

KEWAUNEE
INITIAL LICENSE EXAM

DECEMBER 11 THRU 20, 2000

The ***as-given scenarios*** including
Forms ES-D-1, "Scenario Outline," and
ES-D-2, "Operator Actions," for each
scenario set administered.

Facility: Kewaunee Scenario No.: 1 Op-Test No.: 1

Examiners: _____ Operators: _____ SRO
 _____ RO
 _____ BOP

Initial Conditions: IC-9 19% power, beginning of cycle (BOC)
 Rods in MAN
 4160V Bkrs in Shutdown alignment

Turnover: The plant is at 19% power. Plant startup following a short outage. Currently at step 4.27.2 of N-0-02, ready align 4160V bkrs to normal operating lineup. The Continuous Action Steps 4.19, 4.22 and 4.23 are also applicable. Directions are to continue the load increase at 1/4%/min to 35% power for Chemistry hold. I&C is performing some testing in the Logic Cabinet for Rod Control. Weather Service has issued a Severe Thunderstorm Warning for western Kewaunee and Door counties. The line of thunderstorms is moving in an east-southeastern direction.
 Equipment Out of Service: AFW Pump A

Event No.	Malf. No.	Event Type*	Event Description
Preload	SW01B		SW301B/CV-31089 Service Water from Diesel Generator B fails to open
1	—	N BOP SRO	Transfer 4160 V buses Increase turbine load to 35% at 0.25 %/min
		R RO	Increase reactor power using rods and/or dilution
2	SO4 - 1. 682 (RX228)	I RO SRO	Loop B Channel III Thot RTD (TE-403A) fails high
3	SO3-3, 4.47E6 (RX215)	I BOP SRO	FI-464, S/G A controlling steam flow channel fails high
4	CV06, 50%	C RO SRO	Charging Line Leak (75 gpm) between Valve CVC-7 and Flow Element FE-128
5	ED01 ED06A	M BOP RO SRO	Loss of offsite power - 345 & 138 KV Loss of 125 VDC Bus BRA-102
6	(SW01B)	-- ----	SW301B/CV-31089 Service Water from Diesel Generator B fails to open. Mechanically bound

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

SCENARIO 1-1

NOTES TO SIMULATOR OPERATOR:

1. Ensure 4160V Brks are aligned in shutdown mode:
 - Bkrs 1-101, 1-201, 1-307, 1-407 CLOSED
 - Bkrs 1-104, 1-204, 1-301, 1-401 in PULLOUT
 - Bkrs 1-501 and 1-601 CLOSED
 - Bkrs 1-511 and 1-610 in PULLOUT
 - Bkrs 1-509, 1-503, 1-510, 1-602, 1-611, 1-603 OPEN
2. PULL-OUT AFW Pump A C/S. 46111 and TAG
3. Event 2 is not entered until after rods are placed in AUTO. If rods are NOT placed in AUTO when P-2 permissive allows, contact control room as I&C (Langer) and request rods be placed in AUTO to facilitate testing (Taking point measurements in Logic Cabinet).
4. Event 2, trip bistables when directed with following Remote Functions:
 - RP3-10 (RP139) 407A OVER POWER TRIP
 - RP3-11 (RP140) 407B ROD STOP
 - RP3-12 (RP141) 407C OVER TEMP TRIP
 - RP3-13 (RP142) 407D ROD STOP
 - RP2-9 (RP125) 403A HI TAVG
 - RP2-10 (RP126) 403D LO/LO TAVG
 - RP2-11 (RP127) 403F FW VALVE OVERRIDE
5. Event 3, trip bistables when directed with following Remote Functions:
 - RP5-14 (RP177) 464A HI SAL
 - RP5-15 (RP178) 464B HI/HI SAL
 - RP6-2 (RP182) 466C FWF < SF
 - RP6-1 (RP181) 466B FWF > SF
6. In Event 4, if directed to investigate CVCS for leak report leak is between CVC-7 and the flow element FE-128, upstream of the Inlet Isolation Valve CVC-6. When directed close Charging Pumps to Charging header isolation valves CVC-5A, CVC-5B and CVC-5C, use Remote Function toggle for CV4-8 (CV125), CV4-11 (CV128) and CV4-14 (CV131), respectively, to CLOSE the valves.
7. In Event 6, when operator calls to check Diesel Generator B alarm report back alarm for High Water Temperature and that SW-301B is closed and you could not get the valve to open. It appears to be mechanically bound.
8. In Event 5, when a loss of all AC Power occurs:
 - Communications should be performed by radio.
 - If directed to locally operate the T/D AFW valves (to start the pump and establish flow), acknowledge but perform NO actions
 - When directed to perform actions to restore electrical power, report to Control Room to secure radio.
9. In Event 5/6, when the crew has **placed the Bus 5 Voltage Restoring Mode Switch to MAN** (ECA-0.0 Step 10), contact the Control Room and report you are at 125VDC Panel BRA-102. An Electrician and his Foreman are with you. The only thing discovered was Circuit Breaker 4 is tripped open. The electricians have checked all circuits and everything appears to be in good condition. (May need to detail to Control Room personnel the previous history of sensitivity of associated trip relay and recent lightning strike as most probable cause.) When directed by crew to close the breaker, remove MALF ED06A.
10. In Event 5/6, if required report DG A is running (after DC restored) and if contacted to check position of SW-301A SW valve to DG A, report valve is open.
11. In Event 5/6, after ECA-0.1 is entered and when local actions for closing valves are directed, use Remote Function toggle:
 - CV201A/B – NO RF provided so use CV102 and CV103 at 0% for CVC-204A/B throttle valves to isolate flow to RXCP seals
 - CC-613A/B (in lieu of CC-612A/B) – CC1-5 (CC105) RCP 1A CCW Return Isol & CC1-6 (CC106) RCP 1B CCW Return

SCENARIO 1-1 OVERVIEW

Event 1 - The plant is at 19% power. The BOP operator will transfer the 4160V buses to the at-power lineup (N-EHV-39). When power is increased above 15% power (Status Light 0602 AUTO ROD WDL BLOCK P-2 goes off) and at RO operator discretion, rod control may be placed in automatic. If not placed in AUTO, I&C will contact operators and request this action be taken to support testing. Severe thunderstorms are in the area and approaching the site from the west and northwest.

Event 2 - Following clearly observable plant response from the reactivity changes with rods in AUTO, the Loop B Thot instrument fails high, resulting in demand for inward rod motion. The operator will respond to annunciator 47042-G AUCTIONEERED TAVG - TREF DEVIATION alarm. The operator will identify the failed temperature instrument and place rod control in manual. The actions of A-MI-87 are implemented for the BLUE channel % Full Power Delta Temp (TI-407B) which includes defeating the Channel 3 Delta Temp and TAVG Rx Protection inputs. Rod control should be returned to automatic after the failed channel has been removed from service. The SRO should address Technical Specification 3.5 for actions for the failed Thot instrument.

Event 3 - After the operator has placed rod control back to automatic, S/G A steam flow channel (controlling channel for Main Feedwater Control Valve FW-7A), FT-464, will fail high. This results in an indicated steam flow - feedwater flow mismatch, and a demanded opening of FW-7A causing S/G level to increase. The operator responds to annunciator 47061-B SG A SF > FF alarm. The operator is expected to recognize this condition, take manual control of the FW-7A and adjust it to restore S/G A level to normal. The actions of A-MI-87 are implemented for the failed S/G steam flow channel, including selection of the alternate steam flow channel (FT-465) for control. Once S/G levels are stabilized, FW-7A controller may be restored to AUTO per procedure A-FW-05A. The SRO should review Technical Specification 3.5 for actions associated with the failed steam flow channel.

Event 4 - During the time S/G levels are being returned to normal a 75 gpm leak will occur (over 2 minutes) on the Charging line between valve CVC-7 and flow element FE-128. The following indications alert the operator to the leak: 1) decreasing PRZR level 2) increased charging speed 3) decreased seal injection flow and 4) regenerative heat exchanger outlet temperature will be increasing due to the decreased charging flow. The operators should respond to annunciator 47043-J, CHARGING PUMP IN AUTO HIGH/LOW SPEED AND 47041-K, REGEN HX LETDOWN TEMP HIGH, and should isolate normal letdown and initiate excess letdown (N-CVC-35B). The operators should respond to the leak using A-RC-36D and A-CVC-35B. The leak may be isolated by stopping all charging pumps, closing valves CVC-5A,B,C and restart one charging pump to supply seal injection flow. HP should be contacted to monitor radiation levels due to leak.

Event 5&6 - When the charging leak has been isolated, lightning strikes around the plant result in several electrical problems. The plant will trip when a loss of offsite power occurs when the 345 KV and 138 KV feeder breakers in the KNPP Substation open. Additionally Train A components, including the Diesel Generator (DG) and the turbine-driven AFW Pump, are affected (lost) when the 125 VDC bus BRA-102 power is lost due to a power supply fuse operation. The operator will be alerted by annunciators and indications: 47101-A BRA-102 DC VOLTAGE LOW; 47091-B DIESEL GEN A MECH LOCKOUT. DG B will start and should supply its associated busses; however, its SW return valve will fail to open. This will cause the diesel jacket water and lube oil temperatures to rise.

E-0 should be entered. The operators will perform the immediate actions and subsequent actions of from E-0. SI is active (B Train) due to the loss of two instrument buses resulting in input signal for Przr Low Pressure SI and S/G Low pressure SI failing low. The operator is alerted to the DG problem by annunciator 47091-F DIESEL GEN B ABNORMAL. When the local operator checks, he should find alarms for jacket water temperature (DR111-11 & D-1B-7) and lube oil temperature (DR11-14 [ENGINE PRE FAILURE] & D-1B-4). [If directed to locally open SW-301B, local operator reports valve will not move.] If not stopped, the DG will fail due to overheating.

SCENARIO 1-1 OVERVIEW (CONT.)

The operators should transition to ECA-0.0. The operators will take action to isolate the RCS, establish AFW flow and attempt to restore DG operation and/or DC power. The operators will place equipment in PULLOUT. At step 13, if dispatched to check Train A DC power, an operator [or appropriate plant staff member (i.e. Electrician)] will report trip of the DC feeder breaker with no indications on panels. Electrical maintenance reports no discernible damage and evaluation shows that it may be reenergized. [When directed to close in feeder breaker, the Simulator Operator will remove the malfunction (ED06A)]. DG A and the T/D AFW should start once DC power is restored. Once power is restored to Bus 5, the operators will initiate actions with step 31. Once loads and SW pumps are verified loaded on the bus, the operators will evaluate which recovery procedure to use and transition to ECA-0.1 (no SI equipment operating). The scenario ends following loading of identified equipment in step 3 onto the bus, including a Charging Pump and the Train A Fan Coil Coolers, and MCC alignment to bus 52.

Critical Tasks

1. RODCONT A: Prevent a Rx Trip by shifting rod control selector switch to manual. [Event 2]
2. ECA-0.0 — F: Manually start the SW pump so that the DG does not fail because of damage caused by engine overheating [DG A].
3. ECA-0.0 — H: Isolate RCP seal injection before a charging pump starts or is started.

Op-Test No.: 1 Scenario No.: 1 Event No.: 1

Event Description: Transfer 4160V Buses to normal power alignment.
Ramp UP power to 35% at 0.25% per minute.

Time	Position	Applicant's Actions or Behavior
	CUE:	Turnover direction to raise power to 35% and transfer S/Gs to Main Feed Control Valves <i>OK</i>
	CRS	Implement actions of N-0-02, step 4.27
	CRS	Direct transfer of 4160V Buses to power alignment and increase to 35% power at 0.25 %/min.
	CREW	Review applicable Precautions, and Limitations and Actions.
	BOP	<p>Increase load per N-TB-54:</p> <ul style="list-style-type: none"> • Review applicable Precautions & Limitations • Determine maximum load rate per Figures 2 & 3 • Set setter to desired load (~ 35%) • Verify/set loading rate to ¼%/min. • Verify loading rate is less than maximum allowable rate • Inform GenCo of rate and amount of load pickup • Depress GO • Verify load increases
	RO	<p>Perform reactivity adjustments:</p> <p>Rod Control (outward motion at 1.5°F difference Tref-Tave)</p> <p>AND/OR</p> <p>Boron Concentration Control (initiate dilution) per N-CV-35A</p> <ul style="list-style-type: none"> • Review applicable Precautions & Limitations • Verify at least one RXCP in operation • Determine rate and magnitude of dilution • Position Reactor Makeup Mode Selector to DILUTE or ALT DIL. • Adjust MU-1022/CV-31095, Blender Control Rx Mu Flow, to required flow rate • Set Rx Make-up Totalizer to required quantity • Position Reactor Makeup Control switch to START • Verify required change has been achieved by monitoring: <ul style="list-style-type: none"> • Rod Position • Boron Concentration • Tave

Comments: _____

Op-Test No.: 1 Scenario No.: 1 Event No.: 1

Event Description: Transfer 4160V Buses to normal power alignment.
Ramp UP power to 35% at 0.25% per minute.

Time	Position	Applicant's Actions or Behavior
	RO (cont.)	<ul style="list-style-type: none"> When dilution is complete: <ul style="list-style-type: none"> Position Reactor Makeup Mode Selector to AUTO Position Reactor Makeup Control switch to START Adjust CVC-403/CV-31092, Blender Control BA Flow, to current RCS boron concentration If RCS boron concentration has been changed by >50 ppm, operate Przr heaters as necessary to equalize RCS and Przr boron.
	BOP	<p>Align 4160 Breakers to normal operating lineup per N-EHV-39:</p> <ul style="list-style-type: none"> Review Precautions and Limitations Verify power source availability: MAT (Buses 1-4), TAT (Bus 5), RAT (BCRS 6) Bus 1 - 4: <ul style="list-style-type: none"> Position Sync switch for Bkr 1-104 MAT to Bus 1 (Bkr 1-204 MAT to Bus 2, Bkr 1-301 MAT to Bus 3, Bkr 1-401 MAT to Bus 4) to ON Verify Incoming and Running Voltmeters matched Position C/S Bkr 1-104 MAT to Bus 1 (Bkr 1-204 MAT to Bus 2, Bkr 1-301 MAT to Bus 3, Bkr 1-401 MAT to Bus 4) to CLOSE Verify Bkr 1-104 MAT to Bus 1 (Bkr 1-204 MAT to Bus 2, Bkr 1-301 MAT to Bus 3, Bkr 1-401 MAT to Bus 4) RED indication lit Position C/S Bkr 1-101 RAT to Bus 1 (Bkr 1-201 RAT to Bus 2, Bkr 1-307 RAT to Bus 3, Bkr 1-407 RAT to Bus 4) to TRIP and verify GREEN light lit Position Sync switch for Bkr 1-104 MAT to Bus 1 (Bkr 1-204 MAT to Bus 2, Bkr 1-301 MAT to Bus 3, Bkr 1-401 MAT to Bus 4) to OFF

Comments: _____

Op-Test No.: 1 Scenario No.: 1 Event No.: 1

Event Description: Transfer 4160V Buses to normal power alignment.
Ramp UP power to 35% at 0.25% per minute.

Time	Position	Applicant's Actions or Behavior
	BOP (cont)	<ul style="list-style-type: none"> Bus 5: <ul style="list-style-type: none"> Verify open Bkr 1-509 DG A to Bus 5 Verify open Bkr 1-503 RAT to Bus 5 Verify open Bkr 1-511 MAT to Bus 5 Verify closed Bkr 1-501 TAT to Bus 5 Verify open Bkr 1-510 Bus 5 & 6 Tie Bus 6: <ul style="list-style-type: none"> Verify open Bkr 1-602 Bus 5 & 6 Tie Verify open Bkr 1-611 TAT to Bus 6 Verify closed Bkr 1-601 RAT to Bus 6 Verify open Bkr 1-610 MAT to Bus 6 Verify open Bkr 1-603 DG B to Bus 6 <p>NOTE: Each of the above steps for Buses 1 through 4 are performed for each individual breaker listed to complete the transfer. Only one set of steps is listed for space limitation & ease of reading.</p>
	RO	When 44905-0602 AUTO ROD WDL BLOCK P-2 status light is OFF, Control Rod Bank Selector may be placed in AUTO
		NOTE: Following the required plant response and when rods are in AUTO, Event 2 may be started.

Comments: _____

Op-Test No.: <u>1</u> Scenario No.: <u>1</u> Event No.: <u>2</u>		
Event Description: Loop B RCS Channel III Thot RTD (TE-403A) fails high. With Control rods in AUTO, control rods will begin to step in due to auctioneered high Tavg being well above the (load) reference temperature (Tref). Przr reference level setpoint will also increase, and if a Charging Pump is in AUTO, its speed and charging header flow will increase. Letdown may isolate due changes in Tave resulting in low Przr level.		
Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciator alarms: 47042-H RCS TAVG HIGH 47043-E PRESSURIZER LEVEL DEVIATION 47044-G RCS TAVG DEVIATION 47044-H RCS ΔT DEVIATION Control Rods stepping in at high rate % Full Power Delta Temperature ΔT indication (TI-407A) high Charging Pump A (AUTO) speed increase to maximum LETDOWN ISOLATION: 47042-F PRESSURIZER LVL LETDOWN ISOL & HEATERS OFF <i>PRZR level < 18.3% on control or protection channel (2, LI-427 / 3, LI-428)</i>
	RO/CRS	Identify/report failed Thot/temperature channel failure.
	RO [CT] RODCONT A	Verify plant conditions do NOT warrant rod motion: <ul style="list-style-type: none"> • Turbine load stable • RCS temperature stable or decreasing on other channels Place rod Control Bank Selector to MAN Stabilize the plant
	CRS	Implement Alarm Response Sheet and A-MI-87 "Bistable Tripping for Failed Reactor Protection or Safeguards Inst.". Attachment I "TI-407B % FULL POWER DELTA TEMP RR-112" – "REMOVAL FROM SERVICE" and direct operator action.
	RO/CRS	Direct actions to remove TI-407B from service: <ul style="list-style-type: none"> • Direct I&C to perform SP 47-316C to check redundant channel bistable contacts for TI-407B removal from service. • Direct performance/verification of prerequisite lineup of "Removal From Service". • Direct I&C to enter Relay Rack RR-112 to trip associated bistables for TI-407B.

Comments: _____

Op-Test No.: <u>1</u> Scenario No.: <u>1</u> Event No.: <u>2</u>		
Event Description: Loop B RCS Channel III Hot RTD (TE-403A) fails high. With Control rods in AUTO, control rods will begin to step in due to auctioneered high Tavg being well above the (load) reference temperature (Tref). Przr reference level setpoint will also increase, and if a Charging Pump is in AUTO, its speed and charging header flow will increase. Letdown may isolate due changes in Tave resulting in low Przr level.		
Time	Position	Applicant's Actions or Behavior
	RO/BOP	Perform/verify prerequisite alignments: <ul style="list-style-type: none"> Place Delta Temperature RX Protection Channel Defeat switch to BLUE (Ch III) and PULLOUT Place TAVE RX Protection Channel Defeat switch to BLUE (Ch III) and PULLOUT Select WHITE (Channel II) on TR-405 RX Clnt Delta Temp Recorder Selector
	RO	When conditions permit, position Control Rod Bank Selector to AUTO <ul style="list-style-type: none"> Verify the following: <ul style="list-style-type: none"> Annunciator 47033-D OPΔT HIGH in alarm Annunciator 47033-C OTΔT HIGH in alarm Annunciator 47042-H RCS TAVG HIGH in alarm Annunciator 47041-Q OPΔT CHANNEL RNBAC/RDSTP ALERT in alarm Annunciator 47041-R OTΔT CHANNEL RNBAC/RDSTP ALERT in alarm Annunciator 47043-G LOOP B TAVG LOW LOW in alarm 44908-0307 Loop B Low Tave Status Light lit 44908-0407 Loop B Low Low Tave Status Light lit 44907-0507 Loop B OTΔT Status Light lit 44907-0607 Loop B OPΔT Status Light lit 44904-0202 Loop B Chan 3 OTΔT Status Light lit 44904-0502 Loop B Chan 3 OPΔT Status Light lit
		NOTE: The following actions address the isolation of letdown that may occur due to the RCS temperature changes resulting from the malfunction. These actions are in italics since they will only occur if letdown does isolate.
	RO	<i>Identify and report letdown isolation due to low PRZR level (< 18.3%)</i> <i>Implement Alarm Response Sheet for 47042-F</i> <i>Implement actions of A-RC-36D "Reactor Coolant Leak"</i> <i>Determine level change is NOT due to RCS leakage and exit A-RC-36D</i>

Comments: _____

Op-Test No.: 1 Scenario No.: 1 Event No.: 2

Event Description: Loop B RCS Channel III Thot RTD (TE-403A) fails high. With Control rods in AUTO, control rods will begin to step in due to auctioneered high Tavg being well above the (load) reference temperature (Tref). Przr reference level setpoint will also increase, and if a Charging Pump is in AUTO, its speed and charging header flow will increase. Letdown may isolate due changes in Tave resulting in low Przr level.

Time	Position	Applicant's Actions or Behavior
	RO (cont.)	<p><i>Implement N-CVC-35B</i></p> <ul style="list-style-type: none"> • <i>Isolate letdown by closing:</i> <ul style="list-style-type: none"> • <i>LD-2/CV-31108, Letdown Isolation.</i> • <i>LD-3/CV-31104, Letdown Isolation.</i> • <i>LD-4A/CV-31231, Letdown Orifice A Isolation.</i> • <i>LD-4B/CV-31232, Letdown Orifice B Isolation.</i> • <i>LD-4C/CV-31233, Letdown Orifice C Isolation.</i> <p><i>AND</i></p> <ul style="list-style-type: none"> • <i>Adjust charging flow to restore PRZR level</i> • <i>Monitor and maintain seal injection flow to RXCPs between 6 and 13 gpm per pump.</i> • <i>When restored to normal (23-24%), reduce charging flow to stabilize Przr level.</i> <p><i>Restore normal letdown per N-CVC-35B:</i></p> <ul style="list-style-type: none"> • <i>Establish ≥20 gpm charging flow.</i> • <i>Open LD-6/CV-31234, Letdown Line Isolation.</i> • <i>Adjust LD-10/CV-31099, Letdown Pressure Controller, to 50% OPEN in MANUAL.</i> • <i>Adjust CC-302/CV-31100, Letdown Cont Outl Temp Controller, to 50% OPEN in MANUAL.</i> • <i>Open LD-2/CV-31108 and LD-3/CV-31104 Letdown Isolation valves.</i> • <i>Simultaneously perform the following:</i> <ul style="list-style-type: none"> • <i>Open ONE: LD-4A/CV-31231, LD-4B/CV-31232 OR LD-4C/CV-31233 Letdown Orifice Isol</i> • <i>Adjust LD-10 to establish Letdown HX Outlet Pressure (PI-135) at 245-255 psig.</i> • <i>Adjust CC-302 to establish Letdown HX Outlet Temp (TI-130) at 110-130 °F.</i> • <i>When letdown pressure is stable at 245-25 psig:</i> <ul style="list-style-type: none"> • <i>Adjust LD-10 auto setpoint dial to null deviation meter (top).</i> • <i>Position LD-10 to AUTO.</i> • <i>Verify LD-10 controlling Letdown HX Pressure (PI-135) 245-255 psig.</i> • <i>When Letdown HX Outlet Temp is stable at 110-130 °F:</i> <ul style="list-style-type: none"> • <i>Adjust CC-302 auto setpoint dial to null deviation meter (top).</i> • <i>Position CC-302 to AUTO.</i> • <i>Verify CC-302 controlling Letdown HX Outlet Temp (TI-130) at 110-130 °F.</i>

Comments: _____

Op-Test No.: 1 Scenario No.: 1 Event No.: 2

Event Description: Loop B RCS Channel III Hot RTD (TE-403A) fails high. With Control rods in AUTO, control rods will begin to step in due to auctioneered high Tavg being well above the (load) reference temperature (Tref). Przr reference level setpoint will also increase, and if a Charging Pump is in AUTO, its speed and charging header flow will increase. Letdown may isolate due changes in Tave resulting in low Przr level.

Time	Position	Applicant's Actions or Behavior
	CRS	<p>Review Technical Specification 3.5.b & c:</p> <ul style="list-style-type: none"> Table 3.5-2: <ul style="list-style-type: none"> No. 5 Overtemperature ΔT No. 6 Overpower ΔT <p>Determine continued operation acceptable (3 channels required OPERABLE)</p> <ul style="list-style-type: none"> Table TS 3.5-4, No. 2.b. Hi Steam Flow and 2 of 4 Lo-Lo T_{avg} with Safety Injection Steamline Isolation <p>Determine continued operation acceptable (Tavg Lo-Lo interlock input becomes 1 of 4 with BOTH channels remaining OPERABLE)</p>
	CRS	Contact I&C/Maintenance to investigate indicated RTD failure

Comments: _____

Op-Test No.: <u>1</u> Scenario No.: <u>1</u> Event No.: <u>3</u>		
Event Description: S/G A controlling steam flow channel, FI-464, fails high. Feedwater flow and S/G level will initially increase in response to sensed steam demand. FW-7A will throttle open. The operator is required to take manual control of FW-7A and restore level to reference value.		
Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciator alarms: 47061-B S/G A SF > FF 47061-C S/G A FEED FLOW EXCESSIVE (due to non-failed channels) 47062-B S/G A BYPASS CV LEVEL DEVIATION Steam flow FI-464 reading at top of scale (while FT-465 reads approx. same as S/G B steam flow channels FI-474 and FI-475) Unexpected rise in S/G A level (LI-461/462) Stable turbine load
	BOP/CRS	Identify/report unusual response of FW-7A/failure of steam flow channel FT-464
	BOP	Take MAN control of FW-7A Restore S/G A level to program
	CRS	Implement Alarm Response Sheet, A-MI-87 "Bistable Tripping for Failed Reactor Protection or Safeguards Inst.", Attachment I "FT-464 STEAM GENERATOR STEAM FLOW RR-109" – "REMOVAL FROM SERVICE", and direct operator action.
	BOP/CRS	Direct actions to remove FT-464 from service: <ul style="list-style-type: none"> • Direct I&C to perform SP 47-316B to check redundant channel bistable contacts for FT-464 removal from service. • Direct performance/verification of prerequisite lineup of "Removal From Service". • Direct I&C to enter Relay Rack RR-109 to trip associated bistables for FT-464.
	BOP/RO	Perform prerequisite alignments: <ul style="list-style-type: none"> • Place Steam Flow Channel Selector switch for S/G A 46547/HFC-465 to 465/WHITE (Ch II)
	BOP	When conditions permit, position balance S/G A level, steam flow and feed flow and restore FW-7A to AUTO <ul style="list-style-type: none"> • Verify the following: <ul style="list-style-type: none"> • Annunciator 47063-I MAIN STEAM HEADER A FLOW HI-HI in alarm • Annunciator 47062-I STEAM HEADER A ISOLATION ALERT in alarm

Comments: _____

Op-Test No.: <u> 1 </u> Scenario No.: <u> 1 </u> Event No.: <u> 3 </u>		
Event Description: S/G A controlling steam flow channel, FI-464, fails high. Feedwater flow and S/G level will initially increase in response to sensed steam demand. FW-7A will throttle open. The operator is required to take manual control of FW-7A and restore level to reference value.		
Time	Position	Applicant's Actions or Behavior
	BOP (cont.)	<ul style="list-style-type: none"> • Annunciator 47061-C S/G A FEED FLOW EXCESSIVE in alarm • Annunciator 47061-B S/G A SF > FF in alarm • 44908-0501 MS Hdr A Hi Flow Status Light lit • 44908-0601 MS Hdr A Hi-Hi Flow Status Light lit • 44907-0901 S/G A SF > FF Status Light lit
	CRS	Review Technical Specification 3.5.b & c: <ul style="list-style-type: none"> • Table 3.5-2: <ul style="list-style-type: none"> • No. 16 Steam Flow/Feedwater Flow Mismatch Determine continued operation acceptable (1 channel required OPERABLE) • Table TS 3.5-4: <ul style="list-style-type: none"> • No. 2.a. Hi-Hi Steam Flow with Safety Injection Steamline Isolation • No. 2.b. Hi Steam Flow and 2 of 4 Lo-Lo T_{avg} with Safety Injection Steamline Isolation Determine continued operation acceptable (One channel required OPERABLE)
	CRS	Inform I&C/Maintenance of S/G A steam flow channel FT-464 failure/status

Comments: _____

Op-Test No.: <u>1</u> Scenario No.: <u>1</u> Event No.: <u>4</u>		
Event Description: Charging line leak of 75 gpm occurs between the Charging Control Charging Line valve CVC-7 and the charging header flow element FE-128. Flow to the RXCP seals is severely reduced and charging header flow (through the Regen HX) is also severely affected. Przr level will begin to drop, and Charging Pump speed (in AUTO) and indicated charging flow will increase. The header will be isolated to stop the leak.		
Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciators: 47014-I RXCP A LABRYNTH SEAL DP LOW 47014-L RXCP B LABRYNTH SEAL DP LOW 47041-K REGEN HX LETDOWN TEMPERATURE HIGH 47043-J CHARGING PUMP IN AUTO HIGH/LOW SPEED Increased CVCS Charging flow FI-128 (Charging Pump speed) Decreasing Przr level
	RO/CRS	Identify/report leakage indicated from CVCS: <ul style="list-style-type: none"> • Charging Pump speed increasing • Charging flow increase indicated • Low flow to RXCP seals • High Regen HX temps
	CRS	Implement A-CVC-35B "Leak from the CVC System" and direct operator action.
	RO	Isolate letdown by closing: <ul style="list-style-type: none"> • LD-2 and LD-3 Letdown Isolation valves • LD-4A, LD-4B and LD-4C Letdown Orifice Isolation valves Operate two charging pumps and maintain Przr level Verify Przr heaters maintaining system pressure
	CREW	Direct operator(s) to initiate Aux Bldg CVC Piping inspection
	CREW	Perform symptom review and determine leak location <ul style="list-style-type: none"> • If HC-142, Charging Line CVC-7/CV-31103, taken to CLOSE, monitor Charging flow to Regen HX, FI-128 Determine leak is on Charging Header between flow element and Charging Control Charging Line valve CVC-7

Comments: _____

Op-Test No.: <u>1</u> Scenario No.: <u>1</u> Event No.: <u>4</u>		
Event Description: Charging line leak of 75 gpm occurs between the Charging Control Charging Line valve CVC-7 and the charging header flow element FE-128. Flow to the RXCP seals is severely reduced and charging header flow (through the Regen HX) is also severely affected. Przr level will begin to drop, and Charging Pump speed (in AUTO) and indicated charging flow will increase. The header will be isolated to stop the leak.		
Time	Position	Applicant's Actions or Behavior
		NOTE: By closing CVC-7, enough information can be gathered to identify the probable location of leak. With charging flow indicated and seal injection flow low, all locations downstream of CVC-7 are eliminated. With charging flow indicated, leak on the seal injection line is less likely since with CVC-7 closed FI-128 should read ZERO (if leak is upstream of flow element or on seal injection lines). Therefore the leakage location is identified between FE-128 and CVC-7.
	RO	<p>(NOTE: Crew may chose to stop the running Charging Pumps when isolating the charging header to prevent lifting of Charging Pump relief valve. If so actions are same except after isolation, one Charging Pump will be restarted and run at minimum speed.)</p> <p>When leakage location determined and/or when local operator reports on leak location for system walkdown:</p> <ul style="list-style-type: none"> • Verify letdown isolated • Stop one Charging Pump • <i>Decrease running Charging Pump Controller to minimum speed [HC-428A (B)]</i> • Close CVC-7 [HC-142] • Direct operator to locally close CVC-5A, 5B and 5C, 1A(B, C) Charging Pump to Charging Line Supply valve for each Charging Pump • Verify #1 Seal Injection flow indicate 6-8 gpm [FI-115, FI-116] • Initiate Excess Letdown per N-CVC-35B <ul style="list-style-type: none"> • Review Precautions and Limitations • Open CC-653/MV-32082 Excess Ldtn HX Comp Cooling Return • Open LD-300/CV-31236 Excess Letdown Isolation • Throttle open LD-301/CV31090 Excess LD Flow [HC-123], while maintaining: <ul style="list-style-type: none"> • Excess LD Outlet pressure < 150 psig [PI-121] • VCT temperature < 103°F [TI-140] • Adjust Charging Pump speed [HC-428A (B)] and/or LD-301 position [HC-123] to control Przr level at program level
	CREW	<ul style="list-style-type: none"> • Contact Health Physics to set up portable radiation monitor for seal return line
	RO	<p>If increased charging is required for RCS Concentration control:</p> <ul style="list-style-type: none"> • Contact local operator to adjust CV-204A and CV-204B RXCP Seal Supply Line Throttle valves • Adjust Charging Speed as necessary to obtain seal injection flow ≤ 13 gpm to each RXCP [FI-115, FI-116]

Comments: _____

Op-Test No.: 1 Scenario No.: 1 Event No.: 4

Event Description: Charging line leak of 75 gpm occurs between the Charging Control Charging Line valve CVC-7 and the charging header flow element FE-128. Flow to the RXCP seals is severely reduced and charging header flow (through the Regen HX) is also severely affected. Przr level will begin to drop, and Charging Pump speed (in AUTO) and indicated charging flow will increase. The header will be isolated to stop the leak.

Time	Position	Applicant's Actions or Behavior
	CRS	Review Technical Specification 3.2.a for CVCS boration flowpath applicability Notify Maintenance to investigate/repair charging header leak
		NOTE: After excess letdown has been established, proceed with Event 5.

Comments: _____

Op-Test No.: 1 Scenario No.: 1 Event No.: 5&6

Event Description:

Due to lightning strikes:

1. A loss of offsite power occurs when one strike results in all 345 KV and 138 KV feeder breakers opening.
2. The Train A DC power is lost when BRA-102 125VDC Distribution Cabinet circuit breaker 4 to Dist Cabinet BRA-104 trips open due to sensitivity to a lightning strike. (Premature trip)

These conditions result in start signal to the Emergency Diesel Generators, with DG A mechanical lockout due to the loss of control power. The Turbine-Driven AFW Pump will NOT start due to loss of DC power. Power is also lost to two Instrument Buses and the associated Instrument Channels (I, RED & IV, YELLOW). Train A equipment and valve indication is lost, and remote capability of operation of equipment is also lost.

DG B will run for a period before the ABNORMAL annunciator actuates, alerting the control room operator to a problem. Service Water valve SW-301/CV-31089 fails to open resulting in either a decision to manually shutdown the DG, or it will trip. A loss of all AC power occurs and ECA-0.1 will be implemented. Train A DC power will be made available. If DC power restored, the T/D AFW Pump will start, and DG A will start. The crew will determine the method to use for reenergizing Bus 5, and reenergize the Bus.

Time	Position	Applicant's Actions or Behavior
	CUE:	<p>Loss of offsite power: Numerous annunciators Main Generator trip Start of DG B and tie to bus 6</p> <p>Loss of Train A DC Power: Annunciators: 47101-A BRA-102 DC VOLTAGEW LOW 47091-B DIESEL GEN A MECH LOCKOUT</p> <p>Failure of DG A to start Failure of T/D AFW Pump to start Loss of indication for A Train components Loss of Instrument Bus I and IV indications</p> <p>Failure of D/G B Service Water valve SW301B: Annunciator 47091-F DIESEL GENERATOR ABNORMAL Local operator reports</p>
	CREW	<p>Identify report a loss of all offsite power condition</p> <p>Report reactor trip</p>
	CRS	Implement E-0 "REACTOR TRIP OR SI"

Comments: _____

Op-Test No.: 1 Scenario No.: 1 Event No.: 5&6

Event Description:

Due to lightning strikes:

1. A loss of offsite power occurs when one strike results in all 345 KV and 138 KV feeder breakers opening.
2. The Train A DC power is lost when BRA-102 125VDC Distribution Cabinet circuit breaker 4 to Dist Cabinet BRA-104 trips open due to sensitivity to a lightning strike. (Premature trip)

These conditions result in start signal to the Emergency Diesel Generators, with DG A mechanical lockout due to the loss of control power. The Turbine-Driven AFW Pump will NOT start due to loss of DC power. Power is also lost to two Instrument Buses and the associated Instrument Channels (I, RED & IV, YELLOW). Train A equipment and valve indication is lost, and remote capability of operation of equipment is also lost.

DG B will run for a period before the ABNORMAL annunciator actuates, alerting the control room operator to a problem. Service Water valve SW-301/CV-31089 fails to open resulting in either a decision to manually shutdown the DG, or it will trip. A loss of all AC power occurs and ECA-0.1 will be implemented. Train A DC power will be made available. If DC power restored, the T/D AFW Pump will start, and DG A will start. The crew will determine the method to use for reenergizing Bus 5, and reenergize the Bus.

Time	Position	Applicant's Actions or Behavior
	RO	Perform immediate operator actions of E-0 Verify reactor trip: <ul style="list-style-type: none"> • Reactor trip & bypass breakers open • Rod Position Indicators read ZERO • Rod bottom lights LIT • Neutron flux decreasing
	BOP	Perform immediate operator actions of E-0 Verify Turbine Trip: <ul style="list-style-type: none"> • HP turbine impulse pressure PI-485/486 trending toward ZERO • All turbine STOP VALVES closed Verify power to Emergency AC Busses <ul style="list-style-type: none"> • Bus 5 energized • Bus 6 energized Report Bus 5 de-energized, DG A failed to start (Lockout). Report Bus 6 energized from DG B
	CREW	Perform immediate operator actions of E-0 Determine SI status: <ul style="list-style-type: none"> • Check if actuated: <ul style="list-style-type: none"> • 47021-A SI TRAIN A ACTUATED lit • 47021-B SI TRAIN B ACTUATED lit

Comments: _____

Op-Test No.: 1 Scenario No.: 1 Event No.: 5&6

Event Description: Due to lightning strikes:

1. A loss of offsite power occurs when one strike results in all 345 KV and 138 KV feeder breakers opening.
2. The Train A DC power is lost when BRA-102 125VDC Distribution Cabinet circuit breaker 4 to Dist Cabinet BRA-104 trips open due to sensitivity to a lightning strike. (Premature trip)

These conditions result in start signal to the Emergency Diesel Generators. with DG A mechanical lockout due to the loss of control power. The Turbine-Driven AFW Pump will NOT start due to loss of DC power. Power is also lost to two Instrument Buses and the associated Instrument Channels (I, RED & IV, YELLOW). Train A equipment and valve indication is lost, and remote capability of operation of equipment is also lost.

DG B will run for a period before the ABNORMAL annunciator actuates, alerting the control room operator to a problem. Service Water valve SW-301/CV-31089 fails to open resulting in either a decision to manually shutdown the DG, or it will trip. A loss of all AC power occurs and ECA-0.1 will be implemented. Train A DC power will be made available. If DC power restored, the T/D AFW Pump will start, and DG A will start. The crew will determine the method to use for reenergizing Bus 5, and reenergize the Bus.

Time	Position	Applicant's Actions or Behavior
	CREW (cont.)	<ul style="list-style-type: none"> • If NOT actuated, check if SI is required: <ul style="list-style-type: none"> • Pr/r pressure <1815 psig • Pr/r level < 5% • RCS Subcooling (CETs) < 30°F • S/G pressures < 500 psig • CNMT pressure > 4 psig <p>Determine SI is actuated</p> <ul style="list-style-type: none"> • Announce. Safety Injection has occurred.
	BOP	<p>(NOTE: The alarm will actuate during performance of E-0. Actions associated with the DG B problem are listed here for simplicity in location.)</p> <p>Respond to 47091-F DIESEL GENERATOR ABNORMAL alarm</p> <ul style="list-style-type: none"> • Notify/Dispatch an operator to locally check DG B <p>Respond to Operator report on DG B temperature (alarm for High Water Temperature)</p> <ul style="list-style-type: none"> • Direct operator to locally verify open SW-301B <p>Respond to Operator report on SW-301B failure to open</p> <ul style="list-style-type: none"> • Notify CRS of loss of cooling to DG B
	CREW	<p>Make decision on stopping of DG B (considering resultant Loss of All AC condition)</p> <p>(NOTE: If DG B is not secured, it will trip.)</p>
		<p>NOTE: The further actions of E-0 are listed below in italics to the point where the loss of all AC condition may occur. How much of these actions performed (if any) is dependent on timing.</p>

Comments: _____

Op-Test No.: 1 Scenario No.: 1 Event No.: 5&6

Event Description: Due to lightning strikes:

1. A loss of offsite power occurs when one strike results in all 345 KV and 138 KV feeder breakers opening.
2. The Train A DC power is lost when BRA-102 125VDC Distribution Cabinet circuit breaker 4 to Dist Cabinet BRA-104 trips open due to sensitivity to a lightning strike. (Premature trip)

These conditions result in start signal to the Emergency Diesel Generators, with DG A mechanical lockout due to the loss of control power. The Turbine-Driven AFW Pump will NOT start due to loss of DC power. Power is also lost to two Instrument Buses and the associated Instrument Channels (I, RED & IV, YELLOW). Train A equipment and valve indication is lost, and remote capability of operation of equipment is also lost.

DG B will run for a period before the ABNORMAL annunciator actuates, alerting the control room operator to a problem. Service Water valve SW-301/CV-31089 fails to open resulting in either a decision to manually shutdown the DG, or it will trip. A loss of all AC power occurs and ECA-0.1 will be implemented. Train A DC power will be made available. If DC power restored, the T/D AFW Pump will start, and DG A will start. The crew will determine the method to use for reenergizing Bus 5, and reenergize the Bus.

Time	Position	Applicant's Actions or Behavior
	BOP	<p><i>Check Main Steamline Isolation</i></p> <ul style="list-style-type: none"> • Check high-high steam flow ($> 4.45 \times 10^6$ lb/hr) for S/G A(B) • Check high steam flow ($> 0.7 \times 10^6$ lb/hr) AND $T_{avg} < 540^\circ F$ for S/G A(B) • Check Containment pressure > 17 psig <p><i>Determine Steamline Isolation is not required</i></p>
	RO/BOP	<p><i>Verified Containment Spray NOT required:</i></p> <ul style="list-style-type: none"> • CNMT pressure remained below 23 psig <p><i>Determine/report CNMT Spray NOT required</i></p>
	BOP	<p><i>Verify Containment Cooling</i></p> <ul style="list-style-type: none"> • Fan Coil Units running (B train only) • Verify SW-903A-D CFCU SW Return Isolation valves open (C & D only indicated) • Check Containment pressure remained below 4 psig • May check RBV-150A-D CFCU Emergency Dampers remain shut <p><i>Verify Aux Bldg Special Vent running:</i></p> <ul style="list-style-type: none"> • Annunciator 47052-G ZONE SV BNDRY DAMPER NOT CLOSED not lit • Verify Zone SV fans [ASV-91A(B)/CD-34014(34015) ASV Exhaust Fan A(B) and Damper] running <p><i>Verify Service Water Pumps (B1, B2) running</i></p>

Comments: _____

Op-Test No.: 1 Scenario No.: 1 Event No.: 5&6

Event Description: Due to lightning strikes:

1. A loss of offsite power occurs when one strike results in all 345 KV and 138 KV feeder breakers opening.
2. The Train A DC power is lost when BRA-102 125VDC Distribution Cabinet circuit breaker 4 to Dist Cabinet BRA-104 trips open due to sensitivity to a lightning strike. (Premature trip)

These conditions result in start signal to the Emergency Diesel Generators, with DG A mechanical lockout due to the loss of control power. The Turbine-Driven AFW Pump will NOT start due to loss of DC power. Power is also lost to two Instrument Buses and the associated Instrument Channels (I, RED & IV, YELLOW). Train A equipment and valve indication is lost, and remote capability of operation of equipment is also lost.

DG B will run for a period before the ABNORMAL annunciator actuates, alerting the control room operator to a problem. Service Water valve SW-301/CV-31089 fails to open resulting in either a decision to manually shutdown the DG, or it will trip. A loss of all AC power occurs and ECA-0.1 will be implemented. Train A DC power will be made available. If DC power restored, the T/D AFW Pump will start, and DG A will start. The crew will determine the method to use for reenergizing Bus 5, and reenergize the Bus.

Time	Position	Applicant's Actions or Behavior
	BOP	<p><i>Verify Feedwater Isolation:</i></p> <ul style="list-style-type: none"> • <i>FW-7A and FW-7B Main FW Flow Control Valves closed</i> • <i>FW-10A and FW-10B Main FW Bypass Flow Control Valves closed</i> • <i>BOTH Feedwater Pumps off</i> <p><i>Verify AFW Pumps running:</i></p> <p><i>Identify/report AFW Pump B running</i></p> <p><i>May identify failure of Turbine Driven AFW Pump to start and manually attempt to start</i></p>
	RO	<p><i>Verify the CI Active Status Panel [11] lights lit</i></p> <p><i>Verify ECCS pumps running (B Train only):</i></p> <ul style="list-style-type: none"> • <i>SI pump</i> • <i>RHR pump</i> • <i>CC Pump</i>
	CREW	<ul style="list-style-type: none"> • <i>SI Active Status Panel [10] lights lit</i> <p><i>Report SI Active Status Panel lights lit for B Train equipment only</i></p>

Comments: _____

Op-Test No.: 1 Scenario No.: 1 Event No.: 5&6

Event Description:

Due to lightning strikes:

1. A loss of offsite power occurs when one strike results in all 345 KV and 138 KV feeder breakers opening.
2. The Train A DC power is lost when BRA-102 125VDC Distribution Cabinet circuit breaker 4 to Dist Cabinet BRA-104 trips open due to sensitivity to a lightning strike. (Premature trip)

These conditions result in start signal to the Emergency Diesel Generators, with DG A mechanical lockout due to the loss of control power. The Turbine-Driven AFW Pump will NOT start due to loss of DC power. Power is also lost to two Instrument Buses and the associated Instrument Channels (I, RED & IV, YELLOW). Train A equipment and valve indication is lost, and remote capability of operation of equipment is also lost.

DG B will run for a period before the ABNORMAL annunciator actuates, alerting the control room operator to a problem. Service Water valve SW-301/CV-31089 fails to open resulting in either a decision to manually shutdown the DG, or it will trip. A loss of all AC power occurs and ECA-0.1 will be implemented. Train A DC power will be made available. If DC power restored, the T/D AFW Pump will start, and DG A will start. The crew will determine the method to use for reenergizing Bus 5, and reenergize the Bus.

Time	Position	Applicant's Actions or Behavior
	RO	<i>Verify SI flow:</i> <ul style="list-style-type: none"> • If RCS pressure < 2100 psig: <ul style="list-style-type: none"> • SI flow indicated on FI-925 • Check RCS pressure < 150 and determine it is not
	BOP	<i>Verify total AFW flow > 200 gpm [410+102, 410+202]</i>
	RO	<i>Check RXCP Seal Cooling:</i> <ul style="list-style-type: none"> • CC Supply for Thermal Barrier Isolation Valves CC-600, CC-601A(B), CC-610A(B) and CC-612A(B) open • Thermal Barrier temperatures TI-610 and TI-614 normal • RXCP Bearing Temperatures TI-125 and TI-132 normal <i>Check RCS temperatures:</i> <ul style="list-style-type: none"> • RCS Average Temperature [TI-401-404, recorder 42554, computer trend] stable at or trending to 547°F (or RCS Cold Leg Temps [Recorder 42555 or computer trend] at or trending to 547°F is NO RXCP running)
	BOP	<ul style="list-style-type: none"> • If temperature < 547°F: <ul style="list-style-type: none"> • Stop dumping steam • Verify T/D AFW pump required (only AFW Pump running) • Control feed flow to > 200 gpm until one S/G NR level > 4%
		NOTE: This concludes the listing of actions of E-0. It is expected that a Loss of all AC condition will exist by this point.

Comments: _____

Op-Test No.: 1 Scenario No.: 1 Event No.: 5&6

Event Description: Due to lightning strikes:

1. A loss of offsite power occurs when one strike results in all 345 KV and 138 KV feeder breakers opening.
2. The Train A DC power is lost when BRA-102 125VDC Distribution Cabinet circuit breaker 4 to Dist Cabinet BRA-104 trips open due to sensitivity to a lightning strike. (Premature trip)

These conditions result in start signal to the Emergency Diesel Generators, with DG A mechanical lockout due to the loss of control power. The Turbine-Driven AFW Pump will NOT start due to loss of DC power. Power is also lost to two Instrument Buses and the associated Instrument Channels (I, RED & IV, YELLOW). Train A equipment and valve indication is lost, and remote capability of operation of equipment is also lost.

DG B will run for a period before the ABNORMAL annunciator actuates, alerting the control room operator to a problem. Service Water valve SW-301/CV-31089 fails to open resulting in either a decision to manually shutdown the DG, or it will trip. A loss of all AC power occurs and ECA-0.1 will be implemented. Train A DC power will be made available. If DC power restored, the T/D AFW Pump will start, and DG A will start. The crew will determine the method to use for reenergizing Bus 5, and reenergize the Bus.

Time	Position	Applicant's Actions or Behavior
	CREW	When either DG B is shutdown or trips, identify/report a loss of all AC condition
	CRS	Transition to ECA-0.0 "LOSS OF ALL AC POWER" Direct monitoring Critical Safety Function Status Trees for information only Direct action of ECA-0.0 (NOTE: A RED Path is expected to exist for Heat Sink due to loss of feed.)
	RO	Perform immediate operator actions of ECA-0.0 Verify reactor trip: <ul style="list-style-type: none"> • Reactor trip and Bypass breakers open • Neutron flux decreasing
	BOP	Perform immediate operator actions of ECA-0.0 Verify turbine trip by HP turbine impulse pressure trending to ZERO [PI-486]
	RO	Check RCS is isolated: <ul style="list-style-type: none"> • Przr PORVs PR-2A and 2B closed • Letdown isolation valves LD-4A, 4b and 4C closed • Excess letdown isolation valve LD-300 closed <ul style="list-style-type: none"> • If not closed, manually close valve

Comments: _____

Op-Test No.: 1 Scenario No.: 1 Event No.: 5&6

Event Description: Due to lightning strikes:

1. A loss of offsite power occurs when one strike results in all 345 KV and 138 KV feeder breakers opening.
2. The Train A DC power is lost when BRA-102 125VDC Distribution Cabinet circuit breaker 4 to Dist Cabinet BRA-104 trips open due to sensitivity to a lightning strike. (Premature trip)

These conditions result in start signal to the Emergency Diesel Generators, with DG A mechanical lockout due to the loss of control power. The Turbine-Driven AFW Pump will NOT start due to loss of DC power. Power is also lost to two Instrument Buses and the associated Instrument Channels (I, RED & IV, YELLOW). Train A equipment and valve indication is lost, and remote capability of operation of equipment is also lost.

DG B will run for a period before the ABNORMAL annunciator actuates, alerting the control room operator to a problem. Service Water valve SW-301/CV-31089 fails to open resulting in either a decision to manually shutdown the DG, or it will trip. A loss of all AC power occurs and ECA-0.1 will be implemented. Train A DC power will be made available. If DC power restored, the T/D AFW Pump will start, and DG A will start. The crew will determine the method to use for reenergizing Bus 5, and reenergize the Bus.

Time	Position	Applicant's Actions or Behavior
	RO (cont.)	<ul style="list-style-type: none"> Other RCS Vent Paths closed: <ul style="list-style-type: none"> PR-33A & 33B Pr/r Head Vents Train A(B) RC-45A & 45B Reactor Head Vent Train A(B) RC-46 Rx/Pr/r Head Vent to Pr/r Relief Tank RC-49 Rx/Pr/r Head Vent to Containment
	BOP	<p>Verify flow > 200 gpm</p> <ul style="list-style-type: none"> Verify T/D AFW Pump running <p>Identify/report T/D AFW pump is not running (if not done previously)</p> <ul style="list-style-type: none"> Verify open: <ul style="list-style-type: none"> MS-100A (no indication) MS-100B (open) MS-103 (open) MS-102 (closed with no indication) <p>Report inability to start T/D AFW pump</p>
	CREW	Dispatch operator to locally start and operate T/D AFW Pump
	BOP	<ul style="list-style-type: none"> Verify Proper alignment of AFW Valves <ul style="list-style-type: none"> Train B valves indicate proper alignment (AFW-10B, AFW-2B); Train A have no indication

Comments: _____

Op-Test No.: 1 Scenario No.: 1 Event No.: 5&6

Event Description: Due to lightning strikes:

1. A loss of offsite power occurs when one strike results in all 345 KV and 138 KV feeder breakers opening.
2. The Train A DC power is lost when BRA-102 125VDC Distribution Cabinet circuit breaker 4 to Dist Cabinet BRA-104 trips open due to sensitivity to a lightning strike. (Premature trip)

These conditions result in start signal to the Emergency Diesel Generators, with DG A mechanical lockout due to the loss of control power. The Turbine-Driven AFW Pump will NOT start due to loss of DC power. Power is also lost to two Instrument Buses and the associated Instrument Channels (I, RED & IV, YELLOW). Train A equipment and valve indication is lost, and remote capability of operation of equipment is also lost.

DG B will run for a period before the ABNORMAL annunciator actuates, alerting the control room operator to a problem. Service Water valve SW-301/CV-31089 fails to open resulting in either a decision to manually shutdown the DG, or it will trip. A loss of all AC power occurs and ECA-0.1 will be implemented. Train A DC power will be made available. If DC power restored, the T/D AFW Pump will start, and DG A will start. The crew will determine the method to use for reenergizing Bus 5, and reenergize the Bus.

Time	Position	Applicant's Actions or Behavior
	BOP (cont.)	<p>Restore power to Bus 5 or Bus 6:</p> <ul style="list-style-type: none"> • Energize Bus with DG <p>Direct operator to check DG A (if not done previously)</p> <p>Report inability to start either DG</p>
	CREW	<ul style="list-style-type: none"> • Check Bus 5 or Bus 6 energized • Inform System Operating of urgency of restoring offsite power • Start action to obtain portable power and water sources
	CRS	Direct Maintenance to expedite investigation/repairs to DGs
	CREW	<p>Place Equipment C/Ss in PULLOUT:</p> <ul style="list-style-type: none"> • SI Pump A and B • Containment Spray Pump A and B • RHR Pumps A and B • Component Cooling Pumps A and B • Charging Pumps • AFW Pump B • Containment Fan Coil Units

Comments: _____

Op-Test No.: 1 Scenario No.: 1 Event No.: 5&6

Event Description: Due to lightning strikes:

1. A loss of offsite power occurs when one strike results in all 345 KV and 138 KV feeder breakers opening.
2. The Train A DC power is lost when BRA-102 125VDC Distribution Cabinet circuit breaker 4 to Dist Cabinet BRA-104 trips open due to sensitivity to a lightning strike. (Premature trip)

These conditions result in start signal to the Emergency Diesel Generators, with DG A mechanical lockout due to the loss of control power. The Turbine-Driven AFW Pump will NOT start due to loss of DC power. Power is also lost to two Instrument Buses and the associated Instrument Channels (I, RED & IV, YELLOW). Train A equipment and valve indication is lost, and remote capability of operation of equipment is also lost.

DG B will run for a period before the ABNORMAL annunciator actuates, alerting the control room operator to a problem. Service Water valve SW-301/CV-31089 fails to open resulting in either a decision to manually shutdown the DG, or it will trip. A loss of all AC power occurs and ECA-0.1 will be implemented. Train A DC power will be made available. If DC power restored, the T/D AFW Pump will start, and DG A will start. The crew will determine the method to use for reenergizing Bus 5, and reenergize the Bus.

Time	Position	Applicant's Actions or Behavior
	CREW (cont)	Dispatch personnel to locally restore emergency AC power
	BOP	<p>Check S/G isolation:</p> <ul style="list-style-type: none"> • FW-7A and 7B closed (S/G A(B) Main Feedwater Flow control valves) • FW-10A and 10B closed (S/G A(B) Main Feedwater Bypass Flow control valves) • BT-3A and 3B closed (S/G A(B) Blowdown Isolation) • MS-1A and 1B closed (S/G A(B) MSIV) • MS-2A and 2B closed (S/G A(B) MSIV Bypass Valves) <p>Verify power to Bus 46 by verifying TSC DG running and Bus 46 energized [Bkr 14604]</p> <p>Place Bus 5 Voltage Restoring Mode Selector to MAN</p> <p style="text-align: center;"><i>Field</i></p>
		<p>NOTE: At this point a radio call from the field ⁰²⁸ will come in concerning status of Train A DC power. The operator (and Electrician Supv. if required) will indicate BRA-102 circuit breaker 4 is tripped with no apparent cause. All electrical equipment associated with Bus appears to be fine. If pressed, Electrician states noted historical problem with the CB tripping early, and probably did so when the lightning strike took out the AC power.</p>
	CREW	Respond to call about Train A DC power BRA-102 CB 4
	CRS	Make decision about closure of BRA-102 CB 4

Comments: _____

Op-Test No.: 1 Scenario No.: 1 Event No.: 5&6

Event Description: Due to lightning strikes:

1. A loss of offsite power occurs when one strike results in all 345 KV and 138 KV feeder breakers opening.
2. The Train A DC power is lost when BRA-102 125VDC Distribution Cabinet circuit breaker 4 to Dist Cabinet BRA-104 trips open due to sensitivity to a lightning strike. (Premature trip)

These conditions result in start signal to the Emergency Diesel Generators, with DG A mechanical lockout due to the loss of control power. The Turbine-Driven AFW Pump will NOT start due to loss of DC power. Power is also lost to two Instrument Buses and the associated Instrument Channels (I, RED & IV, YELLOW). Train A equipment and valve indication is lost, and remote capability of operation of equipment is also lost.

DG B will run for a period before the ABNORMAL annunciator actuates, alerting the control room operator to a problem. Service Water valve SW-301/CV-31089 fails to open resulting in either a decision to manually shutdown the DG, or it will trip. A loss of all AC power occurs and ECA-0.1 will be implemented. Train A DC power will be made available. If DC power restored, the T/D AFW Pump will start, and DG A will start. The crew will determine the method to use for reenergizing Bus 5, and reenergize the Bus.

Time	Position	Applicant's Actions or Behavior
	CREW	Direct closure of CB 4
	CREW	Verify/Report DG A start Verify/report T/D AFW Pump start
	CRS	Direct restoration of power to Bus 5: <ul style="list-style-type: none"> • Direct placing of Bus 5 Voltage Restoring Mode Selector to AUTO OR <ul style="list-style-type: none"> • Direct manual closure of Breaker 1-509 DG A to Bus 5
	BOP	Energize Bus 5: <ul style="list-style-type: none"> • Place Bus 5 Voltage Restoring Mode Selector to AUTO • Verify closure of Breaker 1-509 DG A to Bus 5 OR <ul style="list-style-type: none"> • Verify all Bus 5 Supply breakers open [1-509, 1-503, 1-511, 1-501, 1-510] • Place Breaker 1-509 DGA to Bus 5, 43 switch to MAN • Place Beaker 1-509 Synch Switch to ON • Close Breaker 1-509 <ul style="list-style-type: none"> • Start one Train A Service Water Pump • Direct local operator to verify SW-301A SW from DG 1A HX open • Place Beaker 1-509 Synch Switch to ON • Place Breaker 1-509 DGA to Bus 5, 43 switch to MAN
	[CT] ECA-0.0 — F	Start one Train A Service Water Pump (if not already started)

Comments: _____

Op-Test No.: 1 Scenario No.: 1 Event No.: 5&6

Event Description: Due to lightning strikes:

1. A loss of offsite power occurs when one strike results in all 345 KV and 138 KV feeder breakers opening.
2. The Train A DC power is lost when BRA-102 125VDC Distribution Cabinet circuit breaker 4 to Dist Cabinet BRA-104 trips open due to sensitivity to a lightning strike. (Premature trip)

These conditions result in start signal to the Emergency Diesel Generators, with DG A mechanical lockout due to the loss of control power. The Turbine-Driven AFW Pump will NOT start due to loss of DC power. Power is also lost to two Instrument Buses and the associated Instrument Channels (I, RED & IV, YELLOW). Train A equipment and valve indication is lost, and remote capability of operation of equipment is also lost.

DG B will run for a period before the ABNORMAL annunciator actuates, alerting the control room operator to a problem. Service Water valve SW-301/CV-31089 fails to open resulting in either a decision to manually shutdown the DG, or it will trip. A loss of all AC power occurs and ECA-0.1 will be implemented. Train A DC power will be made available. If DC power restored, the T/D AFW Pump will start, and DG A will start. The crew will determine the method to use for reenergizing Bus 5, and reenergize the Bus.

Time	Position	Applicant's Actions or Behavior
	CRS	When Bus 5 power is restored, go to step 31 to initiate recovery actions
	BOP	Stabilize S/G pressures by manually controlling S/G PORVs [HC-468, HC-478]
	CREW	Reset SI if actuated Verify equipment on AC Bus 5: <ul style="list-style-type: none"> • 4160V Bus 5 • 480 V Bus 51 (Bus 52 is powered from TSC DG) • Instrument Bus I and Bus IV • Battery Chargers BRA-108 • Communications (Gaitronics available)
	BOP	Verify Service Water System operation: <ul style="list-style-type: none"> • Direct operator to locally verify SW-301A is open (if not already performed) • Verify SW Pumps running (at least one)
	CREW	Select Recovery Procedure: <ul style="list-style-type: none"> • Check RCS subcooling based on CETs > 30°F • Check Pr/r level > 5% • Check SI equipment NOT auto actuated (NO SI equipment operating)

Comments: _____

Op-Test No.: 1 Scenario No.: 1 Event No.: 5&6

Event Description: Due to lightning strikes:

1. A loss of offsite power occurs when one strike results in all 345 KV and 138 KV feeder breakers opening.
2. The Train A DC power is lost when BRA-102 125VDC Distribution Cabinet circuit breaker 4 to Dist Cabinet BRA-104 trips open due to sensitivity to a lightning strike. (Premature trip)

These conditions result in start signal to the Emergency Diesel Generators, with DG A mechanical lockout due to the loss of control power. The Turbine-Driven AFW Pump will NOT start due to loss of DC power. Power is also lost to two Instrument Buses and the associated Instrument Channels (I, RED & IV, YELLOW). Train A equipment and valve indication is lost, and remote capability of operation of equipment is also lost.

DG B will run for a period before the ABNORMAL annunciator actuates, alerting the control room operator to a problem. Service Water valve SW-301/CV-31089 fails to open resulting in either a decision to manually shutdown the DG, or it will trip. A loss of all AC power occurs and ECA-0.1 will be implemented. Train A DC power will be made available. If DC power restored, the T/D AFW Pump will start, and DG A will start. The crew will determine the method to use for reenergizing Bus 5, and reenergize the Bus.

Time	Position	Applicant's Actions or Behavior
	CRS	Transition to ECA-0.1 "LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED"
		Evaluate Critical Safety Function Status Trees
	CRS	Direct action of ECA-0.1
	RO [CT] ECA-0.0 — H	<p>Check RXCP Seal Isolation Status:</p> <ul style="list-style-type: none"> • CV-201A and B Seal Supply Line Filter A(B) Inlet closed <ul style="list-style-type: none"> • Direct operator to locally verify/close CVC-201A and CVC-201B • CC-613A and B RXCP CC Return Manual Isolation valves closed <ul style="list-style-type: none"> • Manually close CC-612A • Direct operator to locally close CC-613A <p>Verify Containment Isolation not actuated by annunciators 47021-C and 47021-D CI TRAIN A(B) ACTUATED not lit</p>
	CREW	<p>Manually load following equipment:</p> <ul style="list-style-type: none"> • Check At least one Air Compressor running • Check Air header pressure >60 psig [4150101/4150103] • Check Instrument Air to Containment Isol IA-101 open

Comments: _____

Op-Test No.: 1 Scenario No.: 1 Event No.: 5&6

Event Description: Due to lightning strikes:

1. A loss of offsite power occurs when one strike results in all 345 KV and 138 KV feeder breakers opening.
2. The Train A DC power is lost when BRA-102 125VDC Distribution Cabinet circuit breaker 4 to Dist Cabinet BRA-104 trips open due to sensitivity to a lightning strike. (Premature trip)

These conditions result in start signal to the Emergency Diesel Generators, with DG A mechanical lockout due to the loss of control power. The Turbine-Driven AFW Pump will NOT start due to loss of DC power. Power is also lost to two Instrument Buses and the associated Instrument Channels (I, RED & IV, YELLOW). Train A equipment and valve indication is lost, and remote capability of operation of equipment is also lost.

DG B will run for a period before the ABNORMAL annunciator actuates, alerting the control room operator to a problem. Service Water valve SW-301/CV-31089 fails to open resulting in either a decision to manually shutdown the DG, or it will trip. A loss of all AC power occurs and ECA-0.1 will be implemented. Train A DC power will be made available. If DC power restored, the T/D AFW Pump will start, and DG A will start. The crew will determine the method to use for reenergizing Bus 5, and reenergize the Bus.

Time	Position	Applicant's Actions or Behavior
	CREW (cont.)	<ul style="list-style-type: none"> • Start CC Pump <ul style="list-style-type: none"> • Check open CC-6A or CC-6B CC HX outlet • Start CC Pump A
	RO	<ul style="list-style-type: none"> • Start one Charging Pump <ul style="list-style-type: none"> • Verify Bus 52 energized • Verify Bus 32 or Bus 42 energized <ul style="list-style-type: none"> • Open CVC-301 RWST Supply to Charging Pumps • Close CVC-1 VCT Supply to Charging Pumps • Check CV-7 and CV-11 Charging Line Flow Control and Isolation valves OPEN <p>Report CV-7/Charging header isolated due to leak</p>
	CREW	Evaluate starting Charging Pump
		NOTE: Scenario can be terminated at this point without decision being made about starting Charging Pump.)

Comments: _____

Facility: Kewaunee Scenario No.: 2 Op-Test No.: 1

Examiners: _____ Operators: _____ SRO
 _____ RO
 _____ BOP

Initial Conditions: IC-12: 100% power, middle of cycle (MOC)

SG02A, 1% - S/G tube leak 0.5 gpm

Radiation monitors R-15 and R-19 readings are rising

Align systems to minimize secondary plant contamination (A-RC-36D)

Przr level channel LT-426 reads 0% and is removed from service per A-MI-87 (provided)

Turnover: The plant is at 100% power. S/G tube leak has been identified in S/G A. A-RC-36D has been implemented and all required actions have been completed. Monitoring of the leak rate (as directed in A-RC-36D) is continuing. The leak rate was 70 gpd but has been determined that over the past hour the rate has increased to approximately 700 gpd (0.5 gpm). Operations Management has confirmation and directs the Action Level 3 requirements of RCC-088 be initiated. Directions are to backdown load to $\leq 50\%$ within the next hour and to achieve HOT SHUTDOWN within the next 2 hours

Equipment Out of Service: AFW Pump B

RHR Pump B

Przr level channel I LT-426 has failed

Event No.	Malf. No.	Event Type*	Event Description
Preload	ED10A, 80%		Train A Sequencer fails after step 1 (SI Pump)
Preload	FW15A, 100%		AFW Pump A motor winding failure (Overcurrent trip)
1	—	N BOP SRO	Plant backdown due to tube leak
		R RO	Decrease reactor power using rods and/or boration
2	SO1 - 4, 100% (CV204)	I RO SRO	VCT level channel LT-112 fails high
3	SO2 - 14, 100% (RX211)	I BOP SRO	S/G A Controlling Level Channel (LT-461) Fails High
4	I/O 43304-01 AUTO RC09A	C RO SRO	Przr Spray valve (PS-1A) fails open
5	S/G01B, 7%	M BOP RO SRO	S/G Tube Rupture of 350 gpm occurs in S/G B (opposite S/G from one with tube leak)
6	(FW15A, 100%)	-- -----	AFW Pump A trips due to motor winding failure
7	(ED10A, 80%)	C RO BOP SRO	ESF Train A sequencer fails after completion of step 2 (loading SI Pump) (RHR Pump A and Train A Zone SV Fan affected)

*(N)ormal, (R)activity (I)nsrument, (C)omponent, (M)ajor Transient

SCENARIO 1-2

NOTES TO SIMULATOR OPERATOR:

1. Initialize to IC-12 and enter the following:
 - Enter MALF SG02A, 1% for tube leak of 0.5 gpm in S/G A
 - Run Simulator until radiation levels for S/G A cause rising trend on R-15 and R-19
2. For Przr level channel I, LT-426 OOS
 - Ensure Przr Level Control Channel Selector is in 2-3 position
 - Place sticker on meter
 - Enter System Override: SO2-7 (RX204) Przr level LT-426, 0%
 - Enter Remote Function: RP4-7 (RP153) 426A – HIGH LEVEL TRIP
3. PULL-OUT AFW Pump B C/S, 46112 and TAG
4. PULL-OUT RHR Pump B C/S, 46304 and TAG
5. In Event 3, trip bistables when directed with following Remote Functions:
 - RP5-7 (RP170) 461B – LO/LO LEVEL LOGIC
 - RP5-6 (RP169) 461A – HI LEVEL LOGICIf crew shows hesitance or contacts Operations Management in reference to tripping bistable, direct tripping within one hour, as part of commitment.
6. In Event 4, the I/O Override [43304-1 AUTO] must be input and active prior to input of MALF [RC09A] to ensure the operator cannot take manual control of the Spray Valve when it fails open.
7. In event 6, if directed to check AFW Pump A trip. Report Overcurrent trip occurred. No apparent damage visible. Electricians are troubleshooting cause.
8. In event 5, when crew is in E-3, if directed to close Main Steam Header B (If correct S/G identified) Trap 9 Inlet & Bypass Valves TD-1-9 & TD-3-9, report approximately 2 minutes later that valves are closed.

SCENARIO 1-2 OVERVIEW

Event 1 - The plant is at 100% power with an identified primary to secondary leakage in S/G A of 70 gpd existing over the past several weeks. All actions of A-RC-36D have been performed and leak monitoring is continuing as directed by the procedure. Just prior to shift turnover, Chemistry reported confirmation of an increase in leakage up to 700 gpd. Operations Management has directed that Action Level 3 requirements of RCC-088 be implemented (as directed in A-RC-36D), and that a plant backdown be commenced with power reduced to < 50% in ONE hour and the plant be in HOT SHUTDOWN within the following TWO hours. The operators will commence a plant backdown following turnover at a rate to meet the required power level requirements.

Event 2 - Following clearly observable plant response from the reactivity changes, VCT level channel LT-112 fails high diverting letdown flow to the CVC HUT via LD-27. VCT level will drop and auto makeup will NOT be available. The operator respond to annunciator 47043-L, VCT LEVEL HIGH/LOW, and will determine that manual control of makeup to the VCT is required. The operator may also take manual control of LD-27, placing its control switch in the "VCT" position to restore normal letdown to the VCT. Again manual control of VCT level is required.

Event 3 - Following restoration of Przr level and stabilization of charging flows, S/G A controlling level channel will fail high. S/G A Feedwater control valve FW-7A will start to close and the operators should respond to annunciators 47064-B, S/G A LEVEL HIGH (due to failed channel) and 47062-A, S/G A PROGRAM LEVEL DEVIATION, and place valve FW-7A to manual to manually control S/G level at program level.

Event 4 - After the bistables are tripped for the failed S/G level channel, the Przr spray valve (PS-1A) will fail open and stick open. The operator is alerted by annunciators 47043-C PRESSURIZER CONTROL PRESS ABNORMAL and 47043-D PRESSURIZER LOW PRESSURE. The operator should attempt to manually close the spray valve, and trip the reactor when it cannot be closed. Following the reactor trip, RXCP A should be stopped (or SI actuated as Przr pressure continues to drop to 1830 psig). E-0 should be entered and the immediate actions performed. (NOTE: RXCP A may not be stopped until directed in E-0.)

Event 5,6&7 - Concurrent with the reactor trip, S/G B will experience a large tube rupture (~ 350 gpm). This will require SI actuation (if not already actuated) based on inability to maintain Przr level (above 5%). The ESF Train A sequencer will fail at step 2 of equipment loading, having loaded only SI Pump A. The operator is alerted to the condition by the SI ACTIVE Panel lights that remain NOT lit for the components NOT started. The operators are expected to manually start components including RHR Pump A, RHR Pump A Pump Pit Fan Coil Unit (starts when pump is started), and Zone SV Exhaust Fan A. Also, AFW Pump A will trip due to motor winding failure (O/C trip), leaving the turbine-driven AFW pump as the only source of feed to the S/Gs. If not already performed, RXCP A should be stopped as directed at step 19.b (CA) with the spray valve open. Transition from E-0 is made to E-3 at step 22. The operators should use the information from previous S/G status and the changes involved in S/G B to determine S/G B (at least) has ruptured tube(s). Some of the indications include abnormal rise in S/G B level, high (rising) radiation level on R-33 [R-3] for S/G A should remain stable. (The operators may choose to isolate both S/Gs based on radiation indications, but must maintain steam supply from one S/G open to turbine-driven AFW Pump as directed in CAUTION.) S/G A should be selected to supply steam to the turbine-driven AFW. Once the required cooldown is completed, the crew will depressurize the RCS. Depressurization will be accomplished using a Przr PORV since Przr spray flow will be ineffective. The scenario terminates following depressurization of RCS and evaluation of SI termination status at step 24 of E-3.

SCENARIO 1-2 OVERVIEW (CONT.)

Critical Tasks

1. SGWLC A: Prevent a Rx Trip by shifting S/G A level control to manual and controlling level manually [Event 3]
2. E-3 — A: Isolate feedwater flow into and steam flow from the ruptured SG before transition to ECA-3.1 occurs.
3. E-3 — B: Establish/maintain RCS temperature so that transition from E-3 does not occur because RCS temperature results in 1) loss of subcooling or 2) RED or ORANGE path occurs on SUBCRITICALITY or INTEGRITY.
4. E-3 — C: Depressurize the RCS until either: 1) Przr level is >74%; OR, 2) RCS subcooling (CETs) is <30°F [65°F ADVERSE]; OR, 3) RCS pressure is < ruptured SG pressure and Przr level is >5% [30% ADVERSE] before 96% level is reached in ruptured SG.

Op-Test No.: 1 Scenario No.: 2 Event No.: 1

Event Description: Backdown load to $\leq 50\%$ within the one hour.

Time	Position	Applicant's Actions or Behavior
	CUE:	Turnover direction of increased S/G A tube leakage with implementation of Action Level 3 requirements of RCC-088 "Primary-to-Secondary Leak Rate Data". Directions state reduce load to $\leq 50\%$ within the next hour and be in HOT SHUTDOWN within the following 2 hours.
	CRS	Implement actions of N-0-03, step 4.3.1 Review A-RC-36D/RCC-088
	CRS	Direct plant backdown to be $\leq 50\%$ within the next hour.
	CREW	Review applicable Precautions, and Limitations and Actions.
	CREW	Direct operator to stop boric acid injection to S/Gs per N-CI-28 Direct operator to align AFW Hydrazine System per N-CI-28
	RO	Perform reactivity estimate based on planned load decrease (if required).
	BOP	<i>(NOTE: Items in italics are actions that <u>may</u> be performed depending on conditions and operator choice.)</i> Decrease load per N-TB-54: <ul style="list-style-type: none"> • Review applicable Precautions & Limitations • Determine maximum unloading rate per Figures 2 & 3 • Set setter to desired load (<i>50%</i>) • Verify/set loading rate to appropriate rate for required backdown (<i>1%/min.</i>) • Inform GenCo of rate and amount of load reduction • Depress GO • Verify load decreases • Maintain Reactive load within limits of Figure 5
	RO	Perform reactivity adjustments: Rod Control (inward motion at 1.5°F difference Tave-Tref) AND/OR Boron Concentration Control (initiate boration) per N-CV-35A <ul style="list-style-type: none"> • Review applicable Precautions & Limitations • Verify at least one RXCP in operation.

Comments: _____

Op-Test No.: 1 Scenario No.: 2 Event No.: 1

Event Description: Backdown load to $\leq 50\%$ within the one hour.

Time	Position	Applicant's Actions or Behavior
	RO (cont.)	<ul style="list-style-type: none"> Determine rate and magnitude of boration. Position Reactor Makeup Mode Selector to BORATE Adjust CVC-403/CV-31092, Blender Control BA Flow, to required flow rate. Set Boric Acid Totalizer to required quantity. Position Reactor Makeup Control switch to START. Verify required change has been achieved by monitoring: <ul style="list-style-type: none"> Rod Position Boron Concentration Tave When boration is complete: <ul style="list-style-type: none"> Close CVC-406/CV-31904 BA Blender to VCT. Perform 20 gallon Alternate Dilute Position CVC-406 to AUTO <p><i>Alternate Dilution actions (to flush lines):</i></p> <ul style="list-style-type: none"> Position Reactor Makeup Mode Selector to ALT DIL. Adjust MU-1022/CV-31095, Blender Control Rx Mu Flow, to desired flow rate. Set Rx Make-up Totalizer to 20 gal. Position Reactor Makeup Control switch to START. When dilution is complete: <ul style="list-style-type: none"> Position Reactor Makeup Mode Selector to AUTO. Position Reactor Makeup Control switch to START. Adjust CVC-403/CV-31092, Blender Control BA Flow, to current RCS boron concentration. If RCS boron concentration has been changed by >50 ppm, operate Przr heaters as necessary to equalize RCS and Przr boron.
	BOP	Adjust Heater Drain Pump speed as required to maintain equal loading on pumps
		NOTE: Following the required plant response, Event 2 may be started.

Comments: _____

Op-Test No.: 1 Scenario No.: 2 Event No.: 2

Event Description: VCT level channel LT-112 fails high to 100%. In AUTO the VCT Divert To CVC HUT valve, LD-27 will open to divert letdown flow to the CVC HUT. Actual VCT level will fall. AUTO makeup to the VCT will NOT occur since it is controlled by LT-112. If actual VCT level is lost, the running Charging Pumps will trip due to cavitation. Manual control of VCT level will be required either using singly or in combination, manual makeup to the VCT using the reactor makeup control in MAN, and/or manual operation of LD-27 to restore letdown to the VCT.

Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciator alarm: 47043-L VCT LEVEL HIGH LOW (Computer Point L0112A) LT-112 indication at 100% LT-141 indication at actual VCT level and dropping Amber indication for LD-27 indicating divert to CVC HUT
	RO/CRS	Identify/report increase LT-112 VCT level indication at 100% and alternate channel LT-141 near expected VCT level and dropping.
	CRS	Direct action per Alarm Response Sheet
	RO	<ul style="list-style-type: none"> Check VCT level: <ul style="list-style-type: none"> IF level is high (as indicated by LT-112), verify LD27/CV-31906 is open diverting flow to CVC Holdup Tanks <p>Determine actual level is decreasing</p>
	CRS	<p>Direct Manual Control of valve LD-27</p> <p>AND/OR</p> <p>Direct manual makeup to VCT to maintain normal level</p>
	RO	<p>If directed, Place LD-27 in VC TK position</p> <p>Monitor VCT level using LT-141</p> <p>If required, initiate manual makeup to VCT to maintain level between 17% and 28%:</p> <ul style="list-style-type: none"> Determine the total amount of blended water required Position Reactor Makeup Mode Selector to MANUAL

Comments: _____

Op-Test No.: 1 Scenario No.: 2 Event No.: 2

Event Description: VCT level channel LT-112 fails high to 100%. In AUTO the VCT Divert To CVC HUT valve, LD-27 will open to divert letdown flow to the CVC HUT. Actual VCT level will fall. AUTO makeup to the VCT will NOT occur since it is controlled by LT-112. If actual VCT level is lost, the running Charging Pumps will trip due to cavitation. Manual control of VCT level will be required either using singly or in combination, manual makeup to the VCT using the reactor makeup control in MAN, and/or manual operation of LD-27 to restore letdown to the VCT.

Time	Position	Applicant's Actions or Behavior
	RO (Cont.)	<ul style="list-style-type: none"> Using RD 2.1 (Oper Aid 96-3), adjust CVC-403/CV-31092 Blender Control BA flow to required flow rate Align makeup to VCT by opening CVC-406/CV-31094 BA Blender to VCT <ul style="list-style-type: none"> If required open CVC-408/CV-30193 BA Blender to Charging Pumps Position Reactor Makeup Control Switch to ON Verify proper boron concentration using: <ul style="list-style-type: none"> CVCS BA & MU flow recorder Boric Acid Tank level change to BA Totalizer change Source Range count rate Change in Tave Control Rod motion When the amount of blended flow has been achieved: <ul style="list-style-type: none"> Restore valves CVC-406 and/or CVC-408 to closed and AUTO If desired, position Reactor Makeup Mode Selector to AUTO If desired, position Reactor Makeup Control Switch to ON Adjust CVC-403 to match current RCS boron concentration

Comments: _____

Op-Test No.: 1 Scenario No.: 2 Event No.: 3

Event Description: S/G A controlling level channel, LI-461, fails high. Feedwater flow and S/G level will decrease in response to FW-7A throttling closed in attempt to restore level. The operator is required to take manual control of FW-7A and restore level to reference value.

Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciator alarms: 47064-B S/G A LEVEL HIGH 47062-A S/G A PROGRAM LEVEL DEVIATION 47062-B S/G A BYPASS CV LEVEL DEVIATION S/G A level indication LI-461 at top of scale Unexpected decrease in S/G A actual level LI-462/463 Decreasing S/G A feedwater flow FI-466/467 FW-7A stroking closed Stable S/G A steam flow FI-464/465 Stable turbine load
	BOP/CRS	Identify/report failed S/G A level channel L-461
	BOP [CT] SGWLC A	Take FW-7A S/G A Main FW Flow Control Valve to MAN and adjust to restore level to program (44%)
	CRS	Implement Alarm Response Sheet, A-MI-87 "Bistable Tripping for Failed Reactor Protection or Safeguards Inst.". Attachment I "LT-461 STEAM GENERATOR LEVEL RR-109" – "REMOVAL FROM SERVICE", and direct operator action.
	BOP/CRS	Direct actions to remove LT-461 from service: <ul style="list-style-type: none"> • Direct I&C to perform SP 47-316C to check redundant channel bistable contacts for LT-461 removal from service. • Direct performance/verification of prerequisite lineup of "Removal From Service". • Direct I&C to enter Relay Rack RR-109 and trip associated bistables for LT461.
	BOP/RO	Position FW-7A S/G A Main FW Flow Control Valve to MAN and verify action Position FW-10A S/G A Bypass FW Flow Control Valve to MAN

Comments: _____

Op-Test No.: 1 Scenario No.: 2 Event No.: 3

Event Description: S/G A controlling level channel, LI-461, fails high. Feedwater flow and S/G level will decrease in response to FW-7A throttling closed in attempt to restore level. The operator is required to take manual control of FW-7A and restore level to reference value.

Time	Position	Applicant's Actions or Behavior
	BOP	<ul style="list-style-type: none">Following tripping of bistables, verify the following:<ul style="list-style-type: none">Annunciator 47064-A S/G A LEVEL LOW LOW in alarmAnnunciator 47064-B S/G A LEVEL HIGH in alarm44907-1101 S/G A Low-Low Level Status Light lit44908-0801 S/G A Hi-Hi Level Status Light lit
	CRS	<p>Review Technical Specification 3.5.b & c:</p> <ul style="list-style-type: none">Table 3.5-2:<ul style="list-style-type: none">No. 12 Lo-Lo Steam Generator Water LevelDetermine continued operation acceptable (2 channels/loop required OPERABLE)Table TS 3.5-3:<ul style="list-style-type: none">No. 4.a. MDAFW Pumps Either S/G LO-LO levelNo. 5.a. TDAFW Pump Both S/G LO-LO levelDetermine continued operation acceptable (2 channels required OPERABLE)Table TS 3.5-4:<ul style="list-style-type: none">No. 4.a. Hi-Hi Steam Generator Level Main Feedwater IsolationDetermine continued operation acceptable (2 channels required OPERABLE)
	CRS	Inform I&C to investigate Steam Generator level channel LT-461 failure/status.

Comments: _____

Op-Test No.: 1 Scenario No.: 2 Event No.: 4

Event Description: Przr Spray Valve PS-1A from Loop A fails open. Manual control of the spray valve does not function. This results in decreasing RCS pressure that can only be stopped when RXCP A (supply flow through the spray valve) is stopped. The reactor must be tripped and the RXCP stopped. Safety Injection will actuate if RCS pressure continues to fall (with the RXCP running).

Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciators: 47043-C PRESSURIZER CONTROL PRESS ABNORMAL 47043-D PRESSURIZER PRESSURE LOW Decreasing Przr pressure Pressurizer Spray Valve RED light (OPEN) indication on Controller with Przr pressure low Pressurizer Spray Valve RED light (OPEN) indication on Controller when attempt made to close valve
	RO/CRS	Identify/report RCS pressure dropping Identify/report Przr Spray valve PS-1A open
	RO	Take Loop A-PS-1A controller [HC-431C] to MAN and attempt to close valve Report failure of PS-1A to close
	CRS	Implement Alarm Response Sheets and direct operator action.
	RO	Verify PS-1A and PS-1B Przr Spray Control Loop A(B) closed Verify Przr heaters on Report PS-1A will not close Monitor RCS conditions. trip reactor and actuate SI if: • RCS Subcooling (CETs) < 30°F OR • Przr level cannot be maintained < 5%
	CREW	Determine continued operator of RXCP A will result in reactor trip and SI
	CRS	Direct manual trip the reactor and stopping of RXCP A

Comments: _____

Op-Test No.: 1 Scenario No.: 2 Event No.: 4

Event Description: Prxr Spray Valve PS-1A from Loop A fails open. Manual control of the spray valve does not function. This results in decreasing RCS pressure that can only be stopped when RXCP A (supply flow through the spray valve) is stopped. The reactor must be tripped and the RXCP stopped. Safety Injection will actuate if RCS pressure continues to fall (with the RXCP running).

Time	Position	Applicant's Actions or Behavior
	RO	Manually trip reactor by depressing reactor trip pushbutton [46285] Stop RXCP A and place S/S in PULLOUT

Comments: _____

Op-Test No.: 1 Scenario No.: 2 Event No.: 5, 6 & 7

Event Description: When the reactor is tripped, a S/G tube rupture of 350 gpm occurs in S/G B (opposite of the S/G with the leak). SI will be manually actuated or will automatically occur on low Przr pressure. When the AFW Pump start signal is generated, AFW Pump A will trip on an overcurrent condition resulting from motor winding failure. The T/D AFW Pump is the only available source for feeding the S/Gs. The Train A ESF sequencer will halt after the SI Pump A is started (step 2). The operators will be required to manually start the remaining Train A ECCS and ESF components not started.

Time	Position	Applicant's Actions or Behavior
	CUE:	SGTR: Numerous annunciators Decreasing Przr pressure Decreasing Przr level Increasing S/G A level Increasing radiation levels on R-15 and R-19, also R-33 Trip of AFW Pump A Annunciator: 47092-I BUS 5 FEEDER BKR TRIP (SER Point 712) AFW Pump A C/S trip indication ZERO indicated AFW Pump A HDR A flow 4104101 ZERO indicated AFW Pump A Disch Pressure 4104102 Failure of Train A Sequencer: Following components GREEN (STOP) lights lit and SI Active Status Panel light not lit following sequencing operation: <ul style="list-style-type: none"> • RHR Pump A [RHR PUMP A ON] • RHR Pump A Pump Pit Fan Coil Unit [RHR PUMP FAN COIL A ON] • SBV Exhaust Fan A & Discharge Damper [SBV EXH FAN A DISCH DAMPER OPEN]
	CRS	Implement E-0 "REACTOR TRIP OR SI"
	RO	Perform immediate operator actions of E-0 Verify reactor trip: <ul style="list-style-type: none"> • Reactor trip & bypass breakers open • Rod Position Indicators read ZERO • Rod bottom lights LIT • Neutron flux decreasing

Comments: _____

Op-Test No.: 1 Scenario No.: 2 Event No.: 5, 6 & 7

Event Description: When the reactor is tripped, a S/G tube rupture of 350 gpm occurs in S/G B (opposite of the S/G with the leak). SI will be manually actuated or will automatically occur on low Przr pressure. When the AFW Pump start signal is generated, AFW Pump A will trip on an overcurrent condition resulting from motor winding failure. The T/D AFW Pump is the only available source for feeding the S/Gs. The Train A ESF sequencer will halt after the SI Pump A is started (step 2). The operators will be required to manually start the remaining Train A ECCS and ESF components not started.

Time	Position	Applicant's Actions or Behavior
	BOP	<p>Perform immediate operator actions of E-0</p> <p>Verify Turbine Trip:</p> <ul style="list-style-type: none">• HP turbine impulse pressure PI-485/486 trending toward ZERO• All turbine STOP VALVES closed <p>Verify power to Emergency AC Busses</p> <ul style="list-style-type: none">• Bus 5 energized• Bus 6 energized
	CREW	<p>Perform immediate operator actions of E-0</p> <p>Determine SI needed/actuated</p> <ul style="list-style-type: none">• If actuated:<ul style="list-style-type: none">• 47021-A SI TRAIN A ACTUATED lit• 47021-B SI TRAIN B ACTUATED lit• If NOT actuated<ul style="list-style-type: none">• Check<ul style="list-style-type: none">• Przr pressure <1815 psig• Przr level CANNOT be maintained > 5%• RCS Subcooling (CETs) < 30°F• S/G pressures < 500 psig• CNMT pressure > 4 psig <p>Determine that SI is required (or soon will be required) on either Przr level, and/or Przr pressure</p> <ul style="list-style-type: none">• If required, Manually actuate SI [Safety Injection Train A(B) – START pushbuttons[4647201, 4647501] <p>Make plant announcement for Safety Injection</p>

Comments: _____

Op-Test No.: 1 Scenario No.: 2 Event No.: 5, 6 & 7

Event Description: When the reactor is tripped, a S/G tube rupture of 350 gpm occurs in S/G B (opposite of the S/G with the leak). SI will be manually actuated or will automatically occur on low Prxr pressure. When the AFW Pump start signal is generated, AFW Pump A will trip on an overcurrent condition resulting from motor winding failure. The T/D AFW Pump is the only available source for feeding the S/Gs. The Train A ESF sequencer will halt after the SI Pump A is started (step 2). The operators will be required to manually start the remaining Train A ECCS and ESF components not started.

Time	Position	Applicant's Actions or Behavior
	CREW	Identify report loss of RCS pressure and inventory Identify/report primary to secondary leak (SGTR)
	BOP	Check Main Steamline Isolation <ul style="list-style-type: none"> • Check high-high steam flow ($> 4.45 \times 10^6$ lb/hr) for S/G A(B) • Check high steam flow ($> 0.7 \times 10^6$ lb/hr) AND Tavg $< 540^\circ\text{F}$ for S/G A(B) • Check Containment pressure > 17 psig Determine Steamline Isolation is not required
	RO/BOP	Verified Containment Spray NOT required: <ul style="list-style-type: none"> • CNMT pressure remained below 23 psig Determine/report CNMT Spray NOT required
	BOP	Verify Containment Cooling <ul style="list-style-type: none"> • Fan Coil Units running • Verify SW-903A-D CFCU SW Return Isolation valves open • Check Containment pressure remained below 4 psig • May check RBV-150A-D CFCU Emergency Dampers remain shut Verify Aux Bldg Special Vent running: <ul style="list-style-type: none"> • Annunciator 47052-G ZONE SV BNDRY DAMPER NOT CLOSED not lit • Verify Zone SV fans [ASV-91A(B)/CD-34014(34015) ASV Exhaust Fan A(B) and Damper] running Identify failure of ASV Exhaust Fan A to start. Verify Service Water Pumps (A1, A2, B1, B2) running Verify Feedwater Isolation: <ul style="list-style-type: none"> • FW-7A and FW-7B Main FW Flow Control Valves closed • FW-10A and FW-10B Main FW Bypass Flow Control Valves closed • BOTH Feedwater Pumps off

Comments: _____

Op-Test No.: 1 Scenario No.: 2 Event No.: 5, 6 & 7

Event Description: When the reactor is tripped, a S/G tube rupture of 350 gpm occurs in S/G B (opposite of the S/G with the leak). SI will be manually actuated or will automatically occur on low Przr pressure. When the AFW Pump start signal is generated, AFW Pump A will trip on an overcurrent condition resulting from motor winding failure. The T/D AFW Pump is the only available source for feeding the S/Gs. The Train A ESF sequencer will halt after the SI Pump A is started (step 2). The operators will be required to manually start the remaining Train A ECCS and ESF components not started.

Time	Position	Applicant's Actions or Behavior
	BOP (cont.)	<p>Verify AFW Pumps running:</p> <p>Identify/report failure of AFW Pump A to start (trip)</p> <ul style="list-style-type: none"> Verify Turbine Driven AFW Pump running
	RO	<p>Verify the CI Active Status Panel [11] lights lit</p> <p>Verify ECCS pumps running:</p> <ul style="list-style-type: none"> SI pumps RHR pumps CC Pumps <p>Report RHR Pump A not running; RHR Pump B and AFW Pump B not available</p> <p>Manually start RHR Pump A</p>
	CREW	<ul style="list-style-type: none"> SI Active Status Panel [10] lights lit <p>Report all SI Active Status Panel lights lit with exceptions of AFW Pump A [0202] (failed to start); AFW Pump B [0206] (expected); RHR Pump B [0207] (expected); SBV Filter A Fan and Inlet Damper [0604] (failure of sequencer)</p>
	BOP	Manually start/open ASV Fan A/damper
	RO	<p>Verify SI flow:</p> <ul style="list-style-type: none"> With RCS pressure < 2100 psig: SI flow indicated on FI-925 Check RCS pressure < 150 and determine it is not

Comments: _____

Op-Test No.: 1 Scenario No.: 2 Event No.: 5, 6 & 7

Event Description: When the reactor is tripped, a S/G tube rupture of 350 gpm occurs in S/G B (opposite of the S/G with the leak). SI will be manually actuated or will automatically occur on low Przr pressure. When the AFW Pump start signal is generated, AFW Pump A will trip on an overcurrent condition resulting from motor winding failure. The T/D AFW Pump is the only available source for feeding the S/Gs. The Train A ESF sequencer will halt after the SI Pump A is started (step 2). The operators will be required to manually start the remaining Train A ECCS and ESF components not started.

Time	Position	Applicant's Actions or Behavior
	BOP	Verify total AFW flow > 200 gpm [4104102, 4104202]
	RO	<p>Check RXCP Seal Cooling:</p> <ul style="list-style-type: none"> • CC Supply for Thermal Barrier Isolation Valves CC-600, CC-601A(B), CC-610A(B) and CC-612A(B) open • Thermal Barrier temperatures TI-610 and TI-614 normal • RXCP Bearing Temperatures TI-125 and TI-132 normal <p>Check RCS temperatures:</p> <ul style="list-style-type: none"> • RCS Average Temperature [TI-401-404, recorder 42554, computer trend] stable at or trending to 547°F (or RCS Cold Leg Temps [Recorder 42555 or computer trend] at or trending to 547°F is NO RXCP running)
	BOP	<ul style="list-style-type: none"> • If temperature < 547°F: <ul style="list-style-type: none"> • Stop dumping steam • Verify T/D AFW pump required (only AFW Pump running) • Control feed flow to > 200 gpm until one S/G NR level > 4%
	RO	<p>Check Przr PORVs and Spray Valves closed:</p> <ul style="list-style-type: none"> • PORVs closed • Normal Spray valves closed [PS-1A(B) indicating lights] <p>Report PS-1A open</p> <ul style="list-style-type: none"> • Stop RXCP A (If not done previously) • CVC-15 Aux Spray Valve closed <p>Check if RXCPs should be tripped:</p> <ul style="list-style-type: none"> • SI flow indicated on FI-925 • RCS subcooling based on CETs < 15°F • If both conditions exist stop both RXCPs and place in PULLOUT

Comments: _____

Op-Test No.: 1 Scenario No.: 2 Event No.: 5, 6 & 7

Event Description: When the reactor is tripped, a S/G tube rupture of 350 gpm occurs in S/G B (opposite of the S/G with the leak). SI will be manually actuated or will automatically occur on low Przr pressure. When the AFW Pump start signal is generated, AFW Pump A will trip on an overcurrent condition resulting from motor winding failure. The T/D AFW Pump is the only available source for feeding the S/Gs. The Train A ESF sequencer will halt after the SI Pump A is started (step 2). The operators will be required to manually start the remaining Train A ECCS and ESF components not started.

Time	Position	Applicant's Actions or Behavior
	BOP	<p>Check if S/G secondary boundary:</p> <ul style="list-style-type: none"> • Check S/G pressures decreasing in uncontrolled manner <p>Identify/report both S/G pressures stable (or increasing)</p>
	CREW	<p>Check S/G tubes are NOT ruptured:</p> <ul style="list-style-type: none"> • R-15 (Condenser Air Ejector radiation monitor) indication normal • R-19 (S/G Blowdown monitor) indication normal • R-31 and R-33 (Main Steamline monitors) indication normal <p>Determine/report radiation levels rising on all monitors (prior to any isolation)</p> <ul style="list-style-type: none"> • Steam flow/feed flow and narrow range (NR) S/G level response before trip normal <p>Report S/G A had known leak prior to trip but level parameters were normal</p>
	CRS	<p>Transition to E-3 "STEAM GENERATOR TUBE RUPTURE"</p> <p>Evaluate Critical Safety Function Status Trees</p> <p>Direct operator actions of E-3</p>
	RO	<p>Check if RXCPs should be tripped:</p> <ul style="list-style-type: none"> • SI flow indicated on FI-925 • RCS subcooling based on CETs < 15°F <ul style="list-style-type: none"> • If both conditions exist stop both RXCPs and place in PULLOUT

Comments: _____

Op-Test No.: 1 Scenario No.: 2 Event No.: 5, 6 & 7

Event Description: When the reactor is tripped, a S/G tube rupture of 350 gpm occurs in S/G B (opposite of the S/G with the leak). SI will be manually actuated or will automatically occur on low Przr pressure. When the AFW Pump start signal is generated, AFW Pump A will trip on an overcurrent condition resulting from motor winding failure. The T/D AFW Pump is the only available source for feeding the S/Gs. The Train A ESF sequencer will halt after the SI Pump A is started (step 2). The operators will be required to manually start the remaining Train A ECCS and ESF components not started.

Time	Position	Applicant's Actions or Behavior
	CREW	<p>Identify ruptured SG</p> <ul style="list-style-type: none"> • Unexpected rise in level • High radiation on any steamline monitor for S/G A [R-31] or S/G B [R-33] on SPDS • Radiation levels above background indicated on hand-held monitor on S/G Blowdown Ion Exchange Resin Column • Increase in S/G Blowdown cation Conductivity on secondary analytical panel recorder 61438 • High radiation on R-19 when S/Gs aligned for sampling per Attachment A <p>Identify/report S/G B as ruptured and S/G A as known leakage prior to trip</p> <p>(NOTE: Diagnosis may be delayed as actions of steps 8-15 (as indicated below by ♦) in E-3 are performed as allowed by Contingency Action step. When ruptured S/G identified actions begin immediately below.)</p>
	CREW	<p>Determine one S/G must remain available:</p> <ul style="list-style-type: none"> • Required for steam supply to T/D AFW Pump • Required for cooldown <p>Determine S/G B is the S/G to isolate</p>
	BOP	<p>Isolate ruptured S/G B:</p> <ul style="list-style-type: none"> • Verify S/G B blowdown isol valves BT-2B and BT-3B closed • Set S/G B PORV Controller [4301302/HC-478] at 1050 psig • When S/G B pressure < 1050 psig, verify S/G B PORV SD-3B closed • Close S/G B Supply to TDAFW Pump MS-100B • Direct operator to locally close Main Steam Header B Trap ^{9.049} inlet TD-1-9 & bypass TD-3-9 • Close MS-1B MSIV and MS-2B MSIV Bypass Valve for S/G B

Comments: _____

Op-Test No.: 1 Scenario No.: 2 Event No.: 5, 6 & 7

Event Description: When the reactor is tripped, a S/G tube rupture of 350 gpm occurs in S/G B (opposite of the S/G with the leak). SI will be manually actuated or will automatically occur on low Priz pressure. When the AFW Pump start signal is generated, AFW Pump A will trip on an overcurrent condition resulting from motor winding failure. The T/D AFW Pump is the only available source for feeding the S/Gs. The Train A ESF sequencer will halt after the SI Pump A is started (step 2). The operators will be required to manually start the remaining Train A ECCS and ESF components not started.

Time	Position	Applicant's Actions or Behavior
	BOP (cont.) [CT] E-3 — A	Check S/G B level: <ul style="list-style-type: none"> Narrow Range (NR) level > 4% [LI-471, 472, 473] If not, then maintain feed flow to S/G B until NR level is > 4%, then stop feed <ul style="list-style-type: none"> Stop feed Verify/Close AFW Pump 2B flow control valve AFW-2B Close AFW Train B Crossover Valve AFW-10B Check S/G B pressure > 200 psig
	RO	Reset SI by depressing both SI RESET pushbuttons 4647202, 4647502
	CREW	Initiate RCS Cooldown: <ul style="list-style-type: none"> Determine required CET temperature based on S/G B pressure S/G B pressure _____ psig Req CET temp _____ °F
	BOP	Dump steam from S/G A <ul style="list-style-type: none"> Select SM PRESS on Main Steam Dump Mode Selector C/S Dump steam at maximum rate (using HC-484) When RCS temperature reaches 540°F, take Train A and Train B Steam Dump Interlock Selector C/Ss to BYPASS INTLK
	CREW	<ul style="list-style-type: none"> When CET temperature < required CET temperature determined above, stop the RCS cooldown Maintain CET temperatures less than the required temperature

Comments: _____

Op-Test No.: 1 Scenario No.: 2 Event No.: 5, 6 & 7

Event Description: When the reactor is tripped, a S/G tube rupture of 350 gpm occurs in S/G B (opposite of the S/G with the leak). SI will be manually actuated or will automatically occur on low Pr/r pressure. When the AFW Pump start signal is generated, AFW Pump A will trip on an overcurrent condition resulting from motor winding failure. The T/D AFW Pump is the only available source for feeding the S/Gs. The Train A ESF sequencer will halt after the SI Pump A is started (step 2). The operators will be required to manually start the remaining Train A ECCS and ESF components not started.

Time	Position	Applicant's Actions or Behavior
	BOP	<ul style="list-style-type: none"> ♦ Check intact S/G level: <ul style="list-style-type: none"> • S/G A NR level > 4% <ul style="list-style-type: none"> • If NOT, maintain total feed flow > 200 gpm until level is > 4% • Control feed flow to maintain S/G A NR level between 4% and 50%
	RO	<ul style="list-style-type: none"> ♦ Check Pr/r PORVs and Block Valves: <ul style="list-style-type: none"> • Power to PR-1A and PR-1B available • PORVs closed <ul style="list-style-type: none"> • PR-2A • PR-2B • At least ONE PORV Block valve OPEN <ul style="list-style-type: none"> • PR-1A • PR-2A <p>Isolate letdown by placing LD-4A, 4B and 4C. Letdown Orifice Isol, C/Ss to CLOSE:</p>
	RO	<ul style="list-style-type: none"> ♦ Reset SI by depressing both SI RESET pushbuttons 4647202, 4647502 (If not done previously) <p>Reset Containment Isolation by depressing both CNTMT ISOL RESET pushbuttons [4647302, 4647602]</p>
	BOP	<ul style="list-style-type: none"> ♦ Verify Instrument Air to Containment established <ul style="list-style-type: none"> • At least one Air Compressor running • Air header pressure >60 psig [4150101/4150103] • Instrument Air to Containment Isol IA-101 open

Comments: _____

Op-Test No.: 1 Scenario No.: 2 Event No.: 5, 6 & 7

Event Description: When the reactor is tripped, a S/G tube rupture of 350 gpm occurs in S/G B (opposite of the S/G with the leak). SI will be manually actuated or will automatically occur on low Przi pressure. When the AFW Pump start signal is generated, AFW Pump A will trip on an overcurrent condition resulting from motor winding failure. The T/D AFW Pump is the only available source for feeding the S/Gs. The Train A ESF sequencer will halt after the SI Pump A is started (step 2). The operators will be required to manually start the remaining Train A ECCS and ESF components not started.

Time	Position	Applicant's Actions or Behavior
	RO	<ul style="list-style-type: none"> ◆ Check if RHR Pumps should be stopped: <ul style="list-style-type: none"> • RCS pressure >150 psig • Combined RHR Flow ZERO on FI-626 and FI- 928 • Verify RHR Pumps NOT supplying Containment Sump Recirculation flow • Stop RHR pumps and place in C/Ss in AUTO Establish Charging flow: <ul style="list-style-type: none"> • Verify at least one Charging Pump running <ul style="list-style-type: none"> • If NOT: <ul style="list-style-type: none"> • Verify CCW flow to RXCP Thermal Barriers has not been lost <ul style="list-style-type: none"> • CC Supply for Thermal Barrier Isolation Valves CC-600, CC-601A(B), CC-610A(B) and CC-612A(B) open • Thermal Barrier temperatures TI-610 and TI-614 normal • Start Charging Pumps as necessary • Align Charging Pump suction to RWST: <ul style="list-style-type: none"> • Open CVC-301 RWST Supply to Charging Pumps • Verify CVC-1 VCT Supply to Charging Pumps, closed • Start a second Charging Pump and establish maximum charging flow [FI-128] <p>(NOTE: The ruptured S/G must be identified and isolated before further steps performed.)</p>
	CREW	<ul style="list-style-type: none"> Check if RCS Cooldown should be stopped: <ul style="list-style-type: none"> • CET temperatures < required temperature • Stop RCS cooldown • Maintain CET temperatures less than the required temperature

Comments: _____

Op-Test No.: 1 Scenario No.: 2 Event No.: 5, 6 & 7

Event Description: When the reactor is tripped, a S/G tube rupture of 350 gpm occurs in S/G B (opposite of the S/G with the leak). SI will be manually actuated or will automatically occur on low Przr pressure. When the AFW Pump start signal is generated, AFW Pump A will trip on an overcurrent condition resulting from motor winding failure. The T/D AFW Pump is the only available source for feeding the S/Gs. The Train A ESF sequencer will halt after the SI Pump A is started (step 2). The operators will be required to manually start the remaining Train A ECCS and ESF components not started.

Time	Position	Applicant's Actions or Behavior
	BOP [CT] E-3—B 1	Check S/G B pressure > stable or increasing
	CREW [CT] E-3—B 2	Check RCS subcooling based on CETs > 50°F
	RO	<p>Depressurize RCS:</p> <ul style="list-style-type: none"> • If normal spray available (At least one RXCP running): <ul style="list-style-type: none"> • Manually control Przr heaters to maintain saturated condition in Przr • Spray Przr with maximum available spray until any of below conditions are met: <ul style="list-style-type: none"> • Przr level > 74% OR • RCS subcooling based on CETs < 30°F OR • Both of the following conditions are met: <ul style="list-style-type: none"> • RCS pressure < S/G B pressure AND • Przr level > 5% <p>(NOTE: It is expected Przr Spray will be ineffective due to the PS-1A being open and a PORV will be used to depressurize the RCS)</p>
	CREW	Determine Przr Spray flow is not adequate to depressurize RCS at desired rate
	RO	<ul style="list-style-type: none"> • Close Przr Spray Valve PS-1B

Comments: _____

Op-Test No.: 1 Scenario No.: 2 Event No.: 5, 6 & 7

Event Description: When the reactor is tripped, a S/G tube rupture of 350 gpm occurs in S/G B (opposite of the S/G with the leak). SI will be manually actuated or will automatically occur on low Przr pressure. When the AFW Pump start signal is generated, AFW Pump A will trip on an overcurrent condition resulting from motor winding failure. The T/D AFW Pump is the only available source for feeding the S/Gs. The Train A ESF sequencer will halt after the SI Pump A is started (step 2). The operators will be required to manually start the remaining Train A ECCS and ESF components not started.

Time	Position	Applicant's Actions or Behavior
	RO (cont) [CT] E-3—C	<p>Depressurize RCS using Przr PORV: PR-2A(B)</p> <ul style="list-style-type: none"> • Verify at least one PORV available [PR-1A(B) indicating lights] • Manually control Przr heaters to maintain saturated condition in Przr • Open one PORV until any of below conditions are met: <ul style="list-style-type: none"> • Przr level > 74% <p>OR</p> <ul style="list-style-type: none"> • RCS subcooling based on CETs < 30°F <p>OR</p> <ul style="list-style-type: none"> • Both of the following conditions are met: <ul style="list-style-type: none"> • RCS pressure < S/G B pressure <p>AND</p> <ul style="list-style-type: none"> • Przr level > 5% <p>• When above condition(s) satisfied, close PORV [PR-1A(B) indicating lights]</p>
	CREW	<p>Check RCS pressure rising</p> <p>Check if SI flow should be terminated:</p> <ul style="list-style-type: none"> • RCS subcooling based on CETs > 30°F • RCS pressure stable or rising • Przr level > 5% • Secondary heat sink: <ul style="list-style-type: none"> • Total feed flow to S/Gs > 200 gpm available <p>OR</p> <ul style="list-style-type: none"> • NR level in S/G A > 4%

Comments: _____

Op-Test No.: 1 Scenario No.: 2 Event No.: 5, 6 & 7

Event Description: When the reactor is tripped, a S/G tube rupture of 350 gpm occurs in S/G B (opposite of the S/G with the leak). SI will be manually actuated or will automatically occur on low Przr pressure. When the AFW Pump start signal is generated, AFW Pump A will trip on an overcurrent condition resulting from motor winding failure. The T/D AFW Pump is the only available source for feeding the S/Gs. The Train A ESF sequencer will halt after the SI Pump A is started (step 2). The operators will be required to manually start the remaining Train A ECCS and ESF components not started.

Time	Position	Applicant's Actions or Behavior
	RO	<ul style="list-style-type: none"> Stop SI Pumps and place in AUTO <p>Establish charging flow:</p> <ul style="list-style-type: none"> Verify at least one charging pump running Establish flow to maintain PRZR level > 19%
	CREW	<p>Verify SI flow NOT required:</p> <ul style="list-style-type: none"> RCS subcooling based on CETs > 30°F Przr level > 5% <p>Determine if SI flow is needed based on above conditions (Ability to maintain Przr level being the determining factor)</p>
		NOTE: Scenario can be terminated at this point when SI requirement determined.

Comments: _____

Facility: Kewaunee Scenario No.: 3 Op-Test No.: 1

Examiners: _____ Operators: _____ SRO
 _____ RO
 _____ BOP

Initial Conditions: IC-14; 84% power beginning of cycle (BOC).

Service Water Pump B2 running and Service Water Pump B2 selected on Preferred Selector. Turbine Building SW Header selected to 1B.

Turnover: The plant is at 84% power BOC. A plant shutdown is in progress due to exceeding the LCO time interval for inoperability of the TDAFW Pump (TS 3.4.b.2). Technical Specification 3.4.b.5 is being applied. Management has directed the backdown continue at 0.5%/min.

Diesel Generator B has been tested 6 hours ago (following SW Pump A1 failure per N-SW-02 2.2)

All ESF features for Train B have been verified OPERABLE

Equipment Out of Service: Turbine-driven AFW Pump
 Service Water Pump A1

I&C is in process of performing SP-47-316A "Channel 1 (Red) Instrument Channel Test" section 6.18 for the RC temperature and Przr pressure instruments.

Event No.	Malf. No.	Event Type*	Event Description
Preload	TC07		Turbine fails to trip (ASO fails to trip open interface valve; trip solenoid valves fail)
Preload	MS08A MS08B		MSIVs A and B stick in open position
Preload	SI05A		SI Pump A failure to auto start
1	—	N BOP SRO	Reduce load at 0.5%/minute
		R RO	Decrease reactor power using rods and/or boration
2	NI05D, 100%	I RO SRO	Improper Power Range Channel N-44 Response, fails high
3	FW17B, 100%	C BOP RO SRO	Feedwater Pump B trip resulting in VPL runback
4	RD01	C RO SRO	Rods fail to move in AUTO /Rods must be inserted using MANUAL control
5	SO3-10, 0% (RX222)	I BOP SRO	PT-485, Turbine Impulse Pressure channel fails low
6	RD07	M RO BOP SRO	Rod Ejection (K-7) in Control Bank D (SB LOCA)
7	(TC07) (MS08A) (MS08B)	M BOP C RO SRO	Turbine fails to trip and MSIVs fail to close. (MSIV failure adds safety significance to BOP actions in closing turbine governor valves)
8	(SI05A)	C RO SRO	SI Pump fails to auto start A OKP

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

SCENARIO 1-3

NOTES TO SIMULATOR OPERATOR:

1. Remove Service Water Pump A1 from service:
 - Start SW Pump B2
 - Place the SW Preferred Selector to B2 position
 - Place Turbine Building SW Header Selector to 1B position
 - Stop SW Pump A1, PULL-OUT SW Pump A1 C/S, 46524 and TAG
2. For SP-47-316A test (RCS temperature and Przr pressure instruments) setup:
 - Take Delta Temperature Rx Protection Channel Defeat – 1(RED)/PULLOUT
 - Take TAVE Rx Protection Channel Defeat – 1(RED)/PULLOUT
 - Place Przr Pressure Control Channel Selector – 2-3
 - Place Przr Pressure Recorder Input Selector – 2
 - Place TR-405, Rx Clnt Delta-Temp Recorder Selector – 2
 - Enter the following Remote Functions
 1. RP2-3 (RP119) 401A - HI TAVG
 2. RP2-4 (RP120) 401D - LO/LO TAVG
 3. RP2-5 (RP121) 401F - FW VALVE OVERRIDE
 4. RP3-2 (RP131) 405A - OVER POWER TRIP
 5. RP3-3 (RP132) 405B - ROD STOP
 6. RP3-4 (RP133) 405C - OVER TEMP TRIP
 7. RP3-5 (RP134) 405D ROD STOP
3. PULL-OUT T/D AFW Pump C/S, 46118 and TAG
4. Set turbine load rate to ½%/min
5. In Event 2 (NI N44 failure), if directed to perform the redundant channel bistable check per SP 47-316D, report back that following redundant channel bistables are already tripped in Channel 1: 405A-OVER POWER TRIP; 405B-ROD STOP; 405C-OVER TEMP TRIP; 405D-ROD STOP.
6. In Event 2 (NI N44 failure), if directed to, trip bistables when directed with following Remote Functions:
NOTE: TRIPPING 405A / 405C prior to restoration of Channel 1 will result in a reactor trip
 - RP3-14 (RP143) 405A – OVER POWER TRIP
 - RP3-15 (RP144) 405B – ROD STOP
 - RP3-16 (RP145) 405C – OVER TEMP TRIP
 - RP3-17 (RP146) 405D – ROD STOP
7. In Event 2, once the conflict between the two sets of bistables have been identified and discuss, contact the Control Room as I&C and report testing has been completed for RED Channel and you are ready to initiate steps to restore channel to normal. Using the provided RESTORE section of SP-47-316A, restore the Remote Functions and then restore all items in STEP 2 to NORMAL positions. Enter Control Room with SP-47-316A restoration steps completed steps 6.18.73 – 6.18.78.
8. Events 3 and 4 are entered at the same time. The AUTO ROD failure should be active prior to entering Feedwater Pump trip.
9. After event 3 & 4 recovery steps performed, if crew does not resume load backdown, contact CRS and direct load backdown to continue.
10. In E-1 step 17.a, when asked by operator to energize SI valves, toggle Remote Function SI109 – Breaker Rack-out for SI Valves.

SCENARIO 1-3 OVERVIEW

Event 1 – The plant is at 84% power. Power reduction is in progress and Operations Management has directed the rate of load reduction be increased to 0.5%/min. The plant backdown is due to exceeding the allowable TS LCO for the TDAFW Pump. I&C is performing SP-47-316A “Channel 1 (Red) Instrument Channel Test”, required testing on Channel 1 Reactor Coolant Temperature and Pressurizer Pressure instruments.

Events 2 - Following clearly observable plant response from the reactivity changes, NI Channel N-44 fails high due to summer amplifier problem. Control Rods will insert in AUTO. Power Range Overpower Rod Stop (Annunciator 47043-1) will prevent withdrawal of control rods in AUTO or MAN. Complicating the removal from service is the condition that a test is being performed on Channel 1 reactor protection. Tripping all bistables associate with the OVERTEMPERATURE and OVERPOWER protection will result in a reactor trip. Tripping the associated ROD STOP bistables will result in the inability to withdraw control rods. N-44 is removed from service, with the exceptions noted above, and rod control is restored to automatic. The SRO will also review Technical Specification 3.5 for applicability of N44 failure and per Table TS 3.5-2 determine that Minimum Channels OPERABLE (3) is not met for No. 5 and No. 6 (OTAT and OPAT). Entry into 3.0.c. “Standard Shutdown Sequence” is required. The SRO may contact Operations Management concerning the situation. When item is fully researched, I&C will contact CRS to report testing of RED Channel is complete and they are ready to restoration of the Channel in test. Once channel is restored, Crew should fully remove affected NI channel from service

Events 3 & 4 - When the problem with the NI channel N-44 has been identified, Main Feedwater Pump B trips resulting in a VPL runback of turbine load to 60%. Concurrent with the runback, a failure in AUTO Rod Control will occur. The operators will respond to alarms including 47061-D, FEEDWATER PUMP B TRIP, 47082-B, BUS 2 FEEDER BKR TRIP and perform actions of A-FW-05A, including verification of the VPL runback. If required, the BOP operator will reduce turbine load to $\leq 60\%$ using the VPL CONTROL “lower” pushbutton, or using the “normal” load reduction controls at a higher-than-normal rate. The RO will be alerted to failure of rods to move by annunciators including 47042-G AUCTIONEERED TAVG – TREF DEVIATION and inward rod demand with NO rod motion. The operator should select MAN for Rod Control and insert rods as necessary to bring Tavg to within $\pm 1^\circ\text{F}$ of Tref. A-CRD-49A may be reviewed for applicability of actions. The plant should be stabilized at approximately 60% power, and the tripped Feedwater Pump and the rod failure investigated. The SRO may review Technical Specification 3.10 for applicability.

Event 5 - When the plant has been stabilized, Operations Management directs (if necessary) the continuation of the backdown. Once the load has begun to decrease, turbine first stage pressure instrument (PT-485) fails low, causing S/G program level to drop to 33%. The operator will be alerted by annunciators 47062-A & D, S/G A (B) PROGRAM LEVEL DEVIATION, and decreasing S/G levels and feedwater flow. Rod Control should remain unaffected since rods are in MAN. The operators will take actions of A-TB-54 to place S/G feedwater control in manual and restore S/G levels to normal and shift steam dumps to Steam Pressure mode. The SRO should review Technical Specification 3.5 for the effect of this failure on P-7 permissive.

Events 6, 7 & 8 - Following the stabilization of the plant, control rod K-7 in Control Bank D is ejected from the core. This results in RPI indication for K-7 to fail low (as in a dropped rod), and indications of a RCS leak greater than the capacity of the charging pumps. The operators should recognize the indications of a LOCA, and trip the reactor and initiate Safety Injection. Upon the reactor trip, the turbine fails to trip (automatically or manually) due to an ASO and solenoid valve failures. Entry is made to E-0 and immediate operator actions performed. The BOP operator will manually run back the turbine (Manual control OR VPL) and stop both EH Oil Pumps. The RO will recognize SI Pump A failure to automatic start and will manually start the pump. Transition from E-0 is made to E-1 at step 23. The operators should stop the RXCPs when SI flow and RCS subcooling conditions are met. The operators should establish charging flow, evaluate conditions for SI termination, stop the RHR pumps and verify recirculation capability. Transition from E-1 is made to ES-1.2 at step 18, following determination the RCS cooldown and depressurization is required. (NOTE: At step 15 of E-1, the crew may be directed back to Step 1 of E-1 [RCS pressure increasing] until RCS pressure has stabilized with break flow matched with injection flow.)

The operators will continue action in ES-1.2, including: cooldown of the RCS, depressurization of the RCS to restore Przr level, evaluation of RXCP start, and evaluation of ECCS pump operation for SI termination/reduction. The scenario is terminated following reduction of ECCS flow with stable RCS conditions. (Equalization of injection flow and break flow.)

Critical Tasks

1. RODCONT C: Prevent a Rx Trip by taking manual control of rods to control Tave.
2. E-0 — Q: Manually trip the main turbine before an ORANGE Path develops on SUBCRITICALITY or INTEGRITY OR before transition to ECA-2.1, whichever happens first.

Op-Test No.: <u> 1 </u> Scenario No.: <u> 3 </u> Event No.: <u> 1 </u>		
Event Description: Backdown load at 0.5%/min.		
Time	Position	Applicant's Actions or Behavior
	CUE:	Turnover direction of backdown of load in progress due to Technical Specification action associated with the T/D AFW Pump OOS condition.
	CRS	Implement actions of N-0-03, step 4.3.4, 4.3.5 7 4.3.6
	CRS	Direct plant backdown at <i>0.5%/min</i>
	CREW	Review applicable Precautions, and Limitations and Actions.
	RO	Perform reactivity estimate based on planned load decrease (if required).
	BOP	<p><i>(NOTE: Items in italics are actions or setting that <u>may</u> be performed depending on conditions and operator choice.)</i></p> <p>Decrease load per N-TB-54:</p> <ul style="list-style-type: none"> • Review applicable Precautions & Limitations • Determine maximum unloading rate per Figures 2 & 3 • Set setter to desired load (<i>50%</i>) • Verify/set loading rate to appropriate rate for required backdown (<i>½ - 1 %/min.</i>) • Inform GenCo of rate and amount of load reduction • Depress GO • Verify load decreases • Maintain Reactive load within limits of Figure 5
	RO	<p>Perform reactivity adjustments:</p> <p>Rod Control (inward motion at 1.5°F difference Tave-Tref)</p> <p>AND/OR</p> <p>Boron Concentration Control (initiate boration) per N-CV-35A</p> <ul style="list-style-type: none"> • Review applicable Precautions & Limitations • Verify at least one RXCP in operation.

Comments: _____

Op-Test No.: 1 Scenario No.: 3 Event No.: 1

Event Description: Backdown load at 0.5%/min.

Time	Position	Applicant's Actions or Behavior
	RO (cont.)	<ul style="list-style-type: none"> • Determine rate and magnitude of boration. • Position Reactor Makeup Mode Selector to BORATE • Adjust CVC-403/CV-31092, Blender Control BA Flow, to required flow rate. • Set Boric Acid Totalizer to required quantity. • Position Reactor Makeup Control switch to START. • Verify required change has been achieved by monitoring: <ul style="list-style-type: none"> • Rod Position • Boron Concentration • Tave • When boration is complete: <ul style="list-style-type: none"> • Close CVC-406/CV-31904 BA Blender to VCT. • Perform 20 gallon Alternate Dilute • Position CVC-406 to AUTO <p><i>Alternate Dilution actions (to flush lines):</i></p> <ul style="list-style-type: none"> • Position Reactor Makeup Mode Selector to ALT DIL. • Adjust MU-1022/CV-31095, Blender Control Rx Mu Flow, to desired flow rate. • Set Rx Make-up Totalizer to 20 gal. • Position Reactor Makeup Control switch to START. • When dilution is complete: <ul style="list-style-type: none"> • Position Reactor Makeup Mode Selector to AUTO. • Position Reactor Makeup Control switch to START. • Adjust CVC-403/CV-31092, Blender Control BA Flow, to current RCS boron concentration. • If RCS boron concentration has been changed by >50 ppm, operate Przr heaters as necessary to equalize RCS and Przr boron.
	BOP	Adjust Heater Drain Pump speed as required to maintain equal loading on pumps
		NOTE: Following the required plant response, Event 2 may be started.

Comments: _____

Op-Test No.: 1 Scenario No.: 3 Event No.: 2

Event Description: Nuclear power range channel N44 output fails high (100%). Channel total output will indicate 100%. Control rods will begin to step in due to the rate of change of nuclear power (compared to turbine power that does not change). The operator will determine rod motion is not required and placed in MAN. The failed instrument cannot be removed from service (totally) since some redundant bistables in Channel I are already in tripped condition per Surveillance Procedure. The SRO will be required to apply Technical Specification 3.0.c, Standard Shutdown Sequence, and restore one channel to OPERABLE condition.

Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciator alarms: 47031-L POWER RANGE OVERPOWER ROD STOP 47031-M POWER RANGE HIGH FLUX 47033-K POWER RANGE CHANNEL DEVIATION 47032-K POWER RANGE POSITIVE RATE CHANNEL ALERT Control board indication 4122602 NI-44B high N44 channel B drawer indication NI-44 high
	RO/CRS	Identify/report failure of Power Range NI channel 44 high Determine rod motion not required: 1. Turbine load stable 2. RCS Tave stable for turbine load ($\leq T_{ref}$)
	RO	Place Rod Control Bank Selector to MAN
	CRS	Implement Alarm Response Sheet and A-NI-48 "Abnormal Nuclear Instrumentation" and direct operator action. Direct stopping load increase
	RO	Verify Control Rod Bank Selector in MAN
	CRS	Implement A-MI-87 "Bistable Tripping for Failed Reactor Protection or Safeguards Inst.", and Attachment I "N44 NUCLEAR POWER CHANNEL" – "REMOVAL FROM SERVICE", and direct operator action. <ul style="list-style-type: none"> Direct I&C to perform SP 47-316D to check redundant channel bistable contacts NOTE: CRS may identify at this time that redundant channel bistables for OTΔT trip & rod stop, and OPΔT trip & rod stop are in. Technical Specifications actions would then be addressed (see below).

Comments: _____

Op-Test No.: 1 Scenario No.: 3 Event No.: 2

Event Description: Nuclear power range channel N44 output fails high (100%). Channel total output will indicate 100%. Control rods will begin to step in due to the rate of change of nuclear power (compared to turbine power that does not change). The operator will determine rod motion is not required and placed in MAN. The failed instrument cannot be removed from service (totally) since some redundant bistables in Channel I are already in tripped condition per Surveillance Procedure. The SRO will be required to apply Technical Specification 3.0.c, Standard Shutdown Sequence, and restore one channel to OPERABLE condition.

Time	Position	Applicant's Actions or Behavior
	RO	<p>Perform prerequisite alignments of A-MI-87:</p> <ul style="list-style-type: none"> Place Upper Section switch on Detector Current Comparator to PR N44 Place Lower Section switch on Detector Current Comparator to PR N44 Place Rod Stop Bypass switch on Miscellaneous Control and Indication Panel to BYPASS PR N44 Place Power Mismatch Bypass switch on Miscellaneous Control and Indication Panel to BYPASS PR N44 Place Comparator Channel Defeat switch on Comparator and Rate drawer to N44 Place N44A drawer Control Power breaker to OFF
	CREW	<p>Direct actions to trip bistables associated with PR N44:</p> <p>IDENTIFY tripping listed bistables will result in generating reactor trip. (408A OPΔT trip & 408C OTΔT trip)</p>
	CRS	<p>Review Technical Specification 3.5.b, Table TS 3.5.2:</p> <ul style="list-style-type: none"> No. 2 – 3 of 4 channels operable for each trip – satisfied No. 5 – 2 of 4 channels operable – Action required due to minimum channels not operable No. 6 – 2 of 4 channels operable – Action required due to minimum channels not operable <p>Enter Technical Specification 3.0.c Standard Shutdown Sequence and determine within ONE hour action must be initiated to place the unit in a MODE in which the TS does not apply (HOT SHUTDOWN) – Be in HOT STANDBY within the next 6 hours.</p> <p>Contact Operations Management and discuss plant status and shutdown requirement with them (Notify SS to review Emergency Plan actions [EP-AD-2 Chart G])</p> <p>When contacted by I&C, direct restoration of Channel I (Red) Instrument Channel Test for the RC temperature and Przr pressure instruments.</p>

Comments: _____

Op-Test No.: 1 Scenario No.: 3 Event No.: 2

Event Description: Nuclear power range channel N44 output fails high (100%). Channel total output will indicate 100%. Control rods will begin to step in due to the rate of change of nuclear power (compared to turbine power that does not change). The operator will determine rod motion is not required and placed in MAN. The failed instrument cannot be removed from service (totally) since some redundant bistables in Channel I are already in tripped condition per Surveillance Procedure. The SRO will be required to apply Technical Specification 3.0.c, Standard Shutdown Sequence, and restore one channel to OPERABLE condition.

Time	Position	Applicant's Actions or Behavior
	RO/BOP	<p>Perform/Verify restoration steps as directed by I&C (SP-47-316A, step 6.18.79 - 83):</p> <ul style="list-style-type: none"> Place/Verify DELTA TEMP RX PROTECTION CHANNEL DEFEAT switch [46374] to OFF Place/Verify TAVE RX PROTECTION CHANNEL DEFEAT switch [46375] to OFF Verify PRZR PRESSURE CONTROL CHANNEL SELECTOR [46324] is in desired position (2-3 is sat.) Verify PRZR PRESSURE RECORDER INPUT SELECTOR [46325] is in desired position (2 is sat.) Verify TR-405 RX CLNT DELTA-TEMP RECORDER SELECTOR [46551] is in desired position (2 is sat.)
	CRS/RO	<ul style="list-style-type: none"> Direct (continuation of) performance/verification of prerequisite lineup of "Removal From Service". Direct I&C to enter Relay Rack RR-106 to trip associated bistables for N44. <p>NOTE: Performance of the Removal from service Prerequisite may be delayed in total until the redundant bistable issue is resolved, if so the actions detailed on previous page for "RO" are also performed now.</p>
	RO	<p>Following I&C tripping of bistables:</p> <p>When conditions permit ($T_{avg}-T_{ref} \leq 1^{\circ}F$), place Control Rod Bank Selector to AUTO.</p> <p>Verify the following (per A-MI-87):</p> <ul style="list-style-type: none"> Annunciator 47033-D OPΔT HIGH in alarm Annunciator 47033-C OTΔT HIGH in alarm Annunciator 47041-Q OPΔT CHANNEL RNBACK/RDSTP ALERT in alarm Annunciator 47041-R OTΔT CHANNEL RNBACK/RDSTP ALERT in alarm Annunciator 47032-K POWER RANGE POSITIVE RATE CHANNEL ALERT in alarm Annunciator 47032-J POWER RANGE NEGATIVE RATE CHANNEL ALERT in alarm Annunciator 47031-M POWER RANGE HIGH FLUX in alarm Annunciator 47033-J POWER RANGE DETECTOR VOLTAGE LOW in alarm

Comments: _____

Op-Test No.: 1 Scenario No.: 3 Event No.: 2

Event Description: Nuclear power range channel N44 output fails high (100%). Channel total output will indicate 100%. Control rods will begin to step in due to the rate of change of nuclear power (compared to turbine power that does not change). The operator will determine rod motion is not required and placed in MAN. The failed instrument cannot be removed from service (totally) since some redundant bistables in Channel I are already in tripped condition per Surveillance Procedure. The SRO will be required to apply Technical Specification 3.0.c, Standard Shutdown Sequence, and restore one channel to OPERABLE condition.

Time	Position	Applicant's Actions or Behavior
	RO (cont.)	<p>Verify the following (cont.):</p> <ul style="list-style-type: none"> • 44907-0404 PR N44 P8 Status Light lit • 44907-0504 PR N44 P10 Status Light lit • 44907-0604 PR N44 Low Range Hi Flux Status Light lit • 44907-0704 PR N44 Hi Range Hi Flux Status Light lit • 44907-0508 Loop A OTΔT Status Light lit • 44907-0608 Loop A OPΔT Status Light lit • 44907-0804 PR 44 Hi Flux Rate Status Light lit • 44906-0602 N44 Rod Stop Bypassed Status Light lit • 44904-0201 Loop A Chan 4 OTΔT Status Light lit • 44904-0501 Loop A Chan 4 OPΔT Status Light lit
	CRS	<p>Review Technical Specification 3.5.b & c:</p> <ul style="list-style-type: none"> • Table 3.5-2: • No. 2 Nuclear Flux Power Range • No. 5 Overtemperature ΔT • No. 6 Overpower ΔT <p>Determine continued operation acceptable (3 channels required OPERABLE)</p> <p>NOTE: This is just a review of those actions that should have already been noted when evaluation was done earlier.</p>
	CRS	Contact I&C/Maintenance to investigate N44 failure

Comments: _____

Op-Test No.: <u> 1 </u> Scenario No.: <u> 3 </u> Event No.: <u> 3 & 4 </u>		
Event Description: Main Feedwater Pump B trips due to an overcurrent trip. If turbine load is >72%, then a VPL Turbine runback is generated until 60% load is achieved. If load is ≤72%, the operator will be required to manually reduce load to approximately 60%, to establish stable S/G levels within the capability of one Feedwater Pump. As turbine load is reduced, the control rods will NOT move in AUTO. The operator will be required to take the Control Rod Selector to MANUAL and insert rods to restore Tavg to Tref.		
Time	Position	Applicant's Actions or Behavior
	CUE:	Feedwater Pump Trip: Annunciator alarms: 47061-D FEEDWATER PUMP B TRIP 47064-F FEEDWATER PUMP B VIBRATION TB-5 RUNBACK VPL light lit on Turbine Control Panel – Limits (if initial turbine power > 72%) 47082-B BUS 2 FEEDER BKR TRIP (SER Point 711) 47083-B BUS 2 FEEDER BKR OVERLOAD Feedwater Pump B C/S White and Green lights lit Failure of Control Rods Annunciator alarm: 47042-G AUCTIONEERED TAVG – TREF DEVIATION No rod motion with > 1.5° difference between Tave and Tref
	BOP/CRS	Identify/report trip of Feedwater Pump B
	CRS	Implement Alarm Response Sheet, A-FW-05A "Abnormal Feedwater System Operation", and direct operator action.
	BOP	If load is > 72%, verify VPL runback reduces load to < 60% • If load is > 60%, reduce load to ≤ 60% based on Feedwater Pump trip Determine Condensate Pump has not tripped • Monitor S/G levels and FW pressure and flows If "RUNBACK VPL" Limit light lit ((Turbine Control Panel), decrease SETTER value until light clears
	RO	Identify/report failure of control rods to insert in AUTO Position Control Rod Bank Selector to MAN
	[CT] RODCONT C	Insert control rods to match Tave to Tref

Comments: _____

Op-Test No.: 1 Scenario No.: 3 Event No.: 3 & 4

Event Description: Main Feedwater Pump B trips due to an overcurrent trip. If turbine load is $>72\%$, then a VPL Turbine runback is generated until 60% load is achieved. If load is $\leq 72\%$, the operator will be required to manually reduce load to approximately 60% , to establish stable S/G levels within the capability of one Feedwater Pump.
As turbine load is reduced, the control rods will NOT move in AUTO. The operator will be required to take the Control Rod Selector to MANUAL and insert rods to restore Tav_g to Tref.

Time	Position	Applicant's Actions or Behavior
	RO (cont.)	Perform reactivity adjustments as necessary to maintain Tav _g -Tref matched and stabilize plant: Rod Control insertion AND/OR Boron Concentration Control
	CRS	Contact Maintenance to investigate trip of Feedwater Pump B. Contact I&C to investigate problem with Rod Control Automatic function
		NOTE: EVENT 5 occurs following stabilization of the plant.

Comments: _____

Op-Test No.: 1 Scenario No.: 3 Event No.: 5

Event Description: Turbine Impulse Pressure Channel P-485 fails low. S/G level reference setpoint will decrease from 44% to 33%. Steam Dumps are affected in Tave Mode in that the steam dumps receive a demand (open) signal from the load rejection controller difference between Tref (computed from the failed channel) and RCS auctioneered high Tave. However the dumps remain closed due to lack of an arming signal.

Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciator alarms: 47062-A S/G A PROGRAM LEVEL DEVIATION 47062-B S/G A BYPASS CV LEVEL DEVIATION 47062-D S/G B PROGRAM LEVEL DEVIATION 47062-E S/G B BYPASS CV LEVEL DEVIATION 47042-G AUCTIONEERED TAVG-TREF DEVIATION 44904-0801 CDSR DUMP VLV MODULATE 44904-0802 CDSR DUMP VLV TRIP OPEN S/G levels trending to 33%
	BOP/CRS	Identify/report failed turbine impulse pressure channel P-485.
	BOP	Control of S/G levels and restore to normal (44%) <ul style="list-style-type: none"> Take manual control of FW-7A and adjust to restore level to program Take manual control of FW-7B and adjust to restore level to program
	CRS	Implement Alarm Response Sheet and A-TB-54 "Abnormal Turbine Generator Operation" and direct operator action.
	RO	Verify Control Rod Bank Selector in MAN
	BOP	Verify FW-7A and FW-7B controllers in MAN and maintaining S/G levels at program <ul style="list-style-type: none"> Adjust FW-7A and/or FW-7B as necessary Shift Steam Dumps to Steam Pressure mode: <ul style="list-style-type: none"> Place Main Steam Dump Train A Interlock Selector to OFF –RESET Place Main Steam Dump Train B Interlock Selector to OFF –RESET Position Main Steam Dump Control Mode Selector to RESET and then place in STM PRESS Set Steam Dump Release Control Pressure Setpoint HC-484 to 1005 psig and position controller in AUTO Verify Pressure Setpoint output at 0.0 and Steam Dump valves closed [Vertical Board Steam Dump Valve position indicators] Place Main Steam Dump Train A Interlock Selector to OFF –RESET Place Main Steam Dump Train B Interlock Selector to OFF –RESET

Comments: _____

Op-Test No.: 1 Scenario No.: 3 Event No.: 5

Event Description: Turbine Impulse Pressure Channel P-485 fails low. S/G level reference setpoint will decrease from 44% to 33%. Steam Dumps are affected in Tave Mode in that the steam dumps receive a demand (open) signal from the load rejection controller difference between Tref (computed from the failed channel) and RCS auctioneered high Tave. However the dumps remain closed due to lack of an arming signal.

Time	Position	Applicant's Actions or Behavior
	CRS	Review Technical Specification 3.5.b Table TS 3.5-2 Column 5, P-7 Permissive Notify I&C of P-485 failure (NOTE: Technical Specification review is NOT required since the instrument failure is not directly addressed in Technical Specifications.)

Comments: _____

Op-Test No.: 1 Scenario No.: 3 Event No.: 6, 7 & 8

Event Description:

Control Rod K-7 in Control Bank D is ejected for the core resulting in a small-break LOCA. The plant will trip on NI rate trip or the operators will trip the plant and initiate Safety Injection (if required) based on conditions. When the reactor trips, the turbine will fail to trip due to ASO associated failures, and the MSIV MS-1A and MS-1 B will not close. This will require the operator to manually run back the turbine to close the governor valves and stop both EH Pumps to stop steam flow through the turbine. The RCS cooldown will result in RCS depressurization initiating Safety Injection (if not manually initiated previously). Once the turbine governor (control) valves are closed, the crew will address the LOCA condition. Safety Injection Pump A will fail to automatically start requiring the operator to manually start the pump as directed in IPEOPs.

Time	Position	Applicant's Actions or Behavior
	CUE:	<p>Ejected Rod</p> <ul style="list-style-type: none"> Numerous alarms Initial power increase on NIs Individual Rod Position Indication for K07 at ZERO Increased charging flow Decreasing Przr level Decreasing Przr pressure Containment humidity, temperature and pressure rise Containment Radiation monitors increase <p>Turbine Trip failure</p> <ul style="list-style-type: none"> Turbine SV and CV OPEN lights lit on Turbine Control Panel Turbine speed remains 1800 rpm Turbine first stage pressure > ZERO Steam flow indicated for S/G A and S/G B S/G A and S/G B pressure decreasing <p>MSIV failure</p> <ul style="list-style-type: none"> MS-1A and MS-1B open with close signal active (auto and/or manual) <p>Following SI actuation and sequencing:</p> <ul style="list-style-type: none"> GREEN Indication for SI Pump A C/S remains lit SI Pump A amps 4131403 indicates ZERO SI Pump A discharge pressure PI-923 remains ZERO
	CREW	Identify/report reactor trip and/or Safety Injection
	CRS	Implement E-0 "REACTOR TRIP OR SI"

Comments: _____

Op-Test No.: 1 Scenario No.: 3 Event No.: 6, 7 & 8

Event Description:

Control Rod K-7 in Control Bank D is ejected for the core resulting in a small-break LOCA. The plant will trip on NI rate trip or the operators will trip the plant and initiate Safety Injection (if required) based on conditions. When the reactor trips, the turbine will fail to trip due to ASO associated failures, and the MSIV MS-1A and MS-1 B will not close. This will require the operator to manually run back the turbine to close the governor valves and stop both EH Pumps to stop steam flow through the turbine. The RCS cooldown will result in RCS depressurization initiating Safety Injection (if not manually initiated previously). Once the turbine governor (control) valves are closed, the crew will address the LOCA condition. Safety Injection Pump A will fail to automatically start requiring the operator to manually start the pump as directed in IPEOPs.

Time	Position	Applicant's Actions or Behavior
	RO	<p>Perform immediate operator actions of E-0</p> <p>Verify reactor trip:</p> <ul style="list-style-type: none"> • Reactor trip & bypass breakers open • Rod Position Indicators read ZERO • Rod bottom lights LIT • Neutron flux decreasing
	BOP	<p>Perform immediate operator actions of E-0</p> <p>Verify Turbine Trip:</p> <ul style="list-style-type: none"> • HP turbine impulse pressure PI-485/486 trending toward ZERO • All turbine STOP VALVES closed <p>Identify/report failure of turbine to trip</p> <p>Manually trip the turbine [46155 Turbine Trip pushbutton], if not tripped</p> <ul style="list-style-type: none"> • Manually run back turbine (Turbine Manual "CV ↓" or Valve position Limiter Control "VLV POS LIMIT ↓" buttons) <p>AND</p> <ul style="list-style-type: none"> • Stop both EH Oil Pumps [Turbine EH Pump A and B to PULLOUT] <p>Report Turbine Stop and/or Governor Valves shut. [Turbine Control Panel lights]</p> <p>Verify power to Emergency AC Busses</p> <ul style="list-style-type: none"> • Bus 5 energized • Bus 6 energized
	E-0 — Q	

Comments: _____

Op-Test No.: 1 Scenario No.: 3 Event No.: 6, 7 & 8

Event Description: Control Rod K-7 in Control Bank D is ejected for the core resulting in a small-break LOCA. The plant will trip on NI rate trip or the operators will trip the plant and initiate Safety Injection (if required) based on conditions. When the reactor trips, the turbine will fail to trip due to ASO associated failures, and the MSIV MS-1A and MS-1 B will not close. This will require the operator to manually run back the turbine to close the governor valves and stop both EH Pumps to stop steam flow through the turbine. The RCS cooldown will result in RCS depressurization initiating Safety Injection (if not manually initiated previously). Once the turbine governor (control) valves are closed, the crew will address the LOCA condition. Safety Injection Pump A will fail to automatically start requiring the operator to manually start the pump as directed in IPEOPs.

Time	Position	Applicant's Actions or Behavior
	CREW	<p>Perform immediate operator actions of E-0</p> <p>Determine SI needed/actuated</p> <ul style="list-style-type: none"> • If actuated: <ul style="list-style-type: none"> • 47021-A SI TRAIN A ACTUATED lit • 47021-B SI TRAIN B ACTUATED lit • If NOT actuated <ul style="list-style-type: none"> • Check <ul style="list-style-type: none"> • Przr pressure <1815 psig • Przr level CANNOT be maintained > 5% • RCS Subcooling (CETs) < 30°F • S/G pressures < 500 psig • CNMT pressure > 4 psig <p>Identify LOCA condition inside containment</p> <p>Report inability to maintain Przr level and/or RCS pressure</p> <p>Determine that SI is required (or soon will be required) on either Przr level, and/or Przr pressure</p> <ul style="list-style-type: none"> • If required, Manually actuate SI [Safety Injection Train A(B) – START pushbuttons[4647201, 4647501] <p>Make plant announcement for Safety Injection</p>
	BOP	<p>Check Main Steamline Isolation</p> <ul style="list-style-type: none"> • Check high-high steam flow (> 4.45x10⁶ lb/hr) for S/G A(B) • Check high steam flow (> 0.7x10⁶ lb/hr) AND Tav_g < 540°F for S/G A(B) • Check Containment pressure > 17 psig

Comments: _____

Op-Test No.: 1 Scenario No.: 3 Event No.: 6, 7 & 8

Event Description:

Control Rod K-7 in Control Bank D is ejected for the core resulting in a small-break LOCA. The plant will trip on NI rate trip or the operators will trip the plant and initiate Safety Injection (if required) based on conditions. When the reactor trips, the turbine will fail to trip due to ASO associated failures, and the MSIV MS-1A and MS-1 B will not close. This will require the operator to manually run back the turbine to close the governor valves and stop both EH Pumps to stop steam flow through the turbine. The RCS cooldown will result in RCS depressurization initiating Safety Injection (if not manually initiated previously). Once the turbine governor (control) valves are closed, the crew will address the LOCA condition. Safety Injection Pump A will fail to automatically start requiring the operator to manually start the pump as directed in IPEOPs.

Time	Position	Applicant's Actions or Behavior
	BOP (cont.)	If Annunciators 47062-I and 47062-J lit, determine Steamline Isolation should have occurred but did not If so, <ul style="list-style-type: none">Manually close MSIVs MS-1A and MS-1B [Main Steam Isolation – Initiate Train A(B) pushbuttons] Report failure of MSIV s to close
	RO/BOP	Verified Containment Spray NOT required: <ul style="list-style-type: none">CNMT pressure remained below 23 psig Determine/report CNMT Spray NOT required
	BOP	Verify Containment Cooling <ul style="list-style-type: none">Fan Coil Units runningVerify SW-903A-D CFCU SW Return Isolation valves openCheck Containment pressure remained below 4 psigMay check RBV-150A-D CFCU Emergency Dampers remain shut Verify Aux Bldg Special Vent running: <ul style="list-style-type: none">Annunciator 47052-G ZONE SV BNDRY DAMPER NOT CLOSED not litVerify Zone SV fans [ASV-91A(B)/CD-34014(34015) ASV Exhaust Fan A(B) and Damper] running Verify Service Water Pumps (A2, B1, B2) running Verify Feedwater Isolation: <ul style="list-style-type: none">FW-7A and FW-7B Main FW Flow Control Valves closedFW-10A and FW-10B Main FW Bypass Flow Control Valves closedBOTH Feedwater Pumps off Verify both MD AFW Pumps running

Comments: _____

Op-Test No.: 1 Scenario No.: 3 Event No.: 6, 7 & 8

Event Description:

Control Rod K-7 in Control Bank D is ejected for the core resulting in a small-break LOCA. The plant will trip on NI rate trip or the operators will trip the plant and initiate Safety Injection (if required) based on conditions. When the reactor trips, the turbine will fail to trip due to ASO associated failures, and the MSIV MS-1A and MS-1 B will not close. This will require the operator to manually run back the turbine to close the governor valves and stop both EH Pumps to stop steam flow through the turbine. The RCS cooldown will result in RCS depressurization initiating Safety Injection (if not manually initiated previously). Once the turbine governor (control) valves are closed, the crew will address the LOCA condition. Safety Injection Pump A will fail to automatically start requiring the operator to manually start the pump as directed in IPEOPs.

Time	Position	Applicant's Actions or Behavior
	CREW	Identify/report need to use ADVERSE CONTAINMENT values when Containment pressure exceeds 4 psig
	RO	<p>Verify the CI Active Status Panel [11] lights lit</p> <p>Verify ECCS pumps running:</p> <ul style="list-style-type: none"> • SI pumps • RHR pumps • CC Pumps • SI Active Status Panel [10] lights lit <p>Identify and report failure of Safety Injection Pump A to start</p> <p>Manually start SI Pump A</p> <p>Report all SI Active Status Panel lights lit with exception of SW Pump A1 [0401] (expected)</p> <p>Verify SI flow:</p> <ul style="list-style-type: none"> • With RCS pressure < 2100 psig [1900 psig ADVERSE]: • SI flow indicated on FI-925 • Check RCS pressure < 150 and determine it is not
	BOP	Verify total AFW flow > 200 gpm [4104102, 4104202]
	RO	<p>Check RXCP Seal Cooling:</p> <ul style="list-style-type: none"> • CC Supply for Thermal Barrier Isolation Valves CC-600, CC-601A(B), CC-610A(B) and CC-612A(B) open • Thermal Barrier temperatures TI-610 and TI-614 normal • RXCP Bearing Temperatures TI-125 and TI-132 normal <p>Check RCS temperatures:</p> <ul style="list-style-type: none"> • RCS Average Temperature [TI-401-404, recorder 42554, computer trend] stable at or trending to 547°F (or RCS Cold Leg Temps [Recorder 42555 or computer trend] at or trending to 547°F is NO RXCP running)

Comments: _____

Op-Test No.: 1 Scenario No.: 3 Event No.: 6, 7 & 8

Event Description: Control Rod K-7 in Control Bank D is ejected for the core resulting in a small-break LOCA. The plant will trip on NI rate trip or the operators will trip the plant and initiate Safety Injection (if required) based on conditions. When the reactor trips, the turbine will fail to trip due to ASO associated failures, and the MSIV MS-1A and MS-1 B will not close. This will require the operator to manually run back the turbine to close the governor valves and stop both EH Pumps to stop steam flow through the turbine. The RCS cooldown will result in RCS depressurization initiating Safety Injection (if not manually initiated previously). Once the turbine governor (control) valves are closed, the crew will address the LOCA condition. Safety Injection Pump A will fail to automatically start requiring the operator to manually start the pump as directed in IPEOPs.

Time	Position	Applicant's Actions or Behavior
	BOP	<ul style="list-style-type: none"> With temperature < 547°F: <ul style="list-style-type: none"> Stop dumping steam Verify T/D AFW is in PULLOUT (not available) Control feed flow to > 200 gpm until one S/G NR level > 4% [15% ADVERSE]
	RO	<p>Check Przr PORVs and Spray Valves closed:</p> <ul style="list-style-type: none"> PORVs closed Normal Spray valves closed [PS-1A(B) indicating lights] CVC-15 Aux Spray Valve closed <p>Check if RXCPs should be tripped:</p> <ul style="list-style-type: none"> SI flow indicated on FI-925 <p>AND</p> <ul style="list-style-type: none"> RCS subcooling based on CETs < 15°F [45°F ADVERSE] <ul style="list-style-type: none"> If both conditions exist stop both RXCPs and place in PULLOUT <p>(NOTE: Above action to trip RXCPs may have occurred earlier or may occur later, as directed by E-0 QRF, depending on conditions.)</p>
	BOP	<p>Check if S/G secondary boundary:</p> <ul style="list-style-type: none"> Check S/G pressures decreasing in uncontrolled manner <p>Identify/report both S/G pressures stable (or increasing)</p>
	CREW	<p>Check S/G tubes are NOT ruptured:</p> <ul style="list-style-type: none"> R-15 (Condenser Air Ejector radiation monitor) indication normal R-19 (S/G Blowdown monitor) indication normal R-31 and R-33 (Main Steamline monitors) indication normal <p>Identify/report all secondary radiation monitors normal</p>

Comments: _____

Op-Test No.: 1 Scenario No.: 3 Event No.: 6, 7 & 8

Event Description:

Control Rod K-7 in Control Bank D is ejected for the core resulting in a small-break LOCA. The plant will trip on NI rate trip or the operators will trip the plant and initiate Safety Injection (if required) based on conditions. When the reactor trips, the turbine will fail to trip due to ASO associated failures, and the MSIV MS-1A and MS-1 B will not close. This will require the operator to manually run back the turbine to close the governor valves and stop both EH Pumps to stop steam flow through the turbine. The RCS cooldown will result in RCS depressurization initiating Safety Injection (if not manually initiated previously). Once the turbine governor (control) valves are closed, the crew will address the LOCA condition. Safety Injection Pump A will fail to automatically start requiring the operator to manually start the pump as directed in IPEOPs.

Time	Position	Applicant's Actions or Behavior
	CREW	<p>Check if RCS is intact, check:</p> <ul style="list-style-type: none">• Containment pressure [PI-945-450 (4150501-4150506)]• Containment Sump A level [41337]• Wide Range Containment level [LI-41317-03, 04 (4131703, 04); Computer points L8001A, L8002A]• Containment Radiation monitors:<ul style="list-style-type: none">• R2 Containment vessel area• R7 Incore Instr Seal Table area• RE-29064, RE 29065 (WR Recorder) Containment Hi Level Rad 1B & 1A <p>Determine all parameters are off-normal with rising indications</p> <p>Identify/report LOCA</p>
	CRS	<p>Transition to E-1 "LOSS OF REACTOR OR SECONDARY COOLANT"</p> <p>Evaluate Critical Safety Function Status Trees</p> <p>Direct operator actions of E-1</p>
	RO	<p>If RXCPs not already stopped, check if RXCPs should be tripped:</p> <ul style="list-style-type: none">• Verify RCS injection flow:<ul style="list-style-type: none">• SI flow indicated on FI-925OR• RHR Pump flow > 375 gpm for F928 or F626 <p>RCS subcooling based on CETs < 15°F [45°F ADVERSE]</p> <p>If both conditions exist stop both RXCPs and place in PULLOUT</p> <p>Check RWST level > 37% [4131101 LI-920, 4131102 LI-921]</p>

Comments: _____

Op-Test No.: 1 Scenario No.: 3 Event No.: 6, 7 & 8

Event Description:

Control Rod K-7 in Control Bank D is ejected for the core resulting in a small-break LOCA. The plant will trip on NI rate trip or the operators will trip the plant and initiate Safety Injection (if required) based on conditions. When the reactor trips, the turbine will fail to trip due to ASO associated failures, and the MSIV MS-1A and MS-1 B will not close. This will require the operator to manually run back the turbine to close the governor valves and stop both EH Pumps to stop steam flow through the turbine. The RCS cooldown will result in RCS depressurization initiating Safety Injection (if not manually initiated previously). Once the turbine governor (control) valves are closed, the crew will address the LOCA condition. Safety Injection Pump A will fail to automatically start requiring the operator to manually start the pump as directed in IPEOPs.

Time	Position	Applicant's Actions or Behavior
	BOP	<p>Check if S/Gs are faulted:</p> <ul style="list-style-type: none"> • Check S/G pressures decreasing in uncontrolled manner <p>OR</p> <ul style="list-style-type: none"> • Check any S/G completely depressurized <p>Check intact S/G levels:</p> <ul style="list-style-type: none"> • S/G B narrow range (NR) level > 4% [15% ADVERSE] <ul style="list-style-type: none"> • If not, maintain total feed flow to S/G B > 200 gpm until NR level > 4% [15% ADVERSE] • Control feed flow to maintain NR level between 4% [15% ADVERSE] and 50%
	CREW	Check Main Steamline Radiation Channels R-31 and R-33 on SPDS normal
	RO	<p>Check Przr PORVs and Block Valves:</p> <ul style="list-style-type: none"> • Power to PR-1A and PR-1B available • PORVs closed <ul style="list-style-type: none"> • PR-2A • PR-2B • At least ONE PORV Block valve OPEN <ul style="list-style-type: none"> • PR-1A • PR-2A <p>Isolate letdown by closing LD-4A, 4B and 4C Letdown Orifice Isol (If not done previously)</p> <p>Reset SI by depressing both SI RESET pushbuttons [4647202, 4647502]</p> <p>Reset Containment Isolation by depressing both CNTMT ISOL RESET pushbuttons [4647302, 4647602]</p>

Comments: _____

Op-Test No.: 1 Scenario No.: 3 Event No.: 6, 7 & 8

Event Description:

Control Rod K-7 in Control Bank D is ejected for the core resulting in a small-break LOCA. The plant will trip on NI rate trip or the operators will trip the plant and initiate Safety Injection (if required) based on conditions. When the reactor trips, the turbine will fail to trip due to ASO associated failures, and the MSIV MS-1A and MS-1 B will not close. This will require the operator to manually run back the turbine to close the governor valves and stop both EH Pumps to stop steam flow through the turbine. The RCS cooldown will result in RCS depressurization initiating Safety Injection (if not manually initiated previously). Once the turbine governor (control) valves are closed, the crew will address the LOCA condition. Safety Injection Pump A will fail to automatically start requiring the operator to manually start the pump as directed in IPEOPs.

Time	Position	Applicant's Actions or Behavior
	BOP	Verify Instrument Air to Containment established <ul style="list-style-type: none"> At least one Air Compressor running Air header pressure >60 psig [4150101/4150103] Instrument Air to Containment Isol IA-101 open
	RO	Establish Charging flow: <ul style="list-style-type: none"> Verify at least one Charging Pump running <ul style="list-style-type: none"> If NOT: <ul style="list-style-type: none"> Verify CCW flow to RXCP Thermal Barriers has not been lost CC Supply for Thermal Barrier Isolation Valves CC-600, CC-601A(B), CC-610A(B) and CC-612A(B) open Thermal Barrier temperatures TI-610 and TI-614 normal Start Charging Pumps as necessary Establish charging flow to maintain Przr level > 5% [30% ADVERSE]
	CREW	Check if SI should be terminated: <ul style="list-style-type: none"> RCS subcooling based on CETs > 30°F [65°F ADVERSE] RCS pressure > 2100 psig [1900 ADVERSE] AND stable or rising Przr level > 5% [30% ADVERSE] Secondary Heat Sink: <ul style="list-style-type: none"> Total feed flow to S/G B > 200 gpm OR <ul style="list-style-type: none"> NR level in S/G B > 4% [15% ADVERSE] Determine SI should not be terminated (based on one or more of the above highlighted conditions)
	RO	Check if Containment Spray should be stopped: <ul style="list-style-type: none"> Check ICS Pump any running [GREEN lights lit] Determine ICS not running

Comments: _____

Op-Test No.: 1 Scenario No.: 3 Event No.: 6, 7 & 8

Event Description: Control Rod K-7 in Control Bank D is ejected for the core resulting in a small-break LOCA. The plant will trip on NI rate trip or the operators will trip the plant and initiate Safety Injection (if required) based on conditions. When the reactor trips, the turbine will fail to trip due to ASO associated failures, and the MSIV MS-1A and MS-1 B will not close. This will require the operator to manually run back the turbine to close the governor valves and stop both EH Pumps to stop steam flow through the turbine. The RCS cooldown will result in RCS depressurization initiating Safety Injection (if not manually initiated previously). Once the turbine governor (control) valves are closed, the crew will address the LOCA condition. Safety Injection Pump A will fail to automatically start requiring the operator to manually start the pump as directed in IPEOPs.

Time	Position	Applicant's Actions or Behavior
	RO (cont.)	<p>Check if RHR Pumps should be stopped:</p> <ul style="list-style-type: none"> • RCS pressure >150 psig <p>AND</p> <ul style="list-style-type: none"> • Stable or increasing • Combined RHR Flow ZERO on FI-626 and FI- 928 • Verify RHR Pumps NOT supplying Containment Sump Recirculation flow • Reset SI if necessary [4647202, 4647502 pushbuttons] • If above are satisfied, stop RHR pumps and place in C/Ss in AUTO
	CREW	<p>Check RCS and S/G pressures:</p> <ul style="list-style-type: none"> • Pressure in both S/Gs stable or increasing • RCS pressure stable or decreasing <p>If neither condition met, return to step 1 of E-1</p>
		NOTE: The crew may return to step 1 and reperform actions if RCS pressure is rising due to injection flow.
	BOP	<p>Check if Diesel Generators (DGs) should be stopped</p> <ul style="list-style-type: none"> • Verify Bus 5 and Bus 6 energized from offsite power (Breakers 1-501 and 1-601 closed) • Stop DG A and DG B 30 seconds apart (by taking C/S to STOP/PULLOUT position) and place in AUTO
	CREW	<p>Evaluate Plant status:</p> <ul style="list-style-type: none"> • Verify recirculation capability • Both RHR Pumps operable <p>Report RHR Pump B is not operable</p> <ul style="list-style-type: none"> • Determine at least one train recirculation capability

Comments: _____

Op-Test No.: 1 Scenario No.: 3 Event No.: 6, 7 & 8

Event Description:

Control Rod K-7 in Control Bank D is ejected for the core resulting in a small-break LOCA. The plant will trip on NI rate trip or the operators will trip the plant and initiate Safety Injection (if required) based on conditions. When the reactor trips, the turbine will fail to trip due to ASO associated failures, and the MSIV MS-1A and MS-1 B will not close. This will require the operator to manually run back the turbine to close the governor valves and stop both EH Pumps to stop steam flow through the turbine. The RCS cooldown will result in RCS depressurization initiating Safety Injection (if not manually initiated previously). Once the turbine governor (control) valves are closed, the crew will address the LOCA condition. Safety Injection Pump A will fail to automatically start requiring the operator to manually start the pump as directed in IPEOPs.

Time	Position	Applicant's Actions or Behavior
	CREW (cont.)	<ul style="list-style-type: none"> • Open CC-400A Component Cooling to RHR HX A • Verify operable CC-400B Component Cooling to RHR HX B [GREEN light lit] • Verify operable SI300A and B, RWST Supply to RHR Pump A(B) [RED light lit] • Verify operable SI-350A and B, CNTMT Sump B Supply to RHR Pump A(B) [GREEN light lit] • Verify operable SI-351A and B, CNTMT Sump B Supply to RHR Pump A(B) [GREEN light lit] <ul style="list-style-type: none"> • Direct local operator(s) to unlock and set to on breakers for recirculation MOVs • Check Aux Building radiation monitors R-13, R-14 and R-22 normal • Consult Tech Support Staff to see if E-MDS-30 should be implemented • Notify Chemistry to start Containment Hydrogen Monitoring System • Direct chemistry to obtain primary and secondary samples per EPIPs • Evaluate starting additional plant equipment Check if RCS cooldown and depressurization is required: <ul style="list-style-type: none"> • Check RCS pressure > 150 psig
	CRS	Transition to ES-1.2 "POST LOCA COOLDOWN AND DEPRESSURIZATION " Direct operator actions of ES-1.2
		(NOTE: Scenario can be terminated at this point with transition to ES-1.2 if crew was required to cycle to Step 1 of E-1 due to RCS pressure.
	BOP	Verify all AC Buses powered from offsite <ul style="list-style-type: none"> • Breakers 1-101, 1-201, 1-307, 1-407, 1-601 closed to RAT • Breaker 1-501 closed to TAT • Buses energized

Comments: _____

Op-Test No.: 1 Scenario No.: 3 Event No.: 6, 7 & 8

Event Description:

Control Rod K-7 in Control Bank D is ejected for the core resulting in a small-break LOCA. The plant will trip on NI rate trip or the operators will trip the plant and initiate Safety Injection (if required) based on conditions. When the reactor trips, the turbine will fail to trip due to ASO associated failures, and the MSIV MS-1A and MS-1 B will not close. This will require the operator to manually run back the turbine to close the governor valves and stop both EH Pumps to stop steam flow through the turbine. The RCS cooldown will result in RCS depressurization initiating Safety Injection (if not manually initiated previously). Once the turbine governor (control) valves are closed, the crew will address the LOCA condition. Safety Injection Pump A will fail to automatically start requiring the operator to manually start the pump as directed in IPEOPs.

Time	Position	Applicant's Actions or Behavior
	RO	<p>Establish Charging flow:</p> <ul style="list-style-type: none"> • Verify at least one Charging Pump running <ul style="list-style-type: none"> • If NOT: <ul style="list-style-type: none"> • Verify CCW flow to RXCP Thermal Barriers has not been lost <ul style="list-style-type: none"> • CC Supply for Thermal Barrier Isolation Valves CC-600, CC-601A(B), CC-610A(B) and CC-612A(B) open • Thermal Barrier temperatures TI-610 and TI-614 normal • Start Charging Pumps as necessary • Align Charging Pump Suction to RWST <ul style="list-style-type: none"> • Open CVC-301 RWST Supply to Charging Pumps • Verify CVC-1 VCT Supply to Charging Pumps, closed • Start a second Charging Pump and establish maximum charging flow [FI-128] <p>Check if RHR Pumps should be stopped:</p> <ul style="list-style-type: none"> • Check neither RHR Pump running
	BOP	<p>Check intact S/G levels:</p> <ul style="list-style-type: none"> • S/G B narrow range (NR) level > 4% [15% ADVERSE] <ul style="list-style-type: none"> • If not, maintain total feed flow to S/Gs > 200 gpm until NR level in one S/G > 4% [15% ADVERSE] • Control feed flow to maintain NR level between 4% [15% ADVERSE] and 50%

Comments: _____

Op-Test No.: 1 Scenario No.: 3 Event No.: 6, 7 & 8

Event Description: Control Rod K-7 in Control Bank D is ejected for the core resulting in a small-break LOCA. The plant will trip on NI rate trip or the operators will trip the plant and initiate Safety Injection (if required) based on conditions. When the reactor trips, the turbine will fail to trip due to ASO associated failures, and the MSIV MS-1A and MS-1 B will not close. This will require the operator to manually run back the turbine to close the governor valves and stop both EH Pumps to stop steam flow through the turbine. The RCS cooldown will result in RCS depressurization initiating Safety Injection (if not manually initiated previously). Once the turbine governor (control) valves are closed, the crew will address the LOCA condition. Safety Injection Pump A will fail to automatically start requiring the operator to manually start the pump as directed in IPEOPs.

Time	Position	Applicant's Actions or Behavior
	CREW	<p>Initiate RCS cooldown:</p> <ul style="list-style-type: none"> • Maintain cooldown rate in RCS cold legs < 100°F /hr • Dump steam from S/Gs using Steam Dumps in STM PRESS mode <ul style="list-style-type: none"> • Select SM PRESS on Main Steam Dump Mode Selector C/S • Dump steam at controlled rate (using HC-484) • When RCS temperature reaches 540°F, take Train A and Train B Steam Dump Interlock Selector C/Ss to BYPASS INTLK • RCS subcooling based on CETs > 30°F [65°F ADVERSE] <ul style="list-style-type: none"> • If NOT, evaluate isolation of accumulators
		NOTE: Scenario can be terminated at this point if subcooling does NOT allow evaluation of SI termination.
	RO	<p>Check SI Pump Status</p> <ul style="list-style-type: none"> • Any SI Pump running • Any RHR Pump running in SI mode with injection flow indicated on F928 or F626 <p>Place all Przr heater C/S to OFF</p> <p>Depressurize RCS to refill Przr:</p> <ul style="list-style-type: none"> • If normal spray available (At least one RXCP running): <ul style="list-style-type: none"> • Open PS-1A and/or PS-1B • When Przr level > 19% [42% ADVERSE], close the opened Spray Valves • If normal spray is not available: <ul style="list-style-type: none"> • Verify at least one PORV available [PR-1A(B) indicating lights] • Open one PORV • When Przr level > 19% [42% ADVERSE], close the opened PORV

Comments: _____

Op-Test No.: 1 Scenario No.: 3 Event No.: 6, 7 & 8

Event Description: Control Rod K-7 in Control Bank D is ejected for the core resulting in a small-break LOCA. The plant will trip on NI rate trip or the operators will trip the plant and initiate Safety Injection (if required) based on conditions. When the reactor trips, the turbine will fail to trip due to ASO associated failures, and the MSIV MS-1A and MS-1 B will not close. This will require the operator to manually run back the turbine to close the governor valves and stop both EH Pumps to stop steam flow through the turbine. The RCS cooldown will result in RCS depressurization initiating Safety Injection (if not manually initiated previously). Once the turbine governor (control) valves are closed, the crew will address the LOCA condition. Safety Injection Pump A will fail to automatically start requiring the operator to manually start the pump as directed in IPEOPs.

Time	Position	Applicant's Actions or Behavior
	RO (cont)	<p>Check if a RXCP should be started:</p> <ul style="list-style-type: none"> Both RXCPs stopped <ul style="list-style-type: none"> If not, stop all but one RXCP (and skip next 4 steps) RCS subcooling based on CETs > 30°F [65°F ADVERSE] Przr level > 19% [42% ADVERSE] Establish conditions for starting one RXCP (N-RC-36A) and start the RXCP <ul style="list-style-type: none"> If a RXCP cannot be started continue also
	CREW	<p>Check if one SI Pump should be stopped:</p> <ul style="list-style-type: none"> Check any SI pump running Determine required RCS subcooling from table <div style="text-align: right;"> # Charging Pumps running _____ RXCP Status RUNNING/OFF _____ # SI Pumps running _____ (1)Reqd Subcooling _____ ° (2)Reqd Subcooling _____ ° </div> <ul style="list-style-type: none"> Check RCS Subcooling > Required Subcooling Przr Level > 19% [42% ADVERSE] Stop one SI Pump
	CREW	<p>Allow for RCS pressure stabilization</p> <p>Perform above step again for second pump</p>
		<p>NOTE: Scenario can be terminated at this point when evaluation indicates whether one or both SI Pumps are required. If subcooling or Przr levels are NOT met, the scenario should also be terminated as next step continues with Accumulator isolation.</p>

Comments: _____
