ILC-27 NRC Scenario #1 Event Description

Facility: Turkey Point **Scenario:** 1 **Op Test.:** 2011-302

Examiners: _____ **Candidates:** _____ **US**

_____ _____ **ATC**

_____ _____ **BOP**

Initial Conditions: Mode 1 75% power at MOL.

Turnover: Equipment OOS: Breaker 3AB18 for 3B2 Circ water pump is racked out due to breaker failure. Shift Manager has received notification that conditions for a Grass Influx are favorable and has performed a Grass Influx evaluation.

- 3-GOP-100 Contingency Brief for Loss of a CWP
- Holding at 75% power.
- Online Risk – Green with B Train protected on both units.

Event No.	Malf. No.	Event Type	Event Description
1	TFH1TV60	(I) ATC (I,TS) SRO	LT-3-460 fails low which isolates letdown. The crew responds using the ARP and 3-ONOP-49.1 to remove LT-3-460 from service. The SRO will address LCO 3.3.1. The crew restores normal letdown and PZR heaters following LT-3-460 failure using 3-ONOP-041.6.
2	V8CI29ON TVKKB1	(C) BOP (C) SRO	Circ Water Pump 3B1 Motor Bearing high temperature from increased bearing friction. The crew will lower reactor power to < 60% & secure SJAE suction before securing the 3B1 CW pump using 3-NOP-010.
3	N/A	(N) BOP (R) ATC (R) SRO	The crew initiates a boration and reduces Turbine load to 60% using 3-GOP-100.
4	TFH1TU45 TVHV456	(I) ATC (I,TS) SRO	PT-3-445 fails high, the crew responds using the ARP and 3-ONOP-41.5 to attempt to manually close PORV-456. During the instrument failure, PORV-456 develops leakage. The contingent action will be to close the block valve to stop the leakage. The SRO will address LCO 3.4.4 due to excessive leakage on the PORV.
5	TVFABP6B TFF1D6CM	(C) BOP (C) SRO	"B" Condensate Pump Motor Shaft slowly seizes causing a failure of the pump. The automatic start of the "C" Condensate Pump is blocked. The BOP can manually start the "C" Condensate Pump or stop one Main Feed Pump to initiate a Runback to equalize Turbine load with available Feedwater flow.
6	TVHV456 TVHV535	(M) ALL	During plant stabilization, Block Valve MOV-3-535 develops leakage with PORV 456 leaking. The crew responds using 3-EOP-E-0 and transitions to 3-EOP-E-1. RCPs are tripped with the loss of Subcooling Margin.
7	TAFK339 TFFXCGVC TCF5MTB	(C) BOP (C) SRO	AFW flow to the 3C S/G is blocked. Also, B TDAFWP mechanically trips and the C TDAFWP Governor Valve Fails closed. During the performance of 3-EOP-E-0, the crew uses "A" TDAFWP to establish greater than 345 gpm total to the 3A and 3B S/G.
8	TFQ6A4AF	(C) BOP (C) SRO	The 3C ECC fails to Auto Start, the BOP manually starts the 3C ECC during Attachment 3 of 3-EOP-E-0.

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

SIMULATOR SETUP INSTRUCTIONS

1. Reset to IC-16 (100% BOL) or other IC with correct setup conditions.
2. Place Simulator in RUN
3. Open and Execute ILC27SCN1N.lsn.
4. Place 3B2 CWP Handswitch to stop.
5. Trigger lesson step:
   - SETUP - 3B2 CIRC WATER PUMP OOS
     insert TAK4DP RACKOUT delay=0 ramp=0 on=0 off=0
6. Once the pump is stopped and discharge valve is closed, place a clearance tag on 3B2 CWP Handswitch.
7. Store IC with initial conditions setup if desired.
8. Trigger lesson step:
   - SETUP - 3C ECC FAIL TO AUTO START
     insert TFQ6A4AF true delay=0 ramp=0 on=0 off=0
9. Place Simulator in freeze.
10. Provide Shift Turnover Checklists
11. Perform Simulator Operator Checklist
12. When ready to begin, place Simulator in RUN.

FACILITY OPERATOR INSTRUCTIONS

EVENT 1

LT-3-460 fails low which isolates letdown. The crew responds using the ARP and 3-ONOP-49.1 to remove LT-3-460 from service. The SRO will address LCO 3.3.1. The crew restores normal letdown and PZR heaters following LT-3-460 failure using 3-ONOP-041.6.

When directed, Trigger EVENT 1 - LT-3-460 FAILS LOW.

- insert TFH1TV60 TRUE delay=0 ramp=0 on=0 off=0

SM - If directed, respond and acknowledge the failure of LT-3-460.

WCC - If directed, respond and acknowledge the failure of LT-3-460 and to write a PWO for troubleshooting.

EVENT 2

Circ Water Pump 3B1 Motor Bearing high temperature from increased bearing friction. The crew will lower reactor power to < 60% & secure SJAE suction before securing the 3B1 CW pump using 3-NOP-010.

When directed, Trigger EVENT 2 - 3B1 CW PUMP HIGH TEMP.

- insert V8CI29ON TRUE delay=0 ramp=0 on=0 off=0
- insert TVKKB1 0.5 delay=0 ramp=4800 on=0 off=0

SM - If directed, respond and acknowledge the failure of Circ Water Pump 3B1.

WCC - If directed, respond and acknowledge the failure of Circ Water Pump 3B1 and to write a PWO for troubleshooting.

When directed, Trigger EVENT 2 - CLOSE 3-30-003 AND 3-30-005.

- insert TAFB003 0.0 delay=60 ramp=0 on=0 off=0
- insert TAFB005 0.0 delay=120 ramp=0 on=0 off=0

When directed, Trigger EVENT 2 - SECURE PRIMING JETS AND VENT WTRBX VACUUM TKS.

- insert TAKKV66 0.000000 delay=0 ramp=0 on=0 off=0
- insert TAKKV81 0.000000 delay=60 ramp=0 on=0 off=0
- insert TAKKV78 1.000000 delay=180 ramp=0 on=0 off=0
- insert TAKKV63 1.000000 delay=120 ramp=0 on=0 off=0

When directed, Trigger EVENT 2 - RACKOUT 3B1 CW PUMP.

- insert TAK4CP RACKOUT delay=0 ramp=0 on=0 off=0

EVENT 3

The crew initiates a boration and reduces Turbine load to 60% using 3-GOP-100.

SM - If directed, acknowledge power reduction.

WCC - If directed, acknowledge power reduction for the removal of 3B1 CWP.

SYSTEM DISPATCH - If directed, acknowledge power reduction to 60% for the removal of 3B1 CWP.

ENGINEERING - If directed, acknowledge power reduction to 60% for the removal of 3B1 CWP.

CHEMISTRY - If directed, acknowledge power reduction to 60% for the removal of 3B1 CWP and to sample the RCS for the power change .

EVENT 4

PT-3-445 fails high, the crew responds using the ARP and 3-ONOP-41.5 to attempt to manually close PORV-456. During the instrument failure, PORV-456 develops leakage. The contingent action will be to close the block valve to stop the leakage. The SRO will address LCO 3.4.4 due to excessive leakage on the PORV.

When directed, Trigger EVENT 4 - PT-3-445 FAILS HIGH - PORV 456 DEVELOPING LEAKAGE.

- insert TFH1TU45 -1 delay=0 ramp=0 on=0 off=0
- insert TVHV456 0.1 delay=0 ramp=0 on=0 off=0

SM - If directed, respond and acknowledge the failure of PT-3-445.

WCC - If directed, respond and acknowledge the failure of PT-3-445 and to write a PWO for troubleshooting.

EVENT 5

"B" Condensate Pump Motor Shaft slowly seizes causing a failure of the pump. The automatic start of the "C" Condensate Pump is blocked. The BOP can manually start the "C" Condensate Pump or stop one Main Feed Pump to initiate a Runback to equalize Turbine load with available Feedwater flow.

When directed, Trigger EVENT 5 - LOSS OF 3B CONDENSATE PUMP.

- insert TVFABP6B 1.000000 delay=0 ramp=300 on=0 off=0
- insert TFF1D6CM TRUE delay=0 ramp=0 on=0 off=0
- insert TFF1D6CM FALSE cd='imf1p6cs' delay=0 ramp=0 on=0 off=0

SM - If directed, respond and acknowledge the failure of the 3B CONDENSATE PUMP.

WCC - If directed, respond and acknowledge the failure of the 3B CONDENSATE PUMP and to write a PWO for troubleshooting.

EVENT 6

During plant stabilization, Block Valve MOV-3-535 develops leakage with PORV 456 leaking. The crew responds using 3-EOP-E-0 and transitions to 3-EOP-E-1. RCPs are tripped with the loss of Subcooling Margin.

When directed, Trigger EVENT 6 - PORV 456 AND BLOCK VALVE 535 LEAKAGE INCREASES

- insert TVHV456 1.000000 delay=0 ramp=60 on=0 off=0
- insert TVHV535 1.000000 delay=0 ramp=60 on=0 off=0

SM - If directed, respond and acknowledge the failure of Block Valve MOV-3-535 develops leaking with PORV 456 leakage.

WCC - If directed, respond and acknowledge the failure of Block Valve MOV-3-535 developing leakage with PORV 456 leakage and to write a PWO for troubleshooting.

When directed, Trigger EVENT 6 - EVENT 6 - ALIGN PAHMS FOR SERVICE.

- insert TAC2V02A 1.000000 delay=0 ramp=0 on=0 off=0
- insert TAC2V02B 1.000000 delay=0 ramp=0 on=0 off=0
- insert TAAAV21 1.000000 delay=0 ramp=0 on=0 off=0
- insert TAAAV22 1.000000 delay=0 ramp=0 on=0 off=0
- insert TACA005 .000000 delay=0 ramp=0 on=0 off=0

EVENT 7

AFW flow to the 3C S/G is blocked. Also, B TDAFWP mechanically trips and the C TDAFWP Governor Valve Fails closed. During the performance of 3-EOP-E-0, the crew uses "A" TDAFWP to establish greater than 345 gpm total to the 3A and 3B S/G.

Auto Trigger EVENT 7 - AFW MALFUNCTIONS

- insert TAFK339 0.0 delay=0 ramp=0 on=0 off=0
- insert TFFXCGVC true delay=60 ramp=0 on=0 off=0
- insert TCF5MTB true delay=60 ramp=0 on=0 off=0

EVENT 8

The 3C ECC fails to Auto Start, the BOP manually starts the 3C ECC during Attachment 3 of 3-EOP-E-0.

SCENARIO QUANTITATIVE ATTRIBUTES

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	#
1. Total malfunctions (5–8)	5
2. Malfunctions after EOP entry (1–2)	3
3. Abnormal events (2–4)	4
4. Major transients (1–2)	1
5. EOPs entered/requiring substantive actions (1–2)	1
6. EOP contingencies requiring substantive actions (0–2)	0
7. Critical tasks (2–3)	3

CRITICAL TASKS

1. Establish minimum AFW flow of 345 gpm prior to transitioning out of 3-EOP-E-0. [EVENT 7] **OR** **If crew transitions to 3-EOP-FR-H1 to correct loss of AFW, then establish minimum AFW flow of 345 gpm prior to completing Step 2 of 3-EOP-FR-H1.**
2. Trip RCPs due to a loss of subcooling during a SBLOCA prior to completing step 1 of 3-EOP-E-1.
3. With RHR Flow less than 1000 gpm, stop the RHR Pumps within 44 minutes of their start signal.

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Event Description: LT-3-460 fails low which isolates letdown. The crew responds using the ARP, 3-ONOP-041.6 and 3-ONOP-49.1 to remove LT-3-460 from service. The SRO will address LCO 3.3.1.

Time	Position	Applicant's Actions or Behavior
Direct Facility Operator to trigger lesson step, EVENT 1 - LT-3-460 FAILS LOW. (insert TFH1TV60 TRUE delay=0 ramp=0 on=0 off=0)		
	SRO/ATC	Observes failure of LT-3-460. • Alarms A 8/4, A 9/4, & B 3/1 • LI-3-460 fails low • Letdown isolates (LCV-3-460 & CV-3-200's all close) • PZR heaters de-energize
	SRO/ATC	CAUSES: 1. PZR Level control malfunction 2. LOCA/Excessive RCS leakage 3. Steam Break 4. RCS Refueling operations in mid-loop A8/4 **PZR LO-LO LEVEL ALERT**
	SRO/ATC	**ALARM CONFIRMATION** 1. **CHECK** the following less than or equal to 6% at VPA: • LI-3-459A • LI-3-460 • LI-3-461
	SRO/ATC	**OPERATOR ACTIONS** 1. IF either of the following exist: • Two or more level instruments are less than or equal to 12% • Two or more bistables are ON THEN: A. **TRIP** the reactor. B. **INITIATE** a Safety Injection. C. **ENTER** 3-EOP-E-0, Reactor Trip Or Safety Injection.

Rec'd 10/5/10

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Event Description: LT-3-460 fails low which isolates letdown. The crew responds using the ARP, 3-ONOP-041.6 and 3-ONOP-49.1 to remove LT-3-460 from service. The SRO will address LCO 3.3.1.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	**CAUSES:** 1. SCR cabinet fan(s) have tripped 2. SCR cabinet door is open 3. Failed air flow switch or door contact switch in SCR cabinet **B3** **PZR HEATER CONTROLLER FAN OFF**
	SRO/ATC	**ALARM CONFIRMATION** 1. **CHECK** RCS pressure.
	SRO/ATC	**OPERATOR ACTIONS** 1. **ENSURE** PZR Control Group Heaters trip. 2. **CONTROL** pressure by manually cycling backup heater group per 3-OP-041.2, Pressurizer Operation. 3. **DISPATCH** operator to check: • Door on SCR cabinet CLOSED • All SCR cabinet fans operating
	FACILITY OPERATOR	**NOTE** If called, the operator reports: 1) The SCR cabinet door is CLOSED. 2) All SCR cabinet fans are operating.
	SRO/ATC	**CAUSES:** 1. RCS leak/LOCA 2. Steam line leak/break 3. PZR level control malfunction 4. Instrument failure **A9/4** **PZR LO LEVEL/ HEATER OFF/ LTDN SECURED**
	SRO/ATC	**ALARM CONFIRMATION** 1. **CHECK** LCV-3-460, HIGH PRESSURE L/D ISOL VALVE FROM LOOP B COLD LEG, CLOSED on VPA. 2. **CHECK** the following CLOSED on VPA: • CV-3-200A, 45 GPM L/D ISOLATION VALVE • CV-3-200B, 60 GPM L/D ISOLATION VALVE • CV-3-200C, 60 GPM L/D ISOLATION VALVE 3. **CHECK** Control and Backup heaters OFF.

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Event Description: LT-3-460 fails low which isolates letdown. The crew responds using the ARP, 3-ONOP-041.6 and 3-ONOP-49.1 to remove LT-3-460 from service. The SRO will address LCO 3.3.1.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	**OPERATOR ACTIONS** 1. IF PZR level is less than or equal to 12%, THEN **ENTER** 3-EOP-E-0, Reactor Trip or Safety Injection. 2. IF an RCS leak is suspect, THEN **REFER TO** 3-ONOP-041.3, Excessive RCS Leakage. 3. IF an instrument has failed, THEN **RESTORE** letdown and heaters to service per 3-ONOP-041.6, Pressurizer Level Control Malfunction.
	SRO	Directs response using **3-ONOP-041.6**, Pressurizer Level Control Malfunction to restore level control.
	SRO/ATC	**NOTES** • *If Pressurizer Level Malfunction is a result of a failure of the 3-459CX or 3-460CX relays (as indicated by a loss of letdown flow with a loss of Pressurizer Heaters with no concurrent failure of Level Transmitters 3-459A, 3-460, 3-461), use 3–ONOP–003.6 Attachment 4, for 3-460CX failure, **OR** 3–ONOP–003.9 Attachment 4, for 3-459CX failure as guidance for establishing Letdown flow and Pressurizer Heaters.* • *If the button on relays 3-459CX or 3-460CX are used to restore Letdown flow and Pressurizer Heaters, comply with Tech Spec Action Statement 3.4.3 Action b.* • *If the manual control of Heaters from the Electrical penetration room is used, comply with Tech Spec Action Statement 3.4.3 Action a.*
	SRO/ATC	5.0 **SUBSEQUENT ACTIONS** 5.1 Check pressurizer level indicators LI-3-459A, LI-3-460 **AND** LI-3-461, 5.1.1 **IF** one level indicator deviates significantly from the others, **THEN** place CHANNEL SELECT PRESSURIZER LEVEL CONTROL switch in a position that will NOT include the defective channel.
	SRO/ATC	Places CHANNEL SELECT PRESSURIZER LEVEL CONTROL switch to Position 2.
	SRO/ATC	Determines Steps 5.2 and 5.3 and they are N/A at this time.
	SRO/ATC	5.4 **IF** LR-3-459 is selected to a defective channel, **THEN** place CHANNEL SELECT PRESSURIZER LEVEL RECORDER in another position.
	SRO/ATC	Ensures CHANNEL SELECT PRESSURIZER LEVEL RECORDER is selected to a functioning channel.

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Event Description: LT-3-460 fails low which isolates letdown. The crew responds using the ARP, 3-ONOP-041.6 and 3-ONOP-49.1 to remove LT-3-460 from service. The SRO will address LCO 3.3.1.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	5.5 **IF** control malfunction caused letdown isolation, **THEN** re-establish flow as follows: 5.5.1 Throttle Low Pressure LTDN Controller, PCV-3-145, as necessary to prevent LTDN relief valve from lifting, (approximately 50 percent open). 5.5.2 Manually control Low Pressure Letdown Control Valve, PCV-3-145, to limit pressure spike. 5.5.3 OPEN High Pressure L/D Isol Vlv from Loop B Cold Leg LCV-3-460. 5.5.4 OPEN L/D Isolation Valves, CV-3-200 A, B **OR** C as required to restore pressurizer level to programmed level. 5.5.5 Return Lower Pressure Letdown Control Valve, PCV-3-145 to automatic.
	SRO/ATC	Restores Letdown to service and places PCV-3-145 to AUTO.
	SRO/ATC	Determines Steps 5.6 is N/A at this time.
	SRO/ATC	5.7 **IF** control malfunction caused pressurizer heaters to deenergize, **THEN** restore PRZ heaters to automatic operation or take manual control.
	SRO/ATC	Restores Pressurizer Heaters to service
	SRO/ATC	5.8 Maintain pressurizer level to be consistent with programmed level as indicated in Enclosure 1.
	SRO/ATC	5.9 Perform actions required by 3-ONOP-049.1, DEVIATION OR FAILURE OF SAFETY RELATED OR REACTOR PROTECTION CHANNELS.
	SRO	Directs response using **3-ONOP-049.1**, Deviation or Failure of Safety Related or Reactor Protection Channels, to remove LT-3-460 from service.
	SRO/ATC	SUBSEQUENT ACTIONS 5.1 Verify instrument loop failure by comparison to adjacent loops and known plant parameters and conditions.
	SRO/ATC	5.2 Verify no off-normal conditions exist on the adjacent channels which are to remain in service.
	SRO/ATC	5.3 Verify applicable control transfer switches are in the position which eliminates the failed loop.
	SRO/ATC	5.4 **IF** a control function was placed in manual control due to the failure, **THEN** verify the control function is returned to automatic.
	SRO/ATC	5.5 **IF** the failed channel is **NOT** related to Technical Specifications **AND** is **NOT** an input to Reactor Protection or Safeguards, **THEN** go to Step 5.16.

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Event Description: LT-3-460 fails low which isolates letdown. The crew responds using the ARP, 3-ONOP-041.6 and 3-ONOP-49.1 to remove LT-3-460 from service. The SRO will address LCO 3.3.1.

Time	Position	Applicant's Actions or Behavior
	SRO	5.6 Refer to Technical Specifications 3/4.3, Instrumentation **AND** verify the minimum channels operable. 5.6.1 Take appropriate actions as specified in Technical Specifications.
	SRO	Refers to TS LCO 3.3.1, Table 3.3-1, Functional Unit 9 Action 13
	SRO	TABLE 3.3-1 REACTOR TRIP SYSTEM INSTRUMENTATION FUNCTIONAL UNIT | TOTAL NO. OF CHANNELS | CHANNELS TO TRIP | MINIMUM CHANNELS OPERABLE | APPLICABLE MODES | ACTION 9. Pressurizer Water Level--High (Above P-7) | 3 | 2 | 2 | 1 | 13 ACTION 13 -With the number of OPERABLE channels one less than the Total number of channels, STARTUP and/or POWER OPERATION may proceed provided the inoperable channel is placed in the tripped condition within 6 hours. For subsequent required DIGITAL CHANNEL OPERATIONAL TESTS the inoperable channel may be placed in bypass status for up to 4 hours.
	SRO	**CAUTION** ***The failed channel bistable(s) is required to be placed in the tripped mode within 6 hours of the failure determination, except if other channel bistable(s) are in the tripped or test position and would result in an undesired Engineered Safety Features actuation or Reactor Trip actuation. The overall effect of a failure of this type is a reduction of instrumentation redundancy and, therefore, a possible reduction in plant protection.***
	SRO	L-3-460 Pressurizer Level Max Deviation As Compared to other Channels 8% LEVEL DEVIATION RACK No. | BISTABLE No. | BISTABLE FUNCTION | STATUS LIGHT | ANNUNCIATOR | FUNC-TION | LOGIC AFFECTED 11 | BS-3-460A-1 | Pzr HI Level | PRZR HI LEVEL LC460A1 | PZR A8/3 PROTECTION HI LEVEL | P | 2/3 channel pressurizer high level (92%), with P-7 satisfied causing reactor trip signal 11 | BS-3-460A-2 | Pzr Lo Lo Level | PRZR LO LEVEL LC460A2 | A8/4 PZR LO-LO LEVEL ALERT | C | C - CONTROL RELATED P - RX PROTECTION RELATED S - SAFETY INJECTION RELATED
	SRO	Makes determination to trip the following bistables within 6 hours.

EXAMINER NOTE: When the SRO selects which bistables to trip, proceed to EVENT 2 - 3B1 CW PUMP HIGH TEMP.

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Circ Water Pump 3B1 Motor Bearing high temperature from increased bearing friction. The crew will lower reactor power to < 60% & secure SJAE suction before securing the 3B1 CW pump using 3-OP-010.

Time	Position	Applicant's Actions or Behavior
Direct Facility Operator to trigger lesson step, EVENT 2 - 3B1 CW PUMP HIGH TEMP. (insert V8CI29ON TRUE delay=0 ramp=0 on=0 off=0, insert TVKKB1 0.5 delay=0 ramp=4800 on=0 off=0)		
	SRO/ATC	Observes Alarm I-2/4.
	SRO/ATC	CAUSES: 1. Motor failure 2. Pump failure 3. Low bearing oil level I2/4 CWP B1 MOTOR BRG HI TEMP
	SRO/ATC	OPERATOR ACTIONS 1. **CHECK** the following at 3B1 CWP: • TS-3-4113, -4114, and -4115 equal to or greater than 235°F. • Bearing oil level. • Pump/motor vibration/noise. 2. IF bearing temperature exceeds 248°F, THEN **STOP** 3B1 CWP using 3-OP-010, Circulating Water System.
	FACILITY OPERATOR	**NOTE** If called, the operator reports: The 3B1 CW Pump High Bearing temperature is 238°F and rising at 10°F/hr.
	SRO	Directs response using **3-NOP-010**, Circulating Water System to secure 3B1 CW Pump.
	SRO/ATC	2.2 **Limitations** 1. If the unit is operating, a maximum of two Circulating Water Pumps may be removed from service at the same time.
	SRO/ATC	4.3.2 **Circulating Water Pumps 3B1 and 3B2 Shutdown** 1. IF shifting to only two Circulating Water Pumps in operation, THEN **ENSURE** Main Turbine is less than 60% load.

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Circ Water Pump 3B1 Motor Bearing high temperature from increased bearing friction. The crew will lower reactor power to < 60% & secure SJAE suction before securing the 3B1 CW pump using 3-OP-010.

Time	Position	Applicant's Actions or Behavior
EXAMINER NOTE: The SRO determines the need to reduce power to < 60% and secure SJAE (due to CWP 3B2 not available) in order to stop the pump and not loose Main Condenser vacuum. **(Go to Event 3 for details on power reduction.)**		
	SRO/BOP	2. IF all Circulating Water Pumps will be shutdown, THEN **ENSURE** the following are shutdown: • Main Turbine • Condensate System
	SRO/BOP	3. **ENSURE** Amertap System is shutdown per 3-NOP-015.01, Amertap Condenser Tube Cleaning Operation.
	SRO/BOP	**NOTE** DCS/P1612X indicates Main Condenser backpressure. To determine vacuum from backpressure: Main Condenser Vacuum = 30 in Hg - DCS/P1612X_A
	SRO/BOP	**CAUTION** When removing a set of waterboxes from service, Main Condenser vacuum should be monitored using the most conservative indication of the following: • PI-3-1612, CONDENSER VACUUM (VPA) • PI-3-1406, CONDENSER VACUUM (VPA) • DCS/P1612X_A
	SRO/BOP	4. **ENSURE** the following are CLOSED: • 3-30-003, NORTH CNDSR AIR REMOVAL LINE TO SJAE ISOL • 3-30-005, SOUTH CNDSR AIR REMOVAL LINE TO SJAE ISOL
	SRO/BOP	5. IF removing a set of waterboxes from service and condenser air inleakage is greater than 10 SCFM, THEN **PLACE** the SJAE hogger in service per 3-NOP-073.01, Steam Jet Air Ejector Operation, prior to removing waterboxes from service.

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Circ Water Pump 3B1 Motor Bearing high temperature from increased bearing friction. The crew will lower reactor power to < 60% & secure SJAE suction before securing the 3B1 CW pump using 3-OP-010.

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	**6.** IF removing a set of waterboxes from service during power operation, THEN: **A.** **DETERMINE** the estimated turbine load expected following the stop of the last Circulating Water Pump. **B.** **DETERMINE** the required vacuum for the estimated turbine load of Section 4.3.2 Step 6.A using Attachment 4, Condenser Vacuum Limitations. **C.** **ENSURE** a minimum 2 inches Hg margin exists between the current Main Condenser vacuum and required vacuum determined by Section 4.3.2 Step 6.B.
	SRO/BOP	**NOTE** The stop circuit for the pump will trip the pump when the associated discharge MOV is 5% open or 90 seconds elapse after the switch is placed in the STOP position and the MOV has failed to close.
	SRO/BOP	**7.** WHEN an operator is standing by the associated discharge valve, THEN **PLACE** one of the following Circulating Water Pumps to STOP at VPA: • 3B1 CIRCULATING WATER PUMP • 3B2 CIRCULATING WATER PUMP
	SRO/BOP	Places handswitch for the CWP 3B1 to STOP **after** power is below 60%
	SRO/BOP	**8.** **CHECK** the affected Circulating Water Pump stops when its discharge MOV is approximately 5% OPEN.
	SRO/BOP	**9.** **CHECK** the affected Circulating Water Pump discharge MOV continues to fully CLOSED after the pump stops.

EXAMINER NOTE: A consequential failure can occur if the crew does not decrease load after an hour. The Lead Examiner will direct the setpoint for TVKKB1 to be raised by the Facility Operator to 1.0. Annunciator I 2/1, the CWP B1/B2 MOTOR OVERLOAD ALARM, will alarm on high current and the pump can automatically trip. When this alarm comes in, BOP reports this alarm and consults the ARP.

EXAMINER NOTE: After the 3B1 CWP is stopped, proceed to EVENT 4 - PT-3-445 FAILS HIGH WITH PORV 455C FAILED OPEN.

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Event Description: The crew initiates a boration to reduce turbine load to 60% using 3-GOP-100.

Time	Position	Applicant's Actions or Behavior
	SRO	Directs response using **3-GOP-100**, Fast Load Reduction.
	CREW	Reviews 3-GOP-100 Foldout Page actions (See next page)
	SRO	**1** **Brief Control Room Personnel Using ATTACHMENT 3** **NOTES** • *Suggested boration is 9 gallons per % with control rods completely withdrawn and available; 18 gallons per % with no control rod movement (use a value between 9 and 18 if rods are not fully withdrawn when starting a load reduction from full power).* • *The Unit Supervisor may change the boration as desired during the load reduction.* 4. Boration Rate: _____ total gallons / _____ minutes = _____ gallons/minute.
	SRO/ATC	Determines **9 gal/%** boric acid addition times **15 %** which equals **135 gallons** total.
	CREW	**FOLDOUT PAGE** 1. 3-EOP-E-0 Transition Criteria IF any of the following limits are reached, THEN trip the Reactor and Turbine AND go to 3-EOP-E-0, REACTOR TRIP OR SAFETY INJECTION: a. RCS Tavg - GREATER THAN 578 °F b. RCS Tavg - GREATER THAN Tref by 6 °F c. Rod Insertion Limits are exceeded as indicated by: • Rod Position Bank D Insertion Limit Recorder (VPA) • Stepcounters on console • Plant Curve Book Section 7, Figure 3 2. Notify Chemistry Department WHEN reactor power has changed by greater than or equal to 15 percent, THEN notify the Chemistry Department that RCS sampling is required according to Tech Spec Table 4.4-4. 3. Restore Blender to AUTO WHEN boration is complete, THEN restore the Blender to AUTO as follows: a. Place the Reactor Makeup Selector Switch to AUTO. b. Set FC-3-113A, Boric Acid Flow Controller pot setting as desired. c. Place the RCS Makeup Control Switch to START.

Op-Test No.: 2011-302 Scenario No.: 1 Event No.: 3 Page 2 of 5

Event Description: The crew initiates a boration to reduce turbine load to 60% using 3-GOP-100.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	**2** **Begin Boration** a. Set the Boric Acid Totalizer to value determined using ATTACHMENT 3 b. Set FC-3-113A, Boric Acid Flow Controller to a pot setting of 8.0 c. Place the Reactor Makeup Selector Switch to BORATE d. Place the RCS Makeup Control Switch to START IF boration is not required, THEN go to Step 3.
	SRO/BOP	**3** **Notify The Following** • System Dispatcher • Plant personnel using the Page Boost
	CREW	**4** Reduce Unit Load a. Check for boration effects (reducing Tavg) a. IF boration is used, THEN wait for effects before starting load reduction. b. Adjust FC-3-113A, Boric Acid Flow Controller to obtain the ATTACHMENT 3 desired flow rate c. Initiate AND maintain load reduction rate to the target power level d. Monitor load reduction and auto rod control to ensure that the expected Tavg/Tref ΔT identified in ATTACHMENT 3 is maintained d. Stop or slow power reduction to control temperature. If necessary, place control rods in manual AND maintain Tavg within the expected Tavg/Tref ΔT of ATTACHMENT 3.
	BOP	Reduces Turbine load.
	SRO/ATC	**5** **Monitor Annunciator B 8/1, ROD BANK LO LIMIT – RESET** Perform the following: a. Slow load reduction until alarm is reset. b. Re-evaluate boration amount and rate, and make adjustments as necessary.
	SRO	**6** **Notify The Shift Manager To Refer To The Following Procedures** • 0-EPIP-20101, DUTIES OF EMERGENCY COORDINATOR • 0-ADM-115, NOTIFICATION OF PLANT EVENTS
	SRO/ATC	**NOTE** *Axial flux difference is allowed to exceed the Target Band during the load reduction without entering 0-NOP-059.09, OPERATION WITHIN THE AXIAL FLUX DIFFERENCE OPERATIONAL SPACE.*

Op-Test No.: 2011-302 Scenario No.: 1 Event No.: 3 Page 3 of 5

Event Description: The crew initiates a boration to reduce turbine load to 60% using 3-GOP-100

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	**7 Check Plant Response** a. Check pressurizer level following program a. **IF** directed by the Unit Supervisor, **THEN** increase charging flow as follows: 1) Start an additional charging pump. 2) Place an additional letdown orifice in service. 3) Place L/D Temp Controller TC-3-144A in Manual and Control letdown temperature manually. 4) **WHEN** letdown temperature is 115-121°F and stable, **THEN** place TC-3-144A in AUTO. b. Verify load reduction rate and auto rod control is maintaining the expected Tavg/Tref ΔT identified in ATTACHMENT 3 b. Stop or slow power reduction to control temperature. If necessary, place control rods in manual **AND** maintain Tavg within the expected Tavg/Tref ΔT of ATTACHMENT 3.
	SRO/ATC	**8 Energize Pressurizer Backup Heaters**
	SRO/BOP	**9 Verify Turbine Load Less Than 570 MWE** Open the SGFP recirculation valves for the first feedwater pump to be stopped **WHEN** turbine load is less than 570 MWe, **THEN** open the SGFP recirculation valves for the first feedwater pump to be stopped.
	SRO/ATC	**NOTE** *Boration should be stopped above the target power level to prevent excessive boration.*
	SRO/ATC	**10 Monitor Turbine Load Within 10% Of Target Power Level** Stop the boration as follows: a. Place the Reactor Makeup Selector Switch to AUTO b. Set FC-3-113A, Boric Acid Flow Controller pot setting as desired c. Place the RCS Makeup Control Switch to START Go to Step 11.
	ATC	Stops the boration.

Op-Test No.: 2011-302 Scenario No.: 1 Event No.: 3 Page 4 of 5

Event Description: The crew initiates a boration to reduce turbine load to 60% using 3-GOP-100

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	**11** **Check Target Load – LESS THAN 450 Mwe** IF Target Load is GREATER THAN 450 Mwe, THEN perform the following: a. Maintain reactor power at or below the target value using: • Boration/dilution • Control Rod adjustments • Turbine load adjustments b. Maintain Tavg within ± 1 °F of Tref. c. Maintain Pressurizer level on program. d. Maintain Pressurizer pressure on program. e. Maintain SG Levels on program. f. Refer to any ONOPs in effect. g. Go to procedure and step in effect.
	SRO/BOP	**12** **Check Station Service Loads Supplied From The Startup Transformer** WHEN directed by the Unit Supervisor, THEN transfer station service from the Auxiliary Transformers to the Startup Transformer using ATTACHMENT 2.
	SRO/BOP	**13** **Check Auxiliary Steam Supplied From Another Unit** WHEN directed by the Unit Supervisor, THEN align auxiliary steam supply from another unit using ATTACHMENT 1.
	BOP	Turnover Sheet indicates Aux Steam is aligned to Unit 4.
	SRO/ATC	**NOTES** • *Boration should be stopped above the target power level to prevent excessive boration, or at ≥ 25% power if the unit is to be taken off line.* • *Remaining procedure steps should be taken as appropriate for the intended power level.*

Examiner Note: The SRO may or may NOT implement the following steps.

	SRO/BOP	**14** **Continue Load Reduction** a. Verify Turbine load less than – **450 MWE** • Stop one heater drain pump b. Verify Turbine load less than – **400 MWE** 1) Place the Feedwater Pump Turbine Runback Defeat switch to DEFEAT 2) Stop the SGFP with recirculation valves open 3) Place SGFP recirculation valves control switch in the CLOSED/AUTO position

Op-Test No.: 2011-302 Scenario No.: 1 Event No.: 3 Page 5 of 5

Event Description: The crew initiates a boration to reduce turbine load to 60% using 3-GOP-100

Time	Position	Applicant's Actions or Behavior
	BOP	15 Ensure Station Service Loads Supplied From The Startup Transformer Using ATTACHMENT 2 16 Ensure Auxiliary Steam Supplied From Another Unit Using ATTACHMENT 1

EXAMINER NOTE: When power has been sufficiently reduced and the 3B1 CW pump has been shutdown, proceed to EVENT 4 (page 1).

FOLDOUT PAGE

1. **3-EOP-E-0 Transition Criteria**

   IF any of the following limits are reached, THEN trip the Reactor and Turbine AND go to 3-EOP-E-0, REACTOR TRIP OR SAFETY INJECTION:

   a. RCS Tavg - GREATER THAN 578 °F

   b. RCS Tavg - GREATER THAN Tref by 6 °F

   c. Rod Insertion Limits are exceeded as indicated by:
      - Rod Position Bank D Insertion Limit Recorder (VPA)
      - Stepcounters on console
      - Plant Curve Book Section 7, Figure 3

2. **Notify Chemistry Department**

   WHEN reactor power has changed by greater than or equal to 15 percent, THEN notify the Chemistry Department that RCS sampling is required according to Tech Spec Table 4.4-4.

3. **Restore Blender to AUTO**

   WHEN boration is complete, THEN restore the Blender to AUTO as follows:

   a. Place the Reactor Makeup Selector Switch to AUTO.

   b. Set FC-3-113A, Boric Acid Flow Controller pot setting as desired.

   c. Place the RCS Makeup Control Switch to START.

Op-Test No.: 2011-302 Scenario No.: 1 Event No.: 4 Page 1 of 6

Event Description: PT-3-445 fails high, the crew responds using the ARP and 3-ONOP-41.5 to attempt to manually close PORV-456. During the instrument failure, PORV-456 develops leakage. The contingent action is to close the block valve to stop the leakage. The SRO will address LCO 3.4.4 due to excessive leakage on the PORV.

Time	Position	Applicant's Actions or Behavior
Direct Facility Operator to trigger lesson step, EVENT 4 - PT-3-445 FAILS HIGH - PORV 456 DEVELOPING LEAKAGE. (insert TFH1TU45 -1 delay=0 ramp=0 on=0 off=0 and insert TvHV456 0.1 delay=0 ramp=0 on=0 off=0).		
	SRO/ATC	Observes the following: • RCS pressure decreasing. • PZR pressure control channel PT-3-445 pegged high • PORV PCV-3-456 open with no actual high pressure condition • Pressurizer High Pressure PC 456A bistable light ON.
	SRO/ATC	Observes annunciators : A-4/1, A-9/2, A-9/5
	SRO	Directs response using the ARP and 3-ONOP-41.5
	SRO/ATC	Alarm Response actions: • Attempts to closes PORV PCV-3-456. • Closes Block Valve MOV-3-535 to isolate leakage.
	SRO/ATC	***NOTE*** *Foldout page is required to be monitored throughout this procedure.*
	SRO/ATC	***CAUTION*** ***The Master Controller should be operated carefully (Normal controller output for 2235 psig is 42.5 percent demand; 92 percent demand will open PCV-3-455C). If the following conditions are met, an excessive increase in controller output could cause Power Operated Relief Valve PCV-3-455C to open:*** ***1. PCV-3-455C hand switch in AUTO.*** ***2. Pressurizer pressure is greater than or equal to 2000 psig, or OMS switch in LO Press Ops.***
	SRO/ATC	Reviews 3-ONOP-41.5 foldout page actions (See next page)

Op-Test No.: 2011-302 Scenario No.: 1 Event No.: 4 Page 2 of 6

Event Description: PT-3-445 fails high, the crew responds using the ARP and 3-ONOP-41.5 to attempt to manually close PORV-456. During the instrument failure PORV-456 develops leakage. The contingent action is to close the block valve to stop the leakage. The SRO will address LCO 3.4.4 due to excessive leakage on the PORV.

	CREW	***FOLDOUT FOR PROCEDURE 3-ONOP-041.5*** 1. FAILED INSTRUMENT ISOLATION a. IF any Pressurizer Pressure control Instrument Loop fails, THEN place applicable control switches to a position that isolates the failed instrument. 2. IF PZR pressure cannot be maintained greater than 2000 psig, THEN perform the following: a. Continue efforts to restore PZR pressure and b. Trip the reactor and turbine and go to 3-EOP-E-0, REACTOR TRIP OR SAFETY INJECTION. 3. PORV ISOLATION/LEAKING PORV IDENTIFICATION a. IF any PORV is OPEN OR Leaking AND pressure is less than 2235 psig, THEN CLOSE the applicable PORV and/or Block valve. b. The following are indications of leakage from a PZR PORV and should be used to identify and isolate a leaking PORV: 1) PZR relief line temperature, TI-3-463, INCREASING. 2) PZR relief tank level, LI-3-470, INCREASING. 3) PZR relief tank temperature, TI-3-471, INCREASING. 4) PZR relief tank pressure, PI-3-472, INCREASING. 5) PZR PORV/SAFETY ACOUSTIC MONITOR, LEDs LIT. 4. OPEN/LEAKING PZR SAFETY VALVE IDENTIFICATION a. The following are indications that a PZR safety is open or leaking: 1) PZR Safety line temperature, TI-3-465, INCREASING or at saturation temperature associated with the PZR relief tank pressure per Attachment 2. 2) PZR Safety line temperature, TI-3-467, INCREASING or at saturation temperature associated with the PZR relief tank pressure per Attachment 2. 3) PZR Safety line temperature, TI-3-469, INCREASING or at saturation temperature associated with the PZR relief tank pressure per Attachment 2. 4) PZR relief tank level, LI-3-470, INCREASING. 5) PZR relief tank temperature, TI-3-471, INCREASING. 6) PZR relief tank pressure, PI-3-472, INCREASING. 7) PZR PORV/Safety Acoustic Monitor, LEDs LIT. 5. SPURIOUS ACTUATION OF CV-3-311 AUXILIARY SPRAY VALVE due to fire in Containment or 3B 4KV Switchgear Room a. IF pressurizer pressure is decreasing and Auxiliary Spray Valve, CV-3-311, is suspect, THEN reduce charging to one charging pump on slow speed AND close charging to RCS Control Valve HCV-3-121.

Op-Test No.: 2011-302 Scenario No.: 1 Event No.: 4 Page 3 of 6

Event Description: PT-3-445 fails high, the crew responds using the ARP and 3-ONOP-41.5 to attempt to manually close PORV-456. During the instrument failure PORV-456 develops leakage. The contingent action is to close the block valve to stop the leakage. The SRO will address LCO 3.4.4 due to excessive leakage on the PORV.

Potential Additional Tech Spec Call

SRO

POWER DISTRIBUTION LIMITS

3/4.2.5 DNB PARAMETERS

LIMITING CONDITION FOR OPERATION

3.2.5 The following DNB-related parameters shall be maintained within the following limits:

a. Reactor Coolant System $T_{avg} \leq 581.2°F$

b. Pressurizer Pressure $\geq$ 2200 psig*, and

c. Reactor Coolant System Flow $\geq$ 264,000 gpm

APPLICABILITY: MODE 1.

ACTION:

With any of the above parameters exceeding its limit, restore the parameter to within its limit within 2 hours reduce THERMAL POWER to less then 5% of RATED THERMAL POWER within the next 4 hours.

* Limit not applicable during either a THERMAL POWER ramp in excess of 5% of RATED THERMAL POWER per minute or a THERMAL POWER step in excess of 10% of RATED THERMAL POWER.

Op-Test No.: 2011-302 Scenario No.: 1 Event No.: 4 Page 4 of 6

Event Description: PT-3-445 fails high, the crew responds using the ARP and 3-ONOP-41.5 to attempt to manually close PORV-456. During the instrument failure, PORV-456 develops leakage. The contingent action is to close the block valve to stop the leakage. The SRO will address LCO 3.4.4 due to excessive leakage on the PORV.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	**EXAMINER NOTE: Steps annotated with * may have already been performed in the ARP.**
	SRO/ATC	* **1 Check PZR Pressure Control Instrument Loop Not Failed** a. Check PT-3-444 - NOT FAILED by comparison with adjacent pressure channels and known plant parameters a. Perform the following: 1) Verify PCV-3-455C **OR** MOV-3-536 CLOSED. 2) Take manual control of PC-3-444J, PZR PRESS CONTROL. 3) **IF** manual control of PC-3-444J is **NOT** effective, **THEN** perform the following: * Take manual control of PZR spray valves. * Take manual control of PZR heaters.
	SRO/ATC	* b. Check PT-3-445 - NOT FAILED by comparison with adjacent pressure channels and known plant parameters b. Perform the following: 1) Verify PCV-3-456 **OR** MOV-3-535 CLOSED.
	SRO/ATC	- Attempts to closes PORV PCV-3-456 (if not already done). - Closes MOV-3-535 to stop leakage.
	SRO/ATC	**2 Check PORVs Closed** • PCV-3-455C - CLOSED • PCV-3-456 - CLOSED Perform the following: • **IF** PZR pressure is less than 2335, **THEN** manually close PORVs. **IF** any PZR PORV can **NOT** be closed, **THEN** manually close its block valve.
	SRO/ATC	***CAUTION*** ***A fire in containment or the 3B 4KV Switchgear Room may cause spurious actuation of and give false valve position indication for Auxiliary Spray Valve, CV-3-311.***

Op-Test No.: 2011-302 Scenario No.: 1 Event No.: 4 Page 5 of 6

Event Description: PT-3-445 fails high, the crew responds using the ARP and 3-ONOP-41.5 to attempt to manually close PORV-456. During the instrument failure, PORV-456 develops leakage. The contingent action is to close the block valve to stop the leakage. The SRO will address LCO 3.4.4 due to excessive leakage on the PORV.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	**3** **Check PZR Spray Valves Closed** • PZR pressure normal or trending to normal **IF** PZR pressure less than normal, **THEN** perform the following: a. Verify PZR Spray valves closed. • Place PZR Spray Loop C, PCV-3-455A in MANUAL and CLOSE. • Place PZR Spray Loop B, PCV-3-455B in MANUAL and CLOSE. • Verify Aux Spray Valve CV-3-311 CLOSED. b. **IF** PZR pressure can **NOT** be maintained greater then 2000 psig, **THEN** perform the following: 1) Trip the reactor and turbine and go to E-0, REACTOR TRIP OR SAFETY INJECTION. 2) Trip the RCP in the affected loop.
	SRO/ATC	**4** Check PZR Safety Valves Closed a. PZR PORV/Safety acoustic monitor LEDs - NOT LIT b. PZR safety line temperatures at or near normal • PZR safety line temperature, TI-3-465 • PZR safety line temperature, TI-3-467 • PZR safety line temperature, TI-3-469
	SRO/ATC	**5** **Check PZR Pressure Stable Or Increasing** Perform the following: • Continue efforts to restore PZR pressure control.
	SRO/ATC	Determines Pressurizer pressure can be maintained greater than 2000 psig.
	SRO	Recognizes requirement for LCO 3.2.5 Action b entry.

Op-Test No.: 2011-302 Scenario No.: 1 Event No.: 4 Page 6 of 6

Event Description: PT-3-445 fails high, the crew responds using the ARP and 3-ONOP-41.5 to attempt to manually close PORV-456. During the instrument failure, PORV-456 develops leakage. The contingent action is to close the block valve to stop the leakage. The SRO will address LCO 3.4.4 due to excessive leakage on the PORV.

Time	Position	Applicant's Actions or Behavior
	SRO	Recognizes requirement for LCO 3.2.5 entry.
	SRO	3.2.5 The following DNB-related parameters shall be maintained within the following limits: a. Reactor Coolant System $T_{avg} \leq 581.2°F$ b. Pressurizer Pressure ≥ 2200 psig*, and c. Reactor Coolant System Flow $\geq 264{,}000$ gpm APPLICABILITY: MODE 1. ACTION: With any of the above parameters exceeding its limit, restore the parameter to within its limit within 2 hours or reduce THERMAL POWER to less then 5% of RATED THERMAL POWER within the next 4 hours.
	SRO	Recognizes requirement for LCO 3.4.4 Action a entry.
	SRO	3.4.4 Both power-operated relief valves (PORVs) and their associated block valves shall be OPERABLE. APPLICABILITY: MODES 1, 2, and 3. ACTION: a. With one or both PORVs inoperable because of excessive leakage, within 1 hour either restore the PORV(s) to OPERABLE status or close the associated block valve(s) with power maintained to the block valve(s); otherwise be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

EXAMINER NOTE: When Pressurizer pressure is stabilized, proceed to Event 5.

Op-Test No.: 2011-302 Scenario No.: 1 Event No.: 5 Page 1 of 1

Event Description: "B" Condensate Pump Motor Shaft slowly seizes causing a failure of the pump. The automatic start of the "C" Condensate Pump is blocked. The BOP can manually start the "C" Condensate Pump or stop one Main Feed Pump to initiate a Runback to equalize Turbine load with available Feedwater flow.

Time	Position	Applicant's Actions or Behavior
Direct Facility Operator to trigger lesson step, EVENT 5 - LOSS OF 3B CONDENSATE PUMP. (insert TVFABP6B 1.000000 delay=0 ramp=300 on=0 off=0, insert TFF1D6CM TRUE delay=0 ramp=0 on=0 off=0, and insert TFF1D6CM FALSE cd='imf1p6cs' delay=0 ramp=0 on=0 off=0)		
	SRO/ATC	Observes the following: • RCS pressure decreasing. • PZR pressure control channel PT-3-445 pegged high • PORV PCV-3-456 open with no actual high pressure condition • Pressurizer High Pressure PC 456A bistable light ON.
	SRO/ATC	Observes annunciator : D 9/1 and D 9/2
	SRO	Directs response using the ARP and/or 3-ONOP-089.
	SRO/BOP	CAUSES: 1. Motor malfunction 2. High system flow 3. Low bus voltage D9 COND PUMP A/B/C MOTOR OVERLOAD
	SRO/BOP	**ALARM CONFIRMATION** 1. **CHECK** Condensate pump(s) ammeter(s)
	SRO/BOP	**OPERATOR ACTIONS** 1. **MONITOR** SGFP suction pressure. 2. IF necessary to maintain adequate suction pressure, THEN **START** 3rd condensate pump. 3. **CHECK** associated feed train components for proper operation. 4. **REQUEST** Operator check condensate pump recirculation valves closed and amps locally. 5. IF cause of motor overload can **NOT** be corrected, THEN **MAKE** preparations to stop affected pump(s) using 3-OP-073, Condensate System.
	SRO/BOP	- Starts additional Condensate Pump. - Stops 3B Condensate Pump with high current if not tripped.

Op-Test No.: 2011-302 Scenario No.: 1 Event No.: 5 Page 1 of 2

Event Description: "B" Condensate Pump Motor Shaft slowly seizes causing a failure of the pump. The automatic start of the "C" Condensate Pump is blocked. The BOP can manually start the "C" Condensate Pump or stop one Main Feed Pump to initiate a Runback to equalize Turbine load with available Feedwater flow.

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	CAUSES: 1. Motor malfunction 2. Low bus voltage D18 COND PUMP A/B/C MOTOR OVRLD TRIP
	SRO/BOP	**ALARM CONFIRMATION** 1. **CHECK** condensate pump indications on console.
	SRO/BOP	**OPERATOR ACTIONS** 1. **ENSURE** the following automatic actions have occurred: • Automatic start of idle condensate pump if applicable • Possible trip of SGFP 2. **MONITOR** SGFP suction pressure. 3. **REQUEST** Operator check condensate pump breaker(s) 3AA21, 3AB21, or 3AC12 for any targets. 4. **REQUEST** Operator check condensate pump(s) locally for any abnormal indications.
EXAMINER NOTE: When secondary system parameters stabilize, proceed to Event 6. If another Condensate Pump is started late after a Main Feed Water Pump trips, then continue below with initial steps of 3-ONOP-089, Turbine Runback.		
	SRO	Directs response using 3-ONOP-089.
	CREW	4.0 IMMEDIATE OPERATOR ACTIONS 4.1 Verify the automatic actions listed in Section 3.0 are functioning to stabilize and maintain plant conditions, or assume manual control.
	CREW	3.0 AUTOMATIC ACTIONS 3.1 Main Turbine Control Valves and the Reheat Intercept Valves modulate closed upon receipt of a runback signal from the Generator Governor/Speed Changer. 3.2 Steam Dump Valves arm and open to relieve excess steam to the condenser due to the load rejection and subsequent Tavg/Tref mismatch. 3.3 Automatic Rod Insertion Control adjusts core reactivity to match Tavg with Tref. 3.4 Main Feedwater Control Valves open or close in programmed response to steamflow/feedflow mismatch and level input signals, to maintain steam generator levels at program. 3.5 Pressurizer Level Controller and Pressurizer Pressure Controller vary charging pumps speed and Heater/Spray actuation to maintain the programmed level and pressure, as required for the changing values of Tavg. 3.6 Turbine runback upon a SGFP breaker trip with first stage pressure greater than 45 percent load. Both a governor and a load limit runback occur until first stage pressure is at 45 percent load.

Op-Test No.: 2011-302 Scenario No.: 1 Event No.: 5 Page 2 of 2

Event Description: "B" Condensate Pump Motor Shaft slowly seizes causing a failure of the pump. The automatic start of the "C" Condensate Pump is blocked. The BOP can manually start the "C" Condensate Pump or stop one Main Feed Pump to initiate a Runback to equalize Turbine load with available Feedwater flow.

Time	Position	Applicant's Actions or Behavior
	CREW	SUBSEQUENT OPERATOR ACTIONS 5.1 Determine the cause of the runback initiation **AND** refer to the appropriate ONOP for specific recovery instructions. 5.2 Verify the following conditions: 5.2.1 Steam generator levels and pressures stabilized. 5.2.2 Steam dumps closed. 5.2.3 Tavg matches Tref. 5.2.4 Pressurizer levels and pressures stabilized.

EXAMINER NOTE: When secondary system parameters stabilize, proceed to Event 6.

Op-Test No.: 2011-302 Scenario No.: 1 Event No.: 6 Page 1 of 23

Event Description: During plant stabilization, Block Valve MOV-3-535 develops leakage with PORV 456 leaking. The crew responds using 3-EOP-E-0 and transitions to 3-EOP-E-1. RCPs are tripped with the loss of Subcooling Margin.

Time	Position	Applicant's Actions or Behavior
		Direct Facility Operator to trigger lesson step, EVENT 6 – PORV 456 AND BLOCK VALVE 535 LEAKAGE INCREASES. (insert TVHV535 1.000000 delay=0 ramp=60 on=0 off=0 and insert TVHV456 1.000000 delay=0 ramp=60 on=0 off=0)
	SRO	May direct a manual trip as Reactor trip setpoints are reached.
	SRO	Directs response using 3-EOP-E-0 starting at Step 1.
	CREW	**NOTE** *Steps 1 through 4 are IMMEDIATE ACTION steps.*
	SRO/ATC	**1 Verify Reactor Trip** • Rod bottom lights – ON • Reactor trip and bypass breakers – OPEN • Rod position indicators - AT ZERO • Neutron flux – DECREASING Manually trip reactor. **IF** reactor power is greater than 5% **OR** intermediate range power is **NOT** stable or decreasing, **THEN** perform the following: a. Monitor Critical Safety Functions using 3-EOP-F-0, CRITICAL SAFETY FUNCTION STATUS TREES. b. Go to 3-EOP-FR-S.1, RESPONSE TO NUCLEAR POWER GENERATION/ ATWS, Step 1.
	SRO/BOP	**2 Verify Turbine Trip** a. All turbine stop or associated control valves – CLOSED b. Verify Moisture Separator Reheater Steam Valves – CLOSED • MSR Main Steam Supply Stop MOVs • Reheater Timing Valves • MSR Purge Steam Valves c. Check Mid and East GCBs – OPEN (Normally 30-second delay) a. Manually trip turbine. **IF** unable to verify turbine trip, **THEN** close main steamline isolation and bypass valves. b. Manually close valves. **IF** any valve can **NOT** be closed, **THEN** close main steamline isolation and bypass valves. c. Manually open breakers. **IF** breakers do **NOT** open, **THEN** actuate EMERGENCY GEN. BKR. TRIP SWITCH for the affected breaker(s).
	SRO/BOP	Manually closes MSR steam supply MOVs.

Op-Test No.: 2011-302 Scenario No.: 1 Event No.: 6 Page 2 of 23

Event Description: During plant stabilization, Block Valve MOV-3-535 develops leakage with PORV 456 leaking. The crew responds using 3-EOP-E-0 and transitions to 3-EOP-E-1. RCPs are tripped with the loss of Subcooling Margin.

Applicant's Actions or Behavior

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	**3 Verify Power To Emergency 4 KV Buses** a. Check the 3A and 3B 4 KV buses - MAINTAIN AT LEAST ONE ENERGIZED a. Perform the following: 1) Attempt to emergency start any Unit 3 available diesel generator. 2) **IF** neither 3A nor 3B 4 KV bus is energized, **THEN** go to 3-EOP-ECA-0.0, LOSS ALL AC POWER, Step 1. b. Check the 3A and 3B 4 KV buses - MAINTAIN BOTH ENERGIZED b. Attempt to emergency start the de-energized Unit 3 bus diesel generator. c. Maintain the 3D 4 KV bus energized - ALIGNED TO AN ENERGIZED 4 KV BUS c. Perform the following: 1) **IF** lockout of 3D 4 KV bus **NOT** present, **THEN** perform the following: a) Verify 3C CCW pump - BREAKER OPEN. b) Verify 3C ICW pump – BREAKER OPEN. c) Operate bus supply breakers to restore power.

Op-Test No.: 2011-302 Scenario No.: 1 Event No.: 6 Page 3 of 23

Event Description: During plant stabilization, Block Valve MOV-3-535 develops leakage with PORV 456 leaking. The crew responds using 3-EOP-E-0 and transitions to 3-EOP-E-1. RCPs are tripped with the loss of Subcooling Margin.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	**4** **Check If SI Is Actuated** * SI Annunciators - ANY ON OR * Safeguards equipment – AUTO STARTED Perform the following: a. Check if SI is required: * Low pressurizer pressure – 1730 psig OR * High containment pressure – 4 psig OR * High steam line differential pressure – 100 psid OR * High steam flow with low S/G pressure - 614 psig OR low Tavg (543 F) b. IF SI is required, THEN manually actuate SI and containment isolation phase A AND go to Step 5. c. IF SI is NOT required, THEN perform the following: 1) Monitor Critical Safety Functions using 3-EOP-F-0, CRITICAL SAFETY FUNCTION STATUS TREES. 2) Go to 3-EOP-ES-0.1, REACTOR TRIP RESPONSE, Step 1.
	CREW	**NOTE** *FOLDOUT Page shall be monitored for the remainder of this procedure.*
	CREW	Monitors 3-EOP-E-0 Foldout page (see next page)
	SRO/BOP	**5** **Continue With Attachment 3 To Complete The Prompt Action Verifications While Performing This Procedure**

Examiner Note: 3-EOP-E-0, Attachment 3 commences at Page 12 of 23.

Examiner Note: The SRO and ATC will complete the remaining steps in 3-EOP-E-0, while the BOP performs 3-EOP-E-0 Prompt Action Verifications using Attachment 3.

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Event Description: During plant stabilization, Block Valve MOV-3-535 develops leakage with PORV 456 leaking. The crew responds using 3-EOP-E-0 and transitions to 3-EOP-E-1. RCPs are tripped with the loss of Subcooling Margin.

Time	Position	Applicant's Actions or Behavior

FOLDOUT FOR PROCEDURE E-0

1. **ADVERSE CONTAINMENT CONDITIONS**

IF either of the conditions listed below occur, **THEN** use adverse containment setpoints:

Containment atmosphere temperature ≥ 180°F

OR

Containment radiation levels ≥ 1.3×10^5 R/hr

WHEN containment parameters drop below the above values, **THEN** normal setpoints can again be used **IF** the TSC determines that containment integrated dose rate has not exceeded 10^6 Rads.

2. **RCP TRIP CRITERIA**

a. **IF** both conditions listed below occur, **THEN** trip all RCPs:
   1) High-head SI pumps - AT LEAST ONE RUNNING **AND** SI FLOWPATH VERIFIED.
   2) RCS subcooling - LESS THAN 25°F[65°F]

b. **IF** phase B actuated, **THEN** trip all RCPs.

3. **FAULTED S/G ISOLATION CRITERIA**

IF any S/G pressure decreasing in an uncontrolled manner **OR** any S/G completely depressurized, **THEN** the following may be performed:

a. Maintain total feedwater flow greater than 345 gpm until narrow range level in at least one S/G is greater than 6%[32%].
b. Isolate AFW flow to faulted S/G(s).
c. Stabilize RCS hot leg temperature using steam dumps when faulted S/G has blown down to less than 10% wide range.

4. **RUPTURED S/G ISOLATION CRITERIA**

IF any S/G level increases in an uncontrolled manner **OR** any S/G has abnormal radiation, **AND** narrow range level in affected S/G(s) is greater than 6%[32%], **THEN** feed flow may be stopped to affected S/G(s).

5. **AFW SYSTEM OPERATION CRITERIA**

a. **IF** two AFW pumps are operating on a single train, **THEN** one of the pumps shall be shut down within one hour of the initial start signal
b. **IF** two AFW trains are operating and one of the AFW pumps has been operating at low flow of 60 gpm or less for one hour, **THEN** that AFW pump shall be shut down

6. **CST MAKEUP WATER CRITERIA**

IF CST level decreases to less than 10%, **THEN** add makeup to CST using 3-NOP-018.01, CONDENSATE STORAGE TANK (CST).

7. **RHR SYSTEM OPERATION CRITERIA**

IF RHR flow is less than 1000 gpm, **THEN** the RHR pumps shall be shut down within 44 minutes of the initial start signal.

Op-Test No.: 2011-302 Scenario No.: 1 Event No.: 6 Page 5 of 23

Event Description: During plant stabilization, Block Valve MOV-3-535 develops leakage with PORV 456 leaking. The crew responds using 3-EOP-E-0 and transitions to 3-EOP-E-1. RCPs are tripped with the loss of Subcooling Margin.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	Stops RCPs if subcooling is less than 25°F (65°F) with HHSI flowpath verified and HHSI pumps running based on foldout page requirements.
CREW CRITICAL TASK: Trip RCPs due to a loss of subcooling during a SBLOCA prior to completing Step 1 of 3-EOP-E-1.		
	SRO/ATC	**6** **Check AFW Pumps - AT LEAST TWO RUNNING** Perform the following: a. Manually open valves to establish two AFW pumps running. b. **IF** an AFW pump is tripped, **THEN** dispatch an operator to locally reset the AFW turbine trips. c. **IF** both units require AFW **AND** only one AFW pump is available, **THEN** perform the following: 1) Verify all RCPs - TRIPPED 2) Establish 270 gpm AFW flow to each unit. 3) Use a setpoint of 270 gpm for required AFW flow instead of 345 gpm specified in subsequent Steps and Procedures.
	SRO/ATC	**7** **Verify AFW Valve Alignment - PROPER EMERGENCY ALIGNMENT** Manually align valves to establish proper AFW alignment.

Op-Test No.: 2011-302 Scenario No.: 1 Event No.: 6 Page 6 of 23

Event Description: During plant stabilization, Block Valve MOV-3-535 develops leakage with PORV 456 leaking. The crew responds using 3-EOP-E-0 and transitions to 3-EOP-E-1. RCPs are tripped with the loss of Subcooling Margin.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	8 Verify Proper AFW Flow a. Check narrow range level in at least one S/G - GREATER THAN 6%[32%] a. Perform the following: 1) Verify AFW flow greater than 345 gpm. 2) IF AFW flow less than 345 gpm, THEN manually start pumps AND align valves to establish greater than 345 gpm flow. 3) IF total feed flow from all sources greater than 345 gpm can NOT be established, THEN perform the following: a) Monitor Critical Safety Functions using 3-EOP-F-0, CRITICAL SAFETY FUNCTION STATUS TREES. b) Go to 3-EOP-FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK, Step 1.
	SRO/ATC	b. Maintain feed flow to S/G until narrow range levels between 15%[32%] and 50%
	SRO/ATC	Raises flow to the 3A and 3B S/G to at least 345 gpm total. May direct the field operator to reset the B AFW overspeed trip.

CREW CRITICAL TASK: Establish minimum AFW flow of 345 gpm prior to transitioning out of 3-EOP-E-0. [EVENT 7]

OR

If crew transitions to 3-EOP-FR-H1 to correct loss of AFW, then establish minimum AFW flow of 345 gpm prior to completing Step 2 of 3-EOP-FR-H1.

Op-Test No.: 2011-302 Scenario No.: 1 Event No.: 6 Page 7 of 23

Event Description: During plant stabilization, Block Valve MOV-3-535 develops leakage with PORV 456 leaking. The crew responds using 3-EOP-E-0 and transitions to 3-EOP-E-1. RCPs are tripped with the loss of Subcooling Margin.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	**9** Check RCP Seal Cooling a. Check all RCP thermal barrier alarms – OFF • A 1/1, RCP THERMAL BARR COOLING WATER HI FLOW • A 1/2, RCP THERMAL BARR COOLING WATER HI TEMP • A 1/3, RCP THERMAL BARR COOLING WATER LO FLOW a. IF CCW to an RCP thermal barrier is lost, THEN: 1) Trip the affected RCP(s). 2) Go to Step 9c. b. Go to Step 10 c. Check all RCP seal return temperatures are less than 235 F c. Go to Step 10. d. Verify SI - RESET d. Reset SI. e. IF offsite power is NOT available, THEN check diesel capacity adequate to run one charging pump. IF adequate diesel capacity is NOT available, THEN shed nonessential loads. Refer to ATTACHMENT 2 for component KW load rating f. Start one charging pump at minimum speed for seal injection f. Go to Step 10. g. Adjust Charging Flow To Regen Heat Exchanger, HCV-3-121, to maintain proper seal injection flow

Op-Test No.: 2011-302 Scenario No.: 1 Event No.: 6 Page 8 of 23

Event Description: During plant stabilization, Block Valve MOV-3-535 develops leakage with PORV 456 leaking. The crew responds using 3-EOP-E-0 and transitions to 3-EOP-E-1. RCPs are tripped with the loss of Subcooling Margin.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	**10** **Maintain RCS Cold Leg Temperature** * STABLE AT OR TRENDING TO 547°F IF ANY RCP RUNNING OR * LESS THAN 547°F AND STABLE IF NO RCP RUNNING Perform the following: a. IF temperature is decreasing, THEN perform the following: 1) Stop dumping steam. 2) Reduce total feed flow to 345 gpm until narrow range level greater than 6%[32%] in at least one S/G. 3) IF cooldown is due to excessive steam flow, THEN close main steamline isolation and bypass valves. b. IF temperature greater than 547°F AND increasing, THEN perform the following: * Dump steam to condenser. OR * Dump steam using S/G steam dump to atmosphere valves.
	SRO/ATC	Reduces total AFW flow to 345 gpm max for all S/G's.
	SRO/ATC	**11** **Check PRZ PORVs, Spray Valves And Excess Letdown Isolated** a. PORVs – CLOSED a. IF PRZ pressure less than 2335 psig, THEN manually close PORVs. IF any PRZ PORV can NOT be closed, THEN manually close its block valve. IF block valve can NOT be closed, THEN perform the following: 1) Monitor Critical Safety Functions using 3-EOP-F-0, CRITICAL SAFETY FUNCTION STATUS TREES. 2) Go to 3-EOP-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1. b. Normal PRZ spray valves – CLOSED b. IF PRZ pressure less than 2260 psig, THEN manually close valves. IF valve(s) can NOT be closed, THEN stop RCP(s) as necessary to stop spray flow. c. Auxiliary Spray Valve, CV-3-311 – CLOSED c. Manually close auxiliary spray valve. IF auxiliary spray valve can NOT be closed, THEN close Charging Flow to Regen Heat Exchanger, HCV-3-121.

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Event Description: During plant stabilization, Block Valve MOV-3-535 develops leakage with PORV 456 leaking. The crew responds using 3-EOP-E-0 and transitions to 3-EOP-E-1. RCPs are tripped with the loss of Subcooling Margin.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	**11** **Check PRZ PORVs, Spray Valves And Excess Letdown Isolated** (continued) d. Excess letdown isolation valves – CLOSED — d. Manually close valve(s). • CV-3-387, Excess Letdown Isolation Valve From Cold Leg To Excess Letdown Heat Exchanger • HCV-3-137, Excess Letdown Flow Controller
	SRO/ATC	**12** **Check If RCPs Should Be Stopped** a. Check RCPs - ANY RUNNING — a. Go to Step 13. b. Check RCS subcooling – LESS THAN 25°F[65°F] — b. Go to Step 13. c. High-Head SI Pump – AT LEAST ONE RUNNING **AND** FLOWPATH VERIFIED — c. Go to Step 13. d. Stop all RCPs
	SRO/ATC	Stops RCPs if subcooling is less than 25°F (65°F) with HHSI flowpath verified with HHSI pumps running.

CREW CRITICAL TASK: Trip RCPs due to a loss of subcooling during a SBLOCA prior to completing step 1 of 3-EOP-E-1.

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Event Description: During plant stabilization, Block Valve MOV-3-535 develops leakage with PORV 456 leaking. The crew responds using 3-EOP-E-0 and transitions to 3-EOP-E-1. RCPs are tripped with the loss of Subcooling Margin.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	**13** Check If S/Gs Are Faulted a. Check pressures in all SGs – a. Go to Step 14. * ANY SG PRESSURE DECREASING IN AN UNCONTROLLED MANNER OR * ANY SG COMPLETELY DEPRESSURIZED b. Perform the following: 1) Monitor Critical Safety Functions using 3-EOP-F-0, CRITICAL SAFETY FUNCTION STATUS TREES 2) Go to 3-EOP-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1
	SRO/ATC	**14** Check If S/G Tubes Are Ruptured a. Check levels in all S/Gs and secondary radiation levels: a. Go to Step 15. * ANY SG LEVEL INCREASING IN AN UNCONTROLLED MANNER OR * Condenser air ejector radiation, R-15 – HIGHER THAN NORMAL OR * SG blowdown radiation, R-19 – HIGHER THAN NORMAL OR * DCS SG or secondary radiation readings – HIGHER THAN NORMAL OR * Local steamline radiation – HIGHER THAN NORMAL b. Perform the following: 1) Monitor Critical Safety Functions using 3-EOP-F-0, CRITICAL SAFETY FUNCTION STATUS TREES 2) Go to 3-EOP-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1

Op-Test No.: 2011-302 Scenario No.: 1 Event No.: 6 Page 11 of 23

Event Description: During plant stabilization, Block Valve MOV-3-535 develops leakage with PORV 456 leaking. The crew responds using 3-EOP-E-0 and transitions to 3-EOP-E-1. RCPs are tripped with the loss of Subcooling Margin.

Time	Position	Applicant's Actions or Behavior

	SRO/ATC	15 Check If RCS Is Intact
		• Containment radiation - NORMAL
		• Containment pressure - NORMAL
		• Containment sump level - NORMAL
		  • LI-3-6308A
		  • LI-3-6308B
		Perform the following:
		1. Monitor Critical Safety Functions using 3-EOP-F-0, CRITICAL SAFETY FUNCTION STATUS TREES.
		2. Go to 3-EOP-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1.

	CREW	Diagnoses the Small Break LOCA.
	SRO	Transitions to 3-EOP-E-1.
	BOP	Continues performance of 3-EOP-E-0 Attachment 3 Prompt Action Verification.

Examiner Note: 3-EOP-E-1 details start on EVENT 6 - Page 18 of 23

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Event Description: During plant stabilization, Block Valve MOV-3-535 develops leakage with PORV 456 leaking. The crew responds using 3-EOP-E-0 and transitions to 3-EOP-E-1. RCPs are tripped with the loss of Subcooling Margin.

Time	Position	Applicant's Actions or Behavior
	BOP	**ATTACHMENT 3** (Page 1 of 7) **PROMPT ACTION VERIFICATIONS**
	BOP	**1. Check The Load Centers Associated With The Energized 4 KV Buses – ENERGIZED** — Close the Load Center supply breakers. • 3A LC • 3B LC • 3C LC • 3D LC • 3H LC
	BOP	**2. Check If Main Steamlines Should Be Isolated** a. Check main steamline isolation and bypass valves - ANY OPEN — a. Go to Step 3. b. Check if either main steam isolation signal has actuated — b. Go to Step 3. • High steam flow with either low S/G pressure 614 psig **OR** low Tavg 543 F **OR** • Hi-Hi containment pressure 20 PSIG c. Verify main steam isolation and bypass valves - CLOSED — c. Push manual Steamline Isolation push buttons on VPB **OR** manually close valves.
	BOP	**3. Verify Feedwater Isolation** a. Place main feedwater pump switches in STOP b. Feedwater control valves – CLOSED — b. Manually close valves. c. Feedwater bypass valves – CLOSED — c. Manually close valves. d. Close feedwater isolation MOVs — d. Locally close valves. e. Verify standby feedwater pumps – OFF — e. **IF** standby feedwater is aligned to Unit 3, **THEN** stop standby feedwater pump(s).
	BOP	Places Main Feedwater Pump switches in STOP.

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Event Description: During plant stabilization, Block Valve MOV-3-535 develops leakage with PORV 456 leaking. The crew responds using 3-EOP-E-0 and transitions to 3-EOP-E-1. RCPs are tripped with the loss of Subcooling Margin.

Time	Position	Applicant's Actions or Behavior
	BOP	**4. Verify Proper ICW System Operation** a. Verify ICW pumps - AT LEAST TWO RUNNING a. Start ICW pump(s) to establish at least two running. b. Verify ICW to TPCW Heat Exchanger – ISOLATED • POV-3-4882 – CLOSED • POV-3-4883 – CLOSED b. Manually close valve(s). **IF** valve(s) can **NOT** be closed, **THEN** locally close the following valves: • 3-50-319 for POV-3-4882 • 3-50-339 for POV-3-4883 c. Check ICW headers - TIED TOGETHER c. **IF** both ICW headers are intact, **THEN** direct operator to tie headers together.
	BOP	**5. Verify Proper CCW System Operation** a. CCW Heat Exchangers – THREE IN SERVICE a. Perform the following: 1) Start or stop CCW pumps as necessary to establish ONLY ONE RUNNING CCW PUMP. 2) Verify Emergency Containment Coolers - ONLY TWO RUNNING 3) Go to Step 5c. b. CCW pumps - ONLY TWO RUNNING b. Start or stop CCW pumps as necessary to establish ONLY TWO RUNNING CCW PUMPS. c. CCW headers - TIED TOGETHER c. **IF** both CCW headers are intact, **THEN** direct a field operator to tie the headers together. d. RCP Thermal Barrier CCW Outlet, MOV-3-626 – OPEN d. **IF** containment isolation phase B **NOT** actuated **AND** CCW radiation levels are normal, **AND** RCP number one seal leak-off temperature is less than 235°F, **THEN** manually open MOV-3-626. **IF** MOV-3-626 can **NOT** be manually opened, **THEN** direct operator to open MOV-3-626 locally.
	BOP	**6. Verify Containment Cooling** a. Check emergency containment coolers - ONLY TWO RUNNING a. Manually start or stop emergency containment coolers to establish - ONLY TWO RUNNING. b. Verify emergency containment filter fans - AT LEAST TWO RUNNING b. Manually start emergency containment filter fans.
	BOP	Places the handswitch for the 3C ECC to START. **[EVENT 8]**

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Event Description: During plant stabilization, Block Valve MOV-3-535 develops leakage with PORV 456 leaking. The crew responds using 3-EOP-E-0 and transitions to 3-EOP-E-1. RCPs are tripped with the loss of Subcooling Margin.

Time	Position	Applicant's Actions or Behavior
	BOP	**7. Verify Pump Operation** a. At least two high head SI pumps running — a. Manually start high-head pump(s). b. Both RHR pumps running — b. Manually start RHR pump(s).
	BOP	**8. Verify SI Flow** a. RCS pressure - LESS THAN 1600 PSIG [2000 PSIG] — a. Go to Step 9. b. High-head SI pump flow indicator – CHECK FOR FLOW — b. Manually start pumps **AND** align valves to establish an injection flowpath. c. RCS pressure - LESS THAN 250 PSIG [650 PSIG] — c. Go to Step 9. d. RHR pump flow indicator - CHECK FOR FLOW — d. Manually start pumps **AND** align valves to establish an injection flowpath.
	BOP	**9. Realign SI System** a. Verify Unit 3 high-head SI pumps - TWO RUNNING — a. Perform the following: 1) Operate Unit 3 and Unit 4 high-head SI pumps to establish injection to Unit 3 from two high-head SI pumps. 2) Direct Unit 4 Reactor Operator to align Unit 4 high-head SI pump suction to Unit 3 RWST using ATTACHMENT 1 of this procedure. 3) Go to Step 10. b. Stop both Unit 4 high-head SI pumps **AND** place in standby
	BOP	Places the handswitches for the 4A and 4B HHSI pumps to STOP.

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Event Description: During plant stabilization, Block Valve MOV-3-535 develops leakage with PORV 456 leaking. The crew responds using 3-EOP-E-0 and transitions to 3-EOP-E-1. RCPs are tripped with the loss of Subcooling Margin.

Time	Position	Applicant's Actions or Behavior
	BOP	10. **Verify Containment Isolation Phase A Valve White Lights On VPB – ALL BRIGHT** Perform the following: a. Manually actuate Containment Isolation Phase A. b. **IF** any Containment Isolation Phase A valve is **NOT** closed, **THEN** manually close valve. **IF** valve(s) can **NOT** be manually closed, **THEN** manually or locally isolate affected containment penetration.
	BOP	11. **Verify SI Valve Amber Lights On VPB - ALL BRIGHT** Manually align valves to establish proper SI alignment for an injection flowpath.
	BOP	12. **Verify SI – RESET** Reset SI
	BOP	13. **Verify Containment Phase A – RESET** Reset Phase A
	BOP	14. **Reestablish RCP Cooling** a. Check RCPs – AT LEAST ONE RUNNING — a. Go to Step 15. b. Open CCW to normal containment cooler valves — b. Stop all RCPs • MOV-3-1417 • MOV-3-1418 c. Reset and start normal containment coolers — c. Stop all RCPs
	BOP	If RCPs are running, then resets and starts Normal Containment Coolers.

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Event Description: During plant stabilization, Block Valve MOV-3-535 develops leakage with PORV 456 leaking. The crew responds using 3-EOP-E-0 and transitions to 3-EOP-E-1. RCPs are tripped with the loss of Subcooling Margin.

Time	Position	Applicant's Actions or Behavior
	BOP	**15. Monitor Containment Pressure To Verify Containment Spray NOT Required** a. Containment pressure - HAS REMAINED LESS THAN 20 PSIG • PR-3-6306A **AND** • PR-3-6306B a. Perform the following: 1) **IF** containment spray **NOT** initiated, **THEN** manually initiate containment spray. 2) Verify Containment Isolation Phase B - ACTUATED. 3) Verify Containment Isolation Phase B valve white lights on VPB – ALL BRIGHT. 4) **IF** any Containment Isolation Phase B valve did **NOT** close, **THEN** manually or locally isolate affected containment penetration. 5) Stop all RCPs.
	BOP	**16. Verify Containment and Control Room Ventilation Isolation** a. Unit 3 containment purge exhaust and supply fans – OFF a. Manually stop fans. b. Verify Control Room ventilation status panel - PROPER EMERGENCY RECIRCULATION ALIGNMENT b. Manually align equipment for Control Room emergency recirculation.
	BOP	**NOTE** *Hydrogen Monitors should be in service within 30 minutes of a valid SI signal. They should be available in a timely manner to support decision-making related to hydrogen generation in containment.*
	BOP	**17. Place Hydrogen Monitors In Service Using 3-NOP-094, CONTAINMENT POST ACCIDENT MONITORING SYSTEM**
	BOP	**18. Verify All Four EDGs – RUNNING** EMERGENCY START any available EDG **NOT** running.

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Event Description: During plant stabilization, Block Valve MOV-3-535 develops leakage with PORV 456 leaking. The crew responds using 3-EOP-E-0 and transitions to 3-EOP-E-1. RCPs are tripped with the loss of Subcooling Margin.

Time	Position	Applicant's Actions or Behavior
	BOP	**19. Verify Power To Emergency 4 KV Buses and Load Centers** a. Check the 3A, 3B and 3D 4 KV buses - ALL ENERGIZED a. Perform the following: 1) Inform the Unit Supervisor that ATTACHMENT 3 is complete with the exception of the de-energized bus or buses. 2) **IF** the Unit Supervisor decides not to energize the de-energized bus or buses, **THEN** go to Step 20. 3) **IF** the Unit Supervisor decides to energize 3A, 3B, or 3D bus, **THEN** perform the following: a) **IF** 3A 4 KV bus de-energized, **THEN** restore power to bus using 3-ONOP-004.2, LOSS OF 3A 4KV BUS. b) **IF** 3B 4 KV bus de-energized, **THEN** restore power to bus using 3-ONOP-004.3, LOSS OF 3B 4KV BUS. c) **IF** 3D 4 KV bus de-energized, **THEN** restore power to bus using 3-ONOP-004.5, LOSS OF 3D 4KV BUS.
	BOP	**20. Notify The Unit Supervisor That The PROMPT ACTION VERIFICATIONS Attachment Is Complete And Discuss Any Safeguards Equipment That Is Not In The Required Condition**

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Event Description: During plant stabilization, Block Valve MOV-3-535 develops leakage with PORV 456 leaking. The crew responds using 3-EOP-E-0 and transitions to 3-EOP-E-1. RCPs are tripped with the loss of Subcooling Margin.

Time	Position	Applicant's Actions or Behavior
	SRO	Transitions to 3-EOP-E-1.
	SRO	Directs response using 3-EOP-E-1.
		NOTE *Foldout page is required to be monitored throughout this procedure.*
	CREW	Monitors 3-EOP-E-1 Foldout page (see next page for foldout)
CREW CRITICAL TASK: With RHR Flow less than 1000 gpm, stop the RHR Pumps within 44 minutes of their start signal.		
	SRO/ATC	**1 Monitor Conditions To Determine If RCPs Should Be Stopped** a. RCPs - ANY RUNNING — a. Go to Step 2. b. High-head SI pumps - AT LEAST ONE RUNNING — b. Go to Step 2. c. RCS Subcooling - LESS THAN 25°F[65°F] — c. Go to Step 2. d. Controlled plant cooldown – NOT IN PROGRESS — d. Go to Step 2. e. Stop all RCPs
	SRO/ATC	Stops RCPs if subcooling is less than 25° with HHSI flowpath verified and HHSI pumps running.
CREW CRITICAL TASK: Trip RCPs due to a loss of subcooling during a SBLOCA prior to completing step 1 of 3-EOP-E-1.		
	SRO/BOP	**2 Check If S/Gs Are NOT Faulted** a. Check pressures in all S/Gs – • NO S/G PRESSURE DECREASING IN AN UNCONTROLLED MANNER • NO S/G COMPLETELY DEPRESSURIZED — a. IF any S/G is faulted AND that S/G has NOT previously been isolated, THEN go to 3-EOP-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

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Event Description: During plant stabilization, Block Valve MOV-3-535 develops leakage with PORV 456 leaking. The crew responds using 3-EOP-E-0 and transitions to 3-EOP-E-1. RCPs are tripped with the loss of Subcooling Margin.

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	**3 Maintain Intact S/G Levels** a. Narrow range level - GREATER THAN 6%[32%] — a. Maintain total feed flow greater than 345 gpm until narrow range level greater than 6%[32%] in at least one S/G. b. Control feed flow to maintain narrow range level between 15%[32%] and 50% c. Narrow range level - LESS THAN 50% — c. Stop feed flow to any S/G with narrow range level greater than 50%. IF narrow range level in any S/G continues to increase in an uncontrolled manner, THEN go to 3-EOP-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.
	SRO/BOP	**4 Monitor Secondary Radiation** a. Direct Nuclear Chemistry to take periodic activity samples of all S/Gs b. Direct Nuclear Chemistry to check DAM1 monitor reading c. Direct Health Physics to take radiation readings on main steamlines d. Secondary radiation - NORMAL NEAR ROUTINE OPERATION VALUE — d. Go to 3-EOP-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.
	SRO/ATC	***CAUTION*** ***If any PRZ PORV opens because of high PRZ pressure, it is required to be verified closed or isolated after pressure decreases to less than the PORV setpoint.***
	SRO/ATC	**5 Check PRZ PORVs AND Block Valves** a. Power to block valves - AVAILABLE — a. Restore power to block valves b. PORVs - CLOSED — b. IF PRZ pressure less than 2335 psig, THEN manually close PORVs. IF any valve can NOT be closed, THEN manually close its block valve. c. Block valves - AT LEAST ONE OPEN — c. Open one block valve unless it was closed to isolate an open PORV.
	SRO/ATC	**6 Verify SI - RESET**

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Event Description: During plant stabilization, Block Valve MOV-3-535 develops leakage with PORV 456 leaking. The crew responds using 3-EOP-E-0 and transitions to 3-EOP-E-1. RCPs are tripped with the loss of Subcooling Margin.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	**7** **Reset Containment Isolation Phase A AND Phase B**
	SRO/ATC	**8** **Verify Instrument Air To Containment** a. Verify Instrument Air Containment Isolation, CV-3-2803 - OPEN b. Verify instrument air pressure, PI-3-1444 - GREATER THAN 95 PSIG b. Restore instrument air pressure using 0-ONOP-013, LOSS OF INSTRUMENT AIR, while continuing with this procedure.
	SRO/ATC	**9** **Check Power Supply To All Charging Pumps - ALIGNED TO OFFSITE POWER** Check diesel capacity adequate to run three charging pumps. **IF** adequate diesel capacity is **NOT** available, **THEN** shed nonessential loads. Refer to ATTACHMENT 3 for component KW load rating.
	SRO/ATC	**10** **Check Charging Flow Established** a. Charging pumps - AT LEAST ONE RUNNING a. Perform ATTACHMENT 4 to establish charging. b. Adjust speed controllers as necessary to establish desired charging flow to establish SI Termination conditions c. Adjust Charging Flow To Regen Heat Exchanger, HCV-3-121, to maintain proper seal injection flow
	ATC	Starts Charging Pumps as required (may start all 3).

Examiner Note: 3-EOP-E-1, Attachment 4 is on Page 22 of 23

Op-Test No.: 2011-302 Scenario No.: 1 Event No.: 6 Page 21 of 23

Event Description: During plant stabilization, Block Valve MOV-3-535 develops leakage with PORV 456 leaking. The crew responds using 3-EOP-E-0 and transitions to 3-EOP-E-1. RCPs are tripped with the loss of Subcooling Margin.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	**11** **Check if SI Should be Terminated** a. RCS subcooling based on core exit TCs - GREATER THAN 30°F[Refer to Foldout Page Item 3 Adverse Value] — a. Go to Step 12. b. Secondary heat sink — b. **IF** neither condition satisfied, **THEN** go to Step 12. * Total feed flow to intact S/Gs - GREATER THAN 345 GPM **OR** * Narrow range level in at least one intact S/G - GREATER THAN 6%[32%] c. RCS pressure — c. Go to Step 12. • Pressure - GREATER THAN 1600 PSIG[2000 PSIG] • Pressure - STABLE OR INCREASING d. PRZ level - GREATER THAN 17%[50%] — d. Try to stabilize RCS pressure with normal PRZ spray. Go to Step 12. e. Go to 3-EOP-ES-1.1, SI Termination, Step 1

TERMINATION CRITERIA

EXAMINER NOTE: The scenario is terminated when a SI Termination decision has been made or earlier based on the discretion of the Lead Examiner.

Op-Test No.: 2011-302 Scenario No.: 1 Event No.: 6 Page 22 of 23

Event Description: During plant stabilization, Block Valve MOV-3-535 develops leakage with PORV 456 leaking. The crew responds using 3-EOP-E-0 and transitions to 3-EOP-E-1. RCPs are tripped with the loss of Subcooling Margin.

Time	Position	Applicant's Actions or Behavior

ATTACHMENT 4
(Page 1 of 1)
ESTABLISH CHARGING FLOW

1. Verify CCW Flow Alarms To All RCP Thermal Barriers - OFF

- A 1/1, RCP THERMAL BARR COOLING WATER HI FLOW

AND

- A 1/2, RCP THERMAL BARR COOLING WATER HI TEMP

AND

- A 1/3, RCP THERMAL BARR COOLING WATER LO FLOW

IF CCW flow to RCPs thermal barrier is lost, perform the following:

a. Verify seal return temperature for each RCP to be less than 235 F.

b. **IF** seal return temperature for each RCP is less than 235 F, **THEN** go to Step 2.

c. **IF** seal return temperature is ≥ 235 F, **THEN** locally isolate seal injection to affected RCP(s) before starting charging pumps.
   * 3-297A for RCP A
   * 3-297B for RCP B
   * 3-297C for RCP C

d. **WHEN** seal injection is isolated to each affected RCP, **THEN** go to Step 2.

2. Check Offsite Power Available

IF offsite power is NOT available, **THEN** check diesel capacity adequate to run one charging pump. **IF** diesel capacity is NOT adequate, **THEN** shed non-essential loads. Refer to ATTACHMENT 3 for component KW load rating.

3. Start One Charging Pump

4. Place RCS Makeup Control Switch in STOP

5. Establish Desired Charging Flow

a. Start additional charging pumps if needed and offsite power available

a. **IF** offsite power is NOT available, **THEN** check diesel capacity adequate to run additional charging pumps.

c. Adjust Charging Flow To Regen Heat Exchanger, HCV-3-121, to maintain proper seal injection flow

d. Verify charging pump suction auto transfers to RWST

6. Notify The Unit Supervisor That The ESTABLISH CHARGING FLOW Attachment Is Complete

Op-Test No.: 2011-302 Scenario No.: 1 Event No.: 6 Page 23 of 23

Event Description: During plant stabilization, Block Valve MOV-3-535 develops leakage with PORV 456 leaking. The crew responds using 3-EOP-E-0 and transitions to 3-EOP-E-1. RCPs are tripped with the loss of Subcooling Margin.

Time	Position	Applicant's Actions or Behavior

FOLDOUT FOR PROCEDURE E-1

1. **ADVERSE CONTAINMENT CONDITIONS**
IF either of the conditions listed below occurs, THEN use adverse containment setpoints:
Containment atmosphere temperature ≥ 180°F
OR
Containment radiation levels ≥ 1.3×10^5 R/hr
WHEN containment parameters drop below the above values, THEN normal setpoints can again be used
IF containment integrated dose rate has not exceeded 10^6 Rads.

2. **RCP TRIP CRITERIA**
a. IF all conditions listed below occur, THEN trip all RCPs:
1) High-head SI pumps - AT LEAST ONE RUNNING AND SI FLOWPATH VERIFIED
2) RCS subcooling - LESS THAN 25°F[65°F]
3) Controlled RCS cooldown is NOT in progress
b. IF phase B actuated, THEN trip all RCPs

3. **SI TERMINATION CRITERIA**
IF all conditions listed below occur, THEN go to 3-EOP-ES-1.1, SI TERMINATION, Step 1:
a. RCS subcooling based on core exit TCs - GREATER THAN 30°F[See below Table]

SI TERMINATION ADVERSE SUBCOOLING VALUE	
RCS PRESSURE (PSIG)	ADVERSE SUBCOOLING VALUE
< 2485 AND ≥ 2000	≥ 55 °F
< 2000 AND ≥ 1000	≥ 85 °F
< 1000	≥ 210°F

b. Total feed flow to intact SGs - GREATER THAN 345 GPM OR narrow range level in at least one intact SG - GREATER THAN 6%[32%]
c. RCS pressure - GREATER THAN 1600 PSIG[2000 psig] AND STABLE OR INCREASING
d. PRZ level - GREATER THAN 17%[50%]

4. **SECONDARY INTEGRITY CRITERIA**
IF any S/G pressure is decreasing in an uncontrolled manner OR has completely depressurized AND that S/G has NOT been isolated, THEN go to 3-EOP-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

5. **E-3 TRANSITION CRITERIA**
IF any S/G level increases in an uncontrolled manner OR any S/G has abnormal radiation, THEN manually start SI pumps as necessary and go to 3-EOP-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

6. **COLD LEG RECIRCULATION SWITCHOVER CRITERIA**
IF RWST level decreases to less than 155,000 gallons, THEN go to 3-EOP-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

7. **RECIRCULATION SUMP BLOCKAGE**
IF RHR pump flow AND amps become erratic OR abnormally low after recirculation has been established, THEN transition to 3-EOP-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.

8. **CST MAKEUP WATER CRITERIA**
IF CST level decreases to less than 10%, THEN add makeup to CST using 3-NOP-018.01, Condensate Storage Tank (CST).

9. **LOSS OF OFFSITE POWER OR SI ON OTHER UNIT**
IF SI has been reset AND either offsite power is lost OR SI actuates on the other unit, THEN restore safeguards equipment to required configuration. Refer to ATTACHMENT 3 for essential loads.

10. **RHR SYSTEM OPERATION CRITERIA**
IF RHR flow is less than 1000 gpm, THEN the RHR pumps shall be shut down within 44 minutes of the initial start signal.

Op-Test No.: 2011-302 Scenario No.: 1 Event No.: 6 Page 1 of 6

NOTE: This is an additional Attachment 3 which is conveniently at the end for evaluator comments.

3-EOP-E-0, Reactor Trip or Safety Injection – Attachment 3, Prompt Action Verifications

Time	Position	Applicant's Actions or Behavior
	BOP	**ATTACHMENT 3** (Page 1 of 7) **PROMPT ACTION VERIFICATIONS**
	BOP	**1. Check The Load Centers Associated With The Energized 4 KV Buses – ENERGIZED** • 3A LC • 3B LC • 3C LC • 3D LC • 3H LC Close the Load Center supply breakers.
	BOP	**2. Check If Main Steamlines Should Be Isolated** a. Check main steamline isolation and bypass valves - ANY OPEN — a. Go to Step 3. b. Check if either main steam isolation signal has actuated — b. Go to Step 3. • High steam flow with either low S/G pressure 614 psig **OR** low Tavg 543 F **OR** • Hi-Hi containment pressure 20 PSIG c. Verify main steam isolation and bypass valves - CLOSED — c. Push manual Steamline Isolation push buttons on VPB **OR** manually close valves.
	BOP	**3. Verify Feedwater Isolation** a. Place main feedwater pump switches in STOP b. Feedwater control valves – CLOSED — b. Manually close valves. c. Feedwater bypass valves – CLOSED — c. Manually close valves. d. Close feedwater isolation MOVs — d. Locally close valves. e. Verify standby feedwater pumps – OFF — e. **IF** standby feedwater is aligned to Unit 3, **THEN** stop standby feedwater pump(s).
	BOP	Places Main Feedwater Pump switches in STOP.

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NOTE: This is an additional Attachment 3 which is conveniently at the end for evaluator comments.

3-EOP-E-0, Reactor Trip or Safety Injection – Attachment 3, Prompt Action Verifications

Time	Position	Applicant's Actions or Behavior
	BOP	**4. Verify Proper ICW System Operation** a. Verify ICW pumps - AT LEAST TWO RUNNING a. Start ICW pump(s) to establish at least two running. b. Verify ICW to TPCW Heat Exchanger – ISOLATED • POV-3-4882 – CLOSED • POV-3-4883 – CLOSED b. Manually close valve(s). **IF** valve(s) can **NOT** be closed, **THEN** locally close the following valves: • 3-50-319 for POV-3-4882 • 3-50-339 for POV-3-4883 c. Check ICW headers - TIED TOGETHER c. **IF** both ICW headers are intact, **THEN** direct operator to tie headers together.
	BOP	**5. Verify Proper CCW System Operation** a. CCW Heat Exchangers – THREE IN SERVICE a. Perform the following: 1) Start or stop CCW pumps as necessary to establish ONLY ONE RUNNING CCW PUMP. 2) Verify Emergency Containment Coolers - ONLY TWO RUNNING 3) Go to Step 5c. b. CCW pumps - ONLY TWO RUNNING b. Start or stop CCW pumps as necessary to establish ONLY TWO RUNNING CCW PUMPS. c. CCW headers - TIED TOGETHER c. **IF** both CCW headers are intact, **THEN** direct a field operator to tie the headers together. d. RCP Thermal Barrier CCW Outlet, MOV-3-626 – OPEN d. **IF** containment isolation phase B **NOT** actuated **AND** CCW radiation levels are normal, **AND** RCP number one seal leak-off temperature is less than 235°F, **THEN** manually open MOV-3-626. **IF** MOV-3-626 can **NOT** be manually opened, **THEN** direct operator to open MOV-3-626 locally.
	BOP	**6. Verify Containment Cooling** a. Check emergency containment coolers - ONLY TWO RUNNING a. Manually start or stop emergency containment coolers to establish - ONLY TWO RUNNING. b. Verify emergency containment filter fans - AT LEAST TWO RUNNING b. Manually start emergency containment filter fans.
	BOP	Places the handswitch for the 3C ECC to START. **[EVENT 8]**

Op-Test No.: 2011-302 Scenario No.: 1 Event No.: 6 Page 3 of 6

NOTE: This is an additional Attachment 3 which is conveniently at the end for evaluator comments.

3-EOP-E-0, Reactor Trip or Safety Injection – Attachment 3, Prompt Action Verifications

Time	Position	Applicant's Actions or Behavior
	BOP	**7. Verify Pump Operation** a. At least two high head SI pumps running — a. Manually start high-head pump(s). b. Both RHR pumps running — b. Manually start RHR pump(s).
	BOP	**8. Verify SI Flow** a. RCS pressure - LESS THAN 1600 PSIG [2000 PSIG] — a. Go to Step 9. b. High-head SI pump flow indicator – CHECK FOR FLOW — b. Manually start pumps **AND** align valves to establish an injection flowpath. c. RCS pressure - LESS THAN 250 PSIG [650 PSIG] — c. Go to Step 9. d. RHR pump flow indicator - CHECK FOR FLOW — d. Manually start pumps **AND** align valves to establish an injection flowpath.
	BOP	**9. Realign SI System** a. Verify Unit 3 high-head SI pumps - TWO RUNNING — a. Perform the following: 1) Operate Unit 3 and Unit 4 high-head SI pumps to establish injection to Unit 3 from two high-head SI pumps. 2) Direct Unit 4 Reactor Operator to align Unit 4 high-head SI pump suction to Unit 3 RWST using ATTACHMENT 1 of this procedure. 3) Go to Step 10. b. Stop both Unit 4 high-head SI pumps **AND** place in standby
	BOP	Places the handswitches for the 4A and 4B HHSI pumps to STOP.

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NOTE: This is an additional Attachment 3 which is conveniently at the end for evaluator comments.

3-EOP-E-0, Reactor Trip or Safety Injection – Attachment 3, Prompt Action Verifications

Time	Position	Applicant's Actions or Behavior	
	BOP	10. **Verify Containment Isolation Phase A Valve White Lights On VPB – ALL BRIGHT**	Perform the following: a. Manually actuate Containment Isolation Phase A. b. **IF** any Containment Isolation Phase A valve is **NOT** closed, **THEN** manually close valve. **IF** valve(s) can **NOT** be manually closed, **THEN** manually or locally isolate affected containment penetration.
	BOP	11. **Verify SI Valve Amber Lights On VPB - ALL BRIGHT**	Manually align valves to establish proper SI alignment for an injection flowpath.
	BOP	12. **Verify SI – RESET**	Reset SI
	BOP	13. **Verify Containment Phase A – RESET**	Reset Phase A
	BOP	14. **Reestablish RCP Cooling** a. Check RCPs – AT LEAST ONE RUNNING b. Open CCW to normal containment cooler valves • MOV-3-1417 • MOV-3-1418 c. Reset and start normal containment coolers	a. Go to Step 15. b. Stop all RCPs c. Stop all RCPs

Op-Test No.: 2011-302 Scenario No.: 1 Event No.: 6 Page 5 of 6

NOTE: This is an additional Attachment 3 which is conveniently at the end for evaluator comments.

3-EOP-E-0, Reactor Trip or Safety Injection – Attachment 3, Prompt Action Verifications

Time	Position	Applicant's Actions or Behavior
	BOP	**15. Monitor Containment Pressure To Verify Containment Spray NOT Required** a. Containment pressure - HAS REMAINED LESS THAN 20 PSIG • PR-3-6306A **AND** • PR-3-6306B a. Perform the following: 1) **IF** containment spray **NOT** initiated, **THEN** manually initiate containment spray. 2) Verify Containment Isolation Phase B - ACTUATED. 3) Verify Containment Isolation Phase B valve white lights on VPB – ALL BRIGHT. 4) **IF** any Containment Isolation Phase B valve did **NOT** close, **THEN** manually or locally isolate affected containment penetration. 5) Stop all RCPs.
	BOP	**16. Verify Containment and Control Room Ventilation Isolation** a. Unit 3 containment purge exhaust and supply fans – OFF a. Manually stop fans. b. Verify Control Room ventilation status panel - PROPER EMERGENCY RECIRCULATION ALIGNMENT b. Manually align equipment for Control Room emergency recirculation.
	BOP	**NOTE** *Hydrogen Monitors should be in service within 30 minutes of a valid SI signal. They should be available in a timely manner to support decision-making related to hydrogen generation in containment.*
	BOP	**17. Place Hydrogen Monitors In Service Using 3-NOP-094, CONTAINMENT POST ACCIDENT MONITORING SYSTEM**
	BOP	**18. Verify All Four EDGs – RUNNING** EMERGENCY START any available EDG **NOT** running.

Op-Test No.: 2011-302 Scenario No.: 1 Event No.: 6 Page 6 of 6

NOTE: This is an additional Attachment 3 which is conveniently at the end for evaluator comments.

3-EOP-E-0, Reactor Trip or Safety Injection – Attachment 3, Prompt Action Verifications

Time	Position	Applicant's Actions or Behavior
	BOP	19. **Verify Power To Emergency 4 KV Buses and Load Centers** a. Check the 3A, 3B and 3D 4 KV buses - ALL ENERGIZED a. Perform the following: 1) Inform the Unit Supervisor that ATTACHMENT 3 is complete with the exception of the de-energized bus or buses. 2) **IF** the Unit Supervisor decides not to energize the de-energized bus or buses, **THEN** go to Step 20. 3) **IF** the Unit Supervisor decides to energize 3A, 3B, or 3D bus, **THEN** perform the following: a) **IF** 3A 4 KV bus de-energized, **THEN** restore power to bus using 3-ONOP-004.2, LOSS OF 3A 4KV BUS. b) **IF** 3B 4 KV bus de-energized, **THEN** restore power to bus using 3-ONOP-004.3, LOSS OF 3B 4KV BUS. c) **IF** 3D 4 KV bus de-energized, **THEN** restore power to bus using 3-ONOP-004.5, LOSS OF 3D 4KV BUS.
	BOP	20. **Notify The Unit Supervisor That The PROMPT ACTION VERIFICATIONS Attachment Is Complete And Discuss Any Safeguards Equipment That Is Not In The Required Condition**

ILC-27 NRC Scenario #2 Event Description

Facility: Turkey Point **Scenario:** 2 **Op Test.:** 2011-302

Examiners: _____ **Candidates:** _____ **US**

_____ _____ **ATC**

_____ _____ **BOP**

Initial Conditions: Mode 1 100% power at BOL.

Turnover:
- Maintain 100% power.
- Online Risk – Green with B Train protected on both units.

Event No.	Malf. No.	Event Type	Event Description
1	N/A	(N) ATC (N) SRO	TS LCO 3.5.1 was entered for 3B Accumulator level at greater than 6,820 gallons. Use 3-NOP-064, Section 5.2 to lower 3B Accumulator level to the normal operating band (6,552 to 6,788 gallons). After reached, the SRO exits the LCO.
2	TVB1LCDV	(I) ATC (I) SRO	VCT Level Transmitter, LT-3-115, drifts high over 7 minutes to divert water to the Hold Up Tanks. This requires manual operator action to reposition 3-LCV-115A to the VCT position. The crew responds using the ARP or 3-ONOP-046.4.
3	TVUTPMPA	(C) BOP (C) SRO	3A Heater Drain Pump trips on high amps which require starting an additional Condensate Pump to support this power level.
4	TFH2L9FH	(I) ATC (I) SRO	The Master Charging Pump Controller, LC-3-459G, signal fails high. The RO takes action to control the Charging Pump Speed Controller in manual and maintain program level per Enclosure 1 of 3-ONOP-041.6, Pressurizer Level Control Malfunction.
5	TFS1MAML	(I) ATC (I,TS) SRO	Turbine First Stage Pressure Channel, P-3-447 fails low. ATC determines no runback. Rod Control is taken to manual per 3-ONOP-028 or 0-ADM-211. 3-ONOP-049.1 is entered for mitigation. The SRO will address LCO 3.3.1 and 3.3.2. This channel is declared inoperable.
6	TFS1MWEA	(I) BOP (I,TS) SRO	S/G Steam Flow Channel FI-474 fails as is for A S/G. The A S/G Feed Reg Valve does respond properly during power maneuver. Action is necessary for manual control and/or swap channels. When discovered, the SRO will address LCO 3.3.1 and 3.3.2. This channel is declared inoperable.
7	N/A	(R) ATC (N) BOP (R) SRO	Engineering reports 3B S/G Feedwater Pump High Vibration. SM directs a 3-GOP-100 power reduction to remove the 3B S/G Feedwater Pump within the next hour.
8	TVFAHDR2 TVFALN3	(M) ALL	A common Main Feed Header break occurs, the crew responds to the reactor trip using 3-EOP-E-0.
9	TAFK144 TAFK244 TAFK344	(M) ALL	During the loss of Main Feed, a common loss of suction to all AFW pumps. The crew transitions to 3-EOP-FR-H.1 to initiate Feed and Bleed.
10	TFU100005	(I) BOP (I) SRO	The Main Turbine fails to automatically trip. The BOP will take compensatory action to trip the Turbine manually.
11	TFKC883A	(I) BOP (I) SRO	The ICW to TPCW Heat Exchanger Valve, POV-3-4883, does not automatically isolate on a Safety Injection signal. The BOP takes action while performing Attachment 3 of 3-EOP-E-0 to manually close the valve.

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

SIMULATOR SETUP INSTRUCTIONS

1. Reset to IC-11 (100% BOL) or other IC with correct setup conditions.
2. Place Simulator in RUN
3. Open and Execute ILC27SCN2N.lsn.
4. Ensure 3A S/G Steam Flow Channel Control Transfer is selected to FI-3-474.
5. Ensure Channel Select First Stage Pressure Control is selected to CH4 YELLOW.
6. Increase 3B Accumulator level to greater than 6,820 gallons.
7. Store IC with initial conditions setup if desired.
8. Trigger lesson steps:
   - SETUP - LOSS OF AFW PUMP SUCTION SUPPLY
     insert TAFK144 0.000000 delay=0 ramp=0 on=0 off=0
     insert TAFK244 0.000000 delay=0 ramp=0 on=0 off=0
     insert TAFK344 0.000000 delay=0 ramp=0 on=0 off=0
   - SETUP - MAIN TURBINE FAILS TO TRIP
     insert TFU10005 TRUE delay=0 ramp=0 on=0 off=0
   - SETUP - FAIL POV-3-4883 AS IS
     insert TFKC883A TRUE delay=0 ramp=0 on=0 off=0
9. Provide an in progress procedure of 3-NOP-064, Safety Injection Accumulators.
10. Place Simulator in freeze.
11. Provide Shift Turnover Checklists
12. Perform Simulator Operator Checklist
13. When ready to begin, place Simulator in RUN.

FACILITY OPERATOR INSTRUCTIONS

EVENT 1

TS LCO 3.5.1 was entered for 3B Accumulator level at greater than 6,820 gallons. Use 3-NOP-064, Section 5.2 to lower 3B Accumulator level to the normal operating band (6,552 to 6,788 gallons). After reached, the SRO exits the LCO.

EVENT 2

VCT Level Transmitter, LT-3-115, drifts high over 7 minutes to divert water to the Hold Up Tanks. This requires manual operator action to reposition 3-LCV-115A to the VCT position. The crew responds using the ARP or 3-ONOP-046.4.

When directed, Trigger EVENT 2 - LT-3-115 DRIFTS HIGH.

- insert TVB1LCDV 1.000000 delay=0 ramp=420 on=0 off=0

SM - If directed, respond and acknowledge the failure of LT-3-115.

WCC - If directed, respond and acknowledge the failure of LT-3-115 and to write a PWO for troubleshooting.

EVENT 3

3A Heater Drain Pump trips on high amps which require starting an additional Condensate Pump to support this power level.

When directed, Trigger EVENT 3 - 3A HDP TRIPS ON HIGH AMPS.

- insert TVUTPMPA 1.000000 delay=0 ramp=120 on=0 off=0

SM - If directed, respond and acknowledge the failure of 3A HDP.

WCC - If directed, respond and acknowledge the failure of 3A HDP and to write a PWO for troubleshooting.

EVENT 4

The Master Charging Pump Controller, LC-3-459G, signal fails high. The RO takes action to control the Charging Pump Speed Controller in manual and maintain program level per Enclosure 1 of 3-ONOP-041.6, Pressurizer Level Control Malfunction.

When directed, Trigger EVENT 4 - MSTR CHARGING CONTROL LC-3-459G FAILS HI.

- insert TFH2L9FH TRUE delay=0 ramp=0 on=0 off=0

SM - If directed, respond and acknowledge the failure of LC-3-459G.

WCC - If directed, respond and acknowledge the failure of LC-3-459G and to write a PWO for troubleshooting.

EVENT 5

Turbine First Stage Pressure Channel, P-3-447 fails low. ATC determines no runback. Rod Control is taken to manual per 3-ONOP-028 or 0-ADM-211. 3-ONOP-049.1 is entered for mitigation. The SRO will address LCO 3.3.1 and 3.3.2. This channel is declared inoperable.

When directed, Trigger EVENT 5 - PT-3-447 FAILS LOW.

- insert TFS1MAML TRUE delay=0 ramp=0 on=0 off=0

SM - If directed, respond and acknowledge the failure of PT-3-447

WCC - If directed, respond and acknowledge the failure of PT-3-447 and to write a PWO for troubleshooting.

FS/TO - If directed, respond and reset AMSAC by

Trigger EVENT 5 - RESET AMSAC

- insert TCL4RST TRUE delay=0 ramp=0 on=0 off=0

EVENT 6

S/G Steam Flow Channel FI-3-474 fails as is for A S/G. The A S/G Feed Reg Valve does respond properly during power maneuver. Action is necessary for manual control and/or swap channels. When discovered, the SRO will address LCO 3.3.1 and 3.3.2. This channel is declared inoperable.

When directed, Trigger EVENT 6 - SG FLOW TRANSMITTER SB-FT-474 FAILS AS IS.

- insert TFS1MWEA TRUE delay=0 ramp=0 on=0 off=0

SM - If directed, respond and acknowledge the failure of FI-3-474.

WCC - If directed, respond and acknowledge the failure of FI-3-474 and to write a PWO for troubleshooting.

EVENT 7

Engineering reports 3B S/G Feedwater Pump High Vibration. SM directs a 3-GOP-100 power reduction to remove the 3B S/G Feedwater Pump within the next hour.

When directed, call as Shift Manager and report, "**Engineering has completed a walkdown of the secondary system. They have reported 3B S/G Feedwater Pump has high vibration. I am directing you to reduce Unit 3 power to 50% using 3-GOP-100 and remove the 3B S/G Feedwater Pump from service over the next hour.**"

SM - If directed, acknowledge power reduction.

WCC - If directed, acknowledge power reduction for the removal of 3B S/G Feedwater Pump.

SYSTEM DISPATCH - If directed, acknowledge power reduction to 50% for the removal of 3B S/G Feedwater Pump.

ENGINEERING - If directed, acknowledge power reduction to 50% for the removal of 3B S/G Feedwater Pump.

CHEMISTRY - If directed, acknowledge power reduction to 50% for the removal of 3B S/G Feedwater Pump and to sample the RCS for the power change .

EVENT 8

A Main Feed Header break occurs, the crew responds to the reactor trip using 3-EOP-E-0.

When directed, Trigger EVENT 8 - MAIN FEED HEADER BREAK WITH SGFP BKRS TRIPPING.

- insert TVFAHDR2 1 delay=0 ramp=0 on=0 off=0
- insert TVFALN3 1.0 delay=0 ramp=0 on=0 off=0
- insert TFF1D1AT TRUE delay=120 ramp=0 on=0 off=0
- insert TFF1D1BT TRUE delay=120 ramp=0 on=0 off=0

When directed, Trigger EVENT 8 - PAHMS.

- insert TAC2V02A 1.000000 delay=0 ramp=0 on=0 off=0
- insert TAC2V02B 1.000000 delay=0 ramp=0 on=0 off=0
- insert TAAAV21 1.000000 delay=0 ramp=0 on=0 off=0
- insert TAAAV22 1.000000 delay=0 ramp=0 on=0 off=0
- insert TACA005 .000000 delay=0 ramp=0 on=0 off=0

EVENT 9

During the loss of Main Feed, a common loss of suction to all AFW pumps. The crew transitions to 3-EOP-FR-H.1 to initiate Feed and Bleed.

FS/TO – If dispatched to investigate loss of Auxiliary Feedwater, the operator will respond they cannot enter the Aux. Feedwater Cage Area due to steam in the area.

EVENT 10

The Main Turbine fails to automatically trip. The BOP will take compensatory action to trip the Turbine manually.

Conditional Trigger EVENT 10-MANUALLY TRIP MAIN TURBINE.

- Condition: IMU1PR4O insert TFU10005 0 delay=0 ramp=0 on=0 off=0

EVENT 11

The ICW to TPCW Heat Exchanger Valve, POV-3-4883, does not automatically isolate on a Safety Injection signal. The BOP takes action while performing Attachment 3 of 3-EOP-E-0 to manually close the valve.

Conditional Trigger EVENT 11- ALLOWS MANUAL CLOSURE OF POV-3-4883.

- Condition: IMK2883C delIA TFKC883A 2 delay=0

SCENARIO QUANTITATIVE ATTRIBUTES

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	#
1. Total malfunctions (5–8)	5
2. Malfunctions after EOP entry (1–2)	2
3. Abnormal events (2–4)	4
4. Major transients (1–2)	1
5. EOPs entered/requiring substantive actions (1–2)	1
6. EOP contingencies requiring substantive actions (0–2)	1
7. Critical tasks (2–3)	2

CRITICAL TASKS

1. **Manually trip the Main Turbine prior to Step 5 of 3-EOP-E-0 as read by the Unit Supervisor.**
2. **Initiate feed and bleed cooling so that the RCS depressurizes sufficiently for HHSI injection flow to occur prior to completing Step 16 of 3-EOP-FR-H.1.**

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Event Description: TS LCO 3.5.1 was entered for 3B Accumulator level at greater than 6,820 gallons. Use 3-NOP-064, Section 5.2 to lower 3B Accumulator level to the normal operating band (6,552 to 6,788 gallons). After reached, the SRO exits the LCO.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	Observes high 3B Accumulator level. • High 3B Accumulator level above Tech Spec limit • Drains 3B Accumulator level by 3- NOP-064 • Exits Tech Spec limit
	SRO/ATC	5.2 **Draining Accumulators** **NOTE** This Section allows one or more Accumulators to be drained to reduce level or pressure or for draining in preparation to increase boron concentration.
	SRO/ATC	1. **CHECK** RCDT available to receive discharge from Accumulators.
	SRO/ATC	**NOTE** • MODES 1, 2, or 3 with RCS pressure greater than 1000 psig, Technical Specifications require Accumulator levels between 6520 and 6820 gallons; however, to account for possible instrument inaccuracies, the required range has been administratively established at 6552 to 6788 gallons. • Technical Specifications require Accumulator pressures to be maintained in the range of 600 psig to 675 psig.
	SRO/ATC	2. IF in MODES 1, 2 or 3 with RCS pressure greater than 1000 psig, AND Accumulator will be drained to less than 6520 gallons, THEN **ENSURE** the remaining two Accumulators are OPERABLE with: • Water levels between 6552 to 6788 gallons. • Nitrogen pressure between 625 to 665 psig.

Op-Test No.: 2011-302 Scenario No.: 2 Event No.: 1 Page 2 of 4

Event Description: TS LCO 3.5.1 was entered for 3B Accumulator level at greater than 6,820 gallons. Use 3-NOP-064, Section 5.2 to lower 3B Accumulator level to the normal operating band (6,552 to 6,788 gallons). After reached, the SRO exits the LCO.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	3. IF in MODES 1, 2 or 3 with RCS pressure greater than 1000 psig AND draining Accumulators via the following normal Accumulator drain valves: • CV-3-852A, 3A ACCUMULATOR DRAIN • CV-3-852B, 3B ACCUMULATOR DRAIN • CV-3-852C, 3C ACCUMULATOR DRAIN
	SRO/ATC	**CAUTION** With RCS pressure greater than 1000 psig, only one Accumulator drain valve shall be OPENED at a time.
	SRO/ATC	Realizes Step 4 is N/A and to be used for 3A Accumulator.
	SRO/ATC	5. IF draining 3B Accumulator, THEN: **A.** **LOG** 3B Accumulator initial level in Narrative Log.
	SRO/ATC	**B.** IF using normal Accumulator drain path, THEN: (1) IF Accumulator is to remain pressurized as water level decreases, THEN **REFER TO** Section 4.2.4. (2) IF Accumulator is to be vented, THEN **REFER TO** Section 4.2.6. (3) **OPEN** CV-3-852B, 3B ACCUMULATOR DRAIN. (4) WHEN desired level or pressure is obtained per Plant Curve Book, Accumulator Level or Accumulator Volume Verses Pressure Graph, THEN **CLOSE** CV-3-852B, 3B ACCUMULATOR DRAIN.
	ATC	Opens CV-3-852A Accumulator Drain

IV

Op-Test No.: 2011-302 Scenario No.: 2 Event No.: 1 Page 3 of 4

Event Description: TS LCO 3.5.1 was entered for 3B Accumulator level at greater than 6,820 gallons. Use 3-NOP-064, Section 5.2 to lower 3B Accumulator level to the normal operating band (6,552 to 6,788 gallons). After reached, the SRO exits the LCO.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	**C.** IF using alternate Accumulator drain path, THEN: (1) IF Accumulator is to remain pressurized as water level decreases, THEN **REFER TO** Section 4.2.4. (2) IF Accumulator is to be vented, THEN **REFER TO** Section 4.2.6. (3) **DIRECT** Chemistry to drain 3B Accumulator per 0-NCZP-064, Obtaining Accumulator Samples. (4) WHEN desired level or pressure is obtained per Plant Curve Book, Accumulator Level or Accumulator Volume Verses Pressure Graph, THEN **DIRECT** Chemistry to terminate draining per 0-NCZP-064, Obtaining Accumulator Samples.
	SRO/ATC	**D.** **LOG** 3B Accumulator final level in Narrative Log.
	SRO/ATC	**CAUTION** Chemistry sample results are required within 6 hours by TS 4.5.1.1.b, after each solution volume change of greater than or equal to 1% of tank volume.
	SRO/ATC	**E.** IF 3B Accumulator was drained due to in-leakage, THEN: (1) **NOTIFY** Chemistry to sample the Accumulator. (2) **LOG** time Chemistry was notified in Narrative Log.
	SRO/ATC	Realizes Step 6 is N/A and to be used for 3A Accumulator.
	SRO/ATC	7. **NOTIFY** Chemistry to sample Accumulator(s) for boron concentration. 8. **ENSURE** Chemistry sampling results for the Accumulator has been entered in the Unit Narrative Log.

Op-Test No.: 2011-302 Scenario No.: 2 Event No.: 1 Page 4 of 4

Event Description: TS LCO 3.5.1 was entered for 3B Accumulator level at greater than 6,820 gallons. Use 3-NOP-064, Section 5.2 to lower 3B Accumulator level to the normal operating band (6,552 to 6,788 gallons). After reached, the SRO exits the LCO.

Time	Position	Applicant's Actions or Behavior
	SRO	**Verifies 3B Accumulator Level and Pressure are SAT and exits LCO 3.5.1.**
EXAMINER NOTE: Once Technical Specifications are referenced or at the Lead Examiner's direction, then proceed onto Event 2.		
	SRO	**Technical Specifications** 4.5.1.1 Each accumulator shall be demonstrated OPERABLE: a. At least once per 12 hours by: 1) Verifying the borated water volume in each accumulator is between 6520 and 6820 gallons, and 2) Verifying that the nitrogen cover pressure in each accumulator is between 600 and 675 psig, and 3) Verifying that each accumulator isolation valve is open by control room indication (power may be restored to the valve operator to perform this surveillance if redundant indicator is inoperable).

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Event Description: VCT Level Transmitter, LT-3-115, drifts high over 7 minutes to divert water to the Hold Up Tanks. This requires manual operator action to reposition 3-LCV-115A to the VCT position. The crew responds using the ARP or 3-ONOP-046.4.

Time	Position	Applicant's Actions or Behavior
Direct Facility Operator to trigger lesson step, EVENT 2 - EVENT 1 - LT-3-115 DRIFTS HIGH (insert TVB1LCDV 1.000000 delay=0 ramp=420 on=0 off=0)		
	SRO/ATC	Observes failure of LT-3-115 • Indicated high level on LT-3-115 with normal level on LT-3-112. • VCT Level starts diverting to the Holdup Tanks • Annunciator A 4/6
	SRO/ATC	CAUSES: 1. Failed VCT level instrumentation 2. Loss of charging/letdown 3. RCS leak 4. VCT auto makeup malfunction **A4/6** **VCT HI/LO LEVEL**
	SRO/ATC	**ALARM CONFIRMATION** 1. **CHECK** LI-3-115, VCT LEVEL on VPA. 2. **CHECK** VCT level on LT-3-112 by at least one of the following methods: • **CHECK** LT-112 on DCS Chemical & Volume Control System display. • **DISPATCH** operator to check local reading on LI-3-112 in the Charging Pump room. • **ADJUST** LC-3-112, VCT LEVEL CONTROLLER AUTO setpoint potentiometer until demand begins to indicate greater than zero, read the pot setting, then return to previous setting.
	SRO/ATC	**OPERATOR ACTIONS** **NOTE** LT-3-112 and LT-3-115 share a common dry reference leg and a common wet variable leg. Failure of the common dry reference leg will cause a false high level.
	SRO/ATC	1. IF LT-3-115 has failed high, THEN **PLACE** LCV-3-115A, L/D DIVERT FROM VCT TO HOLD-UP TANK control switch to VCT position.
	SRO/ATC	Realizes LT-3-115 has failed high and places handswitch in the VCT position.

Op-Test No.: 2011-302 Scenario No.: 2 Event No.: 2 Page 2 of 3

Event Description: VCT Level Transmitter, LT-3-115, drifts high over 7 minutes to divert water to the Hold Up Tanks. This requires manual operator action to reposition 3-LCV-115A to the VCT position. The crew responds using the ARP or 3-ONOP-046.4.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	2. IF VCT has an actual HI level, THEN: A. **ENSURE** LC-3-112, VCT LEVEL CONTROLLER setpoint is between 37% to 40%. B. **CHECK** LCV-3-115A diverts to the HUT according to VCT level program.
	SRO/ATC	**NOTE** LCV-3-115A fully resets at 76%
	SRO/ATC	C. **ENSURE** LCV-3-115A fully diverts at 86%. D. **ENSURE** proper charging and letdown flow balance.
	SRO/ATC	3. IF VCT has an actual LO level, THEN: A. WHEN VCT level lowers to 4%, THEN **ENSURE** charging pump suction swaps to the RWST, with LCV-3-115B, RWST TO CHARGING PUMP SUCTION, OPEN and LCV-3-115C, VCT OUTLET ISOLATION VALVE, CLOSED. B. **ENSURE** auto makeup rate is greater than charging flow. C. **ENSURE** suction source swaps back to VCT at 11%.
	SRO/ATC	4. IF LT-3-112 or LT-3-115 have failed, THEN **REFER TO** 3-ONOP-046.4, Malfunction of Boron Concentration Control System.
	SRO	5. **REFER TO** Tech Spec 3.1.2.1 and 3.1.2.2.
	SRO	Enters 3-ONOP-046.4, Malfunction of Boron Concentration Control System, for additional actions.

EXAMINER NOTE: The crew may have entered 3-ONOP-046.4 directly which is an acceptable flowpath.

	SRO/ATC	1	**Check Boric Acid OR Primary Water Makeup Flow Rates - ABNORMAL**	Observe note prior to Step 28 and go to Step 28.
	SRO/ATC	**NOTES** • *LT-3-112 and LT-3-115 share a common wet variable leg and a common dry reference leg. A false high level will be produced if the common dry reference leg fails.* • *Steps 28 through 38 assume stable charging and letdown flow; therefore, a transient could mask the symptoms being used to determine which level transmitter has failed.*		

Op-Test No.: 2011-302 Scenario No.: 2 Event No.: 2 Page 3 of 3

Event Description: VCT Level Transmitter, LT-3-115, drifts high over 7 minutes to divert water to the Hold Up Tanks. This requires manual operator action to reposition 3-LCV-115A to the VCT position. The crew responds using the ARP or 3-ONOP-046.4.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	**28** **Check For VCT Level Transmitter, LT-3-115, Failing Or Failed High** Go to Step 31. • LI-3-115 - ABNORMALLY HIGH • LI-3-112 - DECREASING DUE TO FULL DIVERT OF LCV-3-115A
	SRO/ATC	**CAUTION** ***With no operator action, LT-3-115 failed high will result in loss of suction to the charging pumps.***
	SRO/ATC	**NOTE** *Failure of LT-3-115 high will result in the following:* • *Annunciator Alarm A 4/6 VCT HI/LO LEVEL.* • *Full divert of valve LCV-3-115A to the CVCS holdup tank.* • *No auto makeup.* • *No auto swap over to the RWST.*
	SRO/ATC	**29** **Place The L/D DIVERT FROM VCT TO HOLDUP TANK, LCV-3-115A, Control Switch To The VCT Position** **IF** valve LCV-3-115A does **NOT** respond to the control switch, **THEN** dispatch an operator to fail the valve to VCT position by performing the following: a. Isolate instrument air to LCV-3-115A. b. Bleed off regulator to LCV-3-115A.
	SRO/ATC	**30** **Go To Step 41**
	SRO/ATC	**41** **Report All Equipment Failures Or Malfunctions To The Responsible Supervisor**
	SRO/ATC	**42** **Notify The Nuclear Plant Supervisor To Evaluate Plant Conditions** a. Refer to 0-ONOP-046.3, LOSS OF BORATION FLOWPATHS b. Review Technical Specifications

EXAMINER NOTE: After Technical Specifications are check or at Lead Examiner's direction, proceed onto Event 3.

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Event Description: 3A Heater Drain Pump trips on high amps which require starting an additional Condensate Pump to support this power level.

Time	Position	Applicant's Actions or Behavior
Direct Facility Operator to trigger lesson step, EVENT 3 - 3A HDP TRIPS ON HIGH AMPS (insert TVUTPMPA 1.000000 delay=0 ramp=120 on=0 off=0)		
	SRO/BOP	Observes failure of 3A HDP: • Observes rising amps on 3 A HDP • Alarms D 8/2, 9/2, 6/3, and 5/3
	SRO/BOP	CAUSES: 1. Motor malfunction 2. Low bus voltage D17 HDP A/B MOTOR OVRLD TRIP
	SRO/BOP	**ALARM CONFIRMATION** 1. **CHECK** heater drain pump indications on console.
	SRO/BOP	**OPERATOR ACTIONS** **CAUTION** Rejection of heater drains to the condenser can damage condenser tubes.
	SRO/BOP	1. **ENSURE** automatic start of idle HDP.
	SRO/BOP	2. IF feed pump suction pressure is less than 260 psig, THEN: A. **START** a standby condensate pump. B. IF feed pump suction pressure remains less than 260 psig, THEN **REDUCE** power to restore suction pressure using 3-ONOP-100, Fast Load Reduction. C. **CHECK** feed train components for correct operation.
	BOP	Starts a standby Condensate Pump.
	SRO/BOP	3. **MAINTAIN** reactor power less than 100 percent.
	BOP	Reduces Main Turbine load as necessary to maintain less than 100%.

Op-Test No.: 2011-302 Scenario No.: 2 Event No.: 3 Page 2 of 2

Event Description: 3A Heater Drain Pump trips on high amps which require starting an additional Condensate Pump to support this power level.

Time	Position	Applicant's Actions or Behavior
EXAMINER NOTE: If Engineering is contacted, they will recommend maintaining full power operation with an engineering walkdown to monitor secondary performance. This condition will feed into Event 7 where 3B S/G Feedwater Pump is running with high vibration. If the crew decides to reduce power in accordance with the table, then proceed with Event 6 with S/G Stm Flow Channel FI-474 failed as is.		
	SRO/BOP	4. Within 24 hours, **PERFORM** one of the following: A. **ENSURE** minimum heater drain pump operation as required by table below using 3-OP-081, Heater Drain Pumps, or 3-OP-081.1, Feedwater Heater Extraction Steam Vents and Drains Valve Alignment. B. **OBTAIN** Engineering concurrence to maintain full power operation. C. **REDUCE** power as required by table below using 3-ONOP-100, Fast Load Reduction.
	SRO/BOP	5. **CHECK** HDP locally for abnormal indications and HDP Breakers 3AA07 or 3AB03 for targets.
EXAMINER NOTE: After power reduction is addressed or at Lead Examiners discretion, then proceed with Event 4.		

Turbine Load	HDPs Required
Above 450 MWe	Two
300 to 450 MWe	One
Below 300 Mwe	None

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Event Description: The Master Charging Pump Controller, LC-3-459G, signal fails high. The RO takes action to control the Charging Pump Speed Controller in manual and maintain program level per Enclosure 1 of 3-ONOP-041.6, Pressurizer Level Control Malfunction.

Time	Position	Applicant's Actions or Behavior
Direct Facility Operator to trigger lesson step, EVENT 4 - MSTR CHARGING CONTROL LC-3-459G FAILS HI (insert TFH2L9FH TRUE delay=0 ramp=0 on=0 off=0)		
	SRO/ATC	Observes the following: • Charging Pump Speed increasing • Charging flow to RCS rising • Annunciator G 1/2
	SRO/ATC	CAUSES: 1. Charging pump controller malfunction 2. Pressurizer level mismatch 3. RCS leakage G1/2 CHARGING PUMP HI SPEED
	SRO	**NOTE** • Breaker must be closed on a given pump for alarm to be functional. • 93% demand is equivalent to approx 73 gpm.
	SRO/ATC	**ALARM CONFIRMATION** Check individual charging pump controller and the master charging pump controller.
	SRO/ATC	**OPERATOR ACTIONS** 1. IF a failure of the master charging pump controller has occurred in automatic, THEN **PLACE** the master controller in manual and **MAINTAIN** pressurizer level on program. A. **GO TO** 3-ONOP-041.6, Pressurizer Level Control Malfunction. 2. IF a failure of the individual charging pump controller has occurred in automatic, THEN **PLACE** the individual controller in manual and **MAINTAIN** pressurizer level on program. A. **GO TO** 3-ONOP-041.6, Pressurizer Level Control Malfunction.
	SRO	Enters 3-ONOP-041.6, Pressurizer Level Controller for additional actions.

Op-Test No.: 2011-302 Scenario No.: 2 Event No.: 4 Page 2 of 3

Event Description: The Master Charging Pump Controller, LC-3-459G, signal fails high. The RO takes action to control the Charging Pump Speed Controller in manual and maintain program level per Enclosure 1 of 3-ONOP-041.6, Pressurizer Level Control Malfunction.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	**NOTES** • *If Pressurizer Level Malfunction is a result of a failure of the 3-459CX or 3-460CX relays (as indicated by a loss of letdown flow with a loss of Pressurizer Heaters with no concurrent failure of Level Transmitters 3-459A, 3-460, 3-461), use 3–ONOP–003.6 Attachment 4, for 3-460CX failure, **OR** 3–ONOP–003.9 Attachment 4, for 3-459CX failure as guidance for establishing Letdown flow and Pressurizer Heaters.* • *If the button on relays 3-459CX or 3-460CX are used to restore Letdown flow and Pressurizer Heaters, comply with Tech Spec Action Statement 3.4.3 Action b.* • *If the manual control of Heaters from the Electrical penetration room is used, comply with Tech Spec Action Statement 3.4.3 Action a.*
	SRO/ATC	5.0 SUBSEQUENT ACTIONS 5.1 Check pressurizer level indicators LI-3-459A, LI-3-460 AND LI-3-461, 5.1.1 IF one level indicator deviates significantly from the others, THEN place CHANNEL SELECT PRESSURIZER LEVEL CONTROL switch in a position that will NOT include the defective channel.
	SRO/ATC	5.2 IF pressurizer level does not follow programmed level, THEN place MASTER CHARGING PUMP CONTROLLER, LC-3-459G in MANUAL AND maintain programmed level per Enclosure 1. 5.2.1 IF individual charging pump controllers are not following LC-3-459G, THEN place individual CHARGING PUMP CONTROLLERS in MANUAL AND maintain programmed level per Enclosure 1.
	SRO/ATC	The Master Charging Pump Controller LC-3-459G is placed in Manual and programmed level is maintained per Enclosure 1.

EXAMINER NOTE: Enclosure 1 is on the next page.

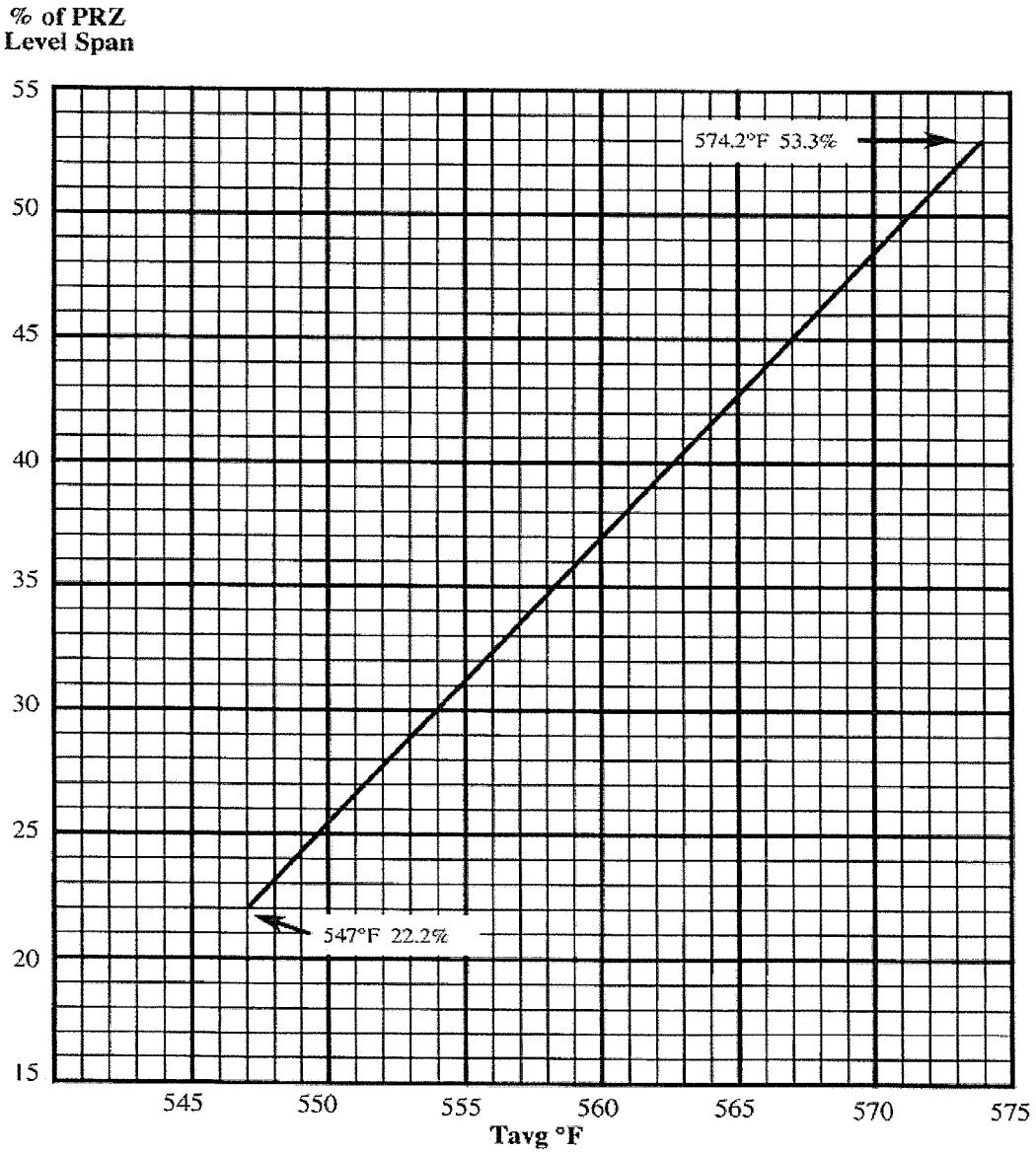
Op-Test No.: 2011-302	Scenario No.: 2	Event No.: 4	Page 3 of 3

Event Description: The Master Charging Pump Controller, LC-3-459G, signal fails high. The RO takes action to control the Charging Pump Speed Controller in manual and maintain program level per Enclosure 1 of 3-ONOP-041.6, Pressurizer Level Control Malfunction.

Time	Position	Applicant's Actions or Behavior

ENCLOSURE 1
(Page 1 of 1)

PRESSURIZER PROGRAMMED LEVEL



EXAMINER NOTE: When Pressurizer Level has been stabilized or at the Lead Examiner's discretion, then proceed to Event 5.

Op-Test No.: 2011-302 Scenario No.: 2 Event No.: 5 Page 1 of 9

Event Description: Turbine First Stage Pressure Channel, P-3-447 fails low. ATC determines no runback. Rod Control is taken to manual per 3-ONOP-028 or 0-ADM-211. 3-ONOP-049.1 is entered for mitigation. The SRO will address LCO 3.3.1 and 3.3.2. This channel is declared inoperable.

Time	Position	Applicant's Actions or Behavior
Direct Facility Operator to trigger lesson step, EVENT 5 - PT-3-447 FAILS LOW. (insert TFS1MAML TRUE delay=0 ramp=0 on=0 off=0)		
	SRO/ATC	Observes the following: • Multiple Annunciators in Control Room • Control Rods inserting • Stable Turbine load • P-3-447 failing downscale
	SRO/ATC	**CAUSES:** 1. Rapid load change 2. Reactivity addition (i.e. dilution, boration, Xenon transient) 3. Instrumentation failure B31 TAVG/ TAVG-TREF DEVIATION
	SRO/ATC	**ALARM CONFIRMATION** 1. **CHECK** T_{avg}-T_{ref} trace on TR-3-408 at console. 2. **COMPARE** T_{avg} indicators on VPA. 3. **COMPARE** 1st stage pressure indicators on VPA.
	SRO/ATC	**OPERATOR ACTIONS** 1. IF T_{avg} greater than T_{ref} by more than 1.5°F, THEN **CHECK** rods driving inward in AUTO. 2. IF a sudden load reduction has occurred, THEN **CHECK** for steam dump actuation. 3. **ENSURE** automatic rod control is correcting temperature error.
	SRO/ATC	4. IF rods are **NOT** correcting the deviation, THEN **PLACE** rod control in MANUAL to correct the problem with rod motion/boration.
	SRO/ATC	Recognizes an instrument error and places rods in Manual.
	SRO/ATC	5. IF T_{avg} changing with load steady, THEN **CHECK** for possible inadvertent dilution/boration or Xenon transient in progress.
	SRO/ATC	6. IF due to instrumentation failure, THEN **REFER TO** 3-ONOP-049.1, Deviation or Failure of Safety Related or Reactor Protection Channels.
	SRO	Refers to 3-ONOP-049.1, Deviation or Failure of Safety Related or Reactor Protection Channels for additional actions.

Op-Test No.: 2011-302 Scenario No.: 2 Event No.: 5 Page 2 of 9

Event Description: Turbine First Stage Pressure Channel, P-3-447 fails low. ATC determines no runback. Rod Control is taken to manual per 3-ONOP-028 or 0-ADM-211. 3-ONOP-049.1 is entered for mitigation. The SRO will address LCO 3.3.1 and 3.3.2. This channel is declared inoperable.

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: 3-ONOP-028 can be entered first to complete immediate action responses, and then the crew will enter 3-ONOP-049.1.
		3-ONOP-028 Reactor Control System Malfunction
	SRO/ATC	**CAUTIONS** • ***If the Rod Control System is inoperable due to Urgent Failure or other cause, the Shift Manager shall be notified immediately.*** • ***If a transient occurs and the Reactor cannot be stabilized by boration/dilution or changes in turbine load, the Reactor shall be tripped and a transition made to 3-EOP-E-0, REACTOR TRIP OR SAFETY INJECTION.***
	SRO/ATC	**NOTES** • *Boration/dilution or changes in turbine load will effect shutdown margin and axial offset. If plant conditions permit, the Shift Manager shall be consulted for methods used to achieve and maintain stable plant conditions.* • *Failure of RCC(s) to move when demanded, (e.g., ROD CONTROL URGENT FAILURE), constitutes inoperability of the associated RCC(s). The requirements of T.S. 3.1.3.1 apply.*
	SRO/ATC	4.0 **IMMEDIATE ACTIONS** 4.3 Continuous Insertion of an RCC Control Bank 4.3.1 Place the Rod Motion Control Selector switch to the MAN position.
	ATC	Places Control Rod Selector Switch in Manual.
	SRO/ATC	5.0 **SUBSEQUENT ACTIONS**
	SRO/ATC	5.3 Continuous Insertion of an RCC Control Bank 5.3.1 Adjust rods or reduce turbine load as determined by the Shift manager to restore Tavg equal to Tref. 5.3.2 **IF** PT-3-446 or PT-3-447 has failed, **THEN** place Channel Select First Stage Control to the operable channel. 5.3.3 Compare rod position to control rod insertion limits using the Rod Position Bank Recorders (VPA) or using the Plant Curve Book, Section VII, Figure 3.

Op-Test No.: 2011-302 Scenario No.: 2 Event No.: 5 Page 3 of 9

Event Description: Turbine First Stage Pressure Channel, P-3-447 fails low. ATC determines no runback. Rod Control is taken to manual per 3-ONOP-028 or 0-ADM-211. 3-ONOP-049.1 is entered for mitigation. The SRO will address LCO 3.3.1 and 3.3.2. This channel is declared inoperable.

Time	Position	Applicant's Actions or Behavior
	ATC/BOP	Restores Tavg / Tref mismatch per direction.
	ATC	Selects PT-3-446 on Channel Select First Stage Control
	SRO/ATC	5.3.4 **IF** the control banks insertion limits are exceeded, **THEN** perform the following: 1. Borate at equal to or greater than 16 gpm using 0-OP-046, CVCS – BORON CONCENTRATION CONTROL, until control rods are above the Low Limit. 2. Ensure compliance with Technical Specifications by performing one of the following: a. Restore the control banks to within the limits within 2 hours. **OR** b. Reduce thermal power within 2 hours to less than or equal to the fraction of rated thermal power that is allowed by the bank position Plant Curve Book Section VII, Figure 3. **OR** 3. Be in Hot Standby within 6 hours.
	SRO/ATC	5.3.5 **IF** Power Range Channel 4 has failed, **THEN** perform to 3-ONOP-059.8, POWER RANGE NUCLEAR INSTRUMENTATION MALFUNCTION. 5.3.6 **IF** PT-3-446 or PT-3-447 has failed, **THEN** perform the following: **NOTE** *A few minutes needs to elapse between the time First Stage Pressure is transferred and Rod Control is returned to Automatic. This will preclude the possibility of the power mismatch circuitry causing undesired rod motion.* 1. Verify Channel Select First Stage Press Control has been placed to an operable channel **AND** place the Rod Motion Control Selector switch in AUTO. 2. Perform 3-ONOP-049.1, DEVIATION OR FAILURE OF SAFETY RELATED OR REACTOR PROTECTION CHANNELS.
	SRO	Directs response per 3- ONOP-049.1.

Op-Test No.: 2011-302 Scenario No.: 2 Event No.: 5 Page 4 of 9

Event Description: Turbine First Stage Pressure Channel, P-3-447 fails low. ATC determines no runback. Rod Control is taken to manual per 3-ONOP-028 or 0-ADM-211. 3-ONOP-049.1 is entered for mitigation. The SRO will address LCO 3.3.1 and 3.3.2. This channel is declared inoperable.

Time	Position	Applicant's Actions or Behavior
		3-ONOP-049.1 Deviation or Failure of Safety Related or Reactor Protection Channels
	SRO/ATC	5.0 SUBSEQUENT ACTIONS 5.1 Verify instrument loop failure by comparison to adjacent loops and known plant parameters and conditions. 5.2 Verify no off-normal conditions exist on the adjacent channels which are to remain in service. 5.3 Verify applicable control transfer switches are in the position which eliminates the failed loop.
	SRO/ATC	5.4 IF a control function was placed in manual control due to the failure, THEN verify the control function is returned to automatic. 5.5 IF the failed channel is NOT related to Technical Specifications AND is NOT an input to Reactor Protection or Safeguards, THEN go to Step 5.16. 5.6 Refer to Technical Specifications 3/4.3, Instrumentation AND verify the minimum channels operable. 5.6.1 Take appropriate actions as specified in Technical Specifications.
	SRO/ATC	**CAUTION** ***The failed channel bistable(s) is required to be placed in the tripped mode within 6 hours of the failure determination, except if other channel bistable(s) are in the tripped or test position and would result in an undesired Engineered Safety Features actuation or Reactor Trip actuation. The overall effect of a failure of this type is a reduction of instrumentation redundancy and, therefore, a possible reduction in plant protection.***
	SRO/ATC	5.7 IF a 4KV bus/480V load center undervoltage channel has failed, THEN perform Attachment 1. 5.8 IF a turbine stop valve closure channel has failed, THEN perform Attachment 2. 5.9 IF a turbine auto stop oil channel has failed, THEN perform Attachment 3.
	SRO/ATC	**NOTE** *If I&C determines a Test Sequence Processor for an Eagle-21 Channel has failed, then that associated Eagle-21 Channel may remain in service if Attachment 6 is performed once per 4 hours. (Reference Safety Evaluation JPN-PTN-SEIS-95-001)*
	SRO/ATC	5.10 IF I&C determines a Test Sequence Processor on an Eagle-21 Channel has failed AND no off-normal bistables are lit, THEN perform Attachment 6 once per 4 hours until the associated Eagle-21 Channel is removed from service for repair.

Op-Test No.: 2011-302 Scenario No.: 2 Event No.: 5 Page 5 of 9

Event Description: Turbine First Stage Pressure Channel, P-3-447 fails low. ATC determines no runback. Rod Control is taken to manual per 3-ONOP-028 or 0-ADM-211. 3-ONOP-049.1 is entered for mitigation. The SRO will address LCO 3.3.1 and 3.3.2. This channel is declared inoperable.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	5.11 **IF** a containment pressure channel has failed, **THEN** place the failed channel in the tripped condition by performing the following: 5.11.1 Remove fuses for failed channel using Attachment 7. 5.11.2 Verify channel is in tripped condition by observing corresponding status light (VPB) lit.
	SRO/ATC	5.12 **IF** any other channel has failed, **THEN** perform the following to trip bistables for the failed channel. 5.12.1 **IF** plant conditions are such that all required bistables associated with the failed channel may be tripped without an undesired RPS or ESF actuation, **THEN** perform the following: 1. Place all bistable switches for the affected loop in test position using Attachment 4. 2. Verify bistables tripped by observing corresponding status light (VPB) lit. 5.12.2 **IF** plant conditions are such that all bistables associated with the failed channel may **NOT** be tripped due to an undesired RPS or ESF actuation, **THEN** perform the following: 1. Place only the bistables which will **NOT** cause an RPS or ESF actuation in the test/tripped position using Attachment 4. 2. Verify bistables tripped by observing corresponding status light (VPB) lit. 3. Follow action of Tech. Spec. 3/4.3 and/or 3.0.3 for those bistables which were **NOT** placed in the tripped condition.
	SRO	References Attachment 4 for Bistables and Function. **(Page 8 of 9)**
	SRO/ATC	5.13 **IF** any of the following channels are failed, **THEN** place the Bypass Switch(es) for the failed channel to Bypass position at the AMSAC panel using Attachment 5: 5.13.1 Any Steam Generator Level Channel I (LI-3-474, LI-3-484, or LI-3-494) **OR** 5.13.2 Any Steam Generator Level Channel II (LI-3-475, LI-3-485, or LI-3-495) **OR** 5.13.3 PT-3-446 **OR** 5.13.4 PT-3-447
	SRO/ATC	Directs FS/TO to bypass/reset AMSAC per Attachment 5. **(Page 8 of 9)**

EXAMINER NOTE: Technical Specifications are on next two pages.

Op-Test No.: 2011-302 Scenario No.: 2 Event No.: 5 Page 6 of 9

Event Description: Turbine First Stage Pressure Channel, P-3-447 fails low. ATC determines no runback. Rod Control is taken to manual per 3-ONOP-028 or 0-ADM-211. 3-ONOP-049.1 is entered for mitigation. The SRO will address LCO 3.3.1 and 3.3.2. This channel is declared inoperable.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	**NOTE** *The following step is to allow automatic operation of the Steam Dump to Condenser System during a turbine trip subsequent to a failure of PT-3-447, First Stage Pressure Channel.*
	SRO/ATC	5.14 **IF** First Stage Pressure Channel, PT-3-447 has failed **AND** Steam Dump to Condenser has armed, **THEN** place the Steam Dump to Condenser Mode Selector switch to RESET and return to AUTO.
	BOP	Places Steam Dump to Condenser Mode Selector Switch to RESET and then back to AUTO.

3/4.3 INSTRUMENTATION

3/4.3.1 REACTOR TRIP SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.1 As a minimum, the Reactor Trip System instrumentation channels and interlocks of Table 3.3-1 shall be OPERABLE.

APPLICABILITY: As shown in Table 3.3-1.

ACTION:

As shown in Table 3.3-1.

TABLE 3.3-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
17. Reactor Trip System Interlocks					
a. Intermediate Range Neutron Flux, P-6	2	1	2	2#	7
b. Low Power Reactor Trips Block, P-7					
P-10 Input	4	2	3	1	7
or					
Turbine First Stage Pressure	2	1	2	1	7

ACTION 7 - With less than the Minimum Number of Channels OPERABLE, within 1 hour determine by observation of the associated permissive annunciator window(s) that the interlock is in its required state for the existing plant condition, or apply Specification 3.0.3.

Op-Test No.: 2011-302 Scenario No.: 2 Event No.: 5 Page 7 of 9

Event Description: Turbine First Stage Pressure Channel, P-3-447 fails low. ATC determines no runback. Rod Control is taken to manual per 3-ONOP-028 or 0-ADM-211. 3-ONOP-049.1 is entered for mitigation. The SRO will address LCO 3.3.1 and 3.3.2. This channel is declared inoperable.

Time	Position	Applicant's Actions or Behavior

INSTRUMENTATION

3/4.3.2 ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.2 The Engineered Safety Feature Actuation System (ESFAS) instrumentation channels and interlocks shown in Table 3.3-2 shall be OPERABLE with their Trip Setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3-3.

APPLICABILITY: As shown in Table 3.3-2.

ACTION:

a. With an ESFAS instrumentation or interlock Trip Setpoint less conservative than the value shown in the Trip Setpoint column but more conservative than the value shown in the Allowable Value column of Table 3.3-3, adjust the Setpoint consistent with the Trip Setpoint value within permissible calibration tolerance.

b. With an ESFAS instrumentation or interlock Trip Setpoint less conservative than the value shown in the Allowable Value column of Table 3.3-3, either:

1. Adjust the Setpoint consistent with the Trip Setpoint value of Table 3.3-3 and determine within 12 hours that the affected channel is OPERABLE; or

2. Declare the channel inoperable and apply the applicable ACTION statement requirements of Table 3.3-2 until the channel is restored to OPERABLE status with its setpoint adjusted consistent with the Trip Setpoint value.

c. With an ESFAS instrumentation channel or interlock inoperable, take the ACTION shown in Table 3.3-2.

TABLE 3.3-2 (Continued)

ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
f. Steam Line flow–High Coincident with:	2/steam line	1/steam line in any two steam lines	1/steam line in any two steam lines	1, 2, 3*	15

ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
4. Steam Line Isolation (Continued)					
d. Steam Line Flow–High Coincident with: Steam Generator Pressure–Low	2/steam line	1/steam line in any two steam lines	1/steam line in any two steam lines	1, 2, 3	15
	1/steam generator	1/steam generator in any two	1/steam generator in any two	1, 2, 3	15

ACTION 15 - With the number of OPERABLE channels one less than the Total Number of Channels, operation may proceed until performance of the next required ANALOG CHANNEL OPERATIONAL TEST or TRIP ACTUATING DEVICE OPERATIONAL TEST provided the inoperable channel is placed in the tripped condition within 6 hours.

Op-Test No.: 2011-302 Scenario No.: 2 Event No.: 5 Page 8 of 9

Event Description: Turbine First Stage Pressure Channel, P-3-447 fails low. ATC determines no runback. Rod Control is taken to manual per 3-ONOP-028 or 0-ADM-211. 3-ONOP-049.1 is entered for mitigation. The SRO will address LCO 3.3.1 and 3.3.2. This channel is declared inoperable.

Time	Position	Applicant's Actions or Behavior

ATTACHMENT 4 FAILED CHANNEL BISTABLE LIST

P-3-447		Turbine First Stage Pressure		Ref Dwgs 5610-T-D-18A,18B,12A,12B &17; 5610-T-L1, Sh 17, 21 & 22A		
Max Deviation As Compared to other Channels			50 PSIG DEVIATION			
RACK No.	BISTABLE No.	BISTABLE FUNCTION	STATUS LIGHT	ANNUNCIATOR	FUNC-TION	LOGIC AFFECTED
25	BS-3-447-1	Input to P-7 (Turbine >10% Pwr)	Turbine Power P-7 PC447E1		P	P-7, 1/2 turbine first stage pressure >10% power to allow at power trips (P-10 also an input to enable at power trips). 2/2 turbine first stage pressure <10% and 3/4 power range channels <10% blocks at power trips.
25	BS-3-447-2	Allows Load Limit Runback	Turb Pow Load Limit PC447E2		P	2/2 channels >70% turbine power, allows load limit runback for NIS/RPI rod drop signal (Runback on Rod Drop Deleted)
24	BS-3-475	Program Steam Flow Versus Turbine Load	LOOP A HI STM FLOW FC475	SG A C 7/1 STEAMLINE HI FLOW	S	1/2 channels on 2/3 S/Gs high steam flow > program with 2/3 low Tavg (543°F) or 2/3 low S/G pressure (614 psig)
25	BS-3-485	Program Steam Flow Versus Turbine Load	LOOP B HI STM FLOW FC485	SG B C 7/2 STEAMLINE HI FLOW	S	1/2 channels on 2/3 S/Gs high steam flow > program with 2/3 low Tavg (543°F) or 2/3 low S/G pressure (614 psig)
25	BS-3-495	Program Steam Flow Versus Turbine Load	LOOP C HI STM FLOW FC495	SG C C 7/3 STEAMLINE HI FLOW	S	1/2 channels on 2/3 S/Gs high steam flow > program with 2/3 low Tavg (543°F) or 2/3 low S/G pressure (614 psig)

C - CONTROL RELATED
P - RX PROTECTION RELATED
S - SAFETY INJECTION RELATED

ATTACHMENT 5 AMSAC CONTROL PANEL

1. Place the Normal/Bypass switch(es) to BYPASS for the applicable failed channel(s) at the local AMSAC Control Panel.
   a. Processor A
      (1) Level 1 (A S/G Level, Channel 474)
      (2) Level 2 (B S/G Level, Channel 484)
      (3) Level 3 (C S/G Level, Channel 494)
      (4) Power 1 (First Stage Turbine Pressure, Channel 446)
      (5) Power 2 (First Stage Turbine Pressure, Channel 447)
   b. Processor B
      (1) Level 1 (A S/G Level, Channel 475)
      (2) Level 2 (B S/G Level, Channel 485)
      (3) Level 3 (C S/G Level, Channel 495)
      (4) Power 1 (First Stage Turbine Pressure, Channel 446)
      (5) Power 2 (First Stage Turbine Pressure, Channel 447)
2. At the AMSAC Panel, depress and release the SYSTEM RESET pushbutton.

Op-Test No.: 2011-302 Scenario No.: 2 Event No.: 5 Page 9 of 9

Event Description: Turbine First Stage Pressure Channel, P-3-447 fails low. ATC determines no runback. Rod Control is taken to manual per 3-ONOP-028 or 0-ADM-211. 3-ONOP-049.1 is entered for mitigation. The SRO will address LCO 3.3.1 and 3.3.2. This channel is declared inoperable.

Potential Additional Tech Spec Call

SRO

POWER DISTRIBUTION LIMITS

3/4.2.5 DNB PARAMETERS

LIMITING CONDITION FOR OPERATION

3.2.5 The following DNB-related parameters shall be maintained within the following limits:

a. Reactor Coolant System $T_{avg} \leq 581.2°F$

b. Pressurizer Pressure $\geq$ 2200 psig*, and

c. Reactor Coolant System Flow $\geq$ 264,000 gpm

APPLICABILITY: MODE 1.

EXAMINER NOTE: After Technical Specifications are addressed, go to Events 6 & 7. Event 6 will be discovered on the downpower.

Op-Test No.: 2011-302 Scenario No.: 2 Event No.: 6 Page 1 of 5

Event Description: S/G Steam Flow Channel FI-474 fails as is for A S/G. The A S/G Feed Reg Valve does respond properly during power maneuver. Action is necessary for manual control and/or swap channels. When discovered, the SRO will address LCO 3.3.1 and 3.3.2. This channel is declared inoperable.

Time	Position	Applicant's Actions or Behavior
Direct Facility Operator to trigger lesson step, EVENT 6 - SG FLOW TRANSMITTER SB-FT-474 FAILS AS IS. (insert TFS1MWEA TRUE delay=0 ramp=0 on=0 off=0)		
EXAMINER NOTE: **Go to Events 7. Event 6 will be discovered on the downpower.**		
	SRO/BOP	CAUSES: 1. Steam Generator Level Control Malfunction 2. Instrument Failure C6 SG A LEVEL DEVIATION
	SRO/BOP	**PROMPT ACTIONS** IF malfunctioning SG level controls, THEN: • **TAKE** manual control of level. • **RETURN** SG levels to normal.
	BOP	Takes manual control and adjusts to return level to program.
	SRO/BOP	**ALARM CONFIRMATION** **CHECK** LI-3-476 or LI-3-478, A STM GEN LEVEL controlling channel vs. PI-3-446 or PI-3-447, FIRST STAGE PRESSURE level control program on VPA.
	SRO/BOP	**OPERATOR ACTIONS** IF alarm is due to instrument failure, THEN **REFER TO** 3-ONOP-049.1, Deviation or Failure of Safety Related or Reactor Protection Channels.
3-ONOP-049.1 Deviation or Failure of Safety Related or Reactor Protection Channels		
	SRO/ATC	5.0 SUBSEQUENT ACTIONS 5.1 Verify instrument loop failure by comparison to adjacent loops and known plant parameters and conditions. 5.2 Verify no off-normal conditions exist on the adjacent channels which are to remain in service. 5.3 Verify applicable control transfer switches are in the position which eliminates the failed loop.

Op-Test No.: 2011-302 Scenario No.: 2 Event No.: 6 Page 2 of 5

Event Description: S/G Steam Flow Channel FI-474 fails as is for A S/G. The A S/G Feed Reg Valve does respond properly during power maneuver. Action is necessary for manual control and/or swap channels. When discovered, the SRO will address LCO 3.3.1 and 3.3.2. This channel is declared inoperable.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	5.4 **IF** a control function was placed in manual control due to the failure, **THEN** verify the control function is returned to automatic. 5.5 **IF** the failed channel is **NOT** related to Technical Specifications **AND** is **NOT** an input to Reactor Protection or Safeguards, **THEN** go to Step 5.16. 5.6 Refer to Technical Specifications 3/4.3, Instrumentation **AND** verify the minimum channels operable. 5.6.1 Take appropriate actions as specified in Technical Specifications.
	SRO/ATC	**CAUTION** ***The failed channel bistable(s) is required to be placed in the tripped mode within 6 hours of the failure determination, except if other channel bistable(s) are in the tripped or test position and would result in an undesired Engineered Safety Features actuation or Reactor Trip actuation. The overall effect of a failure of this type is a reduction of instrumentation redundancy and, therefore, a possible reduction in plant protection.***
	SRO/ATC	5.7 **IF** a 4KV bus/480V load center undervoltage channel has failed, **THEN** perform Attachment 1. 5.8 **IF** a turbine stop valve closure channel has failed, **THEN** perform Attachment 2. 5.9 **IF** a turbine auto stop oil channel has failed, **THEN** perform Attachment 3.
	SRO/ATC	**NOTE** *If I&C determines a Test Sequence Processor for an Eagle-21 Channel has failed, then that associated Eagle-21 Channel may remain in service if Attachment 6 is performed once per 4 hours. (Reference Safety Evaluation JPN-PTN-SEIS-95-001)*
	SRO/ATC	5.10 **IF** I&C determines a Test Sequence Processor on an Eagle-21 Channel has failed **AND** no off-normal bistables are lit, **THEN** perform Attachment 6 once per 4 hours until the associated Eagle-21 Channel is removed from service for repair.
	SRO/ATC	5.11 **IF** a containment pressure channel has failed, **THEN** place the failed channel in the tripped condition by performing the following: 5.11.1 Remove fuses for failed channel using Attachment 7. 5.11.2 Verify channel is in tripped condition by observing corresponding status light (VPB) lit.

Op-Test No.: 2011-302 Scenario No.: 2 Event No.: 6 Page 3 of 5

Event Description: S/G Steam Flow Channel FI-474 fails as is for A S/G. The A S/G Feed Reg Valve does respond properly during power maneuver. Action is necessary for manual control and/or swap channels. When discovered, the SRO will address LCO 3.3.1 and 3.3.2. This channel is declared inoperable.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	5.12 **IF** any other channel has failed, **THEN** perform the following to trip bistables for the failed channel. 5.12.1 **IF** plant conditions are such that all required bistables associated with the failed channel may be tripped without an undesired RPS or ESF actuation, **THEN** perform the following: 1. Place all bistable switches for the affected loop in test position using Attachment 4. 2. Verify bistables tripped by observing corresponding status light (VPB) lit. 5.12.2 **IF** plant conditions are such that all bistables associated with the failed channel may **NOT** be tripped due to an undesired RPS or ESF actuation, **THEN** perform the following: 1. Place only the bistables which will **NOT** cause an RPS or ESF actuation in the test/tripped position using Attachment 4. 2. Verify bistables tripped by observing corresponding status light (VPB) lit. 3. Follow action of Tech. Spec. 3/4.3 and/or 3.0.3 for those bistables which were **NOT** placed in the tripped condition.

Attachment 4

Max Deviation As Compared to other Channels

0% ≤ Power < 10%, MAX DEV 7.5 x 10^5 lb/HR
10% < Power ≤ 50%, MAX DEV 5.0 x 10^5 lb/HR
50% < Power ≤ 70%, MAX DEV 4.0 x 10^5 lb/HR
70% < Power ≤ 100%, MAX DEV 3.0 x 10^5 lb/HR

RACK No.	BISTABLE No.	BISTABLE FUNCTION	STATUS LIGHT	ANNUNCIATOR	FUNC-TION	LOGIC AFFECTED
16	BS-3-474	Safeguards Logic	LOOP A HI STM FLOW FC474	C 7/1 SG A STEAMLINE HI FLOW	S	1/2 channels on 2/3 S/G high steam flow > program with 2/3 low Tavg (543 °F) or 2/3 low S/G pressure (614 psig)
17	BS-3-478B-1	FW to SF Mismatch Logic	S/G A STM-FW FLO DEV FC478B1		P	1/2 channels on 1/3 S/G low level (10%) with 1/2 low feedwater flow (665,000 lb/hr <steam flow) on same S/G
17	BS-3-478B-2	SF > FW Alarm		C 5/1 SG A STEAM > FEED	C	
17	BS-3-478C	FW > SF Alarm		C 4/1 SG A FEED > STEAM	C	

C - CONTROL RELATED
P - RX PROTECTION RELATED
S - SAFETY INJECTION RELATED

EXAMINER NOTE: Technical Specifications are on next two pages. After Technical Specifications are referenced, continue on with Event 8 after Event 7 is complete.

Op-Test No.: 2011-302 Scenario No.: 2 Event No.: 6 Page 4 of 5

Event Description: S/G Steam Flow Channel FI-474 fails as is for A S/G. The A S/G Feed Reg Valve does respond properly during power maneuver. Action is necessary for manual control and/or swap channels. When discovered, the SRO will address LCO 3.3.1 and 3.3.2. This channel is declared inoperable.

Time	Position	Applicant's Actions or Behavior

3/4.3 INSTRUMENTATION

3/4.3.1 REACTOR TRIP SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.1 As a minimum, the Reactor Trip System instrumentation channels and interlocks of Table 3.3-1 shall be OPERABLE.

APPLICABILITY: As shown in Table 3.3-1.

ACTION:

As shown in Table 3.3-1.

TABLE 3.3-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
12. Steam Generator Water Level--Low Coincident With Steam/ Feedwater Flow Mismatch	2 stm. gen. level and 2 stm./feed-water flow mismatch in each stm. gen.	1 stm. gen. level coin-cident with 1 stm./feed-water flow mismatch in same stm. gen.	1 stm. gen. level and 2 stm./feed-water flow mismatch in same stm. gen. or 2 stm. gen. level and 1 stm./feedwater flow mismatch in same stm. gen.	1, 2	6

ACTION 6 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed until performance of the next required ANALOG CHANNEL OPERATIONAL TEST provided the inoperable channel is placed in the tripped condition within 6 hours.

Op-Test No.: 2011-302 Scenario No.: 2 Event No.: 6 Page 5 of 5

Event Description: S/G Steam Flow Channel FI-474 fails as is for A S/G. The A S/G Feed Reg Valve does respond properly during power maneuver. Action is necessary for manual control and/or swap channels. When discovered, the SRO will address LCO 3.3.1 and 3.3.2. This channel is declared inoperable.

Time	Position	Applicant's Actions or Behavior

INSTRUMENTATION

3/4.3.2 ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.2 The Engineered Safety Feature Actuation System (ESFAS) instrumentation channels and interlocks shown in Table 3.3-2 shall be OPERABLE with their Trip Setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3-3.

APPLICABILITY: As shown in Table 3.3-2.

ACTION:

a. With an ESFAS Instrumentation or Interlock Trip Setpoint less conservative than the value shown in the Trip Setpoint column but more conservative than the value shown in the Allowable Value column of Table 3.3-3, adjust the Setpoint consistent with the Trip Setpoint value within permissible calibration tolerance.

b. With an ESFAS Instrumentation or Interlock Trip Setpoint less conservative than the value shown in the Allowable Value column of Table 3.3-3, either:

1. Adjust the Setpoint consistent with the Trip Setpoint value of Table 3.3-3 and determine within 12 hours that the affected channel is OPERABLE; or

2. Declare the channel inoperable and apply the applicable ACTION statement requirements of Table 3.3-2 until the channel is restored to OPERABLE status with its setpoint adjusted consistent with the Trip Setpoint value.

c. With an ESFAS instrumentation channel or interlock inoperable, take the ACTION shown in Table 3.3-2.

ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
4. Steam Line Isolation (Continued)					
d. Steam Line Flow--High Coincident with: Steam Generator Pressure--Low	2/steam line	1/steam line in any two steam lines	1/steam line in any two steam lines	1, 2, 3	15
	1/steam generator	1/steam generator in any two steam lines	1/steam generator in any two steam lines	1, 2, 3	15
or T_{avg}--Low	1/Loop	1/loop in any two loops	1/loop in any two loops	1, 2, 3	25

ACTION 15 - With the number of OPERABLE channels one less than the Total Number of Channels, operation may proceed until performance of the next required ANALOG CHANNEL OPERATIONAL TEST or TRIP ACTUATING DEVICE OPERATIONAL TEST provided the inoperable channel is placed in the tripped condition within 6 hours.

Op-Test No.: 2011-302 Scenario No.: 2 Event No.: 7 Page 1 of 5

Event Description: Engineering reports 3B S/G Feedwater Pump High Vibration. SM directs a 3-GOP-100 power reduction to remove the 3B S/G Feedwater Pump within the next hour.

Time	Position	Applicant's Actions or Behavior
	SRO	Directs response using **3-GOP-100**, Fast Load Reduction to reduce load to 50%.
	CREW	Reviews 3-GOP-100 Foldout Page actions (See next page)
	SRO	**1** **Brief Control Room Personnel Using ATTACHMENT 3** **NOTES** • *Suggested boration is 9 gallons per % with control rods completely withdrawn and available; 18 gallons per % with no control rod movement (use a value between 9 and 18 if rods are not fully withdrawn when starting a load reduction from full power).* • *The Unit Supervisor may change the boration as desired during the load reduction.* 4. Boration Rate: _____ total gallons / _____ minutes = _____ gallons/minute.
	SRO/ATC	Determines **9 gal/%** boric acid addition times **50 %** which equals **450 gallons** total. [Adjust for current power]
EXAMINER NOTE: Reduce power to 50% was cue from Shift Manager.		
	CREW	**FOLDOUT PAGE** 1. 3-EOP-E-0 Transition Criteria IF any of the following limits are reached, THEN trip the Reactor and Turbine AND go to 3-EOP-E-0, REACTOR TRIP OR SAFETY INJECTION: a. RCS Tavg - GREATER THAN 578 °F b. RCS Tavg - GREATER THAN Tref by 6 °F c. Rod Insertion Limits are exceeded as indicated by: • Rod Position Bank D Insertion Limit Recorder (VPA) • Stepcounters on console • Plant Curve Book Section 7, Figure 3 2. Notify Chemistry Department WHEN reactor power has changed by greater than or equal to 15 percent, THEN notify the Chemistry Department that RCS sampling is required according to Tech Spec Table 4.4-4. 3. Restore Blender to AUTO WHEN boration is complete, THEN restore the Blender to AUTO as follows: a. Place the Reactor Makeup Selector Switch to AUTO. b. Set FC-3-113A, Boric Acid Flow Controller pot setting as desired. c. Place the RCS Makeup Control Switch to START.

Op-Test No.: 2011-302 Scenario No.: 2 Event No.: 7 Page 2 of 5

Event Description: Engineering reports 3B S/G Feedwater Pump High Vibration. SM directs a 3-GOP-100 power reduction to remove the 3B S/G Feedwater Pump within the next hour.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	**2** **Begin Boration** a. Set the Boric Acid Totalizer to value determined using ATTACHMENT 3 b. Set FC-3-113A, Boric Acid Flow Controller to a pot setting of 8.0 c. Place the Reactor Makeup Selector Switch to BORATE d. Place the RCS Makeup Control Switch to START **IF** boration is not required, **THEN** go to Step 3.
	SRO/BOP	**3** **Notify The Following** • System Dispatcher • Plant personnel using the Page Boost
	CREW	**4** **Reduce Unit Load** a. Check for boration effects (reducing Tavg) a. **IF** boration is used, **THEN** wait for effects before starting load reduction. b. Adjust FC-3-113A, Boric Acid Flow Controller to obtain the ATTACHMENT 3 desired flow rate c. Initiate **AND** maintain load reduction rate to the target power level d. Monitor load reduction and auto rod control to ensure that the expected Tavg/Tref ΔT identified in ATTACHMENT 3 is maintained d. Stop or slow power reduction to control temperature. If necessary, place control rods in manual **AND** maintain Tavg within the expected Tavg/Tref ΔT of ATTACHMENT 3.
	SRO/ATC	**5** **Monitor Annunciator B 8/1, ROD BANK LO LIMIT – RESET** Perform the following: a. Slow load reduction until alarm is reset. b. Re-evaluate boration amount and rate, and make adjustments as necessary.
	SRO	**6** **Notify The Shift Manager To Refer To The Following Procedures** • 0-EPIP-20101, DUTIES OF EMERGENCY COORDINATOR • 0-ADM-115, NOTIFICATION OF PLANT EVENTS
	SRO/ATC	**NOTE** *Axial flux difference is allowed to exceed the Target Band during the load reduction without entering 0-NOP-059.09, OPERATION WITHIN THE AXIAL FLUX DIFFERENCE OPERATIONAL SPACE.*

Op-Test No.: 2011-302 Scenario No.: 2 Event No.: 7 Page 3 of 5

Event Description: Engineering reports 3B S/G Feedwater Pump High Vibration. SM directs a 3-GOP-100 power reduction to remove the 3B S/G Feedwater Pump within the next hour.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	**7** **Check Plant Response** a. Check pressurizer level following program a. **IF** directed by the Unit Supervisor, **THEN** increase charging flow as follows: 1) Start an additional charging pump. 2) Place an additional letdown orifice in service. 3) Place L/D Temp Controller TC-3-144A in Manual and Control letdown temperature manually. 4) **WHEN** letdown temperature is 115-121°F and stable, **THEN** place TC-3-144A in AUTO. b. Verify load reduction rate and auto rod control is maintaining the expected Tavg/Tref ΔT identified in ATTACHMENT 3 b. Stop or slow power reduction to control temperature. If necessary, place control rods in manual **AND** maintain Tavg within the expected Tavg/Tref ΔT of ATTACHMENT 3.
	SRO/ATC	**8** **Energize Pressurizer Backup Heaters**
	SRO/BOP	**9** **Verify Turbine Load Less Than 570 MWE** **WHEN** turbine load is less than 570 MWe, **THEN** open the SGFP recirculation valves for the first feedwater pump to be stopped. Open the SGFP recirculation valves for the first feedwater pump to be stopped
	SRO/ATC	**NOTE** *Boration should be stopped above the target power level to prevent excessive boration.*
	SRO/ATC	**10** **Monitor Turbine Load Within 10% Of Target Power Level** Go to Step 11. Stop the boration as follows: a. Place the Reactor Makeup Selector Switch to AUTO b. Set FC-3-113A, Boric Acid Flow Controller pot setting as desired c. Place the RCS Makeup Control Switch to START

Op-Test No.: 2011-302 Scenario No.: 2 Event No.: 7 Page 4 of 5

Event Description: Engineering reports 3B S/G Feedwater Pump High Vibration. SM directs a 3-GOP-100 power reduction to remove the 3B S/G Feedwater Pump within the next hour.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	**11** **Check Target Load – LESS THAN 450 Mwe** IF Target Load is GREATER THAN 450 Mwe, THEN perform the following: a. Maintain reactor power at or below the target value using: • Boration/dilution • Control Rod adjustments • Turbine load adjustments b. Maintain Tavg within ± 1 °F of Tref. c. Maintain Pressurizer level on program. d. Maintain Pressurizer pressure on program. e. Maintain SG Levels on program. f. Refer to any ONOPs in effect. g. Go to procedure and step in effect.
	SRO/BOP	**12** **Check Station Service Loads Supplied From The Startup Transformer** WHEN directed by the Unit Supervisor, THEN transfer station service from the Auxiliary Transformers to the Startup Transformer using ATTACHMENT 2.
	SRO/BOP	**13** **Check Auxiliary Steam Supplied From Another Unit** WHEN directed by the Unit Supervisor, THEN align auxiliary steam supply from another unit using ATTACHMENT 1.
	BOP	Turnover Sheet indicates Aux Steam is aligned to Unit 4.
	SRO/ATC	**NOTES** • *Boration should be stopped above the target power level to prevent excessive boration, or at ≥ 25% power if the unit is to be taken off line.* • *Remaining procedure steps should be taken as appropriate for the intended power level.*
Examiner Note: The SRO may or may NOT implement the following steps.		
	SRO/BOP	**14** **Continue Load Reduction** a. Verify Turbine load less than – **450 MWE** • Stop one heater drain pump b. Verify Turbine load less than – **400 MWE** 1) Place the Feedwater Pump Turbine Runback Defeat switch to DEFEAT 2) Stop the SGFP with recirculation valves open 3) Place SGFP recirculation valves control switch in the CLOSED/AUTO position

Op-Test No.: 2011-302 Scenario No.: 2 Event No.: 7 Page 5 of 5

Event Description: Engineering reports 3B S/G Feedwater Pump High Vibration. SM directs a 3-GOP-100 power reduction to remove the 3B S/G Feedwater Pump within the next hour.

Time	Position	Applicant's Actions or Behavior
	BOP	15 **Ensure Station Service Loads Supplied From The Startup Transformer Using ATTACHMENT 2** 16 **Ensure Auxiliary Steam Supplied From Another Unit Using ATTACHMENT 1**

EXAMINER NOTE: When power has been sufficiently reduced, proceed to EVENT 8.

3-GOP-100

FOLDOUT PAGE

1. **3-EOP-E-0 Transition Criteria**

   IF any of the following limits are reached, THEN trip the Reactor and Turbine AND go to 3-EOP-E-0, REACTOR TRIP OR SAFETY INJECTION:

   a. RCS Tavg - GREATER THAN 578 °F

   b. RCS Tavg - GREATER THAN Tref by 6 °F

   c. Rod Insertion Limits are exceeded as indicated by:
      - Rod Position Bank D Insertion Limit Recorder (VPA)
      - Stepcounters on console
      - Plant Curve Book Section 7, Figure 3

2. **Notify Chemistry Department**

   WHEN reactor power has changed by greater than or equal to 15 percent, THEN notify the Chemistry Department that RCS sampling is required according to Tech Spec Table 4.4-4.

3. **Restore Blender to AUTO**

   WHEN boration is complete, THEN restore the Blender to AUTO as follows:

   a. Place the Reactor Makeup Selector Switch to AUTO.

   b. Set FC-3-113A, Boric Acid Flow Controller pot setting as desired.

   c. Place the RCS Makeup Control Switch to START.

Op-Test No.: 2011-302 Scenario No.: 2 Event No.: 8 Page 1 of 12

Event Description: During the loss of Main Feed, a common loss of suction to all AFW pumps. The crew transitions to 3-EOP-FR-H.1 to initiate Feed and Bleed. The Main Turbine fails to automatically trip. The BOP will take compensatory action to trip the Turbine manually. The ICW to TPCW Heat Exchanger Valve, POV-3-4883, does not automatically isolate on a Safety Injection signal. The BOP takes action while performing Attachment 3 of 3-EOP-E-0 to manually close the valve.

Time	Position	Applicant's Actions or Behavior
Direct Facility Operator to trigger lesson step, EVENT 8 - MAIN FEED HEADER BREAK WITH SGFP BKRS TRIPPING. (insert TVFAHDR2 1 delay=0 ramp=0 on=0 off=0, insert TVFALN3 1.0 delay=0 ramp=0 on=0 off=0, insert TFF1D1AT TRUE delay=120 ramp=0 on=0 off=0, and insert TFF1D1BT TRUE delay=120 ramp=0 on=0 off=0)		
	SRO	Directs response using 3-EOP-E-0 starting at Step 1.
	CREW	**NOTE** *Steps 1 through 4 are IMMEDIATE ACTION steps.*
	SRO/ATC	**1** **Verify Reactor Trip** • Rod bottom lights – ON • Reactor trip and bypass breakers – OPEN • Rod position indicators - AT ZERO • Neutron flux – DECREASING Manually trip reactor. **IF** reactor power is greater than 5% **OR** intermediate range power is **NOT** stable or decreasing, **THEN** perform the following: a. Monitor Critical Safety Functions using 3-EOP-F-0, CRITICAL SAFETY FUNCTION STATUS TREES. b. Go to 3-EOP-FR-S.1, RESPONSE TO NUCLEAR POWER GENERATION/ ATWS, Step 1.
	SRO/BOP	**2** **Verify Turbine Trip** a. All turbine stop or associated control valves – CLOSED b. Verify Moisture Separator Reheater Steam Valves – CLOSED • MSR Main Steam Supply Stop MOVs • Reheater Timing Valves • MSR Purge Steam Valves c. Check Mid and East GCBs – OPEN (Normally 30-second delay) a. Manually trip turbine. **IF** unable to verify turbine trip, **THEN** close main steamline isolation and bypass valves. b. Manually close valves. **IF** any valve can **NOT** be closed, **THEN** close main steamline isolation and bypass valves. c. Manually open breakers. **IF** breakers do **NOT** open, **THEN** actuate EMERGENCY GEN. BKR. TRIP SWITCH for the affected breaker(s).

Op-Test No.: 2011-302 Scenario No.: 2 Event No.: 8 Page 2 of 12

Event Description: During the loss of Main Feed, a common loss of suction to all AFW pumps. The crew transitions to 3-EOP-FR-H.1 to initiate Feed and Bleed. The Main Turbine fails to automatically trip. The BOP will take compensatory action to trip the Turbine manually. The ICW to TPCW Heat Exchanger Valve, POV-3-4883, does not automatically isolate on a Safety Injection signal. The BOP takes action while performing Attachment 3 of 3-EOP-E-0 to manually close the valve.

Applicant's Actions or Behavior

Time	Position	Applicant's Actions or Behavior
	BOP	• Manually closes MSR steam supply MOVs. • Manually trips the Main Turbine **[Event 10]**
CREW CRITICAL TASK: Manually trip the Main Turbine prior to Step 5 of 3-EOP-E-0 as read by the Unit Supervisor.		
	SRO/BOP	**3 Verify Power To Emergency 4 KV Buses** a. Check the 3A and 3B 4 KV buses - MAINTAIN AT LEAST ONE ENERGIZED a. Perform the following: 1) Attempt to emergency start any Unit 3 available diesel generator. 2) IF neither 3A nor 3B 4 KV bus is energized, THEN go to 3-EOP-ECA-0.0, LOSS ALL AC POWER, Step 1. b. Check the 3A and 3B 4 KV buses - MAINTAIN BOTH ENERGIZED b. Attempt to emergency start the de-energized Unit 3 bus diesel generator. c. Maintain the 3D 4 KV bus energized - ALIGNED TO AN ENERGIZED 4 KV BUS c. Perform the following: 1) IF lockout of 3D 4 KV bus NOT present, THEN perform the following: a) Verify 3C CCW pump - BREAKER OPEN. b) Verify 3C ICW pump – BREAKER OPEN. c) Operate bus supply breakers to restore power.

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Event Description: During the loss of Main Feed, a common loss of suction to all AFW pumps. The crew transitions to 3-EOP-FR-H.1 to initiate Feed and Bleed. The Main Turbine fails to automatically trip. The BOP will take compensatory action to trip the Turbine manually. The ICW to TPCW Heat Exchanger Valve, POV-3-4883, does not automatically isolate on a Safety Injection signal. The BOP takes action while performing Attachment 3 of 3-EOP-E-0 to manually close the valve.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	**4** **Check If SI Is Actuated** * SI Annunciators - ANY ON OR * Safeguards equipment – AUTO STARTED Perform the following: a. Check if SI is required: * Low pressurizer pressure – 1730 psig OR * High containment pressure – 4 psig OR * High steam line differential pressure – 100 psid OR * High steam flow with low S/G pressure - 614 psig OR low Tavg (543 F) b. IF SI is required, THEN manually actuate SI and containment isolation phase A AND go to Step 5. c. IF SI is NOT required, THEN perform the following: 1) Monitor Critical Safety Functions using 3-EOP-F-0, CRITICAL SAFETY FUNCTION STATUS TREES. 2) Go to 3-EOP-ES-0.1, REACTOR TRIP RESPONSE, Step 1.
	CREW	**NOTE** *FOLDOUT Page shall be monitored for the remainder of this procedure.*
	CREW	Monitors 3-EOP-E-0 Foldout page (see next page)
	SRO/BOP	**5** **Continue With Attachment 3 To Complete The Prompt Action Verifications While Performing This Procedure**

Examiner Note: 3-EOP-E-0, Attachment 3 commences at Page 38 and at Page 46.

Examiner Note: The SRO and ATC will complete the remaining steps in 3-EOP-E-0, while the BOP performs 3-EOP-E-0 Prompt Action Verifications using Attachment 3.

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Event Description: During the loss of Main Feed, a common loss of suction to all AFW pumps. The crew transitions to 3-EOP-FR-H.1 to initiate Feed and Bleed. The Main Turbine fails to automatically trip. The BOP will take compensatory action to trip the Turbine manually. The ICW to TPCW Heat Exchanger Valve, POV-3-4883, does not automatically isolate on a Safety Injection signal. The BOP takes action while performing Attachment 3 of 3-EOP-E-0 to manually close the valve.

Time	Position	Applicant's Actions or Behavior

FOLDOUT FOR PROCEDURE E-0

1. **ADVERSE CONTAINMENT CONDITIONS**

   IF either of the conditions listed below occur, **THEN** use adverse containment setpoints:

   Containment atmosphere temperature ≥ 180°F

   OR

   Containment radiation levels ≥ 1.3×10^5 R/hr

   WHEN containment parameters drop below the above values, **THEN** normal setpoints can again be used **IF** the TSC determines that containment integrated dose rate has not exceeded 10^6 Rads.

2. **RCP TRIP CRITERIA**

   a. **IF** both conditions listed below occur, **THEN** trip all RCPs:
      1) High-head SI pumps - AT LEAST ONE RUNNING **AND** SI FLOWPATH VERIFIED.
      2) RCS subcooling - LESS THAN 25°F[65°F]

   b. **IF** phase B actuated, **THEN** trip all RCPs.

3. **FAULTED S/G ISOLATION CRITERIA**

   IF any S/G pressure decreasing in an uncontrolled manner **OR** any S/G completely depressurized, **THEN** the following may be performed:

   a. Maintain total feedwater flow greater than 345 gpm until narrow range level in at least one S/G is greater than 6%[32%].

   b. Isolate AFW flow to faulted S/G(s).

   c. Stabilize RCS hot leg temperature using steam dumps when faulted S/G has blown down to less than 10% wide range.

4. **RUPTURED S/G ISOLATION CRITERIA**

   IF any S/G level increases in an uncontrolled manner **OR** any S/G has abnormal radiation, **AND** narrow range level in affected S/G(s) is greater than 6%[32%], **THEN** feed flow may be stopped to affected S/G(s).

5. **AFW SYSTEM OPERATION CRITERIA**

   a. **IF** two AFW pumps are operating on a single train, **THEN** one of the pumps shall be shut down within one hour of the initial start signal

   b. **IF** two AFW trains are operating and one of the AFW pumps has been operating at low flow of 60 gpm or less for one hour, **THEN** that AFW pump shall be shut down

6. **CST MAKEUP WATER CRITERIA**

   IF CST level decreases to less than 10%, **THEN** add makeup to CST using 3-NOP-018.01, CONDENSATE STORAGE TANK (CST).

7. **RHR SYSTEM OPERATION CRITERIA**

   IF RHR flow is less than 1000 gpm, **THEN** the RHR pumps shall be shut down within 44 minutes of the initial start signal.

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Event Description: During the loss of Main Feed, a common loss of suction to all AFW pumps. The crew transitions to 3-EOP-FR-H.1 to initiate Feed and Bleed. The Main Turbine fails to automatically trip. The BOP will take compensatory action to trip the Turbine manually. The ICW to TPCW Heat Exchanger Valve, POV-3-4883, does not automatically isolate on a Safety Injection signal. The BOP takes action while performing Attachment 3 of 3-EOP-E-0 to manually close the valve.

Time	Position	Applicant's Actions or Behavior	
	SRO/ATC	**6** Check AFW Pumps - AT LEAST TWO RUNNING	Perform the following: a. Manually open valves to establish two AFW pumps running. b. **IF** an AFW pump is tripped, **THEN** dispatch an operator to locally reset the AFW turbine trips. c. **IF** both units require AFW **AND** only one AFW pump is available, **THEN** perform the following: 1) Verify all RCPs - TRIPPED 2) Establish 270 gpm AFW flow to each unit. 3) Use a setpoint of 270 gpm for required AFW flow instead of 345 gpm specified in subsequent Steps and Procedures.
EXAMINER NOTE: The Aux. Feedwater Pumps initially come up to speed. This scenario simulates a total loss of suction in the Aux. Feed Water System. The key parameters to watch are S/G Levels and AFW Flow. A Red Path for 3-EOP-FR-H.1 will come in quickly due to this massive break.			
	SRO/ATC	**7** Verify AFW Valve Alignment - PROPER EMERGENCY ALIGNMENT	Manually align valves to establish proper AFW alignment.

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Event Description: During the loss of Main Feed, a common loss of suction to all AFW pumps. The crew transitions to 3-EOP-FR-H.1 to initiate Feed and Bleed. The Main Turbine fails to automatically trip. The BOP will take compensatory action to trip the Turbine manually. The ICW to TPCW Heat Exchanger Valve, POV-3-4883, does not automatically isolate on a Safety Injection signal. The BOP takes action while performing Attachment 3 of 3-EOP-E-0 to manually close the valve.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	**8** **Verify Proper AFW Flow** a. Check narrow range level in at least one S/G - GREATER THAN 6%[32%] a. Perform the following: 1) Verify AFW flow greater than 345 gpm. 2) IF AFW flow less than 345 gpm, THEN manually start pumps AND align valves to establish greater than 345 gpm flow. 3) IF total feed flow from all sources greater than 345 gpm can NOT be established, THEN perform the following: a) Monitor Critical Safety Functions using 3-EOP-F-0, CRITICAL SAFETY FUNCTION STATUS TREES. b) Go to 3-EOP-FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK, Step 1.
EXAMINER CUE: CREW observes a RED PATH for Loss of Secondary Heat Sink and recommends entry to 3-FRP-H-1 within 10 minutes.		
	SRO/ATC	b. Maintain feed flow to S/G until narrow range levels between 15%[32%] and 50%
	SRO/ATC	UNABLE to raise flow to at least 345 gpm. Directs the field operator to investigate the loss.
	SRO	Directs STA to monitor 3-EOP-F-0 and transitions to 3-EOP-FR-H.1 for Response to Loss of Secondary Heat Sink. [Event 9 – Page 44]

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Event Description: During the loss of Main Feed, a common loss of suction to all AFW pumps. The crew transitions to 3-EOP-FR-H.1 to initiate Feed and Bleed. The Main Turbine fails to automatically trip. The BOP will take compensatory action to trip the Turbine manually. The ICW to TPCW Heat Exchanger Valve, POV-3-4883, does not automatically isolate on a Safety Injection signal. The BOP takes action while performing Attachment 3 of 3-EOP-E-0 to manually close the valve.

Time	Position	Applicant's Actions or Behavior
	BOP	1. **Check The Load Centers Associated With The Energized 4 KV Buses – ENERGIZED** • 3A LC • 3B LC • 3C LC • 3D LC • 3H LC Close the Load Center supply breakers.
	BOP	2. **Check If Main Steamlines Should Be Isolated** a. Check main steamline isolation and bypass valves - ANY OPEN — a. Go to Step 3. b. Check if either main steam isolation signal has actuated — b. Go to Step 3. • High steam flow with either low S/G pressure 614 psig **OR** low Tavg 543 F **OR** • Hi-Hi containment pressure 20 PSIG c. Verify main steam isolation and bypass valves - CLOSED — c. Push manual Steamline Isolation push buttons on VPB **OR** manually close valves.
	BOP	3. **Verify Feedwater Isolation** a. Place main feedwater pump switches in STOP b. Feedwater control valves – CLOSED — b. Manually close valves. c. Feedwater bypass valves – CLOSED — c. Manually close valves. d. Close feedwater isolation MOVs — d. Locally close valves. e. Verify standby feedwater pumps – OFF — e. **IF** standby feedwater is aligned to Unit 3, **THEN** stop standby feedwater pump(s).
	BOP	• Places Main Feedwater Pump switches in STOP. • Closes Feedwater Isolation MOVs.

Op-Test No.: 2011-302 Scenario No.: 2 Event No.: 8 Page 8 of 12

Event Description: During the loss of Main Feed, a common loss of suction to all AFW pumps. The crew transitions to 3-EOP-FR-H.1 to initiate Feed and Bleed. The Main Turbine fails to automatically trip. The BOP will take compensatory action to trip the Turbine manually. The ICW to TPCW Heat Exchanger Valve, POV-3-4883, does not automatically isolate on a Safety Injection signal. The BOP takes action while performing Attachment 3 of 3-EOP-E-0 to manually close the valve.

Time	Position	Applicant's Actions or Behavior
	BOP	**4. Verify Proper ICW System Operation** a. Verify ICW pumps - AT LEAST TWO RUNNING — a. Start ICW pump(s) to establish at least two running. b. Verify ICW to TPCW Heat Exchanger – ISOLATED • POV-3-4882 – CLOSED • POV-3-4883 – CLOSED — b. Manually close valve(s). **IF** valve(s) can **NOT** be closed, **THEN** locally close the following valves: • 3-50-319 for POV-3-4882 • 3-50-339 for POV-3-4883 c. Check ICW headers - TIED TOGETHER — c. **IF** both ICW headers are intact, **THEN** direct operator to tie headers together.
	BOP	Places the handswitch for the POV-3-4883 to CLOSE. **[Event 11]**
	BOP	**5. Verify Proper CCW System Operation** a. CCW Heat Exchangers – THREE IN SERVICE — a. Perform the following: 1) Start or stop CCW pumps as necessary to establish ONLY ONE RUNNING CCW PUMP. 2) Verify Emergency Containment Coolers - ONLY TWO RUNNING 3) Go to Step 5c. b. CCW pumps - ONLY TWO RUNNING — b. Start or stop CCW pumps as necessary to establish ONLY TWO RUNNING CCW PUMPS. c. CCW headers - TIED TOGETHER — c. **IF** both CCW headers are intact, **THEN** direct a field operator to tie the headers together. d. RCP Thermal Barrier CCW Outlet, MOV-3-626 – OPEN — d. **IF** containment isolation phase B **NOT** actuated **AND** CCW radiation levels are normal, **AND** RCP number one seal leak-off temperature is less than 235°F, **THEN** manually open MOV-3-626. **IF** MOV-3-626 can **NOT** be manually opened, **THEN** direct operator to open MOV-3-626 locally.

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Event Description: During the loss of Main Feed, a common loss of suction to all AFW pumps. The crew transitions to 3-EOP-FR-H.1 to initiate Feed and Bleed. The Main Turbine fails to automatically trip. The BOP will take compensatory action to trip the Turbine manually. The ICW to TPCW Heat Exchanger Valve, POV-3-4883, does not automatically isolate on a Safety Injection signal. The BOP takes action while performing Attachment 3 of 3-EOP-E-0 to manually close the valve.

Time	Position	Applicant's Actions or Behavior
	BOP	**6. Verify Containment Cooling** a. Check emergency containment coolers - ONLY TWO RUNNING a. Manually start or stop emergency containment coolers to establish - ONLY TWO RUNNING. b. Verify emergency containment filter fans - AT LEAST TWO RUNNING b. Manually start emergency containment filter fans.
	BOP	**7. Verify Pump Operation** a. At least two high head SI pumps running a. Manually start high-head pump(s). b. Both RHR pumps running b. Manually start RHR pump(s).
	BOP	**8. Verify SI Flow** a. RCS pressure - LESS THAN 1600 PSIG [2000 PSIG] a. Go to Step 9. b. High-head SI pump flow indicator – CHECK FOR FLOW b. Manually start pumps **AND** align valves to establish an injection flowpath. c. RCS pressure - LESS THAN 250 PSIG [650 PSIG] c. Go to Step 9. d. RHR pump flow indicator - CHECK FOR FLOW d. Manually start pumps **AND** align valves to establish an injection flowpath.
	BOP	**9. Realign SI System** a. Verify Unit 3 high-head SI pumps - TWO RUNNING a. Perform the following: 1) Operate Unit 3 and Unit 4 high-head SI pumps to establish injection to Unit 3 from two high-head SI pumps. 2) Direct Unit 4 Reactor Operator to align Unit 4 high-head SI pump suction to Unit 3 RWST using ATTACHMENT 1 of this procedure. 3) Go to Step 10. b. Stop both Unit 4 high-head SI pumps **AND** place in standby
	BOP	Places the handswitches for the 4A and 4B HHSI pumps to STOP.

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Event Description: During the loss of Main Feed, a common loss of suction to all AFW pumps. The crew transitions to 3-EOP-FR-H.1 to initiate Feed and Bleed. The Main Turbine fails to automatically trip. The BOP will take compensatory action to trip the Turbine manually. The ICW to TPCW Heat Exchanger Valve, POV-3-4883, does not automatically isolate on a Safety Injection signal. The BOP takes action while performing Attachment 3 of 3-EOP-E-0 to manually close the valve.

Time	Position	Applicant's Actions or Behavior	
	BOP	10. **Verify Containment Isolation Phase A Valve White Lights On VPB – ALL BRIGHT**	Perform the following: a. Manually actuate Containment Isolation Phase A. b. **IF** any Containment Isolation Phase A valve is **NOT** closed, **THEN** manually close valve. **IF** valve(s) can **NOT** be manually closed, **THEN** manually or locally isolate affected containment penetration.
	BOP	11. **Verify SI Valve Amber Lights On VPB - ALL BRIGHT**	Manually align valves to establish proper SI alignment for an injection flowpath.
	BOP	12. **Verify SI – RESET**	Reset SI
	BOP	13. **Verify Containment Phase A – RESET**	Reset Phase A
	BOP	14. **Reestablish RCP Cooling** a. Check RCPs – AT LEAST ONE RUNNING b. Open CCW to normal containment cooler valves • MOV-3-1417 • MOV-3-1418 c. Reset and start normal containment coolers	a. Go to Step 15. b. Stop all RCPs c. Stop all RCPs

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Event Description: During the loss of Main Feed, a common loss of suction to all AFW pumps. The crew transitions to 3-EOP-FR-H.1 to initiate Feed and Bleed. The Main Turbine fails to automatically trip. The BOP will take compensatory action to trip the Turbine manually. The ICW to TPCW Heat Exchanger Valve, POV-3-4883, does not automatically isolate on a Safety Injection signal. The BOP takes action while performing Attachment 3 of 3-EOP-E-0 to manually close the valve.

Time	Position	Applicant's Actions or Behavior
	BOP	**15. Monitor Containment Pressure To Verify Containment Spray NOT Required** a. Containment pressure - HAS REMAINED LESS THAN 20 PSIG • PR-3-6306A **AND** • PR-3-6306B a. Perform the following: 1) IF containment spray NOT initiated, THEN manually initiate containment spray. 2) Verify Containment Isolation Phase B - ACTUATED. 3) Verify Containment Isolation Phase B valve white lights on VPB – ALL BRIGHT. 4) IF any Containment Isolation Phase B valve did NOT close, THEN manually or locally isolate affected containment penetration. 5) Stop all RCPs.
	BOP	**16. Verify Containment and Control Room Ventilation Isolation** a. Unit 3 containment purge exhaust and supply fans – OFF a. Manually stop fans. b. Verify Control Room ventilation status panel - PROPER EMERGENCY RECIRCULATION ALIGNMENT b. Manually align equipment for Control Room emergency recirculation.
	BOP	**NOTE** *Hydrogen Monitors should be in service within 30 minutes of a valid SI signal. They should be available in a timely manner to support decision-making related to hydrogen generation in containment.*
	BOP	**17. Place Hydrogen Monitors In Service Using 3-NOP-094, CONTAINMENT POST ACCIDENT MONITORING SYSTEM**
	BOP	**18. Verify All Four EDGs – RUNNING** EMERGENCY START any available EDG NOT running.

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Event Description: During the loss of Main Feed, a common loss of suction to all AFW pumps. The crew transitions to 3-EOP-FR-H.1 to initiate Feed and Bleed. The Main Turbine fails to automatically trip. The BOP will take compensatory action to trip the Turbine manually. The ICW to TPCW Heat Exchanger Valve, POV-3-4883, does not automatically isolate on a Safety Injection signal. The BOP takes action while performing Attachment 3 of 3-EOP-E-0 to manually close the valve.

Time	Position	Applicant's Actions or Behavior
	BOP	**19. Verify Power To Emergency 4 KV Buses and Load Centers** a. Check the 3A, 3B and 3D 4 KV buses - ALL ENERGIZED a. Perform the following: 1) Inform the Unit Supervisor that ATTACHMENT 3 is complete with the exception of the de-energized bus or buses. 2) **IF** the Unit Supervisor decides not to energize the de-energized bus or buses, **THEN** go to Step 20. 3) **IF** the Unit Supervisor decides to energize 3A, 3B, or 3D bus, **THEN** perform the following: a) **IF** 3A 4 KV bus de-energized, **THEN** restore power to bus using 3-ONOP-004.2, LOSS OF 3A 4KV BUS. b) **IF** 3B 4 KV bus de-energized, **THEN** restore power to bus using 3-ONOP-004.3, LOSS OF 3B 4KV BUS. c) **IF** 3D 4 KV bus de-energized, **THEN** restore power to bus using 3-ONOP-004.5, LOSS OF 3D 4KV BUS.
	BOP	**20. Notify The Unit Supervisor That The PROMPT ACTION VERIFICATIONS Attachment Is Complete And Discuss Any Safeguards Equipment That Is Not In The Required Condition**

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During the loss of Main Feed, a common loss of suction to all AFW pumps. The crew transitions to 3-EOP-FR-H.1 to initiate Feed and Bleed.

Time	Position	Applicant's Actions or Behavior
	SRO	Directs 3-EOP-FRP-H.1 response.
	SRO/ATC	**CAUTIONS** • *If total feed flow has been reduced to less than 345 gpm due to procedural requirements and 345 gpm total feed flow is available, then this procedure shall NOT be performed.* • *Feed flow should NOT be reestablished to any faulted S/G if a non-faulted S/G is available.*
	SRO/ATC	**1 Check If Secondary Heat Sink Is Required** a. RCS pressure - GREATER THAN ANY NON-FAULTED S/G PRESSURE — a. Return to procedure and step in effect. b. RCS average temperature - GREATER THAN 350°F — b. Try to place RHR System in service while continuing in this procedure. Refer to 3-OP-050, RESIDUAL HEAT REMOVAL SYSTEM. IF adequate cooling with RHR system established, THEN return to procedure and step in effect.
	SRO/ATC	**CAUTIONS** • *If wide range level in any S/G is less than 22% [narrow range level in all S/Gs less than 32%] or PRZ pressure is greater than or equal to 2335 psig due to loss of secondary heat sink, Steps 11 through 19 should be initiated immediately for bleed and feed.* • *If CST level decreases to less than 10%, makeup water sources for CST will be necessary to maintain secondary heat sink.*
	ATC	Observes 3C SG Wide Range level less than 22%
	SRO	Directs immediate transition to steps 11-19 of 3-EOP-FR-H.1.
	SRO/ATC	**CAUTION** *Steps 11 through 19 must be performed quickly in order to establish RCS heat removal by RCS bleed and feed.*
	SRO/ATC	**11 Verify RCPs - ALL STOPPED**

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During the loss of Main Feed, a common loss of suction to all AFW pumps. The crew transitions to 3-EOP-FR-H.1 to initiate Feed and Bleed.

Time	Position	Applicant's Actions or Behavior
	ATC	Manually stops all RCPs
	SRO/ATC	**12** **Actuate SI AND Containment Isolation Phase A**
	ATC	Manually initiates SI & Containment Isolation phase A if not previously initiated.
	SRO/ATC	**13** **Verify RCS Feed Path** a. Check high-head SI pumps – AT LEAST ONE RUNNING b. Verify SI valve amber lights on VPB - ALL BRIGHT Manually start pumps and align valve(s) to establish RCS feed path. IF RCS feed path can NOT be established, THEN continue attempts to establish S/G feed flow. Observe CAUTIONS prior to Step 2 AND return to Step 2.
	SRO/ATC	**14** **Establish RCS Bleed Path** a. Verify power to PRZ PORV block valves - AVAILABLE — a. Restore power to block valves. b. Verify PRZ PORV block valves - BOTH OPEN — b. Open both block valves. c. Open both PRZ PORVs
	ATC	Manually opens both PORVs for adequate RCS bleed path.
	SRO/ATC	**15** **Verify Instrument Air To Containment** a. Verify Instrument Air Containment Isolation, CV-3-2803 - OPEN b. Verify instrument air pressure, PI-3-1444 - GREATER THAN 95 PSIG — b. Restore instrument air pressure using 0-ONOP-013, LOSS OF INSTRUMENT AIR, while continuing with this procedure.
	SRO/ATC	**16** **Verify Adequate RCS Bleed Path** • PRZ PORVs - BOTH OPEN • PRZ PORV block valves – BOTH OPEN

Crew Critical Task: Initiate feed and bleed cooling so that the RCS depressurizes sufficiently for HHSI injection flow to occur prior to completing Step 16 of 3-EOP-FR-H.1.

EXAMINER NOTE: The scenario is terminated when the crew verifies the RCS Feed & Bleed flowpath of 3-EOP-FR-H.1 at Step or earlier based on the discretion of the Lead Examiner.

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NOTE: This is an additional Attachment 3 which is conveniently at the end for evaluator comments.

3-EOP-E-0, Reactor Trip or Safety Injection – Attachment 3, Prompt Action Verifications

Time	Position	Applicant's Actions or Behavior
	BOP	1. **Check The Load Centers Associated With The Energized 4 KV Buses – ENERGIZED** — Close the Load Center supply breakers. • 3A LC • 3B LC • 3C LC • 3D LC • 3H LC
	BOP	2. **Check If Main Steamlines Should Be Isolated** a. Check main steamline isolation and bypass valves - ANY OPEN — a. Go to Step 3. b. Check if either main steam isolation signal has actuated — b. Go to Step 3. • High steam flow with either low S/G pressure 614 psig **OR** low Tavg 543 F **OR** • Hi-Hi containment pressure 20 PSIG c. Verify main steam isolation and bypass valves - CLOSED — c. Push manual Steamline Isolation push buttons on VPB **OR** manually close valves.
	BOP	3. **Verify Feedwater Isolation** a. Place main feedwater pump switches in STOP b. Feedwater control valves – CLOSED — b. Manually close valves. c. Feedwater bypass valves – CLOSED — c. Manually close valves. d. Close feedwater isolation MOVs — d. Locally close valves. e. Verify standby feedwater pumps – OFF — e. **IF** standby feedwater is aligned to Unit 3, **THEN** stop standby feedwater pump(s).
	BOP	Places Main Feedwater Pump switches in STOP.

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NOTE: This is an additional Attachment 3 which is conveniently at the end for evaluator comments.

3-EOP-E-0, Reactor Trip or Safety Injection – Attachment 3, Prompt Action Verifications

Time	Position	Applicant's Actions or Behavior
	BOP	**4. Verify Proper ICW System Operation** a. Verify ICW pumps - AT LEAST TWO RUNNING — a. Start ICW pump(s) to establish at least two running. b. Verify ICW to TPCW Heat Exchanger – ISOLATED • POV-3-4882 – CLOSED • POV-3-4883 – CLOSED — b. Manually close valve(s). IF valve(s) can NOT be closed, THEN locally close the following valves: • 3-50-319 for POV-3-4882 • 3-50-339 for POV-3-4883 c. Check ICW headers - TIED TOGETHER — c. IF both ICW headers are intact, THEN direct operator to tie headers together.
	BOP	Places the handswitch for the POV-3-4883 to CLOSE. **[Event 11]**
	BOP	**5. Verify Proper CCW System Operation** a. CCW Heat Exchangers – THREE IN SERVICE — a. Perform the following: 1) Start or stop CCW pumps as necessary to establish ONLY ONE RUNNING CCW PUMP. 2) Verify Emergency Containment Coolers - ONLY TWO RUNNING 3) Go to Step 5c. b. CCW pumps - ONLY TWO RUNNING — b. Start or stop CCW pumps as necessary to establish ONLY TWO RUNNING CCW PUMPS. c. CCW headers - TIED TOGETHER — c. IF both CCW headers are intact, THEN direct a field operator to tie the headers together. d. RCP Thermal Barrier CCW Outlet, MOV-3-626 – OPEN — d. IF containment isolation phase B NOT actuated AND CCW radiation levels are normal, AND RCP number one seal leak-off temperature is less than 235°F, THEN manually open MOV-3-626. IF MOV-3-626 can NOT be manually opened, THEN direct operator to open MOV-3-626 locally.

Op-Test No.: 2011-302 Scenario No.: 2 Event No.: 8 Page 3 of 6

NOTE: This is an additional Attachment 3 which is conveniently at the end for evaluator comments.

3-EOP-E-0, Reactor Trip or Safety Injection – Attachment 3, Prompt Action Verifications

Time	Position	Applicant's Actions or Behavior
	BOP	**6. Verify Containment Cooling** a. Check emergency containment coolers - ONLY TWO RUNNING a. Manually start or stop emergency containment coolers to establish - ONLY TWO RUNNING. b. Verify emergency containment filter fans - AT LEAST TWO RUNNING b. Manually start emergency containment filter fans.
	BOP	**7. Verify Pump Operation** a. At least two high head SI pumps running a. Manually start high-head pump(s). b. Both RHR pumps running b. Manually start RHR pump(s).
	BOP	**8. Verify SI Flow** a. RCS pressure - LESS THAN 1600 PSIG [2000 PSIG] a. Go to Step 9. b. High-head SI pump flow indicator – CHECK FOR FLOW b. Manually start pumps **AND** align valves to establish an injection flowpath. c. RCS pressure - LESS THAN 250 PSIG [650 PSIG] c. Go to Step 9. d. RHR pump flow indicator - CHECK FOR FLOW d. Manually start pumps **AND** align valves to establish an injection flowpath.
	BOP	**9. Realign SI System** a. Verify Unit 3 high-head SI pumps - TWO RUNNING a. Perform the following: 1) Operate Unit 3 and Unit 4 high-head SI pumps to establish injection to Unit 3 from two high-head SI pumps. 2) Direct Unit 4 Reactor Operator to align Unit 4 high-head SI pump suction to Unit 3 RWST using ATTACHMENT 1 of this procedure. 3) Go to Step 10. b. Stop both Unit 4 high-head SI pumps **AND** place in standby
	BOP	Places the handswitches for the 4A and 4B HHSI pumps to STOP.

Op-Test No.: 2011-302 Scenario No.: 2 Event No.: 8 Page 4 of 6

NOTE: This is an additional Attachment 3 which is conveniently at the end for evaluator comments.

3-EOP-E-0, Reactor Trip or Safety Injection – Attachment 3, Prompt Action Verifications

Time	Position	Applicant's Actions or Behavior
	BOP	10. **Verify Containment Isolation Phase A Valve White Lights On VPB – ALL BRIGHT** Perform the following: a. Manually actuate Containment Isolation Phase A. b. **IF** any Containment Isolation Phase A valve is **NOT** closed, **THEN** manually close valve. **IF** valve(s) can **NOT** be manually closed, **THEN** manually or locally isolate affected containment penetration.
	BOP	11. **Verify SI Valve Amber Lights On VPB - ALL BRIGHT** Manually align valves to establish proper SI alignment for an injection flowpath.
	BOP	12. **Verify SI – RESET** Reset SI
	BOP	13. **Verify Containment Phase A – RESET** Reset Phase A
	BOP	14. **Reestablish RCP Cooling** a. Check RCPs – AT LEAST ONE RUNNING a. Go to Step 15. b. Open CCW to normal containment cooler valves b. Stop all RCPs • MOV-3-1417 • MOV-3-1418 c. Reset and start normal containment coolers c. Stop all RCPs

Op-Test No.: 2011-302 Scenario No.: 2 Event No.: 8 Page 5 of 6

NOTE: This is an additional Attachment 3 which is conveniently at the end for evaluator comments.

3-EOP-E-0, Reactor Trip or Safety Injection – Attachment 3, Prompt Action Verifications

Time	Position	Applicant's Actions or Behavior
	BOP	**15. Monitor Containment Pressure To Verify Containment Spray NOT Required** a. Containment pressure - HAS REMAINED LESS THAN 20 PSIG • PR-3-6306A AND • PR-3-6306B a. Perform the following: 1) IF containment spray NOT initiated, THEN manually initiate containment spray. 2) Verify Containment Isolation Phase B - ACTUATED. 3) Verify Containment Isolation Phase B valve white lights on VPB – ALL BRIGHT. 4) IF any Containment Isolation Phase B valve did NOT close, THEN manually or locally isolate affected containment penetration. 5) Stop all RCPs.
	BOP	**16. Verify Containment and Control Room Ventilation Isolation** a. Unit 3 containment purge exhaust and supply fans – OFF a. Manually stop fans. b. Verify Control Room ventilation status panel - PROPER EMERGENCY RECIRCULATION ALIGNMENT b. Manually align equipment for Control Room emergency recirculation.
	BOP	**NOTE** *Hydrogen Monitors should be in service within 30 minutes of a valid SI signal. They should be available in a timely manner to support decision-making related to hydrogen generation in containment.*
	BOP	**17. Place Hydrogen Monitors In Service Using 3-NOP-094, CONTAINMENT POST ACCIDENT MONITORING SYSTEM**
	BOP	**18. Verify All Four EDGs – RUNNING** EMERGENCY START any available EDG NOT running.

Op-Test No.: 2011-302 Scenario No.: 2 Event No.: 8 Page 6 of 6

NOTE: This is an additional Attachment 3 which is conveniently at the end for evaluator comments.

3-EOP-E-0, Reactor Trip or Safety Injection – Attachment 3, Prompt Action Verifications

Time	Position	Applicant's Actions or Behavior
	BOP	19. **Verify Power To Emergency 4 KV Buses and Load Centers** a. Check the 3A, 3B and 3D 4 KV buses - ALL ENERGIZED a. Perform the following: 1) Inform the Unit Supervisor that ATTACHMENT 3 is complete with the exception of the de-energized bus or buses. 2) **IF** the Unit Supervisor decides not to energize the de-energized bus or buses, **THEN** go to Step 20. 3) **IF** the Unit Supervisor decides to energize 3A, 3B, or 3D bus, **THEN** perform the following: a) **IF** 3A 4 KV bus de-energized, **THEN** restore power to bus using 3-ONOP-004.2, LOSS OF 3A 4KV BUS. b) **IF** 3B 4 KV bus de-energized, **THEN** restore power to bus using 3-ONOP-004.3, LOSS OF 3B 4KV BUS. c) **IF** 3D 4 KV bus de-energized, **THEN** restore power to bus using 3-ONOP-004.5, LOSS OF 3D 4KV BUS.
	BOP	20. **Notify The Unit Supervisor That The PROMPT ACTION VERIFICATIONS Attachment Is Complete And Discuss Any Safeguards Equipment That Is Not In The Required Condition**

ILC-27 NRC Scenario #3 Event Description

Facility: ~~Turkey Point~~ **Scenario:** 3 **Op Test.:** 2011-302

Examiners: _____ **Candidates:** _____ **US**

_____ _____ **ATC**

_____ _____ **BOP**

Initial Conditions: Mode 2 3% power at MOL.

Turnover:

- Raise power to 5% for rolling the Main Turbine with Control Rods. MODE 1 preps are complete.
- After the Main Turbine is rolled, make preps to increase power above 10%.
- Online Risk – Green with B Train protected on both units.

Event No.	Malf. No.	Event Type	Event Description
1	TFN1CP22	(I) BOP (I,TS) SRO	A Power Range Nuclear Instrument N-42 Control Power fuse blows. The ATC checks all PR NI Channels to determine the failure. 3-ONOP-059.8, Power Range Nuclear Instrumentation Malfunction, is entered to remove the channel from service. The SRO will address LCO 3.3.1.
2	N/A	(R) ATC (R) SRO	In accordance with 3-GOP-301, raise power to 5% for rolling the Main Turbine with Control Rods. MODE 1 preps are complete for the MODE change.
3	TFK1A12T TFK1A611 TFK1S611	(C) ATC (C, TS) SRO	3A CCW Pump trips due to breaker failure. 3-701G, PC-3_611 isolation, is inadvertently closed which prevents the Auto Start of 3B CCW Pump. The ATC uses the ARP, 3-ONOP-030, or 0-ADM-211 to start 3B CCW Pump. Technical Specification 3.7.2 is entered.
4	N/A	(N) BOP (N) SRO	Swaps from 3A to 3B Condensate Pump using 3-NOP-073, Condensate System.
5	IAF1479	(I) BOP (I) SRO	3A S/G Bypass Feed Valve Controller drifts causing the valve to open. After noticing the S/G level change, the BOP establishes 3A S/G control band with the S/G Bypass Feed Valve per 3-GOP-301.
6	IAH244G	(I) ATC (I) SRO	PCV-3-455A Spray Valve Controller causes valve to fail partially open. The ATC mitigates this event by manually operating the valve per ARP, 3-ONOP-041.5, or 0-ADM-211.
7	TFKXSMA	(C) BOP (C) SRO	The 3A TPCW Pump shaft fails. The BOP will start the 3B TPCW pump using the ARP, 3-ONOP-008, or 0-ADM-211 to maintain plant operations.
8	TVSBVL14	(M) ALL	A Main Steam Line Leak upstream of the 3B MSIV inside Containment gradually develops. A manual or automatic Reactor Trip occurs. The crew responds using 3-EOP-E-0. The crew transitions to 3-EOP-E-2. The BOP ensures 3B MSIV is closed. The crew isolates the 3B S/G. After 3B S/G isolation, the crew transitions to 3-EOP-E-1 and, subsequently, to 3-EOP-ES 1.1 to terminate SI.
9	TFL3SIA2	(C) ATC (C) SRO	During the performance of 3-EOP-E-0, the B Train of SI fails to actuate. The ATC manually actuates SI to initiate Train B SI.
10	TFSVVX6C	(C) BOP (C) SRO	The 3B MSIV fails to close in AUTO. The BOP manually closes using Attachment 3 of 3-EOP-E-0.

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

SIMULATOR SETUP INSTRUCTIONS

1. Reset to IC-5 (3% MOL) or other IC with correct setup conditions.
2. Place Simulator in RUN
3. Open and Execute ILC27SCN3N.lsn.
4. Start 3A CCW Pump.
5. Stop 3B CCW Pump.
6. Trigger lesson steps:
   - SETUP - B TRAIN OF SI FAILS TO ACTUATE
     insert TFL3SIA2 TRUE delay=0 ramp=0 on=0 off=0
   - SETUP - 3B MSIV FAILS TO AUTO CLOSE
     insert TFSVVX6C true delay=0 ramp=0 on=0 off=0
7. Store IC with initial conditions setup if desired.
8. Place Simulator in freeze.
9. Provide Shift Turnover Checklists
10. Perform Simulator Operator Checklist
11. When ready to begin, place Simulator in RUN.

FACILITY OPERATOR INSTRUCTIONS

EVENT 1

A Power Range Nuclear Instrument N-42 Control Power fuse blows. The ATC checks all PR NI Channels to determine the failure. 3-ONOP-059.8, Power Range Nuclear Instrumentation Malfunction, is entered to remove the channel from service. The SRO will address LCO 3.3.1.

When directed, Trigger EVENT 1 - N42 PR NI CONTROL POWER FUSE BLOWS.

- insert TFN1CP22 TRUE delay=0 ramp=0 on=0 off=0

SM - If directed, respond and acknowledge the failure of Power Range Nuclear Instrument N-42.

WCC - If directed, respond and acknowledge the failure of Power Range Nuclear Instrument N-42 and to write a PWO for troubleshooting.

EVENT 2

In accordance with 3-GOP-301, raise power to 5% for rolling the Main Turbine with Control Rods. MODE 1 preps are complete for the MODE change.

SM - If directed, acknowledge power increase.

WCC - If directed, acknowledge power increase.

SYSTEM DISPATCH - If directed, acknowledge power increase.

ENGINEERING - If directed, acknowledge power increase.

CHEMISTRY - If directed, acknowledge power increase.

EVENT 3

3A CCW Pump trips due to breaker failure. 3-701G, PC-3_611 isolation, is inadvertently closed which prevents the Auto Start of 3B CCW Pump. The ATC uses the ARP, 3-ONOP-030, or 0-ADM-211 to start 3B CCW Pump. Technical Specification 3.7.2 is entered.

When directed, Trigger EVENT 3 - 3A CCW PUMP BREAKER TRIPS.

- insert TFK1S611 TRUE delay=0 ramp=0 on=0 off=0
- insert TFK1A611 TRUE delay=0 ramp=0 on=0 off=0
- insert TFK1A12T TRUE delay=0 ramp=0 on=0 off=0

SM - If directed, respond and acknowledge the failure of 3A CCW PUMP TRIP.

WCC - If directed, respond and acknowledge the failure of 3A CCW PUMP TRIP and to write a PWO for troubleshooting.

EVENT 4

Swaps from 3A to 3B Condensate Pump using 3-NOP-073, Condensate System.

EVENT 5

3A S/G Bypass Feed Valve Controller drifts causing the valve to open. After noticing the S/G level change, the BOP establishes 3A S/G control band with the S/G Bypass Feed Valve per 3-GOP-301.

When directed, Trigger EVENT 5 - 3A S/G BYPASS FEED VALVE CONTROLLER DRIFT.

- insert TVFV479 0.500000 delay=0 ramp=60 on=0 off=0

SM - If directed, respond and acknowledge the issue with 3A S/G BYPASS FEED VALVE CONTROLLER.

WCC - If directed, respond and acknowledge the issue with 3A S/G BYPASS FEED VALVE CONTROLLER.

EVENT 6

PCV-3-455A Spray Valve Controller causes valve to fail partially open. The ATC mitigates this event by manually operating the valve per ARP,
3-ONOP-041.5, or 0-ADM-211.

When directed, Trigger EVENT 6 - PCV - 455A SPRAY VALVE CONTROLLER PARTIAL FAILURE.

- insert IAH244G 2.5 delay=0 ramp=120 on=0 off=0

SM - If directed, respond and acknowledge the failure of PCV - 455A SPRAY VALVE CONTROLLER.

WCC - If directed, respond and acknowledge the failure of PCV - 455A SPRAY VALVE CONTROLLER and to write a PWO for troubleshooting.

EVENT 7

The 3A TPCW Pump shaft fails. The BOP will start the 3B TPCW pump using the ARP, 3-ONOP-008, or 0-ADM-211 to maintain plant operations.

When directed, Trigger EVENT 7 - A TPCW PUMP SHAFT FAILS.

- insert TFKXSMA TRUE delay=0 ramp=0 on=0 off=0

EVENT 8

A Main Steam Line Leak upstream of the 3B MSIV inside Containment gradually develops. A manual or automatic Reactor Trip occurs. The crew responds using 3-EOP-E-0. The crew transitions to 3-EOP-E-2. The BOP ensures 3B MSIV is closed. The crew isolates the 3B S/G. After 3B S/G isolation, the crew transitions to 3-EOP-E-1 and, subsequently, to 3-EOP-ES 1.1 to terminate SI.

When directed, Trigger EVENT 8 - 3B MAIN STEAM LINE BREAK INSIDE CTMT.

- insert TVSBVL14 0.5 delay=0 ramp=120 on=0 off=0

SCENARIO QUANTITATIVE ATTRIBUTES

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	#
1. Total malfunctions (5–8)	5
2. Malfunctions after EOP entry (1–2)	2
3. Abnormal events (2–4)	4
4. Major transients (1–2)	1
5. EOPs entered/requiring substantive actions (1–2)	2
6. EOP contingencies requiring substantive actions (0–2)	0
7. Critical tasks (2–3)	3

CRITICAL TASKS

1. **Trip RCPs due high Containment pressure and Phase B Isolation of CCW to RCPS prior to entering 3-EOP-E-1.** **OR** **Ensures RCPs are tripped due to a loss of subcooling during a LOCA prior to completing Step 1 of 3-EOP-E-2.**
2. **Isolates the Faulted 3B S/G prior to exiting 3-EOP-E-2.** **(Closes 3B Main Steam Isolation Valve)**
3. **If RHR Flow less than 1000 gpm, stop the RHR Pumps within 44 minutes of their start signal. (3-EOP-E-1)**

Op-Test No.: 2010-302 Scenario No.: 3 Event No.: 1 Page 1 of 5

Event Description: A Power Range Nuclear Instrument N-42 Control Power fuse blows. The ATC checks all PR NI Channels to determine the failure. 3-ONOP-059.8, Power Range Nuclear Instrumentation Malfunction, is entered for initial response. 3-ONOP-049.1, Deviation or Failure of Safety Related or Reactor Protection Channels, is used to remove the channel from service. The SRO will address LCO 3.3.1.

Time	Position	Applicant's Actions or Behavior
		Direct Facility Operator to trigger lesson step, EVENT 1 - N42 PR NI CONTROL POWER FUSE BLOWS. (insert TFN1CP22 TRUE delay=0 ramp=0 on=0 off=0)
	SRO/ATC	Observes failure of N42 PR NI Control Power • Alarms B 6/1, 6/2, 6/3, 6/5, & 7/1 • PR N42 control power fuse blows. • B6/5 may not be the first or only ARP referred to
	SRO/ATC	**CAUSES:** Failure of power range channel due to loss of power **B42** POWER RANGE LOSS OF DETECTOR VOLTAGE
	SRO/ATC	**ALARM CONFIRMATION** 1. **CHECK** LOSS OF DETECTOR VOLT light on any PR channel lit. 2. **CHECK** PR drawers for blown fuses. 3. **CHECK** loss of vital AC power supply to a PR drawer.
	CREW	Diagnosis which NI Channel had the failure through alarm confirmation.
	SRO/ATC	**OPERATOR ACTIONS** 1. **ENSURE** auto rod withdrawal block is lit. 2. WHEN plant conditions stabilize, THEN **PERFORM** 3-ONOP-059.8, Power Range Nuclear Instrumentation Malfunction.
	SRO	Directs response using **3-ONOP-059.8**, Power range Nuclear Instrument Malfunction to restore level control.
	SRO/ATC	3.0 **AUTOMATIC ACTIONS** 3.2 Mode 2 - Startup 3.2.1 Malfunction of ONE channel: 1. Possible Manual Rod Withdrawal Block.

Rec'd 10/5/11

Op-Test No.: 2010-302 Scenario No.: 3 Event No.: 1 Page 2 of 5

Event Description: A Power Range Nuclear Instrument N-42 Control Power fuse blows. The ATC checks all PR NI Channels to determine the failure. 3-ONOP-059.8, Power Range Nuclear Instrumentation Malfunction, is entered for initial response. 3-ONOP-049.1, Deviation or Failure of Safety Related or Reactor Protection Channels, is used to remove the channel from service. The SRO will address LCO 3.3.1.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	4.0 **IMMEDIATE ACTIONS** 4.2 Mode 2 - Startup 4.2.1 Malfunction of ONE channel: 1. None
	SRO/BOP	5.2 Mode 2 - Startup 5.2.1 Malfunction of ONE channel: 1. Maintain manual Rod Control. 2. Place the DROPPED ROD MODE switch for the failed channel in the BYPASS position. 3. Place the applicable ROD STOP BYPASS switch to the failed channel BYPASS position. 4. Transfer the UPPER SECTION comparator defeat switch to the failed channel. 5. Transfer the LOWER SECTION comparator defeat switch to the failed channel. 6. Transfer applicable POWER MISMATCH BYPASS switch to BYPASS the failed channel. 7. Transfer the COMPARATOR CHANNEL DEFEAT switch to the failed channel. 8. Perform the following within 6 hours of the failure determination: a. Trip the Power Range bistables by removing the INSTRUMENT POWER fuses from drawer B of the failed channel.
	SRO/BOP	**NOTE** *The Reactor Protection System bistables associated with the failed power range channel will be in the tripped condition when its bistable test switch is placed in the test (to the right) position as indicated by the red trip LED on the Channel Status Light section of the EAGLE 21 Test Panel being ON.*

Op-Test No.: 2010-302 Scenario No.: 3 Event No.: 1 Page 3 of 5

Event Description: A Power Range Nuclear Instrument N-42 Control Power fuse blows. The ATC checks all PR NI Channels to determine the failure. 3-ONOP-059.8, Power Range Nuclear Instrumentation Malfunction, is entered for initial response. 3-ONOP-049.1, Deviation or Failure of Safety Related or Reactor Protection Channels, is used to remove the channel from service. The SRO will address LCO 3.3.1.

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: This next step is OPTIONAL. If time does not allow bistables to be tripped, then notify the Facility Operator to call as I& C to request time for troubleshooting prior to tripping bistables.
	SRO/BOP	c. **IF** Power Range 2 is failed, **THEN** place the following bistable test switches in protection Channel II, Rack No. 11, in the TEST position: BS-3-422B-1 Overpower ΔT Trip BS-3-422B-2 Overpower ΔT Rod stop BS-3-422C-1 Overtemperature ΔT Trip BS-3-422C-2 Overtemperature ΔT Rod stop
	SRO/BOP	9. Notify I&C.
	SRO	Refers to TS LCO 3.3.1, Table 3.3-1, Functional Unit 9 Action 13
	SRO	TABLE 3.3-1 REACTOR TRIP SYSTEM INSTRUMENTATION FUNCTIONAL UNIT | TOTAL NO. OF CHANNELS | CHANNELS TO TRIP | MINIMUM CHANNELS OPERABLE | APPLICABLE MODES | ACTION 2. Power Range, Neutron Flux a. High Setpoint 4 2 3 1, 2 2 b. Low Setpoint 4 2 3 1##, 2 2 ## Below the P-10 (Low Setpoint Power Range Neutron Flux Interlock) Setpoint. ACTION 2 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied: a. The inoperable channel is placed in the tripped condition within 6 hours. b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.1.1, and c. Either, THERMAL POWER is restricted to less than or equal to 75% of RATED THERMAL POWER and the Power Range Neutron Flux Trip Setpoint is reduced to less than or equal to 85% of RATED THERMAL POWER within 4 hours; or, the QUADRANT POWER TILT RATIO is monitored per Specification 4.2.4.2.
		EXAMINER NOTE: Crew will proceed onto Event 2.

Op-Test No.: 2011-302 Scenario No.: 3 Event No.: 2 Page 1 of 3

Event Description: In accordance with 3-GOP-301, raise power to 5% for rolling the Main Turbine with Control Rods. MODE 1 preps are complete for the MODE change.

Time	Position	Applicant's Actions or Behavior
	SRO	Conducts reactivity briefing with crew.
	CREW	Participates in reactivity briefing.
	SRO	Directs the evolution per 3-GOP-301, Hot Standby to Power Operation in accordance with Step 5.53.2.
	SRO/ATC	**NOTES** • *When reactor power is greater than 5 percent, Mode 1, Power Operation, is entered.* • *Communication between the Reactor Operators on the control board is critical during plant startup. ROs must inform each other of important parameter changes such as reactor and turbine power, S/G levels, changes in blowdown flow and SDTA valve position.* • *Tavg should be controlled between 547°F and 551°F.* • *Annunciator B 4/4, TAVG/ TAVG-TREF DEVIATION, may alarm while waiting to load the main generator. The alarm should clear as the main generator is loaded.*
EXAMINER NOTE: Reactivity briefing will occur prior to assuming the watch in the Simulator Briefing Room.		
	SRO/ATC	1. Commence a reactor power increase to between 5 and 7 percent by dilution using 0-OP-046, CVCS – Boron Concentration Control, **OR** by withdrawing control rods.
	SRO/ATC	In preparation for rolling the Main Turbine, increase Reactor Power to 3 to 5 percent by withdrawing Control Rods. The ATC is be given guidance to withdraw rods in 2 step increments.
		NOTE *Changes to blowdown flow should be minimized during main generator loading to 40 MWe. If blowdown flow is needed to control SG level or RCS temperature, then blowdown flow may be adjusted accordingly.*
		2. **IF** blowdown flow is established, **THEN** maintain stable.
	SRO/ATC	Adjust feedwater flow on the bypasses as reactor power is raised to 5%.

Op-Test No.: 2011-302 Scenario No.: 3 Event No.: 2 Page 2 of 3

Event Description: In accordance with 3-GOP-301, raise power to 5% for rolling the Main Turbine with Control Rods. MODE 1 preps are complete for the MODE change.

Time	Position	Applicant's Actions or Behavior
	BOP	3. Align the SDTA controllers as follows: (Reference Attachment 5 for operation of the SDTA controllers.) a. Ensure two SDTA controllers are in automatic. b. Ensure one SDTA controller is in manual and maintaining Tavg two to four degrees higher than Tref.
EXAMINER NOTE: Attachment 5 is on the next page as a reference.		
		NOTES • *The intent is to have all three SDTA valves throttled open to maintain Tavg greater than Tref and reactor power below P7 (Target is 5 to 7 percent).* • *The SDTA controllers should be adjusted so that the valves do not close at the same time, but operate on a staggered basis and throttle closed as the main generator is loaded.* • *A difference of approximately 20 psi should be used as the initial staggered setting.* • *The SDTA controller settings may be adjusted in small increments as necessary to maintain steam flow from all three steam generators.* • *The steam generator with the lower setpoint will require additional feed flow.*
		c. Adjust the setpoints for SDTA controllers in automatic for staggered operation. d. Adjust the setpoint for SDTA controller in manual to 1005 psig. e. Use the SDTA controller in manual to make minor adjustments to Tavg, as necessary.
EXAMINER NOTE: Once Plant is stable at 5%, Proceed to Event 3 - 3A CCW Pump tripping due to the breaker failure.		

Op-Test No.: 2011-302 Scenario No.: 3 Event No.: 2 Page 3 of 3

Event Description: In accordance with 3-GOP-301, raise power to 5% for rolling the Main Turbine with Control Rods. MODE 1 preps are complete for the MODE change.

Time	Position	Applicant's Actions or Behavior

ATTACHMENT 5
(Page 1 of 1)

OPERATION OF THE STEAM DUMP TO ATMOSPHERE CONTROLLERS

A. **To Go to MANUAL from AUTO Mode of Operation**

1. To place the controller in MANUAL, press the M key (Yellow LED) until the key illuminates indicating MANUAL mode of operation.

2. Note: When the controller is in AUTO, the MANUAL setpoint follows automatically so no adjustments are necessary prior to placing the controller in MANUAL.

B. **Adjusting Output in MANUAL Mode**

1. To raise output on a controller in MANUAL, press the MV Increase key on bottom right of controller (arrow points to the right).

2. To reduce output on a controller in MANUAL, press the MV Decrease key on bottom left of controller (arrow points to the left).

C. **To Go to AUTO from MANUAL Mode of Operation**

1. Match controller setpoint (SV1) with Steam Pressure (PV1) indication using the SV Decrease key on the right side of the controller (arrow points down) OR the SV Increase key on the right side of the controller (arrow points up), as appropriate.

2. Depress the A key (Green LED) on the controller until the key illuminates.

3. Observe the valve demand indication (MV1) on controller. If necessary to prevent oscillating valve demand, return controller to MANUAL Mode.

D. **Adjusting Output in Auto Mode**

1. To raise the setpoint at which a controller is controlling in AUTO, press the SV Increase key on the right side of the controller (arrow points up).

2. To lower the setpoint at which a controller is controlling in AUTO, press the SV Decrease key on the right side of the controller (arrow points down).

Op-Test No.: 2011-302 Scenario No.: 3 Event No.: 3 Page 1 of 7

Event Description: 3A CCW Pump trips due to breaker failure. 3-701G, PC-3_611 isolation, is inadvertently closed which prevents the Auto Start of 3B CCW Pump. The ATC uses the ARP, 3-ONOP-030, or 0-ADM-211 to start 3B CCW Pump. Technical Specification 3.7.2 is entered.

Time	Position	Applicant's Actions or Behavior
		Direct Facility Operator to trigger lesson step, EVENT 3 - 3A CCW PUMP BREAKER TRIPS (insert TFK1S611 TRUE delay=0 ramp=0 on=0 off=0, insert TFK1A611 TRUE delay=0 ramp=0 on=0 off=0, and insert TFK1A12T TRUE delay=0 ramp=0 on=0 off=0)
	SRO/ATC	Observes failure of 3A CCW PUMP. • Multiple Main Control Room Alarms on Panels A, H, and X • 3A CCW Pump Breaker fails open. • 3B CCW Pump does NOT auto start •
		CAUSES: 1. Trip of CCW pump 2. System rupture H8/3 CCW PP HEADER LO PRESS
	CREW	ALARM CONFIRMATION 1. **CHECK** the following: • CCW pump breaker indications on VPB • CCW pump motor ammeters on VPB • CCW header flow indications on VPB • CCW Surge Tank level on VPB
	SRO	OPERATOR ACTIONS NOTE This corresponds to 77 psig at PC-3-611 and PI-3-612 due to 4 psi static head from header elevation. 1. **ENSURE** Standby CCW pump starts at 73 psig CCW pump discharge header pressure with a time delay of 10/20/30 seconds for A/B/C pumps, respectively.) 2. **REFER TO** 3-ONOP-030, Component Cooling Water Malfunction. 3. **REFER TO** TS 3.7.2 for any additional required actions.
	SRO/ATC	Starts 3B or 3C CCW Pump to re-establish flow.
	SRO	Refers to **3-ONOP-030**, Component Cooling Water Malfunction to restore level control.

Op-Test No.: 2011-302 Scenario No.: 3 Event No.: 3 Page 2 of 7

Event Description: 3A CCW Pump trips due to breaker failure. 3-701G, PC-3_611 isolation, is inadvertently closed which prevents the Auto Start of 3B CCW Pump. The ATC uses the ARP, 3-ONOP-030, or 0-ADM-211 to start 3B CCW Pump. Technical Specification 3.7.2 is entered.

Time	Position	Applicant's Actions or Behavior
	SRO	SRO refers to 3-ONOP-030 and recognizes CCW was restored by starting a standby pump. The following steps will offer minimal direction for current lineup and situation.
	SRO/ATC	**CAUTION** ***If any RCP bearing temperature annunciator alarm actuates AND its associated motor bearing temperature is greater than 195°F, trip the reactor and stop the affected RCPs.***
	SRO/ATC	**NOTE** *Foldout page should be monitored throughout this procedure.*
EXAMINER NOTE: The foldout page is on the following page.		
	SRO/BOP	**1** **Verify Power To 4KV Bus 3D** a. Maintain 4KV Bus 3D energized - ALIGNED TO AN ENERGIZED 4KV BUS a. **IF** lockout of 4KV Bus 3D **NOT** present, **THEN** perform the following: 1. Verify 3C CCW Pump - BREAKER OPEN 2. Verify 3C ICW Pump - BREAKER OPEN 3. Operate bus supply breakers to energize bus.
	SRO/ATC	**2** **Verify Component Cooling Water Pumps In Service** a. **IF** starting an idle CCW pump will **NOT** overload an EDG, **THEN** start CCW pumps as necessary to establish flow in both headers.

Op-Test No.: 2011-302 Scenario No.: 3 Event No.: 3 Page 3 of 7

Event Description: 3A CCW Pump trips due to breaker failure. 3-701G, PC-3_611 isolation, is inadvertently closed which prevents the Auto Start of 3B CCW Pump. The ATC uses the ARP, 3-ONOP-030, or 0-ADM-211 to start 3B CCW Pump. Technical Specification 3.7.2 is entered.

Time	Position	Applicant's Actions or Behavior

FOLDOUT FOR 3-ONOP-030

1. **TOTAL LOSS OF CCW FLOW**

   A. Manually trip the reactor, verify reactor trip using the EOP network, **THEN** stop the RCPs.

   B. Isolate letdown and excess letdown.

   C. Establish one charging pump running at maximum speed **AND** dispatch operator to establish emergency cooling water to one of the remaining two charging pumps using Attachment 1. Monitor RCS pressure closely while running charging pump at maximum speed.

   D. **WHEN** Attachment 1 is complete, **THEN** operate charging pump supplied with emergency cooling as necessary to maintain RCP seal cooling.

2. **LOSS OF CCW TO ANY COMPONENT**

   IF component cooling water flow to any component cooled by CCW is lost, **THEN** shut down the affected component.

3. **CHARGING PUMP EMERGENCY COOLING CRITERIA**

   IF Cooling Water is **NOT** available to charging pumps, **THEN** charging pump operation shall be at maximum speed until cooling is restored from CCW System or using Attachment 1.

4. **CCW PUMP STOPPING CRITERIA**

   IF any Component Cooling Water Pump is cavitating, **THEN** stop the affected Component Cooling Water Pumps and place in Pull-To-Lock.

5. **REACTOR TRIP CRITERIA**

   IF tripping a RCP is required, **THEN** manually trip the reactor prior to stopping the RCP.

6. **RCP STOPPING CRITERIA**

   IF any RCP bearing temperature annunciator alarm actuates **AND** its associated motor bearing temperature is greater than 195°F, **THEN** trip reactor and stop the affected RCPs.

7. CCW System operation once CCW System Hdr has been restored shall be within the operating restrictions of 3-NOP-030 summarized as follows: [Commitment - Step 3.3.2]

   CCW Pumps, Heat Exchangers, and Flows/Loads.

   - N-1 CCW Pumps (where N = number of CCW Hxs aligned to CCW)
   - All CCW Hxs in service when RHR in service **OR** with only 2 CCW Hxs in service, place 2 CCW Pumps in Pull-To-Lock.
   - Maximum of 5 out of 6 CCW Heat Loads.

Op-Test No.: 2011-302 Scenario No.: 3 Event No.: 3 Page 4 of 7

Event Description: 3A CCW Pump trips due to breaker failure. 3-701G, PC-3_611 isolation, is inadvertently closed which prevents the Auto Start of 3B CCW Pump. The ATC uses the ARP, 3-ONOP-030, or 0-ADM-211 to start 3B CCW Pump. Technical Specification 3.7.2 is entered.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	**3** **Verify Flow In Both Component Cooling Water Headers - NORMAL** • FT-3-613A for header A • FT-3-613B for header B Perform the following: a. **IF** CCW flow to RCPs can **NOT** be established, **THEN** manually trip the reactor **AND** verify reactor trip using the EOP Network, **AND** then stop all RCPs **AND** perform the following: 1. Isolate Letdown and Excess Letdown 2. **IF** any charging pump is running, **THEN** operate at maximum speed until Attachment 1 is completed. 3. Dispatch an operator to establish emergency cooling water to desired charging pump using Attachment 1.
	SRO/ATC	**NOTES** • *The top of the component cooling water surge tank divider plate is located at approximately 25% indicated level.* • *If a cross tie valve between the units is leaking or open, the surge tank on the opposite unit may be experiencing level control problems.* • *If in Modes 1 through 3, and CCW System level is NOT maintained within the CCW Head Tank, restore CCW System level to be within the CCW Head Tank within 24 hours.* • *LI-3-613A and LI-3-614A are NOT overlapping (i.e., LI-3-614A will go off scale low before LI-3-613A comes off its high peg with decreasing level).*
	SRO/ATC	**4** **Verify Component Cooling Water Surge Tank Level Being Maintained** a. Component Cooling Water Surge Tank Level, LI-3-613A - • GREATER THAN 25% **AND** • STABLE OR INCREASING Perform the following: 1. Open Component Cooling Water Surge Tank Makeup, MOV-3-832 as necessary to add makeup. 2. **IF** Component Cooling Water Surge Tank Level can **NOT** be maintained, **THEN** perform the following: a) Trip the reactor **AND** perform 3-EOP-E-0, Reactor Trip or Safety Injection, while continuing with this procedure. b) **WHEN** rector verified tripped, **THEN** stop all RCPs. 3. Observe NOTES prior to Step 8 and go to Step 8.

Op-Test No.: 2011-302 Scenario No.: 3 Event No.: 3 Page 5 of 7

Event Description: 3A CCW Pump trips due to breaker failure. 3-701G, PC-3_611 isolation, is inadvertently closed which prevents the Auto Start of 3B CCW Pump. The ATC uses the ARP, 3-ONOP-030, or 0-ADM-211 to start 3B CCW Pump. Technical Specification 3.7.2 is entered.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	**5** **Check If Component Cooling Water Headers Should Be Tied Together** a. Check CCW headers - SPLIT → a. Go to Step 34. b. Check if flow has been lost in any CCW header → b. **IF** flow in both CCW headers is normal, **THEN** go to Step 34. * FT-3-613A for header A * FT-3-613B for header B
	SRO/ATC	**34** **Verify Component Cooling Water From Unit 4 - NOT REQUIRED** a. Unit 3 CCW headers filled and intact → a. Return to Step 4. b. Verify CCW pumps - AT LEAST ONE RUNNING → b. Start a Standby CCW pump. c. Verify flow in at least one intact CCW header → c. Perform the following: * FI-3-613A for header A * FI-3-613B for header B 1) Try to establish flow in at least one intact CCW header. 2) **IF** flow in at least one intact CCW header can **NOT** be established, **THEN** observe NOTE prior to Step 36 and go to Step 36.
	SRO/ATC	d. Verify intake cooling water flow to all in service CCW heat exchangers → d. Perform the following: * FI-3-1407 for Hx A * FI-3-1408 for Hx B * FI-3-1409 for Hx C 1) Try to establish intake cooling water flow to in-service CCW heat exchangers. 2) Stop components cooled by component cooling water as necessary to stabilize component cooling water temperature. 3) **IF** any component cooled by component cooling water must be operated **AND** stable component cooling water temperature can **NOT** be maintained, **THEN** observe NOTE prior to Step 36 and go to Step 36.
EXAMINER NOTE: Additional steps are NOT carried in scenario guide. The actions from this procedure should be minimal.		
	SRO	Refers to Technical Specifications and enters 3.7.2 for the Component Cooling Water System.

Op-Test No.: 2011-302 Scenario No.: 3 Event No.: 3 Page 6 of 7

Event Description: 3A CCW Pump trips due to breaker failure. 3-701G, PC-3_611 isolation, is inadvertently closed which prevents the Auto Start of 3B CCW Pump. The ATC uses the ARP, 3-ONOP-030, or 0-ADM-211 to start 3B CCW Pump. Technical Specification 3.7.2 is entered.

Time	Position	Applicant's Actions or Behavior
		PLANT SYSTEMS 3/4.7.2 COMPONENT COOLING WATER SYSTEM LIMITING CONDITION FOR OPERATION 3.7.2 The Component Cooling Water System (CCW) shall be OPERABLE with: a. Three CCW pumps, and b. Two CCW heat exchangers. APPLICABILITY: MODES 1, 2, 3, and 4. ACTION: a. With only two CCW pumps with independent power supplies OPERABLE, restore the inoperable CCW pump to OPERABLE status within 30 days or be in HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. The provisions of Specification 3.0.4 are not applicable. b. With only one CCW pump OPERABLE or with two CCW pumps OPERABLE but not from independent power supplies, restore two pumps from independent power supplies to OPERABLE status within 72 hours or be in HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. c. With less than two CCW heat exchangers OPERABLE, restore two heat exchangers to OPERABLE status within 1 hour or be in HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
	SRO	Enters 3.7.2, Action b for 2 CCW Pumps without separate power.
	SRO	SRO refers to 3-ONOP-030 and recognizes CCW was restored by starting a standby pump. The following steps will offer minimal direction for current lineup and situation. [This is commonly accomplished with skill of craft in 3-EOP-E-0.]
		5.4 Transfer of 3D 4KV Bus from 3B 4KV Bus to 3A 4KV Bus
		CAUTION De-energizing 3D 4KV Bus places Unit 3 in a Technical Specification LCO action statement due to the associated Component Cooling Water and Intake Cooling Water Pumps being inoperable.
		1. **ENSURE** the following: • 3A 4KV Bus is ENERGIZED. • 3C COMPONENT COOLING WATER PUMP is stopped. • 3C INTAKE COOLING WATER PUMP is stopped.

Op-Test No.: 2011-302 Scenario No.: 3 Event No.: 3 Page 7 of 7

Event Description: 3A CCW Pump trips due to breaker failure. 3-701G, PC-3_611 isolation, is inadvertently closed which prevents the Auto Start of 3B CCW Pump. The ATC uses the ARP, 3-ONOP-030, or 0-ADM-211 to start 3B CCW Pump. Technical Specification 3.7.2 is entered.

Time	Position	Applicant's Actions or Behavior
		2. **OPEN** 3AB19, FEEDER TO 4KV BUS 3D. 3. **OPEN** 3AD06, SUPPLY FROM 4KV BUS 3B. 4. **CLOSE** 3AD01, SUPPLY FROM 4KV BUS 3A. 5. **CLOSE** 3AA17, FEEDER TO 4KV BUS 3D.
		6. **CHECK** 3D 4KV Bus voltage between 3744 and 4576 volts at cubicle 3AD08.
		7. **START** <u>one</u> of the following to PMT the Bkr supply for 3D 4KV Bus: • 3C ICW PUMP • 3C CCW PUMP
	SRO	Enters 3.7.2, Action a for 2 CCW Pumps inoperable with separate power supplies and exits Action b.

EXAMINER NOTE: When TS determination is made, then proceed to Event 4.

Op-Test No.: 2011-302 Scenario No.: 3 Event No.: 4 Page 1 of 2

Swaps from 3A to 3B Condensate Pump using 3-NOP-073, Condensate System.

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	Observes the following: • S/G Levels and Flows. • Proper start indications – both remotely and locally. • Adjusts Main Feed Reg Bypass Valves to maintain S/G Levels
	SRO/BOP	**4.1.2 Startup of Additional Condensate Pumps (continued)** **NOTE** The following annunciators are expected when starting a condensate pump: • D 4/1, CONDENSATE LO FLOW • D 1/1 - 1/6, FW HEATER 1A - 6A HI LEVEL • D 2/1 - 2/6, FW HEATER 1B - 6B HI LEVEL • G 8/3, G 8/4 and G 8/5, COND PUMP A/B/C LO FLOW
	SRO/BOP	**CAUTION** Starting a condensate pump may cause an EDG paralleled to the affected 4160 VAC bus to trip and could damage the EDG.
	SRO/BOP	12. **START** selected Condensate Pump. A. **CHECK** running motor amps stabilize in the normal operating range within 60 seconds. PUMP STARTED / Condensate Pump 3A / Condensate Pump 3B / Condensate Pump 3C Normal Operating Amps / 210 - 280 / 210 - 280 / 250 - 320 B. **ENSURE** positive seal water pressure and flow for the available condensate pump stuffing box as follows:
	BOP	Starts 3B Condensate Pump and monitors startup.
	SRO/BOP	AVAILABLE PUMP / Condensate Pump 3A / Condensate Pump 3B / Condensate Pump 3C Cond Seal Wtr Y Strnr Outlet / 3-20-086 / 3-20-713 / 3-20-544 Pressure Indicator / PI-3-1593 / PI-3-1594 / PI-3-1494 Valve to adjust / 3-20-086 / 3-20-713 / 3-20-544 Stuffing Box Pressure / Positive (above 0 psig) / Positive (above 0 psig) / 5-50 psig Flow Indicator / FI-3-596A / FI-3-596B / //////////////////////////////// Seal Water Flow / 2-10 gpm / 2-10 gpm / ////////////////////////////////

Op-Test No.: 2011-302 Scenario No.: 3 Event No.: 4 Page 2 of 2

Swaps from 3A to 3B Condensate Pump using 3-NOP-073, Condensate System.

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	**12. (continued)** **C. CHECK** S/G Feedwater Pump suction pressure rises between 10 and 15 psig. **D. CHECK** motor amperes on the previously running pump lowers.
	SRO/BOP	**13. INSPECT** the operating pump for: • Excessive vibration • Unusual noise • Air or water leaks
	SRO/BOP	**14. CLOSE** the discharge vent valves opened in Section 4.1.2 Step 8.
	SRO/ATC	**4.3.1 Shutdown of the Second and Third (additional) Condensate Pumps** **NOTE** Shutting down a third condensate pump may require adjustment of SGFP seal injection. Refer to 3-NOP-074, Steam Generator Feedwater System, Attachment 5, when adjusting SGFP seal injection.
	SRO/ATC	**1. CHECK** steam generator feed pump suction pressure is greater than 330 psig.
	SRO/ATC	**2. STOP** the designated condensate pump.
	BOP	Stops the 3a Condensate Pump.

EXAMINER NOTE: After Condensate Pumps are swapped, then continue with Event 5 - 3A S/G Bypass Feed Valve Controller drifts.

Op-Test No.: 2011-302 Scenario No.: 3 Event No.: 5 Page 1 of 2

Event Description: 3A S/G Bypass Feed Valve Controller drifts causing the valve to open. After noticing the S/G level change, the BOP establishes 3A S/G control band with the S/G Bypass Feed Valve per 3-GOP-301.

Time	Position	Applicant's Actions or Behavior
EXAMINER NOTE: This disruption is to cause a rise in 3A S/G Level while in manual. This is accomplished with causing an increase in valve leakage while in steady state conditions. Once the operator recognizes this adverse trend and closes the 3A S/G Bypass Feed Valve, then the initiating trigger will be deleted.		
Direct Facility Operator to trigger lesson step, EVENT 5 - 3A S/G BYPASS FEED VALVE CONTROLLER DRIFT. (insert TVFV479 0.500000 delay=0 ramp=60 on=0 off=0)		
	SRO/BOP	Observes the following: • 3A S/G Feedwater flow increasing • A slow rise in 3A S/G Level
	SRO/BOP	Observes Annunciator C 6/1
	SRO	Directs response using the ARP
	SRO/BOP	CAUSES: 1. Steam Generator Level Control Malfunction 2. Instrument Failure C6 SG A LEVEL DEVIATION
	SRO/BOP	**PROMPT ACTIONS** IF malfunctioning SG level controls, THEN: • **TAKE** manual control of level. • **RETURN** SG levels to normal.
	SRO/BOP	**ALARM CONFIRMATION** **CHECK** LI-3-476 or LI-3-478, A STM GEN LEVEL controlling channel vs. PI-3-446 or PI-3-447, FIRST STAGE PRESSURE level control program on VPA.
	SRO/BOP	**OPERATOR ACTIONS** IF alarm is due to instrument failure, THEN **REFER TO** 3-ONOP-049.1, Deviation or Failure of Safety Related or Reactor Protection Channels.
	BOP	Adjusts the 3A S/G Bypass Valve to lower the 3A S/G Feed flow to maintain a band from 45 to 55%.

Op-Test No.: 2011-302 Scenario No.: 3 Event No.: 5 Page 2 of 2

Event Description: 3A S/G Bypass Feed Valve Controller drifts causing the valve to open. After noticing the S/G level change, the BOP establishes 3A S/G control band with the S/G Bypass Feed Valve per 3-GOP-301.

Time	Position	Applicant's Actions or Behavior
		3-GOP-301 4.41 The Shift Manager may designate operating bands as necessary based on current plant mode and equipment conditions as needed to allow the operating crew more flexibility. This guidance on operating bands does not allow the violation of Tech Specs or allow the operation near automatic trip setpoints. One example is S/G levels while not in Mode 1 or in unit startup. The program level is 50 percent, so the operating band is set at 45 to 55 percent. This allows the deviation alarm to remain clear, yet still alert the operator when a 5 percent deviation from program occurs, which is the system design.

EXAMINER NOTE: After the 3A S/G Bypass Valve Controller is lowered, and then the FACILTY OPERATOR ensures this malfunction clears.

EXAMINER NOTE: When conditions stabile after the 3A S/G Bypass Valve Controller is lowered, then continue with Event 6 - PCV - 455A Spray Valve Controller Failure.

Op-Test No.: 2011-302 Scenario No.: 3

Upcoming Potential Additional Tech Spec Call

SRO

POWER DISTRIBUTION LIMITS

3/4.2.5 DNB PARAMETERS

LIMITING CONDITION FOR OPERATION

3.2.5 The following DNB-related parameters shall be maintained within the following limits:

a. Reactor Coolant System $T_{avg} \leq 581.2°F$

b. Pressurizer Pressure $\geq$ 2200 psig*, and

c. Reactor Coolant System Flow $\geq$ 264,000 gpm

APPLICABILITY: MODE 1.

ACTION:

With any of the above parameters exceeding its limit, restore the parameter to within its limit within 2 hours or reduce THERMAL POWER to less then 5% of RATED THERMAL POWER within the next 4 hours.

Op-Test No.: 2011-302 Scenario No.: 3 Event No.: 6 Page 1 of 4

Event Description: PCV-3- 455A Spray Valve Controller causes valve to fail partially open. The ATC mitigates this event by manually operating the valve per ARP, 3-ONOP-041.5, or 0-ADM-211.

Time	Position	Applicant's Actions or Behavior
Direct Facility Operator to trigger lesson step, EVENT 6 - PCV - 455A SPRAY VALVE CONTROLLER PARTIAL FAILURE. (insert IAH244G 2.5 delay=0 ramp=120 on=0 off=0)		
	SRO/ATC	Observes the following: • RCS Pressure slowly lowers • PCV-3-455A partially fails which causes the spray to open further in automatic. Manual operation is successful with reclosing the valve. A 9/2 PZR Control Hi/Lo Press
	SRO/ATC	RCS Pressure is noticed lowering along with PCV-3-455A going further open.
	SRO/ATC	PCV-3-455A is taken to manual and closed in accordance with 0-ADM-211.
EXAMINER NOTE: If prompt action is taken, there may not be an annunciator response. In the case where action is delayed, then initial actions will be taken in accordance with these ARPs prior to entering 3-ONOP-041.5, Pressurizer Pressure Control Malfunction.		
	SRO	Directs response using 3-ONOP-041.5, Pressurizer Pressure Control Malfunction.
	SRO/ATC	***NOTE*** *Foldout page is required to be monitored throughout this procedure.*
		CAUTION ***The Master Controller should be operated carefully (Normal controller output for 2235 psig is 42.5 percent demand; 92 percent demand will open PCV-3-455C). If the following conditions are met, an excessive increase in controller output could cause Power Operated Relief Valve PCV-3-455C to open:*** ***1. PCV-3-455C hand switch in AUTO.*** ***2. Pressurizer pressure is greater than or equal to 2000 psig, or OMS switch in LO Press Ops.***

Op-Test No.: 2011-302 Scenario No.: 3 Event No.: 6 Page 2 of 4

Event Description: PCV-3- 455A Spray Valve Controller causes valve to fail partially open. The ATC mitigates this event by manually operating the valve per ARP, 3-ONOP-041.5, or 0-ADM-211.

Time	Position	Applicant's Actions or Behavior

FOLDOUT FOR PROCEDURE 3-ONOP-041.5

1. FAILED INSTRUMENT ISOLATION

   a. IF any Pressurizer Pressure control Instrument Loop fails, THEN place applicable control switches to a position that isolates the failed instrument.

2. 3-EOP-E-0 TRANSITION CRITERIA

   a. IF PZR pressure cannot be maintained greater than 2000 psig, THEN perform the following:

      1. Continue efforts to restore PZR pressure and

      2. Trip the reactor and turbine and go to 3-EOP-E-0, REACTOR TRIP OR SAFETY INJECTION.

3. PORV ISOLATION/LEAKING PORV IDENTIFICATION

   a. IF any PORV is OPEN OR Leaking AND pressure is less than 2235 psig, THEN CLOSE the applicable PORV and/or Block valve.

   b. The following are indications of leakage from a PZR PORV and should be used to identify and isolate a leaking PORV:

      1) PZR relief line temperature, TI-3-463, INCREASING.

      2) PZR relief tank level, LI-3-470, INCREASING.

      3) PZR relief tank temperature, TI-3-471, INCREASING.

      4) PZR relief tank pressure, PI-3-472, INCREASING.

      5) PZR PORV/SAFETY ACOUSTIC MONITOR, LEDs LIT.

4. OPEN/LEAKING PZR SAFETY VALVE IDENTIFICATION

   a. The following are indications that a PZR safety is open or leaking:

      1) PZR Safety line temperature, TI-3-465, INCREASING or at saturation temperature associated with the PZR relief tank pressure per ATTACHMENT 2.

      2) PZR Safety line temperature, TI-3-467, INCREASING or at saturation temperature associated with the PZR relief tank pressure per ATTACHMENT 2.

      3) PZR Safety line temperature, TI-3-469, INCREASING or at saturation temperature associated with the PZR relief tank pressure per ATTACHMENT 2.

      4) PZR relief tank level, LI-3-470, INCREASING.

      5) PZR relief tank temperature, TI-3-471, INCREASING.

      6) PZR relief tank pressure, PI-3-472, INCREASING.

      7) PZR PORV/Safety Acoustic Monitor, LEDs LIT.

5. SPURIOUS ACTUATION OF CV-3-311 AUXILIARY SPRAY VALVE due to fire in Containment or 3B 4KV Switchgear Room

   a. IF pressurizer pressure is decreasing and Auxiliary Spray Valve, CV-3-311, is suspect, THEN reduce charging to one charging pump on slow speed AND close charging to RCS Control Valve HCV-3-121.

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Event Description: PCV-3- 455A Spray Valve Controller causes valve to fail partially open. The ATC mitigates this event by manually operating the valve per ARP, 3-ONOP-041.5, or 0-ADM-211.

Time	Position	Applicant's Actions or Behavior
		1 Check PZR Pressure Control Instrument Loop Not Failed a. Check PT-3-444 - NOT FAILED by comparison with adjacent pressure channels and known plant parameters a. Perform the following: 1) Verify PCV-3-455C OR MOV-3-536 CLOSED. 2) Take manual control of PC-3-444J, PZR PRESS CONTROL. 3) IF manual control of PC-3-444J is NOT effective, THEN perform the following: * Take manual control of PZR spray valves. * Take manual control of PZR heaters. b. Check PT-3-445 - NOT FAILED by comparison with adjacent pressure channels and known plant parameters b. Perform the following: 1) Verify PCV-3-456 OR MOV-3-535 CLOSED.
		2 Check PORVs Closed • PCV-3-455C - CLOSED • PCV-3-456 - CLOSED Perform the following: • IF PZR pressure is less than 2335, THEN manually close PORVs. IF any PZR PORV can NOT be closed, THEN manually close its block valve.
		CAUTION *A fire in containment or the 3B 4KV Switchgear Room may cause spurious actuation of and give false valve position indication for Auxiliary Spray Valve, CV-3-311.*

Op-Test No.: 2011-302 Scenario No.: 3 Event No.: 6 Page 4 of 4

Event Description: PCV-3- 455A Spray Valve Controller causes valve to fail partially open. The ATC mitigates this event by manually operating the valve per ARP, 3-ONOP-041.5, or 0-ADM-211.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	**3** **Check PZR Spray Valves Closed** • PZR pressure normal or trending to normal **IF** PZR pressure less than normal, **THEN** perform the following: a. Verify PZR Spray valves closed. • Place PZR Spray Loop C, PCV-3-455A in MANUAL and CLOSE. • Place PZR Spray Loop B, PCV-3-455B in MANUAL and CLOSE. • Verify Aux Spray Valve CV-3-311 CLOSED. b. **IF** PZR pressure can **NOT** be maintained greater then 2000 psig, **THEN** perform the following: 1) Trip the reactor and turbine and go to E-0, REACTOR TRIP OR SAFETY INJECTION. 2) Trip the RCP in the affected loop.
	SRO/ATC	**4** Check PZR Safety Valves Closed a. PZR PORV/Safety acoustic monitor LEDs - NOT LIT b. PZR safety line temperatures at or near normal • PZR safety line temperature, TI-3-465 • PZR safety line temperature, TI-3-467 • PZR safety line temperature, TI-3-469
	SRO/ATC	**5** Check PZR Pressure Stable Or Increasing Perform the following: • Continue efforts to restore PZR pressure control.

EVALUATOR NOTE: After PZR Pressure is checked stable, then proceed with Event 7 - 3A TPCW Pump shaft fails.

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Event Description: The 3A TPCW Pump shaft fails. The BOP will start the 3B TPCW pump using the ARP, 3-ONOP-008, or 0-ADM-211 to maintain plant operations.

Time	Position	Applicant's Actions or Behavior
Direct Facility Operator to trigger lesson step, EVENT 7 - A TPCW PUMP SHAFT FAILS. (insert TFKXSMA TRUE delay=0 ramp=0 on=0 off=0)		
	SRO/BOP	CAUSES: 1. TPCW System leakage 2. Inadequate ICW flow through TPCW HXs 3. Inadequate TPCW System flow 4. Plugged ICW/TPCW basket strainer I5/4 TPCW HI TEMP/ LO PRESS
	SRO/BOP	ALARM CONFIRMATION **CHECK** TPCW header pressure equal to or less than 75 psig.
	SRO/BOP	OPERATOR ACTIONS 1. **CALL UP** ERDADS Component Cooling Water System Data and Interfaces display, and **CHECK** T1472_A to be between 108°F and 112°F. 2. IF TPCW header low pressure condition exists, THEN **PERFORM** the following: A. **START** standby TPCW pump. B. **MONITOR** pump amp indication on 3C04. C. Locally **CHECK** for system leakage. 3. IF TPCW header high temperature condition exists, THEN **PERFORM** the following: A. **CHECK** ICW pumps running. B. **CHECK** at least one TPCW Heat Exchanger in service. C. **REFER TO** 3-ONOP-008, Turbine Plant Cooling Water Malfunction.
	BOP	Starts 3B TPCW Pump using the ARP, 3-ONOP-008, or 0-ADM-211.

EVALUATOR NOTE: After 3B TPCW Pump is running, then proceed with Event 8 - Main Steam Line Leak upstream of the 3B MSIV inside Containment.

Op-Test No.: 2011-302 Scenario No.: 3 Event No.: 8 Page 1 of 26

Event Description: A Main Steam Line Leak upstream of the 3B MSIV inside Containment gradually develops. A manual or automatic Reactor Trip occurs. The crew responds using 3-EOP-E-0. The crew transitions to 3-EOP-E-2. The BOP ensures 3B MSIV is closed. The crew isolates the 3B S/G. After 3B S/G isolation, the crew transitions to 3-EOP-E-1 and, subsequently, to 3-EOP-ES 1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior
Direct Facility Operator to trigger lesson step, EVENT 8 - 3B MAIN STEAM LINE BREAK INSIDE CTMT. (insert TVSBVL14 0.5 delay=0 ramp=120 on=0 off=0 and insert TFSVVX6C true delay=0 ramp=0 on=0 off=0)		
	SRO	Directs response using 3-EOP-E-0 starting at Step 1.
	CREW	**NOTE** *Steps 1 through 4 are IMMEDIATE ACTION steps.*
	SRO/ATC	**1** **Verify Reactor Trip** • Rod bottom lights – ON • Reactor trip and bypass breakers – OPEN • Rod position indicators - AT ZERO • Neutron flux – DECREASING Manually trip reactor. **IF** reactor power is greater than 5% **OR** intermediate range power is **NOT** stable or decreasing, **THEN** perform the following: a. Monitor Critical Safety Functions using 3-EOP-F-0, CRITICAL SAFETY FUNCTION STATUS TREES. b. Go to 3-EOP-FR-S.1, RESPONSE TO NUCLEAR POWER GENERATION/ ATWS, Step 1.
	SRO/BOP	**2** **Verify Turbine Trip** a. All turbine stop or associated control valves – CLOSED b. Verify Moisture Separator Reheater Steam Valves – CLOSED • MSR Main Steam Supply Stop MOVs • Reheater Timing Valves • MSR Purge Steam Valves c. Check Mid and East GCBs – OPEN (Normally 30-second delay) a. Manually trip turbine. **IF** unable to verify turbine trip, **THEN** close main steamline isolation and bypass valves. b. Manually close valves. **IF** any valve can **NOT** be closed, **THEN** close main steamline isolation and bypass valves. c. Manually open breakers. **IF** breakers do **NOT** open, **THEN** actuate EMERGENCY GEN. BKR. TRIP SWITCH for the affected breaker(s).
	SRO/BOP	Manually closes MSR steam supply MOVs.

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Event Description: A Main Steam Line Leak upstream of the 3B MSIV inside Containment gradually develops. A manual or automatic Reactor Trip occurs. The crew responds using 3-EOP-E-0. The crew transitions to 3-EOP-E-2. The BOP ensures 3B MSIV is closed. The crew isolates the 3B S/G. After 3B S/G isolation, the crew transitions to 3-EOP-E-1 and, subsequently, to 3-EOP-ES 1.1 to terminate SI.

Applicant's Actions or Behavior

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	**3 Verify Power To Emergency 4 KV Buses** a. Check the 3A and 3B 4 KV buses - MAINTAIN AT LEAST ONE ENERGIZED a. Perform the following: 1) Attempt to emergency start any Unit 3 available diesel generator. 2) **IF** neither 3A nor 3B 4 KV bus is energized, **THEN** go to 3-EOP-ECA-0.0, LOSS ALL AC POWER, Step 1. b. Check the 3A and 3B 4 KV buses - MAINTAIN BOTH ENERGIZED b. Attempt to emergency start the de-energized Unit 3 bus diesel generator. c. Maintain the 3D 4 KV bus energized - ALIGNED TO AN ENERGIZED 4 KV BUS c. Perform the following: 1) **IF** lockout of 3D 4 KV bus **NOT** present, **THEN** perform the following: a) Verify 3C CCW pump - BREAKER OPEN. b) Verify 3C ICW pump – BREAKER OPEN. c) Operate bus supply breakers to restore power.

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Event Description: A Main Steam Line Leak upstream of the 3B MSIV inside Containment gradually develops. A manual or automatic Reactor Trip occurs. The crew responds using 3-EOP-E-0. The crew transitions to 3-EOP-E-2. The BOP ensures 3B MSIV is closed. The crew isolates the 3B S/G. After 3B S/G isolation, the crew transitions to 3-EOP-E-1 and, subsequently, to 3-EOP-ES 1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	**4** Check If SI Is Actuated * SI Annunciators - ANY ON OR * Safeguards equipment – AUTO STARTED Perform the following: a. Check if SI is required: * Low pressurizer pressure – 1730 psig OR * High containment pressure – 4 psig OR * High steam line differential pressure – 100 psid OR * High steam flow with low S/G pressure - 614 psig OR low Tavg (543 F) b. IF SI is required, THEN manually actuate SI and containment isolation phase A AND go to Step 5. c. IF SI is NOT required, THEN perform the following: 1) Monitor Critical Safety Functions using 3-EOP-F-0, CRITICAL SAFETY FUNCTION STATUS TREES. 2) Go to 3-EOP-ES-0.1, REACTOR TRIP RESPONSE, Step 1.
	CREW	**NOTE** *FOLDOUT Page shall be monitored for the remainder of this procedure.*
	RO	Manually actuates Train B SI and Phase A depressing SI and Phase A pushbuttons.
	SRO/BOP	**5** Continue With Attachment 3 To Complete The Prompt Action Verifications While Performing This Procedure

Examiner Note: 3-EOP-E-0, Attachment 3 commences at Page 21 of 26.

Examiner Note: The SRO and ATC will complete the remaining steps in 3-EOP-E-0, while the BOP performs 3-EOP-E-0 Prompt Action Verifications using Attachment 3.

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Event Description: A Main Steam Line Leak upstream of the 3B MSIV inside Containment gradually develops. A manual or automatic Reactor Trip occurs. The crew responds using 3-EOP-E-0. The crew transitions to 3-EOP-E-2. The BOP ensures 3B MSIV is closed. The crew isolates the 3B S/G. After 3B S/G isolation, the crew transitions to 3-EOP-E-1 and, subsequently, to 3-EOP-ES 1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior

FOLDOUT FOR PROCEDURE E-0

1. **ADVERSE CONTAINMENT CONDITIONS**

IF either of the conditions listed below occur, **THEN** use adverse containment setpoints:

Containment atmosphere temperature ≥ 180°F

OR

Containment radiation levels ≥ 1.3×10^5 R/hr

WHEN containment parameters drop below the above values, **THEN** normal setpoints can again be used **IF** the TSC determines that containment integrated dose rate has not exceeded 10^6 Rads.

2. **RCP TRIP CRITERIA**

a. **IF** both conditions listed below occur, **THEN** trip all RCPs:
   1) High-head SI pumps - AT LEAST ONE RUNNING **AND** SI FLOWPATH VERIFIED.
   2) RCS subcooling - LESS THAN 25°F[65°F]

b. **IF** phase B actuated, **THEN** trip all RCPs.

3. **FAULTED S/G ISOLATION CRITERIA**

IF any S/G pressure decreasing in an uncontrolled manner **OR** any S/G completely depressurized, **THEN** the following may be performed:

a. Maintain total feedwater flow greater than 345 gpm until narrow range level in at least one S/G is greater than 6%[32%].

b. Isolate AFW flow to faulted S/G(s).

c. Stabilize RCS hot leg temperature using steam dumps when faulted S/G has blown down to less than 10% wide range.

4. **RUPTURED S/G ISOLATION CRITERIA**

IF any S/G level increases in an uncontrolled manner **OR** any S/G has abnormal radiation, **AND** narrow range level in affected S/G(s) is greater than 6%[32%], **THEN** feed flow may be stopped to affected S/G(s).

5. **AFW SYSTEM OPERATION CRITERIA**

a. **IF** two AFW pumps are operating on a single train, **THEN** one of the pumps shall be shut down within one hour of the initial start signal

b. **IF** two AFW trains are operating and one of the AFW pumps has been operating at low flow of 60 gpm or less for one hour, **THEN** that AFW pump shall be shut down

6. **CST MAKEUP WATER CRITERIA**

IF CST level decreases to less than 10%, **THEN** add makeup to CST using 3-NOP-018.01, CONDENSATE STORAGE TANK (CST).

7. **RHR SYSTEM OPERATION CRITERIA**

IF RHR flow is less than 1000 gpm, **THEN** the RHR pumps shall be shut down within 44 minutes of the initial start signal.

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Event Description: A Main Steam Line Leak upstream of the 3B MSIV inside Containment gradually develops. A manual or automatic Reactor Trip occurs. The crew responds using 3-EOP-E-0. The crew transitions to 3-EOP-E-2. The BOP ensures 3B MSIV is closed. The crew isolates the 3B S/G. After 3B S/G isolation, the crew transitions to 3-EOP-E-1 and, subsequently, to 3-EOP-ES 1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	Trip RCPs due high Containment pressure and Phase B Isolation of CCW to RCPS within 13 minutes of CCW isolation.
CREW CRITICAL TASK: Trip RCPs due high Containment pressure and Phase B Isolation of CCW to RCPS prior to entering 3-EOP-E-1.		
	SRO/ATC	**6** **Check AFW Pumps - AT LEAST TWO RUNNING** Perform the following: a. Manually open valves to establish two AFW pumps running. b. **IF** an AFW pump is tripped, **THEN** dispatch an operator to locally reset the AFW turbine trips. c. **IF** both units require AFW **AND** only one AFW pump is available, **THEN** perform the following: 1) Verify all RCPs - TRIPPED 2) Establish 270 gpm AFW flow to each unit. 3) Use a setpoint of 270 gpm for required AFW flow instead of 345 gpm specified in subsequent Steps and Procedures.
	SRO/ATC	**7** **Verify AFW Valve Alignment - PROPER EMERGENCY ALIGNMENT** Manually align valves to establish proper AFW alignment.

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Event Description: A Main Steam Line Leak upstream of the 3B MSIV inside Containment gradually develops. A manual or automatic Reactor Trip occurs. The crew responds using 3-EOP-E-0. The crew transitions to 3-EOP-E-2. The BOP ensures 3B MSIV is closed. The crew isolates the 3B S/G. After 3B S/G isolation, the crew transitions to 3-EOP-E-1 and, subsequently, to 3-EOP-ES 1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	**8** Verify Proper AFW Flow a. Check narrow range level in at least one S/G - GREATER THAN 6%[32%] a. Perform the following: 1) Verify AFW flow greater than 345 gpm. 2) IF AFW flow less than 345 gpm, THEN manually start pumps AND align valves to establish greater than 345 gpm flow. 3) IF total feed flow from all sources greater than 345 gpm can NOT be established, THEN perform the following: a) Monitor Critical Safety Functions using 3-EOP-F-0, CRITICAL SAFETY FUNCTION STATUS TREES. b) Go to 3-EOP-FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK, Step 1.
	SRO/ATC	b. Maintain feed flow to S/G until narrow range levels between 15%[32%] and 50%
	SRO/ATC	Raises flow to the 3A and 3C S/G to at least 345 gpm total. May direct the field operator to reset the B AFW overspeed trip.

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Event Description: A Main Steam Line Leak upstream of the 3B MSIV inside Containment gradually develops. A manual or automatic Reactor Trip occurs. The crew responds using 3-EOP-E-0. The crew transitions to 3-EOP-E-2. The BOP ensures 3B MSIV is closed. The crew isolates the 3B S/G. After 3B S/G isolation, the crew transitions to 3-EOP-E-1 and, subsequently, to 3-EOP-ES 1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	**9** Check RCP Seal Cooling a. Check all RCP thermal barrier alarms – OFF • A 1/1, RCP THERMAL BARR COOLING WATER HI FLOW • A 1/2, RCP THERMAL BARR COOLING WATER HI TEMP • A 1/3, RCP THERMAL BARR COOLING WATER LO FLOW a. IF CCW to an RCP thermal barrier is lost, THEN: 1) Trip the affected RCP(s). 2) Go to Step 9c. b. Go to Step 10 c. Check all RCP seal return temperatures are less than 235 F c. Go to Step 10. d. Verify SI - RESET d. Reset SI. e. IF offsite power is NOT available, THEN check diesel capacity adequate to run one charging pump. IF adequate diesel capacity is NOT available, THEN shed nonessential loads. Refer to ATTACHMENT 2 for component KW load rating f. Start one charging pump at minimum speed for seal injection f. Go to Step 10. g. Adjust Charging Flow To Regen Heat Exchanger, HCV-3-121, to maintain proper seal injection flow

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Event Description: A Main Steam Line Leak upstream of the 3B MSIV inside Containment gradually develops. A manual or automatic Reactor Trip occurs. The crew responds using 3-EOP-E-0. The crew transitions to 3-EOP-E-2. The BOP ensures 3B MSIV is closed. The crew isolates the 3B S/G. After 3B S/G isolation, the crew transitions to 3-EOP-E-1 and, subsequently, to 3-EOP-ES 1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	**10** Maintain RCS Cold Leg Temperature * STABLE AT OR TRENDING TO 547°F IF ANY RCP RUNNING OR * LESS THAN 547°F AND STABLE IF NO RCP RUNNING Perform the following: a. IF temperature is decreasing, THEN perform the following: 1) Stop dumping steam. 2) Reduce total feed flow to 345 gpm until narrow range level greater than 6%[32%] in at least one S/G. 3) IF cooldown is due to excessive steam flow, THEN close main steamline isolation and bypass valves. b. IF temperature greater than 547°F AND increasing, THEN perform the following: * Dump steam to condenser. OR * Dump steam using S/G steam dump to atmosphere valves.
	SRO/ATC	Reduces total AFW flow to > 345 gpm max for both A & C S/Gs.
	SRO/ATC	Places 3B Main Steam Isolation Valve to CLOSE.

CREW CRITICAL TASK: Places 3B Main Steam Isolation Valve to CLOSE

EXAMINER NOTE: 3B Main Steam Isolation Valve may be CLOSED in Attachment 3 of 3-EOP-E-0

EXAMINER NOTE: Direct Facility Operator to ensure trigger, TFSVVX6C true is DELETED.

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Event Description: A Main Steam Line Leak upstream of the 3B MSIV inside Containment gradually develops. A manual or automatic Reactor Trip occurs. The crew responds using 3-EOP-E-0. The crew transitions to 3-EOP-E-2. The BOP ensures 3B MSIV is closed. The crew isolates the 3B S/G. After 3B S/G isolation, the crew transitions to 3-EOP-E-1 and, subsequently, to 3-EOP-ES 1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	**11 Check PRZ PORVs, Spray Valves And Excess Letdown Isolated** a. PORVs – CLOSED a. **IF** PRZ pressure less than 2335 psig, **THEN** manually close PORVs. **IF** any PRZ PORV can **NOT** be closed, **THEN** manually close its block valve. **IF** block valve can **NOT** be closed, **THEN** perform the following: 1) Monitor Critical Safety Functions using 3-EOP-F-0, CRITICAL SAFETY FUNCTION STATUS TREES. 2) Go to 3-EOP-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1. b. Normal PRZ spray valves – CLOSED b. **IF** PRZ pressure less than 2260 psig, **THEN** manually close valves. **IF** valve(s) can **NOT** be closed, **THEN** stop RCP(s) as necessary to stop spray flow. c. Auxiliary Spray Valve, CV-3-311 – CLOSED c. Manually close auxiliary spray valve. **IF** auxiliary spray valve can **NOT** be closed, **THEN** close Charging Flow to Regen Heat Exchanger, HCV-3-121. d. Excess letdown isolation valves – CLOSED • CV-3-387, Excess Letdown Isolation Valve From Cold Leg To Excess Letdown Heat Exchanger • HCV-3-137, Excess Letdown Flow Controller d. Manually close valve(s).

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Event Description: A Main Steam Line Leak upstream of the 3B MSIV inside Containment gradually develops. A manual or automatic Reactor Trip occurs. The crew responds using 3-EOP-E-0. The crew transitions to 3-EOP-E-2. The BOP ensures 3B MSIV is closed. The crew isolates the 3B S/G. After 3B S/G isolation, the crew transitions to 3-EOP-E-1 and, subsequently, to 3-EOP-ES 1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	**12 Check If RCPs Should Be Stopped** a. Check RCPs - ANY RUNNING — a. Go to Step 13. b. Check RCS subcooling – LESS THAN 25°F[65°F] — b. Go to Step 13. c. High-Head SI Pump – AT LEAST ONE RUNNING **AND** FLOWPATH VERIFIED — c. Go to Step 13. d. Stop all RCPs
	SRO/ATC	Stops RCPs if subcooling is less than 25°F (65°F) with HHSI flowpath verified with HHSI pumps running.

EXAMINER NOTE: RCPs will be tripped if not previously tripped on 3-EOP-E-0 Foldout Page.

CREW CRITICAL TASK: Ensures RCPs are tripped due to a loss of subcooling during a LOCA prior to completing Step 1 of 3-EOP-E-2.

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Event Description: A Main Steam Line Leak upstream of the 3B MSIV inside Containment gradually develops. A manual or automatic Reactor Trip occurs. The crew responds using 3-EOP-E-0. The crew transitions to 3-EOP-E-2. The BOP ensures 3B MSIV is closed. The crew isolates the 3B S/G. After 3B S/G isolation, the crew transitions to 3-EOP-E-1 and, subsequently, to 3-EOP-ES 1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	**13** Check If S/Gs Are Faulted a. Check pressures in all SGs – a. Go to Step 14. * ANY SG PRESSURE DECREASING IN AN UNCONTROLLED MANNER OR * ANY SG COMPLETELY DEPRESSURIZED b. Perform the following: 1) Monitor Critical Safety Functions using 3-EOP-F-0, CRITICAL SAFETY FUNCTION STATUS TREES 2) Go to 3-EOP-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1
	SRO/ATC	Diagnoses the B S/G faulted based on 3B S/G Level and Pressure decreasing in an uncontrolled manner.
	SRO/ATC	Transitions to 3-EOP-E-2
	SRO/ATC	Continues performance of 3-EOP-E-0 Attachment 3 Prompt Action Verification
	SRO/ATC	Provides the RO with stabilization S/G pressure information.
	SRO/ATC	Stabilizes RCS temperature using Steam Dump to Atmosphere Valves based on foldout page requirements when Wide Range S/G Level < 10%.
	SRO	Transitions to 3-EOP-E-2.

CREW CRITICAL TASK: Isolate the Faulted 3B S/G prior to exiting 3-EOP-E-2.

EXAMINER NOTE: 3-EOP-E-2 continued on next page.

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Event Description: A Main Steam Line Leak upstream of the 3B MSIV inside Containment gradually develops. A manual or automatic Reactor Trip occurs. The crew responds using 3-EOP-E-0. The crew transitions to 3-EOP-E-2. The BOP ensures 3B MSIV is closed. The crew isolates the 3B S/G. After 3B S/G isolation, the crew transitions to 3-EOP-E-1 and, subsequently, to 3-EOP-ES 1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior
		3-EOP-E-2
	SRO	Directs response using 3-EOP-E-2
	SRO	Conducts crew brief for using 3-EOP-E-2
	CREW	**CAUTIONS** • *At least one S/G must be maintained available for RCS cooldown.* • *Any faulted S/G or secondary break is required to be maintained isolated during subsequent recovery actions unless needed for RCS cooldown.*
	CREW	***NOTE*** *RCS hot leg temperature should be stabilized using steam dumps when the faulted S/G has blown down to less than 10% S/G wide range indication.*
	SRO/ATC	1 **Verify The Main Steamline Isolation AND Bypass Valves On Faulted S/G(s) - CLOSED** — Manually close valves.
	SRO/ATC	Manually closes 3-PV-2605 "B" S/G MSIV (if not already closed)
	SRO/ATC	2 **Check If Any S/G Is NOT Faulted** a. Check pressures in all S/Gs - ANY STABLE OR INCREASING a. IF all S/G pressures decreasing in an uncontrolled manner, THEN go to 3-EOP-ECA-2.1, UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS, Step 1.
	SRO/ATC	3 **Identify Faulted SG(s)** a. Check pressure in all S/G • ANY S/G PRESSURE DECREASING IN AN UNCONTROLLED MANNER OR • ANY S/G COMPLETELY DEPRESSURIZED a. Search for initiating break: • Main Steamlines • Main Feedlines • Other secondary piping Go to Step 5
	SRO/ATC	Verifies "B" S/G completely depressurized.

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Event Description: A Main Steam Line Leak upstream of the 3B MSIV inside Containment gradually develops. A manual or automatic Reactor Trip occurs. The crew responds using 3-EOP-E-0. The crew transitions to 3-EOP-E-2. The BOP ensures 3B MSIV is closed. The crew isolates the 3B S/G. After 3B S/G isolation, the crew transitions to 3-EOP-E-1 and, subsequently, to 3-EOP-ES 1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior
	CREW	**CAUTION** ***If the AFW pumps are the only available source of feed flow, a steam supply to the AFW pumps must be maintained from at least one S/G.***
	CREW	**4 Isolate Faulted S/G(s)** a. Isolate main feedline • Close feedwater isolation valve • Close feedwater bypass valve a. Manually isolate main feedline. b. Isolate AFW flow b. Manually isolate. c. Verify SI-RESET d. Verify steam supply aligned to both trains of AFW pumps from intact S/G(s) d. Reposition AFW steam supply cross-connect valves to provide steam from intact S/G(s) to all AFW pumps. Maintain steam flow to AFW pumps while repositioning cross-connect valves. • AFSS-3-006 • AFSS-3-007 e. Dispatch operator to perform the following 1) Open AFW pump steam supply MOV breaker on faulted S/G(s) 2) Close AFW pump steam supply MOV on faulted S/G(s) f. Verify S/G dump to atmosphere valve - CLOSED f. Place steam dump to atmosphere controller in MANUAL **AND** close the steam dump to atmosphere valve. **IF** steam dump to atmosphere can **NOT** be closed, **THEN** locally isolate steam dump to atmosphere valve. g. Verify S/G blowdown isolation valves - CLOSED h. Verify S/G sample lines - ISOLATED
	BOP	Isolates AFW to the 3B S/G. Maintains greater than 345 gpm total AFW flow to the 3A and 3C S/Gs until greater than 6% NR level [32%] in one S/G is attained. (May have already been completed in 3-EOP-E-0)
	CREW	Directs SNPO/TO/FS to de-energize by opening breaker 30833 & closing 3B SG AFW steam supply isolation MOV-3-1404.

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Event Description: A Main Steam Line Leak upstream of the 3B MSIV inside Containment gradually develops. A manual or automatic Reactor Trip occurs. The crew responds using 3-EOP-E-0. The crew transitions to 3-EOP-E-2. The BOP ensures 3B MSIV is closed. The crew isolates the 3B S/G. After 3B S/G isolation, the crew transitions to 3-EOP-E-1 and, subsequently, to 3-EOP-ES 1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior
	BOP	Manually closes 3-PV-2605 "B" S/G MSIV (if not already closed)
CREW CRITICAL TASK: Isolate the Faulted 3B S/G prior to exiting 3-EOP-E-2.		
	CREW	**5** **Check CST Level - GREATER THAN 10%** Add to makeup to CST using 3-OP-018.1, CONDENSATE STORAGE TANK.
	CREW	**6** **Check Secondary Radiation** a. Direct Nuclear Chemistry to take periodic activity samples of all S/Gs b. Direct Nuclear Chemistry to check DAM 1 monitor reading c. Direct Health Physics to take radiation readings on main steam lines d. Secondary radiation - NORMAL NEAR ROUTINE OPERATION VALUE
	CREW	**7** **Go To 3-EOP-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1**
	SRO	Transitions to 3-EOP-E-1.
EXAMINER NOTE: 3-EOP-E-1 continued on next page.		

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Event Description: A Main Steam Line Leak upstream of the 3B MSIV inside Containment gradually develops. A manual or automatic Reactor Trip occurs. The crew responds using 3-EOP-E-0. The crew transitions to 3-EOP-E-2. The BOP ensures 3B MSIV is closed. The crew isolates the 3B S/G. After 3B S/G isolation, the crew transitions to 3-EOP-E-1 and, subsequently, to 3-EOP-ES 1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior
		3-EOP-E-1
	SRO	Directs response using 3-EOP-E-1.
	SRO	Conducts crew brief for using 3-EOP-E-1.
	CREW	***NOTE*** *Foldout page is required to be monitored throughout this procedure*
	CREW	Monitors 3-EOP-E-1 Foldout page (see next page)
	SRO/ATC	**1 Monitor Conditions To Determine If RCPs Should Be Stopped** a RCPs - ANY RUNNING → a Go to Step 2. b. High-head SI pumps - AT LEAST ONE RUNNING → b. Go to Step 2. c. RCS Subcooling - LESS THAN 25°F[65°F] → c. Go to Step 2. d. Controlled plant cooldown – **NOT** IN PROGRESS → d. Go to Step 2. e. Stop all RCPs
	SRO/BOP	**2 Check If S/Gs Are NOT Faulted** a Check pressures in all S/Gs – • NO S/G PRESSURE DECREASING IN AN UNCONTROLLED MANNER • NO S/G COMPLETELY DEPRESSURIZED → a **IF** any S/G is faulted **AND** that S/G has **NOT** previously been isolated, **THEN** go to 3-EOP-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.
	SRO/BOP	**3 Maintain Intact S/G Levels** a. Narrow range level - GREATER THAN 6%[32%] → a. Maintain total feed flow greater than 345 gpm until narrow range level greater than 6%[32%] in at least one S/G. b. Control feed flow to maintain narrow range level between 15%[32%] and 50% c. Narrow range level - LESS THAN 50% → c. Stop feed flow to any S/G with narrow range level greater than 50% **IF** narrow range level in any S/G continues to increase in an uncontrolled manner, **THEN** go to 3-EOP-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

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Event Description: A Main Steam Line Leak upstream of the 3B MSIV inside Containment gradually develops. A manual or automatic Reactor Trip occurs. The crew responds using 3-EOP-E-0. The crew transitions to 3-EOP-E-2. The BOP ensures 3B MSIV is closed. The crew isolates the 3B S/G. After 3B S/G isolation, the crew transitions to 3-EOP-E-1 and, subsequently, to 3-EOP-ES 1.1 to terminate SI.

FOLDOUT FOR PROCEDURE E-1

1. ADVERSE CONTAINMENT CONDITIONS
IF either of the conditions listed below occurs, THEN use adverse containment setpoints:
Containment atmosphere temperature ≥ 180°F
OR
Containment radiation levels ≥ 1.3×10^5 R/hr
WHEN containment parameters drop below the above values, THEN normal setpoints can again be used
IF containment integrated dose rate has not exceeded 10^5 Rads.

2. RCP TRIP CRITERIA
a. IF all conditions listed below occur, THEN trip all RCPs:
1) High-head SI pumps - AT LEAST ONE RUNNING AND SI FLOWPATH VERIFIED
2) RCS subcooling - LESS THAN 25°F[65°F]
3) Controlled RCS cooldown is NOT in progress
b. IF phase B actuated, THEN trip all RCPs

3. SI TERMINATION CRITERIA
IF all conditions listed below occur, THEN go to 3-EOP-ES-1.1, SI TERMINATION, Step 1:
a. RCS subcooling based on core exit TCs - GREATER THAN 30°F[See below Table]

SI TERMINATION ADVERSE SUBCOOLING VALUE	
RCS PRESSURE (PSIG)	ADVERSE SUBCOOLING VALUE
< 2485 AND ≥ 2000	≥ 55 °F
< 2000 AND ≥ 1000	≥ 85 °F
< 1000	≥ 210°F

b. Total feed flow to intact SGs - GREATER THAN 345 GPM OR narrow range level in at least one intact SG - GREATER THAN 6%[32%]
c. RCS pressure - GREATER THAN 1600 PSIG[2000 psig] AND STABLE OR INCREASING
d. PRZ level - GREATER THAN 17%[50%]

4. SECONDARY INTEGRITY CRITERIA
IF any S/G pressure is decreasing in an uncontrolled manner OR has completely depressurized AND that S/G has NOT been isolated, THEN go to 3-EOP-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

5. E-3 TRANSITION CRITERIA
IF any S/G level increases in an uncontrolled manner OR any S/G has abnormal radiation, THEN manually start SI pumps as necessary and go to 3-EOP-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.

6. COLD LEG RECIRCULATION SWITCHOVER CRITERIA
IF RWST level decreases to less than 155,000 gallons, THEN go to 3-EOP-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

7. RECIRCULATION SUMP BLOCKAGE
IF RHR pump flow AND amps become erratic OR abnormally low after recirculation has been established, THEN transition to 3-EOP-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1.

8. CST MAKEUP WATER CRITERIA
IF CST level decreases to less than 10%, THEN add makeup to CST using 3-NOP-018.01, Condensate Storage Tank (CST).

9. LOSS OF OFFSITE POWER OR SI ON OTHER UNIT
IF SI has been reset AND either offsite power is lost OR SI actuates on the other unit, THEN restore safeguards equipment to required configuration. Refer to ATTACHMENT 3 for essential loads.

10. RHR SYSTEM OPERATION CRITERIA
IF RHR flow is less than 1000 gpm, THEN the RHR pumps shall be shut down within 44 minutes of the initial start signal.

CREW CRITICAL TASK: If RHR flow is less than 1000 gpm, then RHR Pump shall be shutdown within 44 minutes of the start signal.

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Event Description: A Main Steam Line Leak upstream of the 3B MSIV inside Containment gradually develops. A manual or automatic Reactor Trip occurs. The crew responds using 3-EOP-E-0. The crew transitions to 3-EOP-E-2. The BOP ensures 3B MSIV is closed. The crew isolates the 3B S/G. After 3B S/G isolation, the crew transitions to 3-EOP-E-1 and, subsequently, to 3-EOP-ES 1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	**4 Monitor Secondary Radiation** a. Direct Nuclear Chemistry to take periodic activity samples of all S/Gs b. Direct Nuclear Chemistry to check DAM1 monitor reading c. Direct Health Physics to take radiation readings on main steamlines d. Secondary radiation - NORMAL NEAR ROUTINE OPERATION VALUE d. Go to 3-EOP-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.
	CREW	**CAUTION** *If any PRZ PORV opens because of high PRZ pressure, it is required to be verified closed or isolated after pressure decreases to less than the PORV setpoint.*
	SRO/ATC	**5 Check PRZ PORVs AND Block Valves** a. Power to block valves - AVAILABLE a. Restore power to block valves b. PORVs - CLOSED b. IF PRZ pressure less than 2335 psig, THEN manually close PORVs. IF any valve can NOT be closed, THEN manually close its block valve. c. Block valves - AT LEAST ONE OPEN c. Open one block valve unless it was closed to isolate an open PORV.
	SRO/ATC	**6 Verify SI - RESET**
	SRO/ATC	**7 Reset Containment Isolation Phase A AND Phase B**
	SRO/ATC	**8 Verify Instrument Air To Containment** a. Verify Instrument Air Containment Isolation, CV-3-2803 - OPEN b. Verify instrument air pressure, PI-3-1444 - GREATER THAN 95 PSIG b. Restore instrument air pressure using 0-ONOP-013, LOSS OF INSTRUMENT AIR, while continuing with this procedure.

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Event Description: A Main Steam Line Leak upstream of the 3B MSIV inside Containment gradually develops. A manual or automatic Reactor Trip occurs. The crew responds using 3-EOP-E-0. The crew transitions to 3-EOP-E-2. The BOP ensures 3B MSIV is closed. The crew isolates the 3B S/G. After 3B S/G isolation, the crew transitions to 3-EOP-E-1 and, subsequently, to 3-EOP-ES 1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	**9** **Check Power Supply To All Charging Pumps - ALIGNED TO OFFSITE POWER** Check diesel capacity adequate to run three charging pumps. **IF** adequate diesel capacity is **NOT** available, **THEN** shed nonessential loads. Refer to ATTACHMENT 3 for component KW load rating.
	SRO/ATC	**10** **Check Charging Flow Established** a. Charging pumps - AT LEAST ONE RUNNING a. Perform ATTACHMENT 4 to establish charging. b. Adjust speed controllers as necessary to establish desired charging flow to establish SI Termination conditions c. Adjust Charging Flow To Regen Heat Exchanger, HCV-3-121, to maintain proper seal injection flow

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Event Description: A Main Steam Line Leak upstream of the 3B MSIV inside Containment gradually develops. A manual or automatic Reactor Trip occurs. The crew responds using 3-EOP-E-0. The crew transitions to 3-EOP-E-2. The BOP ensures 3B MSIV is closed. The crew isolates the 3B S/G. After 3B S/G isolation, the crew transitions to 3-EOP-E-1 and, subsequently, to 3-EOP-ES 1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior
	SRO/RO	

ATTACHMENT 4
(Page 1 of 1)
ESTABLISH CHARGING FLOW

1. **Verify CCW Flow Alarms To All RCP Thermal Barriers - OFF** • A 1/1, RCP THERMAL BARR COOLING WATER HI FLOW **AND** • A 1/2, RCP THERMAL BARR COOLING WATER HI TEMP **AND** • A 1/3, RCP THERMAL BARR COOLING WATER LO FLOW	**IF** CCW flow to RCPs thermal barrier is lost, perform the following: a. Verify seal return temperature for each RCP to be less than 235 F. b. **IF** seal return temperature for each RCP is less than 235 F, **THEN** go to Step 2. c. **IF** seal return temperature is ≥ 235 F, **THEN** locally isolate seal injection to affected RCP(s) before starting charging pumps. * 3-297A for RCP A * 3-297B for RCP B * 3-297C for RCP C d. **WHEN** seal injection is isolated to each affected RCP, **THEN** go to Step 2.
2. **Check Offsite Power Available**	**IF** offsite power is NOT available, **THEN** check diesel capacity adequate to run one charging pump. **IF** diesel capacity is NOT adequate, **THEN** shed non-essential loads. Refer to ATTACHMENT 3 for component KW load rating.
3. **Start One Charging Pump**	
4. **Place RCS Makeup Control Switch in STOP**	
5. **Establish Desired Charging Flow**	
a. Start additional charging pumps if needed and offsite power available	a. **IF** offsite power is NOT available, **THEN** check diesel capacity adequate to run additional charging pumps.
c. Adjust Charging Flow To Regen Heat Exchanger, HCV-3-121, to maintain proper seal injection flow	
d. Verify charging pump suction auto transfers to RWST	
6. **Notify The Unit Supervisor That The ESTABLISH CHARGING FLOW Attachment Is Complete**	

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Event Description: A Main Steam Line Leak upstream of the 3B MSIV inside Containment gradually develops. A manual or automatic Reactor Trip occurs. The crew responds using 3-EOP-E-0. The crew transitions to 3-EOP-E-2. The BOP ensures 3B MSIV is closed. The crew isolates the 3B S/G. After 3B S/G isolation, the crew transitions to 3-EOP-E-1 and, subsequently, to 3-EOP-ES 1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior
	SRO/RO	**11 Check if SI Should be Terminated** a. RCS subcooling based on core exit TCs - GREATER THAN 30°F[Refer to Foldout Page Item 3 Adverse Value] — a. Go to Step 12. b. Secondary heat sink — b. **IF** neither condition satisfied, **THEN** go to Step 12. * Total feed flow to intact S/Gs - GREATER THAN 345 GPM **OR** * Narrow range level in at least one intact S/G - GREATER THAN 6%[32%] c. RCS pressure — c. Go to Step 12. • Pressure - GREATER THAN 1600 PSIG[2000 PSIG] • Pressure - STABLE OR INCREASING d. PRZ level - GREATER THAN 17%[50%] — d. Try to stabilize RCS pressure with normal PRZ spray. Go to Step 12. e. Go to 3-EOP-ES-1.1, SI Termination, Step 1
	SRO/RO	Transitions to 3-EOP-ES-1.1
	CREW	Identifies that adverse containment no longer exists when containment temperature is less than 180°F.

TERMINATION CRITERIA

EXAMINER NOTE: The scenario is terminated when a SI Termination decision has been made or earlier based on the discretion of the Lead Examiner.

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Event Description: A Main Steam Line Leak upstream of the 3B MSIV inside Containment gradually develops. A manual or automatic Reactor Trip occurs. The crew responds using 3-EOP-E-0. The crew transitions to 3-EOP-E-2. The BOP ensures 3B MSIV is closed. The crew isolates the 3B S/G. After 3B S/G isolation, the crew transitions to 3-EOP-E-1 and, subsequently, to 3-EOP-ES 1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior
	BOP	1. **Check The Load Centers Associated With The Energized 4 KV Buses – ENERGIZED** • 3A LC • 3B LC • 3C LC • 3D LC • 3H LC Close the Load Center supply breakers.
	BOP	2. **Check If Main Steamlines Should Be Isolated** a. Check main steamline isolation and bypass valves - ANY OPEN — a. Go to Step 3. b. Check if either main steam isolation signal has actuated — b. Go to Step 3. • High steam flow with either low S/G pressure 614 psig **OR** low Tavg 543 F **OR** • Hi-Hi containment pressure 20 PSIG c. Verify main steam isolation and bypass valves - CLOSED — c. Push manual Steamline Isolation push buttons on VPB **OR** manually close valves.
	BOP	Places 3B Main Steam Isolation Valve to CLOSE.
CREW CRITICAL TASK: Places 3B Main Steam Isolation Valve to CLOSE is part of isolating the Faulted 3B S/G prior to exiting 3-EOP-E-2.		
	BOP	3. **Verify Feedwater Isolation** a. Place main feedwater pump switches in STOP b. Feedwater control valves – CLOSED — b. Manually close valves. c. Feedwater bypass valves – CLOSED — c. Manually close valves. d. Close feedwater isolation MOVs — d. Locally close valves. e. Verify standby feedwater pumps – OFF — e. **IF** standby feedwater is aligned to Unit 3, **THEN** stop standby feedwater pump(s).
	BOP	Places Main Feedwater Pump switches in STOP.

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Event Description: A Main Steam Line Leak upstream of the 3B MSIV inside Containment gradually develops. A manual or automatic Reactor Trip occurs. The crew responds using 3-EOP-E-0. The crew transitions to 3-EOP-E-2. The BOP ensures 3B MSIV is closed. The crew isolates the 3B S/G. After 3B S/G isolation, the crew transitions to 3-EOP-E-1 and, subsequently, to 3-EOP-ES 1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior
	BOP	**4. Verify Proper ICW System Operation** a. Verify ICW pumps - AT LEAST TWO RUNNING a. Start ICW pump(s) to establish at least two running. b. Verify ICW to TPCW Heat Exchanger – ISOLATED • POV-3-4882 – CLOSED • POV-3-4883 – CLOSED b. Manually close valve(s). **IF** valve(s) can **NOT** be closed, **THEN** locally close the following valves: • 3-50-319 for POV-3-4882 • 3-50-339 for POV-3-4883 c. Check ICW headers - TIED TOGETHER c. **IF** both ICW headers are intact, **THEN** direct operator to tie headers together.
	BOP	**5. Verify Proper CCW System Operation** a. CCW Heat Exchangers – THREE IN SERVICE a. Perform the following: 1) Start or stop CCW pumps as necessary to establish ONLY ONE RUNNING CCW PUMP. 2) Verify Emergency Containment Coolers - ONLY TWO RUNNING 3) Go to Step 5c. b. CCW pumps - ONLY TWO RUNNING b. Start or stop CCW pumps as necessary to establish ONLY TWO RUNNING CCW PUMPS. c. CCW headers - TIED TOGETHER c. **IF** both CCW headers are intact, **THEN** direct a field operator to tie the headers together. d. RCP Thermal Barrier CCW Outlet, MOV-3-626 – OPEN d. **IF** containment isolation phase B **NOT** actuated **AND** CCW radiation levels are normal, **AND** RCP number one seal leak-off temperature is less than 235°F, **THEN** manually open MOV-3-626. **IF** MOV-3-626 can **NOT** be manually opened, **THEN** direct operator to open MOV-3-626 locally.
	BOP	**6. Verify Containment Cooling** a. Check emergency containment coolers - ONLY TWO RUNNING a. Manually start or stop emergency containment coolers to establish - ONLY TWO RUNNING. b. Verify emergency containment filter fans - AT LEAST TWO RUNNING b. Manually start emergency containment filter fans.

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Event Description: A Main Steam Line Leak upstream of the 3B MSIV inside Containment gradually develops. A manual or automatic Reactor Trip occurs. The crew responds using 3-EOP-E-0. The crew transitions to 3-EOP-E-2. The BOP ensures 3B MSIV is closed. The crew isolates the 3B S/G. After 3B S/G isolation, the crew transitions to 3-EOP-E-1 and, subsequently, to 3-EOP-ES 1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior
	BOP	**7. Verify Pump Operation** a. At least two high head SI pumps running — a. Manually start high-head pump(s). b. Both RHR pumps running — b. Manually start RHR pump(s).
	BOP	**8. Verify SI Flow** a. RCS pressure - LESS THAN 1600 PSIG [2000 PSIG] — a. Go to Step 9. b. High-head SI pump flow indicator – CHECK FOR FLOW — b. Manually start pumps **AND** align valves to establish an injection flowpath. c. RCS pressure - LESS THAN 250 PSIG [650 PSIG] — c. Go to Step 9. d. RHR pump flow indicator - CHECK FOR FLOW — d. Manually start pumps **AND** align valves to establish an injection flowpath.
	BOP	**9. Realign SI System** a. Verify Unit 3 high-head SI pumps - TWO RUNNING — a. Perform the following: 1) Operate Unit 3 and Unit 4 high-head SI pumps to establish injection to Unit 3 from two high-head SI pumps. 2) Direct Unit 4 Reactor Operator to align Unit 4 high-head SI pump suction to Unit 3 RWST using ATTACHMENT 1 of this procedure. 3) Go to Step 10. b. Stop both Unit 4 high-head SI pumps **AND** place in standby
	BOP	Places the handswitches for the 4A and 4B HHSI pumps to STOP.

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Event Description: A Main Steam Line Leak upstream of the 3B MSIV inside Containment gradually develops. A manual or automatic Reactor Trip occurs. The crew responds using 3-EOP-E-0. The crew transitions to 3-EOP-E-2. The BOP ensures 3B MSIV is closed. The crew isolates the 3B S/G. After 3B S/G isolation, the crew transitions to 3-EOP-E-1 and, subsequently, to 3-EOP-ES 1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior	
	BOP	10. **Verify Containment Isolation Phase A Valve White Lights On VPB – ALL BRIGHT**	Perform the following: a. Manually actuate Containment Isolation Phase A. b. **IF** any Containment Isolation Phase A valve is **NOT** closed, **THEN** manually close valve. **IF** valve(s) can **NOT** be manually closed, **THEN** manually or locally isolate affected containment penetration.
	BOP	11. **Verify SI Valve Amber Lights On VPB - ALL BRIGHT**	Manually align valves to establish proper SI alignment for an injection flowpath.
	BOP	12. **Verify SI – RESET**	Reset SI
	BOP	13. **Verify Containment Phase A – RESET**	Reset Phase A
	BOP	14. **Reestablish RCP Cooling** a. Check RCPs – AT LEAST ONE RUNNING b. Open CCW to normal containment cooler valves • MOV-3-1417 • MOV-3-1418 c. Reset and start normal containment coolers	a. Go to Step 15. b. Stop all RCPs c. Stop all RCPs

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Event Description: A Main Steam Line Leak upstream of the 3B MSIV inside Containment gradually develops. A manual or automatic Reactor Trip occurs. The crew responds using 3-EOP-E-0. The crew transitions to 3-EOP-E-2. The BOP ensures 3B MSIV is closed. The crew isolates the 3B S/G. After 3B S/G isolation, the crew transitions to 3-EOP-E-1 and, subsequently, to 3-EOP-ES 1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior
	BOP	**15. Monitor Containment Pressure To Verify Containment Spray NOT Required** a. Containment pressure - HAS REMAINED LESS THAN 20 PSIG • PR-3-6306A **AND** • PR-3-6306B a. Perform the following: 1) IF containment spray NOT initiated, THEN manually initiate containment spray. 2) Verify Containment Isolation Phase B - ACTUATED. 3) Verify Containment Isolation Phase B valve white lights on VPB – ALL BRIGHT. 4) IF any Containment Isolation Phase B valve did NOT close, THEN manually or locally isolate affected containment penetration. 5) Stop all RCPs.
	BOP	**16. Verify Containment and Control Room Ventilation Isolation** a. Unit 3 containment purge exhaust and supply fans – OFF a. Manually stop fans. b. Verify Control Room ventilation status panel - PROPER EMERGENCY RECIRCULATION ALIGNMENT b. Manually align equipment for Control Room emergency recirculation.
	BOP	**NOTE** *Hydrogen Monitors should be in service within 30 minutes of a valid SI signal. They should be available in a timely manner to support decision-making related to hydrogen generation in containment.*
	BOP	**17. Place Hydrogen Monitors In Service Using 3-NOP-094, CONTAINMENT POST ACCIDENT MONITORING SYSTEM**
	BOP	**18. Verify All Four EDGs – RUNNING** EMERGENCY START any available EDG NOT running.

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Event Description: A Main Steam Line Leak upstream of the 3B MSIV inside Containment gradually develops. A manual or automatic Reactor Trip occurs. The crew responds using 3-EOP-E-0. The crew transitions to 3-EOP-E-2. The BOP ensures 3B MSIV is closed. The crew isolates the 3B S/G. After 3B S/G isolation, the crew transitions to 3-EOP-E-1 and, subsequently, to 3-EOP-ES 1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior
	BOP	**19. Verify Power To Emergency 4 KV Buses and Load Centers** a. Check the 3A, 3B and 3D 4 KV buses - ALL ENERGIZED a. Perform the following: 1) Inform the Unit Supervisor that ATTACHMENT 3 is complete with the exception of the de-energized bus or buses. 2) **IF** the Unit Supervisor decides not to energize the de-energized bus or buses, **THEN** go to Step 20. 3) **IF** the Unit Supervisor decides to energize 3A, 3B, or 3D bus, **THEN** perform the following: a) **IF** 3A 4 KV bus de-energized, **THEN** restore power to bus using 3-ONOP-004.2, LOSS OF 3A 4KV BUS. b) **IF** 3B 4 KV bus de-energized, **THEN** restore power to bus using 3-ONOP-004.3, LOSS OF 3B 4KV BUS. c) **IF** 3D 4 KV bus de-energized, **THEN** restore power to bus using 3-ONOP-004.5, LOSS OF 3D 4KV BUS.
	BOP	**20. Notify The Unit Supervisor That The PROMPT ACTION VERIFICATIONS Attachment Is Complete And Discuss Any Safeguards Equipment That Is Not In The Required Condition**