Facility: Byron Scenario No.: N19-1 Op-Test No.: 2019-301

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: IC-171; 54.0% power (due to a grid issue), 644 MW, BOL, steady state, 946 ppm boron, equilibrium xenon, 1A FW Pump Out of Service

Turnover: The fuel is preconditioned to 100% power. Online risk is green. 1A FW pump is OOS for an alignment and vibration problem; it is expected back in service in one week. Following completion of turnover, the shift manager directs continuation of 1B Diesel Generator loading per 1BOSR 8.1.2-2 step F.7.b. Ten minutes of operation at 2750KW is complete. It is anticipated that Power Team will order a ramp to 880 MWe at 1.6 MWe/min during the shift.

Event No.	Malf. No.	Event Type*	Event Description
Preload	IOR ZDI1FW01PA PTL IOR ZDI1FW01PAB PTL IOR ZDI1FW012A CLS IOR ZLO1FW012A1 OFF IOR ZLO1FW002A1 OFF MRF ED091C OPEN IMF CC02B 200		1A FW Pump OOS 1A FW Pump AOP OOS 1FW012 OOS 1FW002A OOS CCW Pump Discharge Press Switch Failure
1	None	N (BOP, SRO)	Continue Loading 1B Diesel Generator per 1BOSR 8.1.2-2 step F.7.b
2	IMF RX10A 450 30	I (ATC, SRO) TS (SRO)	Turbine impulse pressure channel 1PT-505 fails high. Tech Spec 3.3.1 will be entered.
3	MRF EG20 TRIP	TS (SRO)	Report from local Equipment Operator that he has depressed the 1B Diesel Generator Emergency Stop pushbutton due to a large fuel oil leak. Tech Spec 3.8.1 will be entered.
4	None	R (ATC, SRO) N (BOP)	Raise power at 1.6 Mw/min.
5	IMF CV05 600 5	I (ATC, SRO)	Letdown line pressure controller failure causes 1CV131 to fail closed.
6	IMF CC01B	C (BOP, SRO) TS (SRO)	1A CC pump trips, requiring a manual start of the 1B CC pump. Tech Spec 3.7.7 will be entered.
7	IMF ED15D IMF ED15G IMF ED15I	C (BOP, SRO)	Loss of Off-Site Power (SATs to Unit 1). The crew will GO to 1BOA ELEC-4, LOSS OF OFFSITE POWER UNIT 1 and subsequently to 1BOA ELEC-3, LOSS OF 4KV ESF BUS to attempt to Energize/Load Bus 142
8	IMF EG08A	M (ALL)	1A Diesel Generator seizure, Loss of All AC Power

9	FW44	C	Auxiliary Feedwater Pump 1B Trips
*	(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor		

SCENARIO N19-1 OVERVIEW

54.0% power (due to a grid issue), 644 MW, BOL, steady state, 946 ppm boron, equilibrium xenon. The fuel is preconditioned to 100% power. Online risk is green. 1A FW pump is OOS for an alignment and vibration problem; it is expected back in service in one week. Following completion of turnover, the shift manager directs continuation of 1B Diesel Generator loading per 1BOSR 8.1.2-2 step F.7.b. Ten minutes of operation at 2750KW is complete. It is expected that Power Team will order a ramp to 880 MWe at 1.6 MWe/min when 1B Diesel Generator is fully loaded.

After completing shift turnover and relief; the BOP will continue the loading of 1B Diesel Generator per 1 BOSR 8.1.2-2, 1B DIESEL GENERATOR OPERABILITY SURVEILLANCE, at step F.7.b. The BOP will raise load to 4100 KW while maintaining KVARs between 0 and 1000. After 10 minutes elapsed time load will be raised to≥ 4950 KW and ≤ 5500 KW.

After 1B Diesel Generator load increase to 4100KW; turbine impulse pressure channel 1PT-505 will fail to 450 psig over a 30 second period. Control rods will begin automatically withdrawing. The RO will implement BHC 1-RD, UNCONTROLLED ROD MOTION, check turbine power stable, and place rod control in manual to stop the outward rod motion. The crew may implement 1BOA ROD-1 UNCONTROLLED ROD MOTION to diagnose the reason for the control rod motion. After recognizing the instrument failure (1PT-505 is about 50 psig higher than 1PT-506) 1BOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL, Attachment D, will be implemented. The crew will defeat the failed instrument and the RO will restore Tave – Tref deviation. Technical specification 3.3.1, conditions A and P apply.

After 1PT505 failure is addressed; the local Equipment Operator will contact the Control Room and report that there is a large fuel oil leak on the 1B Diesel Generator, he has depressed the Emergency Stop pushbutton and he has exited the room. Tech Spec 3.8.1, condition B applies. The 1B DG will remain unavailable for the remainder of the scenario. On-line risk will rise to yellow.

After the 1B DG failure is addressed, Power Team will request Unit 1 raise power to 880 MWe at 1.6 MWe/min due to grid demand.

After a measurable change in power; letdown line pressure controller 1CV131 will close. The letdown PCV will close and letdown pressure will rise, potentially lifting the letdown line relief valve. The RO will implement BHC 1-LD, LETDOWN MALFUNCTION, establish manual control of 1CV131, and subsequently isolate letdown if the letdown relief valve lifts. Letdown will be re-established per 1BOA ESP-2, RE-ESTABLISHING CV LETDOWN, if it had been isolated.

After the 1CV131 failure is addressed; the 1A CC pump will trip. The 1B CC pump will NOT automatically start on low pressure however a manual start will work. This may cause entry into 1BOA PRI-6, COMPONENT COOLING MALFUNCTION. The US will enter Tech. Spec. 3.7.7. Condition B for the failed 1A CC pump. Also, IF THE Unit 0 Component Cooling Pump has not been aligned for standby, Required Action 3.8.1.B.3 applies to Declare required feature(s) supported by the inoperable DG inoperable, within 4 hours, when its required redundant feature(s) is inoperable (1B Component Cooling Pump).

After the 1A CC pump failure is addressed; a loss of all offsite power will occur, the crew will GO to 1BOA ELEC-4, LOSS OF OFFSITE POWER UNIT 1 and subsequently to 1BOA ELEC-3, LOSS OF 4KV ESF BUS to attempt to Energize/Load Bus 142.

While performing actions to Limit Bus 142 Load; the 1A DG engine supplying Bus 141 seizes, resulting in a loss of all AC power to Unit 1. Entry will be made to 1BCA-0.0, LOSS OF ALL AC POWER. A limited crosstie to Unit 2 will be **required due to the reported failure of the 2B DG to energize bus 242. The crew must restore power to Unit 1 within 10 minutes.** Additionally, while taking actions to restore Bus 141, AF Pump 1B will trip due to a low lube oil pressure condition and will be unable to be restarted. This will require the start of 1A AF pump to maintain heat sink after Bus is re-energized.

The scenario is complete when the crew has cross-tied power from Unit 2 to Unit 1, started AF Pump 1A and isolated RCP seal injection by closing seal injection filter inlet valve(s) prior to starting a CV pump.

Critical Tasks

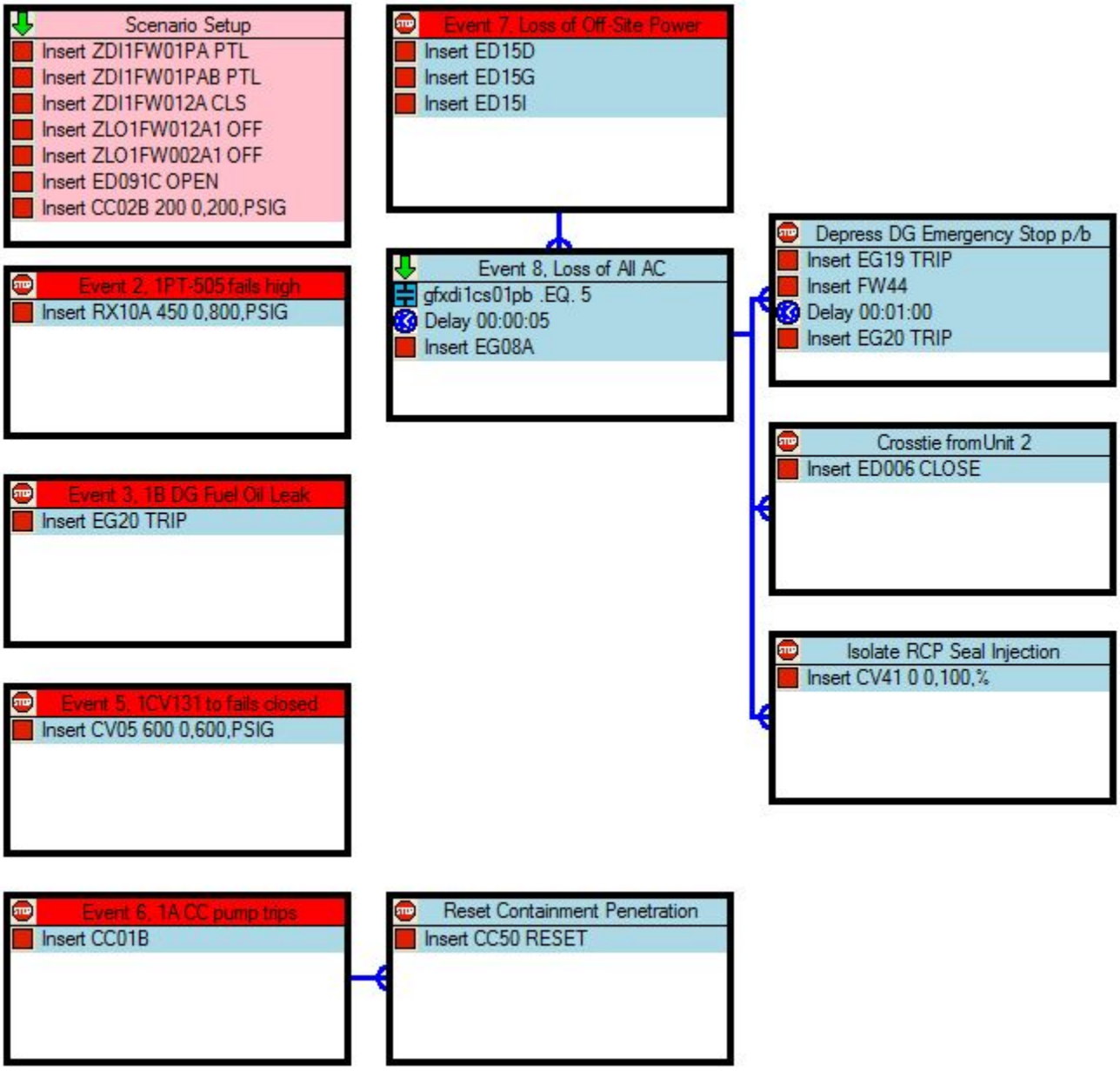
TCA#3: Align alternate a-c power source within 10 minutes of onset of SBO.
(UFSAR 8.3.1.1.2.2 pg. 8.3-10, R14) (K/A number – 000055EA2.03 importance 3.9/4.7)

CT-27: Isolate RCP seal injection before a CV pump is started in 1BCA-0.0.
(K/A number – 000003A4.01 importance 3.3/3.2)

CT-4: Establish AFW to the SGs when power is restored to ESF Bus and before transition out of 1BCA 0.0 to prevent entry to 1BFR-H.1.
(K/A number – 000061A2.04 importance 3.4/3.8)

SIMULATOR SETUP GUIDE:

- Verify/perform TQ-BY-201-0113, Appendix A, Simulator “Ready for Training” Checklist.
- Establish the conditions of IC 171, 55% power, BOL, equilibrium xenon
  - (IC-16 with 1B Diesel Generator in Operation per 1BOSR 8.1.2-2 step F.7.b at 2750KW loading)
- Place Simulator in RUN
- Initiate Smart Scenario:
  - Open SMART SCENARIO (Extreme Ace icon)
  - Open file Scenario N19-1.ssf
  - Load Initial values for instrument failures; Event 2
  - Click on the MODE button (near top of screen) and pick EXECUTE
  - Click on the PLAY button (bottom left of screen)
- Verify the following are included in the Smart Scenario:



- Verify malfunctions and overrides from Scenario Setup command box have input into Instructor Station Summary

- Ensure REMA is available at the Unit Desk
- Provide copies of the following documents:
  - 1 BOSR 8.1.2-2, 1B DIESEL GENERATOR OPERABILITY SURVEILLANCE, marked up to step F.7.b ready to increase load to 4100KW.
- Provide timer at cart along with 1 BOSR 8.1.2-2.
- Set AB Pot to 3.69 for 946 ppm boron
- Verify the Online Risk Placard is Green
- Place clearance order INFO tag on the following control switches:
  - 1A FW Pump – PTL
  - 1A FW Pump Aux Oil Pump – PTL
  - 1FW012A – CLS
  - 1FW002A – power removed
- Place Protected Equipment placards at the following locations:
  - 1B FW Pump
  - 1C FW Pump

Turnover Information

- Unit 1 is at 54.0%
- 644 MWe
- RCS boron concentration is 946 ppm
- Equilibrium xenon
- Control bank D @ 150 steps
- BA Flow Cont Vlv, Pot = 3.69
- The fuel is preconditioned to 100% power.
- 1A FW pump is OOS for an alignment and vibration problem; it is expected back in service in one week.
- Following completion of turnover, the shift manager directs continuation of 1B Diesel Generator loading per 1BOSR 8.1.2-2 step F.7.b. Ten minutes of operation at 2750KW is complete.
- It is anticipated that Power Team will order a ramp to 880 MWe at 1.6 MWe/min during the shift.
- Online Risk is Green
- Protected Equipment:
  - 1B FW Pump
  - 1C FW Pump

Event 1: Continue Loading 1B Diesel Generator per 1BOSR 8.1.2-2 step F.7.b

Acknowledge requests as Equipment Operator to monitor the Diesel Generator and its auxiliaries.
Report as required; normal operation and parameters.

Event 2: Turbine impulse pressure channel 1PT-505 fails high

At Lead Evaluator's cue, use Smart Scenario to fail 1PT-505 to 450 psig over a 30 second period by right clicking on the box titled, **Event 2, 1PT505 fails high**, and select, **Release**

If crew requests an operator to trip or bypass bistables, respond that an operator will be called in, briefed, and will contact the US when they are ready.

Acknowledge as Shift Manager the failure report, LCOAR entry, on line risk assessment, EAL evaluation, request for maintenance support, IR request, and placing Control Rods to Manual to restore Tave.

Event 3: 1B DG Fuel Oil Leak

At Lead Evaluator's cue, use Smart Scenario to Trip the 1B Diesel Generator by right clicking on the box titled, **Event 3, 1B DG Fuel Oil Leak**, and select, **Release**

- **Report as local Equipment Operator:** 1B Diesel Generator has a large Fuel Oil Leak and that I have depressed the Emergency Stop pushbutton and exited the room.

If asked, report as Unit 2 that both U-2 DGs are operable.

Acknowledge as SM entry into TS 3.8.1, condition B entry, on line risk assessment (yellow), request for common cause failure analysis, request for maintenance support, and IR requests.

As Equipment Operator if subsequently requested to determine cause of leak, wait five minutes and report: fuel oil line leak and is now stopped.

Once recognized that the Offsite AC Power Availability surveillance needs to be performed, report that an assist NSO will perform the surveillance**.**

Event 4: Raise power at 1.6 Mw/min

As Power Team, contact the MCR by phone and request Unit 1 raise power to 880MW at 1.6 MW/min due to grid demand.

Acknowledge as chemistry/rad protection requests for RCS samples (if required).

Acknowledge as Power Team initiation of ramp.

Event 5: Letdown line pressure controller failure causes 1CV131 to fail closed

At Lead Evaluator's cue, use Smart Scenario to initiate PCV131 Auto Controller Failure by right clicking on the box titled, **Event 5, 1CV131 tc fails closed**, and select, **Release**

If dispatched as EO to investigate 1PT-131, wait three minutes and report no visible damage to 1PT-131. If requested to observe valve stroke and/or check for air leaks, report: it no air leaks present and the valve strokes smoothly.

Acknowledge as SM 1PK-131 failure, on line risk assessment, requests for maintenance support, and IR requests.

Event 6: 1A CC pump trips

At Lead Evaluator's cue, use Smart Scenario to fail 1A Component Cooling Pump by right clicking on the box titled, **Event 6, 1A CC pump trips**, and select, **Release**

If dispatched as EO to investigate 1A CC pp breaker, wait three minutes and report: "C" phase OC relay flag has "dropped".

If dispatched as EO to investigate 1A CC pp, wait three minutes and report no visible damage.

Acknowledge as SM 1CC01PA failure, on line risk assessment, requests for maintenance support, and IR requests.

If Containment Penetration Cooling alarm needs to be reset, then right click on the box titled, **Reset Containment Penetration**, and select, **Release**

Event 7: Loss of Off-Site Power

At Lead Evaluator's cue, use Smart Scenario to initiate a Loss of Off Site Power by right clicking on the box titled, **Event 7, Loss of Off-Site Power**, and select, **Release**

Event 8: Loss of All AC Power

When Containment Spray Pump B control switch has been placed to Pullout, use Smart Scenario to verify a Dual Unit Loss of ALL AC has automatically inserted, **Event 8, Dual Unit Loss of ALL AC**, and select, **Release**, and record the time.

Record time loss of all AC power occurred: _____:_____:_____.

Record time AC power restored to Bus 141: _____:_____:_____.

Calculate time to restore AC power: _____:_____:_____.

After STA requested, as STA report CSF status

When requested as EO to start the U1 D/Gs, report that 1A D/G is seized, 1B DG has previously been shut down due to the large fuel oil leak.

When requested as EO to depress U1 DG emergency stop push buttons, acknowledge the request.

- Wait two minutes, then use Smart Scenario to depress U1 DG emergency stop push buttons by right clicking on the box titled, **Depress DG Emergency Stop p/b**, and select, **Release**

When requested as Unit 2 operator, report: **ONLY** Bus 241 is energized and that it is energized from 2A DG, acknowledge request to perform 2BCA-0.3, and acknowledge request to monitor crosstie current as loads are started.

- Use Smart Scenario to align Unit 2 4KV ESF buses to Unit 1 by right clicking on the box titled, **Crosstie from Unit 2**, and select, **Release**

Acknowledge as EO request to monitor 1B AF pump and request to maintain 1B AF pump day tank level.

Acknowledge as EO request to throttle 1AF005E, F, G and H.

When requested as EO to investigate 1B AF Pump Trip, report; Lo Lube Oil Pressure locked in.

When requested as Unit 2 operator: report there is adequate capacity to support loading of the 1A AF Pump on Bus 241.

When requested as EO to isolate RCP seals, acknowledge the request.

- Wait three minutes, then use Smart Scenario to isolate RCP seals by right clicking on the box titled, **Isolate RCP Seal Injection**, and select, **Release**
  - When complete, report RCP seal isolation to MCR

Acknowledge as EO request to check inverter status.

Event 9: Auxiliary Feedwater Pump 1B Trips

If contacted as EO to investigate AFW Pump 1B failure, wait 3 minutes and report; that a low lube oil pressure alarm is locked in.

Op-Test No.: 201-301 Scenario No.: N19-1 Event No.: 1

Event Description: Continue Loading 1B Diesel Generator per 1BOSR 8.1.2-2 step F.7.b

Time	Position	Applicant's Actions or Behavior
	CUE	• From turnover, 10 minutes of operation at 2750KW is complete
EVALUATOR NOTE:		**1B Diesel Generator will be loaded in two steps, When the load to 4100 KW is complete and with lead examiner's concurrence, insert Event 2, Turbine Impulse Channel 1PT-505 failure. Following completion of Event 2, the 1B Diesel Generator should be loaded to full load.**

	BOP	• Load the DG per the loading schedule:
		  • RAISE Diesel Generator Load to 4100 KW by going to RAISE on the Diesel Gen1B Gov Adj control.
		  • ADJUST Diesel Generator as necessary to MAINTAIN reactive load between 0 and 1000 KVARS Out using the Diesel Gen 1B Volt Adj control
		• After 10 minutes of operation at 4100KW, load the Diesel Generator to full load:
		  • RAISE Diesel Generator Load to ≥ 4950 KW and ≤ 5500 by going to RAISE on the Diesel Gen1B Gov Adj control.
		  • ADJUST Diesel Generator as necessary to MAINTAIN reactive load between 0 and 1000 KVARS Out using the Diesel Gen 1B Volt Adj control
		  • RECORD Clock time when the Diesel Generator output ≥ 4950 KW and ≤ 5500 KW:
		  ○ Notify the local Equipment Operator to monitor the Diesel Generator and its auxiliaries continuously.

EVALUATOR NOTE:		**After the actions to fully load the 1B Diesel Generator and Event 2, 1PT-505 failure, are complete and with lead examiner's concurrence, insert event 3.**

Op-Test No.: 201-301 Scenario No.: N19-1 Event No.: 2

Event Description: Turbine impulse pressure channel 1PT-505 fails high

Time	Position	Applicant's Actions or Behavior
	CUE	o Annunciator 1-14-E1, TAVE CONT DEV LOW • 1PI-505, first stage pressure, indication rising. • Control rod outward motion. • 1TR-0412, Auct Tave/Tref recorder, Tref indication rising • 1SI-412, Rod Speed, indicates about 8 step per minute
	ATC / BOP	• Determine control rods withdrawing. o Identify 1PT-505 is failing high. • Report failure to US • Implement BHC 1-RD, UNCONTROLLED ROD MOTION • Check turbine power stable • Place rod control in manual
	CREW	o Reference BAR 1-14-E1. o Implement 1BOA ROD-1 UNCONTROLLED ROD MOTION to diagnose the reason for the control rod motion. • Identify entry conditions for 1BOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL.
	US	• Notify SM of plant status and procedure entry • Request evaluation of Emergency Plan conditions o Implement 1BOA INST-2 OPERATION WITH A FAILED INSTRUMENT CHANNEL, Attachment D TURBINE IMPULSE PRESSURE CHANNEL FAILURE and direct operator actions of 1BOA INST -2 to establish the following conditions.
	ATC / BOP	o Restore steam dumps. o Check C-7 bypass permissive NOT LIT. o Perform the following: o Place 1PK-507, MS header pressure controller, in manual. o Lower 1PK-507 demand to 0%. o Place steam dump mode select switch to STM PRESS mode. • Place 1PK-507 in auto. o Check reactor power < 100% RTP o Defeat 1PT-505: • Place 1PS505Z, turbine impulse pressure defeat C/S, to DEFEAT 505
	ATC	• Check Tave – Tref stable and within 1°F • Check if rod control can be placed in auto • Check C-5 bypass permissive NOT LIT. • Check Tave/Tref stable and within 1°F. • 1TR-412 at 1PM05J • HMI display o Adjust Tave – Tref within 1°F by manually inserting control rods • Place rod bank select switch in AUTO.

Op-Test No.: 201-301 Scenario No.: N19-1 Event No.: 2

Event Description: Turbine impulse pressure channel 1PT-505 fails high

Time	Position	Applicant's Actions or Behavior

	ATC / BOP	• Check P13 interlock
		  • Turbine power > 10%
		  • Check P-13 bypass permissive NOT LIT at 1PM05J

	US	(RF 6a) Recognize malfunction of TS Related Instrumentation
		(RF 6b) Locate/Determine Applicable LCOs
		• LCO 3.3.1 Reactor Trip System (RTS) Instrumentation
		  o Function 17 Reactor Trip System Interlocks
		  • b. Low Power Reactor Trips Block, P-7
		  • (2) P-13 Input
		  • e. Turbine Impulse Pressure, P-13
		(RF 6c) CONDITION, REQUIRED ACTION, and COMPLETION TIME
		• CONDITION A - One or more Functions with one or more required channels or trains inoperable.
		  o A.1
		  • RA - Enter the Condition referenced in Table 3.3.1-1 [CONDITION P]
		  • CT – Immediately
		• CONDITION P - One or more channels inoperable
		  o P.1
		  • RA - Verify interlock is in required state for existing unit conditions
		  • CT - 1 hour

	US	• Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure
EVALUATOR NOTE:		**After the actions for the turbine impulse pressure channel failure are complete, and with lead examiner's concurrence, insert the next event.**

Op-Test No.: 201-301 Scenario No.: N19-1 Event No.: 3

Event Description: 1B DG Fuel Oil Leak

Time	Position	Applicant's Actions or Behavior
	CUE	• Report from local Equipment Operator of a large Fuel Oil Leak on the 1B Diesel Generator and that he has depressed the Emergency Stop pushbutton and exited the room. • Annunciator 1-22-A9, BUS 142 DG 1B FD BRKR 1423 TRIP • ACB 1423, DG 1B FEED TO 4Kv, is OPEN • Diesel Gen 1B, STOP lamp illuminated
EVALUATOR NOTE:		**The crew may elect to place the 1B DG and ACB 1423 control switches to pull out due to the DG inoperability. Step for disabling 1B DG is below.**
	BOP	○ *Place 1B DG control switch to pull out.* ○ *Place ACB 1423 control switch to pull out*.
	US	(RF 6a) Recognize malfunction of TS Related Component (RF 6b) Locate/Determine Applicable LCOs • LCO 3.8.1 AC Sources-Operating (RF 6c) CONDITION, REQUIRED ACTION, and COMPLETION TIME • CONDITION B – One required DG inoperable ○ B.1 • RA - Verify both opposite-unit DGs OPERABLE • CT - 1 hour AND Once per 24 hours thereafter AND ○ B.2 • RA - Perform SR 3.8.1.1 for the required qualified circuits • CT - 1 hour AND Once per 8 hours thereafter AND ○ B.3 • RA - Declare required feature(s) supported by the inoperable DG inoperable when its required redundant feature(s) is inoperable • CT - 4 hours from discovery of Condition B concurrent with inoperability of redundant required feature(s) AND ○ B.4.1 • RA - Determine OPERABLE DG is not inoperable due to common cause failure • CT - 24 hours OR ○ B.4.2 • RA - Perform SR 3.8.1.2 for OPERABLE DG • CT - 24 hours AND ○ B.5 • RA - Restore DG to OPERABLE status • CT 14 days AND 17 days from discovery of failure to meet LCO

Op-Test No.: 201-301 Scenario No.: N19-1 Event No.: 3

Event Description: 1B DG Fuel Oil Leak

Time	Position	Applicant's Actions or Behavior
	US	• Contact SM to initiate IR, and perform risk assessment • Identify performance of 1BOSR 8.1.1-1 Unit 1 Offsite AC Power Availability Surveillance required within one hour. • Identify performance of 1BOSR 8.1.1-1, NORMAL AND RESERVE OFFSITE AC POWER AVAILABILITY WEEKLY SURVEILLANCE, required within one hour
EVALUATOR NOTE:		**Once the crew identifies 1BOSR 8.1.1-1 is required to be performed, the SM will report that an Extra NSO will perform the surveillance.**
EVALUATOR NOTE:		**After the actions for 1B DG Fuel Oil Leak are complete and with lead examiner's concurrence, insert the next event.**

Op-Test No.: 201-301 Scenario No.: N19-1 Event No.: 4

Event Description: Raise power at 1.6 Mw/min

Time	Position	Applicant's Actions or Behavior
	CUE	○ Direction from Power Team to raise power to 880 MW at 1.6 Mw/min.
	US	• Acknowledge request to raise power to 880 MW at 1.6 Mw/min. • Implement actions of 1BGP 100-3T5, LOAD CHANGE INSTRUCTION SHEET FOR RAISING POWER ≤ 15% IN ONE HOUR. ○ Perform pre-job brief per OP-BY-101-0001 ATTACHMENT 9 REACTIVITY CHANGE BRIEF SHEET for load ramp. • Direct raising load to 880MW at 1.6 MW/min. • Initiate load swing instruction sheet, 1BGP 100-3T5.

	ATC	• Verify rod position and boron concentration.
		• Conducts reactivity brief
		• Initiate dilution IAW ReMA and BOP CV-5 or BOP CV-5T1
		  • Select STOP on RMCS Makeup Control Switch
		  • Select DIL or ALT DIL on RMCS Mode Select Switch
		  ○ Enter desired flowrate
		  ○ Verify Prescaler set to 1.0
		  ○ Reset PW/ Total Flow counter
		  • Enter desired dilution amount in PW counter
		  • Place RMCS Makeup Control Switch to START
		  • Verify 1CV110B OPEN if in ALT DIL
		  • Verify 1CV111A and B OPEN
		  • Verify proper PW flow on flow recorder 1CD-CX4102
		• Monitors effects of dilution
		o Turn on PZR backup heaters.

	BOP	• Raise turbine load at 1PM02J or OWS drop 210 by performing the following:
		  • Select SETPOINT.
		  • Enter 1.6 MW/min into the RATE window.
		  • Select ENTER.
		  • Enter 880 MW into REF DEMAND window.
		  • Select ENTER.
		  • Select EXIT.
		  ○ Notify US and RO of pending ramp.
		  • Select GO/HOLD.
		  • Verify GO/HOLD button illuminates.
		  • Verify HOLD illuminated RED.
		  • Select GO.
		  • Verify GO illuminates RED.
		  • Verify main turbine load begins to rise.

	ATC / BOP	• Monitor reactor power and load ascension:
		  • Monitor NI's, Tave, ΔI, Pzr press/level.
		  • Monitor MW and DEHC system response at 1PM02J or OWS drop 210.
		• During dilution, monitor the following at 1PM05J and HMI:
		  • VCT level.
		  • RCS Tave rising/RCS boron concentration lowering.
		  • PW/Total flow counter responding correctly.
		  • Verify dilution auto stops at preset value.
		  ○ Return Reactor Makeup System to automatic.

Op-Test No.: 201-301_ Scenario No.: _N19-1_ Event No.: __4__

Event Description: Raise power at 1.6 Mw/min

Time	Position	Applicant's Actions or Behavior
EVALUATOR NOTE:		**After measurable change in power and with lead examiner's concurrence, initiate the next event.**

Op-Test No.: 201-301 Scenario No.: N19-1 Event No.: 5

Event Description: Letdown line pressure controller failure causes 1CV131 to fail closed

Time	Position	Applicant's Actions or Behavior
	CUE	• Annunciator 1-8-B5, LTDWN HX OUTLET PRESS HIGH ○ Annunciator 1-8-B2, RCP SEAL WTR INJ FLOW LOW ○ Annunciator 1-9-B1, LP LTDWN RLF TEMP HIGH • 1FI-132, letdown line flow, lowering. • 1PI-131, letdown line pressure, rising. ○ Increased VCT makeup frequency
	ATC	• Implement BHC 1-LD, LETDOWN MALFUNCTION: ○ Place 1PK-131, letdown line pressure control valve, in manual. • Raise demand on 1PK-131. • Lower letdown line pressure sufficiently to close letdown line relief valve and/or restore letdown flow to normal. • Maintain letdown flow and pressure by operating 1PK-131 in manual. ○ Close 1CV8149A, B, & C ○ Close 1CV459 & 1CV460
	CREW	• Refer to BARs • Recognize 1CV131 closing. ○ Isolate letdown due to the lifting letdown relief valve.
	US	• Direct/Ensure RO takes manual control of 1PK-131 and isolates letdown. • Inform SM of 1CV131 failure. • Direct BOP/RO to stop load ramp/dilution. ○ If Letdown had been isolated per BHC 1-LD, directs letdown to be re-established per 1BOA ESP-2.

Op-Test No.: 201-301 Scenario No.: N19-1 Event No.: 5

Event Description: Letdown line pressure controller failure causes 1CV131 to fail closed

Time	Position	Applicant's Actions or Behavior
	ATC/BOP	○ Re-establish letdown per 1BOA ESP-2, RE-ESTABLISHING CV LETDOWN: • Check Letdown Isolated: • Verify 1CV8149A, B, & C closed. • Verify 1CV459 & 1CV460 closed. ○ Manually close 1CV460 • Check letdown flow path: • Verify 1CV8401A, 1CV8324A, 1CV8389A, 1CV8152, and 1CV8160 open. • Verify BTRS mode select switch OFF. • Align letdown controllers: • Place 1CV-131 in MANUAL and raise demand to 40%. • Place 1CV-130 in MANUAL and raise demand to 60%. • Verify charging flow established: • Verify 1CV8105 & 1CV8106 open. • Throttle 1CV182 and 1CV121 to establish 8-13 gpm seal inj and 100 gpm charging flows. • Establish letdown flow: • Open 1CV459 and 1CV460. • Open 1CV8149A/B/C to establish 120 gpm letdown. • Adjust 1CV131 controller to 360 psig • Adjust 1CC130A/B controller to 90° to 115°F and place in AUTO • Verify 1PR06J in service at RM-11 console.
	BOP	• Refer to BARs • Support RO by monitoring panels and providing assistance as requested.
EVALUATOR NOTE:		**After the actions for the Letdown line pressure controller are complete and with lead examiner's concurrence, insert the next event.**

Op-Test No.: 201-301 Scenario No.: N19-1 Event No.: 6

Event Description: 1A CC pump trips

Time	Position	Applicant's Actions or Behavior
	CUES	• Annunciator 1-2-A4, CC PUMP TRIP • Annunciator 1-2-B5, CC PUMP DSCH PRESS LOW • 1PI-CC107 (CC pump discharge pressure) LOWERING • Annunciator 1-7-A/B/C/D4, RCP 1A/B/C/D THERM BARRIER CC WTR FLOW LOW • Annunciator 1-7-E4, RCP THERM BARRIER CC WTR FLOW HIGH LOW • Annunciator 1-7-A/B/C/D5, RCP 1A/B/C/D BRNG CC WTR FLOW LOW • Annunciator 1-7-E5, RCP BRNG CC WTR FLOW HIGH LOW • Annunciator 1-2-A7, SEAL WTR HX CC FLOW LOW • Annunciator 1-2-D7, CNMT PEN CLG FLOW HIGH LOW
	CREW	• Refer to BARs • Identify/report trip of 1A CC pump
	BOP	• Place 1B CC pump C/S to START, then release. • VERIFY adequate Component Cooling flow for the plant conditions. • PLACE switch on the affected 1A CC Pump in the PULL OUT position
	US	• Direct/Ensure BOP attempts a manual start of 1B CC pump • Inform SM of 1A CC pump trip • Inform SM of 1B CC pump failure to auto-start
	US	(RF 6a) Recognize malfunction of TS Related Component (RF 6b) Locate/Determine Applicable LCOs • LCO 3.7.7 Component Cooling Water (CC) System (RF 6c) CONDITION, REQUIRED ACTION, and COMPLETION TIME • CONDITION B - One required CC pump inoperable o B.1 • RA - Restore required CC pump to OPERABLE status • CT - 7 days
EVALUATOR NOTE:		**The four hour discovery time from LCO 3.8.1, CONDITION B, RA B.3 (declare 1B CC Pump Inoperable due to Diesel Generator inoperability and redundant features inoperable) is now applicable until the actions below are taken**.
	US	o Direct aligning Unit 0 Component Cooling Pump o Place CC Pump 1A control switch to Pull-To-Lock o Place CC Pump 0 control switch for Bus 141 in Normal-After Trip
EVALUATOR NOTE:		**After the actions for the 1A CC Pump Trip are complete and with lead examiner's concurrence, insert the next event.**

Op-Test No.: 201-301 Scenario No.: N19-1 Event No.: 7

Event Description: Loss of Off-Site Power

Time	Position	Applicant's Actions or Behavior
	CUE	• Annunciator 1-20-A1, LOSS OF OFFSITE POWER • Annunciator 1-20-A3, SAT 142-1 LOCKOUT RELAY TRIP • Annunciator 1-20-A4, SAT 142-2 LOCKOUT RELAY TRIP • Annunciator 1-20-A6, BUS 159 FD BRKR 1592 TRIP • Annunciator 1-20-A8, BUS 158 FD BRKR 1582 TRIP • Annunciator 1-21-A7, BUS 141 FD BRKR 1412 TRIP • Annunciator 1-22-B7, BUS 141 CONT PWR FAILURE
	Crew	○ Refer to BARs. • Determine Loss of Off-Site Power has occurred.
	US	• Enter/Implement 1BOA ELEC-4, LOSS OF OFFSITE POWER • Notifies SM of plant status and procedure entry. • Requests evaluation of Emergency Plan conditions.
	BOP	VERIFY POWER TO 4KV ESF BUSES: • Bus 141 Energized • Determines Bus 142 NOT energized
	US/BOP	• Enter/Implement 1BOA ELEC-3, LOSS OF 4KV ESF BUS
	BOP	VERIFY REQUIRED ESF LOADS ENERGIZED ON BUS 141 • Bus 131X • Bus 131Z • CENT CHG pump 1A • AF pump 1A • RCFC 1A • RCFC 1C • CC pump 0 • SX pump 1A • VC Train 0A • VA supply and exhaust fans

		CHECK BUS 142 NOT FAULTED
		• Place DG 1B feed breaker control switch ACB 1423 in - PULL OUT
		• Place breaker control switches in - PULL OUT
		  • Non-ESF bus tie (ACB 1421)
		  • SAT feed (ACB 1422)
		  • Reserve feed (ACB 1424)
		• Check Bus 142 lockout alarms - NOT LIT
		  • BUS 142 FD BRKR 1422 TRIP (1-22-A7)
		  • BRKR 1424 CROSS-TIEOVERCURRENT (1-22-B8)
		  • DG 1B OVERLOAD (1-22-B9)

EVALUATOR NOTE:		**Event 8, Loss of All AC Power with 1A Diesel Generator seizure will occur after CS pump 1B is placed in PULL OUT.**

Op-Test No.: 201-301_ Scenario No.: _N19-1_ Event No.: __7__

Event Description: Loss of Off-Site Power

Time	Position	Applicant's Actions or Behavior
	BOP	LIMIT BUS 142 LOAD • Place loads in - PULL OUT • CV pump 1B • RH pump 1B • SI pump 1B • CS pump 1B ○ CC pump 0 feed from Bus 142 ○ CC pump 1B

Op-Test No.: 201-301 Scenario No.: N19-1 Event No.: 8

Event Description: Loss of All AC Power

Time	Position	Applicant's Actions or Behavior
	CUE	• Annunciator 1-21-C7, BUS 141 OVERLOAD OR VOLT LOW • Annunciator 1-21-D6, 125V DC BUS 11 GROUND • Annunciator 1-21-E8, 125V DC BATT CHGR 11 TROUBLE
	CREW	• Determine Loss of All AC Power has occurred.
	US	• Enter/Implement 1BCA-0.0, LOSS OF ALL AC POWER • Notifies SM of plant status and procedure entry. • Requests evaluation of Emergency Plan conditions.
EVALUATOR NOTE:		**Record time loss of all AC power occurred. _____:_____:_____**
	ATC	Perform immediate operator actions of 1BCA-0.0: o Manually trip reactor at 1PM05J or 1PM06J. o Verify reactor trip at 1PM05J: • Reactor trip & Bypass breakers - OPEN • Neutron flux – DROPPING
	BOP	Perform immediate operator actions of 1BCA-0.0: • Manually Isolate Steamlines at 1PM05J or 1PM06J: • Actuate main steamline isolation. • Verify all MSIVs and MSIV Bypass valves – CLOSED.
	BOP	• Verify AF flow: • AF flow >500 gpm (1B AF train only)
	ATC	• Verify RCS isolated: • 1CV8149A, B & C CLOSED. • 1CV459 and 1CV460 CLOSED. • 1RY455A and 1RY456 CLOSED. • 1CV8153A & B CLOSED. • RCPs NOT RUNNING.
	BOP	• Try to restore power to any/both Unit 1 4KV ESF buses at 1PM01J: • Manually start DGs • Check at least one ESF bus energized – none energized • Actuate SI from both locations.
	BOP / US	• Prepare for ESF Bus crosstie: • Dispatch operator to depress emergency stop push buttons on both U1 DGs. o Reset SI (60 seconds after manual actuation).
	US	• Check status of Unit 2 ESF buses: • Bus 241 – energized from 2A DG. • Notify Unit 2 to implement 2BCA-0.3, RESPONSE TO OPPOSITE UNIT LOSS OF ALL AC POWER. • Bus 242 – de-energized • Go to 1BCA-0.0, Step 14 (limited crosstie).

Op-Test No.: 201-301 Scenario No.: N19-1 Event No.: 8

Event Description: Loss of All AC Power

Time	Position	Applicant's Actions or Behavior

[CT]	BOP/US
	
	TCA#3
		• Energize Bus 141 using limited Unit 2 crosstie (DG 2A):
		  • Bus 241 ENERGIZED from 2A DG.
		  • Check Bus 141 – NOT FAULTED:
		  • ACB 1413 (DG feed) in PULL OUT.
		  • ACB 1411 (Non-ESF bus tie) in PULL OUT.
		  • ACB 1412 (SAT feed) in PULL OUT.
		  • ACB 1414 (Reserve feed) in PULL OUT.
		  • Verify Bus 141 alarms NOT LIT:
		  • Annunciator 1-21-A7, BUS 141 FD BRKR ACB 1412 TRIP.
		  • Annunciator 1-21-B8, BRKR 1414 CROSS-TIE OVERCURRENT.
		  • Annunciator 1-21-B9, DG 1A OVERLOAD.
		  • Place ESF loads in PULL OUT:
		  • CENT CHG pumps
		  • RH pumps
		  • SI pumps
		  • 1A AF pump
		  • RCFCs (HI and LO)
		  • CS pumps
		  • CC pumps (1A, 1B, and 0)
		  • SX pumps
		  • MCR chillers
		  • SX Tower Fans (0A, 0B, 0E, and 0F Hi and Lo)
		  • Check ACB 2414 closed
		  • Synch and Close Bus 141/241 reserve feeder breaker:
		  • **Close ACB 1414**
		  • Check Bus 141 energized.
		  • Check 480 V ESF buses energized
		  • Bus 131X
		  • Bus 131Z

EVALUATOR NOTE:		**Record time AC power restored: _____:_____:_____** **Time power restored – time power lost = _____:_____:_____ (<10 minutes)**

	BOP/US	• Check VC Train 0A fans – RUNNING:
		  • Start 0A supply fan, 0A return fan, & 0A makeup fan.
		  • Notify TSO to implement an emergency AC restoration program.
		  • Go to step 16.

Op-Test No.: 201-301 Scenario No.: N19-1 Event No.: 8

Event Description: Loss of All AC Power

Time	Position	Applicant's Actions or Behavior

[CT]	BOP/ATC
	CT-4
		• Check AF pump status:
		  • **Determines 1B AF pump – is NOT RUNNING.**
		  • **Starts AF Pump 1A**
		• Check SG levels:
		  • Maintain NR levels between 10% (31%) and 50%.
		  • Check 1A and 1D SG PORVs in AUTO.

[CT]	BOP/RO
	CT-27
		• Isolate RCP seals:
		  • **Dispatch operator to locally close 1CV8384A & B**.
		  • **Close 1CC9438.**
		  • **Verify/Close 1CV8100.**

	RO/BOP	• Verify Equipment loaded on Bus 141: • Annunciator 1-21-E8, 125V DC BATT CHGR 111 TROUBLE - NOT LIT • Annunciator 1-4-A5, Bus 111 INVERTER TROUBLE - NOT LIT • Annunciator 1-4-C5, Bus 113 INVERTER TROUBLE - NOT LIT • Dispatches operator to check inverter status when annunciators LIT
	US	○ Restore Unit 1 SX cooling per 1BCA-0.0, LOSS OF ALL AC POWER, ATTACHMENT C, STATION BLACKOUT – ALTERNATE SX COOLING
EVALUATOR NOTE:		**Scenario is terminated when decision to implement Attachment C occurs.**

Facility: Byron Scenario No.: N19-2 Op-Test No.: 2019-301

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: IC-172; 100% power 1246 MW, MOL, steady state, 845 ppm boron, equilibrium xenon

Turnover: Online risk is green. 1BOSR 5.5.8.RH.5-1a GROUP A INSERVICE TESTING (IST) REQUIREMENTS FOR RESIDUAL HEAT REMOVAL PUMP 1RH01PA at step F.10. Following turnover, Shift Manager directs the shutdown of the 1A RH pump and the restoration of the 1A RH system per BOP RH-2. An AND request for a 100MWe load reduction at 4MWe/min is anticipated during the shift.

Event No.	Malf. No.	Event Type*	Event Description
1	None	N (BOP, SRO) TS (SRO)	Shutdown the 1A RH pump per 1BOSR 5.5.8.RH.5-1a and restore the 1A RH system from recirculation per BOP RH-2. Tech Spec 3.6.3 will be entered.
2	IOR ZDI1CV181 CLS IOR PN0618 ON	C (ATC, SRO)	1A RCP #3 Seal Standpipe level low. ATC responds per BAR 1-7-A7 to restore level.
3	None	R (ATC, SRO) N (BOP)	AND requests load reduction of 100 MWe to be performed at 4 MW/min.
4	IMF SW01A	C (BOP, SRO) TS (SRO)	SX Pump 1A trips. SX Pump 1B will be manually started per BHC 1-2-A1. Tech Spec 3.7.8 will be entered.
5	IMF CH03D	C (BOP, SRO)	CRDM Exhaust Fan 1D trips. An additional CRDM Exhaust Fan will be started per BOP VP-9.
6	IMF RX13A 0 20	I (ATC, SRO) TS (SRO)	Pressurizer Level Transmitter 1LT459 fails low. Tech Specs 3.3.1 will be entered.
7	IMF SI05A 500 IMF SI03A 500 IMF RH10A 5000 IMF RM06V -4.5 30	M (ALL)	RCS leak in RH Pump 1A Cubicle.
8	IMF RP30A (preload) IMF RP30B (preload) IOR ZDISIA1 (preload)	C (ALL))	Train A Automatic SI failure Train B Automatic SI failure 1PM05J SI Actuate failure

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

SCENARIO N19-2 OVERVIEW

100% power 1246 MW, MOL, steady state, 845 ppm boron, equilibrium xenon. Online risk is green. 1BOSR 5.5.8.RH.5-1a GROUP A INSERVICE TESTING (IST) REQUIREMENTS FOR RESIDUAL HEAT REMOVAL PUMP 1RH01PA at step F.10. Following turnover, Shift Manager directs the shutdown of the 1A RH pump and the restoration of the 1A RH system per BOP RH-2. An AND request for a 100MWe at 4MWe/min load reduction is anticipated during the shift.

After completing shift turnover and relief; the BOP will shut down the 1A RH pump per step F.10 of 1BOSR 5.5.8.RH.5-1a, GROUP A INSERVICE TESTING (IST) REQUIREMENTS FOR RESIDUAL HEAT REMOVAL PUMP 1RH01PA, restore the 1A RH system from recirculation per BOP RH-2, SECURING THE RH SYSTEM FROM RECIRCULATION, requiring the piping be vented per BOP RH-12, DEPRESSURISSING THE RH DISCHARGE PIPING. Installing fuses is entry condition TS 3.6.3 Condition A.

After the RH system has been vented and secured; 1-7-A7 RCP 1A Standpipe Level Low will be received. The ATC will respond per the Bar to open 1CV181 to fill the standpipe and clear the alarm. The crew may implement 1BOA RCP-1, REACTOR COOLANT PUMP SEAL FAILURE.

After RCP 1A Standpipe Level Low has been addressed; Gen Dispatch will contact the Main Control Room to perform an AND load reduction of 100MWe at the rate of 4MWe/min. The BOP will initiate a turbine load reduction per 1BGP 100-4T3, LOAD CHANGE INSTRUCTION SHEET FOR POWER REDUCTION < 15% IN ONE HOUR, while the ATC will perform reactivity calculation and perform the boration and rod insertion as determined by ReMA and using BOP CV-6T1, RCMS OPERATION IN BORATE CHECKLIST.

Following the boration; SX Pump 1A will trip. The BOP will respond by starting SX Pump 1B per BHC 1-2-A1. Tech Spec 3.7.8 condition A will be entered.

After the SX Pump 1A has been addressed, CRDM Exhaust Fan 1D will trip. BOP will refer to BAR 0-33-A5 and start an additional CDRM Fan per BOP VP-9

After an additional CRDM Exhaust Fan has been started; Pressurizer Level Transmitter 1LT459 will fail low. Letdown will automatically isolate and the RO will take manual control of charging flow. 1BOA INST 2, OPERATION WITH A FAILED INSTRUMENT CHANNEL, Attachment C, will be implemented. The RO will restore pressurizer level control to automatic after letdown is reestablished and pressurizer level is restored to normal. Tech Spec 3.3.1 conditions A and K will be entered.

After the 1LT1459 failure has been addressed; An RCS leak will develop in the RH Pump 1A Cubicle due to check valve failure following surveillance performance. The crew will Trip the reactor, enter 1BEP-0, REACTOR TRIP OR SAFETY INJECTION. Automatic Safety Injection will fail to occur and the crew will manually initiate Safety Injection. The manual Safety Injection initiation will only be successful from panel 1PM06J. The crew will proceed to 1BCA-1.2, LOCA OUTSIDE CONTAINMENT, when it is determined that Auxiliary Building Radiation Levels are Not normal. The break into the auxiliary building will be isolated and the crew will transition to 1BEP-1, LOSS OF REACTOR OR SECONDARY COOLANT.

The scenario is complete when the crew has isolated the LOCA per 1BCA-1.2

Critical Tasks

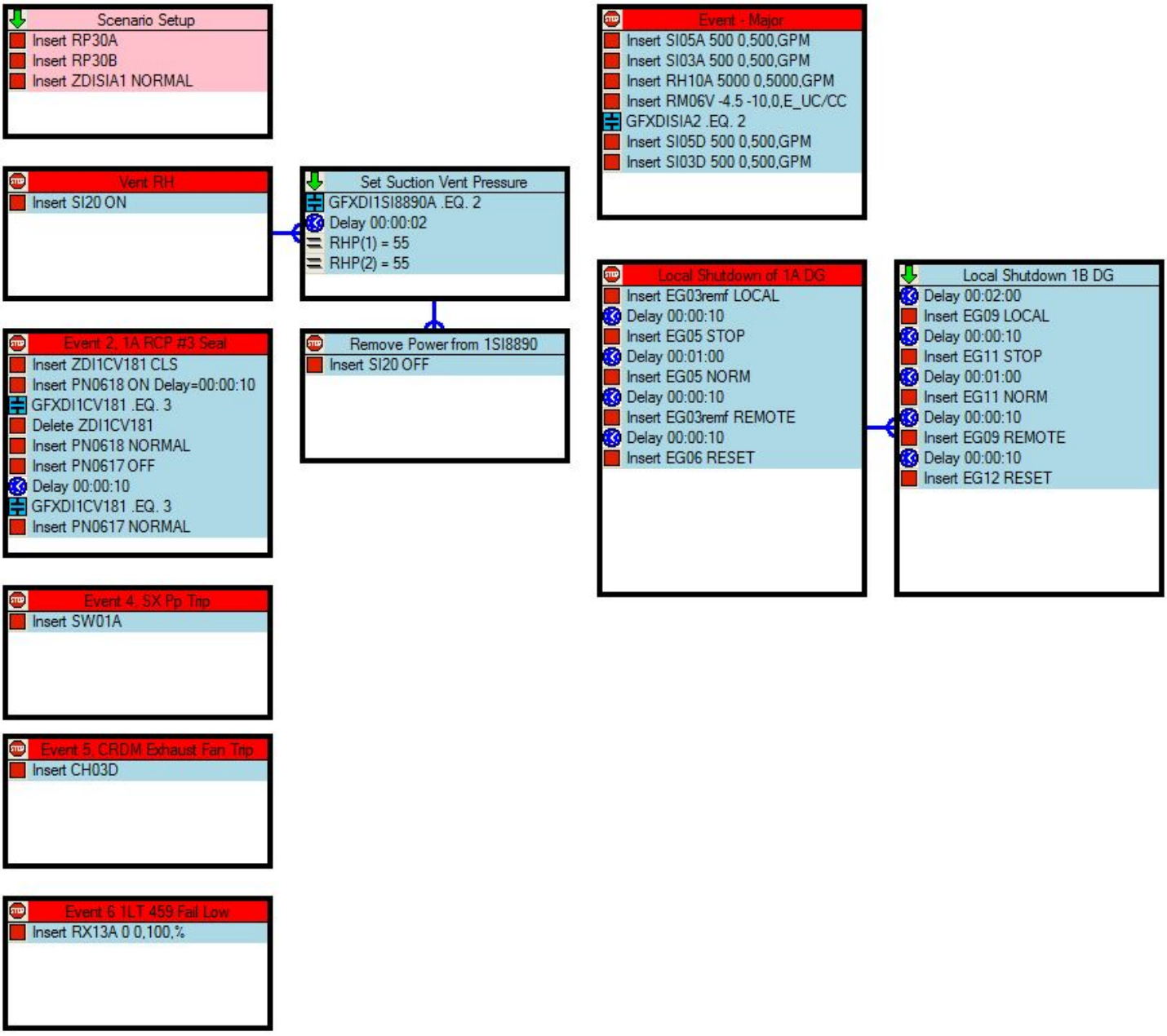
CT-2: Manually actuate at least one train of SIS-actuated safeguards before transition to 1BEP-1, LOSS OF REACTOR OR SECONDARY COOLANT.
(K/A number – 006-A2.12 importance 4.5/4.8)

CT-32: Isolate the LOCA outside containment, as evidenced by rising RCS pressure, before transition out of ECA-1.2.
(K/A number – EPE 011-EA1.09 importance 4.3/4.3)

CT: Establish manual control of Pressurizer Level Controller and/or select an operable Pressurizer Level channel to preclude RPS actuation due to PZR High Water Level. (K/A 011A2.11 importance 3.4/3.6)

SIMULATOR SETUP GUIDE:

- Verify/perform TQ-BY-201-0113, Appendix A, Simulator “Ready for Training” Checklist.
- Establish the conditions of IC 172, 100% power, MOL, equilibrium xenon
  - (IC-22 with Residual Heat Removal Pump 1RH01PA in operation per 1BOSR 5.5.8.RH.5-1a)
- Place Simulator in RUN
- Initiate Smart Scenario:
  - Open SMART SCENARIO (Extreme Ace icon)
  - Open file Scenario N19-2.ssf
  - Load Initial values for instrument failures; Event 6
  - Click on the MODE button (near top of screen) and pick EXECUTE
  - Click on the PLAY button (bottom left of screen)
- Verify the following are included in the Smart Scenario:



- Verify malfunctions and overrides from Scenario Setup command box have input into Instructor Station Summary

- Ensure REMA is available at the Unit Desk
- Provide copies of the following documents:
  - 1BOSR 5.5.8.RH.5-1a, GROUP A INSERVICE TESTING (IST) REQUIREMENTS FOR RESIDUAL HEAT REMOVAL PUMP 1RH01PA, marked up to step F.10 ready to VERIFY/STOP 1RH01PA.
  - BOP RH-2, SECURING THE RH SYSTEM
- Set AB Pot to 3.30 for 845 ppm boron
- Verify the Online Risk Placard is Green
- Place clearance order INFO tag on the following control switches: N/A
- Place Protected Equipment placards at the following locations: N/A

Turnover Information

- Unit 1 is at 100%
- 1246MWe
- RCS boron concentration is 845 ppm
- Equilibrium xenon
- Control bank D @ 221 steps
- BA Flow Cont Vlv, Pot = 3.3

- 1BOSR 5.5.8.RH.5-1a GROUP A INSERVICE TESTING (IST) REQUIREMENTS FOR RESIDUAL HEAT REMOVAL PUMP 1RH01PA at step F.10.
- Following turnover, Shift Manager directs the shutdown of the 1A RH pump and the restoration of the 1A RH system per BOP RH-2.
- An AND request for a 100MWe load reduction at 4MWe/min is anticipated during the shift.

- Online Risk is Green

- Protected Equipment:
  - None

Event 1: Shut down the 1A RH pump per step F.10 of 1BOSR 5.5.8.RH.5-1a and complete surveillance

When contacted as local Equipment Operator; report: All data is within acceptance criteria.

To energize 1SI8890A when requested; use Smart Scenario to energize 1SI8890A by right clicking on the box titled, **Vent RH**, and select, **Release.**

To de-energize 1SI8890A when requested; use Smart Scenario to de-energize 1SI8890A by right clicking on the box titled, **Remove Power from 1SI8890**, and select, **Release.**

Event 2: 1A RCP #3 Seal Standpipe level low

At Lead Evaluator's cue, use Smart Scenario to cause 1A RCP #3 Seal Standpipe level low to annunciate by right clicking on the box titled, **Event 2**, **1A RCP #3 Seal**, and select, **Release**

As SM Acknowledge request for writing IR, performing risk assessment and making appropriate notifications.

Event 3: AND requests load reduction of 100 MWe to be performed at 4 MW/min

As Generation Dispatch, contact the MCR by phone (call x3812) and request Unit 1 lower power 100 MWe at 4 MW/min due to grid demand.

Acknowledge as chemistry/rad protection requests for RCS samples (if required).

Acknowledge as Generation Dispatch initiation of ramp.

Event 4: SX Pump 1A trips

At Lead Evaluator's cue, use Smart Scenario to fail 1A Essential Service Water Pump by right clicking on the box titled, **Event 4**, **SX Pp Trip**, and select, **Release**

If dispatched as EO to investigate 1A SX Pp breaker, wait three minutes and report: 1A SX pump has an overcurrent relay target on Bus 141 Cubicle 2.

If dispatched as EO to investigate 1A SX Pp as EO, wait three minutes and report:

- 1A SX pump – NOT ROTATING
- No indications for reason of pump trip.
- 1B SX operating normally

Event 5: CRDM Exhaust Fan 1D trips

At Lead Evaluator's cue, use Smart Scenario to cause 1D CRDM exhaust fan trip by right clicking on the box titled, **Event 5**, **CRDM Exhaust Fan Trip**, and select, **Release**

If dispatched as EO to investigate CRDM Exhaust Fan D breaker, wait three minutes and report: CRDM Exhaust Fan D breaker 133X6 cubicle 4 has tripped free, no other visible indications.

As SM Acknowledge request for writing IR, performing risk assessment and making appropriate notifications.

Event 6: Pressurizer Level Transmitter 1LT459 fails low

At Lead Evaluator's cue, use Smart Scenario to initiate Pressurizer Level Transmitter 1LT459 to fail low by right clicking on the box titled, **Event 6**, **1LT 459 Fail Low**, and select, **Release**

Respond to requests for NSO support to bypass bistables – Note: Bistables will not be bypassed.

As SM acknowledge the failure, EAL evaluation for BOA entry, on line risk assessment, request for maintenance support, and IR requests

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Event 7: RCS leak in RH Pump 1A Cubicle

If contacted as Radwaste EO to investigate RCS leak in RH Pump 1A Cubicle, report: Annunciator RHR Pump 1A Leak Detection Sump Level High is LIT and pump run time is accumulating.

When requested as Equipment Operator to Stop any unloaded DG and place in standby per BOP DG-12, DIESEL GENERATOR SHUTDOWN, use Smart Scenario to perform local shutdown of Diesel Generators by right clicking on the box titled, **Local Shutdown of 1A DG**, and select, **Release**

As Chemistry, acknowledge request to sample all SGs for activity.

As SM acknowledge EOP procedure entries, EAL determinations, and request for STA.

Op-Test No.: 2019-301 Scenario No.: N19-2 Event No.: 1

Event Description: Shut down the 1A RH pump per step F.10 of 1BOSR 5.5.8.RH.5-1a and complete surveillance

Time	Position	Applicant's Actions or Behavior
	CUE	Directed at turnover to complete shutdown of 1A RH Pump and restore system per BOP RH-2.

	BOP	• Refer to 1BOSR 5.5.8.RH.5-1a, GROUP A INSERVICE TESTING (IST) REQUIREMENTS FOR RESIDUAL HEAT REMOVAL PUMP 1RH01PA.
		• VERIFY/STOP 1RH01PA.
		• VERIFY/RESTORE the 1A RH System per BOP RH-2.
		  • PLACE RH01PA, A RH Pump, Control switch in the AFTER TRIP Position.
		  • CLOSE RH618, RH Heat Exchanger A Bypass Flow Control Valve.
		  ○ CLOSE and LOCK RH8735, RH Recirc to RWST Isol Vlv, locally.
		  • VERIFY/OPEN RH8716A and B, RH HX A/B Dsch Crosstie Vlv.
		  • VERIFY/OPEN and DE-ENERGIZE SI8809A and B, RH to Cold Legs A & D/ B & C Isol Vlv.
		  • VERIFY/PLACE in AUTO RH610 and 611, RH Pump A/B Miniflow Vlv.
		  • VERIFY/CLOSE SI8840, RH to Hot Legs A and C Isol Vlv.
		  • VERIFY/OPEN SI8812A and B, RH Pp A/B Suction from RWST Isol Vlv.
		  • Determines RH piping pressure is greater than 50 psig and vents per BOP RH-12.
		• OPEN SI8871, U1 Accum Fill/Test Inside Cnmt Isol Vlv, at PM06J.
		• OPEN SI8964, U1 Accum Fill/Test to RWST/RECY HUT Isol Vlv, at PM11J.

EVALUATOR NOTE:		**The following action will be simulated by contacting the WEC to have an extra NSO install the fuses and then having Simulator Operator input/remove malfunction SI20 to provide/remove power to 1SI8890A.**
	BOP	• INSTALL the fuse block to the ON position for the SI test valve 1SI8890A.

	US	(RF 6a) Acknowledge entry/need to log 1BOL 6.3 LCOAR Containment Isolation Valves per BOP RH-12 to vent RH piping (RF 6b) Locate/Determine Applicable LCOs • LCO 3.6.3 Containment Isolation Valves (RF 6c) CONDITION, REQUIRED ACTION, and COMPLETION TIME • CONDITION A - One or more penetration flow paths with one containment isolation valve inoperable except for purge valve leakage not within limit ○ A.1 • RA - Isolate the affected penetration flow path by use of at least one closed and de-activated automatic or remote manual valve, closed manual valve, blind flange, or check valve with flow through the valve secured • CT - 4 hours AND ○ A.2 • RA - Verify the affected penetration flow path is isolated • CT - Once per 31 days for isolation devices outside containment AND Prior to entering MODE 4 from MODE 5 if not performed within the previous 92 days for isolation devices inside containment
	BOP	• PERFORM the following when RH piping has reached ~ 50 psig. • CLOSE SI8890A/B, A/B RH HX to Loop C1 Test Line Isol Vlv, at PM11J. • PLACE the fuse for the SI test valve 1SI8890A in the OFF position. • CLOSE SI8964, U1 Accum Fill/Test to RWST/RECY Hut Isol Vlv, at PM11J. • CLOSE SI8871, U1 Accum Fill/Test Inside Cnmt Isol Vlv, at PM06.
EVALUATOR NOTE:		**After the actions to vent the RH piping are complete and with lead examiner's concurrence, insert the next event.**

Op-Test No.: 2019-301 Scenario No.: N19-2 Event No.: 2

Event Description: 1A RCP #3 Seal Standpipe level low

Time	Position	Applicant's Actions or Behavior
	CUE	• Annunciator 1-7-A7, RCP 1A Standpipe Level Low will be received
	ATC	• Open valve 1CV181, RCP 1A Standpipe PW Supply Vlv • Ensure flowpath from PW System is not isolated ○ Refer to 1BOA, RCP-1 RCP Seal Failure
	US	• Ensures 1CV181 manually opened to refill the 1A RCP Standpipe • Inform SM of 1CV181 to automatically open ○ Refer to 1BOA, RCP-1 RCP Seal Failure
EVALUATOR NOTE:		**After the actions for the 1A RCP #3 Seal Standpipe level low are complete and with lead examiner's concurrence, insert the next event.**

Op-Test No.: 2019-301 Scenario No.: N19-2 Event No.: 3

Event Description: AND requests load reduction of 100 MWe to be performed at 4 MW/min.

Time	Position	Applicant's Actions or Behavior
	CUES:	○ Direction from Power Team to lower power to 100 MWe at 4MWe/min.
	US	• Acknowledge request to lower power 100 MWe at 4MWe/min. • Implement actions of 1BGP 100-4T3, LOAD CHANGE INSTRUCTION SHEET FOR POWER REDUCTION < 15% IN ONE HOUR ○ Perform pre-job brief per OP-BY-101-0001 ATTACHMENT 9 REACTIVITY CHANGE BRIEF SHEET for load ramp.
	ATC	• Performs reactivity calculation for Unit 1 ramp of 100 MWe at 4MWe/min. • Initiate boration per: BOP CV-6, OPERATION OF THE REACTOR MAKEUP SYSTEM IN THE BORATE MODE or BOP CV-6T1, RCMS OPERATE IN BORATE CHECKLIST • Place MU MODE CONT SWITCH to STOP position. • Set MU MODE SELECT to BOR position. • Set 1FK-110 BA Flow Cont Pot to desired flow rate (Batches desired) • Set Boric Acid Totalizer to desired volume • Enter/ verify correct number of gallons of Boric Acid in lower portion of Preset 2 counter • Verify 1CV110A & 1CV110B in AUTO • Ensure BA Transfer pp is NOT in Pull Out position • Place MAKE-UP CONTROL Switch to START • Ensure proper operation of valves & BA pump • 1CV110B Opens, 1CV110A Modulates , BA pump is running ○ Verify expected BA flow on recorder 1CD-CX4102 ○ Monitor for Boration effects ○ Verify at least two B/U Heater groups ON and spray valves 1RY455B/C modulate OPEN. • Monitor for RCS Tave lowering. ○ Place Rod Control in Manual utilizing RD-100 as reference ○ Manually insert Control Rods
	BOP	• Initiate turbine load ramp: Using graphic 5501(may use 1BGP 100-4 step or 100-4T3 load swing sheet) • SELECT SETPOINT • ENTER desired (4.0) MW/MIN rate in the RATE window • DEPRESS the respective ENTER pushbutton • ENTER desired final MWe output (~1100) in the REF DEMAND window • SELECT ENTER • DEPRESS EXIT • DEPRESS the GO/HOLD pushbutton • Inform US/RO of pending drop in turbine load • SELECT GO (when RO reports expected Tave drop) • Verify load lowering as expected

Op-Test No.: 2019-301 Scenario No.: N19-2 Event No.: 3

Event Description: AND requests load reduction of 100 MWe to be performed at 4 MW/min.

Time	Position	Applicant's Actions or Behavior
EVALUATOR NOTE:		**After the actions for the load reduction of 100 MWe at 4 MW/min are in progress and with lead examiner's concurrence, insert the next event.**

Op-Test No.: 2019-301 Scenario No.: N19-2 Event No.: 4

Event Description: SX Pump 1A trips

Time	Position	Applicant's Actions or Behavior
	CUE	• Annunciator 1-2-A1, SX PUMP TRIP. • Annunciator 1-2-A2, SX PUMP DISCH HDR PRESS LOW. • 1A SX pump control switch breaker position disagreement light is LIT. • 1A SX pump amps – ZERO • 1A SX pump discharge pressure - LOWERING
	BOP	• Implements BHC 1-2-A1, SX PUMP TRIP • Starts the standby1B SX pump • Holds switch until oil pump starts and 1B SX pump starts
	ATC	○ Performs support actions such as making a plant announcement, dispatching EO to pump and/or bus, and checking BAR
	US	• Direct/Ensure BOP attempts a manual start of 1B SX pump • Inform SM of 1A SX pump trip. ○ Following report of an overcurrent condition from the EO, directs placing the 1A SX pump control switch to Pull-To-Lock to clear the pump trip annunciator.

	US	(RF 6a) Recognize malfunction of TS Related Component
		(RF 6b) Locate/Determine Applicable LCOs
		  • LCO 3.7.8 Essential Service Water (SX) System
		(RF 6c) CONDITION, REQUIRED ACTION, and COMPLETION TIME
		  • CONDITION A, One unit-specific SX train inoperable
		  ○ A.1
		  • RA - Restore unit-specific SX train to OPERABLE status
		  • CT - 72 hours

EVALUATOR NOTE:		**After the actions for the 1A SX Pump Trip are complete and with lead examiner's concurrence, insert the next event.**

Op-Test No.: 2019-301 Scenario No.: N19-2 Event No.: 5

Event Description: CRDM Exhaust Fan 1D trips

Time	Position	Applicant's Actions or Behavior
	CUE	• Annunciator CRDM EXHAUST FAN TRIP (0-33-A5) is LIT. • Annunciator CRDM EXHAUST FLOW LOW (0-33-B5) is LIT. • 1D CRDM amber trip light LIT.
	BOP	• Identify failure of 1D CRDM exhaust fan and report to US.
	US	• Direct starting standby CRDM exhaust fan. • Notify SM of failure, request risk evaluation and IR initiation. ○ Direct placing ramp on HOLD (if still in progress).
	BOP	• Refer to BAR 0-33-A5. • Start standby CRDM Exhaust fan using BOP VP-9.
EVALUATOR NOTE:		**The crew may start the two non-running CRDM fans and stop the remaining, originally running, fan to maintain the preferred alignment to maintain the most even distribution across the CRDMS.**
EVALUATOR NOTE:		**The BOP should be allowed to return to inside the horseshoe prior to continuing with next event.**
EVALUATOR NOTE:		**When standby CRDM exhaust fan has been started or at lead examiner's discretion, continue with next event.**

Op-Test No.: 2019-301 Scenario No.: N19-2 Event No.: 6

Event Description: Pressurizer Level Transmitter 1LT459 fails low

Time	Position	Applicant's Actions or Behavior
	CUE	• Annunciator PZR LEVEL CONT DEV LOW (1-12-B4) ○ Annunciator PZR LVL LOW HTRS OFF LTDWN SECURED (1-12-A4) ○ Annunciator PZR HTR TRIP (1-12-A5) ○ Annunciator PZR PHASE LOSS OR REVERSAL (1-12-C5) ○ Annunciator PZR HTR SCR CLG FAN FAILURE (1-12-D5) ○ Annunciator CHG LINE FLOW HIGH LOW (1-9-D3) • PZR level indicators 1LI-460 and 461 rising.
	ATC	○ Implement BHC for Letdown Malfunction. • Identify 1LT-459 is failing low. • Identify letdown is isolated. • Report failure to US.
	CREW	○ Refer to BARs. • Identify entry conditions for 1BOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL. ○ Places ramp to HOLD
	US	• Notify SM of plant status and procedure entry. • Request evaluation of Emergency Plan conditions. • Implement 1BOA INST-2 OPERATION WITH A FAILED INSTRUMENT CHANNEL, Attachment C PRESSURIZER LEVEL CHANNEL FAILURE and direct operator actions of 1BOA INST -2 to establish the following conditions:
[CT]	ATC **[CT]**	• Perform the following at 1PM05J: • Place 1FK-121, CV pumps flow control valve OR 1LK-459, PZR master level controller, in manual. • Lower demand on 1FK-121 OR 1LK-459 in conjunction with lowering demand on 1CV182 to lower charging flow to the minimum required for RCP seal injection. • Maintain 6-13 gpm RCP seal injection flow. • **Operate 1FK-121 OR 1LK-459 in manual to minimize PZR level rise.** • **Select operable PZR level control channel:** • Place PZR level control select C/S to CH-461/CH-460. • Select operable recorder at 1PM05J: • Place PZR level select switch to CH-460 or CH-461. ○ Restore PZR heaters to normal. ○ Verify PZR backup heaters in auto ○ Cycle PZR variable heater control switch to restore to auto.
EVALUATOR NOTE:		**The unit supervisor may elect to continue on in 1BOA INST-2 while the BOP reestablishes CV letdown per 1BOA ESP-2.**

Op-Test No.: 2019-301 Scenario No.: N19-2 Event No.: 6

Event Description: Pressurizer Level Transmitter 1LT459 fails low

Time	Position	Applicant's Actions or Behavior

	BOP	• Restore normal letdown flow per 1BOA ESP-2, REESTABLISHING CV LETDOWN DURING ABNORMAL CONDITIONS.
		• Perform the following at 1PM05J:
		  • Check Letdown Isolated:
		  • Verify 1CV8149A, B, & C closed.
		  • Verify 1CV459 & 1CV460 closed.
		  ○ Manually close 1CV460
		  • Check letdown flow path:
		  • Verify 1CV8401A, 1CV8324A, 1CV8389A, 1CV8152, and 1CV8160 open.
		  • Verify BTRS mode select switch OFF.
		  • Align letdown controllers:
		  • Place 1CV-131 in MANUAL and raise demand to 40%.
		  • Place 1CV-130 in MANUAL and raise demand to 60%.
		  • Verify charging flow established:
		  • Verify 1CV8105 & 1CV8106 open.
		  • Throttle 1CV182 and 1CV121 to establish 8-13 gpm seal inj and 100 gpm charging flows.
		  • Establish letdown flow:
		  • Open 1CV459 and 1CV460.
		  • Open 1CV8149A/B/C to establish 120 gpm letdown.
		  • Adjust 1CV131 controller to 360 psig and place in AUTO
		  • Adjust 1CC130A/B controller to 90° to 115°F and place in AUTO
		• Verify 1PR06J in service at RM-11 console.

	ATC / BOP	• Check PZR level control in auto: • Place 1CV-121 and 1CV-459 in automatic when PZR level is restored to normal.
	US	• Request extra NSOs to bypass bistables for the failed channel. • Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure

Op-Test No.: 2019-301 Scenario No.: N19-2 Event No.: 6

Event Description: Pressurizer Level Transmitter 1LT459 fails low

Time	Position	Applicant's Actions or Behavior
	US	(RF 6a) Recognize malfunction of TS Related Instrumentation (RF 6b) Locate/Determine Applicable LCOs • LCO 3.3.1 Reactor Trip System (RTS) Instrumentation o Function 9, Pressurizer Water Level - High (RF 6c) CONDITION, REQUIRED ACTION, and COMPLETION TIME • CONDITION A - One or more Functions with one or more required channels or trains inoperable o A.1, Enter the Condition referenced in Table 3.3.1-1 [CONDITION K] • RA - Enter the Condition referenced in Table 3.3.1-1 [CONDITION K] • CT – Immediately • CONDITION K o K.1 • RA - Place channel in trip • CT - 72 hours OR o K.2 • RA – Reduce THERMAL POWER to < P-7 • CT - 78 hours o Determine TS 3.3.3 and 3.3.4 are NOT applicable – minimum channels operable requirement is met
EVALUATOR NOTE:		**After the actions for PZR level transmitter failure are complete and with lead examiners concurrence, continue with the next event.**

Op-Test No.: 2019-301 Scenario No.: N19-2 Event No.: 7

Event Description: RCS leak in RH Pump 1A Cubicle

Time	Position	Applicant's Actions or Behavior
	CUE:	• Annunciator RH Pump 1A DISCH PRESS HIGH (1-6-B1). • Annunciator RH Pump 1B DISCH PRESS HIGH (1-6-B2). • RH Pump 1A Disch Press 1PI-614 oscillating. • RH Pump 1B Disch Press 1PI-615 oscillating. • Pzr LEVEL – lowering. • Charging Flow rising. ○ Rad Monitor alarms on 1RE-PR013B.
	ALL/US	• Direct a manual reactor trip and operators perform immediate actions of 1BEP-0, REACTOR TRIP OR SAFETY INJECTION.
	ATC	• Manually trips reactor.
	US	Implement 1BEP-0, REACTOR TRIP OR SAFETY INJECTION, and directs operator actions. • Notifies SM of 1BEP-0 entry. • Requests Emergency Plan evaluation.
	ATC	Verify Reactor Trip • Rod bottom lights – ALL LIT • Reactor trip & Bypass breakers - OPEN • Neutron flux DROPPING
	BOP	Verify Turbine Trip • Turbine throttle valves - CLOSED • Turbine governor valves - CLOSED
	BOP	Verify power to 4KV busses • Bus 141 - ENERGIZED • Bus 142 - ENERGIZED
EVALUATOR NOTE:		**The crew should diagnose that PZR level (RCS Inventory) is not recovering and that a safety injection actuation is required.**
EVALUATOR NOTE:		**Safety Injection will Not automatically actuate or actuate from the manual switch on 1PM05J.**

Op-Test No.: 2019-301 Scenario No.: N19-2 Event No.: 7

Event Description: RCS leak in RH Pump 1A Cubicle

Time	Position	Applicant's Actions or Behavior
[CT]	ATC **[CT-2]**	Check SI status o SI actuated o SI First OUT annunciator lit (1-11-B1, 1-11-C1, 1-11-D1, 1-11-E1) o SI ACTUATED lit (1-BP-4.1) o SI Equipment running (SI pumps running, CV Cold leg injection SI8801A/B open) Determine if SI required: • Check PZR pressure < 1829 psig • Check Steamline pressure < 640 psig • Check CNMT pressure > 3.4 psig • If SI is required: • **Actuate SI from both SI switches (1PM05J and 1PM06J) and continue in 1BEP-0**
	US	Directs BOP to perform Attachment B, SI VERIFICATION of 1BEP 0.
EVALUATOR NOTE:		**Crew actions of 1BEP-0 continue below.** **BOP actions of 1BEP-0, Attachment B continue on page 24.**
	ATC/BOP	Verify AF system: • AF pumps – BOTH RUNNING • AF isolation valves 1AF13A-H - OPEN • AF flow control valves 1AF005A-H - THROTTLED • AF flow – GREATER THAN 500 GPM Check SG tubes intact: • Secondary radiation level - NORMAL AND STABLE • Narrow range levels – NOT RISING IN AN UNCONTROLLED MANNER
	ATC/BOP	Check PZR PORVs and Spray Valves • PORVs - CLOSED • PORV isol valve – at least one ENERGIZED • PORV relief path – at least one AVAILABLE • PORV in - AUTO • Isol valve - open • Normal spray valves - CLOSED
	ATC/BOP	ADJUST AF FLOW: • Lower total Feed Flow to approximately 600 gpm
	ATC/BOP	Check steam dumps – AVAILABLE • C-9 Permissive light – NOT LIT • CW Pump - AT LEAST ONE RUNNING
	ATC/BOP	Control RCS Temperature per table: • Adjust Feed Flow • Steam Release

Op-Test No.: 2019-301 Scenario No.: N19-2 Event No.: 7

Event Description: RCS leak in RH Pump 1A Cubicle

Time	Position	Applicant's Actions or Behavior
	ATC/BOP	Check if RCPs should be stopped: • All RCP's – ALL RUNNING. • High head flow 1FI-917 > 100 GPM and RCS Pressure > 1425 PSIG.
	ATC/BOP	Check pressure in all SGs: • NO SG dropping in an uncontrolled manner. • NO SG Completely Depressurized.
	ATC/BOP	CHECK IF SG TUBES ARE INTACT: • SJAE/Gland Steam Exhaust Gas radiation - HAS REMAINED LESS THAN ALERT ALARM SETPOINT. • SG Blowdown Liquid radiation – HAS REMAINED LESS THAN ALERT ALARM SETPOINT. • Main Steamline radiation - HAS REMAINED LESS THAN ALERT ALARM SETPOINT.

	ATC/BOP	CHECK IF RCS IS INTACT:
		• CNMT area radiation monitors - LESS THAN ALERT ALARM SETPOINTS:
		  • CNMT pressure - LESS THAN 3.4 PSIG
		  • CNMT floor drain sump level - LESS THAN 46 INCHES

	ATC/BOP	CHECK IF ECCS FLOW SHOULD BE REDUCED: • RCS subcooling – ACCEPTABLE • Secondary heat sink: Total feed flow to intact SGs - GREATER THAN 500 GPM – OR Narrow range level in at least one intact SG – GREATER THAN 10% (31% ADVERSE CNMT) • Determines RCS pressure – is NOT STABLE OR RISING
	US	• Contact STA to INITIATE MONITORING OF CRITICAL SAFETY FUNCTION STATUS TREES
	ATC/BOP	CHECK SG LEVELS • Narrow range levels – GREATER THAN 10% • Control feed flow to maintain narrow range levels – BETWEEN 10% AND 50%
	ATC/BOP	RESET SI: • Depress both SI reset pushbuttons • Verify SI ACTUATED permissive light - NOT LIT • Verify AUTO SI BLOCKED permissive light - LIT
	ATC/BOP	RESET CONTAINMENT ISOLATION: • Phase A
	ATC/BOP	ESTABLISH INSTRUMENT AIR TO CONTAINMENT: • Check SACs - ANY RUNNING • Open instrument air CNMT isol valves: • 1IA065 and 1IA066

Op-Test No.: 2019-301 Scenario No.: N19-2 Event No.: 7

Event Description: RCS leak in RH Pump 1A Cubicle

Time	Position	Applicant's Actions or Behavior

	ATC/BOP	CHECK IF RH PUMPS SHOULD BE STOPPED:
		• Check RCS pressure:
		  • Pressure - GREATER THAN 325 PSIG
		  ○ Pressure - STABLE OR RISING
		  ○ Stop RH pumps and place in standby

	ATC/BOP	CHECK SECONDARY RADIATION NORMAL:
		• Sample all SGs for activity:
		  • Open SG Blowdown Sample Isol valves: 1SD005A/B/C/D
		  • Request Chem Dept to sample all SGs for activity
		• Check secondary radiation trends - NORMAL FOR PLANT CONDITIONS
		• Secondary activity samples – NORMAL (WHEN AVAILABLE)

	ATC/BOP	CHECK AUXILIARY BUILDING RADIATION:
		• Check Aux Bldg radiation trends (PPC or Rad Monitoring System) - NORMAL FOR PLANT CONDITIONS:
		  • Unit 1 Aux Bldg vent stack effluent (1PR28J):
		  ○ Unit 1 Aux Bldg vent stack effluent (1PR30J):

	CREW	Transition to 1BCA-1.2, LOCA OUTSIDE CONTAINMENT
EVALUATOR NOTE:		**Crew actions of 1BCA-1.2 continue on next page.**

Op-Test No.: 2019-301 Scenario No.: N19-2 Event No.: 7

Event Description: RCS leak in RH Pump 1A Cubicle

Time	Position	Applicant's Actions or Behavior
EVALUATOR NOTE:		**Actions for 1BCA-1.2, LOCA OUTSIDE CONTAINMENT, begin on this page.**

	US	Enter and direct actions of 1BCA-1.2
		• Prepares to Stop ECCS Pumps for:
		  o Loss of all suction pressure
		  o No discharge or recirculation flow
		  o major pipe break in either the pump suction or discharge path
		• Notifies SM of BEP entry
		• Requests Emergency Plan evaluation
		• Monitors local indications for LOCA identification

	BOP	VERIFY PROPER VALVE ALIGNMENT:
		• Place control switches for SVAG VALVE 480V bus feeds at 1PM06J in - CLOSE:
		  • 480V FEED TO BUS 131X1A/X2A
		  • 480V FEED TO BUS 132X2A/X4A
		• 1RH8701A and B - CLOSED
		• 1RH8702A and B - CLOSED
		• 1SI 8840 – CLOSED
		• 1SI8802A and B – CLOSED
		• Group 3 CNMT Isol monitor lights - LIT

[CT]	ATC/BOP
	
	[CT-32]
		TRY TO IDENTIFY AND ISOLATE BREAK:
		• Reset SI recirc sump isol valves if necessary:
		  • 1SI8811A/1CV8110
		  • 1SI8811B/1CV8111
		• Reset SI CENT CHG pump miniflow isol valves:
		  • 1CV8114
		  • 1CV8116
		• Verify CENT CHG pump miniflow isol valves - OPEN:
		  • 1CV8110
		  • 1CV8111
		  • 1CV8114
		  • 1CV8116
		• Sequentially close and open the following valves (or sets of valves) one at a time while monitoring for an RCS pressure rise:
		  • **1SI8809A**
		  o 1SI8809B
		  o 1SI8835
		  o 1SI8801A AND 1SI8801B
		• Maintain affected valve(s) 1SI8809A – CLOSED
		• Realign or shutdown affected systems as necessary
		• Place control switches for SVAG VALVE 480V bus feeds at 1PM06J in - CLOSE:
		  • 480V FEED TO BUS 131X1A/X2A
		  • 480V FEED TO BUS 132X2A/X4A

Op-Test No.: 2019-301 Scenario No.: N19-2 Event No.: 7

Event Description: RCS leak in RH Pump 1A Cubicle

Time	Position	Applicant's Actions or Behavior
	ATC/BOP	CHECK IF BREAK IS ISOLATED: • RCS pressure - RISING
EVALUATOR NOTE:		**The scenario can be terminated when the crew has isolated the LOCA per 1BCA-1.2.**

Op-Test No.: 2019-301_ Scenario No.: _N19-2_ Event No.: _7__

Event Description: RCS leak in RH Pump 1A Cubicle

Time	Position	Applicant's Actions or Behavior
EVALUATOR NOTE:		**1BEP-0, Attachment B, SI VERIFICATION actions begin on this page 1BEP-0 main body actions continue on page 19.**
	BOP	**Attachment B action** Verify ECCS pumps running: • CENT CHG pumps – BOTH RUNNING • RH pumps – BOTH RUNNING • SI pumps – BOTH RUNNING
	BOP	**Attachment B action** Verify ECCS valve alignment: • Group 2 Cold Leg Injection monitor lights - LIT
	BOP	**Attachment B action** Verify ECCS flow • HHSI flow >100 gpm • RCS pressure NOT <1700 psig • If RCS pressure <1700 psig check SI pp flow > 200 gpm
	BOP	**Attachment B actions** Verify RCFCs running in Accident Mode: • Group 2 RCFC Accident Mode status lights - LIT Verify CNMT isolation Phase A • Group 3 CNMT isolation monitor lights - LIT Verify CNMT Ventilation isolation • Group 6 CNMT Vent Isol monitor lights - LIT Verify CC Pumps • CC pumps - BOTH RUNNING Verify SX Pumps running • SX pumps – 1B RUNNING Check If Main Steamline Isolation Is Required o Check SG pressure < 640 psig o Check CNMT pressure > 8.2 psig • If either condition is met, then verify MSIVs and MSIV Bypass valves closed Check if CS is required (NOT required)
	BOP	**Attachment B action** Verify FW isolated: • FW pumps tripped • FW isolation monitor lights lit • FW pumps discharge valves closed 1FW002A-C • Trip all running HD pumps

Op-Test No.: 2019-301 Scenario No.: N19-2 Event No.: 7

Event Description: RCS leak in RH Pump 1A Cubicle

Time	Position	Applicant's Actions or Behavior
	BOP	**Attachment B action** Verify both DGs running • SX valves open 1SX169A and B • Dispatch operator locally to check operation
	BOP	**Attachment B action** Verify Generator Trip • GCB 3-4 and OCB 4-5 open • PMG output breaker open

	BOP	**Attachment B action**
		Verify Control Room ventilation aligned for emergency operations:
		• Control Room Outside Air Intake radiation monitors < High Alarm setpoints
		• Operating VC train equipment running Train A
		  • Supply fan
		  • Return fan
		  • M/U fan
		  • Chilled water pump
		  • MCR chiller 0A
		• Operating VC train dampers
		  • M/U fan outlet damper NOT full closed 0VC24Y
		• VC train M/U filter light LIT
		• Operating VC train Charcoal Absorber aligned for train A
		  • 0VC43Y closed
		  • 0VC21Y open
		  • 0VC22Y open
		• Control Room pressure greater than +0.125 inches water on 0PDI-VC038

	BOP	**Attachment B action**
		Verify Auxiliary Building ventilation aligned
		• Two inaccessible filter plenums aligned
		  • Plenum A fan 0VA03CB running
		  • Damper 0VA023Y not fully closed
		  • Damper 0VA436Y closed
		  • Plenum C fan 0VA03CF running
		  • Damper 0VA072Y not fully closed
		  • Damper 0VA438Y closed
		Check Aux Building Supply and Exhaust fans
		• One Exhaust Fan running for every Supply Fan running

Op-Test No.: 2019-301 Scenario No.: N19-2 Event No.: 7

Event Description: RCS leak in RH Pump 1A Cubicle

Time	Position	Applicant's Actions or Behavior

	BOP	**Attachment B action**
		Verify FHB ventilation aligned
		• Train B fan 0VA04CB running
		  • 0VA055Y open
		  • 0VA062Y not fully closed
		  • 0VA435Y closed

	BOP	**Attachment B action** Maintain UHS Basin level > 80% Initiate periodic checking of Spent Fuel Cooling • Dispatch operator to locally check SFP level and temperature Notify Unit Supervisor of • Manual actions taken • Failed equipment status • Attachment B completed
	CREW	**Attachment B action** Shutdown unnecessary plant equipment ○ As time allows refer to 1BGP 100-4T4, REACTOR TRIP POST RESPONSE GUIDELINE ○ As time allows refer to 1BGP 100-5, PLANT SHUTDOWN AND COOLDOWN

Facility: Byron Scenario No.: N19-3 Op-Test No.: 2019-301

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: IC-176; 100% power, 1246 MW, MOL, steady state, 845 ppm boron, equilibrium xenon, CBD at 221 steps.

Turnover: Following completion of turnover, the shift manager directs a partial performance of 1BOSR EH-M2, EH PUMP OPERABILITY MONTHLY SURVEILLANCE using the preferred method of depressing and holding the MCB pushbutton to test the 1B EH Pump following maintenance. The Equipment Operator has briefed and is standing by at the Unit 1 EH skid. Chemistry sampling of SI Accumulators is in progress. Online risk is green.

Event No.	Malf. No.	Event Type*	Event Description
Preload	simN2acc(2) = 1200		Set SI Accumulator 1B N2 pressure
1	None	N (BOP, SRO)	Perform 1BOSR EH-M2
2	MRF ED052A	C (ATC, SRO) TS (SRO)	ACB 1445BC, Bus 144 to PZR Htr, trips. Pressurizer pressure lowers. ATC establishes manual control of PZR pressure and energizes additional heaters. Tech Spec 3.4.9 will be entered.
3	ramp simacc(2) 59480 59300 300	C (BOP, SRO) TS (SRO)	1B SI Accumulator level/pressure lowers. BOP re-pressurizes utilizing BOP-SI-8. Tech Spec 3.5.1 will be entered.
4	IMF CV09 50	I (ATC, SRO)	TE-CV130 (LD HX Temp) fails low. 1TCV-130 will modulate close, letdown line temperature will rise, VCT temperature will rise. The ATC operator will establish manual control of 1CC130, return LD Hx to normal by balancing charging and letdown, and return letdown flow to the demineralizers.
5	IMF TC14D 0	R (ATC, SRO)	Turbine Servo GV#4 fails closed. Control Rods Step in. In response, the ATC operator develops a reactivity plan and withdraws control rods.
6	IMF FW16 1500 30	I (BOP, SRO)	1PT-508 FW Header Pressure fails high
7	IMF MS07D 4 IMF MS01A 100 (preload) IMF MS01D 100 (preload)	M (ALL)	1D Main Steamline break in Containment 1A MSIV fails to close 1D MSIV fails to close
8	IMF CS01A (preload) MRF RP 63 OUT (preload)	C (ALL)	1A CS Pump fails to start Slave relay K643 CS ACT TRN B; 1B CS Pump fails to automatically start

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

SCENARIO C19-3 OVERVIEW

100% power, 1246 MW, MOL, steady state, 845 ppm boron, equilibrium xenon, CBD at 221 steps. Following completion of turnover, the shift manager directs a partial performance of 1BOSR EH-M2, EH PUMP OPERABILITY MONTHLY SURVEILLANCE using the preferred method of depressing and holding the MCB pushbutton to test the 1B EH Pump following maintenance. The Equipment Operator has briefed and is standing by at the Unit 1 EH skid. Chemistry sampling of SI Accumulators is in progress. Online risk is green.

After completing shift turnover and relief;. The BOP performs a partial 1BOSR EH-M2, EH PUMP OPERABILITY MONTHLY SURVEILLANCE using the preferred method of depressing and holding the MCB pushbutton to start the standby EH pump.

After the standby EH pump has been started; ACB 1445BC, Bus 144 to PZR Htr, trips. Pressurizer pressure lowers. The ATC operator establishes manual control of PZR pressure and energizes additional heaters. Tech Spec 3.4.9 condition B will be entered.

After Pressurizer Pressure is re-established;. 1B SI Accumulator level and pressure lower. The BOP will take actions to re-pressurize SI Accumulator 1B per BOP-SI-8, INCREASING SI ACCUMULATOR PRESSURE. Tech Spec 3.5.1 condition B will be entered.

After 1B SI Accumulator is re-pressurized; TE-CV130 (LD HX Temp) fails low. 1TCV-130 will modulate close, letdown line temperature will rise, VCT temperature will rise. When actual line temperature rises to > 133°F, Annunciator 1-9-E2 LTDWN TEMP HIGH, will actuate and divert valve 1TCV-129 will open diverting letdown line flow to the VCT and bypassing the demineralizers. The ATC operator will establish manual control of 1CC130, return LD Hx temperature to normal by balancing charging and letdown, and return letdown flow to the demineralizers.

After the LTDN HX Temp element failure is addressed; the Turbine GV#4 servo will fail and the valve closes. Turbine load will lower approximately 70MW. As a result, Control Rods will step in. In response, the ATC operator develops a reactivity plan to borate the RCS and withdraw control rods to recover ΔI control.

After the Turbine Servo GV#4 failure is addressed; feedwater line pressure detector 1PT-508 will fail high over a 30 second period. Both main feedwater pumps speed will lower, reducing feedwater flow and causing all steam generator levels to begin lowering. The BOP will take actions to stabilize the plant by taking manual control of the FW pump controller per BHC-1-SG, STEAM GENERATOR LEVEL. 1BOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL, Attachment J, will be implemented. 1PT-508 will remain unavailable for the remainder of the scenario.

After the 1PT-508 FW Header Pressure failure is addressed; a large fault will occur on the 1D MS line. The crew will enter 1BEP-0, REACTOR TRIP OR SAFETY INJECTION. 1MS001A and 1MS001D MSIVs fail to close automatically or via manual actuation of Main Steamline Isolation. 1MS001A will be able to be closed via its control switch. When containment pressure reaches 20 psig, Phase B actuates but the Containment Spray pumps do not start. The crew should manually realign train B CS valves per 1BEP-0 Attachment C, which will start the 1B CS pump. Operators should transition to 1BEP-2, FAULTED STEAM GENERATOR ISOLATION, to isolate the faulted 1D Steam Generator including the performance of step 4.h RNO.

The scenario is complete when the crew has transitioned from 1BEP-2 at completion of step 7.

Critical Tasks:

CT-3: Manually actuate at least one train of containment spray before an extreme (RED path) challenge develops to the containment CSF.
(K/A number – 026-A3.01 importance 4.3/4.5)

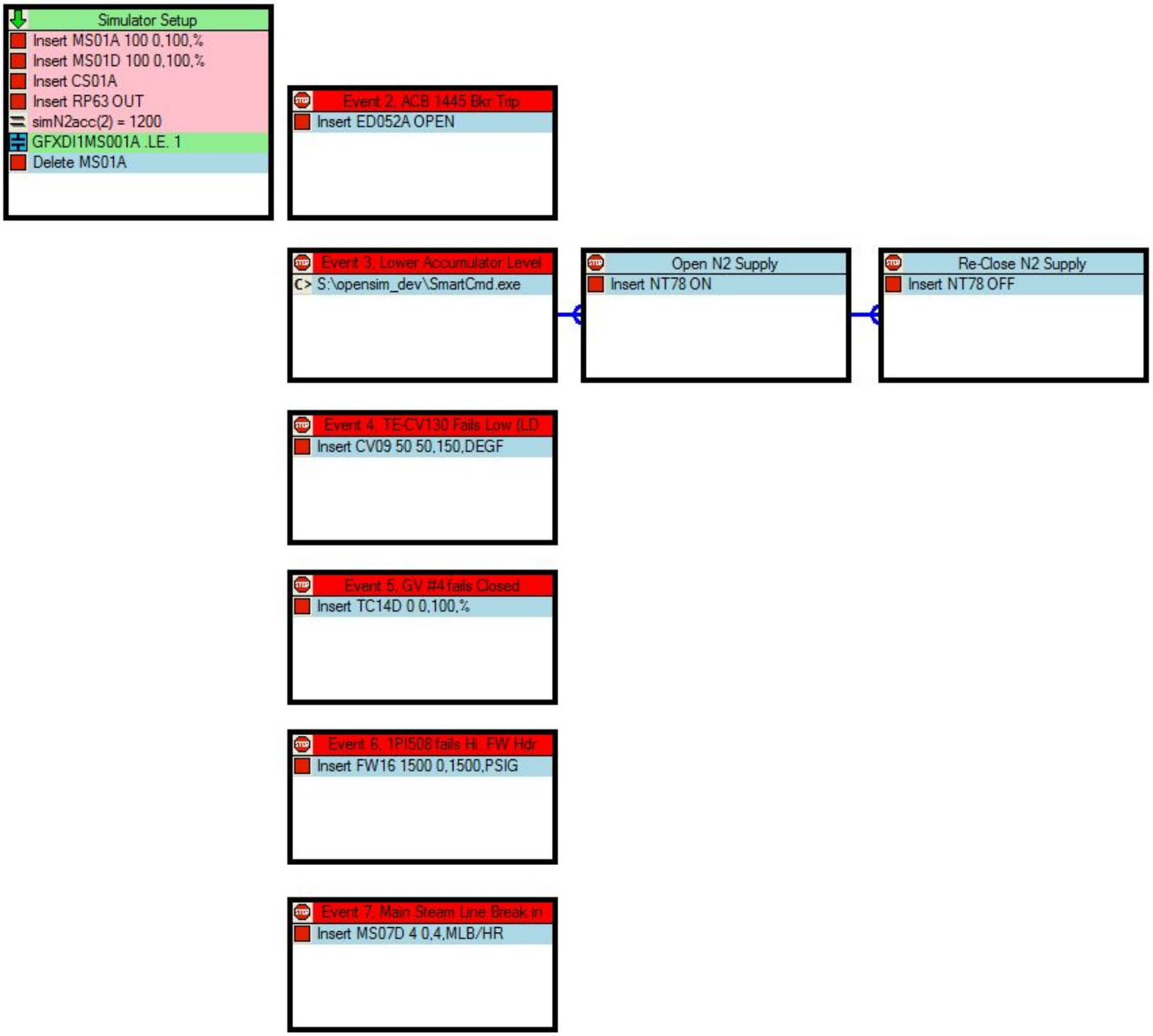
CT-17: Isolate the faulted 1D SG before transition out of 1BEP-2
(K/A number – APE 040-AA1.04 importance 4.3/4.3)

TCA #35: Trip RCPs within 10 minutes of loss of CC
(UFSAR 7.3.2.3) (K/A: APE 015/017-AA1.06; importance – 3.1/2.9)

SIMULATOR SETUP GUIDE:

- Verify/perform TQ-BY-201-0113, Appendix A, Simulator “Ready for Training” Checklist.
- Establish the conditions of IC 176, 100% power, MOL,
  - (IC-22 with lowered 1B SI Accumulator pressure)
- Place Simulator in RUN
- Initiate Smart Scenario:
  - Open SMART SCENARIO (Extreme Ace icon)
  - Open file Scenario N19-3.ssf
  - Load Initial values for instrument failures; Event 6
  - Click on the MODE button (near top of screen) and pick EXECUTE
  - Click on the PLAY button (bottom left of screen)

Verify the following are included in the Smart Scenario



- Verify malfunctions and overrides from Scenario Setup command box have input into Instructor Station Summary

- Ensure REMA is available at the Unit Desk
- Provide copies of the following documents:
  - Marked-up partial 1BOSR EH-M2, U1 EH PUMP OPERABILITY MONTHLY SURVEILLANCE
- Set AB Pot to 3.69 for 946 ppm boron
- Verify the Online Risk Placard is Green
- Verify OPEN:
  - 1PS9357A, SI Accum Sample Inside Isol vlv
  - 1PS9357B, SI Accum Sample Outside Isol vlv
- Place clearance order INFO tag on the following control switches: N/A
- Place Protected Equipment placards at the following locations: N/A

Turnover Information

- Unit 1 is at 100% power
- 1246 MWe
- RCS boron concentration is 845 ppm
- Control bank D @ 221 steps
- Performance of Partial 1BOSR EH-M2, EH PUMP OPERABILITY MONTHLY SURVEILLANCE using the preferred method of depressing and holding the MCB pushbutton to test the 1B EH pump. Shift Manager directs the performance following turnover. The Equipment Operator has briefed and is standing by at the Unit 1 EH skid.
- Chemistry sampling of SI Accumulators is in progress.
- Online Risk is Green
- Protected Equipment:
  - None

Event 1: Perform 1BOSR EH-M2

When requested, as EO report you are standing by the Unit 1 EH skid Report the following data, as requested, while the EH pumps are started and stopped:

When EH Temperature and Pressure is requested from local operator, report values obtained from Simulator Drawing TC6 Turbine Control System.

EH Temperature is (TCTEHR value on SDG TC6)

EH Pressure is (TCPEH value on SDG TC6) psig locally.

EH Pressure of the standby pump / with both running is (TCPEH value on SDG TC6) psig locally.

EH pressure when a pump is shutdown is (TCPEH value on SDG TC6) psig locally.

As SM, acknowledge the start and stop of the surveillance.

Event 2: ACB 1445BC, Bus 144 to PZR Htr, trips

At Lead Evaluator's cue, use Smart Scenario to cause ACB 1445BC, Bus 144 to PZR Htr to trip by right clicking on the box titled, **Event 2**, **ACB 1445 Bkr Trip**, and select, **Release**

Acknowledge as SM the PZR Htr trip, request for E Plan evaluation, and requests for on line risk assessment, maintenance support, and IR initiation. Acknowledge LCO 3.4. entry.

If dispatched as EO, report breaker 144 Cubicle 3 is TRIPPED on ground overcurrent.

Event 3: 1B SI Accumulator level/pressure lowers

At Lead Evaluator's cue, use Smart Scenario to cause 1B SI Accumulator level and pressure to lower by right clicking on the box titled, **Event 3**, **Lower Accumulator Level**, and select, **Release**

When directed to align high pressure nitrogen; use Smart Scenario to align nitrogen supply by right clicking on the box titled, **Open N2 Supply,** and select, **Release,** and report the following:

- Nitrogen Tube Trailer Manifold Discharge Valve is OPEN
- 0NT078, High Pressure Hookup Isolation Valve is OPEN

Is asked, report nitrogen pressure is 2000 psig.

When directed to isolate high pressure nitrogen; use Smart Scenario to align nitrogen supply by right clicking on the box titled, **Re-Close N2 Supply,** and select, **Release**

As SM acknowledge entry into LCO 5.1 when filling the 1B SI Accumulator

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Event 4: TE-CV130 (LD HX Temp) fails low

At Lead Evaluator's cue, use Smart Scenario to cause TE-CV130 (LTDN HX Temp) fails low by right clicking on the box titled, **Event 4**, **TE-CV130 Fails Low (LD HX Temp),** and select, **Release**

SM acknowledge the failure, on line risk assessment, request for maintenance support, and IR requests.

Event 5: Turbine Servo GV#4 fails closed

At Lead Evaluator's cue, use Smart Scenario to cause Turbine Servo GV#4 to fail closed by right clicking on the box titled, **Event 5**, **GV#4 Fails Closed**, and select, **Release**

If dispatched as EO to investigate #4 GV failure, wait 2 minutes and report: #4 GV is closed and no visible damage present.

Acknowledge as Power Team loss of load due to Governor Valve failure.

Acknowledge as chemistry/rad protection requests for RCS samples.

Acknowledge as SM the GV failure and requests for on line risk assessment, maintenance support, and IR initiation. If asked about isolating EH to #4 gov. valve, concur with isolation to prevent further valve movement.

As the SM, if the crew recommends a Turbine load reduction to operate with the Governor valves off of the full open seat, concur with the recommendation**.**

Acknowledge as Power Team load reduction and estimated duration of derate.

Event 6: 1PT-508 FW Header Pressure fails high

At Lead Evaluator's cue, use Smart Scenario to cause 1PI508 to fail high by right clicking on the box titled, **Event 6**, **1PI508 fails Hi, FW Hdr Press**, and select, **Release**

If dispatched as EO to investigate 1PT-508, wait two minutes report no visible damage to 1PT-508.

Acknowledge as SM 1PT-508 failure, on line risk assessment, request for maintenance support, and IR requests.

Event 7, & 8: Main Steam Line Break in CNMT (stuck open 1D MSIV & CS Pp failure**)**

At Lead Evaluator's cue, use Smart Scenario to cause a Main Steam Line Break in CNMT by right clicking on the box titled, **Event 7**, **Main Steam Line Break in CNMT**, and select, **Release**

Acknowledge as Shift Manager procedure changes, Emergency Plan evaluations, STA request, and requests for support personnel.

Op-Test No.: 201-301 Scenario No.: N19-3 Event No.: 1

Event Description: Perform 1BOSR EH-M2

Time	Position	Applicant's Actions or Behavior
	CUES:	Crew will perform 1BOSR EH-M2 per shift turn over.
	US	• Directs performance of 1BOSR EH-M2

	BOP	• Contact field operator at EH skid.
		  • Records running pump status on data sheet.
		  • Obtain and record system pressure (2025 psig) and temp (122°F) from EO.
		• Mark box 4.b for plant conditions.
		• Mark 5.a for test method.
		• Depress the EH PP LO PRESS AUTO START TEST (20-MPT)
		  o Check pumps and running lights as standby pump starts.
		  • VERIFY EH SYS TROUBLE (1-18-B15) NOT lit.
		  • Match targets on the standby EH PP control switch
		• After 10 minutes, align the original running EH PP to standby

	US	• Acknowledges the completion of 1BOSR EH-M2 o Reports this information to the Shift Manager o Reviews the paperwork for acceptance criteria
EVALUATOR NOTE:		**When 1BOSR is complete and with lead examiner's concurrence, insert the next event.**

Op-Test No.: 201-301 Scenario No.: N19-3 Event No.: 2

Event Description: ACB 1445BC, Bus 144 to PZR Htr, trips

Time	Position	Applicant's Actions or Behavior
	CUE	• Annunciator 1-12-A5 Pzr Heater Trip • Annunciator 1-12-C5 Phase Loss or Reversal • Annunciator 1-12-D5 Pzr Htr SCR Clg Fan Failure • Loss of power to B and C Pzr Heater contactors • ACB 1445 Disagreement/trip light • Slowly lowering RCS pressure

	ATC	• MONITOR Pressurizer pressure.
		• Recognizes supply to Pzr heater contactors B and C is tripped.
		• ENERGIZE PZR Backup Heaters as necessary to maintain normal system pressure.
		  • Reports failure to SRO.
		  ○ Dispatches EO to bus 144 to check breaker 1445

	BOP	○ Recognize/report ACB 1445 Disagreement/Trip light.
	US	(RF 6a) Recognize malfunction of TS Related Component (RF 6b) Locate/Determine Applicable LCOs • LCO 3.4.9 Pressurizer (RF 6c) CONDITION, REQUIRED ACTION, and COMPLETION TIME • CONDITION B, One or more required groups of pressurizer heaters inoperable ○ B.1 • RA - Restore required groups of pressurizer heaters to OPERABLE status • CT - 72 hours
	US	○ Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct failure.
EVALUATOR NOTE:		**After the actions for the Pzr Heater trip are complete and with lead examiner's concurrence, insert the next event.**

Op-Test No.: 201-301 Scenario No.: N19-3 Event No.: 3

Event Description: 1B SI Accumulator level/pressure lowers

Time	Position	Applicant's Actions or Behavior
EVALUATOR NOTE:		**The following event takes approximately five minutes to build in to a point where the low pressure alarm is received. This event should be input as the previous event actions near completion.**
	CUE:	1-5-B2, ACCUM 1B PRESS HIGH LOW, alarm in due to Chemistry sample.
	US	• Direct raising pressure in 1B SI Accumulator to ~625 psig o Direct BOP to Close 1PS9357A and 1PS9357B, SI Accumulator Sample Isolation Valves (RF 6a) Acknowledge entry/need to log 1BOL 5.1 when notified by BOP (RF 6b) Locate/Determine Applicable LCOs • LCO 3.5.1 Acccumulators (RF 6c) CONDITION, REQUIRED ACTION, and COMPLETION TIME • CONDITION B, One accumulator inoperable for reasons other than Condition A o B.1 • RA - Restore accumulator to OPERABLE status • CT - 1 hour • Notify SM of LCO entry
	BOP	o Close 1PS9357A and 1PS9357B, SI Accumulator Sample Isolation Valves • Perform BOP SI-8 to raise pressure in 1B SI Accumulator • Direct EO to open Nitrogen Tube Trailer Manifold Discharge Valve. • Direct EO to open 0NT078, High Pressure Hookup Isolation Valve • Perform the following at 1PM06J: o Verify 1SI943 CLOSED • Open 1SI8880, N2 Supply Isolation Valve • Inform US to initiate 1BOL 5.1 • Open 1SI8875B, 1B SI Accumulator Fill Valve, to raise pressure in 1B SI Accumulator to ~ 625 psig. • Close 1SI8875B, 1B SI Accumulator Fill Valve • Inform US to exit 1BOL 5.1 • Close 1SI8880, N2 Supply Isolation Valve o Direct EO to close Nitrogen Tube Trailer Manifold Discharge Valve. o Direct EO to close 0NT078, High Pressure Hookup Isolation Valve.
EVALUATOR NOTE:		**After the actions for filling the 1B SI Accumulator are complete and with lead examiner's concurrence, continue with the next event.**

Op-Test No.: 201-301 Scenario No.: N19-3 Event No.: 4

Event Description: TE-CV130 (LD HX Temp) fails low

Time	Position	Applicant's Actions or Behavior
	CUE	• Annunciator LETDOWN TEMP HIGH (1-9-E2) is LIT • 1CV129 diverted to VCT • 1TK130 at minimum demand
	CREW	• Identify failure of 1TI-130
	US	• Direct manual control of 1CC130 using 1TK-130
EVALUATOR NOTE:		**BAR 1-8-C5 will not alarm due to temp indication failing low. RO should first refer BAR 1-9-E2 to mitigate the event. 1-9-E2 eventually refers the operator to 1-8-C5, where 1CC130 will be placed in Manual if not done previously.**
	ATC	• Refer to BAR 1-9-E2, Letdown Temperature High • Refer to BAR 1-8-C5, Letdown HX Outlet Temperature High • Verify 1CV129 diverted around demin to VCT • Take manual control of 1CC130 and raise demand
	Crew	○ Dispatch EO to locally check letdown temperature
	BOP/ATC	• Monitor panels and assist other operator as required.
	US	• Notify SM of failure, request risk evaluation and IR initiation.
EVALUATOR NOTE:		**If the Crew is slow to diagnose the failure, they may isolate letdown, and may also put on excess letdown. Steps for each follow in *italics.***
	ATC	*To isolate letdown* • *Close 1CV8149A/B/C* • *Close 1CV459/460*
	BOP	*To place excess letdown in service per BOP CV-17* • *Verify/open 1CV8100 & 1CV8112* • *Open 1CC9437A/B* • *Verify closed 1CV123* • *Open 1RC8037A/B/C or D* • *Open 1CV8153A or B* • *Open 1CV123 while maintaining outlet temp <165*
EVALUATOR NOTE:		**When High Temp alarm clears or at lead examiner's discretion, continue with the next event.**

Op-Test No.: 201-301 Scenario No.: N19-3 Event No.: 5

Event Description: Turbine Servo GV#4 fails closed

Time	Position	Applicant's Actions or Behavior
	CUES:	• C-7, TURBINE LOSS OF LOAD • Annunciator 1-14-D1, TAVE CONT DEV HIGH o Annunciator 1-18-C4, DROP 3 SYSTEM TROUBLE • Control Rods stepping inward • #4 governor valve closed indication at 1PM02J or OWS drop 210 • Generator MW lowering at 1PM02J or OWS drop 210. • RCS Tave rising at 1PM05J.
	CREW	• Refer to BARs
	ATC/BOP	• Determine turbine load rejection in progress from 1PM02J or OWS drop210. • Reference BARs. • Dispatch operators to investigate #4 GV.
	US	• Notify SM of #4 GV malfunction. • Direct operators to restore RCS Tave / ΔI.
EVALUATOR NOTE:		**The crew may decide to borate the rods back out based upon ΔI concerns.**
	ATC	o Place Rod Control in Manual utilizing RD-100 as reference o Insert control rods to maintain Tave and Tref approx. equal. o Initiate boration per: BOP CV-6, OPERATION OF THE REACTOR MAKEUP SYSTEM IN THE BORATE MODE or BOP CV-6T1, RCMS OPERATE IN BORATE CHECKLIST • Place MU MODE CONT SWITCH to STOP position. • Set MU MODE SELECT to BOR position. • Set 1FK-110 BA Flow Cont Pot to desired flow rate (Batches desired). • Set Boric Acid Totalizer to desired volume • Enter/ verify correct number of gallons of Boric Acid in lower portion of Preset 2 counter. • Verify 1CV110A & 1CV110B in AUTO • Ensure BA Transfer pp is NOT in Pull Out position • Place MAKE-UP CONTROL Switch to START • Ensure proper operation of valves & BA pump • 1CV110B Opens, 1CV110A Modulates , BA pump is running o Verify expected BA flow on recorder 1CD-CX4102 o Monitor for Boration effects o Verify at least two B/U Heater groups ON and spray valves 1RY455B/C modulate OPEN. o Monitor for RCS Tave lowering o Turn on PZR backup heaters in accordance with BOP RY-9, PRESSURIZER HEATER OPERATION.
	BOP	o Reset C7 by placing "Steam Dump Mode" switch on 1PM02j to Reset
EVALUATOR NOTE:		**The crew may decide to perform a load reduction to get the Governor valves off of the full open seat.**

Op-Test No.: 201-301 Scenario No.: N19-3 Event No.: 5

Event Description: Turbine Servo GV#4 fails closed

Time	Position	Applicant's Actions or Behavior
	ATC	o Place Rod Control in Manual utilizing RD-100 as reference o Insert control rods to maintain Tave and Tref approx. equal. o Initiate boration per: BOP CV-6, OPERATION OF THE REACTOR MAKEUP SYSTEM IN THE BORATE MODE or BOP CV-6T1, RCMS OPERATE IN BORATE CHECKLIST • Place MU MODE CONT SWITCH to STOP position. • Set MU MODE SELECT to BOR position. • Set 1FK-110 BA Flow Cont Pot to desired flow rate (Batches desired). • Set Boric Acid Totalizer to desired volume • Enter/ verify correct number of gallons of Boric Acid in lower portion of Preset 2 counter. • Verify 1CV110A & 1CV110B in AUTO • Ensure BA Transfer pp is NOT in Pull Out position • Place MAKE-UP CONTROL Switch to START • Ensure proper operation of valves & BA pump • 1CV110B Opens, 1CV110A Modulates , BA pump is running o Verify expected BA flow on recorder 1CD-CX4102 o Monitor for Boration effects o Verify at least two B/U Heater groups ON and spray valves 1RY455B/C modulate OPEN. o Monitor for RCS Tave lowering o Turn on PZR backup heaters in accordance with BOP RY-9, PRESSURIZER HEATER OPERATION.
	BOP	• Initiate turbine load ramp: Using graphic 5501(may use 1BGP 100-4 step or 100-4T3 load swing sheet) • SELECT SETPOINT • ENTER desired MW/MIN rate in the RATE window • DEPRESS the respective ENTER pushbutton • ENTER desired final MWe output in the REF DEMAND window • SELECT ENTER • DEPRESS EXIT • DEPRESS the GO/HOLD pushbutton • Inform US/RO of pending drop in turbine load • SELECT GO (when RO reports expected Tave drop) • Verify load lowering as expected
	US	o Contact SM to perform risk assessment, initiate IR, and contact maintenance, OAD, SED to investigate/correct component. o Check reactor power change < 15% in one hour. o Contact Power Team and inform Power Team of load reduction and estimated duration of power derate. o Review Tech Spec 3.4.1 for applicability o Review RIL per COLR

Op-Test No.: 201-301 Scenario No.: N19-3 Event No.: 5

Event Description: Turbine Servo GV#4 fails closed

Time	Position	Applicant's Actions or Behavior
EVALUATOR NOTE:		**After the actions for the governor valve failure are complete and with lead examiner's concurrence, insert the next event.**

Op-Test No.: 201-301_ Scenario No.: _N19-3_ Event No.: _6__

Event Description: 1PT-508 FW Header Pressure fails high

Time	Position	Applicant's Actions or Behavior
	CUE:	○ Control rods inward motion • Annunciators 1-15-A9 thru D9, S/G 1_ LEVEL DEVIATION HIGH LOW ○ Annunciators 1-15-A4 thru D4, S/G 1_ FLOW MISMATCH FW FLOW LOW • Steam flow / FW flow mismatch on all SGs • 1B MFP speed lowering • 1C MFP speed lowering • Master, 1B and 1C MFP speed controllers demand lowering • 1PI-508 meter indication rising. • 1PI-509 meter indication rising.

	BOP	• Take prompt action per BHC-1-SG, Steam Generator Level
		  • Verify/Place 1SK-509A, Master FW pump speed controller, in manual.
		  • Raise demand on 1SK-509A as needed.
		  • Raise FW pump speed sufficiently to restore SG levels and FW header DP to normal per 1BGP 100-3A1.
		  • Maintain SG levels by operating 1SK-509A in manual

	CREW	• Refer to BARs • Determine 1PT-508 failing high at 1PM04J. • Identify entry conditions for 1BOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL. ○ Dispatch operators to investigate 1PT-508 failure.
	US	• Notify SM of plant status and procedure entry • Request evaluation of Emergency Plan conditions • Implement 1BOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL; Attachment J, FW PUMP SPEED CONTROL MALFUNCTION
	ATC	• Perform the following: • Monitor reactor power response to SG under and overfeeding transient.
	US	• Contact SM to perform risk assessment, initiate IR, and contact maintenance to investigate/correct instrument failure.
EVALUATOR NOTE:		**The following Technical Specification determination only applies if RCS pressure lowers to less than 2209 psig.**

	US	(RF 6a) Recognize operation outside of TS Related parameters
		(RF 6b) Locate/Determine Applicable LCOs
		  • LCO 3.4.1 RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits
		(RF 6c) CONDITION, REQUIRED ACTION, and COMPLETION TIME
		  • CONDITION A, One or more RCS DNB parameters not within limits
		  ○ A.1
		  • RA - Restore RCS DNB parameter(s) to within limit
		  • CT - 2 hours

Op-Test No.: 201-301	Scenario No.: N19-3	Event No.: 6
Event Description: 1PT-508 FW Header Pressure fails high		

Time	Position	Applicant's Actions or Behavior
EVALUATOR NOTE:		**After the actions for the instrument failure are complete and with lead examiner's concurrence, insert the next event.**

Op-Test No.: 201-301 Scenario No.: N19-3 Event No.: 7/8

Event Description: Main Steam Line Break in CNMT (stuck open 1D MSIV & CS Pp failure)

Time	Position	Applicant's Actions or Behavior
	CUE:	• Annunciator 1-15-D4, S/G 1D FLOW MISMATCH FW FLOW LOW • Annunciator 1-15-E2, MS PRESS LOW • Annunciator 1-11E1, CNMT PRESS HIGH SI/RX TRIP
	US	• Direct operators perform immediate actions of 1BEP-0, REACTOR TRIP OR SAFETY INJECTION. • Notifies SM of 1BEP-0 entry. • Requests Emergency Plan evaluation
	ATC	Verify Reactor Trip: • Rod bottom lights – ALL LIT • Reactor trip & Bypass breakers - OPEN • Neutron flux DROPPING
	BOP	Verify Turbine Trip: • Turbine throttle valves - CLOSED • Turbine governor valves - CLOSED
	BOP	Verify power to 4KV busses: • Bus 141 - ENERGIZED • Bus 142 - ENERGIZED

	ATC	Check SI status:
		• SI actuated
		  • SI First OUT annunciator lit (1-11-B1, 1-11-C1, 1-11-D1, 1-11-E1)
		  • SI ACTUATED lit (1-BP-4.1)
		  • SI Equipment running (SI pumps running, CV Cold leg injection SI8801A/B open)
		• Actuate SI from both SI switches (1PM05J and 1PM06J) and continue in 1BEP-0

	US	Directs BOP to perform Attachment B, SI VERIFICATION of 1BEP 0.
EVALUATOR NOTE:		**Crew actions of 1BEP-0 continue below.** **BOP actions of 1BEP-0, Attachment B continue on page 21.**

Op-Test No.: 201-301 Scenario No.: N19-3 Event No.: 7/8

Event Description: Main Steam Line Break in CNMT (stuck open 1D MSIV & CS Pp failure)

Time	Position	Applicant's Actions or Behavior
	ATC/BOP	Verify AF system: • AF pumps – BOTH RUNNING • AF isolation valves 1AF13A-H - OPEN • AF flow control valves 1AF005A-H - THROTTLED • AF flow – GREATER THAN 500 GPM Check SG tubes intact: • Secondary radiation level - NORMAL AND STABLE • Narrow range levels – NOT RISING IN AN UNCONTROLLED MANNER
	ATC/BOP	Check PZR PORVs and Spray Valves • PORVs - CLOSED • PORV isol valve – at least one ENERGIZED • PORV relief path – at least one AVAILABLE • PORV in - AUTO • Isol valve - open • Normal spray valves - CLOSED
	ATC/BOP	ADJUST AF FLOW: • Lower total Feed Flow to approximately 600 gpm
	ATC/BOP	Check steam dumps – AVAILABLE • C-9 Permissive light – NOT LIT • CW Pump - AT LEAST ONE RUNNING
	ATC/BOP	Control RCS Temperature per table: • Adjust Feed Flow • Steam Release
EVALUATOR NOTE:		**The RCPs must be tripped within 10 minutes of loss of CC, (Phase B isolation) per TCA #35.**
[CT]	ATC/BOP **[TCA #35]**	Check if RCPs should be stopped: • All RCP's – ALL RUNNING. • High head flow 1FI-917 > 100 GPM and RCS Pressure > 1425 PSIG. • Trip RCPs within 10 minutes of loss of CC
	ATC/BOP	Check pressure in all SGs: • NO SG dropping in an uncontrolled manner. • NO SG Completely Depressurized -> RNO: 1BEP-2
	US	Transition from 1BEP-0 to 1BEP-2, FAULTED STEAM GENERATOR ISOLATION. • Notifies SM of BEP entry • Requests Emergency Plan evaluation

Op-Test No.: 201-301 Scenario No.: N19-3 Event No.: 7/8

Event Description: Main Steam Line Break in CNMT (stuck open 1D MSIV & CS Pp failure)

Time	Position	Applicant's Actions or Behavior
EVALUATOR NOTE:		**The actions of 1BEP-2, FAULTED SEAM GENERATOR ISOLATION, begin on this page.**

		CHECK MAIN STEAMLINE ISOLATION:
		• All MSIVs and MSIV bypass valves – CLOSED
		  • Determines MSIVs and MSIV bypass valves are Not Closed
		  • Manually actuate Main Steamline Isolation
		  • Verify MSIV and MSIV bypass valves are closed
		  • Determines 1MS001A and 1MS001D did Not Close
		  • Manually close 1MS001A and 1MS001D
		  • Determines 1MS001D did Not Close

		CHECK IF ANY SG SECONDARY PRESSURE BOUNDARY IS INTACT: • Check pressure in all SGs - ANY SG PRESSURE STABLE OR RISING

[CT]	ATC/BOP
	
	[CT-17]
		Check pressure in all SGs:
		• NO SG dropping in an uncontrolled manner.
		• NO SG Completely Depressurized.
		  • Determines 1D Generator Pressure Dropping
		  • **CLOSE 1AF013D and 1AF013H**
		• **Check FW to faulted SG(s) - ISOLATED:**
		  • **Associated row on FW ISOLATION MONITOR LIGHTS panel - LIT FOR FAULTED SG(S)**
		• **Verify SG PORV 1MS018D – CLOSED**
		• **Verify SG blowdown isol valves on faulted SG – CLOSED**
		  • **1SD002C CLOSED**
		  • **1SD002D CLOSED**
		• **Verify SG blowdown sample isol valves on faulted SG – CLOSED**
		  • **1SD005B CLOSED**
		• **Verify faulted SG(s) main steamline isolation and bypass valves – CLOSED**
		  • **Determines faulted SG MSIV OPEN and Verifies following CLOSED**
		  • **Main FW pump turbine HP stop valves**
		  • **Steam Dump valves**
		  • **MS RHTR S/U purge control valves 1MS067A thru D**
		  • **MS RHTR Shutoff valves 1MS009A thru D**
		  • **Gland Steam isol and bypass valves 1GS001 and 1GS004**
		  • **Manually Close 1GS001**
		  • **Dispatches EO to verify SJAE isol valves 1MS052A, 1MS055A, 1MS052B, and 1MS055B CLOSED**

	ATC/BOP	MONITOR AF PUMP SUCTION PRESSURE. • AF PUMP SX SUCT VLVS ARMED alarm (1-3-E7) - NOT LIT

Op-Test No.: 201-301 Scenario No.: N19-3 Event No.: 7/8

Event Description: Main Steam Line Break in CNMT (stuck open 1D MSIV & CS Pp failure)

Time	Position	Applicant's Actions or Behavior

	ATC/BOP	Check secondary radiation normal
		• Reset CNMT Isol Phase A (if necessary)
		• Sample all SGs for activity
		  • Open SG Blowdown Sample Isol valves
		  • Request Chem Dept to sample all SGs for activity
		• Check secondary radiation trends NORMAL FOR PLANT CONDITIONS
		Secondary activity samples NORMAL (WHEN AVAILABLE)

	ATC/BOP	CHECK IF ECCS FLOW CAN BE TERMINATED:
		• RCS subcooling - ACCEPTABLE
		  • ICONIC DISPLAY –OR- ATTACHMENT A
		• Secondary heat sink
		  • Total feed flow to SGs - GREATER THAN 500 GPM –OR- Narrow range level in at least one intact SG – GREATER THAN 10% (31% ADVERSE CNMT)
		• RCS pressure - STABLE OR RISINGAny ruptured SG narrow range level - RISING IN AN UNCONTROLLED MANNER OR OFFSCALE HIGH
		• PZR level - GREATER THAN 12% (28% ADVERSE CNMT)

	US	Transition from 1BEP-2 to 1BEP ES-1.1, SI TERMINATION. • Notifies SM of BEP entry • Requests Emergency Plan evaluation
EVALUATOR NOTE:		**Scenario may be terminated after transition into 1BEP ES-1.1 or at the direction of the lead evaluator.**

Op-Test No.: 201-301 Scenario No.: N19-3 Event No.: 7/8

Event Description Main Steam Line Break in CNMT (stuck open 1D MSIV & CS Pp failure)

Time	Position	Applicant's Actions or Behavior
EVALUATOR NOTE:		**1BEP-0, Attachment B, SI VERIFICATION actions begin on this page 1BEP-0 main body actions continue after Attachment B section of guide on page 18.**
	BOP	**Attachment B action** Verify ECCS pumps running • CENT CHG pumps • RH • SI pumps
	BOP	**Attachment B action** Verify ECCS valve alignment • Group 2 Cold Leg Injection monitor lights lit
	BOP	**Attachment B action** Verify ECCS flow • HHSI flow >100 gpm • RCS pressure NOT <1700 psig o If RCS pressure <1700 psig check SI pp flow > 200 gpm
	BOP	**Attachment B actions** Verify RCFCs running in Accident Mode: • Group 2 RCFC Accident Mode status lights - LIT Verify CNMT isolation Phase A • Group 3 CNMT isolation monitor lights - LIT Verify CNMT Ventilation isolation • Group 6 CNMT Vent Isol monitor lights - LIT Verify CC Pumps • CC pumps - BOTH RUNNING Verify SX Pumps running • SX pumps - BOTH RUNNING Check If Main Steamline Isolation Is Required o Check SG pressure < 640 psig o Check CNMT pressure > 8.2 psig • If either condition is met, then verify MSIVs and MSIV Bypass valves closed Check if CS is required • CNMT pressure (1PR-937 or 1PI-CS934 thru 1PI-CS937) – HAS RISEN TO GREATER THAN 20 PSIG • Determines Group 6 CS monitor lights – are Not LIT • Manually actuate CS and Phase B Isolation • Determines NO CS train is providing flow to CNMT and THEN GOES TO ATTACHMENT C

Op-Test No.: 201-301 Scenario No.: N19-3 Event No.: 7/8

Event Description Main Steam Line Break in CNMT (stuck open 1D MSIV & CS Pp failure)

Time	Position	Applicant's Actions or Behavior

[CT]	BOP
	
	[CT-3]
		Attachment C actions
		• CHECK CS VALVE ALIGNMENT:
		  • CS pump RWST suction valves - OPEN:
		  • 1CS001A
		  • 1CS001B
		  • CS pump header isol valves - OPEN:
		  • 1CS007A
		  • 1CS007B
		  • **Manually open valve 1CS007B**
		  • CS eductor spray additive valves - OPEN:
		  • 1CS019A
		  • 1CS019B
		  • Perform the following for the affected train B
		  • **Place 1B CS pump test switch in TEST.**
		  • **Manually open the valve 1CS019B**
		  • CS eductor inlet flow control valves – OPEN
		  • 1CS010A
		  • 1CS010B
		  • **Manually open the valve 1CS010B**
		• CHECK CS PUMPS RUNNING:
		• **CS pumps - AT LEAST ONE RUNNING**
		• RETURN TO ATTACHMENT B, Step 10c

	BOP	**Attachment B action** Verify FW isolated: • FW pumps tripped • FW isolation monitor lights lit • FW pumps discharge valves closed 1FW002A-C • Trip all running HD pumps
	BOP	**Attachment B action** Verify both DGs running • SX valves open 1SX169A and B • Dispatch operator locally to check operation
	BOP	**Attachment B action** Verify Generator Trip • GCB 3-4 and OCB 4-5 open • PMG output breaker open

Op-Test No.: 201-301 Scenario No.: N19-3 Event No.: 7/8

Event Description Main Steam Line Break in CNMT (stuck open 1D MSIV & CS Pp failure)

Time	Position	Applicant's Actions or Behavior

	BOP	**Attachment B action**
		Verify Control Room ventilation aligned for emergency operations:
		• Control Room Outside Air Intake radiation monitors < High Alarm setpoints
		• Operating VC train equipment running Train A
		  • Supply fan
		  • Return fan
		  • M/U fan
		  • Chilled water pump
		  • MCR chiller 0A
		• Operating VC train dampers
		  • M/U fan outlet damper NOT full closed 0VC24Y
		• VC train M/U filter light LIT
		• Operating VC train Charcoal Absorber aligned for train A
		  • 0VC43Y closed
		  • 0VC21Y open
		  • 0VC22Y open
		• Control Room pressure greater than +0.125 inches water on 0PDI-VC038

	BOP	**Attachment B action**
		Verify Auxiliary Building ventilation aligned
		• Two inaccessible filter plenums aligned
		  • Plenum A fan 0VA03CB running
		  • Damper 0VA023Y not fully closed
		  • Damper 0VA436Y closed
		  • Plenum C fan 0VA03CF running
		  • Damper 0VA072Y not fully closed
		  • Damper 0VA438Y closed
		Check Aux Building Supply and Exhaust fans
		• One Exhaust Fan running for every Supply Fan running

	BOP	**Attachment B action**
		Verify FHB ventilation aligned
		• Train B fan 0VA04CB running
		  • 0VA055Y open
		  • 0VA062Y not fully closed
		  • 0VA435Y closed

	BOP	**Attachment B action** Maintain UHS Basin level > 80% Initiate periodic checking of Spent Fuel Cooling • Dispatch operator to locally check SFP level and temperature Notify Unit Supervisor of • Manual actions taken • Failed equipment status • Attachment B completed

Op-Test No.: 201-301 Scenario No.: N19-3 Event No.: 7/8

Event Description Main Steam Line Break in CNMT (stuck open 1D MSIV & CS Pp failure)

Time	Position	Applicant's Actions or Behavior
	CREW	**Attachment B action** Shutdown unnecessary plant equipment ○ As time allows refer to 1BGP 100-4T4, REACTOR TRIP POST RESPONSE GUIDELINE ○ As time allows refer to 1BGP 100-5, PLANT SHUTDOWN AND COOLDOWN

Facility: Byron Scenario No.: N19-5 Op-Test No.: 2019-301

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: IC-175; 75.0% power 912 MW, MOL, steady state, 919 ppm boron, equilibrium xenon, CBD at 171 steps.

Turnover: 1B CW pump is OOS for an intake bay inspection; it is expected back in service in two days. Following turnover, the shift manager requests the BOP to swap GC pumps in preparation for an OOS on 1GC01PB next shift. A power ascension to 1120 MWe at 0.6 MWe/min will be initiated when the GC pump swap is completed. Online risk is green.

Event No.	Malf. No.	Event Type*	Event Description
Preload	IOR ZDI1CW01PB PTL IOR ZDI1CW001B CLS MRF ED093B OPEN		CW Pp 1B Out of Service CW Pp 1B discharge valve closed
1	None	N (BOP, SRO)	BOP performs swap of operating Stator Cooling Water Pumps per BOP-GC-5
2	IMF RX18B 570 120	I (ATC, SRO) TS (SRO)	Primary RTD NR TC, 1TE421B, fails high. The crew will implement 1BOA INST-2, Attachment A. Tech Spec 3.3.1 will be entered.
3	None	R (ATC, SRO) N (BOP)	Raise power at 0.6 MW/min per 1BGP 100-3T5.
4	IMF PN1100 ON	TS (SRO)	CNMT Hatch Door Seal Supply Air Press. Tech Spec 3.6.2 will be entered.
5	MRF ZDI1PK455A MAN IOR ZDI1PK455A	I (ATC, SRO)	Master PZR Pressure Controller 1PK455A fails low. ATC operator will place the controller to manual per BHC 1-RY-P
6	IMF TP03A	C (BOP, SRO)	Air Side Seal Oil Pump Trip
7	IMF RX05 1500 30	C (BOP, SRO)	Steam Line Press Detector 1PT-507 Fails High. BOP will take manual control of the FW pump controller per BHC-1-SG. Steam Dump pressure controller will be placed to Manual.
8	IMF ED07C IMF RP02A (preload) IMF RP02B (preload)	M (ALL)	Loss Of 4160v Bus 4160v Bus 143 Reactor Trip Breaker Fails To Open RTA Reactor Trip Breaker Fails To Open RTB

9	ZDI1HSTG010 NORM	C (ALL)	Turbine Trip (20-1/AST)
	IMF TC03		Turbine Auto Trip Failure
	IMF TC14A 41		GV1 Servo Failure (#1 GV remains open)
	MRF RP34 OUT		MS Isolation Train A relay failure
	MRF RP35 OUT		MS Isolation Train A relay fail
	MRF RP60 OUT		MS Isolation Train B relay fail
	MRF RP61 OUT		MS Isolation Train B relay fail
	IMF RD09 8		Control Rods insert at minimum speed in automatic.
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

SCENARIO C19-5 OVERVIEW

75.0% power 912 MW, MOL, steady state, 919 ppm boron, equilibrium xenon, CBD at 171 steps. 1B CW pump is OOS for an intake bay inspection; it is expected back in service in two days. Following turnover, the shift manager requests the BOP to swap GC pumps in preparation for an OOS on 1GC01PB next shift. A power ascension to 1120 MWe at 0.6 Mwe/min will be initiated when the GC pump swap is completed. Online risk is green.

After completing shift turnover and relief; the BOP will start the standby stator cooling water pump and secure the operating stator cooling water pump per BOP GC-5.

After swap of Stator Cooling Water Pumps; Primary NR TC RTD, 1TE421B, fails to 570°F. Tave 1B rises, Loop 1B ΔT lowers. Control Rods begin to step in. The ATC operator will place control rods to Manual per BHC 1-RD UNCONTROLLED ROD MOTION. The crew will implement 1BOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL Attachment A. Tech Spec 3.3.1 conditions A and E will be entered.

After Tc RTD failure is addressed; The BOP will initiate a turbine load ascension per 1BGP 100-3T5, LOAD CHANGE INSTRUCTION SHEET FOR RAISING POWER < 15% IN ONE HOUR, while the ATC will perform reactivity calculation and the perform dilutions and rod withdrawal as determined by ReMA and using BOP CV-5T1, RCMS OPERATION IN DILUTE/ALT DILUTE CHECKLIST.

After a measurable change in power; Annunciator 1-1-B2 CNMT HATCH DOOR SEAL TROUBLE will be received. The crew will dispatch an operator to investigate. Air lock supply air pressure will be reported low and, if asked, will take actions to return supply air pressure to normal range. Tech Spec 3.6.2 condition A will be entered

After the CNMT Hatch Door Seal Supply Air Press failure is addressed, Master PZR Pressure Controller 1PK455A fails low. Demand lowers, PZR spray valves close and PZR heaters energize. Actual PZR pressure begins to rise. The ATC operator will place the controller to manual per BHC 1-RY-P PRESURIZER PRESSURE MALFUNCTION.

After the Master PZR Pressure Controller 1PK455A failure is addressed; the Air Side Seal Oil Pump will trip. The BOP will respond to start a Seal Oil Backup pump per BAR 1-18-B2, GEN AIR SIDE SEAL OIL PUMP TRIP.

After the Air Side Seal Oil Pump failure is addressed; steam line pressure detector 1PT-507 will fail high over a 30 second period. Both main feedwater pumps speed will rise, rising feedwater flow and causing all steam generator levels to begin rise. The BOP will take actions to stabilize the plant by taking manual control of the FW pump controller per BHC-1-SG, STEAM GENERATOR LEVEL. 1BOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL, Attachment J, will be implemented AND Steam Dump pressure controller will be placed to Manual. 1PT-507 will remain unavailable for the remainder of the scenario.

After the 1PT-507 failure is addressed; bus 143 is lost causing the loss of 1A and 1C CW pumps. Condenser vacuum will degrade. An automatic Turbine Trip/Reactor Trip signal, if generated, will fail and a manual Reactor Trip and Manual Turbine Trip will be required. The Reactor will NOT Trip and the crew will implement 1BFR-S.1, RESPONSE TO NUCLEAR POWER GENERATION/ATWS. The control rods will fail and move at minimum speed in automatic requiring manual insertion at 48 step per minute. The Turbine will NOT Trip and when the governor valves are run back, GV1 will remain partially open. Main Steamline Isolation will then be actuated. The local operator, when dispatched, will locally Trip the Reactor Trip Breakers after Emergency Boration flow of greater than 30 gallons has been verified. The crew will then return to 1BEP-0, REACTOR TRIP OR SAFETY INJECTION.

The scenario is complete when the crew has transitioned from 1BEP-0 to 1BEP ES-1.1, SI TERMINATION.

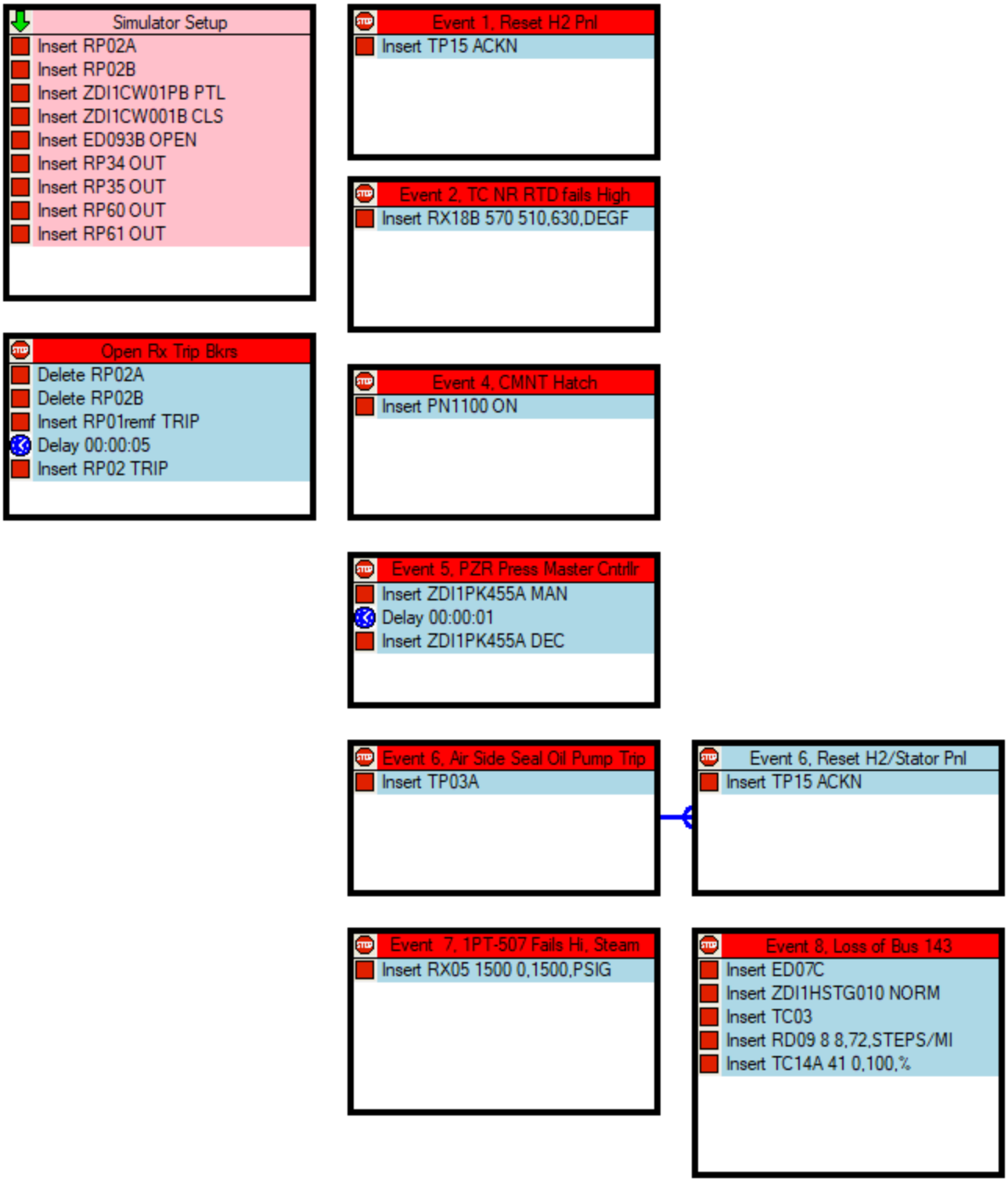
Critical Tasks:

CT-52: Insert negative reactivity into the core by manually inserting the Control Rods prior to dispatching operators to locally trip the reactor.
(K/A number – EPE 029-EA2.08; importance 3.4/3.5)

CT-50: Isolate main turbine from SGs during ATWS prior to re-entering 1BEP-0
(K/A: EPE 029EA1.13; importance - 4.1/3.9)

SIMULATOR SETUP GUIDE:

- Verify/perform TQ-BY-201-0113, Appendix A, Simulator “Ready for Training” Checklist.
- Establish the conditions of IC 175, 75% power, MOL, equilibrium xenon
    - (IC-18 with 1B CW Pump Out of Service)
- Place Simulator in RUN
- Initiate Smart Scenario:
    - Open SMART SCENARIO (Extreme Ace icon)
    - Open file Scenario N19-5.ssf
    - Load Initial values for instrument failures; Event 7
    - Click on the MODE button (near top of screen) and pick EXECUTE
    - Click on the PLAY button (bottom left of screen)
- Verify the following are included in the Smart Scenario:



- Verify malfunctions and overrides from Scenario Setup command box have input into Instructor Station Summary

- Ensure REMA is available at the Unit Desk
- Provide copies of the following documents: N/A
- Set AB Pot to 3.59 for 919 ppm boron
- Verify the Online Risk Placard is Green
- Place clearance order INFO tag on the following control switches:
  - 1B CW Pump – PTL
  - 1CW001B – CLS / power removed
- Place Protected Equipment placards at the following locations:
  - 1A CW Pump
  - 1C CW Pump

Turnover Information

- Unit 1 is at 75% MOL
- 912 MWe
- RCS boron concentration is 919 ppm
- Control bank D @ 171 steps
- 1B CW pump is OOS for an intake bay inspection; it is expected back in service in two days.
- Shift Manager requests the BOP to swap GC pumps in preparation for an OOS on 1GC01PB next shift.
- Power ascension to 1120 MWe at 0.6 Mwe/min will be initiated when the GC pump swap is completed.
- Fuel is NOT preconditioned
- Online Risk is Green
- Protected Equipment:
  - 1A CW Pump
  - 1C CW Pump

Event 1: BOP performs swap of operating Stator Cooling Water Pumps per BOP-GC-5

If dispatched as EO to observe stator cooling pump swap, report 1A stator cooling pump is ready for start.

- Once started, AS EO, report the 1A GC pump is operating normally. If asked, discharge pressure is 28 psid at 1PDICG15.

If dispatched as EO to acknowledge stator panel alarm; use Smart Scenario to reset the H2/Stator Panel alarm by right clicking on the box titled, **Event 1, Reset H2 Pnl**, and select, **Release**.

If alarm 1-18-D13 does NOT come in and crew questions why not, as EO report: there is a tag on the panel stating IR written for unreliable alarm.

Acknowledge as SM commencement and completion of procedure.

Event 2: Primary RTD NR TC, 1TE421B, fails high

As Shift Manager, acknowledge procedure entry and request for Emergency Plan evaluations.

As Shift Manager, acknowledge entry into TS 3.3.1

As Shift Manager, acknowledge request for writing IR, performing risk assessment and making appropriate notifications.

Event 3: Raise power at 0.6 MW/min

As Generation Dispatch, contact the MCR by phone and request Unit 1 raise power to 1120 MW at 0.6 MW/min due to grid demand.

As Shift Manager, acknowledge the initiation of ramp (if required).

Acknowledge as chemistry/rad protection requests for RCS samples (if required).

Acknowledge as Generation Dispatch initiation of ramp.

Event 4: CNMT Hatch Door Seal Supply Air Press.

At Lead Evaluator's cue, use Smart Scenario to alarm CNMT Hatch Door Seal Trouble by right clicking on the box titled, **Event 4, CMNT Hatch**, and select, **Release**

When dispatched as EO to check CNMT Hatch and/or IA alignment and air regulator settings; report: the Containment airlock appears to have a gasket failure, I can feel air blowing from the outside door seal.

As Shift Manager acknowledge the failure, LCO 3.6.2, on line risk assessment, request for maintenance support, and IR request.

Event 5: Master PZR Pressure Controller 1PK455A fails low

At Lead Evaluator's cue, use Smart Scenario to fail Master PZR Pressure Controller low by right clicking on the box titled, **Event 5, PZR Press Master Cntrllr**, and select, **Release**

As SM acknowledge the failure, request for on line risk assessment, request for maintenance support, and IR requests.

Event 6: Air Side Seal Oil Pump Trip

At Lead Evaluator's cue, use Smart Scenario to trip the Air Side Seal Oil Pump by right clicking on the box titled, **Event 6, Air Side Seal Oil Pump Trips**, and select, **Release**

When requested as EO to investigate the Air Side Seal Oil Pump Trip, acknowledge the request.

- Wait two minutes, Report: Air Side Seal Oil Pump breaker at MCC134V6 Cub B4 has Tripped Free. The H2/Stator Cooling Panel trouble is Air Side Seal Oil Pump Off.
- Use Smart Scenario to reset the H2/Stator Panel alarm by right clicking on the box titled, **Event 6, Reset H2/Stator Pnl**, and select, **Release**

Event 7: Steam Line Press Detector 1PT-507 Fails High

At Lead Evaluator's cue, use Smart Scenario to fail 1PT-507 high by right clicking on the box titled, **Event 7, 1PT-507 Fails Hi Steam**, and select, **Release**

Acknowledge as SM 1PT-507 failure, on line risk assessment, request for maintenance support, and IR requests.

Event 8: Loss Of 4160v Bus 4160v Bus 143 & Event 9 Reactor Trip Complications (ATWS)

At Lead Evaluator's cue, use Smart Scenario to cause a Loss of Power to Bus 143 by right clicking on the box titled, **Event 8, Loss of Bus 143**, and select, **Release**

If dispatched to bus 143, report: an acrid smell in Div. 11 ESF switchgear room but no fire.

As Shift Manager, acknowledge procedure entry and request for Emergency Plan evaluations.

After transition to 1BFR-S.1, Acknowledge request for STA and begin monitoring BSTs.

As EO, acknowledge request for local trip of Reactor Trip Breakers. After the crew has directed the performance of step 6.RNO in 1BFR-S.1 to locally Trip the Reactor; use Smart Scenario to locally Trip the Reactor by right clicking on the box titled, **Open Rx Trip Bkrs**, and select, **Release.** Report breaker opening to MCR.

Op-Test No.: 2019-301 Scenario No.: N19-5 Event No.: 1

Event Description: Swap of operating Stator Cooling Water

Time	Position	Applicant's Actions or Behavior
	CUE	From turnover, swap stator cooling pumps per BOP GC-5, SWITCHING STANDBY AND OPERATING GC PUMPS.
	US	Directs BOP to perform BOP GC-5.
	BOP	• Refer to BOP GC-5. • Start 1A stator water pump at 1PM02J. ○ Allow both pumps to run in parallel for ≥ 5 minutes (Precaution D.1). • Shutdown 1B stator water pump at 1PM02J. ○ Notify EO to perform leak check at skid. ○ Notify EO to reset Hy/GC panel alarm, if received.
	ATC	• Monitor primary and secondary panels while BOP performing BOP GC-5. • Provide support and peer checks as requested to BOP.
EVALUATOR NOTE:		**After BOP GC-5 is complete and with lead examiner's concurrence, enter next event.**

Op-Test No.: 2019-301 Scenario No.: N19-5 Event No.: 2

Event Description: Primary RTD NR TC, 1TE421B, fails high

Time	Position	Applicant's Actions or Behavior
	CUE	• Annunciator 1-14-B5 LOOP 1B ΔT DEV LOW is LIT ○ Annunciator 1-14-E2, AUCT TAVE HIGH is LIT ○ Annunciator 1-14-D1, TAVE CONT DEV HIGH is LIT ○ Annunciator 1-12-B4, PZR LEVEL CONT DEV LOW is LIT ○ Annunciator 1-9-D3, CHG LINE FLOW HIGH LOW is LIT • Rods begin stepping in.
	ATC	• Implement BHC 1-RD, UNCONTROLLED ROD MOTION • CHECK Turbine Power STABLE • Place Rod Control to Manual
	CREW	• Identify instrument failure
	US	• Enter 1BOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL, Attachment A. • Notify SM of procedure entry, request EAL evaluation and IR
	ATC	○ Verify/Place Rod Bank Select Switch in MANUAL • Manually defeat 1B Tave channel • Manually defeat 1B ΔT channel • Check reactor power less than 100% RTP • Select operable RTD for the ΔT recorder • Check if Rod Control can be placed in AUTO • Check C-5 NOT LIT ○ May place rods in AUTO if Tave within 1° of Tref • Check Pzr level trending to normal ○ May take manual control of Master Pzr level controller or 1CV121 • Check P12 interlock for proper state • Remove SPDS Inputs • On the PPC PDMS Test Mode page place the following points in - TEST: • T0422A (NR RANGE LOOP B COLD LEG TEMP) • Delete the following points from - SCAN: • T0420 (RCL 2 TAVG) (Input to SPDS)
	BOP	• Assist RO with BAR response

	US	(RF 6a) Recognize malfunction of TS Related Instrumentation (RF 6b) Locate/Determine Applicable LCOs • LCO 3.3.1 Reactor Trip System (RTS) Instrumentation o Function 6, Overtemperature ΔT o Function 7, Overpower ΔT (RF 6c) CONDITION, REQUIRED ACTION, and COMPLETION TIME • CONDITION A - One or more Functions with one or more required channels or trains inoperable o A.1 • RA, Enter the Condition referenced in Table 3.3.1-1 [CONDITION E], CT Immediately • CONDITION E, One channel inoperable o E.1 • RA – Place channel in trip • CT – 72 hours OR o E.2 • RA – Be in MODE 3 • CT – 78 hours
EVALUATOR NOTE:		**The following Technical Specification determination only applies if RCS pressure lowers to less than 2209 psig.**
	US	(RF 6a) Recognize operation outside of TS Related parameters (RF 6b) Locate/Determine Applicable LCOs • LCO 3.4.1 RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits (RF 6c) CONDITION, REQUIRED ACTION, and COMPLETION TIME • CONDITION A, One or more RCS DNB parameters not within limits o A.1 • RA - Restore RCS DNB parameter(s) to within limit • CT - 2 hours
EVALUATOR NOTE:		**After the actions for the 1TE421B NR TC RTD failure are complete, and with the lead examiner's concurrence, enter next event.**

Op-Test No.: 2019-301 Scenario No.: N19-5 Event No.: 3

Event Description: Raise power at 0.6 MW/min

Time	Position	Applicant's Actions or Behavior
	CUE	○ Call from Generation Dispatch to raise power to 1120 MW at 0.6 Mw/min.
	US	• Acknowledge request to raise power to 1120 MW at 0.6 Mw/min. • Implement actions of 1BGP 100-3T5, LOAD CHANGE INSTRUCTION SHEET FOR RAISING POWER ≤ 15% IN ONE HOUR. ○ Perform pre-job brief per OP-BY-101-0001 ATTACHMENT 9 REACTIVITY CHANGE BRIEF SHEET for load ramp.
	US	• Direct raising load to 1120MW at 0.6 MW/min. • Initiate load swing instruction sheet, 1BGP 100-3T5.
	ATC	• Verify rod position and boron concentration. • Conducts reactivity brief • Initiate dilution using BOP CV-5 or BOP CV-5T1 checklist • Select STOP on RMCS Makeup Control Switch • Select DIL or ALT DIL on RMCS Mode Select Switch • Enter desired flowrate ○ Verify Prescaler set to 1.0 ○ Reset PW/ Total Flow counter • Enter desired dilution amount in PW counter • Place RMCS Makeup Control Switch to START • Verify 1CV110B OPEN if in ALT DIL • Verify 1CV111A and B OPEN • Verify proper PW flow on flow recorder 1CD-CX4102 • Monitors effects of dilution o Turn on PZR backup heaters.
	BOP	• Raise turbine load at 1PM02J or OWS drop 210 by performing the following: • Select SETPOINT. • Enter 0.6 MW/min into the RATE window. • Select ENTER. • Enter 1120 MW into REF DEMAND window. • Select ENTER. • Select EXIT. ○ Notify US and RO of pending ramp. • Select GO/HOLD. • Verify GO/HOLD button illuminates. • Verify HOLD illuminated RED. • Select GO. • Verify GO illuminates RED. • Verify main turbine load begins to rise.

Op-Test No.: 2019-301 Scenario No.: N19-5 Event No.: 3

Event Description: Raise power at 0.6 MW/min

Time	Position	Applicant's Actions or Behavior

	ATC/BOP	• Monitor reactor power and load ascension:
		  • Monitor NI's, Tave, ΔI, Pzr press/level.
		  • Monitor MW and DEHC system response at 1PM02J or OWS drop 210.
		• During dilution, monitor the following at 1PM05J and HMI:
		  • VCT level.
		  • RCS Tave rising/RCS boron concentration lowering.
		  • PW/Total flow counter responding correctly.
		  • Verify dilution auto stops at preset value.
		  ○ Return Reactor Makeup System to automatic.

EVALUATOR NOTE:		**With lead examiner's concurrence, initiate the next event.**

Op-Test No.: 2019-301 Scenario No.: N19-5 Event No.: 4

Event Description: CNMT Hatch Door Seal Supply Air Press

Time	Position	Applicant's Actions or Behavior
	CUE	• Annunciator 1-1-B2, CNMT HATCH DOOR SEAL TROUBLE alarm is LIT • SER point 1100 is printed
	Crew	• Check BAR for alarm • Dispatch EO to CHECK IA alignment and air regulator settings • Direct EO to adjust door seal supply air regulator.
	US	(RF 6a) Recognize malfunction of TS Related Component (RF 6b) Locate/Determine Applicable LCOs • LCO 3.6.2 Containment Air Locks (RF 6c) CONDITION, REQUIRED ACTION, and COMPLETION TIME • CONDITION A, One or more containment air locks with one containment air lock door inoperable o A.1 • RA - Verify the OPERABLE door is closed in the affected air lock • CT 1 hour AND o A.2 • RA - Lock the OPERABLE door closed in the affected air lockdoor closed • CT - 24 hours AND o A.3 • RA - Verify the OPERABLE door is locked closed in the affected air lock • CT - Once per 31 days • Notifies SM of failure and requests risk evaluation and IR, and maintenance support
EVALUATOR NOTE:		**When the Technical Specification has been determined and with lead examiner's concurrence, initiate the next event.**

Op-Test No.: 2019-301 Scenario No.: N19-5 Event No.: 5

Event Description: Master PZR Pressure Controller 1PK455A fails low

Time	Position	Applicant's Actions or Behavior
	CUE	• Annunciator 1-12-C1, PZR PRESS CONT DEV HTRS ON is LIT ○ Annunciator 1-12-B2, PZR PRESS HIGH is LIT ○ Annunciator 1-12-D4, RC SYSTEM COLD PRESS HIGH is LIT
	ATC	• Identify 1PK-455A has failed LOW • Identify heaters are on and spray valves close • Report failure to US.
	CREW	Refer to BARs. ○ Place load ramp on hold
	ATC	• MONITOR Pressurizer pressure and level. • ENSURE Spray Valves CLOSED. • CHECK Pressurizer Heaters for proper operation. • CONTROL PZR pressure in MANUAL by operation of PZR heaters and PZR spray. • ENSURE proper operation of Charging and Letdown.
	US	• Set control bands for manual control of PZR pressure • Notifies SM of failure and requests risk evaluation and IR, and maintenance support
EVALUATOR NOTE:		**After the actions for the Master PZR Pressure Controller 1PK455A failure are complete, and with the lead examiner's concurrence, enter next event.**

Op-Test No.: 2019-301 Scenario No.: N19-5 Event No.: 6

Event Description: Air Side Seal Oil Pump Trip

Time	Position	Applicant's Actions or Behavior
	CUE	• Annunciator 1-18-B12, GEN H2 SIDE SEAL OIL PUMP TRIP • Annunciator 1-18-D13, H2/STATOR CLG PANEL TROUBLE • Air Side Seal Oil Pp, disagreement lamp - LIT
	BOP	• START the Seal Oil Back-up Pump. ○ Dispatch EO to investigate.
	US	• Ensure BOP attempts a manual start of Seal Oil Back-up Pump
EVALUATOR NOTE:		**After the actions for the Air Side Seal Oil Pump Trip are complete and with lead examiner's concurrence, insert the next event.**

Op-Test No.: 2019-301 Scenario No.: N19-5 Event No.: 7

Event Description: Steam Line Press Detector 1PT-507 Fails High

Time	Position	Applicant's Actions or Behavior
EVALUATOR NOTE:		**With 1PT-507 failed high, if the steam dumps are placed in the steam pressure mode prior to taking the controller to manual and lowering the output to 0, ALL steam dump valves (12) will fail open until the P-12 interlock at Tave at 550 degrees. RCS temperature will then send a signal to close all steam dump valves.**
	CUE	○ Annunciators 1-15-A/B/C/D9, S/G 1A/B/C/D LEVEL DEVIATION HIGH/LOW ○ Annunciator 1-16-D2, FW PUMP DSCH FLOW HIGH • BOTH main feedwater pump speed/flow – RISING. • 1PI-507, S/G HDR PRESS, - RISING • 1PI-508 FW HTR DISCH. PRESSURE - RISING • 1PI-509 MS/FW HDR D/P – LOWERING • 1PI-MS021 STM HDR PRESS – RISING

	BOP	• Implement BHC-1-SG, STEAM GENERATOR LEVEL
		  • PLACE FW pump affected controller (1SK-509A/B/C) to manual.
		  • ADJUST controlled parameter to pre-failed value.
		  • CLEAR integral from FW Reg Vlv controllers (1FK-510/520/530/540) as required.
		• Inform US of instrument failure

	US	• Notify SM of plant status and procedure entry
		• Request evaluation of Emergency Plan conditions
		• Implement 1BOA INST-2 OPERATION WITH A FAILED INSTRUMENT CHANNEL, Attachment J FW PUMP SPEED CONTROL MALFUNCTION and direct operator actions of 1BOA INST - 2 to establish the following conditions.
		  • PLACE FW pump affected controller (1SK-509A/B/C) to manual.
		  • ADJUST controlled parameter to pre-failed value.
		  • CHECK FW PUMP ΔP at PROGRAM and STABLE
		  • CHECK FW PUMP ΔP:
		  • ALIGN STEAM DUMPS in Tavg MODE

EVALUATOR NOTE:		**After the actions for the 1PT-507 failure are complete and with lead examiner's concurrence, insert the next event.**

Op-Test No.: 2019-301_ Scenario No.: _N19-5_ Event No.: _8/9__

Event Description: Loss Of 4160v Bus 4160v Bus 143 & Reactor Trip Complications (ATWS)

Time	Position	Applicant's Actions or Behavior
EVALUATOR NOTE:		**Crew will likely attempt to trip the turbine/reactor before an automatic trip is received making some of the steps below optional based on crew response. Crew may isolate main steam / an automatic main steam isolation may occur during turbine response.**
	CUE:	• All CW pumps tripped • BP Annunciator C-9 (5.6), CNDSR NOT AVAILABLE is LIT o Annunciator 1-11-A9, TURB TRIP ABOVE P-8 RX TRIP is LIT • Condenser pressure RISING.
	ATC/BOP	• Identify/report loss of bus 143 • Identify report loss of all CW pumps • Identify report condenser pressure rising
	ALL/US	• Direct a manual reactor trip and operators perform immediate actions of 1BEP-0, REACTOR TRIP OR SAFETY INJECTION.
	ATC	• Manually trips reactor.
	US	Implement 1BEP-0, REACTOR TRIP OR SAFETY INJECTION, and directs operator actions. • Notifies SM of 1BEP-0 entry. • Requests Emergency Plan evaluation.
	ATC	Verify Reactor Trip • Rod bottom lights – ALL LIT • Reactor trip & Bypass breakers - OPEN • Neutron flux DROPPING • Determines the Reactor did NOT TRIP • Manually trip the reactor • 1PM05J • 1PM06J
	CREW	Transition to 1BFR-S.1, RESPONSE TO NUCLEAR POWER GENERATION/ATWS
EVALUATOR NOTE:		**Crew actions of 1BFR-S.1 continue on next page.**

Op-Test No.: 2019-301 Scenario No.: N19-5 Event No.: 8/9

Event Description: Loss Of 4160v Bus 4160v Bus 143 & Reactor Trip Complications (ATWS)

Time	Position	Applicant's Actions or Behavior
EVALUATOR NOTE:		**Actions for 1BFR-S.1, RESPONSE TO NUCLEAR POWER GENERATION/ATWS, begin on this page.**
	US	• Notify SM of plant status and procedure entry • Request evaluation of Emergency Plan conditions • Enter/Implement 1BFR-S.1 and direct operator actions of 1BFR-S.1

[CT]
 	
[CT-52]
	ATC	Perform immediate operator actions of 1BFR-S.1:
		• VERIFY REACTOR TRIP
		  • Rod bottom lights – LIT
		  • Determines Rod Bottom lights are Not LIT
		  • Reactor trip & Bypass breakers – OPEN
		  • Determines Reactor Trip Breakers are Not OPEN
		  • Determines Neutron flux – NOT DECREASING
		• Manually trip the reactor
		  • 1PM05J
		  • 1PM06J
		  • Determines control rods NOT inserting automatically
		  • **Manually insert control rods at greater than or equal to 48 steps per minute**

[CT]
 	
[CT-50]
	BOP	Perform immediate operator actions of 1BFR-S.
		• VERIFY TURBINE TRIP
		  • All Turbine throttle valves – CLOSED
		  • All Turbine governor valves – CLOSED
		  • Determines Turbine is Not Tripped
		  • Attempt to trip with push button / OWS Panel (does NOT work)
		  • Determines throttle and governor valves remain OPEN
		  • CLOSE all throttle and governor valves using OWS:
		  • Select turbine MANUAL
		  • Select RAPID
		  • Select and hold GV lower arrow
		  • Determines governor valves #1 remains PARTIALLY OPEN
		  • **Manually actuate Main Steamline Isolation**
		  • **Verify MSIV and bypass valves are CLOSED**

	BOP	• CHECK AF PUMPS RUNNING
		  • AF pump run lights status (May be LIT or NOT LIT)
		  ○ Manually start the 1A AF pump if it did not yet have an auto start signal.
		  ○ Manually start the 1B AF pump if it did not yet have an auto start signal.

Op-Test No.: 2019-301 Scenario No.: N19-5 Event No.: 8/9

Event Description: Loss Of 4160v Bus 4160v Bus 143 & Reactor Trip Complications (ATWS)

Time	Position	Applicant's Actions or Behavior
	ATC/BOP	• INITIATE EMERGENCY BORATION OF THE RCS • CV pumps – ONE RUNNING • Open 1CV8104 o Attempt start boric acid transfer pump (no power to pump) • Open 1CV112D or 1CV112E • Close 1CV112B or 1CV112C • Maximize charging flow. • Verify letdown established • Check PZR pressure – LESS THAN 2335 PSIG
	BOP	• VERIFY CNMT VENTILATION ISOLATION • Group 6 CNMT vent isolation monitor lights – LIT
EVALUATOR NOTE:		**The Reactor will be Tripped locally during the performance of the next step when directed.**
	ATC/BOP	CHECK IF THE FOLLOWING TRIPS HAVE OCCURRED • Reactor Trip • Determines Reactor Trip has NOT occurred. • Dispatch operator to locally trip reactor • Turbine Trip o All Turbine governor valves – CLOSED o Determines GV#1 remains OPEN o All Turbine throttle valves – CLOSED o Perform the following until the turbine is tripped: o Place EH pumps in PULL OUT position o Dispatch operator to locally TRIP the turbine at the pedestal o Dispatch operator to locally open both EH pump breakers
	ATC	CHECK IF REACTOR IS SUBCRITICAL • PR channels - LESS THAN 5% • IR channels - NEGATIVE STARTUP RATE
	CREW	Transition to 1BEP-0, REACTOR TRIP OR SAFETY INJECTION
EVALUATOR NOTE:		**Crew actions of 1BEP-0 continue on next page.**

Op-Test No.: 2019-301 Scenario No.: N19-5 Event No.: 8/9

Event Description: Loss Of 4160v Bus 4160v Bus 143 & Reactor Trip Complications (ATWS)

Time	Position	Applicant's Actions or Behavior
EVALUATOR NOTE:		**Actions for 1BEP-0, REACTOR TRIP OR SAFETY INJECTION, begin on this page.**
	US	Implement 1BEP-0, REACTOR TRIP OR SAFETY INJECTION, and directs operator actions. • Notifies SM of 1BEP-0 entry. • Requests Emergency Plan evaluation.
	ATC	Verify Reactor Trip • Rod bottom lights – ALL LIT • Reactor trip & Bypass breakers - OPEN • Neutron flux DROPPING
	BOP	Verify Turbine Trip • Turbine throttle valves - CLOSED • Turbine governor valves – CLOSED ○ Determines GV #1 remains open, but no combination of a TV and GV remains open. Also, Main Steam Isolation was completed earlier.
	BOP	Verify power to 4KV busses • Bus 141 - ENERGIZED • Bus 142 - ENERGIZED
	ATC	Check SI status ○ SI actuated ○ SI First OUT annunciator lit (1-11-B1, 1-11-C1, 1-11-D1, 1-11-E1) ○ SI ACTUATED lit (1-BP-4.1) ○ SI Equipment running (SI pumps running, CV Cold leg injection SI8801A/B open) Determine if SI required: • Check PZR pressure < 1829 psig • Check Steamline pressure < 640 psig • Check CNMT pressure > 3.4 psig • If SI is required: • Actuate SI from both SI switches (1PM05J and 1PM06J) and continue in 1BEP-0
	US	Directs BOP to perform Attachment B, SI VERIFICATION of 1BEP 0.
EVALUATOR NOTE:		**Crew actions of 1BEP-0 continue below.** **BOP actions of 1BEP-0, Attachment B continue on page 25.**

Op-Test No.: 2019-301 Scenario No.: N19-5 Event No.: 8/9

Event Description: Loss Of 4160v Bus 4160v Bus 143 & Reactor Trip Complications (ATWS)

Time	Position	Applicant's Actions or Behavior
	ATC/BOP	Verify AF system: • AF pumps – BOTH RUNNING • AF isolation valves 1AF13A-H - OPEN • AF flow control valves 1AF005A-H - THROTTLED • AF flow – GREATER THAN 500 GPM Check SG tubes intact: • Secondary radiation level - NORMAL AND STABLE • Narrow range levels – NOT RISING IN AN UNCONTROLLED MANNER
	ATC/BOP	Check PZR PORVs and Spray Valves • PORVs - CLOSED • PORV isol valve – at least one ENERGIZED • PORV relief path – at least one AVAILABLE • PORV in - AUTO • Isol valve - open • Normal spray valves - CLOSED
	ATC/BOP	ADJUST AF FLOW: • Lower total Feed Flow to approximately 600 gpm
	ATC/BOP	Check steam dumps – AVAILABLE • C-9 Permissive light – NOT LIT • CW Pump - AT LEAST ONE RUNNING
	ATC/BOP	Control RCS Temperature per table: • Adjust Feed Flow • Steam Release
	ATC/BOP	Check if RCPs should be stopped: • All RCP's – ALL RUNNING. • High head flow 1FI-917 > 100 GPM and RCS Pressure > 1425 PSIG.
	ATC/BOP	Check pressure in all SGs: • NO SG dropping in an uncontrolled manner. • NO SG Completely Depressurized.
	ATC/BOP	CHECK IF SG TUBES ARE INTACT: • SJAE/Gland Steam Exhaust Gas radiation - HAS REMAINED LESS THAN ALERT ALARM SETPOINT. • SG Blowdown Liquid radiation – HAS REMAINED LESS THAN ALERT ALARM SETPOINT. • Main Steamline radiation - HAS REMAINED LESS THAN ALERT ALARM SETPOINT.

Op-Test No.: 2019-301 Scenario No.: N19-5 Event No.: 8/9

Event Description: Loss Of 4160v Bus 4160v Bus 143 & Reactor Trip Complications (ATWS)

Time	Position	Applicant's Actions or Behavior

	ATC/BOP	CHECK IF RCS IS INTACT:
		• CNMT area radiation monitors - LESS THAN ALERT ALARM SETPOINTS:
		  • CNMT pressure - LESS THAN 3.4 PSIG
		  • CNMT floor drain sump level -
		  • LESS THAN 46 INCHES

	ATC/BOP	CHECK IF ECCS FLOW SHOULD BE REDUCED: • RCS subcooling – ACCEPTABLE • Secondary heat sink: Total feed flow to intact SGs - GREATER THAN 500 GPM – OR Narrow range level in at least one intact SG – GREATER THAN 10% • RCS pressure - STABLE OR RISING • PZR level - GREATER THAN 12%
	CREW	Transition to 1BEP ES-1.1, SI TERMINATION
EVALUATOR NOTE:		**The scenario can be terminated when the crew transitions to 1BEP ES-1.1, SI TERMINATION.**

Op-Test No.: 2019-301 Scenario No.: N19-5 Event No.: 8/9

Event Description Loss Of 4160v Bus 4160v Bus 143 & Reactor Trip Complications (ATWS)

Time	Position	Applicant's Actions or Behavior
EVALUATOR NOTE:		**1BEP-0, Attachment B, SI VERIFICATION actions begin on this page.**
	BOP	**Attachment B action** Verify ECCS pumps running: • CENT CHG pumps – BOTH RUNNING • RH pumps – BOTH RUNNING • SI pumps – BOTH RUNNING
	BOP	**Attachment B action** Verify ECCS valve alignment: • Group 2 Cold Leg Injection monitor lights - LIT
	BOP	**Attachment B action** Verify ECCS flow • HHSI flow >100 gpm • RCS pressure NOT <1700 psig • If RCS pressure <1700 psig check SI pp flow > 200 gpm
	BOP	**Attachment B actions** Verify RCFCs running in Accident Mode: • Group 2 RCFC Accident Mode status lights - LIT Verify CNMT isolation Phase A • Group 3 CNMT isolation monitor lights - LIT Verify CNMT Ventilation isolation • Group 6 CNMT Vent Isol monitor lights - LIT Verify CC Pumps • CC pumps - BOTH RUNNING Verify SX Pumps running • SX pumps - BOTH RUNNING Check If Main Steamline Isolation Is Required o Check SG pressure < 640 psig o Check CNMT pressure > 8.2 psig • If either condition is met, then verify MSIVs and MSIV Bypass valves closed Check if CS is required (NOT required)
	BOP	**Attachment B action** Verify FW isolated: • FW pumps tripped • FW isolation monitor lights lit • FW pumps discharge valves closed 1FW002A-C • Trip all running HD pumps

Op-Test No.: 2019-301 Scenario No.: N19-5 Event No.: 8/9

Event Description Loss Of 4160v Bus 4160v Bus 143 & Reactor Trip Complications (ATWS)

Time	Position	Applicant's Actions or Behavior
	BOP	**Attachment B action** Verify both DGs running • SX valves open 1SX169A and B • Dispatch operator locally to check operation
	BOP	**Attachment B action** Verify Generator Trip • GCB 3-4 and OCB 4-5 open • PMG output breaker open

	BOP	**Attachment B action**
		Verify Control Room ventilation aligned for emergency operations:
		• Control Room Outside Air Intake radiation monitors < High Alarm setpoints
		• Operating VC train equipment running Train A
		  • Supply fan
		  • Return fan
		  • M/U fan
		  • Chilled water pump
		  • MCR chiller 0A
		• Operating VC train dampers
		  • M/U fan outlet damper NOT full closed 0VC24Y
		• VC train M/U filter light LIT
		• Operating VC train Charcoal Absorber aligned for train A
		  • 0VC43Y closed
		  • 0VC21Y open
		  • 0VC22Y open
		• Control Room pressure greater than +0.125 inches water on 0PDI-VC038

	BOP	**Attachment B action**
		Verify Auxiliary Building ventilation aligned
		• Two inaccessible filter plenums aligned
		  • Plenum A fan 0VA03CB running
		  • Damper 0VA023Y not fully closed
		  • Damper 0VA436Y closed
		  • Plenum C fan 0VA03CF running
		  • Damper 0VA072Y not fully closed
		  • Damper 0VA438Y closed
		Check Aux Building Supply and Exhaust fans
		• One Exhaust Fan running for every Supply Fan running

Op-Test No.: 2019-301 Scenario No.: N19-5 Event No.: 8/9

Event Description Loss Of 4160v Bus 4160v Bus 143 & Reactor Trip Complications (ATWS)

Time	Position	Applicant's Actions or Behavior

	BOP	**Attachment B action**
		Verify FHB ventilation aligned
		• Train B fan 0VA04CB running
		  • 0VA055Y open
		  • 0VA062Y not fully closed
		  • 0VA435Y closed

	BOP	**Attachment B action** Maintain UHS Basin level > 80% Initiate periodic checking of Spent Fuel Cooling • Dispatch operator to locally check SFP level and temperature Notify Unit Supervisor of • Manual actions taken • Failed equipment status • Attachment B completed
	CREW	**Attachment B action** Shutdown unnecessary plant equipment ○ As time allows refer to 1BGP 100-4T4, REACTOR TRIP POST RESPONSE GUIDELINE ○ As time allows refer to 1BGP 100-5, PLANT SHUTDOWN AND COOLDOWN

Facility: Byron Scenario No.: N19-6 Op-Test No.: 2019-301

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: IC-178; 6.6% Reactor power, BOL, 1332 ppm boron, Startup in progress per 1BGP 100-3. CBD @135 steps withdrawn.

Turnover: Power Ascension is in progress per 1BGP100-3, POWER ASCENSION. 1BOL 3.h for PDMS inoperability in Mode 1 < 25% RTP has been entered. Currently at step 9 to raise Reactor Power to provide additional steam flow capability and at step 14 to Raise Turbine Speed to 1700 rpm and Transfer to GV Control.

Event No.	Malf. No.	Event Type*	Event Description
1	None	R (ATC, SRO)	Perform dilution per the ReMA to raise power per step 9 of 1BGP 100-3.
2	None	N (BOP, SRO)	Continue with Turbine Speed Increase to 1700 RPM per step 14 of 1BGP 100-3.
3	IOR ZDI0CW03PA TRIP IOR ZLO0CW03PA2 ON IOR PN1224 ON	C (BOP, SRO)	0A CW Makeup Pump will spuriously trip; The BOP will refer to BAR 0-38-A11 and start the standby 0B CW Makeup Pump per BOP CW-9, Circulating Makeup Pump Start-up. The crew may also enter 0BOA SEC-11, Inadequate Circulating Water Makeup.
4	IMF RX06C 100 30	I (BOP, SRO) TS (SRO)	Steam Generator 1A Level Channel 1PT519, the controlling level channel fails high. Feedwater flow and Steam Generator level lower. The BOP will place 1FW510A to manual and select an operable level channel per BHC 1–SG. Tech Specs 3.3.1 and 3.3.2 will be entered.
5	IMF TH04B 20 120	C (ATC, SRO) TS (SRO)	RCS begins to leak at 20 GPM: The crew will enter 1BOA PRI-1, Excessive Primary Plant Leakage to raise charging flow and secure letdown. The crew will determine the leak is not isolable. Tech Spec 3.4.13 will be entered.
6	IMF TH04B 6000 420	M (ALL)	After the crew has determined the leak cannot be isolated and declared the Tech Spec; it will increase in magnitude. The crew will trip or verify a trip of the reactor and initiate or verify Safety Injection. The crew will enter 1BEP-0, transition to 1BEP-1 and then to 1BCA-1.1 Loss of Emergency Coolant Recirculation.
7	IMF RH01A (preload) IMF RP28C (preload)	C (ALL)	RHR Pump 1A fails to start Safeguards Sequencer Relay RHR Pump 1B failed deenergized. Requires manual start of the remaining 1B RH pump.

8	MRF ED071N OPEN (preload) IMF TH04B 75000 60 (preload)	C (ALL)	1SI8811B breaker open RCS Leak, Hot Leg B Following Reactor Trip the RCS break rises in severity. The 1SI8811B breaker failure coincident with the failure of RH Pump 1A to be started necessitates transition to 1BCA-1.1.
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

SCENARIO N19-6 OVERVIEW

Power Ascension is in progress per 1BGP100-3, POWER ASCENSION. Currently at step 9 to raise Reactor Power to provide additional steam flow capability and at step 14 to Raise Turbine Speed to 1700 rpm and Transfer to GV Control.

After completing shift turnover and relief; the ATC Operator will raise power by performing a dilution per the ReMA to provide additional steam flow capability.

As Reactor Power is raised and additional steam flow capability is available; The BOP will initiate a turbine speed increase per 1BGP 100-3, POWER ASCENSION, step 14.

After the actions to raise turbine speed are in progress; 0A CW Makeup Pump will spuriously trip; The BOP will refer to BAR 0-38-A11 and start the standby 0B CW Makeup Pump per BOP CW-9, Circulating Makeup Pump Start-up. The crew may also enter 0BOA SEC-11, Inadequate Circulating Water Makeup.

After the 0A CW Makeup Pump failure is addressed; Steam Generator 1A Level Channel 1LT519, the controlling level channel fails high. Feedwater flow and Steam Generator level lower. The BOP will place 1FW510A to manual and select an operable SG level per BHC 1–SG. The crew will implement 1BOA INST 2, OPERATION WITH A FAILED INSTRUMENT CHANNEL, Attachment F. Tech Spec 3.3.1 conditions A and E and Tech Spec 3.3.2 conditions A and D will be entered.

After the 1LT519 failure is addressed; The RCS begins to leak at 20 GPM: The crew will enter 1BOA PRI-1, EXCESSIVE PRIMARY PLANT LEAKAGE, and take actions to raise charging flow, secure letdown and diagnose the leak. The crew will determine the leak is not isolable. Tech Spec 3.4.13 condition A will be entered.

After the crew has determined the leak cannot be isolated and declared the Tech Spec; the RCS leak will increase in magnitude. The crew will Trip the reactor, enter 1BEP-0, REACTOR TRIP OR SAFETY INJECTION, and manually initiate a Safety Injection. A manual start of the 1B RH pump will be required as the 1A RH pump will not start and the 1B RH pump will fail to start automatically. The BOP will take actions to ensure the long-term containment of radioactivity by manually aligning riser valves and starting SX cooling tower fans in High Speed during performance of Attachment B. The crew will proceed to 1BEP-1, LOSS OF REACTOR OR SECONDARY COOLANT, when it is determined that the RCS is NOT intact. A transition will then be made at step 11 to 1BCA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, when it is determined that neither train of Cold Leg Recirculation capability exists. The Equipment Operator will report 1SI8811B Open when the NSO closes the CS pump discharge header isolation valves 1CS007A and 1CS007B at step 8 RNO. The crew will then apply the Caution prior to step 1, and continue further recovery actions per procedure and step in effect; 1BEP-1 step 11.

The scenario can be terminated when the US/crew has established Train B Cold Leg Recirculation AVAILABLE (1SI8811B has been opened) and has determined a course of action based on RWST level; transition to 1BEP ES-1.3 if less than 46% or return to step 11 of 1BEP-1 to continue to Evaluate Plant Status if greater than 46%.

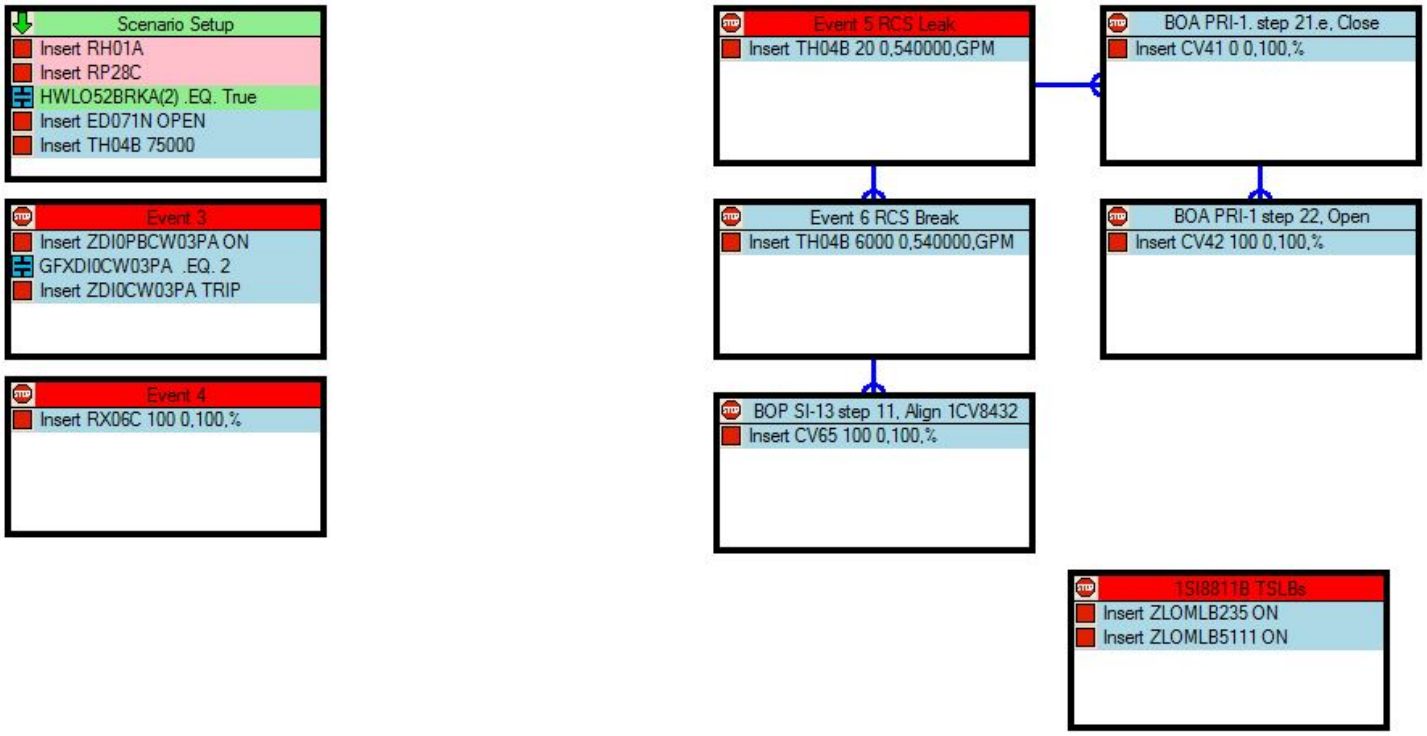
Critical Tasks

CT-5: Manually start at least one low-head ECCS pump, RH Pump 1B, before transition out of 1BEP-0 to 1BEP-1.
(K/A number – EPE 011-EA1.13 importance 4.1/4.2)

TCA#49: Align the SXCT to maximize the heat removal capacity following LBLOCA.
(K/A number – EPE 011-EA1.12 importance 4.1/4.4)

SIMULATOR SETUP GUIDE:

- Verify/perform TQ-BY-201-0113, Appendix A, Simulator “Ready for Training” Checklist.
- Establish the conditions of IC 178, 6.6% power, BOL, startup in progress
- Place Simulator in RUN
- Initiate Smart Scenario:
  - Open SMART SCENARIO (Extreme Ace icon)
  - Open file Scenario N19-6.ssf
  - Load Initial values for instrument failures; Event 4
  - Click on the MODE button (near top of screen) and pick EXECUTE
  - Click on the PLAY button (bottom left of screen)
- Verify the following are included in the Smart Scenario:



- Verify malfunctions and overrides from Scenario Setup command box have input into Instructor Station Summary
- Ensure REMA is available at the Unit Desk
- Provide marked-up copies of the following documents:
  - 1BGP 100-3, POWER ASCENSION
  - 1BGP 100-3T1, POWER ASCENSION FLOWCHART
- Set AB Pot to 5.20 for 1332 ppm boron
- Ensure Control Rods are in Manual
- Verify the Online Risk Placard is Green
- Position the BUS 4 mimic to represent the disconnects OPEN and the grounds closed.
  - At 0PM03J
  - At 1PM01J
- Place clearance order INFO tag on the following control switches: N/A
- Place Protected Equipment placards at the following locations: N/A

Turnover Information

- Unit 1 Reactor power is at 6.6%
- RCS boron concentration is 1332 ppm
- Control bank D @ 135 steps
- BA Flow Cont Vlv, Pot = 5.20
- Power Ascension is in progress per 1BGP 100-3, POWER ASCENSION. 1BOL 3.h for PDMS inoperability in Mode 1 < 25% RTP has been entered. Currently at step 9 to raise Reactor Power to provide additional steam flow capability and at step 14 to Raise Turbine Speed to 1700 rpm and Transfer to GV Control
- The Shift Manager directs the continuation of 1BGP 100-3.
- Online Risk is Green
- Protected Equipment:
  - None

Event 1: SLOWLY RAISE Reactor Power to provide additional steam flow capability

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Event 2: Raise Turbine speed to 1700 rpm

Event 3: 0A CW Makeup Pump trip

At Lead Evaluator's cue, use Smart Scenario to cause a trip of 0A CW makeup pump by right clicking on the box titled, **Event 3,** and select, **Release**

As EO, acknowledge order to investigate cause of pump trip. Report you are at the RSH doing rounds, and that the overcurrent target flag is up.
Respond as necessary for local steps to start the 0B CW Makeup pump per BOP CW-9. Report local steps of BOP CW-9 steps 1-8 are complete.
If asked; respond that seal water pressure is 135psig.

As SM Acknowledge procedure entry and request for Emergency Plan evaluations.

As SM Acknowledge request for writing IR, performing risk assessment and making appropriate notifications.

Event 4: Steam Generator 1A Level Channel 1LT519 fails high

At Lead Evaluator's cue, use Smart Scenario to fail 1LT-519 to 100% over a 30 second period by right clicking on the box titled, **Event 4**, and select, **Release**

As SM, acknowledge the failure, request for maintenance support, and IR request.

Event 5: RCS begins to leak at 20 GPM

At Lead Evaluator's cue, use Smart Scenario to cause 20gpm RCS leak by right clicking on the box titled, **Event 6 RCS Leak,** and select, **Release**

As WEC, acknowledge request for Loose Parts investigation.

When requested as Radiation Protection, acknowledge request to perform leakage surveillance.

When requested at 1BOA PRI-1 step 21 to close in service seal injection filter inlet and outlet isol valves, use Smart Scenario to isolate the 1A Seal Injection Filter by right clicking on the box titled, **BOA PRI-1, step 21.e, Close,** and select, **Release**

When requested at 1BOA PRI-1 step 22 to place opposite seal injection filter in service, use Smart Scenario by right clicking on the box titled, **BOA PRI-1, step 22 Open,** and select, **Release**

As SM Acknowledge procedure entry and request for Emergency Plan evaluations.

Event 6/7/8: RCS Hot Leg B LOCA

At Lead Evaluator's cue, use Smart Scenario to cause enlarge RCS leak by right clicking on the box titled, **Event 7 RCS Break,** and select, **Release**

When requested as Equipment Operator to Stop any unloaded DG and place in standby per BOP DG-12, DIESEL GENERATOR SHUTDOWN, use Smart Scenario to perform local shutdown of Diesel Generators by right clicking on the box titled, **Local Shutdown of 1A DG**, and select, **Release**

As EO dispatched to investigate 1A RH Pump, report; an overcurrent condition on the 1A RH Pump breaker, Bus 141 cubicle 4.

As EO dispatched to breaker for 1SI8811B, report: breaker has tripped and that there is an acrid odor in the area. If requested to attempt to reclose the breaker, report: the breaker will not close.

As EO dispatched to locally attempt to open 1SI8811B, wait until the NSO closes the CS pump discharge header isolation valves 1CS007A and 1CS007B at 1BCA-1.1 step 8 RNO, use Smart Scenario to provide indication of opening 1SI8811B by right clicking on the box titled, **1SI8811B TSLBs**, and select, **Release;** then report; 1SI8811B has been manually opened.

As WEC Supervisor, when an additional NSO is requested to perform the actions of 1BOP SI-13 to refill the RWST, report; you will prepare an NSO to refill the RWST per 1BOPSI-13.

When requested as Equipment Operator to Open 1CV8432 and 1CV8434 during performance of BOP SI-13, use Smart Scenario to open valves by right clicking on the box titled, **BOP SI-13 step 11, Align 1CV8432**, and select, **Release**

As SM Acknowledge procedure entry and request for Emergency Plan evaluations.

Op-Test No.: 2019-301 Scenario No.: N19-6 Event No.: 1

Event Description: SLOWLY RAISE Reactor Power to provide additional steam flow capability

Time	Position	Applicant's Actions or Behavior
	CUES:	Directed to SLOWLY RAISE Reactor Power to provide additional steam flow capability.
	US	• Implement actions of 1BGP 100-3T1, POWER ASCENSION ○ Direct continuation of 1BGP 100-3, POWER ASCENSION
	ATC	• Perform dilution to raise power and provide additional steam flow capability. • Verify rod position and boron concentration. • Conducts reactivity brief • Set up dilution IAW ReMA and BOP CV-5 or BOP CV-5T1 • Initiate dilution using BOP CV-5 or BOP CV-5T1 checklist • Select STOP on RMCS Makeup Control Switch • Select DIL or ALT DIL on RMCS Mode Select Switch ○ Enter desired flowrate ○ Verify Prescaler set to 1.0 ○ Reset PW/ Total Flow counter • Enter desired dilution amount in PW counter • Place RMCS Makeup Control Switch to START • Verify 1CV110B OPEN if in ALT DIL • Verify 1CV111A and B OPEN • Verify proper PW flow on flow recorder 1CD-CX4102 • Monitors effects of dilution • Turn on PZR backup heaters.
EVALUATOR NOTE:		**The first failure may be input when the actions to raise Reactor Power are in progress, with both Reactor Power greater than 8% AND Turbine Speed increase in progress with speed greater than 1300 rpm. The following descriptions are included dependent on magnitude and duration of Events 1 and 2.**
	ATC	○ When reactor power is greater than 10% ○ ENSURE POWER RANGE PERMISSIVE P10 (3.4) Bypass Permissive Light is NOT ILLUMINATED ○ BLOCK Intermediate Range Channel Reactor Trips by taking BOTH trains of IR Man Block Switches to the BLOCK position ○ ENSURE the following Bypass Permissive Lights are NOT ILLUMINATED ○ IR TRIP NOT BLOCKED TRN A (1.3) ○ IR TRIP NOT BLOCKED TRN B (2.3) ○ BLOCK the Power Range Low Setpoint Reactor Trips by taking BOTH trains of Pwr Rng Man Block Switches to the BLOCK position ○ ENSURE the following Bypass Permissive Lights are NOT ILLUMINATED ○ POWER RANGE LOW SETPOINT TRIP NOT BLOCKED TRN A (1.4) ○ POWER RANGE LOW SETPOINT TRIP NOT BLOCKED TRN B (2.4) ○ SELECT desired channels on NR-45 Recorder to be displayed for startup ○ When bypass permissive P10 and/or P13 goes OFF, ENSURE that the LOW POWER TRIPS BLOCKED P7 Bypass Permissive light goes OFF

EVALUATOR NOTE:	**After the actions to raise Reactor Power are in progress, with Reactor Power greater than 8% AND Turbine Speed increase in progress with speed greater than 1300 rpm; with lead examiner's concurrence, initiate event 3.**

Op-Test No.: 2019-301 Scenario No.: N19-6 Event No.: 2

Event Description: Raise Turbine speed to 1700 rpm

Time	Position	Applicant's Actions or Behavior
	CUES:	Directed to raise Turbine Speed to 1700 RPM and Transfer to GV Control per 1BGP 100-3 at shift turnover.

	BOP	• DETERMINE the maximum Main Turbine acceleration rate using BCB-1, Figure 21 or 21a.
		• VERIFY/ENABLE Resonance Range Fast Ramp on graphic 5508.
		• PREPARE to RAMP the turbine by performing the following steps from graphic 5501:
		  • Select SETPOINT.
		  • ENTER 1700 into the REF DEMAND window.
		  • Select ENTER.
		• ENTER 50 into the RATE window (or value determined in step F14.a).
		  • Select ENTER.
		  • Select EXIT.
		• RAMP Main Turbine by performing the following from graphic 5501:
		  • Select GO/HOLD.
		  • Verify GO/HOLD button illuminates.
		  • Verify HOLD illuminated RED.
		  • Select GO.
		  • VERIFY GO indicator illuminates red while turbine ramps.
		• At 600 RPM, ENSURE Exhaust Hood Spray Valves, 1CB118A, B, and C, indicate OPEN, at 1PM02J (1ZL-CB089).
		• ENSURE as turbine speed rises above 600 RPM, Bearing Lift Pumps have automatically STOPPED.

EVALUATOR NOTE:		**The first failure may be input when the actions to raise Reactor Power are in progress, with both Reactor Power greater than 8% AND Turbine Speed increase in progress with speed greater than 1300 rpm. The following descriptions are included dependent on magnitude and duration of Events 1 and 2.**

Op-Test No.: 2019-301	Scenario No.: N19-6	Event No.: 2
Event Description: Raise Turbine speed to 1700 rpm		
	BOP	○ ENSURE that turbine acceleration stops when turbine speed reaches 1700 RPM. ○ Transfer from Throttle Valve (TV) to Governor Valve (GV) Control by performing the following from graphic 5501: ○ SELECT VALVE CONTROL MODE field. ○ VERIFY TRANSF TV/GV is black (permissive met). ○ SELECT TRANSF TV/GV. ○ VERIFY the green indicator flashes while the transfer is in progress. ○ OBSERVE the transfer from TV to GV Control, by valve position indicators on graphic 5501 ○ VERIFY transfer complete with the TRANSF TV/GV indicator is steady ON green and Throttle Valves have reached their full open position. ○ SELECT EXIT. ○ ENSURE all Extraction Steam Spill Valves, indicated on 1ZL-ES079, indicate CLOSED for the feedwater heaters that are in service or DISPATCH operator to investigate open valve(s).
	ATC/BOP	• Monitor reactor power and load ascension: • Monitor NI's, Tave, ΔI, Pzr press/level. • Monitor DEHC system response at 1PM02J or OWS drop 210. • VERIFY/MAINTAIN proper steam generator levels as steam flow rises. • ENSURE steam dumps continue to maintain approximately 1092 psig steam pressure.
EVALUATOR NOTE:		**After the actions to raise Reactor Power are in progress, with Reactor Power greater than 8% AND Turbine Speed increase in progress with speed greater than 1300 rpm; with lead examiner's concurrence, initiate event 3.**

Op-Test No.: 2019-301 Scenario No.: N19-6 Event No.: 3

Event Description: 0A CW Makeup Pump trip

Time	Position	Applicant's Actions or Behavior
EVALUATOR NOTE:		**Annunciator 0-38-A11, CW MAKEUP PUMP TRIP will be received approximately 1 minute from event insertion.**
	CUE	• Annunciator 0-38-A11, CW MAKEUP PUMP TRIP is LIT • Amber trip light LIT for 0A CW Makeup Pump
	US	• Direct operator to respond to alarm
	BOP	• Refer to BAR 0-38-A11 • Dispatch an operator to investigate tripped pump • Monitor CW flume level ○ Adjust 0CW220, CW Intake Bay Level Control Valve • Start the standby CW Makeup pump using BOP CW-9
	ATC	• Monitor primary and secondary parameters while BOP is involved in the pump trip
EVALUATOR NOTE:		***EVALUATOR'S NOTE: The crew may refer to or enter 0BOA SEC-11 for inadequate makeup flow. Actions of 0BOA SEC-11 follow in italics.***
	US	• *Enter 0BOA SEC-11, Inadequate CW Makeup, and direct operator to perform actions* • *Notify SM of procedure entry and request EAL evaluation*

	BOP	• *Perform actions of 0BOA SEC-11*
		• *Check at least 2 pumps running – Only one running*
		• *Using BOP CW-9:*
		  • *Direct EO to perform local actions of procedure or direct the EO's actions*
		  • *F.1 blowdown oil cooler cooling line*
		  • *F.2 Verify open sliding gate suction valve*
		  • *F.3 Verify open recirc valve*
		  • *F.4 Verify closed discharge valve*
		  • *F.8 Throttle open 0CW217B*
		  • *Start 0B CW Makeup pump*
		  • *Direct EO to lineup oil cooling water*
		  ○ *Throttle open 0CW220*
		  • *Verify 0B CW MU discharge valve 0CW216B opens*
		  • *Verify 0B CW MU recirc valve closes*
		  • *Verify open 0B CW MU Pump discharge isolation valve 0CW217B*
		  • *Throttle open 0CW278B, recirc valve locally*
		  • *Verify pump current of 300 to 343 amps*
		  • *Adjust 0CW220*
		  • *Direct EO to Locally check motor and bearing temperatures*
		○ *Check outside air temperature > 40°F*
		○ *Dispatch operator to investigate cause of trip*
		○ *Verify adequate Makeup capability*

Op-Test No.: 2019-301 Scenario No.: N19-6 Event No.: 3

Event Description: 0A CW Makeup Pump trip

Time	Position	Applicant's Actions or Behavior
EVALUATOR NOTE:		**After the 0B CW Makeup Pump has been started, the Equipment Operator has been requested to perform local actions and with lead examiner's concurrence, insert the next event.**

Op-Test No.: 2019-301 Scenario No.: N19-6 Event No.: 4

Event Description: Steam Generator 1A Level Channel 1LT519 fails high

Time	Position	Applicant's Actions or Behavior
	CUE	○ Annunciator 1-15-A9, 1A SG LEVEL DEVIATION HIGH LOW • Steam Generator 1A Feedwater Flows lowering • Steam Generator 1A Narrow and Wide Range Levels lowering
	BOP	• Implement BHC 1-SG, STEAM GENERATOR LEVEL • Take Manual control feed flow to 1A SG, 1FK-510A. • Adjust feedwater flow to pre-failed value • Check 1A SG level, steam flow, feed flow, and determine failed input. • Select operable SG level channel ○ CLEAR integral from FW Reg Vlv controllers • Identify 1LT-519 failed high • Report failure to US
	ATC	• Assist BOP as requested • Monitor reactor panel for reactivity changes
	US	Enter and direct actions of 1BOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL Attachment E • Notifies SM of BOA entry • Requests Emergency Plan evaluation
	BOP	Check affected SG level: ○ Determine SG level not normal ○ Take manual control of 1FW510A M/A station and restore SG level to normal ○ Select an operable SG level channel channel • Restore Automatic level control • Check Reactor Power Less Than 100% RTP:

Op-Test No.: 2019-301 Scenario No.: N19-6 Event No.: 4

Event Description: Steam Generator 1A Level Channel 1LT519 fails high

Time	Position	Applicant's Actions or Behavior
	US	(RF 6a) Recognize malfunction of TS Related Instrumentation (RF 6b) Locate/Determine Applicable LCOs • LCO 3.3.1 Reactor Trip System (RTS) Instrumentation o Function 14, Steam Generator (SG) Water Level Low-Low (per SG) • a. Unit 1 • LCO 3.3.2 Engineered Safety Feature Actuation System Instrumentation o Function 5, Turbine Trip and Feedwater Isolation • b. Steam generator (SG) Water Level Hi-Hi (P-14) o 1) Unit 1 o Function 6, Auxiliary Feedwater • b. SG Water Level Low-Low o 1) Unit 1 (RF 6c) CONDITION, REQUIRED ACTION, and COMPLETION TIME • LCO 3.3.1, CONDITION A - One or more Functions with one or more required channels or trains inoperable o A.1 • RA - Enter the Condition referenced in Table 3.3.1-1 [CONDITION E] • CT - Immediately • LCO 3.3.1, CONDITION E, One channel inoperable o E.1 • RA - Place channel in trip • CT 72 hours OR o E.2 • RA - Be in MODE 3. • CT - 78 hours • LCO 3.3.2, CONDITION A – One or more Functions with one or more required channels or trains inoperable o A.1 • RA - Enter the Condition referenced in Table 3.3.2-1 [CONDITION D] • CT - Immediately • LCO 3.3.2 CONDITION D - One channel inoperable o D.1 • RA - Place channel in trip • CT - 72 hours OR o D.2.1 • RA – Be in Mode 3 • CT 78 - hours AND o D.2.2 • RA - Be in Mode 4 • CT - 84 hours o Contacts maintenance for repair.

Op-Test No.: 2019-301 Scenario No.: N19-6 Event No.: 4

Event Description: Steam Generator 1A Level Channel 1LT519 fails high

Time	Position	Applicant's Actions or Behavior
EVALUATOR NOTE:		**After the actions for the steam generator level channel failure are complete and with lead examiner's concurrence, insert the next event.**

Op-Test No.: 2019-301 Scenario No.: N19-6 Event No.: 5

Event Description: RCS begins to leak at 20 GPM

Time	Position	Applicant's Actions or Behavior
	CUE	• Annunciator 1-1-A2, CNMT DRAIN LEAK DETECT FLOW HIGH is LIT ○ Annunciator 1-13-E9, LOOSE PARTS MONITORING SYSTEM TROUBLE is LIT • Lowering PZR level • RMS alarming for 1PR11J • 1RF-008 CNMT FLR flow rising • 1RF-010 RX CAVITY flow rising
	ATC	• Raise charging flow • Report leak
	CREW	○ Refer to BAR 1-1-A2, CNMT Leak Detection Flow High ○ Dispatch Operator to determine whether alarm is SYS ALM or LP ALM on Master Control Module (MCM)
	US	• Enter 1BOA PRI-1, Excessive Primary Plant Leakage • Notify SM of plant status and procedure entry • Request evaluation of Emergency Plan conditions

	ATC	• Check RCP cooling
		• Check CV pump – running
		• Throttle 1CV121 and 1CV182 to raise charging flow and stabilize PZR level
		• Determine Leak Rate
		• Isolate letdown
		  • Close 1CV8149A-C
		  • Close 1CV459 and 1CV460
		  • Determine Leak Rate

EVALUATOR NOTE:		**As soon as the crew has reported the leakrate and the applicable Tech Specs entered; with the lead examiner's permission, initiate the next event.** **The crew will continue to perform the following until the leakrate is determined, but is only required to perform steps up to the point that the crew reports the leakrate.** **When the leakrate has been determined, the lead evaluator may choose to insert the next event and to initiate a follow-up question to have the candidate determine applicable Technical Specifications after the scenario to ensure continued progress in the scenario.**

Op-Test No.: 2019-301 Scenario No.: N19-6 Event No.: 5

Event Description: RCS begins to leak at 20 GPM

Time	Position	Applicant's Actions or Behavior

	ATC/BOP	• Check Unit in MODE 1
		• Check PZR pressure – NOT < 2220 PSIG
		  • Determines RCS pressure is <2220 psig
		• Monitor PZR level – Stable or rising
		• Check if any individual seal injection flow – indicating abnormally high
		  • Determines no abnormally high seal injection flows
		• Verify leak is not downstream of 1CV121
		• Close 1CV8324B
		• Maintain 1CV182 – at least 20% open
		• Check seal injection flow – 10 to 15 GPM (per pump) and throttle as needed
		• Determines charging flow – is approximately equal to total seal injection flow

	ATC/BOP	• Check if leak is isolable • Calculate RCS Leak Rate • Determines leak rate is not ≤ 0 • Open 1CV8324B • Throttle 1CV121 and 1CV182 to maintain PZR level stable and seal injection flows 8 -13 gpm per pump
	ATC/BOP	• Check secondary radiation monitors trends (Group 12) - NORMAL FOR PLANT CONDITIONS • Check RX VESSEL FLNG LEAKOFF TEMP HIGH alarm (1-14-E5) - NOT LIT • Check PRT parameters - NOT RISING • Determines Leakage into CNMT – INDICATED • Determines CNMT parameters rising • Start RCFCs as necessary to maintain CNMT pressure less than 1 PSIG and CNMT temperature less than 120°F • Monitor CNMT pressure. IF CNMT pressure can NOT be maintained less than 3.4 PSIG, THEN manually trip the reactor.
	ATC/BOP	• Verify makeup - Adequate To Maintain VCT Level • Check Normal Charging Flow Path Established: • Control Charging Flow: • Control PZR Pressure: • Check Letdown System Status: • Check VCT Status: • Determines RCS Leak Rate is Not Less than Tech Spec 3.4.13 Limits

Op-Test No.: 2019-301 Scenario No.: N19-6 Event No.: 5

Event Description: RCS begins to leak at 20 GPM

Time	Position	Applicant's Actions or Behavior
	US	(RF 6a) Recognize malfunction of TS Related Instrumentation (RF 6b) Locate/Determine Applicable LCOs • LCO 3.4.13 RCS Operational LEAKAGE (RF 6c) CONDITION, REQUIRED ACTION, and COMPLETION TIME • CONDITION A, RCS operational LEAKAGE not within limits for reasons other than pressure boundary LEAKAGE or primary to secondary LEAKAGE o A.1 • RA - Reduce LEAKAGE to within limits • CT - 4 hours
EVALUATOR NOTE:		**After the crew has balanced charging and letdown to determine leakrate, and with lead examiners concurrence, insert the next event.**

Op-Test No.: 2019-301 Scenario No.: N19-6 Event No.: 6/7/8

Event Description: RCS Leak progresses to RCS Break with 1SI8811B breaker failure

Time	Position	Applicant's Actions or Behavior
EVALUATOR NOTE:		**The RCS Leak Rate will rise, when the Reactor Trips, the leak will progress to a LOCA coincident with a failure of 1SI8811B breaker**.
	CUE	• PZR level is dropping • PZR pressure dropping • CNMT pressure rising
	ATC	• Notify US of lowering PZR level and inability to maintain level
	US	Implement 1BEP-0, REACTOR TRIP OR SAFETY INJECTION, and directs operator actions. • Notifies SM of 1BEP-0 entry. • Requests Emergency Plan evaluation.
	ATC	Verify Reactor Trip • Rod bottom lights – ALL LIT • Reactor trip & Bypass breakers - OPEN • Neutron flux DROPPING
	BOP	Verify Turbine Trip • Turbine throttle valves - CLOSED • Turbine governor valves - CLOSED
	BOP	Verify power to 4KV busses • Bus 141 - ENERGIZED • Bus 142 - ENERGIZED
EVALUATOR NOTE:		**The crew should diagnose that PZR level (RCS Inventory) is not recovering and that a safety injection actuation is required.**
	ATC	Check SI status o SI actuated o SI First OUT annunciator lit (1-11-B1, 1-11-C1, 1-11-D1, 1-11-E1) o SI ACTUATED lit (1-BP-4.1) o SI Equipment running (SI pumps running, CV Cold leg injection SI8801A/B open) Determine if SI required: • Check PZR pressure < 1829 psig • Check Steamline pressure < 640 psig • Check CNMT pressure > 3.4 psig • If SI is required: • Actuate SI from both SI switches (1PM05J and 1PM06J) and continue in 1BEP-0
	US	Directs BOP to perform Attachment B, SI VERIFICATION of 1BEP 0.
EVALUATOR NOTE:		**Crew actions of 1BEP-0 continue below.** **BOP actions of 1BEP-0, Attachment B continue on page 30.**

Op-Test No.: 2019-301 Scenario No.: N19-6 Event No.: 6/7/8

Event Description: RCS Leak progresses to RCS Break with 1SI8811B breaker failure

Time	Position	Applicant's Actions or Behavior
	ATC/BOP	Verify AF system: • AF pumps – BOTH RUNNING • AF isolation valves 1AF13A-H - OPEN • AF flow control valves 1AF005A-H - THROTTLED • AF flow – GREATER THAN 500 GPM Check SG tubes intact: • Secondary radiation level - NORMAL AND STABLE • Narrow range levels – NOT RISING IN AN UNCONTROLLED MANNER
	ATC/BOP	Check PZR PORVs and Spray Valves • PORVs - CLOSED • PORV isol valve – at least one ENERGIZED • PORV relief path – at least one AVAILABLE • PORV in - AUTO • Isol valve - open • Normal spray valves - CLOSED
	ATC/BOP	ADJUST AF FLOW: • Lower total Feed Flow to approximately 600 gpm
	ATC/BOP	Check steam dumps – AVAILABLE • C-9 Permissive light – NOT LIT • CW Pump - AT LEAST ONE RUNNING
	ATC/BOP	Control RCS Temperature per table: • Adjust Feed Flow • Steam Release
	ATC/BOP	Check if RCPs should be stopped: • All RCP's – ALL RUNNING. • High head flow 1FI-917 > 100 GPM and RCS Pressure < 1425 PSIG • Stop all RCPs
	ATC/BOP	Check pressure in all SGs: • NO SG dropping in an uncontrolled manner. • NO SG Completely Depressurized.
	ATC/BOP	CHECK IF SG TUBES ARE INTACT: • SJAE/Gland Steam Exhaust Gas radiation - HAS REMAINED LESS THAN ALERT ALARM SETPOINT. • SG Blowdown Liquid radiation – HAS REMAINED LESS THAN ALERT ALARM SETPOINT. • Main Steamline radiation - HAS REMAINED LESS THAN ALERT ALARM SETPOINT.

Op-Test No.: 2019-301 Scenario No.: N19-6 Event No.: 6/7/8

Event Description: RCS Leak progresses to RCS Break with 1SI8811B breaker failure

Time	Position	Applicant's Actions or Behavior
	ATC/BOP	CHECK IF RCS IS INTACT: • CNMT area radiation monitors - LESS THAN ALERT ALARM SETPOINTS: • Determines 1RT-AR011 and 1RT-AR-012 are in ALARM
	CREW	Transition to 1BEP-1, LOSS OF REACTOR OR SECONDARY COOLANT
EVALUATOR NOTE:		**Crew actions of 1BEP-1 continue on next page.**

Op-Test No.: 2019-301_ Scenario No.: _N19-6_ Event No.: _6/7/8__

Event Description: RCS Leak progresses to RCS Break with 1SI8811B breaker failure

Time	Position	Applicant's Actions or Behavior
EVALUATOR NOTE:		**Actions for 1BEP- 1, LOSS OF REACTOR OR SECONDARY COOLANT, begin on this page.**
EVALUATOR NOTE:		**The crew may enter 1BFR-P.1, RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION, if an STA is present at this time. The crew will then transition at step 1 when RCS pressure is Not GREATER THAN 325 PSIG and RH flow is greater than 1000 GPM.**
	US	Enter and direct actions of 1BEP-1 • Notifies SM of BEP entry • Requests Emergency Plan evaluation • Maintains Seal injection flow to all RCPs
	ATC	Check if RCPs should be stopped • Any RCPs running • High head flow > 100 gpm or SI flow > 200 gpm • RCS pressure < 1425 psig ○ Stop all RCPs
	ATC	Check if SG secondary pressure boundaries are intact • No SG pressure dropping in an uncontrolled manner • No SG completely depressurized
	BOP	Check intact SG levels • Control feed flow to maintain between 10% (31%) and 50%

	BOP	Check secondary radiation normal
		• Reset CNMT Isol Phase A (if necessary)
		• Sample all SGs for activity
		  • Open SG Blowdown Sample Isol valves
		  • Request Chem Dept to sample all SGs for activity
		• Check secondary radiation trends NORMAL FOR PLANT CONDITIONS
		• Secondary activity samples NORMAL (WHEN AVAILABLE)

	ATC	CHECK PZR PORVs AND ISOLATION VALVES
		• PORV isol valves - ENERGIZED
		  • 1RY8000A
		  • 1RY8000B
		• PORVs – CLOSED
		  • 1RY455A
		  • 1RY456
		• PORV isol valves - AT LEAST ONE OPEN
		  • 1RY8000A
		  • 1RY8000B

	ATC/BOP	CHECK IF ECCS FLOW SHOULD BE REDUCED: • Determines RCS subcooling – is Not ACCEPTABLE

Op-Test No.: 2019-301 Scenario No.: N19-6 Event No.: 6/7/8

Event Description: RCS Leak progresses to RCS Break with 1SI8811B breaker failure

Time	Position	Applicant's Actions or Behavior

	BOP	CHECK IF CS SHOULD BE STOPPED:
		• CS pumps – Both RUNNING
		• Determines CS pumps running - are GREATER THAN NUMBER REQUIRED
		• Reset CS signal
		• Stop one CS pump and place in standby
		• Check if last CS pump can be terminated:
		  • CNMT pressure - LESS THAN 15 PSIG
		  • Determines LOCA time and level conditions Not Met

	BOP	CHECK IF RH PUMPS SHOULD BE STOPPED:
		• Reset SI if necessary:
		  • Depress both SI reset Pushbuttons
		  • Verify SI ACTUATED permissive light - NOT LIT
		  • Verify AUTO SI BLOCKED permissive light – LIT
		• Check RCS pressure:
		  • Determines Pressure – is Not GREATER THAN 325 PSIG

	BOP	CHECK IF DGs SHOULD BE STOPPED:
		• 4KV busses - ENERGIZED BY OFFSITE POWER:
		  • Bus 141
		  • Bus 142
		  • Bus 143
		  • Bus 144
		○ Contact EO to Stop any unloaded DG and place in standby per BOP DG-12, DIESEL GENERATOR SHUTDOWN

	BOP	Check cold leg recirculation capability: • Determines Train A Not AVAILABLE – Pump A will Not start • Determines Train B Not AVAILABLE - 1SI8811B, CNMT sump isol valve position lights – are Not LIT
	CREW	Transition to 1BCA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION
EVALUATOR NOTE:		**Dependent on procedure progression, the crew may transition to 1BEP ES - 1.3, TRANSFER TO COLD LEG RECIRCULATION. Crew actions of 1BEP ES – 1.3 continue on page 28.**
EVALUATOR NOTE:		**Crew actions of 1BCA-1.1 continue on next page.**

Op-Test No.: 2019-301 Scenario No.: N19-6 Event No.: 6/7/8

Event Description: RCS Leak progresses to RCS Break with 1SI8811B breaker failure

Time	Position	Applicant's Actions or Behavior
EVALUATOR NOTE:		**Actions for 1BCA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, begin on this page.**
	US	Enter and direct actions of 1BCA-1.1 • Prepares to Stop ECCS Pumps due to loss of suction • Notifies SM of BEP entry • Requests Emergency Plan evaluation • Monitors local indications for Sump blockage
	ATC/BOP	CHECK EMERGENCY COOLANT RECIRCULATION EQUIPMENT AVAILABLE: • Determines Train A Not AVAILABLE – Pump A will Not start • Determines Train B Not AVAILABLE - 1SI8811B, CNMT sump isol valve position lights – are Not LIT • Initiate actions to restore at least one train of recirculation equipment • Determines RWST LEVEL LO-2 alarm (1-6-B7) – is Not LIT • When Lit performs the following: • CNMT sump isol valves - OPEN: o 1SI8811A (Open, but pump will Not start) o 1SI8811B (breaker Open, valve remains closed)
	ATC/BOP	Reset SI • Depress both SI reset PB • Verify SI Actuated light – NOT LIT • Very Auto SI Blocked light – LIT
	ATC/BOP	RESET RWST AUTO SWAPOVER: o Reset SI recirc sump isol valves if necessary:
	ATC/BOP	Verify RCFCs running in Accident Mode: • Group 2 RCFC Accident Mode status lights - LIT
	ATC/BOP	CHECK RWST LEVEL: • RWST level - GREATER THAN 9%
	ATC/BOP	DETERMINE CS REQUIREMENTS (SUCTION FROM RWST): • Any CS pump suction - ALIGNED TO RWST: • Determine number of CS pumps required from table: (0) • Check CS pumps running – EQUAL TO NUMBER REQUIRED • Stop CS pump(s), THEN place control switch(es) in PULL OUT.
	ATC/BOP	CHECK IF CS SHOULD BE ALIGNED FOR RECIRCULATION: • Determines neither CS Pump Running • Reset CS signal • Close the discharge header isol valve 1CS007A and 1CS007B

Op-Test No.: 2019-301 Scenario No.: N19-6 Event No.: 6/7/8

Event Description: RCS Leak progresses to RCS Break with 1SI8811B breaker failure

Time	Position	Applicant's Actions or Behavior
EVALUATOR NOTE:		**At this point, the Equipment Operator dispatched to locally open 1SI8811B will report that 1SI8811B has been manually opened. The crew will then apply the Caution prior to step 1, and continue further recovery actions per procedure and step in effect; 1BEP-1 step 11**

Op-Test No.: 2019-301 Scenario No.: N19-6 Event No.: 6/7/8

Event Description: RCS Leak progresses to RCS Break with 1SI8811B breaker failure

Time	Position	Applicant's Actions or Behavior
EVALUATOR NOTE:		**Actions for 1BEP- 1, LOSS OF REACTOR OR SECONDARY COOLANT, continuing at step 11, begin on this page.**
	BOP	Check cold leg recirculation capability: • Determines Train A Not AVAILABLE – Pump A will Not start • Determines Train B AVAILABLE - 1SI8811B, CNMT sump isol reported locally opened
	BOP	Check Aux Bldg radiation trends (PPC or Rad Monitoring System) - NORMAL FOR PLANT CONDITIONS: • Unit 1 Aux Bldg vent stack effluents • Unit 2 Aux Bldg vent stack effluents • ECCS cubicles • Grid 4 Aux Bldg area radiation
	US/BOP	Obtain samples: • Place Hydrogen Monitors in service per BOP PS-9, POST LOCA CONTAINMENT HYDROGEN MONITORING SYSTEM OPERATION • Consult TSC for obtaining samples: • Consult TSC for assessing additional sampling requirements for fuel damage
	US/Crew	○ Evaluate plant equipment for long term recovery: • Shutdown chiller on non-operating VC train • MOMENTARILY PLACE CONTROL SWITCH IN TRIP ○ Start additional plant equipment to assist in recovery
	BOP	CHECK IF RCS COOLDOWN AND DEPRESSURIZATION IS REQUIRED: • Determines RCS pressure – is Not GREATER THAN 325 PSIG • Determines RH pump flow (1FI-618/619) is greater than 1000 GPM
	BOP	CHECK IF TRANSFER TO COLD LEG RECIRCULATION IS REQUIRED: • RWST level - LESS THAN 46%
EVALUATOR NOTE:		**The scenario can be terminated when the US/crew has determined a course of action based on RWST level; transition to 1BEP ES-1.3 if less than 46% or return to step 11 to Evaluate Plant Status if greater than 46%.**

Op-Test No.: 2019-301 Scenario No.: N19-6 Event No.: 6/7/8

Event Description: RCS Leak progresses to RCS Break with 1SI8811B breaker failure

Time	Position	Applicant's Actions or Behavior
EVALUATOR NOTE:		**Actions for 1BEP ES – 1.3, TRANSFER TO COLD LEG RECIRCULATION, begin on this page.**

	US/BOP	ESTABLISH CC FLOW TO RH HEAT EXCHANGERS:
		• Check Unit 0 CC HX - ALIGNED TO UNIT 1:
		  • 1CC9473A – OPEN
		  • 1CC9473B – OPEN
		• Check CC pumps - TWO RUNNING
		• Open CC to RH HX isol valves
		  • 1CC9412A
		  • 1CC9412B
		• Check CC to RH HX flow(s) - GREATER THAN 5000 GPM

	US/BOP	CHECK CNMT SUMP LEVEL: • CNMT floor water level – AT LEAST 8 INCHES (13 INCHES ADVERSE CNMT)

	US/BOP	ALIGN RH PUMPS SUCTION TO CNMT SUMPS:
		• Place control switch(es) for SVAG VALVE 480V bus feeds at 1PM06J in - CLOSE
		  • 480V FEED TO BUS 131X1A/X2A (A-Train)
		  • 480V FEED TO BUS 132X2A/X4A (B-Train)
		• Check RH pumps - BOTH RUNNING
		  • Determines ONLY 1B RH Pump RUNNING
		• Check CNMT sump isolation valve FULL OPEN
		  • 1SI8811A
		• Check CNMT sump isolation valve FULL OPEN
		  • 1SI8811B
		  • Determines 1SI8811B is NOT OPEN
		  • RH Pump 1B is available, GO TO ATTACHMENT A

	US/BOP	CHECK IF RH PUMP 1A NEEDS TO BE ALIGNED TO CNMT SUMP:
		• Train A CNMT sump isol valve - FULLY OPEN
		  • 1SI8811A
		• Manually or Locally close RH pump 1A suction from RWST isol valve
		  • 1SI8812A

	US/BOP	CHECK IF RH PUMP 1B NEEDS TO BE ALIGNED TO CNMT SUMP:
		• Train A CNMT sump isol valve - FULLY OPEN
		  • 1SI8811B
		  • Determines 1SI8811B is NOT OPEN

	US/BOP	CHECK TRAIN B RECIRC FLOWPATH FROM CNMT SUMP AVAILABLE
		• RH pump 1B – RUNNING
		• Train B CNMT sump isol valve – ENERGIZED
		  • 1SI8811B
		  • Determines 1SI8811B is NOT ENERGIZED

	US/BOP	CHECK AT LEAST ONE CNMT SUMP RECIRC FLOWPATH ESTABLISHED

Op-Test No.: 2019-301 Scenario No.: N19-6 Event No.: 6/7/8

Event Description: RCS Leak progresses to RCS Break with 1SI8811B breaker failure

Time	Position	Applicant's Actions or Behavior
		Determines RH pump 1A - NOT RUNNING Determines CNMT sump isol valve – OPEN 1SI8811B NOT OPEN
	CREW	Transition to 1BCA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION
EVALUATOR NOTE:		**Crew actions for 1BCA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, begin on page 25.**

Op-Test No.: 2019-301 Scenario No.: N19-6 Event No.: 6/7/8

Event Description RCS Leak progresses to RCS Break with 1SI8811B breaker failure

Time	Position	Applicant's Actions or Behavior
EVALUATOR NOTE:		**1BEP-0, Attachment B, SI VERIFICATION actions begin on this page 1BEP-0 main body actions continue on page 21.**
[CT]	BOP **[CT-5]**	**Attachment B action** Verify ECCS pumps running • CENT CHG pumps • RH pumps (NONE RUNNING) o Attempt to Start 1A RH Pump (pump will Trip/Fail to Start) • **Start 1B RH Pump** • SI pumps
	BOP	**Attachment B action** Verify ECCS valve alignment • Group 2 Cold Leg Injection monitor lights lit
	BOP	**Attachment B action** Verify ECCS flow • HHSI flow >100 gpm • Determines RCS pressure <1700 psig • If RCS pressure <1700 psig check SI pp flow > 200 gpm
	BOP	**Attachment B actions** Verify RCFCs running in Accident Mode: • Group 2 RCFC Accident Mode status lights - LIT Verify CNMT isolation Phase A • Group 3 CNMT isolation monitor lights - LIT Verify CNMT Ventilation isolation • Group 6 CNMT Vent Isol monitor lights - LIT Verify CC Pumps • CC pumps - BOTH RUNNING Verify SX Pumps running • SX pumps - BOTH RUNNING Check If Main Steamline Isolation Is Required o Check SG pressure < 640 psig o Check CNMT pressure > 8.2 psig • If either condition is met, then verify MSIVs and MSIV Bypass valves closed

Op-Test No.: 2019-301 Scenario No.: N19-6 Event No.: 6/7/8

Event Description RCS Leak progresses to RCS Break with 1SI8811B breaker failure

Time	Position	Applicant's Actions or Behavior

[CT]	BOP
	
	[TCA#49]
		Attachment B action
		CHECK IF CS IS REQUIRED:
		• CNMT pressure – HAS RISEN TO GREATER THAN 20 PSIG
		• Group 6 CS monitor lights – LIT
		• Group 6 Phase B Isol monitor lights – LIT
		• Stop all RCPs
		• Check CS eductor suction flow on running pump(s) - GREATER THAN 15 GPM
		• Check CS eductor additive flow on running pump(s) – GREATER THAN 5 GPM
		• Verify SX Cooling Tower alignment
		• Verify SX Cooling Tower alignment
		  • **All EIGHT riser valves - OPEN**
		  • **0SX163A thru 0SX163H**
		  • **Manually opens required valves**
		  • **0SX163C**
		  • **0SX163D**
		  • **All FOUR Hot Water Basin Bypass valves – CLOSED**
		  • **0SX162A thru 0SX162D**
		  • **All EIGHT SX Cooling Tower Fans - RUNNING IN HI SPEED**
		  • **Manually starts required fans**
		  • **0SX03CC**
		  • **0SX03CD**
		  • **0SX03CG**

	BOP	**Attachment B action** Verify FW isolated: • FW pumps tripped • FW isolation monitor lights lit • FW pumps discharge valves closed 1FW002A-C • Trip all running HD pumps
	BOP	**Attachment B action** Verify both DGs running • SX valves open 1SX169A and B • Dispatch operator locally to check operation
	BOP	**Attachment B action** Verify Generator Trip • GCB 3-4 and OCB 4-5 open • PMG output breaker open

Op-Test No.: 2019-301 Scenario No.: N19-6 Event No.: 6/7/8

Event Description RCS Leak progresses to RCS Break with 1SI8811B breaker failure

Time	Position	Applicant's Actions or Behavior

	BOP	**Attachment B action**
		Verify Control Room ventilation aligned for emergency operations:
		• Control Room Outside Air Intake radiation monitors < High Alarm setpoints
		• Operating VC train equipment running Train A
		  • Supply fan
		  • Return fan
		  • M/U fan
		  • Chilled water pump
		  • MCR chiller 0A
		• Operating VC train dampers
		  • M/U fan outlet damper NOT full closed 0VC24Y
		• VC train M/U filter light LIT
		• Operating VC train Charcoal Absorber aligned for train A
		  • 0VC43Y closed
		  • 0VC21Y open
		  • 0VC22Y open
		• Control Room pressure greater than +0.125 inches water on 0PDI-VC038

	BOP	**Attachment B action**
		Verify Auxiliary Building ventilation aligned
		• Two inaccessible filter plenums aligned
		  • Plenum A fan 0VA03CB running
		  • Damper 0VA023Y not fully closed
		  • Damper 0VA436Y closed
		  • Plenum C fan 0VA03CF running
		  • Damper 0VA072Y not fully closed
		  • Damper 0VA438Y closed
		Check Aux Building Supply and Exhaust fans
		• One Exhaust Fan running for every Supply Fan running

	BOP	**Attachment B action**
		Verify FHB ventilation aligned
		• Train B fan 0VA04CB running
		  • 0VA055Y open
		  • 0VA062Y not fully closed
		  • 0VA435Y closed

	BOP	**Attachment B action** Maintain UHS Basin level > 80% Initiate periodic checking of Spent Fuel Cooling • Dispatch operator to locally check SFP level and temperature Notify Unit Supervisor of • Manual actions taken • Failed equipment status • Attachment B completed

Op-Test No.: 2019-301 Scenario No.: N19-6 Event No.: 6/7/8

Event Description RCS Leak progresses to RCS Break with 1SI8811B breaker failure

Time	Position	Applicant's Actions or Behavior
	CREW	**Attachment B action** Shutdown unnecessary plant equipment ○ As time allows refer to 1BGP 100-4T4, REACTOR TRIP POST RESPONSE GUIDELINE ○ As time allows refer to 1BGP 100-5, PLANT SHUTDOWN AND COOLDOWN