

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 – RO SRO	Turbine First Stage Pressure Transmitter PT-485 fails low.
5		M – All	RCS Leak develops to SBLOCA, requiring reactor trip.
6		C – RO SRO	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

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	_____

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. Ensure that RTO is using the LEFM inputs.
7. 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-P32D SERVICE WATER PUMP D HEAD CAPACITY	PMP1SWS004C	90	-	-	-	-		

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 NORMA 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	-	-	-	-		

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	20	00:20:00 1200 Sec	-	-	5		

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

Op-Test No: 2003301 Scenario No: 1 Event No: 1 Page 8 of 28

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

Time	Position	Applicant's Actions or Behavior
------	----------	---------------------------------

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 28

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 28

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

Time	Position	Applicant's Actions or Behavior
------	----------	---------------------------------

	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 28

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
	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 28

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
------	----------	---------------------------------

	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
--	-----	---

Op-Test No: 2003301 Scenario No: 1 Event No: 2 Page 13 of 28

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
	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 Trip 2. Low Pressure Trip 3. Safety Injection 4. Unblock Safety Injection 5. Over-temperature Trip 6. Over-temperature Rod Stop - Remove PT-431 from scan (BOP)
	DOS	Inform DSS PT-431 removed from service and that DCS and STA notifications need to be made.
	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.
	DOS	<p>Check failure for Technical Specification or TRM applicability.</p> <p>(Tech Specs impacted by this failure are listed on previous page).</p>

Op-Test No: 2003301 Scenario No: 1 Event No: 2 Page 14 of 28

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
------	----------	---------------------------------

	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 28

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

Time	Position	Applicant's Actions or Behavior
------	----------	---------------------------------

	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 28

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

Time	Position	Applicant's Actions or Behavior
------	----------	---------------------------------

	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 28

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

Time	Position	Applicant's Actions or Behavior
------	----------	---------------------------------

	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 28

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

Time	Position	Applicant's Actions or Behavior
	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 28

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

Time	Position	Applicant's Actions or Behavior
------	----------	---------------------------------

	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 20 of 28

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
------	----------	---------------------------------

	CREW	<p>Identify RCS leak. The following are some indications available which will enable the crew to identify that an RCS leak exists inside containment.</p> <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	<p>Check Safety Injection Not Required.</p> <ul style="list-style-type: none"> - Pressurizer level within 10% of program level. - RCS subcooling greater than 30 °F. <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 Reactor Trip Not Required</p> <ul style="list-style-type: none"> - Check reactor critical - Check charging pump suction aligned to the VCT. <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 PZR Level – Stable At Or Trending To Program Level.</p> <ul style="list-style-type: none"> - 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.

Op-Test No: 2003301 Scenario No: 1 Event No: 5 Page 21 of 28

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
------	----------	---------------------------------

	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. <u>When the manual reactor trip is directed, proceed to the next event.</u>		
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 <u>NOT</u> be performed.		

Op-Test No: 2003301 Scenario No: 1 Event No: 6, 7 Page 22 of 28

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

Time	Position	Applicant's Actions or Behavior
------	----------	---------------------------------

	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
<i>Critical Task: Crew inserts negative reactivity into the core by continuous control rod insertion.</i>		
	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	Verify immediate actions have been performed and reviews foldout page criteria with crew
	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.

Op-Test No: 2003301 Scenario No: 1 Event No: 6, 7 Page 23 of 28

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

Time	Position	Applicant's Actions or Behavior
------	----------	---------------------------------

	RO/BOP	Align Charging pump suction to RWST <ul style="list-style-type: none">- OPEN 1CV-112B- SHUT 1CV-112C
	RO/BOP	Initiate emergency boration: <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

Op-Test No: 2003301 Scenario No: 1 Event No: 6, 7 Page 24 of 28

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

Time	Position	Applicant's Actions or Behavior
------	----------	---------------------------------

	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	Check pressurizer pressure < 2335 psig
	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.)

Op-Test No: 2003301 Scenario No: 1 Event No: 6, 7 Page 25 of 28

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

Time	Position	Applicant's Actions or Behavior
------	----------	---------------------------------

	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>

Op-Test No: 2003301 Scenario No: 1 Event No: 6, 7 Page 26 of 28

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

Time	Position	Applicant's Actions or Behavior
------	----------	---------------------------------

	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	<p>Exits CSP-S.1 and directs entry into EOP-0</p> <p>(Note: Depending on crew timing, it is possible that a Red Path for CSP-P.1 may develop some time during the scenario due to the uncontrolled cooldown. If this occurs, a transition to CSP-P.1 should be made.)</p>
	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>

Op-Test No: 2003301 Scenario No: 1 Event No: 6, 7 Page 27 of 28

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

Time	Position	Applicant's Actions or Behavior
------	----------	---------------------------------

	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.

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

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

Time	Position	Applicant's Actions or Behavior
------	----------	---------------------------------

	RO	Check PORVs BOTH SHUT
	RO	Verify PZR spray valves- SHUT <ul style="list-style-type: none"> - Normal spray valves BOTH SHUT - Auxiliary spray valves SHUT
	RO	Check if RCPs should remain running <ul style="list-style-type: none"> - Check RCS subcooling > [60 °F] 30 °F. Both RCPs must be tripped at this time if not previously tripped per the Foldout page criteria.
	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	Verify Containment sump recirculation not required: <ul style="list-style-type: none"> - RWST level greater than or equal to 60 % - RCS pressure > [425 psig] 200 psig
	CREW	Check Secondary system Intact.
	CREW	Check if S/G tubes are Intact.
	CREW	Check if RCS is Intact Inside Containment <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.

Op-Test No: 2003301 Scenario No: 1 Event No: 6, 7 Page 29 of 28

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

Time	Position	Applicant's Actions or Behavior
------	----------	---------------------------------

	DOS	Transition to EOP-1, "Loss of Reactor or Secondary Coolant".
Upon transition to EOP-1 (or CSP-P.1 if a Red path exists) and at discretion of Lead Examiner, terminate the scenario.		
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.		