FINAL AS-ADMINISTERED SCENARIOS

FOR THE PRAIRIE ISLAND INITIAL EXAMINATION - AUGUST 2002

OP TEST Scenario 1 (2)

* NOT USED FOR EXAM

Facility: _Prairie Island___ Scenario No.: ____1___ Op-Test No.: 2001301

Examiners: _____ Operators: _____

Initial Conditions: BOL, recovery from reactor scram 24 hours ago, currently 15% power, D2 OOS, 12 AFW OOS, Place Steam Dump in Stm. Pressure mode Instrument maintenance is peforming troubleshooting on the Steam Dump Tave control mode

Turnover: Recovery from Trip 24 hours ago. Raise power to 100% at maximum rate, MSRs are already in service.

Event No.	Malf. No.	Event Type*	Event Description
1		R (RO) N (BOP)	Raise reactor power 5-10%. RO will adjust reactivity by controlling boron concentration BOP will increase power by increasing turbine load, Lineup 13 Feedwater Heater drains for normal operation, Start one heater drain pump per 1C28.4, Heater Drains, and Shutdown the Condenser Spray System per 1C28.5.
2		I (RO) (BOP)	PT 431 (PZR press) fails high - take manual control of pressure and trip bistables (Simulator file number 97-03)
3		C (RO)	Charging pump trip-start another charging pump (Simulator file number 97-02)
4		I (BOP)	PT-484 failure high - Manual control to shut steam dumps (Simulator file 99-05)
5		C (BOP)	11 Condensate pump motor stator HI temp - start a different condensate pump
6		M (All)	Uncontrolled depressurization of both S/G's - steam leak on A steam header results in manual reactor trip (if not already tripped) and stuck open S/G PORV on B S/G - Gets to ECA-2.1 (Simulator file 97-03)
7		C (BOP)	SI pump fails to start on SI signal-manually start SI pump

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

Op-Test No.: 2002301 Scenario No.: __1__ Event No.: __1__ Page _1_ of _2

Event Description: Raise Reactor Power 5-10%

Time	Position	Applicant's Actions or Behavior
		RX Power Increase
	SRO	DIRECT Load increase at maximum allowed rate per 1C1.4.
		PERFORM or delegate the performance of Steps 5.1.1 to 5.1.6 of 1C1.4, "Power Operation."
	BOP	DETERMINE the Maximum Rate of Load Increase per Step 5.1.7A of 1C1.4, "Power Operation."
	RO	DETERMINE the Maximum Rate of Power Increase per Step 5.1.7A of 1C1.4, "Power Operation."
	BOP	START the load increase as follows: -Select the desired load rate on the Turbine EH Control Panel. -Verify the turbine control VALVE POS LIMIT light is OFF. IF NOT, THEN lower the REFERENCE/SETTER until the light is OFF. -Raise the Valve Position Limiter to 100%. -IF ITC is negative, THEN place turbine EH control in "IMP IN." -Set the desired turbine load on the SETTER display on the Turbine EH Control Panel using the reference control pushbuttons.
	RO	INITIATE an alternate dilution of the RCS per C12.5,"Boron Concentration Control," Step 5.4, as necessary.
	BOP	WHEN T_{ave} shows an increase, THEN depress the turbine control GO pushbutton.
	RO	MAINTAIN T_{ave} and T_{ref} matched by varying the alternate dilution rate or performing alternate dilutions per C12.5 as necessary.

Op-Test No.: 2002301 Scenario No.: __1___ Event No.: _1____ Page 2_ of _2

Event Description: Raise Reactor Power 5-10%.

Time	Position	Applicant's Actions or Behavior
	BOP	**CUE: MSR's are already in service and 13 Feedwater heater drains are already aligned for normal operation.** START one heater drain pump per 1C28.4, "Unit 1 Heater Drains," Step 5.1. SHUTDOWN the Condenser Spray System per 1C28.5, "Unit 1 Condenser Spray System," Step 5.2.

Op-Test No.: 2001301 Scenario No.: _1___ Event No.: __2__ Page _1_ of _1_

Event Description: PT431 (PZR press) Fails High

Time	Position	Applicant's Actions or Behavior
		Pressurizer Pressure 1P-431 - Fails High
		EVALUATOR NOTE: The following annunciator will alarm when the malfunction is inserted: 47012-0408, "PRZR HI/LO Press Channel Alert"
	RO	**CRITICAL TASK: PLACE pressurizer pressure controller in MANUAL and stabilize pressure.**
		SELECT 2-1 (white-red) on channel selector switch.
		RETURN pressure control to AUTO.
		SELECT another channel on the pressurizer pressure recorder.
	SRO	REFER to T.S.3.5.B & Table T.S.3.5-2A FU 7,9,10 and Table TS3.5-2B FU 1d (6 hr LCO for B/S tripping), and T.S. 3.10.J.b
		Initiate investigation of reason for loss of Pressurizer Pressure 1P-431
	BOP	TRIP and independently verify bistables IAW 1C51.3, "Instrument Failure Guide," Rev. 17. 1TC-407-C Over Temp ΔT Trip 1TC-407-D Over Temp ΔT Rod Stop 1PC-431-A Hi Press Trip 1PC-431-J LO Press Trip 1PC-431-I Unblock SI 1PC-431-G LO Press SI

Op-Test No.: 2001301 Scenario No.: ___1__ Event No.: _3____ Page _1__ of _1

Event Description: 11Charging Pump OverloadTrip

Time	Position	Applicant's Actions or Behavior
		11 Charging Pump Trip
		EVALUATOR NOTE: The following annunciator will alarm when the malfunction is inserted: 47015-0103, "11 Charging Pump Overload Trip."
	RO	RECOGNIZE reduced charging header and seal injection flow and START a standby Charging Pump IAW 47015-0103, C12.1 AOP1, "Loss of RCP Seal Injection," and C12.1 AOP2, "Loss of Charging Flow To The Regen HX,":
		CRITICAL TASK: START 12 or 13 Charging Pump.
		CRITICAL TASK: INCREASE Charging Pump speed to maintain <2550# discharge pressure and seal injection flow ~8 gpm.
		PLACE L/D in service IAW C12.1,"Letdown, Charging, and Seal Water Injection."
		ADJUST In-service Charging Pump speed to maintain 6-10 gpm seal injection flow to each RCP while balancing total Charging and L/D flow.
		PLACE In-service Charging Pump speed control in AUTO.
	SRO	INITIATE investigation of reason for loss of 11Charging Pump.

Op-Test No.: 2002301 Scenario No.: __1___ Event No.: _4____ Page _1__ of _1

Event Description: high PT-484 MS Header Pressure failure

Time	Position	Applicant's Actions or Behavior
		PT-484 MS Header Pressure failure high
	RO	Identify failure of PT-484 MS Header Pressure high.
		TAKE manual control to Steam Pressure controller 484 and CLOSE steam dumps.
		Monitor and control reactivity transient.
		CUE: When asked Troubleshooting with Tave mode circuitry is complete and ok to go to Tave mode.
	SRO	DETERMINE Status of Maintenance on Tave mode circuitry and give direction to change steam dump control to Tave mode.

Op-Test No.: 2002301 Scenario No.: _1__ Event No.: ___5__ Page _6__ of _10

Event Description: 11Condensate Pump Motor Stator Temperature Increasing

Time	Position	Applicant's Actions or Behavior
		11Condensate Pump Motor Stator Temperature Increasing
		EVALUATOR NOTE: The following annunciator will alarm when the malfunction is inserted: C47009-0302, "11Condensate Pump Motor Stator HI Temp."
	BOP	RESPOND to Alarm C47009-0302, "11Condensate Pump Motor Stator HI Temp."
		RECOGNIZE that 11Condensate Pump has high motor current.
		MONITOR stator temperature increase.
		SHIFT Condensate Pumps per 1C28.3, "Unit 1 Condensate System," Rev. 10W, Step 5.6, as temperatures continue to increase and prior to stator temperature reaching 140° C.
	SRO	Investigate reason for high stator current and temperature.

Op-Test No.: 2002301 Scenario No.: _1____ Event No.: _6&7___ Page_1_ of _5

Event Description: Steam leak on 1A SG safety header followed by 11FRV failure followed by 12 PORV failing open and an uncontrolled depressurization of both S/G's. SI pump does not auto start on SI signal.

Time	Position	Applicant's Actions or Behavior
		Steam Leak on A SG safety relief valve header
		EVALUATOR NOTE: The following annunciator will alarm when the malfunction is inserted: C47022-0611, "Fire Detection Panel FP121 Fire Alarm."
	BOP	RESPOND to Fire Alarm C47022-0611, "Fire Detection Panel FP121 Fire Alarm.": -Determine affected zone -Page Aux. Bldg. Operator -Bypass affected zone -Reset fire detection panel
		CUE: If the field operator is contacted to investigate the fire alarm in the Aux. Bldg. report that there is a large feather of steam coming from Loop A safety valve header.
		EVALUATOR NOTE: The 11 FRV will fail open. The operator will attempt unsuccessful to take MANUAL control of the Feedwater Regulating Valves from the control room.
		11 FRV Fails Open
	SRO	DIRECT operators to enter C28.2 AOP1, "Unit 1 Feedwater Regulating Valve Control Failure."
	BOP	DISPATCH personnel to locally control at manual loading station.
		CUE: If the crew requests to take local control of 11 SG FRV then report that you are unable to approach the valve because of the steam leak in the area.

Op-Test No.: 2002301 Scenario No.: _1____ Event No.: _6&7___ Page_2_ of _5

Event Description: Steam leak on 1A SG safety header followed by 11FRV failure followed by 12 PORV failing open and an uncontrolled depressurization of both S/G's. SI pump does not auto start on SI signal.

Time	Position	Applicant's Actions or Behavior
	BOP	REPORT to SRO that atmospheric conditions from steam leak prevent local manual control.
	SRO	DIRECT the reactor to be manually tripped before tripping due to high steam generator level.
		EVALUATOR NOTE: When a reactor trip is initiated, immediately increase the steam rupture on Loop A safety header. When SI occurs, fail open 12 SG PORV.
	RO	Manually TRIP the reactor
	BOP	VERIFY turbine tripped.
		VERIFY Safeguards buses energized.
		CHECK if SI is actuated.
		VERIFY component alignment.
		EVALUATOR NOTE: 11 SI Pump fails to start
		CRITICAL TASK: Manually START 11 SI pump.
		EVALUATOR NOTE: SRO should direct transition to E-2 when it is recognized that there is a faulted S/G and then into ECA 2.1 when it is recognized that both S/Gs are faulted.
		E-2, "Faulted Steam Generator Isolation,"
	SRO	DIAGNOSE faulted SG and transition to E-2.
	SRO	DIAGNOSE that both SGs are faulted and transition to ECA -2.1.

Op-Test No.: 2002301_ Scenario No.: 1___ Event No.: _6&7__ Page _3_ of _5_

Event Description: Steam leak on 1A SG safety header followed by 11FRV failure followed by 12 PORV failing open and an uncontrolled depressurization of both S/G's.

Time	Position	Applicant's Actions or Behavior
		ECA-2.1,"Uncontrolled Depressurization of Both Steam Generators."
	RO/ BOP	Check secondary pressure boundary: - MSIV's, FRV's, FRV B/P's, SGBD and FW CI valves closed. - Close steam supply valve from one SG to TD AFW pump IAW the note at the top of page 3 of the EOP. - Verify 11 SG PORV closed.
		CUE: If field operator is dispatched to 12 SG PORV for local operation, report that Aux. Bldg. entry is unsafe based on steam conditions and you are unable to locally operate the PORV from the hot shutdown panel.
	BOP	Control feed flow to minimize RCS cooldown: -CHECK cooldown rate in RCS cold legs less than 100° F per hour. -THROTTLE AFW flow to a minimum of 40 GPM per SG with a narrow range of less than 5%. - ENSURE RCS temperature is stable or decreasing.

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Event Description: Steam leak on 1A SG safety header followed by 11FRV failure followed by 12 PORV failing open and an uncontrolled depressurization of both S/G's.

Time	Position	Applicant's Actions or Behavior
		EVALUATOR NOTE: If at least one SI or RHR pump is running and RCS pressure is less than 1250 psig than secure both RCPs
	RO	CHECK if RCPs should be stopped.
		CHECK PRZR PORVs available and closed and at least one block valve open.
	SRO	INITIATE periodic SG samples.
		VERIFY secondary radiation levels are normal.
	BOP	STOP RHR pumps.
		RESET Containment Spray Signal and Stop CS pumps.
		CHECK RWST level greater than 33%
		RESET SI.
		RESET CI.
		ESTABLISH instrument air to containment

Op-Test No.: 2002301 Scenario No.: __1__ Event No.: _6&7____ Page _5_ of _5

Event Description: Steam leak on 1A SG safety header followed by 11FRV failure followed by 12 PORV failing open and an uncontrolled depressurization of both S/G's.

Time	Position	Applicant's Actions or Behavior
	RO	CHECK for SI termination criteria: -RCS subcooling greater than 20° F. -RCS pressure greater than 2000 and stable or increasing. -PZR level greater than 7%. VERIFY SI flow is NOT required.
	BOP	STOP SI pumps. **TERMINATE SCENARIO: The scenario should be terminated once the crew has verified that SI is no longer required and secured SI.**

OP TEST Scenario 2

* NOT USED FOR EXAM

Facility: _Prairie Island___ Scenario No.: __2_____ Op-Test No.: 301-2002

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: Unit 1 is at 77% power. Load increase per C1.4 is in progress. Unit power was reduced to replace a bearing on 12 MFP. Equip OOS: 11TD AFW Pump, 12 EH oil pump, D5 Diesel Generator, 13 condensate pump to be used in an emergency only.

Turnover: __Commence load increase per C1.4 _____

Event No.	Malf. No.	Event Type*	Event Description
1		R (RO) N (BOP)	Load increase per C1.4 File 99-04 RO will adjust reactivity by controlling boron concentration BOP will increase power by increasing turbine load.
2		I (RO) N (BOP)	N42 Power range failure high. Crew will respond per 1C51.2 RO must put rods in manual. Rods must be in auto to start the event. BOP removes N42 from service as normal evolution.
3		C (BOP)	11 Component Cooling Water pump trip, 12 CCW pump fails to start automatically. BOP must recognize the failure of the standby pump to auto start and manually start it.
4		M (ALL)	Loss of MFW, 12 MFW is manually tripped on loss of lube oil 11 MFW pump trips for unknown reason.
5		C(RO) (BOP)	AFW starts and then trips - loss of heat sink - BOP must cross connect Unit 2 AFW

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

Op-Test No.: 2002301 Scenario No.: __2__ Event No.: __1__ Page _1_ of _1__

Event Description: Load increase per C1.4 RO will adjust reactivity by controlling boron concentration BOP will increase power by increasing turbine load.

Time	Position	Applicant's Actions or Behavior
	SRO	DIRECT Load increase to 100% at maximum allowed rate per C1.4.
	BOP	Inform System Control Center of load increase. May inform Duty Chemist of load increase.
	RO	DILUTE using Alternate Dilute mode. When Tave shows a increase, Then increases turbine load by setting the SETTER and depressing GO.
	BOP	OBSERVE turbine and generator limits Start the load increase as follows: SELECT the desired load rate on the Turbine EH Control Panel. VERIFY the turbine control VALVE POS LIMIT light is OFF. IF NOT, THEN **lower** the REFERENCE/SETTER until the light is OFF. RAISE the Valve Position Limiter to 100%. IF ITC is negative, THEN **place** turbine EH control in "IMP IN." SET the desired turbine load on the SETTER display on the Turbine EH Control Panel using the reference control pushbuttons.

Op-Test No.: 2002301 Scenario No.: 2__ Event No.: _2____ Page _1__ of _4__

Event Description: _N42 Power range failure high. Crew will respond per 1C51.2 RO must put rods in manual

Time	Position	Applicant's Actions or Behavior
		EVALUATOR NOTE: The following annunciators will alarm when the malfunction is inserted: **47013-0101 NIS Power Range Positive Flux Rate Channel Alert** **47013-0102 NIS Power Range HI Setpoint Channel Alert** **47013-0103 NIS Power Range Overpower Rod Withdrawal Stop** **47013-0203 NIS Power Range Channel Deviation** **47013-0303 Computer Alarm Delta I Check Typer** **47013-0403 Computer Alarm Flux Tilt Check Typer** **Rods must be in auto to start.** **1C51.2 Instrument Failure Guide**
	RO	RECOGNIZES the failed Power Range Instrument by the following indications : OBSERVES control rods stepping in. PLACE control rods in manual control and restore Tave equal to Tref.

Op-Test No.: 2002301 Scenario No.: 2__ Event No.: _2____ Page _2__ of _4__

Event Description: _N42 Power range failure high. Crew will respond per 1C51.2 RO must put rods in manual

Time	Position	Applicant's Actions or Behavior
	SRO	DIRECT that N-42 be removed from service.
	BOP	REMOVES N-42 from service as follows: On the MISCELLANEOUS CONTROL AND INDICATION PANEL drawer: PLACE ROD STOP BYPASS switch in the N-42 position. PLACE POWER MISMATCH BYPASS switch in the N-42 position. PLACE UPPER SECTION CURRENT COMPARATOR DEFEAT switch in the N-42 position and VERIFY the Upper Section Channel Defeat Light is LIT. PLACE LOWER SECTION CURRENT COMPARATOR DEFEAT switch in the N-42 position and VERIFY the Lower Section Channel Defeat Light is LIT. On the COMPARATOR AND RATE drawer, PLACE COMPARATOR CHANNEL DEFEAT switch in the N-42 position and VERIFY Comparator Defeat Light is LIT. At N-42 POWER RANGE B drawer, REMOVE, and CONCURRENTLY VERIFY removal of the instrument power fuses. At N-42 POWER RANGE B drawer, REMOVE, and CONCURRENTLY VERIFY removal of the control power fuses.

Op-Test No.: 2002301 Scenario No.: 2 Event No.: 2 Page 3 of 4

Event Description: N42 Power range failure high. Crew will respond per 1C51.2 RO must put rods in manual

Time	Position	Applicant's Actions or Behavior
	BOP/RO	VERIFY the following annunciators are received: 47013-0101 NIS POWER RANGE POSITIVE FLUX RATE CHANNEL ALERT 47013-0102 NIS POWER RANGE HI SETPOINT CHANNEL ALERT 47013-0201 NIS POWER RANGE NEGATIVE FLUX RATE CHANNEL ALERT 47014-0203 N42 NUCLEAR OVERPOWER ROD STOP BYPASSED Aqua Light VERIFY the following status lights LIT: 44178-0206 PWR RNG LO Q-HI F NC42P 44178-0207 PWR RNG HI Q-HI F NC42P 44205-0204 PWR RNG HI F RATE NC42U/K
	SRO	REFER to the following Technical Specification requirements: TS 3.5.B & Table 3.5-2A FU 2a. 2b. 3. 4. 7. 8 TS 3.10.B.9 TS 3.10.C.4

Op-Test No.: 2002301 Scenario No.: 2 Event No.: 2 Page 4 of 4

Event Description: N42 Power range failure high. Crew will respond per 1C51.2 RO must put rods in manual

Time	Position	Applicant's Actions or Behavior
	SRO	DESIGNATE the following bistables to be tripped: 1TC-406-A OVER POWER ΔT TRIP 1TC-406-B OVER POWER ΔT ROD STOP 1TC-406-C OVER TEMP ΔT TRIP 1TC-406-D OVER TEMP ΔT ROD STOP

Op-Test No.: 2002301 Scenario No.: _2___ Event No.: _3___ Page _1_ of _1__

Event Description: 11 Component Cooling Water pump trip, 12 CC pump fails to start automatically. BOP must recognize the failure of the standby pump to auto start and manually start it.

Time	Position	Applicant's Actions or Behavior
		EVALUATOR NOTE: The following annunciators will alarm when the malfunction is inserted: C47020-0101 "11 CC Pump Locked Out"
	BOP	REGONIZE that loss of 11CC pump did not result in an auto start of the 12 CC pump. **CRITICAL TASK: START the 12 CC pump.**
	RO/BOP	IF 47015-0408 LTDN Flow HI TEMP annunciator alarms THEN CV-31204 (1TCV-145) must be reset to demineralizer position.
	SRO	Enters TS 3.0.C due to both CC pumps being inoperable. The failure to auto start makes the 12 CC pump inoperable and the requirements of TS 3.3.1 cannot be met. **EVALUATOR NOTE: IF the BOP fails to diagnose the failure of the 12 CC pump to start in a timely manner and RCP bearing temperatures get above 200° F or the CC Surge Tank Level goes "off scale" THEN the reactor must be tripped per 1C14 AOP1.**

Op-Test No.: 2002301 Scenario No.: _2____ Event No.: __4___ Page _1__ of _3__

Event Description: Loss of MFW, 12 MFW is manually tripped on loss of lube oil 11 MFW pump trips for unknown reason.

Time	Position	Applicant's Actions or Behavior
		C47010-0202 11 Feedwater Pump Aux Oil Pump LO Press
	BOP	VERIFIES Aux Oil Pump running
		DISPATCH operator locally to Check for leaks.
		CUE: Field operator reports there is a large amount of oil on the skid and on the floor. After this cue the lo-lo pressure alarm comes in.
	SRO	In preparation for stopping the 11 Main FWP, DIRECT power decrease to a turbine load of 330 MWe per 1C1.4 AOP1, "Rapid Load Reduction - Unit 1"
	RO	BORATE the RCS as necessary to maintain control rods above the insertion limit and to control delta I within limits:

Op-Test No.: 2002301 Scenario No.: _2____ Event No.: __4___ Page _2__ of _3__

Event Description: Loss of MFW, 11 MFW is manually tripped on loss of lube oil 12 MFW pump trips for unknown reason.

Time	Position	Applicant's Actions or Behavior
	BOP	REDUCE turbine load in Automatic OR Manual: - Automatic: • SELECT the desired load rate on the Turbine EHC panel • SET the desired turbine load on the "SETTER" display on the Turbine EHC Panel using the reference control pushbuttons • DEPRESS the turbine control "GO" pushbutton - Manual: • DEPRESS the turbine control "TURBINE MANUAL" pushbutton • DEPRESS the "CV ▾ " pushbutton until the desired turbine load is reached **C47010-0102 11 Feedwater Pump Aux Oil Pump LO-LO Press** **EVALUATOR NOTE: The 11 MFW pump auto trips when this alarm comes in.** **EVALUATOR NOTE: Shortly after the 11 MFW pump trips the 12 MFW pump trips for an unknown reason and the turbine will not trip due to loss of both MFW pumps as expected.**
	SRO	Direct the reactor be manually tripped.
	SRO	**1E-0, "Reactor Trip or Safety Injection"**
	RO	DIRECT actions per 1E-0, "Reactor Trip or Safety Injection" VERIFY Reactor Trip or Manually Trip the Reactor:

Op-Test No.: 2002301 Scenario No.: _2____ Event No.: __4___ Page _3__ of _3__

Event Description: Loss of MFW, 12 MFW is manually tripped on loss of lube oil 11 MFW pump trips for unknown reason.

Time	Position	Applicant's Actions or Behavior
	BOP	VERIFY Turbine Trip
		EVALUATOR NOTE: The turbine will not trip the operator must manually close control valves.
		VERIFY Both Safeguards Buses Energized
		CHECK if SI is Actuated
		EVALUATOR NOTE: The operators are expected to manually actuate SI due to the lowering PZR level cause by the rapid cooldown when the reactor trips and the turbine does not.
	RO/BOP	Verify Safeguard Component Alignement
	BOP	Check if Main Steam Lines are isolated.
	RO	Check Containment Pressure.
	BOP	ANNOUNCE Reactor Trip
		NOTIFY Station Manager and Site Emergency Coordinator
		ENSURE communication with NRC is established within 1 hour
	BOP	CLOSE CC supply to SFP heat exchangers (MV-32115)
		OPEN Turbine Building HP Drains (CS-46392)
		DIRECT Turbine Building operator to stop Turbine Building roof exhausters and isolate Unit 1 MSRs per ATTACHMENT J
		VERIFY SI Flow

Op-Test No.: 2002301 Scenario No.: _2____ Event No.: __5___ Page _1__ of _3__

Event Description: AFW starts and then trips - loss of heat sink - Cross Connect to U2 AFW

Time	Position	Applicant's Actions or Behavior
	BOP	VERIFY RHR Flow VERIFY Total AFW Flow- Greater than 200 gpm.
	SRO	**EVALUATOR NOTE: After the operators have verified proper AFW flow the running AFW pump will trip due to an electric fault on the pump which will preclude it being restarted. The following annunciators will alarm when the malfunction is inserted: C47010 - 0107, "12 AFWP LOCKED OUT."** DIRECT transition to FR-H.1, Loss of Secondary Heat Sink.
	RO	**FR-H.1, Loss of Secondary Heat Sink** VERIFY secondary heat sink is required. RCS pressure - GREATER THAN ANY INTACT SG PRESSURE RCS hot leg temperature - GREATER THAN 350° F CHECK for secondary heat sink, if none stop RCPs and skip directly to bleed and feed. Wide range level in either SG - GREATER THAN 9% PRZR pressure - LESS THAN 2335 PSIG
	BOP	STOP both RCPs RESTORE AFW flow: DISPATCH operator to determine cause of the AFW pump trip and locally restore AFW.
	SRO	**CUE: Field operator reports that the ground fault relay is up at the 12 AFW pump breaker and he cannot restore AFW** DIRECT that AFW be cross-tied to Unit 2.

Op-Test No.: 2002301 Scenario No.: _2____ Event No.: __5___ Page _2__ of _3__

Event Description: AFW starts and then trips - loss of heat sink - Cross Connect to U2 AFW

Time	Position	Applicant's Actions or Behavior
	BOP	CROSS-CONNECT AFW from Unit 2 IAW 1C28.1, Step 5.7. PLACE CS-46425, 12 MD AFWP control switch in "PULLOUT." PLACE CS-46785, 21 MD AFWP selector switch in "MANUAL." STOP 21 MD AFWP, if running using CS-46770. REQUEST that Unit 2 operators CLOSE 21 MD AFW Pump valves to the Unit 2 S/G **CUE: Unit 2 reports that MV-32383 and MV-32384 are closed.** CLOSE 12 MD AFW Pump discharge valves to the Unit 1 SG's MV-32381 using CS-46316 MV-32382 using CS-46317 DIRECT field operator to reposition the following valves: CLOSE AF-13-4 OPEN AF-13-1 and 2AF-13-1 **CUE: Field operator reports AF-13-4 closed and AF-13-1 and 2AF-13-1 open** REQUEST the start of 21 MD AFW Pump **CUE: Unit 2 reports that the 21 MD AFW Pump has been started.**

Op-Test No.: 2002301 Scenario No.: _2____ Event No.: __5___ Page _3__ of _3__

Event Description: AFW starts and then trips - loss of heat sink - Cross Connect to U2 AFW

Time	Position	Applicant's Actions or Behavior
		CRITICAL TASK: THROTTLE flow to Unit 1 SGs as necessary to maintain desired SG level using MV-32381 and MV-32382 **TERMINATE SCENARIO: When AFW has been cross tied to Unit 2**

SCENARIO #3

Copy 1

Facility: Prairie Island Scenario No.: 3 Op-Test No.: _____

Examiners: _____ Operators: _____

Initial Conditions: **Unit 1:** 100% Power, End of Cycle, Equilibrium Xenon, RCS boron = 157 ppm, Breaker 16-10 (Bus 16/Bus 26 Bustie) is OOS. Steam Generator tube leakage of 4 GPD in 11 SG.
Unit 2: 100% power steady state operation

Turnover: The 11 and 13 Heater Drain Pumps are presently running. The 13 HD Pump was just started and the 12 HD Pump was shutdown so that preventive maintenance can be performed on the 12 HD Pump.

Event No.	Malf. No.	Event Type*	Event Description
1	RX07C	I (RO)	Loop B Tcold transmitter failure high (Rods step in and Charging Pump in "AUTO" increases to maximum speed; must place rod control and charging pump speed control in "MANUAL")
2	RC22A (5%)	C(RO)	Pressurizer PORV (CV-31232) leaking (requires isolation)
3	RX14B (at 80% power)	I (BOP)	12 SG FW Reg Valve controller fails "as is" in AUTO (will need to control 12 SG level in "MANUAL")
4	1T2809A (TRG 5) (TRG 11) FW13A (at 70% power, TRG 6)	R (RO) N (BOP)	High stator temperature on 11 Main Feedwater Pump (81°F to 130°F with 300 sec ramp) (requires turbine load decrease to 330 MWe, since will need to shutdown pump) (TRG 5) 47010-0401, "11 FEEDWATER PUMP MOTOR STATOR HI TEMP" (TRG 11) 11 Main Feedwater Pump trip during load reduction (TRG 6) (will need to rapidly reduce turbine load).
5	FW19A (TRG 7)	M(ALL)	Feedwater line break on 11 SG inside containment (300 sec ramp to 100%) (requires entry into 1E-0 and then 1E-2)
6	TC06 (Time 0)	C(BOP)	Failure of turbine to AUTO trip on Reactor Trip (will require MANUAL turbine trip)
7	RP09A RP09B (Time 0)	C(RO)	Failure of SI to AUTO actuate (will require MANUAL actuation of SI)
8	RP05 (Time 0)	C(BOP)	Failure of Containment Isolation to AUTO actuate on SI (will require MANUAL actuation of Containment Isolation)
9	SG02A	M(ALL)	SGTR on 11 SG on Actuation of Safety Injection (300 gpm instantaneous) (requires entry into 1E-3 and then 1ECA-3.1)

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

Op-Test No.: _____ Scenario No.: 3 Event No.: 1 Page 1 of 15

Event Description: Loop B Tcold transmitter failure high
(Rods step in and Charging Pump in "AUTO" increases to maximum speed; must place rod control and charging pump speed control in "MANUAL")

Time	Position	Applicant's Actions or Behavior
		EVALUATOR NOTE : **The following annunciators will alarm when the malfunction is inserted:** - **47012-0104,"REACTOR COOLANT SYSTEM HI TAVG"** - **47012-0304,"REACTOR COOLANT SYSTEM TAVG DEVIATION"** - **47012-0604,"REACTOR COOLANT SYSTEM ΔT DEVIATION"** - **47013-0305,"AUCTIONEERED TAVG-TREF DEVIATION"**
	SRO/RO	RECOGNIZE the failed transmitter by the following indications: - Tavg Loop B failed high (Blue) - ΔT Loop B failed low (Blue) - Rods stepping in
	RO	PLACE rod control in "MANUAL"

	RO	PERFORM actions of ARP 47012-0104,"REACTOR COOLANT SYSTEM HI TAVG":
		- VERIFY Tavg high
		- IF due to an instrument malfunction, THEN:
		  - PLACE rod control in "MANUAL"
		  - SHIFT charging pump speed control to "MANUAL" and adjust speed as necessary
		  - VERIFY steam dumps NOT armed
		  - REFER to 1C51, "Instrument Failure Guide - Unit 1"

	SRO	DIRECT actions per 1C51.3, "Instrument Failure Guide" for Tavg Loop 1B 1T-403 Channel Failure High

Op-Test No.: _____ Scenario No.: 3 Event No.: 1 Page 2 of 15

Event Description: Loop B Tcold transmitter failure high
(Rods step in and Charging Pump in "AUTO" increases to maximum speed; must place rod control and charging pump speed control in "MANUAL")

Time	Position	Applicant's Actions or Behavior
	RO	PERFORM actions per 1C51.3, "Instrument Failure Guide" for Tavg Loop 1B 1T-403 Channel Failure High: - VERIFY or place rod control in "MANUAL" and maintain Tavg equal to Tref - PLACE charging pump speed control in "MANUAL" and maintain pressurizer level - SELECT Blue channel on the Tavg defeat switch and pull out - RETURN rod control and charging pump speed to "AUTO"
	SRO	REFER to the following Tech Spec requirements: - TS 3.5.B and Table 3.5-2A Functional Units 7 and 8 - TS 3.5.B and Table 3.5-2B Functional Units 5d and 6c **EVALUATOR NOTE:** **Six (6) hours are allowed before the bistables in the next step are required to be tripped.**
	RO	DIRECT I & C to trip the following bistables: - 1TC-407-A, "OVER POWER ΔT TRIP" - 1TC-407-B, "OVER POWER ΔT ROD STOP" - 1TC-407-C, "OVER TEMP ΔT TRIP" - 1TC-407-D, "OVER TEMP ΔT ROD STOP" - 1TC-403-A, "HI TAVG ALARM" - 1TC-403-D, "LO TAVG MN STM ISOL" - 1TC-403-F, "LO TAVG FW ISOL" **CUE: I & C will be there in one (1) hour. The I & C Tech is out in Training.**

Op-Test No.: _____ Scenario No.: 3 Event No.: 1 Page 3 of 15

Event Description: Loop B Tcold transmitter failure high
(Rods step in and Charging Pump in "AUTO" increases to maximum speed; must place rod control and charging pump speed control in "MANUAL")

Time	Position	Applicant's Actions or Behavior
	SRO	INITIATE Work Order to repair instrument MAKE necessary log entries **FOLLOWUP QUESTIONS:** **After the scenario is complete, the following questions should be asked of the RO and SRO:** **1) What instrument failed ?** **ANSWER: Loop B Tcold failed high, since Loop B Tavg failed high and Loop B ΔT failed low.** **2) What bistables actually tripped (if any) due to the instrument failure?** ANSWER: None

Op-Test No.: _____ Scenario No.: 3 Event No.: 2 Page 4 of 15

Event Description: Pressurizer PORV (CV-31232) leaking (requires isolation)

Time	Position	Applicant's Actions or Behavior
		EVALUATOR NOTE : **The following annunciators will alarm when the malfunction is inserted:** **- 47012-0506, "PRZR POWER RELIEF LINE HI TEMP"** **- 47012-0606, "PRZR SAFETY VALVE A 0R B HI TEMP"**
	SRO	DIRECT or maintain overview of actions for leaking PRZR PORV per ARP 47012-0506, "PRZR POWER RELIEF LINE HI TEMP"
		EVALUATOR NOTE: **The operator may isolate Block Valve MV-32195 OR MV-32196 FIRST at his discretion to find the leaking PRZR PORV.** **PRZR PORV CV-31232 is the leaking PORV.**
	RO	PERFORM actions per ARP 47012-0506, "PRZR POWER RELIEF LINE HI TEMP" (ISOLATE PRZR PORVs one at a time with block valves to determine which valve is leaking): - CLOSE Block Valve MV-32195 to isolate PORV CV-31231 • OBSERVE relief line temperature (NO decrease observed) • OPEN Block Valve MV-32195 - **CLOSE Block Valve MV-32196 to isolate PORV CV-31232** • **OBSERVE relief line temperature (decrease observed)**
	SRO	REFER to Tech Spec 3.1.A.2.c(1)(b)1 (within one hour either restore the PORV to OPERABLE status or close the associated block valve with power maintained to the block valve) DIRECT RO to close or verify closed PRZR PORV Block Valve MV-32196 to isolate leaking PORV CV-31232 and to maintain power to valve

Op-Test No.: _____ Scenario No.: 3 Event No.: 3 Page 5 of 15

Event Description: 12 SG FW Reg Valve controller fails "as is" in AUTO (will need to control 12 SG level in "MANUAL")

Time	Position	Applicant's Actions or Behavior
		EVALUATOR NOTES: - **This malfunction will be inserted when power has been reduced to 80% during the load reduction performed for the next malfunction for 11 Main Feedwater Pump.** - **The following annunciator will alarm when the malfunction is inserted:** • **47011-0305, "FW CONTROL FAIL TO MANUAL"**
	SRO	DIRECT or maintain overview of actions per ARP 47011-0305, "FW CONTROL FAIL TO MANUAL"
	BOP	PERFORM actions per ARP 47011-0305, "FW CONTROL FAIL TO MANUAL": - CONTROL 12 SG FW Reg Valve in "MANUAL" within +/-5% and return level to normal

Op-Test No.: _____ Scenario No.: 3 Event No.: 4 Page 6 of 15

Event Description: High stator temperature on 11 Main Feedwater Pump (requires turbine load decrease to 330 MWe, since will need to shutdown pump).
11 Main Feedwater Pump trip during load reduction (will need to rapidly reduce turbine load).

Time	Position	Applicant's Actions or Behavior
	SRO	**EVALUATOR NOTE :** **The following annunciator will alarm when the malfunction is inserted: 47010-0401,"11 FEEDWATER PUMP MOTOR STATOR HI TEMP"** DIRECT or maintain overview of actions for high stator temperature alarm per ARP 47010-0401, "11 FEEDWATER PUMP MOTOR STATOR HI TEMP" PERFORM actions for high stator temperature alarm per ARP 47010-0401, "11 FEEDWATER PUMP MOTOR STATOR HI TEMP": - VERIFY stator temperature high by observing the redundant stator temperatures - DIRECT local operator to verify motor coolers in operation AND that cool air is being directed on the motor: (Panel 130 located near the 11Main FWP) • 11 FW Pump 11A Cooling Fans - Panel 130, Circuit 1 • 11 FW Pump 11B Cooling Fans - Panel 130, Circuit 2 **CUE: The local operator reports that the motor coolers are working OK, but the pump is starting to get hot. It must be something internal to motor.** **EVALUATOR NOTE:** **IF crew is hesitant to start reducing power right away, THEN increase stator temperature on ERCS (computer) by 10°C (to 140°C) AND insert the following annunciator alarm:** **- 47010-0401, "11 FEEDWATER PUMP OVERLOAD"**

Op-Test No.: _____ Scenario No.: 3 Event No.: 4 Page 7 of 15

Event Description: High stator temperature on 11 Main Feedwater Pump (requires turbine load decrease to 330 MWe, since will need to shutdown pump).
11 Main Feedwater Pump trip during load reduction (will need to rapidly reduce turbine load).

Time	Position	Applicant's Actions or Behavior
	SRO	In preparation for stopping the 11 Main FWP, DIRECT power decrease to a turbine load of 330 MWe per 1C1.4 AOP1, "Rapid Load Reduction - Unit 1"
	RO	BORATE the RCS as necessary to maintain control rods above the insertion limit and to control delta I within limits: - PLACE the Makeup Mode Selector Switch to "BORATE" - SET YIC-110, "Boric Acid Integrator" to the quantity desired - SET HC-110, "Boric Acid Flow Controller" auto setpoint dial to the flow desired (IF desired, THEN PLACE HC-110 to "MANUAL" and adjust output for the desired flow) - Momentarily PLACE the Boric Acid Makeup switch to "START"
	BOP	REDUCE turbine load in Automatic OR Manual: - Automatic: • SELECT the desired load rate on the Turbine EHC panel • SET the desired turbine load on the "SETTER" display on the Turbine EHC Panel using the reference control pushbuttons • DEPRESS the turbine control "GO" pushbutton - Manual: • DEPRESS the turbine control "TURBINE MANUAL" pushbutton • DEPRESS the "CV ▾ " pushbutton until the desired turbine load is reached

Op-Test No.: _____ Scenario No.: 3 Event No.: 4 Page 8 of 15

Event Description: High stator temperature on 11 Main Feedwater Pump (requires turbine load decrease to 330 MWe, since will need to shutdown pump).
11 Main Feedwater Pump trip during load reduction (will need to rapidly reduce turbine load).

Time	Position	Applicant's Actions or Behavior
		EVALUATOR NOTE : **The 11 Main Feedwater Pump trip will be inserted at 70% power during the ramp down. The following annunciator will alarm when the 11 Main Feedwater Pump is tripped:** **- 47010-0101, "11 FEEDWATER PUMP LOCKED OUT"**
	SRO	DIRECT actions to reduce turbine load to less than 330 MWe per ARP 47010-0101, "11 FEEDWATER PUMP LOCKED OUT" and 1C1.4, "Rapid Power Reduction - Unit 1"
	BOP	REDUCE turbine load in Automatic OR Manual to less than 330 MWe: - Automatic: • SELECT the desired load rate on the Turbine EHC panel • SET the desired turbine load on the "SETTER" display on the Turbine EHC Panel using the reference control pushbuttons • DEPRESS the turbine control "GO" pushbutton - Manual: • DEPRESS the turbine control "TURBINE MANUAL" pushbutton • DEPRESS the "CV ▾ " pushbutton until the desired turbine load is reached
	BOP	CONTROL 12 SG level with its FW Reg Valve controller in "MANUAL"
	RO	BORATE the RCS as necessary to maintain control rods above the insertion limit and control delta I within limits: - PLACE the Makeup Mode Selector Switch to "BORATE" - SET YIC-110, "Boric Acid Integrator" to the quantity desired - SET HC-110, "Boric Acid Flow Controller" auto setpoint dial to the flow desired (IF desired, THEN PLACE HC-110 to "MANUAL" and adjust output for the desired flow) - Momentarily PLACE the Boric Acid Makeup switch to "START"
	SRO	IF the reactor trips, THEN go to 1E-0, "Reactor Trip or Safety Injection"

Op-Test No.: _____ Scenario No.: _____ Event No.: 5,6 Page 9 of 15

Event Description: (5) Feedwater line break on 11 SG inside containment.
(requires entry into 1E-0 and then 1E-2)
(6) Failure of turbine to AUTO trip on Reactor Trip
(will require MANUAL turbine trip)

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	DIAGNOSE the secondary line break: - Containment pressure increasing - Alarm 47011-0301, " 11 STM GEN LVL DEVIATION" - Feedwater flow to 11 SG increasing (**IF** reactor is NOT already tripped)
	SRO	DIRECT RO to manually trip the reactor (**IF** reactor is NOT already tripped)
	RO	Manually TRIP the Reactor
	SRO	TRANSITION to 1E-0, "Reactor Trip or Safety Injection"
		1E-0, "Reactor Trip or Safety Injection"
	SRO	DIRECT actions per 1E-0, "Reactor Trip or Safety Injection"
	RO	VERIFY Reactor Trip or Manually Trip the Reactor: - Reactor trip and bypass breakers are open - Neutron flux is decreasing - Rod Position indicators are at ZERO - Rod Bottom lights are LIT
	BOP	VERIFY Turbine Trip **(failure of turbine to AUTO trip)** - VERIFY both turbine stop valves are closed **CRITICAL TASK: Manually trip the turbine before a severe challenge (ORANGE path) develops to the INTEGRITY critical safety function status tree** VERIFY Both Safeguards Buses Energized

Op-Test No.: _____ Scenario No.: 3 Event No.: 5,7,8 Page 10 of 15

Event Description: (5) Feedwater line break on 11 SG inside containment. (requires entry into 1E-0 and then 1E-2)
(7) Failure of SI to AUTO actuate (will require MANUAL actuation of SI)
(8) Failure of Containment Isolation to AUTO actuate on SI (will require MANUAL actuation of Containment Isolation)

Time	Position	Applicant's Actions or Behavior
		1E-0, "Reactor Trip or Safety Injection"
	RO	CHECK if SI is Actuated **(failure of SI to AUTO actuate)** **CRITICAL TASK: Manually actuate Safety Injection**
	BOP	VERIFY Safeguards Component Alignment: - "SI NOT READY" lights - NOT LIT - "SI ACTIVE" lights - LIT - "CONTAINMENT ISOLATION" lights - LIT **(failure of Containment Isolation to AUTO actuate on SI)** **CRITICAL TASK: Manually actuate Containment Isolation** - Category I doors - CLOSED - CHECK Operations Log for any ventilation openings that must be closed within 6 minutes - CHECK Cooling Water Pressure (Loop A and B) > 65 psig CHECK if MSIVs are Closed (MSIVs should remain open, since containment pressure should be < 17 psig) CHECK if Containment Instrument Air Valves are Closed (CV-31740 and CV-31741) (valves should remain open, since containment pressure should be < 17 psig)
	SRO	ANNOUNCE Reactor Trip and SI NOTIFY Station Manager and Site Emergency Coordinator
	BOP	CLOSE CC Supply to SFP Cooling HXs (MV-32115)
	SRO	ENSURE communication with NRC is established within 1 hour

Op-Test No.: _____ Scenario No.: 3 Event No.: 5,7,8 Page 11 of 15

Event Description: (5) Feedwater line break on 11 SG inside containment. (requires entry into 1E-0 and then 1E-2)
(7) Failure of SI to AUTO actuate (will require MANUAL actuation of SI)
(8) Failure of Containment Isolation to AUTO actuate on SI (will require MANUAL actuation of Containment Isolation)

Time	Position	Applicant's Actions or Behavior
		1E-0, "Reactor Trip or Safety Injection"
	BOP	OPEN Turbine HP Drains (CS-46392)
		DIRECT Turbine Building Operator to stop the TB roof exhausters and isolate the MSRs per Attachment J
		VERIFY SI Fow
		VERIFY RHR Flow (have NO RHR flow due to high RCS pressure)
		VERIFY > 200 gpm total AFW flow
		VERIFY > 900 psig on AFW Pumps Discharge
		VERIFY Status of Equipment in Auto Action Guide (Table E0-1)
		PLACE Steam Dump in "STEAM PRESSURE" Mode
		EVALUATOR NOTE: **RCS temperature will be < 547°F and decreasing in the next step**
	RO BOP	CHECK RCS temperature is stable at or trending to 547°F: - CONTROL AFW flow, but NOT < 200 gpm until level restored to > 50% Wide Range in 12 SG - VERIFY SG blowdown valves closed - IF cooldown continues and RCS temperature is < 535°F , THEN close MSIVs
		CHECK RCP Cooling: - VERIFY CC flow to each RCP > 150 gpm - VERIFY thermal barrier outlet valves open (CV-31245 and CV-31246) - VERIFY seal injection flow to RCPs is normal

Op-Test No.: _____ Scenario No.: 3 Event No.: 5 Page 12 of 15

Event Description: Feedwater line break on 11 SG inside containment.
(requires entry into 1E-0 and then 1E-2)

Time	Position	Applicant's Actions or Behavior
		1E-0, "Reactor Trip or Safety Injection"
	RO	CHECK PRZR PORVs and Spray Valves: - VERIFY PRZR PORVs are closed - VERIFY PRZR Spray Valves are closed
		CHECK if RCPs Should Be Stopped (RCPs should be kept running)
	SRO	TRANSITION to 1E-2, "Faulted Steam Generator Isolation"

Op-Test No.: _____ Scenario No.: 3 Event No.: 5 Page 13 of 15

Event Description: (5) Feedwater line break on 11 SG inside containment.
(requires entry into 1E-0 and then 1E-2)
(9) SGTR on 11 SG on Actuation of Safety Injection
(300 gpm instantaneous) (requires entry into 1E-3 and then 1ECA-3.1)

Time	Position	Applicant's Actions or Behavior
		1E-2, "Faulted Steam Generator Isolation"
	SRO	DIRECT actions per 1E-2, "Faulted Steam Generator Isolation"
	BOP	VERIFY MSIVs and Bypass Valves are Closed
		CHECK if Either SG Not Faulted: - VERIFY 12 SG is NOT Faulted
		IDENTIFY Faulted SG: - VERIFY 11 SG is Faulted
		ISOLATE the Faulted 11 SG: - ISOLATE Main FW line - ISOLATE AFW flow - CLOSE steam supply valve from 11 SG to TD AFW Pump - VERIFY 11 SG PORV is closed - VERIFY SG blowdown isolation valves are closed **CRITICAL TASK: Isolate the 11 SG before transition out of 1E-2**
	SRO	CHECK CST Level > 10,000 gallons
		CHECK Secondary Radiation: - INITIATE periodic activity samples of both SGs - VERIFY secondary radiation is NOT normal - TRANSITION to 1E-3, "Steam Generator Tube Rupture"

Op-Test No.: _____ Scenario No.: 3 Event No.: 9 Page 14 of 15

Event Description: SGTR on 11 SG on Actuation of Safety Injection
(300 gpm instantaneous) (requires entry into 1E-3 and then 1ECA-3.1)

Time	Position	Applicant's Actions or Behavior
		1E-3, "Steam Generator Tube Rupture"
	SRO	DIRECT actions per 1E-3, "Steam Generator Tube Rupture"
	RO	CHECK if RCPs Should Be Stopped (RCPs should be kept running)
	SRO	IDENTIFY that 11 SG is Ruptured
	BOP	ISOLATE Flow from Ruptured 11 SG: - VERIFY 11 SG PORV controller set in Auto at 1050 psig - CHECK 11 SG PORV closed - CLOSE steam supply valve from 11 SG to TD AFW Pump (already closed in E-2) - VERIFY 11 SG blowdown valves closed (already closed in E-2) - CLOSE 11 SG MSIV and bypass valve
	SRO	VERIFY 11 SG Should Remain Isolated (since 11 SG is also faulted)
	RO	CHECK PRZR PORVs and Block Valves: - VERIFY PRZR PORVs are closed - VERIFY at least one PRZR PORV block valve is open
	BOP	VERIFY 11 SG is Faulted and Isolated CONTROL AFW flow to maintain 12 SG Narrow Range Level between 5% and 50% (Wide Range Level between 50% and 59% for Adverse Containment) RESET SI RESET Containment Isolation ESTABLISH Instrument Air to the Containment

Op-Test No.: _____ Scenario No.: 3 Event No.: 9 Page 15 of 15

Event Description: SGTR on 11 SG on Actuation of Safety Injection
(300 gpm instantaneous) (requires entry into 1E-3 and then 1ECA-3.1)

Time	Position	Applicant's Actions or Behavior
		1E-3, "Steam Generator Tube Rupture"
	BOP	VERIFY Safeguards Buses are Energized by Offsite Power
		CHECK if RHR Pumps Should Be Stopped: - STOP RHR Pumps
		VERIFY 11 SG Pressure is < 210 psig
	SRO	TRANSITION to 1ECA-3.1, "SGTR with Loss of Reactor Coolant: Subcooled Recovery"
		1ECA-3.1, "SGTR with Loss of Reactor Coolant: Subcooled Recovery"
	SRO	DIRECT actions per 1ECA-3.1, "SGTR with Loss of Reactor Coolant: Subcooled Recovery"
		TERMINATE SCENARIO when transition to 1ECA-3.1 is made.

SCENARIO #3

Initial Conditions:

Unit 1:

- 100% Power, End of Cycle, Equilibrium Xenon, RCS boron = 157 ppm
- Breaker 16-10 (Bus 16/Bus 26 Bustie) is OOS
- Steam Generator tube leakage of 4 GPD in 11 SG

Unit 2:

- 100% power steady state operation

Turnover:

- The 11 and 13 Heater Drain Pumps are presently running
- The 13 HD Pump was just started and the 12 HD Pump was shutdown so that preventive maintenance can be performed on the 12 HD Pump

SCENARIO #4

Copy 1

Facility: Prairie Island Scenario No.: 4 Op-Test No.: _____

Examiners: _____ Operators: _____

Initial Conditions: **Unit 1:** 50% power, Beginning of Cycle, Equilibrium Xenon, 11 SI Pump is OOS (on hour 16 of a 72 hour clock, expected back in 8 hours), 12 Charging Pump is OOS for overhaul. Breaker 16-10 (Bus 16/Bus 26 Bustie) is OOS. **Unit 2:** 100% power steady state operation

Turnover: Perform power increase on Unit 1 to 100%. Are presently at Step 5.21.E of 1C1.4, "Unit 1 Power Operation" at the step to start the second feedwater pump per 1C28.2, "Unit 1 Feedwater System". Steps 5.5.1 through 5.5.8 of Section 5.5 of 1C28.2 have been completed in preparation for starting the 12 FW Pump. A local operator is available by the 12 FW Pump to perform any required actions during the pump startup.

Event No.	Malf. No.	Event Type*	Event Description
1		N(BOP)	Start 12 Main Feedwater Pump
2		R(RO)	Reactor power increase
3	RX213 (TRG 3)	I(BOP)	11 SG pressure channel 1PT-468 failure high (11 SG PORV opens, must manually close PORV)
4	RX206 (TRG 4)	I(RO)	Pressurizer level channel 1L-428 failure low (letdown isolates, PRZR heaters deenergize, and Charging Pump in "AUTO" increases to maximum speed)
5	RC14 (2 steps) 0 -6% (TRG 5) 6-30%	C(RO) C(BOP)	RCS leak (2 steps for RCS leak) 0 to 30 gpm with ramp of 120 sec 30 to 150 gpm with ramp of 300 sec
6	RP07 (Time 0)	C(RO)	ATWS (reactor trip will work from AMSAC / DSS switch)
7	RC14 (100%)	M(ALL)	Small break LOCA (500 gpm) on Reactor Trip (requires use of E-0, E-1, and ES-1.1)
8	DI46924T (TRG 7) DG02B (Time 0)	C(BOP)	Bus 16 deenergizes due to breaker failure from CT-11 transformer, with a concurrent sequencer failure. Diesel Generator D2 trips during start. (will need to reenergize Bus 16 from 1RY transformer per 1C20.5 AOP2, since have NO SI flow, since have NO SI pumps or PD charging pumps)

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

ADDITIONAL NOTES FOR SIMULATOR OPERATOR

INITIAL SETUP

12 Main Feedwater Pump

- 1T2826A set at 320°F (CPO) - clear after pump start
- 1T2827A set at 320°F (CPO) - clear after pump start

Volume Control

- Have 2 letdown orifices in service
- 11 and 13 Charging Pumps running in AUTO
- Flush through charging line

Reactor Coolant

- All PRZR heaters are ON

Turbine

- VPL set at 105%

Diesel Generator

- DI-46922A - AUTO OFF

Op-Test No.: _____ Scenario No.: 4 Event No.: 1 Page 1 of 18

Event Description: Start 12 Main Feedwater Pump

Time	Position	Applicant's Actions or Behavior
	SRO	DIRECT BOP to start the 12 Main Feedwater Pump and maintain overview of plant operations
	BOP	Start the 12 FWP per 1C28.2, Section 5.5, "Starting a Second Feedwater Pump" starting at step 5.5.9: - PLACE control switch CS-46419 to the "START" position AND HOLD until CV-31875, "12 FWP RECIRC VLV" is FULL OPEN - DIRECT local operator to close the second FWP warm-up valve F-22-4, "12 FWP PMP WARMUP LINE" **CUE: The local operator reports that warm-up valve F-22-4 is closed.** - DIRECT local operator to check the following indications for the 12 FWP: • VERIFY seal water temperature is increasing to or being maintained at ≈ 150°F • OBSERVE no evidence of steaming or external leakage AND OBSERVE seal water leakage is on automatic control (no bypass flow) • VERIFY lube oil pressure > 15 psig • VERIFY the auxiliary lube oil pump stops • THROTTLE the lube oil cooler cooling water outlet valve or outlet bypass valve to control lube oil outlet temperature at 100-125°F • VERIFY 12 FWP discharge pressure is ≈ 1200 psig • CHECK vibration on the local Reliance vibration panel for the 12 FWP, step-up gear, and motor (Vibrations should feel steady to the fingertips) **CUE: The local operator reports that all indications are normal for the 12 FWP**

Op-Test No.: _____ Scenario No.: 4 Event No.: 2 Page 2 of 18

Event Description: Reactor power increase

Time	Position	Applicant's Actions or Behavior
	SRO	DIRECT actions per 1C1.4, "Unit 1 Power Operation" and maintain overview of plant operations
	BOP	INCREASE turbine load: - SELECT the desired load rate on the Turbine EHC panel - SET the desired turbine load on the "SETTER" display on the Turbine EHC Panel using the reference control pushbuttons
	RO	INITIATE an alternate dilution of the RCS per C12.5 as necessary: - PLACE the Makeup Mode Selector Switch to "ALTERNATE DILUTE" - SET YIC-111, "Reactor Makeup Water Batch Integrator" to the quantity desired - IF desired, THEN CLOSE Boric Acid Blender to VCT Valve CV-31201 - Momentarily PLACE the Boric Acid Makeup switch to "START"
	BOP	WHEN Tavg shows an increase , THEN DEPRESS the turbine control "GO" pushbutton
	RO	MAINTAIN Tavg within the desired ± 1.5°F band
	BOP	As power is increased, ADJUST the following as necessary: - HD Pump speed - SG blowdown

Op-Test No.: _____ Scenario No.: 4 Event No.: 3 Page 3 of 18

Event Description: 11 SG pressure channel 1PT-468 failure high
(11 SG PORV opens, must manually close PORV)

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	RECOGNIZE the failed transmitter by the following indications: - 11 SG pressure channel 1PT-468 failure high - Steam Flow indicator 1FI-464 failure high - 11 SG PORV opens PLACE 11 SG PORV controller in "MANUAL" and CLOSE valve
	SRO	DIRECT actions per 1C51.1, "Instrument Failure Guide" for 11 SG pressure channel 1PT-468 failure high
	BOP	PERFORM actions per 1C51.1, "Instrument Failure Guide" for 11 SG Pressure Channel 1PT-468 Failure High: - VERIFY or place 11 SG PORV controller in "MANUAL" and CLOSE valve - VERIFY 11 SG level control operating properly in automatic
	SRO	REFER to the following Tech Spec requirements: - TS 3.5.B and Table 3.5-2B Functional Unit 1c **EVALUATOR NOTE:** **Six (6) hours are allowed in the next step before the bistables are required to be tripped.**
	BOP	DIRECT I & C to trip the following bistables: - 1PC-468-A, "LO/LO PRESS SI" - 1PC-468-B, "LO PRESS ALARM" **CUE: I & C is available to trip the bistables.**

Op-Test No.: _____ Scenario No.: 4 Event No.: 3 Page 4 of 18

Event Description: 11 SG pressure channel 1PT-468 failure high
(11 SG PORV opens, must manually close PORV)

Time	Position	Applicant's Actions or Behavior
	SRO	IF the Thermal Power Monitor is selected to Calorimetric input, THEN perform the following: - CHECK TPM power unaffected by the steam pressure channel failure - IF affected, THEN CHANGE TPM constant K202 from "0" (Calorimetric input) to "1" (NIS input) per C41.4, "ERCS NSSS Applications Program" AND NOTIFY ERCS computer group INITIATE Work Order to repair instrument MAKE necessary log entries

Op-Test No.: _____ Scenario No.: 4 Event No.: 4 Page 5 of 18

Event Description: Pressurizer level channel 1L-428 failure low (letdown isolates, PRZR heaters deenergize, and Charging Pump in "AUTO" increases to maximum speed)

Time	Position	Applicant's Actions or Behavior
		EVALUATOR NOTE : **The following annunciators will alarm when the malfunction is inserted:** - **47012-0507, "PRZR LVL DEVIATION"** - **47012-0607, "PRZR LO-LO LVL HEATERS OFF AND LETDOWN SECURED"** - **47015-0203, "CHARGING PUMP IN AUTO HI/LO SPEED"**
	SRO/RO	RECOGNIZE the failed transmitter by the following indications: - Pressurizer level channel 1L-428 failure low - Letdown isolation / PRZR heater cutoff - Charging Pump in "AUTO" increases to maximum speed
	SRO	DIRECT actions per 1C51.3, "Instrument Failure Guide" for Pressurizer level channel 1L-428 failure low
	RO	PERFORM actions per 1C51.3, "Instrument Failure Guide" for Pressurizer level channel 1L-428 failure low: - PLACE charging pump speed control in "MANUAL" AND ADJUST pressurizer level to setpoint - SELECT position "2-1" (WHITE-RED) on the PRZR Level Control Selector Switch - RESTORE pressurizer heaters (must be placed in OFF for about 10 seconds in order for breaker to be closed)

Op-Test No.: _____ Scenario No.: 4 Event No.: 4 Page 6 of 18

Event Description: Pressurizer level channel 1L-428 failure low (letdown isolates, PRZR heaters deenergize, and Charging Pump in "AUTO" increases to maximum speed)

Time	Position	Applicant's Actions or Behavior
	RO	- RESTORE letdown per C12.1, "CVCS Letdown, Charging and Seal Water Injection": • PLACE 1HC-130, "LTDN TEMP CONT" in "MANUAL" AND OPEN to 50% • PLACE 1HC-135A, "LTDN PRESS CONT" in "MANUAL" AND OPEN to 50% • ESTABLISH charging to Regen HX by adjusting charging line flow control valve 1HC-142 and the inservice charging pump speed • OPEN letdown isolation valves: - CV-31226, "LETDOWN LINE ISOL" - CV-31255, "LETDOWN LINE ISOL" • OPEN letdown orifice isolation valve CV-31325, CV-31326, or CV-31327 while adjusting 1HC-135A, "LTDN PRESS CONT" so the 600 psig relief does NOT lift • RETURN 1HC-135A, "LTDN PRESS CONT" controller to "AUTO" • RETURN 1HC-130, "LTDN TEMP CONT" controller to "AUTO" - RESTORE one charging pump speed control to "AUTO" - ENSURE pressurizer level recorder NOT selected to Blue channel
	SRO	- REFER to the following Tech Spec requirements: • TS 3.5.B and Table 3.5-2A Functional Unit 11 **EVALUATOR NOTE:** **Six (6) hours are allowed before the bistables in the next step are required to be tripped.**
	RO	DIRECT I & C to trip bistable 1LC-428-A, "HI LEVEL TRIP" **CUE: I & C will be there in one (1) hour. The I & C Tech is out in Training.**
	SRO	INITIATE Work Order to repair instrument MAKE necessary log entries

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Event Description: RCS leak (2 steps for RCS leak)
0 to 30 gpm with ramp of 120 sec
30 to 150 gpm with ramp of 300 sec

Time	Position	Applicant's Actions or Behavior
	RO	DIAGNOSE the RCS leak: - Annunciator 47022-0108, "HI RADIATION TRAIN B PANEL ALARM" (due to 1R12 containment rad monitor) - Decreasing pressurizer level - Charging flow increase - Decreasing VCT level - VCT automatic makeup - Annunciator 47012-0507, "PRZR LVL DEVIATION" - Annunciator 47015-0203, "CHARGING PUMP IN AUTO HI/LO SPEED"
	SRO	DIRECT actions per 1C4 AOP1, "Reactor Coolant Leak" IF at any time RCS inventory can NOT be maintained by available charging flow, THEN DIRECT manual trip of the reactor AND go to 1E-0, "Reactor Trip or Safety Injection"
	RO	START additional charging pumps as needed to control pressurizer level IF VCT level can NOT be maintained by the make-up system, THEN align charging pump suction to the RWST USE Computer Screen to determine approximate RCS leak rate **EVALUATOR NOTE: The initial size of the RCS leak is 30 gpm with a ramp of 120 seconds.** DETERMINE the location of the leak **EVALUATOR NOTE: The leak should be identified as being in containment based on:** **- Increasing radiation levels on 1R-11, 12, 2, or 7** **- Increasing containment temperature, pressure, humidity** **- Sump A or C level alarms**

Op-Test No.: _____ Scenario No.: 4 Event No.: 5 Page 8 of 18

Event Description: RCS leak (2 steps for RCS leak)
0 to 30 gpm with ramp of 120 sec
30 to 150 gpm with ramp of 300 sec

Time	Position	Applicant's Actions or Behavior
	SRO	COMPLY with Tech Spec 3.1.C.2 which states: " If the total leakage, other than leakage from controlled sources, exceeds 10 gpm, within one hour initiate action to place the unit in HOT SHUTDOWN and be in at least HOT SHUTDOWN within the next 6 hours." **EVALUATOR NOTE:** **At discretion of Chief Examiner, increase size of RCS leak from 30 gpm to 150 gpm with 300 sec ramp.**
	SRO	DIRECT actions to reduce turbine load per 1C1.4, "Unit 1 Power Reduction"
	RO BOP RO	REDUCE turbine load per 1C1.4, "Unit 1 Power Reduction": - IF desired, THEN place rod control in "MANUAL" - SELECT the desired load rate on the Turbine EHC panel - SET the desired turbine load on the "SETTER" display on the Turbine EHC Panel using the reference control pushbuttons - INITIATE a negative reactivity addition using control rods OR a boration of the RCS per the following: • PLACE the Makeup Mode Selector Switch to "BORATE" • SET YIC-110, "Boric Acid Integrator" to the quantity desired • SET HC-110, "Boric Acid Flow Controller" auto setpoint dial to the flow desired (IF desired, THEN PLACE HC-110 to "MANUAL" and adjust output for the desired flow) • Momentarily PLACE Boric Acid Makeup switch to "START" -• - WHEN Tave shows a decrease, THEN DEPRESS the turbine control "GO" pushbutton - Maintain Tave and Tref within 1.5°F

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Event Description: (6) ATWS (reactor trip will work from AMSAC / DSS switch)
(7) Small break LOCA (500 gpm) on Reactor Trip
(requires use of E-0, E-1, and ES-1.1)

Time	Position	Applicant's Actions or Behavior
	RO	DIAGNOSE the small break LOCA: - Decreasing pressurizer level beyond the capability of available charging flow
	SRO	DIRECT RO to manually trip the reactor
	RO	Manually TRIP the Reactor **(failure of Reactor to trip from BOTH of the Reactor Trip switches)** **CRITICAL TASK: Manually trip the reactor using the AMSAC / DSS Control Switch**
	SRO	TRANSITION to 1E-0, "Reactor Trip or Safety Injection"

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Event Description: (7) Small break LOCA (500 gpm) on Reactor Trip
(requires use of E-0, E-1, and ES-1.1)
(8) Bus 16 deenergizes due to breaker failure from CT-11 transformer, with a concurrent sequencer failure. Diesel Generator D2 trips during start (will need to reenergize Bus 16 from 1RY transformer per 1C20.5 AOP2, since have NO SI flow, since have NO SI pumps or PD charging pumps)

Time	Position	Applicant's Actions or Behavior
		1E-0, "Reactor Trip or Safety Injection"
	SRO	DIRECT actions per 1E-0, "Reactor Trip or Safety Injection"
	RO	VERIFY Reactor Trip: - Reactor trip and bypass breakers are open - Neutron flux is decreasing - Rod Position indicators are at ZERO - Rod Bottom lights are LIT
	BOP	VERIFY Turbine Trip: - VERIFY both turbine stop valves are closed
		EVALUATOR NOTE: **Bus 16 is deenergized due to breaker failure from CT-11 transformer, with a concurrent sequencer failure. Diesel Generator D2 trips during start.**
		VERIFY Both Safeguards Buses Energized: - INITITIATE action to restore Bus 16 (which is deenergized) per 1C20.5 AOP2, "Reenergizing 4.16 KV Bus 16" **CRITICAL TASK: Reenergize Bus 16 from 1RY transformer**
		EVALUATOR NOTE: **See Page 17 for actions to reenergize Bus 16 per 1C20.5 AOP2**
	RO	CHECK if SI is Actuated: - Manually ACTUATE Safety Injection (IF NOT already actuated)

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Event Description: Small break LOCA (500 gpm) on Reactor Trip
(requires use of E-0, E-1, and ES-1.1)

Time	Position	Applicant's Actions or Behavior
		1E-0, "Reactor Trip or Safety Injection"
	BOP	VERIFY Safeguards Component Alignment: - "SI NOT READY" lights - NOT LIT - "SI ACTIVE" lights - LIT - "CONTAINMENT ISOLATION" lights - LIT - Category I doors - CLOSED - CHECK Operations Log for any ventilation openings that must be closed within 6 minutes - CHECK Cooling Water Pressure (Loop A and B) > 65 psig
		CHECK if MSIVs are Closed (MSIVs should remain open, since containment pressure will be < 17 psig)
		CHECK if Containment Instrument Air Valves are Closed (CV-31740 and CV-31741) (valves should remain open, since containment pressure will be < 17 psig)
	SRO	ANNOUNCE Reactor Trip and SI
		NOTIFY Station Manager and Site Emergency Coordinator
	BOP	CLOSE CC Supply to SFP Cooling HXs (MV-32115)
		OPEN Turbine HP Drains (CS-46392)
		DIRECT Turbine Building Operator to stop the TB roof exhausters and isolate the MSRs per Attachment J **CUE: The TB roof exhausters are stopped and the MSRs are isolated per Attachment J**
		VERIFY SI Fow (have NO SI flow due to NO SI pumps running)
		VERIFY RHR Flow (have NO RHR flow due to high RCS pressure)

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Event Description: Small break LOCA (500 gpm) on Reactor Trip
(requires use of E-0, E-1, and ES-1.1)

Time	Position	Applicant's Actions or Behavior
		1E-0, "Reactor Trip or Safety Injection"
	BOP	VERIFY > 200 gpm total AFW flow
		VERIFY > 900 psig on AFW Pumps Discharge
		VERIFY Status of Equipment in Auto Action Guide (Table E0-1)
		PLACE Steam Dump in "STEAM PRESSURE" Mode
	RO	CHECK RCS temperature is stable at or trending to 547°F
	BOP	CHECK RCP Cooling: - VERIFY CC flow to each RCP > 150 gpm - VERIFY thermal barrier outlet valves open (CV-31245 and CV-31246) - VERIFY seal injection flow to RCPs is normal
	RO	CHECK PRZR PORVs and Spray Valves: - VERIFY PRZR PORVs are closed - VERIFY PRZR Spray Valves are closed
		CHECK if RCPs Should Be Stopped (RCPs should be kept running, since have NO SI Pumps running)
	BOP	VERIFY SGs are NOT Faulted
		VERIFY SG tubes are NOT Ruptured
	SRO	VERIFY RCS is NOT intact: - TRANSITION to 1E-1, "Loss of Reactor or Secondary Coolant"

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Event Description: Small break LOCA (500 gpm) on Reactor Trip
(requires use of E-0, E-1, and ES-1.1)

Time	Position	Applicant's Actions or Behavior
		1E-1, "Loss of Reactor or Secondary Coolant"
	SRO	DIRECT actions per 1E-1, "Loss of Reactor or Secondary Coolant"
	BOP	VERIFY Steam Dump in "STEAM PRESSURE" Mode
	RO	CHECK if RCPs Should Be Stopped: - IF an SI Pump is running with flow indicated AND RCS pressure is < 1250 psig (1575 psig for Adverse Containment), THEN STOP both RCPs
	BOP	VERIFY SGs are NOT Faulted
		CONTROL AFW flow to maintain SG Narrow Range Levels between 5% and 50% (Wide Range Level between 50% and 59% for Adverse Containment)
	SRO	VERIFY Secondary Side Radiation is Normal
	RO	CHECK PRZR PORVs and Block Valves: - VERIFY PRZR PORVs are closed - VERIFY at least one PRZR PORV block valve is open

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Event Description: Small break LOCA (500 gpm) on Reactor Trip
(requires use of E-0, E-1, and ES-1.1)

Time	Position	Applicant's Actions or Behavior
		1E-1, "Loss of Reactor or Secondary Coolant"
	BOP	RESET SI
		RESET Containment Isolation
		ESTABLISH Instrument Air to the Containment
		EVALUATOR NOTE: **IF Bus 16 power is NOT restored, THEN NO Charging Pump will have power. The crew should be attempting to restore offsite power to Bus 16 from 1RY transformer per 1C20.5 AOP2.**
	RO	CHECK power supply to Charging Pumps is energized by offsite power (there is NO power until Bus 16 is restored) - ATTEMPT to restore offsite power to Charging Pumps - WHEN at least one charging pump is running, THEN ESTABLISH charging flow
		CHECK if SI Can Be Terminated (can NOT terminate SI, since do NOT have RCS subcooling)
	BOP	VERIFY Containment Spray Pumps are Stopped
		EVALUATOR NOTE: **Will NOT be able to stop RHR Pumps in the next step until Bus 16 is restored and an SI Pump is running.**
		CHECK if RHR Pumps Should Be Stopped: - IF RCS pressure is > 250 psig (550 psig for Adverse Containment) AND RCS pressure is stable or increasing, THEN STOP both RHR pumps

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Event Description: Small break LOCA (500 gpm) on Reactor Trip (requires use of E-0, E-1, and ES-1.1)

Time	Position	Applicant's Actions or Behavior
		1E-1, "Loss of Reactor or Secondary Coolant"
	RO/BOP	CHECK RCS and SG Pressures
	BOP	CHECK if DGs Should Be Stopped
		CHECK if Safeguards Cooling Water Pumps Should Be Stopped
		CHECK if Outside Air Can Be Supplied to Control Room
		VERIFY Containment Dome Recirculation Fans are Running
	SRO	CHECK Auxiliary Building Radiation is Normal
	SRO	DIRECT local operator to align Containment FCU Cooling Water Outlet Radiation Monitors R-16 and R-38: - DIRECT local operator to open valves RD-6 and 2RD-4-2 **CUE: Valves RD-6 and 2RD-4-2 are open**
	BOP	- VERIFY solenoid isolation valves SV-33384 and SV-33907 are open
	BOP	CHECK if Containment Hydrogen Recombiners Should Be Placed in Service
	SRO	CHECK if RCS Cooldown and Depressurization is Required: - TRANSITION to 1ES-1.1, "Post LOCA Cooldown and Depressurization"

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Event Description: Small break LOCA (500 gpm) on Reactor Trip
(requires use of E-0, E-1, and ES-1.1)

Time	Position	Applicant's Actions or Behavior
		1ES-1.1, "Post LOCA Cooldown and Depressurization"
	BOP	VERIFY all AC Buses Energized by Offsite Power
		EVALUATOR NOTE: **Will NOT be able to stop RHR Pumps in the next step until Bus 16 is restored and an SI Pump is running.**
		CHECK if RHR Pumps Should Be Stopped: - IF RCS pressure is > 250 psig (550 psig for Adverse Containment) AND RCS pressure is stable or increasing, THEN STOP both RHR pumps
	RO	CHECK Charging Pump Status: - ALIGN charging pump suction to RWST (OPEN MV-32060) - WHEN at least one charging pump is running, THEN ESTABLISH maximum charging flow
	BOP	CHECK Intact SG Levels: - CONTROL AFW flow to maintain Narrow Range Level between 5% and 50% (Wide Range between 50% and 59% for Adverse Containment)
		INITIATE RCS Cooldown to Cold Shutdown: - MAINTAIN cooldown rate in RCS cold legs < 100°F/HR - DUMP steam to condenser
		TERMINATE SCENARIO when RCS cooldown is established

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Event Description: Bus 16 deenergizes due to breaker failure from CT-11 transformer, with a concurrent sequencer failure. Diesel Generator D2 trips during start. (will need to reenergize Bus 16 from 1RY transformer per 1C20.5 AOP2, since have NO SI flow, since have NO SI pumps or PD Charging pumps)

Time	Position	Applicant's Actions or Behavior
		Reenergizing Bus 16 from 1RY Transformer per 1C20.5 AOP2
		CRITICAL TASK: Reenergize Bus 16 from 1RY transformer
		EVALUATOR NOTE :
		The following annunciators will alarm when Bus 16 is lost and Diesel Generator D2 fails to start:
		- 47024-0204, "BUS 16 4.16 KV UNDERVOLTAGE"
		- 47024-0304, "BUS 16 4.16 KV DEGRADED VOLTAGE"
		- 47024-0504, "BUS 16 BKR 8 SOURCE FROM BUS CT 11 TRIPPED"
		- 47024-0805, "D2 EMERGENCY GENERATOR FAILURE TO START"
	BOP	RECOGNIZE the loss of bus 16, the failure of the Load Sequencer, and the trip of Diesel Generator D2
	SRO	DIRECT actions to restore Bus 16 per the Alarm Response Procedures and 1C20.5 AOP2, "Reenergizing 4.16KV Bus 16"
		RECORD Control Room alarms associated with Bus 16 deenergization
		DIRECT local operator to determine bus protective relay targets and status of bus and breakers
		CUES:
		- Local operator reports:
		• There are NO relay flags present on Bus 16 (except for the UV relays in the sequencer cabinet)
		• There is NO apparent reason why the CT-11 breaker opened
		- IF Engineer contacted, THEN recommend reenergizing Bus 16 using 1RY transformer until the cause of the CT-11 breaker malfunction is determined
		EVALUATOR NOTE:
		IF the crew decides to try to energize Bus 16 from CT-11, THEN the CT-11 breaker will trip when trying to close in

Op-Test No.: _____ Scenario No.: 4 Event No.: 8 Page 18 of 18

Event Description: Bus 16 deenergizes due to breaker failure from CT-11 transformer, with a concurrent sequencer failure. Diesel Generator D2 trips during start. (will need to reenergize Bus 16 from 1RY transformer per 1C20.5 AOP2, since have NO SI flow, since have NO SI pumps or PD Charging pumps)

Time	Position	Applicant's Actions or Behavior
		Reenergizing Bus 16 from 1RY Transformer per 1C20.5 AOP2
	SRO	DETERMINE that CT-11 feeder breaker to Bus 16 opened
	BOP	PLACE Bus 16 Voltage Restoration Switch in "MANUAL"
		PLACE the three(3) Bus 16 feeder breaker closure selector switches in "MANUAL"
		PLACE Bus 16 loads in "PULLOUT"
		PLACE Bus 16 Synchroscope Selector Switch to "1RY"
		CLOSE Breaker 16-2 (Bus 16 Source from 1RY Transformer) to reenergize Bus 16
		VERIFY Bus 16 between 4000-4400 volts
		PLACE Bus 16 Synchroscope Selector Switch to "OFF"
		RESTORE power to 480V Buses 121 and 122: - VERIFY Breakers 121A and 122A are open - VERIFY Breakers 121M and 122M are closed - CLOSE Breaker 16-4 (Bus 16 feed to 121M Transformer) to reenergize Bus 121 - CLOSE Breaker 16-11 (Bus 16 feed to 122M Transformer) to reenergize Bus 122
		RESTORE Bus 16 loads: - START 12 SI Pump **CRITICAL TASK: START 12 SI Pump**

SCENARIO #4

Initial Conditions:

Unit 1:

- 50% power, Beginning of Cycle, Equilibrium Xenon
- 11 SI Pump is OOS (on hour 16 of a 72 hour clock, expected back in 8 hours)
- 12 Charging Pump is OOS for overhaul
- Breaker 16-10 (Bus 16/Bus 26 Bustie) is OOS

Unit 2:

- 100% power steady state operation

Turnover:

- Perform power increase on Unit 1 to 100%
- Are presently at Step 5.21.E of 1C1.4, "Unit 1 Power Operation" at the step to start the second feedwater pump per 1C28.2, "Unit 1 Feedwater System"
- Steps 5.5.1 through 5.5.8 of Section 5.5 of 1C28.2 have been completed in preparation for starting the 12 FW Pump
- A local operator is available by the 12 FW Pump to perform any required actions during the pump startup