATOR EXAM SCENARIO

Revision 0 DRAFT

Initiation Cue	Action or Component Description	Action Tagname	Malfunction Value	Ramp Time	Delay Time	Trigger		Verification Performed	
						Event Criteria	Oper. Init. #	Ready	Inserted
PRELOAD	1-A52-02 STA SERV TRANS NO 1-X11 NORMAL (FAIL AS IS)	BKR1EPS002	5	-	-	-	-		
PRELOAD	1-A5215 STA SERV TRANS NO 1-X12 SUPPLY (FAIL AS IS)	BKR1EPS003	5	-	-	-	-		
PRELOAD	1-B5204B 480V BUS 1-B01 NORMAL FEED (FAIL AS IS)	BKR1EPS023	5	-	-	-	-		
PRELOAD	1-B5205B 480V BUS 1-B02 NORMAL FEED (FAIL AS IS)	BKR1EPS024	5	-	-	-	-		
PRELOAD	REACTOR TRIP BREAKER 52/RTA FAILURE (FAILS TO OPEN)	MAL1PPL001A	3	-	-	-	-		
PRELOAD	REACTOR TRIP BREAKER 52/RTB FAILURE (FAILS TO OPEN)	MAL1PPL001B	3	-	-	-	-		
PRELOAD	1-A5265 P-15B SAFETY INJ PUMP CKTBKR (FAIL AUTO CLOSE)	BKR1SIS002	4	-	-	-	-		

POINT BEACH NUCLEAR PLANT
TRAINING SIMULATOR EXAM SCENARIO

Revision 0 DRAFT

The following events will be entered when requested by the lead examiner.

Initiation Cue	Action or Component Description	Action Tagname	Malfunction Value	Ramp Time	Delay Time	Trigger		Verification Performed	
						Event Criteria	Oper. Init. #	Ready	Inserted
EVENT 1: SERVICE WATER PUMP TRIP									
PLE	1-B5210C P-32A SERVICE WATER PUMP (TRIP)	BKR1SWS001	1		-	-	1		
EVENT 2: CONTROLLING PRESSURIZER PRESSURE CHANNEL PT-431 FAILS HIGH.									
PLE	1-PT431 PRZR PRESSURE FIXED OUTPUT (HIGH)	XMT1RCS019A	2500	00:00:30 30 Sec.	0	0	2		
EVENT 3: CHARGING PUMP, 1P-2A BELT FAILURE.									
PLE	1P-2A CHARGING PUMP NO 1-P2A FLOW CAPACITY	PMP1CVC004C	0	-	-	-	3		
EVENT 4: TURBINE FIRST STAGE PRESSURE TRANSMITTER, 1PT-485 FAILS LOW.									
PLE	1-PT-485 FIRST STAGE PRESSURE XMTR FIXED OUTPUT (LOW)	XMT1MSS008A	0	00:00:30 30 Sec.	0	0	4		
EVENT 5: RCS LEAK DEVELOPS TO SBLOCA, REQUIRING REACTOR TRIP									
PLE	RCS LEAK LOOP B INT LEG	MAL1RCS002F	25	00:20:00 1200 Sec	-	-	5		

POINT BEACH NUCLEAR PLANT
TRAINING SIMULATOR EXAM SCENARIO

Revision 0 DRAFT

Initiation Cue	Action or Component Description	Action Tagname	Malfunction Value	Ramp Time	Delay Time	Trigger		Verification Performed	
						Event Criteria	Operator Init. #	Ready	Inserted
EVENT 6: REACTOR TRIP BREAKERS FAIL TO OPEN - ATWS									
WHEN directed by Crew, THEN	REACTOR TRIP BREAKER 52/RTA FAILURE (FAILS TO OPEN)	MAL1PPL001A	DELETE	-	-	-	-		
WHEN directed by Crew, THEN	REACTOR TRIP BREAKER 52/RTB FAILURE (FAILS TO OPEN)	MAL1PPL001B	DELETE	-	-	-	-		

ANTICIPATED BOOTH COMMUNICATION/GUIDANCE:

Event 1: This event is a failure of Service Water Pump P-32A. Following the SW Pump trip, the AO will be directed to check out P-32A in the Pump House. You will report, if asked, that the motor is very hot to the touch. There are no other signs of damage. If an AO is sent to the breaker, it has tripped on over-current. If asked to check out the Service Water Pump that was started, report back that it appears to be running fine. An AO will also be asked to check power to the Zurn strainers during AOP-9A implementation. Report back that power is available.

Event 2: This event is a failure of the controlling Pressurizer Pressure channel, PT-431. Following the failure of PT-431, the Instructor SM will field crew requests for I&C, STA, and DCS support. There are no anticipated booth communications.

Event 3: This event is a failure (belt shredding) of Charging Pump 1P-2A. If an AO is sent to inspect the pump, inform the crew that the belt is completely destroyed and is lying in pieces on the floor (motor running, pump is not).

Event 4: This event is a failure of Turbine First Stage Pressure Transmitter, 1PT-485. There are no anticipated communications. This event will immediately transition to the next event (RCS leak) after control rods are placed in Manual.

Event 5: This event is an RCS leak inside Containment, eventually reaching the point where a Reactor Trip is required due to lowering Pressurizer level. There are no anticipated communications.

Event 6, 7: When a Reactor Trip is directed (Event 5), all attempts to trip the reactor will fail. This results in transition to CSP-S.1. The Instructor SM will act as the STA to monitor Status Trees. The crew will request an AO to locally open the Reactor Trip Breakers. After sufficient time has elapsed (2-3minutes), then delete the two malfunctions referenced for Event 6 and report back that the breakers are open. Requests will also be made for the status of valves SW-LW-61&62. It should be reported that both valves are shut. Requests for any maintenance support, review of the E-plan, etc. will be fielded by the Instructor SM.

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Event Description: **P-32A Service Water Pump Trips on overload**

Time	Position	Applicant's Actions or Behavior
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At discretion of Lead Examiner, activate Trigger 1.

	BOP	<p>Acknowledges/responds to receipt of annunciators C01 A 3-5 and B 3-4. (Additional low EDG cooling flow alarms will be received on C02)</p> <ul style="list-style-type: none">- Identify P-32A has tripped (white light lit above control switch)- Recognize SW header pressure has dropped.- Reference Alarm Response Book- Notify DOS- Carry out actions of AOP-9A as directed by the DOS. <p>Note: The BOP Operator may start an additional service water pump immediately upon recognizing that P-32A has tripped and Service Water Header pressure is low. Referencing of the ARB and AOP entry are expected for verification of these actions.</p>
	DOS	Entry into AOP-9A, "Service Water System Malfunction" based on ARB C01 A 3-5.
	DOS/BOP	Check Forebay Level > -11 feet on PPCS (points 1/2LT-3586B) or recorder YR-5832.
	DOS/BOP	Check Pumpbay Level > -11 feet on PPCS (points 1/2LT-3586A) or recorder YR-5832.
	DOS/BOP	Check Traveling Screen Differential Level High Alarm clear (C01 A 4-5)

Op-Test No: 2003301 Scenario No: 1 Event No: 1 Page 9 of 56

Event Description: **P-32A Service Water Pump Trips on overload**

Time	Position	Applicant's Actions or Behavior
	DOS/BOP	<p>Check Service Water header Pressure Alarm clear (C01A 3-5) – DOS should answer this question as “NO” even if alarm is now clear (additional pump may have been already started) in order to verify proper operator response actions.</p> <ul style="list-style-type: none">- Start a non-running SW pump to restore SW header pressure between 50 –90 psig (if a service water pump has already been started, then this step is merely verification of the action).- DOS proceeds to step 9 of AOP-9A
	DOS	<p>Requests SM make notification to DCS, implement the Emergency Plan, and enter applicable TS Action Conditions.(Note: the Instructor SM will ask the DOS to assess TS when time permits).</p> <ul style="list-style-type: none">- Properly assesses LCO 3.7.8 LCO is not met.- Condition A and Required Action A.1 of LCO 3.7.8 are applicable (with one SW pump inoperable, there is a completion time of 7 days AND 14 days from discovery of failure to meet the LCO). Applies to both units.
	DOS/BOP	<p>Check supply header integrity</p> <ul style="list-style-type: none">- North and south header pressures approximately equal- C01 A 3-5 Alarm clear- Area sump alarms clear
	DOS/BOP	<p>Check Zurn Strainer</p> <ul style="list-style-type: none">- Power available- Strainer High DP alarms clear

Op-Test No: 2003301 Scenario No: 1 Event No: 1 Page 10 of 56

Event Description: **P-32A Service Water Pump Trips on overload**

Time	Position	Applicant's Actions or Behavior
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	DOS/BOP	Verify Service Water Header Valves Open - SW-2890, 2891, 2869, 2870
	DOS/BOP	Check Component Alarms Clear – high temperature, low flow.
	DOS	Returns to step 1 of AOP-9A Loops through the same procedure steps as above, except this time around, service water header pressure is OK and eventually exits AOP-9A at step 8.
	DOS/BOP	At DOS discretion, the control switch for P-32A may be placed in pullout to clear the Motor Breaker Trip annunciator.
At the discretion of the lead examiner, proceed to the next event.		

Op-Test No: 2003301 Scenario No: 1 Event No: 2 Page 11 of 56

Event Description: **Pressurizer Pressure Channel (PT-431) fails high which causes Pressurizer Spray valves to open and RCS pressure to lower.**

Time	Position	Applicant's Actions or Behavior
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	RO	<p>Acknowledge and respond to receipt of annunciator ARB 1C04 1C 1-2, "Pressurizer PRESSURE HIGH or LOW" and ARB 1C04 1C 3-2, "Pressurizer High Pressure Channel Alert"</p> <p>Operator Actions:</p> <ul style="list-style-type: none"> - Check for associated alarms. - Check whether pressure is high or low (Identify Failed Instrument). - Take manual control of pressurizer control system and close the Pressurizer Spray valves. (Manual control of the Pressurizer Spray valves is established by placing the Master Pressurizer Pressure Controller in Manual; or placing the individual Pressurizer Spray Valve controllers in Manual; or placing the override switches for each spray valve to Closed.)
	DOS	Direct entry into AOP-24, "Response to Instrument Malfunctions".
	RO	Identify Failed Instrument – PT-431 (PZR Pressure Blue Channel)
	RO	Check if failed instrument is a controlling channel – PT-431 is a controlling channel for Pressurizer Pressure Control.
	RO	Establish Manual Control – If not previously performed, manual control of the Pressurizer Spray valves is established via the individual controllers OR the Master Pressurizer Pressure Controller OR the Override switches – the spray valves are shut manually.
	RO/DOS	<p>Return Affected Parameter(s) to desired value(s).</p> <ul style="list-style-type: none"> - Energize back-up heaters to restore plant pressure to 2235 psig. - Manual control of pressurizer spray is required if needed.

Op-Test No: 2003301 Scenario No: 1 Event No: 2 Page 12 of 56

Event Description: **Pressurizer Pressure Channel (PT-431) fails high which causes Pressurizer Spray valves to open and RCS pressure to lower.**

Time	Position	Applicant's Actions or Behavior
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	DOS	<p>Direct entry into 0-SOP-IC-001, "Routine Maintenance Procedure Removal of Safeguards or Protection Sensor from Service".</p> <ul style="list-style-type: none">- Obtain and implement 0-SOP-IC-001- Review precautions and limitations- Identify applicable Technical Specifications (reference 0-SOP-IC-002):- Table 3.3.1-1 Items 5, 7a & 7b- Table 3.3.2-1 Items 1d, 3c, 4d-2, 4e-2, 5c, 6c & 8- Table 3.3.5-1 Item 2<ul style="list-style-type: none">- Channel required to be placed in trip within 1 hour- Table 3.3.3-1 Item 5c<ul style="list-style-type: none">- LCO met due to only 2 channels required- Conduct pre-job brief for removing PT-431 from service<ul style="list-style-type: none">- Note: PT-429 will be the controlling channel after removal of PT-431 from service.- Obtain DSS permission to remove channel from service- Direct 0-SOP-IC-001 Attachment A for PT-431 removal from service
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Op-Test No: 2003301 Scenario No: 1 Event No: 2 Page 13 of 56

Event Description: **Pressurizer Pressure Channel (PT-431) fails high which causes Pressurizer Spray valves to open and RCS pressure to lower.**

Time	Position	Applicant's Actions or Behavior
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	RO/BOP/DOS	<p>Perform actions as directed by DOS from Attachment A for PT-431 removal.</p> <ul style="list-style-type: none">- Place RC-430 and 431C (PZR PORVs) in the close position (RO)- Place HC-431K (pressurizer pressure controller) in MANUAL (RO)- Place pressurizer pressure defeat switch in DEFEAT BLUE inside C-110 (BOP)- Place HC-431K in AUTO, unless directed otherwise by DSS (RO)- Place RC-430 and 431C in AUTO, unless directed otherwise by DSS (RO)- Place the following bistables to TRIP inside C-116: (BOP)- Verify alarms and trip status lights are proper (RO)<ol style="list-style-type: none">1. High Pressure Trip2. Low Pressure Trip3. Safety Injection4. Unblock Safety Injection5. Over-temperature Trip6. Over-temperature Rod Stop- Remove PT-431 from scan (BOP)
	DOS	<p>Inform DSS PT-431 removed from service and that DCS and STA notifications need to be made.</p>
	DOS/RO	<p>Return controls to automatic if desired.</p> <ul style="list-style-type: none">- any Pressurizer Heaters turned on manually may be returned to Auto at this time unless needed.

Op-Test No: 2003301 Scenario No: 1 Event No: 2 Page 14 of 56

Event Description: **Pressurizer Pressure Channel (PT-431) fails high which causes Pressurizer Spray valves to open and RCS pressure to lower.**

Time	Position	Applicant's Actions or Behavior
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	DOS	Check failure for Technical Specification or TRM applicability. (Tech Specs impacted by this failure are listed on previous page).
	DOS	Exit AOP-24
Proceed to next event at the Lead Examiner's discretion.		

Op-Test No: 2003301 Scenario No: 1 Event No: 3 Page 15 of 56

Event Description: **Charging Pump 1P-2A belt fails causing pump flow to decrease to zero.**

Time	Position	Applicant's Actions or Behavior
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	RO	Acknowledge and respond to receipt of annunciator ARB 1C04 1C 1-8, "Charging Pump Speed Control Limit HIGH or LOW" and ARB 1C03 1D 2-1, "1P-1A or B RCP Labyr Seal ΔP LOW" Operator Actions: <ul style="list-style-type: none">- Check for associated alarms.- Check charging pump/flow indications.- Attempt manual control of charging pump speed to determine which pump is affected- Adjust charging pump 1P-2B speed to restore parameters
	DOS	Direct entry into AOP-1D, "Chemical and Volume Control System Malfunction".
	DOS/RO	Review foldout page criteria
	DOS/RO	Check for Charging Pump Malfunction – 1P-2A not operating properly. <ul style="list-style-type: none">- 1P-2A should be secured following local report of belt failure
	DOS/RO	Check any Charging Pump Running – 1P-2B is running
	DOS/RO	Check Charging Flow Stable
	DOS/RO	Check Charging Pump Relief Not Lifted

Op-Test No: 2003301 Scenario No: 1 Event No: 3 Page 16 of 56

Event Description: **Charging Pump 1P-2A belt fails causing pump flow to decrease to zero.**

Time	Position	Applicant's Actions or Behavior
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	DOS/RO	Check Charging Pump Suction Supply Adequate Note : this is a Continuous Action Step
	DOS/RO	Check Charging System Response – Adjust charging flow as necessary to restore PZR level while maintaining labyrinth seal ΔP
	DOS	Notify DCS and Return to Procedure and Step in Effect
	DOS	Check TS applicability: DOS should determine that TLCO 3.5.1 is not met. - Action Condition 'B' is entered. Required Action is to restore a Charging Pump to operable status in 72 hours.
Proceed to next Event at the Lead Examiners Discretion.		

Op-Test No: 2003301 Scenario No: 1 Event No: 4 Page 17 of 56

Event Description: **First Stage Turbine Impulse Pressure (PT-485) Fails Low causing inward rod motion.**

Time	Position	Applicant's Actions or Behavior
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	RO/BOP	<p>Identify Failure of PT-485 (First Stage Turbine Pressure)</p> <ul style="list-style-type: none"> - Rods will automatically move in the inward direction (RO) - PT-485 indication on 1C03 is pegged low (BOP) - Actual turbine load is constant (BOP) - Tavg/Tref indicator on 1C04 indicates RCS is above program (RO)
<p>NOTE: DOS may choose to first enter AOP 24 "Response To Instrument Malfunctions". In either case, both AOP-24 and AOP-6C would need to be utilized to ensure all procedural requirements are met. The following steps of AOP-6C & AOP-24 are included due to lead examiner discretion of when to initiate the next event. The intent is to initiate the next event prior to implementation of AOP-24 and removing the channel from service. AOP-24 & 0-SOP-IC-001 were previously exercised during the PT-431 failure.</p>		
	DOS	Direct entry into AOP-6C, "Uncontrolled Motion of RCCA(s)"
	CREW	<p>Check rod motion required:</p> <ul style="list-style-type: none"> - Change in turbine load - Change in steam demand - Tavg/Tref mismatch > 1.5 degrees F. (Note: Tavg/Tref indicator on 1C04 will not indicate properly – other indications will have to be utilized).
	RO/DOS	<p>Rod motion determined to NOT be required, rods are placed in Manual.</p> <p>Note: Rods may have been placed in Manual upon initial identification of the instrument failure. In this case, rods should be verified to be in Manual at this step.</p>

Op-Test No: 2003301 Scenario No: 1 Event No: 4 Page 18 of 56

Event Description: **First Stage Turbine Impulse Pressure (PT-485) Fails Low causing inward rod motion.**

Time	Position	Applicant's Actions or Behavior
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	DOS	<p>Maintain RCS Tavg:</p> <ul style="list-style-type: none"> - Greater than 540 degrees F - Less than 574 degrees F - Within 7 degrees F of program Tavg <p>Note: this is a continuous action step. Additional actions are required per the RNO column should any of the above conditions not be met.</p>
	RO/DOS	<p>Check RCS Tavg at or trending to Tref.</p> <ul style="list-style-type: none"> - Tavg will be less than Tref due to the inward rod motion. - Tavg may be restored either via rod motion in Manual or adjusting turbine load (fuel has been conditioned).
	RO/DOS	<p>Check control rods above the minimum insertion limit.</p> <p>Rods should be above the limit. If not, boration must be initiated within 1 hour to restore the rods above the insertion limit within 2 hours.</p>
	RO/DOS	<p>Verify AFD within the limit:</p> <ul style="list-style-type: none"> - PPCS axial flux alarm clear (DFMOOB) - At least 3 control board meters within the limit <p>No axial flux problems should be present.</p> <p>Note: this is a continuous action step. Additional actions are required per the RNO column should any of the above conditions not be met.</p>
	CREW	<p>Check rod motion due to instrument failure:</p> <p>Rod motion determined to be due to failure of PT-485, DOS should leave AOP-6C and go to AOP-24 "Response to Instrument Malfunctions".</p>

Op-Test No: 2003301 Scenario No: 1 Event No: 4 Page 19 of 56

Event Description: **First Stage Turbine Impulse Pressure (PT-485) Fails Low causing inward rod motion.**

Time	Position	Applicant's Actions or Behavior
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	DOS	Enter AOP-24, "Response to Instrument Malfunctions"
	RO/DOS	Identify failed instrument as PT-485.
	RO/DOS	Identify PT-485 is a controlling channel. - Control rods placed in Manual or verified in Manual.
	RO/DOS	Return affected parameter to desired value – Tavg should be matched to Tref either by manual rod withdrawal or lowering turbine load (see AOP-6C).
	DOS	Remove failed instrument channel from service per 0-SOP-IC-001 "Routine Maintenance Procedure Removal of Safeguards or Protection Sensor from Service".
	DOS	Check Tech Specs and TRM for applicability: - DOS should determine that LCO 3.3.1 is not met. Action Condition 'A' is entered immediately – Required Action is to enter the Condition referenced in Table 3.3.1-1 for the channel. - Condition 'S' is referenced from Table 3.3.1-1, Function 17.b.2. Required Action is to verify within 1 hour that the interlock (P-7) is in its required state for existing unit conditions OR be in Mode 2 in 7 hours.

Following identification of the failed channel and placing Rod Control in Manual, proceed to the next event at the discretion of the Lead Examiner.

Op-Test No: 2003301 Scenario No: 1 Event No: 5 Page 21 of 56

Event Description:

A small RCS leak develops in the 'B' RCS Loop, degrading to a SBLOCA requiring a reactor trip.

Time	Position	Applicant's Actions or Behavior
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	CREW	Identify RCS leak. The following are some indications available which will enable the crew to identify that an RCS leak exists inside containment. <ul style="list-style-type: none">- Containment Sump 'A' level rising and associated alarm (BOP)- Containment humidity and pressure rising (BOP)- RMS alarms inside containment (RO/BOP)- Auto Charging Pump speed rising (RO)- Pressurizer level lowering (RO)
	DOS	AOP-1A "Reactor Coolant Leak" is entered based on the above indications.
	RO/DOS	Check Safety Injection Not Required. <ul style="list-style-type: none">- Pressurizer level within 10% of program level.- RCS subcooling greater than 30 °F. Note: this is a continuous action step. Additional actions are required per the RNO column should any of the above conditions not be met.
	RO/DOS	Check Reactor Trip Not Required <ul style="list-style-type: none">- Check reactor critical- Check charging pump suction aligned to the VCT. Note: this is a continuous action step. Additional actions are required per the RNO column should any of the above conditions not be met.

Op-Test No: 2003301 Scenario No: 1 Event No: 5 Page 22 of 56

Event Description:

A small RCS leak develops in the 'B' RCS Loop, degrading to a SBLOCA requiring a reactor trip.

Time	Position	Applicant's Actions or Behavior
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	RO/DOS	Check PZR Level – Stable At Or Trending To Program Level. - Manual control of Charging Pump 1P-2B should be established and Charging flow increased. - The crew should manually isolate letdown per this continuous action step if pressurizer level continues to lower.
	RO/DOS	Check PZR Pressure – Stable At Or Trending To Desired Pressure
	RO/DOS	Check Reactor Makeup Control at the proper concentration, armed, and in auto.
	DOS	Notify DCS and implement Emergency Plan (this action will be requested of the DSS)

The remainder of the steps in AOP-1A are diagnostic steps and can be performed in any order. Due to the availability of only one Charging Pump and the magnitude of the leak, it is doubtful that any further steps will be performed in AOP-1A. When PZR level cannot be maintained within 10% of program a manual reactor trip will need to be initiated per AOP-1A step 1 RNO. When the manual reactor trip is directed, proceed to the next event.

Note: A manual Reactor Trip, Safety Injection, and Containment Isolation should be directed by the DOS. However, when the reactor does not trip, a manual Safety Injection should NOT be performed.

	DOS/RO/BOP	<p>Carry out immediate actions of EOP-0</p> <ul style="list-style-type: none"> - Verify reactor trip (<i>not tripped</i>) - Attempt manual reactor trip - De-energize rod drive motor generators (breakers fail to open) - Start monitoring Critical Safety Functions - Go to CSP-S.1
<p><i>Critical Task: Crew inserts negative reactivity into the core by continuous control rod insertion.</i></p>		
	RO/BOP	<p>Carry out immediate actions of CSP-S.1</p> <ul style="list-style-type: none"> - Verify reactor trip (<i>not tripped, ensures continuous rod insertion</i>) - Verify turbine tripped
	DOS	<p>Verify immediate actions have been performed and reviews foldout page criteria with crew</p>
	ROBOP	<p>Verify AFW Actuation</p> <p>(Note: depending on crew timing, an Auto SI may or may not have occurred.)</p> <ul style="list-style-type: none"> - IF an Auto SI has occurred, then start verification of both Motor Driven Pumps and the Turbine Driven AFP should occur. - IF an SI has NOT occurred, then the steam supply valves to the Turbine Driven AFP must be manually opened and both Motor Driven Pumps manually started.
	RO/BOP	<p>Align Charging pump suction to RWST</p> <ul style="list-style-type: none"> - OPEN 1CV-112B - SHUT 1CV-112C

	RO/BOP	<p>Initiate emergency boration:</p> <ul style="list-style-type: none"> - Establish maximum charging by fully opening HC-142 – only 1 Charging Pump (1P-2B) is available. - Start a boric acid transfer pump - Open 1CV-350
	DOS/BOP	<p>Recognize SI Verification criteria applies and directs the BOP to perform Attachment A of CSP-S.1. Major steps of this attachment include:</p> <ul style="list-style-type: none"> - Verify Safeguards Buses energized - Verify Feedwater Isolation - Verify Containment Isolation <p><i>NOTE: Manually starting SI Pump ‘B’ is a critical task. This task may be performed in CSP-S.1, however, this is an EOP-0 critical task and must be performed prior to exiting EOP-0 at step16 (transition to EOP-1).</i></p> <ul style="list-style-type: none"> - Check SI Pumps running (SI Pump ‘B’ should be manually started if not previously started) - Check RHR pumps running - Check CCW pumps-only one running - Verify SW system alignment - Verify Containment Accident Cooling Units running - Check Control Room Fans armed - Check Control Room Ventilation in accident mode - Check if Main Steam Lines can remain open - Verify Spray not required - Check 4160 Vac Safeguards buses both powered by offsite power
	RO/BOP	<p>Check pressurizer pressure < 2335 psig</p>
	RO/BOP/DOS	<p>Check if the reactor trip breakers have opened and if the turbine has tripped</p> <ul style="list-style-type: none"> - Dispatch an AO to locally open reactor trip breakers (if not already completed.)

	RO/BOP	<p>Stabilize intact S/G level</p> <ul style="list-style-type: none"> - Control feed flow to maintain at least 400 GPM AFW <u>until</u> intact S/G level between [51%] 29 % to 65 %. - If SG levels are within the required band, then AFW flows should be reduced to minimize the RCS cooldown. This may require securing one or more AFW pumps due to the minimum flow requirements.
	RO/BOP	<p>Verify dilution paths-ALL ISOLATED</p> <ul style="list-style-type: none"> - Blender via 1CV-111 - Chemical addition pot - VCT drain via P-33 or P-9 - Deboration - Demineralizer resin change-out operations
	RO	<p>Check RCS cold leg temperature > 543 °F</p> <ul style="list-style-type: none"> - If not, ensure atmospheric dumps and condenser steam dumps are shut, and minimize AFW flow
	RO	<p>Check if uncontrolled cooldown is in progress based on RCS temperature dropping in uncontrolled manner or S/G pressure dropping in an uncontrolled manner</p> <ul style="list-style-type: none"> - If NO, Proceed to step 18 - If YES, isolate both main steam lines, identify that neither S/G faulted and proceed to step 18
	RO	<p>Check Core exit thermocouples < 1200 °F</p>
	RO	<p>Verify reactor sub-critical</p> <ul style="list-style-type: none"> - Power range channels < 5% - Intermediate range SUR zero or negative
	RO	<p>Check if boration can be stopped</p> <ul style="list-style-type: none"> - All rods fully inserted - Stop boration - Adjust charging flow as necessary to control PZR level

	DOS	Exits CSP-S.1 and directs entry into EOP-0
	DOS/RO	<p>Enter at Verify Reactor Trip RNO (where exited from)</p> <ul style="list-style-type: none"> - Re-energize stripped MCCs as time permits (none should be de-energized) - Dispatch operator to locally open reactor trip breakers (should have already been performed)
	RO	Verify Turbine Trip
	RO	Verify Safeguard buses energized
	RO	<p>Check if SI is actuated:</p> <ul style="list-style-type: none"> - Recognize SI has actuated - Check SI – BOTH SI & RHR pumps running <p>Note: SI pump 1P-15B should have been manually started in CSP-S.1</p>
	DOS	Review foldout page criteria with the crew.
	DOS/RO	Both RCPs must be manually tripped per foldout page criteria due to loss of subcooling.
	DOS	<p>EOP-0 Attachment A “Automatic Action Verification” directed to be completed by the BOP operator while continuing on with EOP-0.</p> <p>Note: Actions contained in this Attachment are essentially identical to the Attachment performed in CSP-S.1. Therefore, these steps are not included in this guide. This attachment would provide an additional opportunity to identify the failure to start of SI Pump ‘B’.</p> <p><i>Manually starting SI Pump ‘B’ prior to exiting EOP-0 is considered a critical task. SI Pump ‘B’ may have been previously started in CSP-S.1.</i></p>
	RO/BOP	<p>Verify Secondary Heat Sink:</p> <ul style="list-style-type: none"> - Level in at least one S/G >[51%] 29% - Control pumps and align valves as necessary to maintain S/G level [51%] 29% to 65 %

	RO	<p>Verify RCP Seal Cooling:</p> <ul style="list-style-type: none"> - Labyrinth seal $\Delta P > 20$ inches or - Component cooling to RCP thermal barrier-NORMAL
	RO/BOP	<p>Verify RCS Temperature Control:</p> <ul style="list-style-type: none"> - RCS wide range cold leg temperatures less than or equal to 547 °F AND STABLE - If not stable and trending lower, stop dumping steam and control AFW flow to maintain greater than or equal to 200 gpm until at least one S/G level $> [51\%]$ 29%. - If SG levels are within the required band, then AFW flows should be reduced to minimize the RCS cooldown.
	RO	Check PORVs BOTH SHUT
	RO	<p>Verify PZR spray valves- SHUT</p> <ul style="list-style-type: none"> - Normal spray valves BOTH SHUT - Auxiliary spray valves SHUT
	RO	<p>Check if RCPs should remain running</p> <ul style="list-style-type: none"> - Check RCS subcooling $> [60\text{ °F}]$ 30 °F. <p>Both RCPs must be tripped at this time if not previously tripped per the Foldout page criteria.</p>
	DOS	Inform STA to commence monitoring critical safety functions per CSP-ST.0 (Monitoring already in progress after first transition out of EOP-0 due to ATWS)
	RO/BOP	<p>Verify Containment sump recirculation not required:</p> <ul style="list-style-type: none"> - RWST level greater than or equal to 60 % - RCS pressure $> [425\text{ psig}]$ 200 psig
	CREW	Check Secondary system Intact.
	CREW	Check if S/G tubes are Intact.

	CREW	<p>Check if RCS is Intact Inside Containment</p> <ul style="list-style-type: none"> - Check containment radiation levels NORMAL – they are not. - Check containment sump A level NORMAL – it is not. - Check containment pressure NORMAL – it is not.
	DOS	Transition to EOP-1, “Loss of Reactor or Secondary Coolant”
<p>Upon transition to EOP-1 or at discretion of Lead Examiner, terminate the scenario.</p>		
<p>Inform the Examinees that they are to remain in the simulator until any evaluator follow-up questions are answered. Do not discuss any scenario related events.</p>		

Facility: **Point Beach**Scenario No.: **2**OP-Test No.: **2003301**Examiners: _____

_____Operators: _____

Initial Conditions: Unit 1 is at 75% power. Power was reduced approximately 6 hours ago at the request of the Power System Supervisor. Xenon is building in slightly. Unit 2 is at 100% Power.

Turnover: G-02 EDG is out of service for annual maintenance. It was taken OOS 2 days ago, and is expected to be returned to service in 3 days. G-01 EDG is aligned to 4.16 kV buses 1A-05 and 2A-05 IAW OI-35A.

1P-2C Charging Pump is out of service due to a failed motor bearing. The failure occurred 16 hours ago and has been tagged out for repair.

1P-15A Safety Injection Pump has just been tagged out (4 hours ago) due to high vibration that was identified during scheduled In-service Testing. The pump is not available.

Today is Sunday, present clock time is real time. A normal shift complement is available with exception of the 3rd SRO. An RP Tech is on-site along with two mechanics who are working on the diesel. A maintenance crew has just been called in for 1P-15A.

The objective of the shift is to maintain stable plant conditions until the Power System Supervisor requests power be returned to 100%.

Event No.	Malf. No.	Event Type*	Event Description
1		I – BOP SRO	Steam Generator Pressure Transmitter 1PT-478 fails high.
2		C – BOP SRO	Running CCW pump trips, with failure of standby to start.
3		I – RO SRO	Letdown line pressure controller 1HC-135 fails (oscillating in Auto/Man).
4		C – RO SRO	Steam Generator ‘B’ Tube Leak develops.
5		R – RO N – BOP N – SRO	Power reduction initiated due to tube leak.
6		M– ALL	Tube leak increases to rupture requiring reactor trip.
7		C - RO SRO	Main turbine fails to auto-trip.
8		M– ALL	Steam Leak develops on Steam Generator ‘B’.

9		C – BOP SRO	Steam Generator ‘B’ Blowdown Valve fails to isolate.
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* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

DYNAMIC EXAM SCENARIO ID#: SES-2003301: #2

SIMULATOR SHIFT TURNOVER:

Per Scenario Outline.

SIMULATOR SCENARIO SET UP

STEP COUNTERS ON	_____
INIT into IC	_____
PBF-6802, Communicator Telephone Log, available	_____
PBF-6801, Simulator Setup Checklist, completed	_____
PBF-6806, Simulator Book Preparation Checklist, completed	_____
PBF-6807, Simulator Scenario Briefing Sheet, completed	_____
TI 9.0 Attachment 1 (Part 1), PBNP Simulator Security Checklist, completed	_____

POINT BEACH NUCLEAR PLANT
TRAINING SIMULATOR EXAM SCENARIO

Revision 0 DRAFT

SCENARIO GUIDE:

7. Initialize to a Unit 1 75% Power IC or saved specific SES IC.
8. Ensure SI Pump 1P-15A control switch is in pullout, suction valve 1SI-896A is shut , and 1SI-866A is shut. Place a danger tag on all components.
9. Ensure Charging Pump 1P-2C control switch is in pullout (1P-2A and 1P-2B should be running with 1P-2A in Automatic). Balance charging/letdown flows as necessary. Place a danger tag on control switch for 1P-2C.
10. Ensure G-01 EDG is aligned to 1A05 and 2A05.
11. Ensure G-02 Mode Selector switch is in Local. Place Danger Tags on the G-02 Mode Selector switch, breaker 1A52-66 control switch, and breaker 2A52-67 control switch. C02 alarms will have to be acknowledged after going to RUN.
12. Ensure Rod Control is in Automatic.
13. Preload (or verify preloaded) the following simulator codes:

Initiation Cue	Action or Component Description	Action Tagname	Malf. Value	Ramp Time	Delay Time	Trigger		Verification Performed	
						Event Criteria	Oper. Init. #	Ready	Inserted
PRELOAD	1-SI-896A, SI PUMP SUCTION ISOL (FAIL CNTRL FUSE)	VLV1SIS046	1	-	-	-	-		
PRELOAD	1-SI-866A, 1P15A DISCH STOP CHECK (FAIL CNTRL FUSE)	VLV1SIS035	1	-	-	-	-		
PRELOAD	1B-5220A P-2C CHARGING PUMP CKTBKR (FAIL CNTRL FUSE)	BKR1CVC007	6	-	-	-	-		
PRELOAD	1-EP-1A5259R 1-A05 BKR 59 RACKOUT, 1P15A (RACKOUT)	LOA1EPS102	RACKOUT	-	-	-	-		
PRELOAD	1-MS-5959 SGB BD ISOL (FAIL OPEN)	VLV1SGB006	1	-	-	-	-		
PRELOAD	1-B5223B P-11B CC WATER PUMP CKTBKR (FAIL AUTO CLOSE)	BKR1CCW002	4	-	-	-	-		
PRELOAD	SG B MAIN STEAMLINE BREAK INSIDE CONTAINMENT	MAL1SGN003 B	0.5E6	00:01:00 60 Sec.	-	JCRFTR (7)	-		

POINT BEACH NUCLEAR PLANT
TRAINING SIMULATOR EXAM SCENARIO

Revision 0 DRAFT

POINT BEACH NUCLEAR PLANT
TRAINING SIMULATOR EXAM SCENARIO

Revision 0 DRAFT

The following events will be entered when requested by the lead examiner.

Initiation Cue	Action or Component Description	Action Tagname	Malf. Value	Ramp Time	Delay Time	Trigger		Verification Performed	
EVENT 1: STEAM GENERATOR PRESSURE TRANSMITTER, 1PT-478 FAILS HIGH									
PLE	1-PT478 LOOP B STEAM PESS FIXED OUTPUT (HIGH)	XMT1SGN017A	1400	00:00:00 30 Sec.	-	-	1		
EVENT 2: RUNNING CCW PUMP TRIPS, WITH FAILURE OF STANDBY TO START.									
PLE	1-B5210A P-11A CC WATER PUMP CKTBKR (TRIP)	BKR1CCW001	1	-	-	-	2		
EVENT 3: LOW PRESSURE LETDOWN INE, 1HC-135 OSCILLATIONS IN AUTO AND MANUAL									
PLE	1-HC135 LOW PRESS LETDOWN LINE OSC AUTO/MAN	CNH1CVC014C	50	-	-	-	3		
EVENT 4: STEAM GENERATOR "B" TUBE LEAK DEVELOPS									
PLE	STEAM GNERATOR B TUBE RUPTURE (50 GPM)	MAL1RCS008B	1.25	00:10:00 600 Sec.	-	-	4		
EVENT 6: TUBE LEAK INCREASES TO RUPTURE REQUIRING REACTOR TRIP.									
PLE	STEAM GNERATOR B TUBE RUPTURE (400 GPM)	MAL1RCS008B	INCREASE TO 10	00:01:00 60 Sec.	-	-	-		

ANTICIPATED BOOTH COMMUNICATION/GUIDANCE:

Event 1: This event is a failure (high) of SG 'B' controlling pressure transmitter 1PT-478. This will require the crew to manually close SG 'B' Atmospheric Dump valve and take manual control of SG 'B' Main Feed Regulating Valve. Following the failure of 1PT-478, the Instructor SM will field crew requests for I&C, STA, and DCS support. There are no anticipated booth communications.

Event 2: This event is a failure of the running CC pump with a failure to auto-start of the standby pump. Ensure the pre-load for the auto start failure is active, and insert the failure of 1P-11A at the request of the lead examiner. It is important that the insertion of this failure be coordinated such that the BOP is most likely to respond to the failure and not the Unit 1 CO (for position specific malfunction response counting numbers only). The crew should contact the PAB AO to investigate the tripped CC pump (1P-11A) as well as the status of 1P-11B once running. The AO should report back to the crew that the CC pump motor is very hot. If the breaker is checked, it has tripped on over-current. The running CC pump (1P-11B) is running normally if asked. A request to Chemistry for CCW sampling and DCS notification will be fielded by the Instructor SM. No specific response is necessary. The Instructor SM will also be informed to implement the E-plan. This can be acknowledged, and later reported back (if desired) that no E-plan applicability was discovered for this event. Preparation of a tag series for 1P-11A may also be requested, and should be acknowledged.

Event 3: This event is a failure of Letdown Pressure Control Valve 1HC-135. This is an oscillating type failure of the controller affecting both auto and manual control. Letdown must be isolated to mitigate this event. If an AO is sent to investigate the valve, it should be reported that the valve is cycling. The PAB AO may also be contacted due to the Waste Disposal System alarm that occurs when Letdown is isolated. This communication should be acknowledged. Notifications to the DCS and I&C will be fielded by the Instructor SM. No additional booth communications are anticipated.

Event 4, 5: This event involves a tube leak on SG 'B'. Leak size is approximately 50 gpm. The leak size will require a unit shutdown. Chemistry and RP may be contacted to confirm the tube leak. It may be reported back to the crew that there are increased radiation levels near SG 'B' steam line. The crew should choose AOP-17A to perform the downpower. If the crew should decide to use OP-3A, the Instructor SM will inform the SRO that AOP-17A is preferred as it will ensure a timely downpower. Notification of plant conditions should be made to the field operators, and these communications should be acknowledged. All notifications to the STA, DCS, and SM will be fielded by the Instructor SM. The Lead Examiner will determine when the downpower is sufficient which will be the trigger for the next event.

Event 6,7,8,9: After reducing power a sufficient amount, the tube leak will be increased to a full tube rupture that will require a Reactor Trip on lowering Pressurizer level. Upon initiating the trip, a fault will occur inside Containment on SG 'B', making SG 'B' both ruptured and faulted. Also, the Main Turbine will fail to trip requiring the RO to manually trip the turbine. Steam Generator Blowdown Valve 1MS-5959 will fail to isolate and the in-series valve 1MS-2045 must be manually closed. A request will be made for the status of valves SW-LW-61&62, and it should be reported that both valves are shut. A request will also be made for the closing of local valves for SG isolation in EOP-2. After approximately 5 minutes, it can be reported that the valves are closed. No other booth communications are anticipated. All other requests for support (E-plan, RP, Chemistry, STA, etc.) will be fielded by the Instructor SM.

Op-Test No: 2003301 Scenario No: 2 Event No: 1 Page 8 of 56

Event Description: **Steam Generator Pressure Channel (PT-478) Fails High**

Time	Position	Applicant's Actions or Behavior
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	BOP	Identify failure of PT-478 ('B' S/G Pressure BLUE Channel).
	RO/BOP	Acknowledge and respond to receipt of annunciator ARB 1C03 1E2 1-5, "Steam Generator B Level Setpoint Deviation" Operator Actions: <ul style="list-style-type: none"> - HC-478 'B' S/G Atmospheric Dump Valve controller taken to manual and shut. - HC-476 'B' Main Feed Regulating Valve controller taken to manual.
	DOS	Direct entry into AOP-24, "Response to Instrument Malfunctions".
	BOP	Identify Failed Instrument – PT-478 ('B' S/G Pressure BLUE Channel).
	BOP	Check if failed instrument is a controlling channel – PT-478 is a controlling channel for Steam Generator Pressure Control and Steam Generator Level Control.
	BOP	Establish Manual Control – If not previously performed, Manual control of the 'B' S/G Atmospheric Dump valve is established to shut the valve. Also, manual control of the 'B' Main Feed Regulating Valve is required to manually control level.
	RO/DOS	Return Affected Parameter(s) to desired value(s). <ul style="list-style-type: none"> - Manual control of the 'B' Main Feed Regulating Valve is used to re-establish level at 64%.

Op-Test No: 2003301 Scenario No: 2 Event No: 1 Page 9 of 56

Event Description: **Steam Generator Pressure Channel (PT-478) Fails High**

Time	Position	Applicant's Actions or Behavior
	DOS	<p>Direct entry into 0-SOP-IC-001, "Routine Maintenance Procedure Removal of Safeguards or Protection Sensor from Service".</p> <ul style="list-style-type: none"> - Obtain and implement 0-SOP-IC-001 - Review precautions and limitations - Identify applicable Technical Specifications (reference 0-SOP-IC-002): - LCO 3.3.1 is not met: - Action Condition 'A' is entered immediately – Required Action is to enter the Condition referenced in Table 3.3.1-1 for the channel. - Condition 'D' is referenced from Table 3.3.1-1 Functions 14-2. Required Action is to place the channel in trip within 1 hour OR be in Mode 3 in 7 hours. - LCO 3.3.2 is not met: - Action Condition 'A' is entered immediately – Required Action is to enter the Condition referenced in Table 3.3.2-1 for the channel. - Condition 'D' is referenced from Table 3.3.2-1 Functions 1.e. Required Action is to place the channel in trip within 1 hour OR be in Mode 3 in 7 hours AND Mode 4 in 13 hours. - Note: All other affected Functions in Table 3.3.2-1 reference Function 1.e for required action. A list of these functions may be found in 0-SOP-IC-002. Therefore, these are all the TS actions that are required. LCO 3.3.3 is still met since only two channels are required operable. LCO 3.3.5 references LCO 3.3.2 Function 3, which once again references Function 1.e for required actions. The actions required due to removing FT-474 from service are the same as Condition D above. - Conduct pre-job brief for removing PT-478/FT-474 from service - Obtain DSS permission to remove channel from service - Direct 0-SOP-IC-001 Attachment A for PT-478 removal from service

Op-Test No: 2003301 Scenario No: 2 Event No: 1 Page 10 of 56

Event Description: **Steam Generator Pressure Channel (PT-478) Fails High**

Time	Position	Applicant's Actions or Behavior
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	RO/BOP/DOS	<p>Perform actions as directed by DOS from Attachment A for PT-478 removal.</p> <ul style="list-style-type: none">- Place HC-476 in MANUAL (BOP)- Place the loop B steam flow and feedwater flow selector switches in YELLOW (BOP)- Place HC-476 in AUTO, unless directed otherwise by DSS (BOP) (Note: SG 'B' Atmospheric must remain in manual.)- Place HC-478 in MANUAL (BOP)- Place the following bistables to TRIP inside C-115: (BOP)- Verify alarms and trip status lights are proper (RO) <ol style="list-style-type: none">7. Safeguard Actuation8. Low Pressure (Alarm)9. SF<FF (F-476)10. SF>FF (F-476) <ul style="list-style-type: none">- Remove P-478 from scan (BOP)
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Op-Test No: 2003301 Scenario No: 2 Event No: 1 Page 11 of 56

Event Description: **Steam Generator Pressure Channel (PT-478) Fails High**

Time	Position	Applicant's Actions or Behavior
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	DOS	Direct 0-SOP-IC-001 Attachment A for FT-474 removal from service (Note: FT-474 Steam Flow channel must also be removed from service due to the pressure input for density compensation from PT-478)
	RO/BOP/DOS	Perform actions as directed by DOS from Attachment A for FT-474 removal. Note: First 3 steps are deleted due to switches already in YELLOW - Place the following bistables to TRIP inside C-115: (BOP) - Verify alarms and trip status lights are proper (RO) 1. High Trip 2. High-high Trip 3. SF<FF (F-476); previously performed 4. SF>FF (F-476); previously performed - Remove F-474V from scan (BOP)
	DOS	Inform DSS PT-478 & FT-474 removed from service and that DCS and STA notifications need to be made
Note: SG 'B' Atmospheric must remain in manual.		
	DOS	Exits AOP-24
Proceed to next Event at the Lead Examiners Discretion.		

Op-Test No: 2003301 Scenario No: 2 Event No: 2 Page 12 of 56

Event Description: **Running CCW Pump Trips with a Failure of the Standby Pump to AUTO Start**

Time	Position	Applicant's Actions or Behavior
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	BOP/RO	Respond to numerous Annunciator alarms on 1C03.
	RO/DOS	Recognize Motor Breaker Trip of 1P-11A (running CCW Pump) occurred and the Auto Pump (1P-11B) did not AUTO start.
	RO/DOS	Start 1P-11B (standby CCW Pump) – this pump should have started on low pressure but did not, it is expected that the pump be manually started to back up the auto start that failed (also required to be started per ARB).
	DOS	Directs entry into AOP-9B, “Component Cooling System Malfunction”
	DOS/BOP	Check Component Cooling Pumps at least one running (1P-11B manually started)
	DOS/BOP	Check Surge Tank Level lowering (recognizes level is stable and proceeds to next step)
	DOS/BOP	Check Surge Tank Level greater than 10%
	DOS/BOP	Check Component Cooling System for In-leakage (recognizes surge tank level is not rising and proceeds to next step)
	DOS/RO	Check Reactor Trip - NOT REQUIRED - Check reactor critical - Check VCT high temperature alarm-CLEAR
	DOS/BOP	Check RHR Status-RHR not in service and proceeds to next step

Op-Test No: 2003301 Scenario No: 2 Event No: 2 Page 13 of 56

Event Description: **Running CCW Pump Trips with a Failure of the Standby Pump to AUTO Start**

Time	Position	Applicant's Actions or Behavior
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	DOS	Request Chemistry analyze CCW (may request DSS to perform this step).
	DOS	Notify DCS and implement E-plan (may request DSS to perform these actions)
	DOS/BOP	May place 1P-11A in Pull-Out which clears Motor Breaker Trip annunciator.
	DOS	Check TS applicability: DOS should determine that LCO 3.7.7 is not met. - Action Condition 'A' is entered. Required Action is to restore the CC pump to operable status in 72 hours AND 144 hours from discovery of failure to meet the LCO.
Proceed to next Event at the Lead Examiners Discretion.		

hp-Test No: 2003301 Scenario No: 2 Event No: 3 Page 14 of 56

Event Description: **Letdown Line Pressure Controller (HC-135) oscillates in auto and manual, requiring isolation of Letdown.**

Time	Position	Applicant's Actions or Behavior
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	RO	Acknowledge and respond to receipt of annunciator 1C04 1C 1-6, 2-6 and 4-6. Operator Actions: <ul style="list-style-type: none"> - Check for associated alarms - Check operation of CV-135 - Take manual control of letdown pressure controller (HC-135) – CV-135 oscillation continues in manual - Recommend isolating letdown.
	DOS	Direct manual isolation of Letdown.
	DOS	Direct entry into AOP-1D, “Chemical and Volume Control System Malfunction”. Note: AOP-24, “Response to Instrument Malfunctions”, may initially be entered to stabilize charging and letdown.
	DOS/RO	Review foldout page criteria.
	DOS/RO	Check for Charging Pump Malfunction – there is no charging pump malfunction, pumps are operating properly
	DOS	If LP Letdown Line pressure Control Valve failed, go to step addressing 1CV-135
	DOS/RO	Check LP Letdown Line Pressure Control Valve failed
	RO	Establish Manual Control – CV-135 oscillation continues in manual

hp-Test No: 2003301 Scenario No: 2 Event No: 3 Page 15 of 56

Event Description: **Letdown Line Pressure Controller (HC-135) oscillates in auto and manual, requiring isolation of Letdown.**

Time	Position	Applicant's Actions or Behavior
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	RO	Shut Letdown Orifice Outlet valves
	RO	Reduce charging flow to minimum
	DOS/RO	Establish excess letdown per OP-5E, "Establishing and Securing Excess Letdown"
	DOS	Notify DCS and I&C Duty and Call, Return to Procedure and Step in Effect
	DOS	Check TS applicability: If PZR level $\geq 48\%$ (parametric value), DOS should determine that LCO 3.4.9 is not met. - Action Condition 'A' is entered. Required Action is to restore PZR level to within limit in 1 hour.
Excess Letdown will not be established, proceed to next event at the Lead Examiners discretion.		

Op-Test No: 2003301 Scenario No: 2 Event No: 4,5 Page 16 of 56

Event Description: Steam Generator 'B' tube leak requiring a Power Reduction.

Time	Position	Applicant's Actions or Behavior
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	CREW	<p>'B' S/G Tube leak identified. Indications are:</p> <ul style="list-style-type: none"> - Lowering pressurizer level - Auto Charging pump speed rising - Lowering VCT level - Main Steam Line Radiation rising (RE-232) - Air Ejector Radiation rising (RE-215) - 'B' S/G level deviations
	DOS	Enters AOP-3 "Steam Generator Tube Leak" based on available indications.
	DOS	Reviews foldout page criteria with crew.
	DOS/RO	<p>Check Safety Injection Not Required (continuous action step)</p> <ul style="list-style-type: none"> - Check pressurizer level within 10% of program - Check RCS subcooling > 30° F <p>Reactor trip is not required due to this criteria at this time.</p> <p>NOTE: The initial tube leak rate is approximately 50 gpm.</p>
	DOS/RO	<p>Check Reactor Trip Not Required (continuous action step)</p> <ul style="list-style-type: none"> - Check reactor critical - Check charging pump suction aligned to the VCT <p>Reactor trip is not required due to this criteria.</p>

Op-Test No: 2003301 Scenario No: 2 Event No: 4,5 Page 17 of 56

Event Description: Steam Generator 'B' tube leak requiring a Power Reduction.

Time	Position	Applicant's Actions or Behavior
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	DOS/RO	<p>Check Pressurizer level stable at or trending to program level. (continuous action step)</p> <ul style="list-style-type: none"> - If level is trending lower, charging pump speed/flow is raised. - If level continues to lower, letdown is isolated. (Letdown should already be isolated)
	DOS/RO	<p>Check Pressurizer pressure stable at or trending desired pressure.</p> <ul style="list-style-type: none"> - RCS pressure should be controlling near program in Automatic
	DOS/RO	<p>Check Reactor Makeup control</p> <ul style="list-style-type: none"> - Makeup set at proper boric acid concentration - Makeup armed and in auto
	DOS	Notify the DCS, Chemistry, and implement the E-plan.
	CREW	<p>Identify the leaking S/G (continuous action step).</p> <p>From available indications, the 'B' S/G is determined to be leaking.</p>
	CREW	<p>Determine Leak Rate (using either or all of the following)</p> <ul style="list-style-type: none"> - Direct Chemistry to perform CAMP 014 - PBF-2034, Control Room Shift Log Unit 1 - OI-55, Primary Leak Rate Calculation
	CREW	<p>Check Reactor Shutdown Required</p> <ul style="list-style-type: none"> - Reactor shutdown determined to be required due to primary to secondary leakage exceeding 75 gpd.

Op-Test No: 2003301 Scenario No: 2 Event No: 4,5 Page 18 of 56

Event Description: Steam Generator 'B' tube leak requiring a Power Reduction.

Time	Position	Applicant's Actions or Behavior
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	CREW	Determine action response based on S/G Leakage. - First item in Table determined to be applicable – action response is to reduce power to less than or equal to 50% in one hour AND be in Mode 3 in the next two hours.
	CREW	Place the Unit in Mode 3 - AOP-17A determined to be applicable due to required time frame to be in Mode 3.
	DOS	Enters AOP-17A, "Rapid Power Reduction"
	CREW	Determine Desired Power Level – initially less than or equal to 50% in one hour Note: Next four steps may be performed in any order
	DOS	Notify PSS of Load Reduction
	DOS/RO	Check Rod Control System in Auto
	DOS/BOP	Select Rate Reduction Method and Reduce Load – Operator Auto – Impulse In is the recommended mode of operation.
	DOS/RO	Borate as Necessary to Maintain Rods Above the Low-Low Insertion Limit Alarm (continuous action step). - Reference Reactivity Operating Data Book ROD 1.3 for amount of boration required
	DOS/RO	Check PZR pressure stable at or trending to 2235 psig (continuous action step)

Op-Test No: 2003301 Scenario No: 2 Event No: 4,5 Page 19 of 56

Event Description: Steam Generator 'B' tube leak requiring a Power Reduction.

Time	Position	Applicant's Actions or Behavior
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	DOS/RO	Check Pressurizer level stable at or trending to program level. (continuous action step)
	DOS/BOP	Check Steam Generator level controlling in Auto (continuous action step)
	DOS/RO	Maintain RCS Tavg (continuous action step) <ul style="list-style-type: none">- Greater than 540°F- Less than 574°F- Within 7°F of program Tavg
	DOS	Check TS applicability: <ul style="list-style-type: none">- DOS should determine that LCO 3.4.13 is not met.- Action Condition 'A' is entered. Required Action is to reduce leakage to within limits in 4 hours.
Following ≈5% power reduction or at the Lead Examiners discretion, proceed to the next event.		

Op-Test No: 2003301 Scenario No: 1 Event No: 6, 7 Page 23 of 56

Event Description: **ATWS Event and Safety Injection Pump 1P-15B auto start failure with previous SBLOCA.**

Time	Position	Applicant's Actions or Behavior
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Due to a lowering pressurizer level trend, a reactor trip will be required during AOP-3 based on the inability to maintain pressurizer level within 10% of program level.

Critical Task: Crew manually trips the reactor prior to pressurizer level going off scale low

	DOS	Direct a Manual Reactor Trip, Safety Injection, Containment Isolation, and entry into EOP-0, "Reactor Trip or Safety Injection" due to lowering pressurizer level.
	RO	Manual Reactor Trip, SI, and CI performed. Immediate Actions of EOP-0 (Steps 1-4) performed and informs DOS they are ready for verification. <ul style="list-style-type: none"> - Verify reactor trip - Verify turbine trip – the turbine will not automatically trip however, the turbine will trip from the manual pushbutton. - Verify safeguard buses energized - Check if SI is actuated
	DOS/RO	Verify Reactor Trip <ul style="list-style-type: none"> - Check reactor trip and bypass breakers OPEN - Check all rod bottom lights LIT - Check all rod position indicators ON BOTTOM - Check neutron flux LOWERING
	DOS/RO	Verify Turbine Trip – contingency action for manually tripping the turbine is verified.

Op-Test No: 2003301 Scenario No: 1 Event No: 6, 7 Page 24 of 56

Event Description: **ATWS Event and Safety Injection Pump 1P-15B auto start failure with previous SBLOCA.**

Time	Position	Applicant's Actions or Behavior
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	DOS/RO	<p>Verify Safeguard buses energized</p> <ul style="list-style-type: none"> - Check at least one 4160 Vac safeguards bus energized (1A05 or 1A06) - Check at least one 480 Vac safeguards bus energized (1B03 or 1B04)
	DOS/RO	<p>Check if SI is actuated:</p> <ul style="list-style-type: none"> - 1C04-1B 4-2, Manual Safety Injection - 1C04 1B 4-3, Containment Pressure High - 1C04-1B 4-4, Pressurizer Low Pressure SI - 1C04-1B 4-5, Steam Line Loop A Lo-Lo Pressure - 1C04-1B 4-6, Steam Line Loop B Lo-Lo PressureB Pressure Low-Low <p>Manual SI actuation was procedurally required.</p>
	DOS	<p>Review foldout page criteria with the crew</p> <ul style="list-style-type: none"> - Determines that the "Ruptured S/G Isolation Criteria" and "Faulted S/G Isolation Criteria are applicable. - Auxiliary Feedwater flow should be isolated to the 'B' S/G by closing 1AF-4000 and AF-4021. - P-38B Motor Driven AFP is required to be secured when feed is reduced less than 50 gpm.
	DOS	<p>EOP-0 Attachment A "Automatic Action Verification" directed to be completed by the BOP operator while continuing on with EOP-0. The steps for Attachment A are included near the end of this event section.</p> <ul style="list-style-type: none"> - All items of Attachment A should indicate normal with the exception of the 'B' Steam Generator Blowdown Containment Isolation Valve, 1MS-5959 which fails to close.

Op-Test No: 2003301 Scenario No: 1 Event No: 6, 7 Page 25 of 56

Event Description: **ATWS Event and Safety Injection Pump 1P-15B auto start failure with previous SBLOCA.**

Time	Position	Applicant's Actions or Behavior
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Critical Task: Crew manually closes IMS-2045 (in series with IMS-5959) prior to exiting EOP-2.

	RO/DOS	<p>Verify Secondary Heat Sink:</p> <ul style="list-style-type: none"> - Level in at least one S/G > [51%] 29%. - Control pumps and align valves as necessary to maintain S/G level between [51%] 29% and 65%. <p>Adequate Aux Feedwater will be available, > 200 gpm should be maintained until level is within the band on the 'A' S/G.</p>
	DOS/RO	<p>Verify RCP Seal Cooling</p> <ul style="list-style-type: none"> - Check labyrinth seal delta-P > 20 inches <p>OR</p> <ul style="list-style-type: none"> - Check component cooling to RCP thermal barrier normal
	DOS/RO	<p>Verify RCS temperature control (continuous action step).</p> <ul style="list-style-type: none"> - This procedure step provides actions to stop dumping steam and reducing total feed flow (if S/G levels are in the required band) with RCS temperature trending lower.
	DOS/RO	<p>Check pressurizer PORVs both shut.</p>
	DOS/RO	<p>Verify pressurizer spray valves shut</p> <ul style="list-style-type: none"> - Both normal loop spray valves shut. - Auxiliary spray valve shut.

Op-Test No: 2003301 Scenario No: 1 Event No: 6, 7 Page 26 of 56

Event Description: **ATWS Event and Safety Injection Pump 1P-15B auto start failure with previous SBLOCA.**

Time	Position	Applicant's Actions or Behavior
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	DOS/RO	Check if RCPs should remain running – RCPs are running and subcooling is > [60 °F] 30 °F
	DOS	Start Monitoring Critical Safety Function Status trees. The instructor DSS/STA will acknowledge this report and begin monitoring.
	CREW	Verify Containment Sump Recirculation Not Required – sump recirc is not required.
	CREW	Check if secondary system is intact: - No S/G completely depressurized AND - No S/G pressure trending lower in an uncontrolled manner DOS transitions to EOP-2 based on “B” S/G being faulted
	DOS	Reads cautions and reviews foldout page criteria of EOP-2
	DOS/RO	Check RCS wide range Hot Leg Temperatures STABLE: - Control feed and dump steam as necessary using “A” S/G to stabilize RCS hot leg temperatures
	DOS/BOP	Isolate both Main Steam Lines – MSIVs will already be shut.
	DOS/BOP	Check if any S/G in NOT faulted (determines “A” S/G is not faulted)
	DOS/BOP	Identify faulted S/G (determines “B” S/G is faulted)

Op-Test No: 2003301 Scenario No: 1 Event No: 6, 7 Page 27 of 56

Event Description: **ATWS Event and Safety Injection Pump 1P-15B auto start failure with previous SBLOCA.**

Time	Position	Applicant's Actions or Behavior
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	DOS/BOP	Reset Loss of Feedwater Turbine Trip
	DOS/BOP	Isolate Feed to faulted S/G <ul style="list-style-type: none"> - Ensure Main Feed Regulating Valve SHUT - Ensure Main Feed Regulating Bypass Valve SHUT - Ensure Motor Driven AFW pump P-38B is stopped. - Ensure AF-4021 AND 1AF-4000 in manual and SHUT
	DOS/BOP	Isolate flow from faulted S/G <ul style="list-style-type: none"> - Ensure 1MS-2015 SHUT (atmospheric dump) - SHUT 1MS-2019 (turbine driven AFW steam supply) - Ensure 1MS-5959/2045 SHUT (S/G Blowdown) – Note: 1MS-2045 should have previously been closed in EOP-0 Attachment A. Closure of 1MS-2045 prior to exiting EOP-2 is a critical task. - Locally shut 1MS-237 (1P-29 AFP/Radwaste steam isolation) - Locally shut 1MS-238 (main steam trap isolation)
	DOS/BOP	Check CST Level > 8 Ft
	CREW	Check secondary system radiation normal DOS transitions to EOP-3 based on “B” S/G being ruptured
Upon transition to EOP-3, the scenario may be terminated at discretion of Lead Examiner.		

Op-Test No: 2003301 Scenario No: 1 Event No: 6, 7 Page 28 of 56

Event Description: **ATWS Event and Safety Injection Pump 1P-15B auto start failure with previous SBLOCA.**

Time	Position	Applicant's Actions or Behavior
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Inform the Examinees that they are to remain in the simulator until any evaluator follow-up questions are answered. Do not discuss any scenario related events.

Op-Test No: 2003301 Scenario No: 1 Event No: 6, 7 Page 29 of 56

Event Description: **ATWS Event and Safety Injection Pump 1P-15B auto start failure with previous SBLOCA.**

Time	Position	Applicant's Actions or Behavior
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The remainder of steps listed in this event section are those found in EOP-0 Attachment A, "Automatic Action Verification". The DOS should ensure that performance of this Attachment is continued by the BOP operator, and performed in parallel with EOP-0.

	BOP	Verify feedwater isolation: <ul style="list-style-type: none"> - Feedwater Regulating and Bypass Valves SHUT. - Both main feed pumps tripped. - MFP discharge MOVs - BOTH SHUT.
	BOP	Verify containment isolation: <ul style="list-style-type: none"> - CI Panels A and B ALL LIGHTS LIT – 'B' Steam Generator Blowdown CI valve determined not to be shut (1MS-5959). 1MS-5959 will NOT shut. However, 1MS-2045, which is in series with 1MS-5959 can be shut using its control switch. - RS-SA-9 SHUT. - No other valves open under administrative control (DSS may be asked to verify this).
	BOP	Verify AFW Actuation: <ul style="list-style-type: none"> - Checks both motor driven AFW pumps running. (P-38B has been previously secured).
	BOP	Check both SI pumps running.
	BOP	Check both RHR pumps running.

Op-Test No: 2003301 Scenario No: 1 Event No: 6, 7 Page 30 of 56

Event Description: **ATWS Event and Safety Injection Pump 1P-15B auto start failure with previous SBLOCA.**

Time	Position	Applicant's Actions or Behavior
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	BOP	Check only one CCW pump running.
	BOP	Verify Service Water Alignment: <ul style="list-style-type: none"> - 6 service water pumps running. - Service water isolation valves shut. - Direct AO to locally check SW-LW-61 or SW-LW-62 shut.
	BOP	Verify Containment Accident Cooling Units Running <ul style="list-style-type: none"> - All accident fans running. - 1SW-2907 & 2908 OPEN. - Unit 1 Containment Recirc Coolers Water Flow Low Alarm CLEAR.
	BOP	Check Control Room Fans Armed: <ul style="list-style-type: none"> - W-14A & W-13B2 WHITE LIGHT OFF (white light is off).
	BOP	Check Control Room Ventilation IN ACCIDENT MODE: <ul style="list-style-type: none"> - At least one control room recirc fan RUNNING - Control room damper solenoid valve PURPLE LIGHT LIT
	BOP	Check if Main Steam Lines Can Remain Open, checks both MSIVs SHUT.
	BOP	Verify proper SI valve alignment: <ul style="list-style-type: none"> - Unit 1 SI active status panel ALL LIGHTS LIT - Unit 1 SI-Spray Ready status panel NO LIGHTS LIT

Op-Test No: 2003301 Scenario No: 1 Event No: 6, 7 Page 31 of 56

Event Description: **ATWS Event and Safety Injection Pump 1P-15B auto start failure with previous SBLOCA.**

Time	Position	Applicant's Actions or Behavior
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	BOP	Verify containment spray not required: <ul style="list-style-type: none">- Recognize containment pressure is rising and if > 25 psig perform continuous actions of RNO- Containment Spray actuated, C01 B 2-6 LIT- All containment spray discharge valves OPEN- At least one spray pump running- Shutdown one train of spray by placing spray pump in PULL-OUT and shutting it's associated suction valve.- One spray additive valve verified OPEN
	BOP	Verify SI Flow: <ul style="list-style-type: none">- RCS pressure <1400 psig- Check SI pumps flow indicated- RCS pressure < [425] 200 psig
This ends the steps of EOP-0 Attachment A.		