Facility: Turkey Point | Scenario No.: 1 | Op Test No.: 2010-301

Examiners: _____ Candidates: _____ US

_____ _____ RO

_____ _____ BOP

Initial Conditions: Mode 1, 100% Power, 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.

Immediately after turnover perform TPCW HX ICW Isolation Valves POV-3-4882 stroke time test using 3-OSP-206.2 section 7.3 starting at step 7.3.7. All previous steps have been complete. The Shift Manager has granted permission to perform the test. Operators required for this evolution have been briefed and are in the field.

Maintain 100%

Online risk – green

B train protected both units

Event No.		Event Type*	Event Description
1	TFKC882A=T	(TS) SRO	TPCW HX ICW Isolation Valves POV-3-4882 stroke time test using 3-OSP-206.2 section 7.3. During the test, the valve will fail to close and will be declared inoperable. The SRO enters LCO 3.7.3.b Action c.
2	TFBVSHRL=T	(C) RO (C) SRO	Charging pump 3C breaker trips, the RO will respond using the ARP and 3-ONOP-47.1 and start another Charging Pump.
3	TFE2D22T=T	(C) BOP (C) SRO (TS) SRO	Breaker 3AD06 opens resulting in a loss of power to the 3D 4kv bus. The BOP will respond using 3-ONOP-4.5 or 3-OP-005 to energize 3D 4kv bus from the 3A 4kv bus. The SRO will enter LCO 3.7.3.a Action a
4	TFUZ10BO T	(C) BOP	The B Heater Drain Tank High Level Control Valve, CV-3-1510B Fails Open, the BOP will reduce turbine load to maintain power less than100% power and start the 3C Condensate pump to restore Feed Pump suction pressure to normal using the ARP.
5	TFL10201 T	(C) RO (C) SRO	The control rods continuously insert after the downpower, the crew will enter 3-ONOP-28 and the RO will place rod control in MANUAL.
6	**TVHNL1B = 8.7 e-04 3 min ramp**	(R) RO (N) BOP	3B RCP #1 seal failure gradually develops, the crew responds using 3-ONOP 41.1. The RO will initiate a boration and the BOP will reduce turbine load using 3-ONOP-100.
7	TFP8SWYD = T TFQ5GAFS = T TFQ5B20A = T TTFG1B86S = T	(M)ALL (C) BOP	A grid disturbance causes a loss of power to the switchyard. The crew responds using 3-EOP-E-0, the 3A EDG will fail to start, 3B EDG starts but the output breaker fails to close. The Main Turbine fails to trip, the BOP will manually trip the Main Turbine or close the MSIVs. The crew transitions to 3-EOP-ECA-0.0 to recover electrical power by closing the B EDG output breaker. After power is restored the crew will transition back to E-0.

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

Rec'd 8/23/10

2010-301 Scenario #1

Event 1 – TPCW HX ICW Isolation Valves POV-3-4882 stroke time test using 3-OSP-206.2 section 7.3. During the test, the valve will fail to close and will be declared inoperable. The SRO enters LCO 3.7.3.b Action c.

Event 2 – Charging pump 3C breaker trips, the RO will respond using the ARP and 3-ONOP-47.1 and start another Charging Pump.

Event 3 – Breaker 3AD06 opens resulting in a loss of power to the 3D 4kv bus. The BOP will respond using 3-ONOP-4.5 or 3-OP-005 to energize 3D 4kv bus from the 3A 4kv bus. The SRO will enter LCO 3.7.3.a Action a.

Event 4 – The B Heater Drain Tank High Level Control Valve, CV-3-1510B Fails Open, the BOP will reduce power and start the 3C Condensate pump and to restore Feed Pump suction pressure to normal using the ARP.

Event 5 – The control rods continuously insert during the downpower, the crew will enter 3-ONOP-28 and the RO will place rod control in MANUAL.

Event 6 - 3B RCP #1 seal failure gradually develops, the crew responds using 3-ONOP 41.1. The RO will initiate a boration and the BOP will reduce turbine load using 3-ONOP-100.

Event 7 –A grid disturbance causes a loss of power to the switchyard. The crew responds using 3-EOP-E-0, the 3A EDG will fail to start, 3B EDG starts but the output breaker fails to close. The Main Turbine fails to trip; the BOP will manually trip the Main Turbine or close the MSIVs. **Critical Task** The crew transitions to 3-EOP-ECA-0.0 to recover electrical power by closing the B EDG output breaker. **Critical Task**

Rec'd 8/23/10

2010-301 Scenario 1 Simulator Operating Instructions

Setup

IC-1 (100% MOL)

Place simulator in run

Open and execute lesson Gr 26 NRC Scenario 1.lsn

Manually stop the 3B2 Circulating Water pump

Trigger lesson steps:

- SETUP - 3B2 CWP OOS (actuates TAK4DP = 3)
- SETUP –3A EDG Fails To Start (actuates TAQ5GAFS=T)
- SETUP –3B EDG Output Breaker Fails To Close (actuates TFQ5B20A=T)
- SETUP - Main Turbine Fails to Trip (actuates TFU10005=T)
- SETUP - 3C Cond Pump Fail to Start (actuates TFUZ10BO =T)
- Place a stopwatch on the Unit Supervisor desk.
- Hang a Clearance Tag on 3B2 CW Hand Switch

Provide an in progress procedure 3-OSP-206.2 step 7.3.9

Place simulator in freeze.

Provide shift turnover checklists

Perform Simulator Operator Checklist

Event 1 POV-3-4882 & 4883 Stroke Time Test

Initiated immediately after shift turnover.

TPCW HX ICW Isolation Valves POV-3-4882 stroke time test using 3-OSP-206.2 section 7.3. During the test, the valve will fail to close and will be declared inoperable. The SRO enters LCO 3.7.3.b Action c.

When the BOP has placed the HS for POV-3-4882 to close, **ensure lesson step EVENT 1 - POV-3-4882 FAIL TO CLOSE is inserted after 60 seconds.** **(actuates TFKC882A with a 60 second delay.)**

If directed, respond as FS and report local valve position indication section of the test is not required.

If directed, respond as FS/TO and report POV-3-4882 is in mid position and has stopped moving. There is no apparent cause for the failure of the valve.

If directed, respond as SM and acknowledge the failure of POV-3-4882.

If directed, respond as FS/TO and manually close POV-3-4882 isolation valve, 3-50-319, **trigger lesson step EVENT 1 Locally Close 3-50-319, report when complete.**

If directed, respond as WCC if requested to prepare a PWO/Clearance and notify maintenance.

Event 2 Charging pump 3C breaker Trip

Charging pump 3C breaker trips, the RO will respond using the ARP and 3-ONOP-47.1 and start another Charging Pump.

When directed, **trigger lesson step EVENT 2 - 3C Charging Pump Trip** **(actuates TVBMBFN 1)**

If directed, respond as SNPO and report 3C charging pump motor stopped. If directed to check out breaker 35008, report that it is tripped open, but nothing else appears abnormal.

If directed as SNPO, report an after start inspection of the Charging Pump that was started by the RCO.

If directed, respond as WCC/TO/FS to rack out breaker 35008, **trigger** lesson step **EVENT 1 - RACK OUT 3C CHG PP BKR** (actuates TAB1POSN = 3).

If directed, respond as WCC if asked to generate PWO, troubleshoot & repair the 3C charging pump.

Event 3 – Loss of 3D 4kV bus

Breaker 3AD06 opens resulting in a loss of power to the 3D 4kv bus. The BOP will respond using 3-ONOP-4.5 to energize 3D 4kv bus from the 3A 4kv bus. The SRO will enter LCO 3.7.3.a Action a.

When directed, trigger lesson step **EVENT 3 - 3AD06 OPENS** (actuates TFE2D22T = T).

If directed, respond as ANPO to locally investigate 3C ICWP. Report back normal conditions for a recently idled pump.

If directed, respond as ANPO to perform post-start checks for 3A ICWP. Report back that pump is operating normally.

If directed, respond as ANPO to locally investigate breaker 3AD05 and/or 3AD06. Report burnt insulation smell near bus & light wisps of smoke from control cubicle immediately above breaker 3AD06. All breakers (including 3AD05) appear open and, with the exception of 3AD06, otherwise normal. Report 3D 4kV bus is deenergized.

If directed, respond as ANPO/FS to walk down the ICW system to look for leaks. After 4-6 min, report no ICW system leaks are visible.

If directed, respond as TO and report TPCW HXs ICW flow. Click on SCHEMA → COMMON SERVICES → INTAKE COOLING → report TPCW HX ICW total flow as indicated on ICW system mimic (or use default value of 5800 gpm).

If directed, respond as SNPO to report CCW HXs ICW flow. From ICW system mimic, report indicated CCW HX ICW total flow (or use default value of 13600 gpm).

If directed, respond as respond as IST coordinator regarding evaluation of 3C ICWP for flow > 19000 gpm.

If directed, respond as TO and check TPCW supply temperature (TI-3-1432) < 105°F. From ICW system mimic, touch TPCW ♦ & report system temp TE-1472/TI-1432 at top left of TPCW mimic (approx 99°F and stable).

If directed, respond as respond as WCC to troubleshoot & repair breaker 3AD06.

If directed, respond as WCC/FS about 3D 4kV bus, report that the bus is fine for re-energization, but breaker 3AD06 is OOS and needs to be racked out for repair.

If directed, respond as TO/FS to rack out breaker 3AD06, **trigger** lesson step **EVENT 3 - RACK OUT 3AD06** (actuates TAE2D22P = 3).

Report no targets on 3D 4kV bus after reenergization.

EVENT 4 - CV-3-1510B Fails Open

The B Heater Drain Tank High Level Control Valve, CV-3-1510B Fails Open, the BOP will start the 3C Condensate pump and reduce power to restore Feed Pump suction pressure to normal using the ARP.

When directed, **trigger lesson step EVENT 4 CV-3-1510B Fails Open** **(actuates TFL10201 =T)**

Event 5 – Continuous Rod Insertion

The control rods continuously insert during the downpower, the crew will enter 3-ONOP-28 and the RO will place rod control in MANUAL.

When an insertion demand is present, **ensure lesson step EVENT 5 Control Rods Continuous Insertion** (actuates TFL10201 T)

Event 6 – 3B RCP #1 SEAL FAILURE

3B RCP #1 seal failure gradually develops, the crew responds using 3-ONOP 41.1. The RO will initiate a boration and the BOP will reduce turbine load using 3-ONOP-100.

When directed by the lead examiner, **trigger lesson step EVENT 4 - 3B RCP #1 seal failure.** **(actuates TVHNL1B = 8.7 e-04 3 min ramp)**

If directed, wait 3 to 5 minutes and respond as SNPO, "Seal Injection flow to all RCPs is 8 gpm."

If directed, respond as System when called about load reduction.

If directed, respond as SM when told to review 0-EPIP-20101 & 0-ADM-115 for notification requirements. State that the NRC Resident will be notified of the fast load reduction.

If directed, respond as chemistry to take samples. No response back required.

If directed, respond as FS/TO to align aux steam using attachment 1. No response back required.

3-ONOP-100

If called, respond as system dispatcher; acknowledge Unit 3 load reduction.

If directed, respond as SM when told to review 0-EPIP-20101 & 0-ADM-115 for notification requirements. State that the NRC Resident will be notified of the fast load reduction.

If directed, respond as chemistry to take samples. No response back required.

If directed, respond as FS/NSO to align aux steam using attachment 1. No response back required.

Event 7 –Loss of All AC

Event 6 – A grid disturbance causes a loss of power to the switchyard. The crew responds using 3-EOP-E-0, the 3A EDG will fail to start, 3B EDG starts but the output breaker fails to close. The Main Turbine fails to trip; the BOP will manually trip the Main Turbine or close the MSIVs. The crew transitions to 3-EOP-ECA-0.0 to recover electrical power by closing the B EDG output breaker.

When directed by the lead examiner, **trigger lesson step EVENT 6 LOSS OF ALL AC** **(actuates TFP8SWYD = T, TFQ5GAFS = T, TFQ5B20A = T, TFG1B86S = T, TCE2E01T=-1, TCE2E07T=T, & TCE6DR5C=F)**

If directed, respond as FS/SNPO, acknowledge direction to locally open 3-MOV-843A&B. After 3 minutes **TRIGGER lesson step EVENT 7 - LOCALLY OPEN 3-MOV-843 A and B** **(actuates TFMVV01O & TFMVV02O=T)**

If directed, respond SNPO, **trigger lesson step EVENT 7 Locally Isolate RCP Seals** **(actuates TAHN97A, B & C=0)** Report when complete.

If directed, respond as FS/ANPO, acknowledge direction to locally reset 3A EDG lockout relay. After 2 minutes **TRIGGER lesson step EVENT 7 - ATTEMPT LOCAL RESET OF 3A EDG** **(actuates TCQ586AR)**. Report back lockout will not reset.

If directed, respond as FS/ANPO to take 3A EDG MCSS to OFF & rack out 3AA20, **trigger lesson step EVENT 7 – 3A EDG MCSS OFF & RO 3AA20** (actuates TAQ5LRSA=0 & TAQ5A20P=3). Report when complete.

If directed, respond as FS/ANPO after 1 to 2 minutes report the 3"B" EDG is running but the output breaker 3AB20 is open. There are no visible problems with the breaker and no visible problems with the 3"B" 4 kv bus.

If directed, respond as WCC, after 10 minutes report Electrical Maintenance has performed a visual inspection of output breaker 3AB20 and can find no visible problem

When an operator places the control switch for the B EDG Breaker to CLOSE, ensure lesson step **Event 7 - 3B EDG Output Breaker Closes auto inserts**

If directed, respond as FS/TO, acknowledge direction to reduce DC bus loading as necessary using ATTACHMENT 3.

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	--
1. Total malfunctions (5–8)	7
2. Malfunctions after EOP entry (1–2)	2
3. Abnormal events (2–4)	5
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

Op-Test No.: 2010-301 Scenario No.: 1 Event No.: 1 Page 1 of 1

Event Description: The crew will perform TPCW HX ICW Isolation Valves POV-3-4882 stroke time test using 3-OSP-206.2 section 7.3. During the test, the valve will fail to close and will be declared inoperable.

Time	Position	Applicant's Actions or Behavior
	SRO	Directs 3-OSP-206.2 section 7.3 actions.
	BOP	Places 3A TPCW Hx Isolation Valve POV-3-4882 handswitch to CLOSE.
After the BOP places POV-3-4882 HS to close, direct facility operator to trigger lesson step EVENT 1 - POV-3-4882 FAIL TO CLOSE is inserted after 30 seconds. (actuates TFKC882A with a 30 second delay.)		
		NOTE *The tested Intake Cooling Water Valves are operable if all test values are within the specified ranges.*
		Examiner Note: TPCW Hx Isolation Valve POV-3-4882 and 4883 will have a significant delay from the time of switch actuation until the time the valve begins to stroke.
	BOP	Observes POV-3-4882 does not fully close May be directed by US to attempt to manually open POV-3-4882. May be directed by the US to have the ANPO locally close 3-50-319.
	SRO	Declares A ICW INOPERABLE and enters LCO 3.7.3.b action c
		Examiner Note: **3.7.3 The Intake Cooling Water System (ICW) shall be OPERABLE with:** **b. Two ICW headers.** **c. With only one ICW header OPERABLE, restore two headers 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.**
When the SRO has addressed Tech Specs for ICW, direct facility operator to trigger lesson step EVENT 2 – 3C Charging Pump Trip.		

Op-Test No.: 2010-301 Scenario No.: 1 Event No.: 2 Page 1 of 2

Event Description: Charging pump 3C breaker trips, the crew will respond using the ARP or 3-ONOP-47.1 and start another Charging Pump.

Time	Position	Applicant's Actions or Behavior
Direct facility operator to trigger lesson step "EVENT 2 - 3C Charging Pump Trip" (actuates TVBMBFN 1).		
		A23 CHARGING PUMP C TRIP CAUSES: 1. Mechanical failure of pump 2. Loss of suction source to pump 3. Electrical failure
	RO	Observes the trip of the 3C charging pump. Observes annunciator A 6/3, A 6/5
	RO	OPERATOR ACTIONS: 1. Verify alarm by checking the following: a. 3C charging pump red indicator light off. b. Reduced or no charging flow.
		2. Corrective actions: a. Verify adequate suction source by checking: (1) VCT level, LT-3-115, greater than 4% AND LCV-3-115C open, OR (2) IF VCT level less than 4%, THEN LCV-3-115B open.
		2. Corrective actions: b. Start any available charging pump to re-establish charging flow AND seal injection.
	RO	Manually starts the 3A or 3B Charging Pump.
		2. Corrective actions: c. Place C pump switch to STOP AND DO NOT restart.
	RO	Places 3C Charging Pump handswitch to STOP.
	SRO	2. Corrective actions: d. Refer to Tech Spec 3.1.2.1; 3.1.2.2; and 3.1.2.3 e. Refer to 3-ONOP-047.1, Loss of Charging Flow in Modes 1 through 4.
	SRO	Refers to 3-ONOP-047.1, Loss of Charging Flow in Modes 1 through 4.
		Examiner note: When the crew has started a Charging Pump, proceed to Event 3--3AD06 Opens

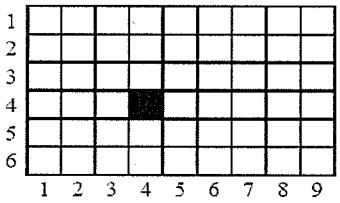
Op-Test No.: 2010-301 Scenario No.: 1 Event No.: 2 Page 2 of 2

Event Description: Charging pump 3C breaker trips, the crew will respond using the ARP or 3-ONOP-47.1 and start another Charging Pump.

Time	Position	Applicant's Actions or Behavior
		NOTE *A plant shutdown using either 3-ONOP-100 or 3-GOP-103 is not desired with a loss of charging because of the high potential of being in an at-power RIL Lo-Lo rod insertion unanalyzed condition.*
		1 Check Any Charging Pumps Running Perform the following to start a charging pump: a. Verify VCT level, LT-3-115, greater than 4% AND LCV-3-115C open. 1) IF unable to open LCV-3-115C, THEN open LCV-3-115B. 2) IF unable to open LCV-3-115B, THEN locally open 3-358, RWST Emer Makeup to Chrg Pumps LCV-3-115B Bypass. 3) IF there is a problem with the VCT level control system, THEN refer to 3-ONOP-046.4, Malfunction of Boron Concentration Control System. b. Verify open Charging Flow to Regen Hx, HCV-3-121. c. Verify open Loop A Charging Isolation, CV-3-310A. d. Start functional charging pumps as necessary to restore pressurizer level. e. Adjust charging pump speed controllers to restore pressurizer level to program. f. Go to Step 3.
	RO	Manually starts the 3A or 3B Charging Pump.
		3 Check Charging Flow Established a. Verify normal expected flow on FI-3-122A, Charging Line Flow
		Examiner note: When the crew has started a Charging Pump, proceed to Event 3—3AD06 Opens

Op-Test No.: 2010-301 Scenario No.: 1 Event No.: 3 Page 1 of 4

Event Description: Breaker 3AD06 opens resulting in a loss of power to the 3D 4kv bus. The crew will respond using 3-ONOP-4.5 to energize 3D 4kv bus from the 3A 4kv bus. The SRO will enter LCO 3.7.3.a Action a.

Time	Position	Applicant's Actions or Behavior
Direct facility operator to trigger lesson step "EVENT 3 - 3AD06 OPENS" (actuates TFE2D22T T).		
		 Page 22 of 54 Panel I ICW HEADER A/B LO PRESS
	BOP	Observes 3C ICW pump not running Observes breaker 3AD06 OPEN
	RO	Observes annunciator I-4/4
	BOP	OPERATOR ACTIONS: 1. Verify alarm by checking the following: a. Check ICW header pressure indicators, PI-3-1619 and/or -1620 less than or equal to 10 PSIG. (VPA) b. **IF** operating a single ICW Pump, **THEN** verify total ICW flow is less than 19,000 gpm.
	BOP	2. Corrective actions: a. Start the standby ICW pump using 3-NOP-019, Intake Cooling Water System. Manually starts the 3B ICW pump.
	BOP	2. Corrective actions: b. Locally check ICW piping **AND** heat exchangers for leaks.
	SRO	2. Corrective actions: c. Refer to 3-ONOP-019, Intake Cooling Water Malfunction.

Op-Test No.: 2010-301 Scenario No.: 1 Event No.: 3 Page 2 of 4

Event Description: Breaker 3AD06 opens resulting in a loss of power to the 3D 4kv bus. The crew will respond using 3-ONOP-4.5 or 3-OP-005 to energize 3D 4kv bus from the 3A 4kv bus. The SRO will enter LCO 3.7.3.a Action a

Time	Position	Applicant's Actions or Behavior
	BOP	**1** **Check 3D 4KV Bus Lockout Relay - RESET** Perform the following: a. Direct Electrical Maintenance to determine and correct cause of lockout relay actuation. b. **WHEN** cause of 3D 4KV bus lockout relay actuation has been determined and corrected, **THEN** reset lockout relay. c. **WHEN** 3D 4KV bus lockout relay has been reset, **THEN** OBSERVE NOTE PRIOR TO STEP 2 and go to Step 2.
		NOTE *Efforts to re-energize 3A and 3B 4KV buses may restore power to 3D 4KV bus. If the 3D 4KV bus will be used to re-energize 3A or 3B 4KV bus using station blackout tie line, the remainder of this procedure shall not be used.*
	BOP	**2** **Check 3A And 3B 4KV Buses – AT LEAST ONE ENERGIZED** Perform the following: a. Try to re-energize 3A 4KV bus using 3-ONOP-004.2, LOSS OF 3A 4KV BUS. b. Try to re-energize 3B 4KV bus using 3-ONOP-004.3, LOSS OF 3B 4KV BUS. c. Continue with procedure and step in effect.
	BOP	**3** **Disconnect Loads From 3D 4KV Bus** a. Verify 3C Intake Cooling Water Pump breaker, 3AD05 - OPEN b. Verify 3C Component Cooling Water Pump breaker, 3AD04 – OPEN

Op-Test No.: 2010-301 Scenario No.: 1 Event No.: 3 Page 3 of 4

Event Description: Breaker 3AD06 opens resulting in a loss of power to the 3D 4kv bus. The crew will respond using 3-ONOP-4.5 to energize 3D 4kv bus from the 3A 4kv bus. The SRO will enter LCO 3.7.3.a Action a

Time	Position	Applicant's Actions or Behavior
	BOP	**4** **Determine Source Of Power For 3D 4KV Bus** a. Check 3A and 3B 4KV buses - BOTH ENERGIZED a. Perform the following: 1) **IF** 3A 4KV bus is energized, **THEN** go to Step 5. 2) **IF** 3B 4KV bus is energized, **THEN** go to Step 7. b. Consult with Nuclear Plant Supervisor to determine desired source of power for 3D 4KV bus: * 3A 4KV bus **OR** * 3B 4KV bus c. Check desired source of power for 3D 4KV bus - 3A 4KV bus c. Go to Step 7.
	BOP	**5** **Re-energize 3D 4KV Bus From 3A 4KV Bus** Go to Step 7. a. Open Feeder To 4KV Bus 3D, 3AB19 b. Open Supply From 4KV Bus 3B, 3AD06 c. Close Supply From 4KV Bus 3A, 3AD01 d. Close Feeder To 4KV Bus 3D, 3AA17
	BOP	Performs actions to energize the 3D 4kv Bus from the 3 A 4kv Bus
	SRO	**6** **Go To Step 8**
	SRO	**8** **Verify 3D 4KV Bus - ALIGNED TO AN ENERGIZED BUS** * 3A 4KV bus **OR** * 3B 4KV bus Perform the following: a. Notify Nuclear Plant Supervisor that 3D 4KV bus cannot be re-energized. b. Continue efforts to re-energize 3D 4KV bus from one of the following: * 3A 4KV bus using Step 5 * 3B 4KV bus using Step 7 c. **WHEN** 3D 4KV bus has been re-energized, **THEN** do Steps 9 and 10. d. Continue with procedure and step in effect.
	SRO	Refers to Tech Specs and determines entry into LCO 3.7.2.a Action a and LCO 3.7.3.a Action a are required.

Op-Test No.: 2010-301 Scenario No.: 1 Event No.: 3 Page 4 of 4

Event Description: Breaker 3AD06 opens resulting in a loss of power to the 3D 4kv bus. The crew will respond using 3-ONOP-4.5 to energize 3D 4kv bus from the 3A 4kv bus. The SRO will enter LCO 3.7.3.a Action a

Time	Position	Applicant's Actions or Behavior
		Examiner Note: TS LCO and Action for the loss of 3D 4kv Bus
		3.7.2 The Component Cooling Water System (CCW) shall be OPERABLE with: a. Three CCW pumps, and 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.
		3.7.3 The Intake Cooling Water System (ICW) shall be OPERABLE with: a. Three ICW pumps, and APPLICABILITY: MODES 1, 2, 3, and 4. ACTION: a. With only two ICW pumps with independent power supplies OPERABLE, restore the inoperable ICW pump to OPERABLE status within 14 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.
		EXAMINER NOTE: Proceed to EVENT 4-B HDT LCV CV-3-1510B fails open.

Op-Test No.: 2010-301 Scenario No.: 1 Event No.: 4 Page 1 of 2

Event Description: The B Heater Drain Tank High Level Control Valve, CV-3-1510B Fails Open, the crew will reduce power to restore Feed Pump suction pressure to normal using 3-ONOP-100

Time	Position	Applicant's Actions or Behavior
Direct facility operator to trigger lesson step "EVENT 4 - CV-3-1510B Fails Open" (actuates TFL10201 =T)		
		D23 SGFP A SUCTION LO PRESS CAUSES: 1. High strainer ΔP on feed train components 2. Heater drain pump(s) tripped 3. Condensate pump tripped
	BOP	Observes annunciator D 5/3, 6/3, 9/6, and 7/4
	BOP	OPERATOR ACTIONS: 1. Verify alarm by checking feed pump suction pressure PI-3-1627 on console. 2. Verify automatic actions have occurred: a. IF SGFP suction pressure is less than 220 psig, THEN verify Low Pressure Heater Bypass CV-3-2011 - OPEN.
	BOP	3. Corrective actions: a. Start a standby condensate pump.
	BOP	Attempts to start the 3C Condensate pump.
	BOP	b. IF feed pump suction pressure is less than 260 psig, THEN reduce power to reset alarm using 3-ONOP-100, FAST LOAD REDUCTION.
		D34 LP HEATER BYPASS OPEN CAUSES: 1. Low feed pump suction pressure 2. Fast load reduction 3. CV-3-2011 malfunction 4. PT-3-1604 failed low
		CAUTIONS • *Reactor power may increase due to the positive reactivity addition of colder feedwater into the Steam Generators.* • *Reactor power indication may be lower than actual power due to lower Tavg.*
	BOP	OPERATOR ACTIONS: 1. Verify alarm by checking LP Heaters Bypass CV-3-2011 indication. 2. Verify automatic actions have occurred - None.

Op-Test No.: 2010-301 Scenario No.: 1 Event No.: 4 Page 2 of 2

Event Description: The B Heater Drain Tank High Level Control Valve, CV-3-1510B Fails Open, the crew will reduce power to restore Feed Pump suction pressure to normal using 3-ONOP-100

Time	Position	Applicant's Actions or Behavior
	BOP	3. Corrective actions: a. Maintain reactor power less than 100 percent.
	BOP	Lowers Main Turbine load to maintain reactor power less than 100%
	BOP	3. Corrective actions: b. IF feed pump suction pressure is less than 260 psig, THEN perform the following: (1) Start a standby condensate pump. (2) IF feed pump suction pressure remains less than 260 psig, THEN reduce power to restore suction pressure using 3-ONOP-100. FAST LOAD REDUCTION.
	BOP	Starts the 3C Condensate pump.

Op-Test No.: 2010-301 Scenario No.: 1 Event No.: 5 Page 1 of 2

Event Description: The control rods continuously insert during the downpower, the crew will enter 3-ONOP-28 and place rod control in MANUAL.

Time	Position	Applicant's Actions or Behavior
Direct facility operator to ensure lesson step "EVENT 5 - Control Rods Continuous Insertion (actuates TFL10201 T)**, actuates**		
	RO	Observes continuous control rod auto insertion with no demand present.
	BOP	Observes annunciator B 8/1
		B8 ROD BANK A/B/C/D LO LIMIT CAUSES: 1. Control bank A or B below 223 steps 2. Control bank C inserted to within 10 steps of its respective extra low limit 3. Control bank D inserted to within 20 steps of its respective extra low limit
		OPERATOR ACTIONS: NOTE *Normal alarm during reactor startup or shutdown when rods are below the lo insertion limit.* 1. Verify alarm by checking the following: a. Control Rod Position - Insertion Limit recorders (VPA) b. RPI and stepcounters on console. 2. Corrective Actions: a. Stop driving control rods in and perform normal boration restore the rods back above the low limit.
	RO	Places Rod Motion Control Selector to MAN
	RO	Initiates normal boration and restore the rods back above the low limit as required. May withdraw rods in manual to restore rods above the low limit.
	RO	2. Corrective Actions: c. Check for possible inadvertent dilution due to valve misalignment in CVCS system d. IF control rod malfunction, THEN refer to 3-ONOP-028, Reactor Control System Malfunction, 3-ONOP-028.1, RCC Misalignment, 3-ONOP-028.2, RCC Position Indication Malfunction, OR 3-ONOP-028.3, Dropped RCC, as appropriate.
	SRO	Directs response using 3-ONOP-028.

Op-Test No.: 2010-301 Scenario No.: 1 Event No.: 5 Page 2 of 2

Event Description: The control rods continuously insert during the downpower, the crew will enter 3-ONOP-28 and place rod control in MANUAL.

Time	Position	Applicant's Actions or Behavior
	RO	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.
	RO	Places Rod Motion Control Selector to MAN
	RO	Observes continuous control rod auto insertion has stopped.
	RO	5.0 **SUBSEQUENT ACTIONS** 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. 5.3.3 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.
	RO	Positions Control Rods as directed to restore RCS Temperature.
		EXAMINER NOTE: Proceed to Event 6-3B RCP #1 Seal Failure

Op-Test No.: 2010-301 Scenario No.: 1 Event No.: 6 Page 1 of 10

Event Description: 3B RCP #1 seal failure gradually develops, the crew enters 3-ONOP 41.1 and subsequently to 3-ONOP-100 which will initiate a boration and reduce turbine load.

Time	Position	Applicant's Actions or Behavior
Direct facility operator to trigger lesson step, EVENT 6 – 3B RCP #1 seal failure. (actuates TVHNL1B = 8.7 e-04 3 min ramp)		
	RO	Notes increasing trend on FR-3-154A
	BOP	Verifies alarm A 1/5 and 6/5
		CAUTION *Containment entries shall NOT be performed when there are indications of an RCP seal package failure until the reactor is shutdown and RCS pressure/temperature is reduced to minimize leakage.*
		NOTES • *Foldout Page is required to be monitored throughout this procedure.* • *Off-normal RCP Conditions that require shutdown of a RCP shall be verified by cross-checking all RCP parameters.* • *If either 3B or 3C RCPs are stopped by the performance of this procedure, then the associated RCS loop pressurizer spray valve should be closed to prevent back-flow through the valve.*
	SRO	Directs response using 3-ONOP-041.1.
	CREW	Reviews 3-ONOP-041.1 foldout page actions (see next page)
	RO	1 **Check For Proper Seal Injection Flow** Go to Step 14 • RCP 3A Thermal Barrier ΔP, PI-3-131A - GREATER THAN ZERO INCHES • RCP 3B Thermal Barrier ΔP, PI-3-128A - GREATER THAN ZERO INCHES • RCP 3C Thermal Barrier ΔP, PI-3-125A - GREATER THAN ZERO INCHES • Local Seal Injection Flow Indication - GREATER THAN OR EQUAL TO 6 GPM ON ALL RCPs • ERDADS Seal Injection Flow Indication - GREATER THAN OR EQUAL TO 6 GPM ON ALL RCPs

Event Description: 3B RCP #1 seal failure gradually develops, the crew enters 3-ONOP 41.1 and subsequently to 3-ONOP-100 which will initiate a boration and reduce turbine load.

Time	Position	Applicant's Actions or Behavior

FOLDOUT PAGE FOR PROCEDURE 3-ONOP-041.1

1. **RCP Vibration Assessment Criteria**

   IF motor frame vibration, R-369 (Points 2, 6, 10) is greater than or equal to 3 mils but less than 5 mils, **THEN** contact Engineering to evaluate the condition.

2. **RCP STOPPING CRITERIA**

   IF any of the following RCP limits are reached, **THEN** manually trip the reactor, verify reactor trip using the EOP network **AND** stop the affected RCP.

   - RCP number one seal ΔP - LESS THAN 200 psid.
   - RCP number one seal leakoff temperatures on ERDADS - GREATER THAN OR EQUAL TO 235°F.
   - RCP pump bearing temperature on ERDADS - GREATER THAN OR EQUAL TO 225°F.
   - RCP motor bearing temperature on ERDADS - GREATER THAN OR EQUAL TO 195°F.
   - RCP stator winding temperature on ERDADS - GREATER THAN OR EQUAL TO 248°F Note exception in Foldout Page Item 4.
   - Motor frame vibration, R-369 (Points 2, 6, 10) - GREATER THAN OR EQUAL TO 5 MILS Note exception in Foldout Page Item 4.
   - RCP shaft vibration, R-369 (Points 3, 7, 11) - GREATER THAN OR EQUAL TO 20 MILS Note exception in Foldout Page Item 4.

3. **RCP SEAL CRITERIA FOR STOPPING RCP**

   WHEN the RCP number one seal leakoff flow exceeds 6 gpm, **THEN** perform the following:

   a. Trip the reactor **AND** verify the reactor tripped using the EOP network.

   b. Stop the affected RCP.

   c. Close the applicable RCP Seal Leakoff Isolation Valve 303A, 303B, or 303C.

4. **EXCEEDING VIBRATION OR STATOR TEMPERATURE LIMITS**

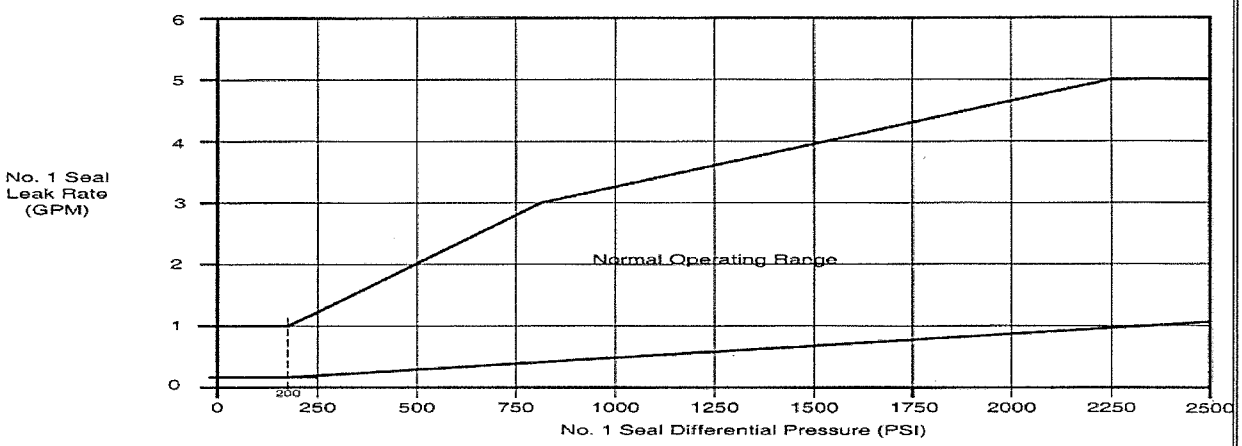
   For the basis of obtaining data for startup, for balancing an RCP, or for shutdown operations; the Electrical Maintenance Supervisor or Component Engineering Supervisor may authorize continued RCP operations with vibration level or stator winding temperature above stopping criteria noted in Foldout Page Item 2. This authorization is required to be obtained prior to starting the RCP.

Op-Test No.: 2010-301 Scenario No.: 1 Event No.: 6 Page 3 of 10

Event Description: 3B RCP #1 seal failure gradually develops, the crew enters 3-ONOP 41.1 and subsequently to 3-ONOP-100 which will initiate a boration and reduce turbine load.

Time	Position	Applicant's Actions or Behavior
	RO	**2** **Check Number One Seal Leakoff Flow Within Limits Of Enclosure 1** — Observe NOTE prior to Step 16 **AND** go to Step 16.

ENCLOSURE 1
(Page 1 of 1)
NUMBER ONE SEAL LEAKOFF



	RO	Verifies 3B #1 seal leakoff is NOT within the upper limit of enclosure 1.
	SRO	Goes to step 16
		NOTE *An RCP STANDPIPE HI LEVEL alarm is indication of 0.5 gpm flow past the number two seal.*
	RO	**16** **Check If Any RCP Number One Seal Leak-off Flow(s), FR-3-154A - GREATER THAN UPPER LIMIT OF ENCLOSURE 1** — Go to Step 21
	SRO	Determines 3B RCP #1 Seal Leakoff flow is greater than 5.5

Op-Test No.: 2010-301 Scenario No.: 1 Event No.: 6 Page 4 of 10

Event Description: 3B RCP #1 seal failure gradually develops, the crew enters 3-ONOP 41.1 and subsequently to 3-ONOP-100 which will initiate a boration and reduce turbine load.

Time	Position	Applicant's Actions or Behavior
	RO	**17** Check RCP Seal Bypass Valve CV-3-307 - CLOSED Perform the following: a. Manually close CV-3-307 b. Check for corresponding decrease in thermal barrier ΔP c. Perform cross check of all RCP parameters to determine cause of high leakoff flow d. Request diagnostic assistance from the System Engineer AND Operations Supervision
	RO	**18** Check All RCP Number One Seal Leak-Off Flows On FR-3-154A – LESS THAN 6 GPM Perform the following: a. Manually trip the reactor AND perform 3-EOP-E-0, REACTOR TRIP OR SAFETY INJECTION, while continuing with this procedure. b. WHEN the reactor verified tripped, THEN stop the affected RCP(s) c. Close affected RCP Seal Leakoff valve(s) after the pump has stopped: * CV-3-303A for RCP A * CV-3-303B for RCP B * CV-3-303C for RCP C d. Monitor RCDT level for indication of number two seal failure. e. DO NOT restart the affected RCP until the cause of the seal malfunction has been determined AND corrected. f. Return to Step 3.
	SRO	Determines 3B RCP #1 Seal Leakoff flow is less than 6 gpm.

Op-Test No.: 2010-301 Scenario No.: 1 Event No.: 6 Page 5 of 10

Event Description: 3B RCP #1 seal failure gradually develops, the crew enters 3-ONOP 41.1 and subsequently to 3-ONOP-100 which will initiate a boration and reduce turbine load.

Time	Position	Applicant's Actions or Behavior
		19 Check All RCP Number One Seal Leak-Off Flows On FR-3-154A a. RCP number one seal leak-off flow - LESS THAN OR EQUAL TO 5.5 GPM a. Perform the following: 1) Commence unit shutdown using 3-ONOP-100, FAST LOAD REDUCTION. 2) WHEN turbine tripped, THEN trip the reactor. 3) WHEN the reactor is tripped, THEN stop affected RCP(s). 4) Go to Step 19c.
	SRO	Determines 3B RCP #1 Seal Leakoff flow is less than 6 gpm and greater than 5.5 gpm.
	SRO	Transitions to 3-ONOP-100

Op-Test No.: 2010-301 Scenario No.: 1 Event No.: 6 Page 6 of 10

Event Description: 3B RCP #1 seal failure gradually develops, the crew enters 3-ONOP 41.1 and subsequently to 3-ONOP-100 which will initiate a boration and reduce turbine load.

Time	Position	Applicant's Actions or Behavior
	SRO	Conducts a crew brief to conduct a power reduction, to trip the reactor and trip 3B RCP.
	SRO	Directs response using 3-ONOP-100.
	SRO	**1** **Brief Control Room Personnel Using Attachment 3** (See page 10 for briefing sheet)
	CREW	Reviews 3-ONOP-100 foldout page actions (see next page)
	SRO	Determines 18 gal/% boric acid addition is required approximately 1800 gallons total..Boration rate is approximately 36 gpm.
	RO	**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.
	CREW	**3** **Notify The Following** • System Dispatcher • Plant personnel using the Page Boost
	RO BOP 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.

Op-Test No.: 2010-301 Scenario No.: 1 Event No.: 6 Page 7 of 10

Event Description: 3B RCP #1 seal failure gradually develops, the crew enters 3-ONOP 41.1 and subsequently to 3-ONOP-100 which will initiate a boration and reduce turbine load.

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.: 2010-301 Scenario No.: 1 Event No.: 6 Page 8 of 10

Event Description: 3B RCP #1 seal failure gradually develops, the crew enters 3-ONOP 41.1 and subsequently to 3-ONOP-100 which will initiate a boration and reduce turbine load.

Time	Position	Applicant's Actions or Behavior
	RO	**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.
	CREW	**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
		NOTE *Axial flux difference is allowed to exceed the Target Band during the load reduction without entering 0-OP-059.9, Operation Within the Axial Flux Difference Operational Space.*
	RO	**7** **Check Plant Response** a. Check pressurizer level following program a. IF directed by the Unit Supervisor, THEN increase charging flow as follows: 1) Throttle open TCV-144, NRHX Temp Control Valve, bypass valve 3-834 to raise flow to approximately 600 gpm. 2) Start an additional charging pump. 3) Place an additional letdown orifice in service. 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.
	RO	**8** **Energize Pressurizer Backup Heaters**
	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
		Examiner Note: The SRO may implement the following steps.

Op-Test No.: 2010-301 Scenario No.: 1 Event No.: 6 Page 9 of 10

Event Description: 3B RCP #1 seal failure gradually develops, the crew enters 3-ONOP 41.1 and subsequently to 3-ONOP-100 which will initiate a boration and reduce turbine load.

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 7-Loss of All AC-ECA-0.0

Op-Test No.: 2010-301 Scenario No.: 1 Event No.: 1 Page 10 of 10

Event Description: 3B RCP #1 seal failure gradually develops, the crew enters 3-ONOP 41.1 and subsequently to 3-ONOP-100 which will initiate a boration and reduce turbine load.

ATTACHMENT 3
(Page 1 of 1)

FAST LOAD REDUCTION BRIEF

1. Reason for load reduction _____

2. Target power level _____ % Power

Time to Shutdown from 100%	25 min	50 min	75 min	110 min
Load Reduction Rate MW/min	30 MW/min	15 MW/min	10 MW/min	7 MW/min
Load Reduction Rate %/min	4 % / min	2 % / min	1.33 % / min	1 % / min
Expected Tavg/Tref ΔT	4 °F	3 °F	2 °F	1 °F

3. Load reduction rate _____ Mw / minute

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.

5. Plant Control Parameters and Contingency Actions
   - Tavg / Tref expected ΔT band, not to exceed ±1 °F of expected, slow ramp to restore band.
   - If Annunciator B 8/1, ROD BANK LO LIMIT alarms, the load reduction shall be slowed.

6. EOP E-0 transition criteria – Manual reactor and turbine trip:

   - Tave > 578 °F
   - Tave 6 °F > Tref
   - Rod Insertion Limits (RIL) are exceeded

7. Review required actions from other procedures currently in effect (example, stop RCP).

8. Questions or crew input?

9. End of Brief

Op-Test No.: 2010-301 Scenario No.: 1 Event No.: 7 Page 1 of 11

Event Description: A grid disturbance causes a loss of power to the switchyard. The crew responds using 3-EOP-E-0, the 3A EDG will fail to start, 3B EDG starts but the output breaker fails to close. The Main Turbine fails to trip, the crew will manually trip the Main Turbine. The crew transitions to 3-EOP-ECA-0.0 to recover electrical power by closing the B EDG output breaker.

Time	Position	Applicant's Actions or Behavior
Direct facility operator to trigger lesson step EVENT 7 LOSS OF ALL AC (actuates TFP8SWYD = T TFQ5GAFS = T TFQ5B20A = TTFG1B86S = T)		
	SRO	Directs response using 3-EOP-E-0
		NOTE *Steps 1 through 4 are IMMEDIATE ACTION steps.*
	RO	**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.
	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).
	BOP	Manually Trips the Main Turbine or closes MSIV's
		CREW CRITICAL TASK: Manually trip the Main Turbine or close all MSIV's prior to the completion of 3-EOP-E-0 step 2.

Op-Test No.: 2010-301 Scenario No.: 1 Event No.: 7 Page 2 of 11

Event Description: A grid disturbance causes a loss of power to the switchyard. The crew responds using 3-EOP-E-0, the 3A EDG will fail to start, 3B EDG starts but the output breaker fails to close. The Main Turbine fails to trip; the crew will manually trip the Main Turbine. The crew transitions to 3-EOP-ECA-0.0 to recover electrical power by closing the B EDG output breaker.

Time	Position	Applicant's Actions or Behavior
	BOP	Manually closes MSR steam supply stop MOVs
	BOP	If offsite power is lost before verification of MSR steam supply stop MOVs is complete, places 3A, 3B and 3C MSIVs PV-3-2604, PV-3-2605, and PV-3-2606 to CLOSE
	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.
	BOP	Determines the 3B EDG is running with the output breaker open
	BOP	Reports 3A and 3B 4kv busses are DE-ENERGIZED
	SRO	Transitions to 3-EOP-ECA-0.0

Op-Test No.: 2010-301 Scenario No.: 1 Event No.: 7 Page 3 of 11

Event Description: A grid disturbance causes a loss of power to the switchyard. The crew responds using 3-EOP-E-0, the 3A EDG will fail to start, 3B EDG starts but the output breaker fails to close. The Main Turbine fails to trip, the crew will manually trip the Main Turbine. The crew transitions to 3-EOP-ECA-0.0 to recover electrical power by closing the B EDG output breaker.

Time	Position	Applicant's Actions or Behavior
	SRO	Directs response using 3-EOP-ECA-0.0
		NOTE • *Steps 1 and 2 are IMMEDIATE ACTION steps.* • *CSF Status Trees are required to be monitored for information only. FRPs shall NOT be implemented.*
	RO	1 **Verify Reactor Trip** Manually trip reactor. • Rod bottom lights – ON • Reactor trip and bypass breakers – OPEN • Rod position indicators – AT ZERO • Neutron flux - DECREASING

Op-Test No.: 2010-301 Scenario No.: 1 Event No.: 7 Page 4 of 11

Event Description: A grid disturbance causes a loss of power to the switchyard. The crew responds using 3-EOP-E-0, the 3A EDG will fail to start, 3B EDG starts but the output breaker fails to close. The Main Turbine fails to trip, the crew will manually trip the Main Turbine. The crew transitions to 3-EOP-ECA-0.0 to recover electrical power by closing the B EDG output breaker.

Time	Position	Applicant's Actions or Behavior
	BOP	**2 Verify Turbine Trip** a. All turbine stop valves - CLOSED a. Manually trip turbine. IF turbine will NOT trip, THEN close main steamline isolation and bypass valves. b. Verify Moisture Separator Reheater Steam Valves - CLOSED • MSR Main Steam Supply Stop MOVs • Reheater Timing Valves • MSR Purge Steam Valves b. Manually close valves. IF any valve can NOT be closed, THEN close main steam isolation and bypass valves. c. Mid and East GCBs - OPEN (Normally 30 seconds delay) c. WHEN approximately one minute has elapsed, THEN verify Mid and East GCBs – OPEN. 1) IF breakers do NOT open, THEN actuate EMERGENCY GEN. BKR. TRIP SWITCH for the affected breaker(s). 2) IF breaker position indication is NOT available AND turbine speed is NOT decreasing, THEN direct Turbine Operator to perform the following: a) Obtain key 17 from Shift Manager key locker. b) Locally trip Mid and East GCBs from the switchyard. • 8W33 • 8W68
	RO	**3 Check If RCS Is Isolated** a. PRZ PORVs – CLOSED a. IF PRZ pressure less than 2335 psig, THEN manually close PORVs. b. Letdown isolation valves - CLOSED b. Manually close valves. c. 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 c. Manually close valves.
	RO	Places Letdown Orifice Stop valve handswitches CV-3-200A, CV-3-200B and CV-3-200C to CLOSE.

Op-Test No.: 2010-301 Scenario No.: 1 Event No.: 7 Page 5 of 11

Event Description: A grid disturbance causes a loss of power to the switchyard. The crew responds using 3-EOP-E-0, the 3A EDG will fail to start, 3B EDG starts but the output breaker fails to close. The Main Turbine fails to trip; the crew will manually trip the Main Turbine. The crew transitions to 3-EOP-ECA-0.0 to recover electrical power by closing the B EDG output breaker.

Time	Position	Applicant's Actions or Behavior
	RO	**4** **Verify Proper AFW Flow** a. Check AFW pumps - AT LEAST TWO RUNNING a. IF both units require AFW, THEN perform the following: 1) Establish 270 gpm flow to each unit. 2) Use a setpoint of 270 gpm for required AFW flow instead of the 345 gpm specified in subsequent steps AND procedures. b. Verify total AFW flow – GREATER THAN 345 GPM b. Perform the following: 1) Verify AFW pump running. IF AFW pump NOT running, THEN manually open steam supply valves. 2) Verify proper alignment of AFW valves. IF alignment NOT proper, THEN manually align valves as necessary to establish proper lineup. 3) IF AFW can NOT be established, THEN restore AFW using 3-ONOP-075, AUXILIARY FEEDWATER SYSTEM MALFUNCTION, while continuing with Step 5.
		CAUTIONS • *If SI has been reset or SI actuation occurs on the other unit, safeguards equipment needs to be restored to the required configuration.* • *If an SI signal exists or is actuated during this procedure, it must be reset to ensure restoration of a power source and to ensure controlled loading of equipment on the 4KV Bus.*
		NOTES • *Attachment 5 provides a reference for Emergency Diesel Generator loads.* • *If a Sequencer failure has occurred and SI has actuated, the associated EDG output breaker may not close unless SI is reset.*

Op-Test No.: 2010-301 Scenario No.: 1 Event No.: 7 Page 6 of 11

Event Description: A grid disturbance causes a loss of power to the switchyard. The crew responds using 3-EOP-E-0, the 3A EDG will fail to start, 3B EDG starts but the output breaker fails to close. The Main Turbine fails to trip; the crew will manually trip the Main Turbine. The crew transitions to 3-EOP-ECA-0.0 to recover electrical power by closing the B EDG output breaker.

Time	Position	Applicant's Actions or Behavior
	BOP RO BOP RO	**5** **Verify 4KV Bus Stripping** a. Verify 4KV bus stripping using ATTACHMENTS 1 and 2 b. Verify SI - RESET c. Check the A and B 4KV buses - AT LEAST ONE ENERGIZED — c. Go to Step 6. d. Verify required safeguards equipment - OPERATING — d. Manually start equipment as required. e. Check if 3-EOP-F-0, CRITICAL SAFETY FUNCTION STATUS TREES being monitored FOR INFORMATION ONLY prior to entering 3-EOP-ECA-0.0, LOSS OF ALL AC POWER — e. Implement FRPs as required, unless this procedure was directly entered from outside the EOP network. f. Return to procedure <u>AND</u> step in effect
		EXAMINER NOTE: The SRO will probably choose to implement Attachment 2 for expediency since the 3B EDG is running. Either attachment is acceptable. See the following two pages for ATTACHMENTS 1 and 2

Op-Test No.: 2010-301 Scenario No.: 1 Event No.: 7 Page 7 of 11

Event Description: A grid disturbance causes a loss of power to the switchyard. The crew responds using 3-EOP-E-0, the 3A EDG will fail to start, 3B EDG starts but the output breaker fails to close. The Main Turbine fails to trip; the crew will manually trip the Main Turbine. The crew transitions to 3-EOP-ECA-0.0 to recover electrical power by closing the B EDG output breaker.

Time	Position	Applicant's Actions or Behavior
	BOP	Attachment 1 **3A 4KV BUS STRIPPING** 1. IF 3A 4KV Bus is de-energized AND 3D 4KV Bus is aligned to 3A 4KV Bus, THEN verify the Station Blackout Tie Permissive Blue light is ON AND 4AD07 OPEN. 2. IF 3A 4KV Bus is de-energized AND 3D 4KV Bus is NOT aligned to 3A 4KV Bus OR Station Blackout Tie Permissive Blue Light is OFF, THEN verify the following breakers open: • 3AA22, 3A 4KV Bus Emergency Tie To Unit 4 Startup Transformer • 3AA09, 3A 4KV Bus Tie To 3B Or 3C 4KV Bus • 3AA05, Startup Transformer 3A 4KV Bus Supply • 3AA02, Auxiliary Transformer 3A Bus Supply • 3AA03, Steam Generator Feed Pump 3A • 3AA07, Heater Drain Pump 3A • 3AA21, Condensate Pump 3A • 3AA13, Safety Injection Pump 3A • 3AA15, Residual Heat Removal Pump 3A • 3AA12, Component Cooling Water Pump 3A • 3AA01, Reactor Coolant Pump 3A • 3AA19, Intake Cooling Water Pump 3A • 3AA11, Turbine Plant Cooling Water Pump 3A • 3AA16, Circulating Water Pump 3A1 • 3AA18, Circulating Water Pump 3A2 • 3AA08, 3A Load Center • 3AA14, 3C Load Center 3. IF Supply From 4KV Bus 3A, 3AD01, is open, THEN verify Feeder To 4KV Bus 3D, 3AA17, is open. 4. IF Supply From 4KV Bus 3A, 3AD01, is closed, THEN perform the following: a. IF Station Blackout Breaker, 3AD07, is closed, THEN perform the following: 1) Open Station Blackout Breaker, 3AD07. 2) Direct Unit 4 Reactor Operator to open Station Blackout Breaker, 4AD07. b. Verify breaker for Intake Cooling Water Pump 3C, 3AD05, is open. c. Verify breaker for Component Cooling Water Pump 3C, 3AD04, is open. d. IF breaker for Intake Cooling Water Pump 3C, 3AD05, OR breaker for Component Cooling Water Pump 3C, 3AD04, can NOT be opened, THEN open Feeder To 4KV Bus 3D, 3AA17, AND Supply From 4KV-Bus 3A, 3AD01. 5. Notify Unit 3 Reactor Operator that 3A 4KV bus stripping is complete.
	BOP	Verifies SBO tie Blue permissive light is ON
	BOP	Verifies 3C ICW and 3C CCW pump breakers are OPEN, as required.

Op-Test No.: 2010-301 Scenario No.: 1 Event No.: 7 Page 8 of 11

Event Description: A grid disturbance causes a loss of power to the switchyard. The crew responds using 3-EOP-E-0, the 3A EDG will fail to start, 3B EDG starts but the output breaker fails to close. The Main Turbine fails to trip; the crew will manually trip the Main Turbine. The crew transitions to 3-EOP-ECA-0.0 to recover electrical power by closing the B EDG output breaker.

Time	Position	Applicant's Actions or Behavior
	BOP	Attachment 2 **3B 4KV BUS STRIPPING** 1. IF 3B 4KV Bus is de-energized AND 3D 4KV Bus is aligned to 3B 4KV Bus, THEN verify the Station Blackout Tie Permissive Blue light is ON AND 4AD07 OPEN. 2. IF 3B 4KV Bus is de-energized AND 3D 4KV Bus is NOT aligned to 3B 4KV Bus OR Station Blackout Tie Permissive Blue Light is OFF, THEN verify the following breakers open: • 3AB22, 3B 4KV Bus Tie To 3A Or 3C 4KV Bus • 3AB05, Startup Transformer 3B 4KV Bus Supply • 3AB02, Auxiliary Transformer 3B Bus Supply • 3AB10, Heater Drain Pump 3B • 3AB21, Condensate Pump 3B • 3AB12, Safety Injection Pump 3B • 3AB15, Residual Heat Removal Pump 3B • 3AB13, Component Cooling Water Pump 3B • 3AB01, Reactor Coolant Pump 3B • 3AB06, Reactor Coolant Pump 3C • 3AB17, Intake Cooling Water Pump 3B • 3AB11, Turbine Plant Cooling Water Pump 3B • 3AB16, Circulating Water Pump 3B1 • 3AB18, Circulating Water Pump 3B2 • 3AB09, 3B Load Center • 3AB14, 3D Load Center 3. IF Supply From 4KV Bus 3B, 3AD06, is open, THEN verify Feeder To 4KV Bus 3D, 3AB19, is open. 4. IF Supply From 4KV Bus 3B, 3AD06, is closed, THEN perform the following: a. IF Station Blackout Breaker, 3AD07, is closed, THEN perform the following: 1) Open Station Blackout Breaker, 3AD07. 2) Direct Unit 4 Reactor Operator to open Station Blackout Breaker, 4AD07. b. Verify breaker for Intake Cooling Water Pump 3C, 3AD05, is open. c. Verify breaker for Component Cooling Water Pump 3C, 3AD04, is open. d. IF breaker for Intake Cooling Water Pump 3C, 3AD05, OR breaker for Component Cooling Water Pump 3C, 3AD05, can NOT be opened, THEN open Feeder To 4KV Bus 3D, 3AB19, AND Supply From 4KV-Bus 3B, 3AD06. 5. Notify Unit 3 Reactor Operator that 3B 4KV bus stripping is complete.

Op-Test No.: 2010-301 Scenario No.: 1 Event No.: 7 Page 9 of 11

Event Description: A grid disturbance causes a loss of power to the switchyard. The crew responds using 3-EOP-E-0, the 3A EDG will fail to start, 3B EDG starts but the output breaker fails to close. The Main Turbine fails to trip; the crew will manually trip the Main Turbine. The crew transitions to 3-EOP-ECA-0.0 to recover electrical power by closing the B EDG output breaker.

Time	Position	Applicant's Actions or Behavior	
	RO/BOP	**6** **Verify The A And B 4KV Bus Lockout Relays – RESET**	Perform the following: a. Reset lockout relay(s). b. IF neither lockout relay can be reset, THEN go to Step 10.
	RO/BOP	**7** **Verify 3A And 3B Emergency Diesel Generator Lockout Relays - RESET**	Perform the following: a. Locally reset affected emergency diesel start failure relay by depressing the alarm reset pushbutton. b. Reset affected emergency diesel lockout relay. c. IF neither lockout relay can be reset, THEN go to Step 10.
	RO/BOP	Attempts to manually reset the 3A EDG LOCKOUT relay.	
	RO/BOP	**8** **Try To Reenergize The A 4KV Bus From 3A Emergency Diesel Generator**	
		a. Manually start 3A emergency diesel generator from Control Room * Emergency start OR * Rapid start OR * Normal start	a. Go to Step 9.
		b. Verify 3A 4KV bus stripping from ATTACHMENT 1 - COMPLETED	b. IF any load can NOT be disconnected from 3A 4KV bus, THEN go to Step 9.
		c. Verify SI – RESET	
		d. Manually synchronize 3A emergency diesel generator to 3A 4KV bus	d. Locally synchronize 3A emergency diesel generator to 3A 4KV bus using 3-ONOP-023.2, EMERGENCY DIESEL GENERATOR FAILURE, while continuing with Step 9

Op-Test No.: 2010-301 Scenario No.: 1 Event No.: 7 Page 10 of 11

Event Description: A grid disturbance causes a loss of power to the switchyard. The crew responds using 3-EOP-E-0, the 3A EDG will fail to start, 3B EDG starts but the output breaker fails to close. The Main Turbine fails to trip; the crew will manually trip the Main Turbine. The crew transitions to 3-EOP-ECA-0.0 to recover electrical power by closing the B EDG output breaker.

Time	Position	Applicant's Actions or Behavior
	RO/BOP	**9** **Try To Reenergize The B 4KV Bus From 3B Emergency Diesel Generator** a. Manually start 3B emergency diesel generator from Control Room — a. Go to Step 10. * Emergency start OR * Rapid start OR * Normal start b. Verify 3B 4KV bus stripping from ATTACHMENT 2 - COMPLETED — b. IF any load can NOT be disconnected from 3B 4KV bus, THEN go to Step 10. c. Verify SI - RESET d. Manually synchronize 3B emergency diesel generator to 3B 4KV bus — d. Locally synchronize 3B emergency diesel generator to 3B 4KV bus using 3-ONOP-023.2, EMERGENCY DIESEL GENERATOR FAILURE, while continuing with Step 10.
	RO/BOP	Manually synchronizes the 3B EDG to the 3B 4kv bus.
		CREW CRITICAL TASK: Energize the 3B 4KV bus from the 3B EDG before completing step 9 of 3-EOP-ECA-0.0.

Op-Test No.: 2010-301 Scenario No.: 1 Event No.: 7 Page 11 of 11

Event Description: A grid disturbance causes a loss of power to the switchyard. The crew responds using 3-EOP-E-0, the 3A EDG will fail to start, 3B EDG starts but the output breaker fails to close. The Main Turbine fails to trip; the crew will manually trip the Main Turbine. The crew transitions to 3-EOP-ECA-0.0 to recover electrical power by closing the B EDG output breaker.

Time	Position	Applicant's Actions or Behavior
	BOP	**10** **Check If AC Power Has Been Restored** a. Check the 3A and 3B 4KV buses - AT LEAST ONE ENERGIZED a. Perform the following: 1) Restore AC power using the following procedures: • 3-ONOP-004.2, LOSS OF 3A 4KV BUS • 3-ONOP-004.3, LOSS OF 3B 4KV BUS 2) **WHEN** power is restored to the 3A or 3B 4KV bus, **THEN** observe the CAUTIONS prior to Step 32 and go to Step 32 to perform recovery actions. 3) Observe CAUTION prior to Step 11 **AND** continue with Step 11.
	RO	b. Verify required safeguards equipment – OPERATING b. Manually start equipment as required. c. Check if 3-EOP-F-0, CRITICAL SAFETY FUNCTION STATUS TREES being monitored FOR INFORMATION ONLY prior to entering 3-EOP-ECA-0.0, LOSS OF ALL AC POWER c. Implement FRPs as required, unless this procedure was directly entered from outside the EOP network. d. Return to procedure **AND** step in effect
		EXAMINER NOTE: The scenario is terminated when power is restored to the 3B 4kv bus.

CREW CRITICAL TASK: CREW CRITICAL TASK: Manually trip the Main Turbine or close all MSIV's prior to the completion of 3-EOP-E-0, step 2.

CREW CRITICAL TASK: Energize the 3B 4KV bus from the 3B EDG before completing step 9 of 3-EOP-ECA-0.0.

Facility: Turkey Point Scenario No.: 2 Op Test No.: 2010-301

Examiners: _____ Candidates: _____ US

_____ _____ RO

_____ _____ BOP

Initial Conditions: Mode 1, 60% Power, 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.

Maintain 60% as directed by the System dispatcher.

Online risk – green

B train protected both units

Event No.		Event Type*	Event Description
1	TFK1WH26 T	(C) RO (C)SRO	FIC-3-626 fails high which results in MOV-3-626 closing and isolating cooling water flow to the RCPs The RO will open MOV-3-626 using the ARP or 3-ONOP-030, Component Cooling Water Malfunction.
2	TFS1MBWHT	(I) BOP (I) SRO (TS) SRO	3A S/G pressure transmitter PT-3-475 gradually fails high. The BOP controls 3A S/G level manually to maintain plant operation using the ARP and 3-ONOP-49.1. The SRO Enters LCO 3.3.1 Action 6 and 3.3.2 Action 15
3	TFLIC81=T	(C) RO (C) SRO	Aux Bldg A Exhaust Fan Trips, the RO responds to restore Aux Bldg HVAC using the ARP.
4	TFLISB31 =T	(TS) SRO (R) RO (N) BOP	Control Bank D rod (L5) drops into the core the SRO addresses LCO 3.1.1.1, 3.1.3.1, 3.1.3.6 and 3.2.4. The RO will initiate a boration and the BOP will reduce turbine load using 3-ONOP-100 in response to the dropped rod.
5	TVSBVL14 0.5 4 min ramp TFL3SIA2 T	(M) ALL	A Main Steam Line Leak upstream of the 3B MSIV inside containment begins and gradually degrades. The reactor trips and the crew responds using 3-EOP-E-0. During the performance of 3-EOP-E-0, the B Train of SI fails to actuate. The crew manually actuates to initiate Train B SI
5a	TFSWX6C=F	(C) BOP	Transition is made to 3-EOP-E-2, the 3B MSIV fails to auto close. The BOP will manually close 3B MSIV using 0-ADM-211 and isolate feed to the faulted S/G.
6			Once the 3B S/G has been isolated, the crew will transition to 3-EOP-E-1 and subsequently to 3-EOP-ES 1.1 to terminate SI.

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

Rec'd 8/23/10

2010-301 Scenario 2

Event 1 – FIC-3-626 fails high which results in MOV-3-626 closing and isolating cooling water flow to the RCPs The RO will open MOV-3-626 using the ARP or 3-ONOP-030, Component Cooling Water Malfunction.

Event 2 –3A S/G pressure transmitter PT-3-475 gradually fails high. The BOP manually controls 3A S/G level to maintain plant operation using the ARP and 3-ONOP-49.1. The SRO Enters LCO 3.3.1 Action 6 and 3.3.2 Action 15

Event 3 – Aux Bldg A Exhaust Fan Trips, the RO responds to restore Aux Bldg HVAC using the ARP.

Event 4 – Control Bank D rod (L5) drops into the core the SRO addresses LCO 3.1.1.1, 3.1.3.1, 3.1.3.6 and 3.2.4. The RO will initiate a boration and the BOP will reduce turbine load using 3-ONOP-100 in response to the dropped rod.

Event 5 – A Main Steam Line Leak upstream of the 3B MSIV inside containment begins and gradually degrades. The reactor trips and the crew responds using 3-EOP-E-0. During the performance of 3-EOP-E-0, the B Train of SI fails to actuate. The crew manually actuates to initiate Train B SI

Event 5a – Transition is made to 3-EOP-E-2, the 3B MSIV fails to auto close. The BOP will manually close 3B MSIV and isolate feed to the faulted S/G. **Critical Task**

Event 6 – Once the 3B S/G has been isolated, the crew will transition to 3-EOP-E-1 and subsequently to 3-EOP-ES 1.1 to terminate SI. **Critical Task**

Nid 2/23/10

2010-301 Scenario 2 Simulator Operating Instructions

Setup

IC-24 (100% BOL)

Place simulator in run.

Open and execute lesson GR 26 NRC Scenario 2.lsn

Manually stop the 3B2 Circulating Water pump

Trigger lesson steps:

- SETUP - 3B2 CWP OOS **(actuates TAK4DP = 3)**
- SETUP - SI TRAIN B AUTO FAIL **(actuates TFL3SIA2 T)**
- SETUP - PV2605 FAILS OPEN **(actuates TFSVVX6C T)**
- Place Clearance Tag on 3B2 Hand Switch

Place simulator in freeze.

Provide shift turnover checklists

Perform Simulator Operator Checklist

Event 1 - FIC-3-626 Fail High

FIC-3-626 fails high which results in MOV-3-626 closing and isolating cooling water flow to the RCPs. The RO will open MOV-3-626 using the ARP or 3-ONOP-030, Component Cooling Water Malfunction.

When directed, **trigger lesson EVENT – 1 FIC-3-626 Fail High** (actuates TFK1WH26 T)

When MOV-3-626 closes, delete FIC-3-626 Fail High (actuates TFK1WH26 T)

Event 2 – PT 475 fails high

3A S/G pressure transmitter PT-3-475 gradually fails high. The BOP manually controls 3A S/G level to maintain plant operation using the ARP and 3-ONOP-49.1. The SRO Enters LCO 3.3.1 Action 6 and 3.3.2 Action 15

When directed, **trigger lesson step EVENT 2 - PT-3-475 FAILS High** (actuates TFS1MBWH=T)

If directed, respond as WCC if requested to prepare a PWO/Clearance and notify I&C.

If directed, respond as I&C and acknowledge request to troubleshoot and repair PT-3-475.

If directed, respond as TO to inspect the main steam platform area around PT-3-475. Wait 5 minutes and report that you observe no apparent damage.

If directed, respond as FS/TO if directed to reset AMSAC. Wait 3 min, then **trigger EVENT 4,** Reset AMSAC (actuates TCL4RST = T). Report when complete.

Event 3 – Aux Bldg A Exhaust Fan Trips

Aux Bldg A Exhaust Fan Trips, the RO responds to restore Aux Bldg HVAC using the ARP.

When directed, **trigger lesson step EVENT – 3 Aux Bldg A Exhaust Fan Trip** (actuates TFK7Z68 T)

If directed acknowledge as FS/SNPO, wait 3 min and report the A Aux Bldg Exh fan is not running, there is no apparent cause for the failure.

If directed acknowledge the failure as WCC

Event 4 – Control Bank D rod (L5) Drop

Control bank D rod (L5) drops into the core the SRO addresses LCO 3.1.1.1, 3.1.3.1, 3.1.3.6 and 3.2.4. The RO will initiate a boration and the BOP will reduce turbine load using 3-ONOP-100 in response to the dropped rod.

When directed, **trigger lesson step EVENT 4 - Dropped Rod L5** (actuates TFLISB31 T)

If directed, respond as Reactor Engineering when notified of rod drop. If directed as the STA, come to the control room and perform hourly QPTRs.

If directed, respond as WCC/I&C when notified of the dropped rod & the need to reset PRNI hi flux trip setpoint. Respond that an I&C technician respond as requested.

If directed, respond as System when called about load reduction.

If directed, respond as SM when told to review 0-EPIP-20101 & 0-ADM-115 for notification requirements. State that the NRC Resident will be notified of the fast laod reduction.

If directed, respond as chemistry to take samples. No response back required.

If directed, respond as FS/NSO to align aux steam using attachment 1. No response back required.

Event 5 – Main Steam Line Leak

A Main Steam Line Leak upstream of the MSIVs begins and gradually degrades. The reactor trips and the crew responds using 3-EOP-E-0. During the performance of 3-EOP-E-0, the B Train of SI fails to actuate. The crew manually actuates SI to initiate Train B SI.

When directed by the lead examiner, **trigger lesson step EVENT 5 - EVENT 5 - B S/G Inside Cont** (actuates TVSBVL14 0.5 ramp 4:00)

When the reactor trips, **ensure lesson step SETUP - SI TRAIN B AUTO FAIL is inserted.** (actuates TFL3SIB1 & TFL3SIB2=T)

If directed, respond as FS/TO to investigate the source of the steam leak, make a report of an extreme amount of steam and loud noise coming from the main steam platform but cannot determine the exact source.

When directed respond as the FS/SNPO to place PAHMS in service, **trigger lesson step EVENT 3 - ALIGN PAHM FOR** SERVICE (actuates TAC2V02A=1.0/30 sec delay, TAC2V02B=1.0/1 min delay, TAAAV21=1.0/ 2 min delay, TAAAV22=1.0/3.5 min delay & TACA005=0.0). Report completion 10-15 min later.

If directed, respond as Chemistry to sample S/G, monitor DAM-1

If directed, respond as HP to perform surveys.

Event 5a – 3-PV2605 FAILS OPEN

Transition is made to 3-EOP-E-2, the 3B MSIV fails to auto close. The BOP manually closes the MSIV and isolates feed to the faulted S/G. **Critical Task**

When the crew manually closes 3-PV-2605, **ensure lesson step SETUP - PV2605 FAILS OPEN is removed** (TFSWX6C=F)

When directed respond as the FS/TO wait 3 minutes and **trigger lesson step EVENT 6 – DEENERGIZE & LOCALLY CLOSE MOV-3-1404** (actuates TCF5M527=F, TFFXC04 = T). Report when complete.

Event 6 – SI Termination

Once the 3B S/G has been isolated, the crew transitions to 3-EOP-ES 1.1 to terminate SI. **Critical Task**

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

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 1 Page 1 of 1

Event Description: The crew diagnoses that MOV-3-616 closed due to an instrument spike on flow. The RO verifies that MOV-3-626 may be reopened. The RO re-opens MOV-3-626 and restores CCW to the RCPs.

Time	Position	Applicant's Actions or Behavior
		A19 RCP THERMAL BARR COOLING WATER LO FLOW CAUSES: 1. MOV-3-626 closed 2. Loss or decrease in total CCW system flow
		A1 RCP THERMAL BARR COOLING WATER HI FLOW CAUSES: 1. RCP thermal barrier leak 2. RCP #1 Seal failure 3. Change in CCW flow due to starting a CCW pump OR isolating of major components supplied by CCW
		ALARM CONFIRMATION **CHECK** position of MOV-3-626, RCP THERMAL BARRIER CCW OUTLET on VPB.
	RO	1. IF MOV-3-626, RCP THERMAL BARRIER CCW OUTLET has closed due to a spurious high flow condition, THEN **OPEN** MOV-3-626.
	BOP	2. **DISPATCH** an operator to check flow on FIC-3-626.
	SRO	Directs evolution.
		Examiner note: Proceed to Event 2-PT-3-475 Fails High

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 2 Page 1 of 4

Event Description: 3A S/G pressure transmitter PT-3-475 gradually fails high. The crew manually controls 3A S/G level manually to maintain plant operation using the ARP and 3-ONOP-49.1. The SRO Enters LCO 3.3.1 Action 6 and 3.3.2 Action 15

Time	Position	Applicant's Actions or Behavior
Direct facility operator to trigger lesson step "EVENT 2 - PT-3-475 FAILS High" (actuates TFS1MBWH=T)		
	BOP	Observes gradual failure of PT-3-475 or responds to annunciator C-4/1, 5/1 & 6/1.
	SRO	Directs response using 3-ONOP-049.1.
	BOP	SUBSEQUENT ACTIONS 5.1 Verify instrument loop failure by comparison to adjacent loops and known plant parameters and conditions.
	SRO	Observes indicators PT-3-475 / FT-3-474 failing high and compares 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.
	SRO	Verifies no off-normal conditions exist on the adjacent channels.
	BOP	Manually controls FCV-3-478 and returns S/G level to program using 3-ARP-097.CR
	BOP	Maintains RCS temperature as directed by the SRO Tavg ± 4° of Tref
	BOP	5.3 Verify applicable control transfer switches are in the position which eliminates the failed loop.
	BOP	When 3A S/G level on program, selects FT-3-475 (channel 4 steam flow) for FCV-3-478 control.
	BOP	5.4 IF a control function was placed in manual control due to the failure, THEN verify the control function is returned to automatic.
	BOP	Places FCV-3-478 to AUTO.
	SRO	5.5 Refer to Technical Specifications 3/4.3, Instrumentation, AND verify the minimum channels operable. 5.5.1 Take appropriate actions as specified in Technical Specifications.
	SRO	Refers to LCO 3.3.1, Table 3.3-1, Functional Unit 12 action 6 & LCO 3.3.2, Table 3.3-2 Functional Unit 1e/1f/ 4d action 15 (b/s trip in 6 hr)

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 2 Page 2 of 4

Event Description: 3A S/G pressure transmitter PT-3-475 fails high. The crew manually controls 3A S/G level manually to maintain plant operation using the ARP and 3-ONOP-49.1. The SRO Enters LCO 3.3.1 Action 6 and 3.3.2 Action 15

Time	Position	Applicant's Actions or Behavior
	SRO	Makes determination to trip the following bistables within 6 hours. • BS-3-474 (rack 16) & BS-3-475 / 478B1 / 478B2 / 478C (rack 17)
		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.*
		EXAMINER NOTE When the SRO selects which bistables to trip, proceed to event 3- Aux Bldg Exhaust Fan Trips
		EXAMINER NOTE See next two pages for applicable Tech Specs.

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 2 Page 3 of 4

Event Description: 3A S/G pressure transmitter PT-3-475 fails high. The crew manually controls 3A S/G level manually to maintain plant operation using the ARP and 3-ONOP-49.1. The SRO Enters LCO 3.3.1 Action 6 and 3.3.2 Action 15

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: 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.

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.
		EXAMINER NOTE: 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: As shown in Table 3.3-2.

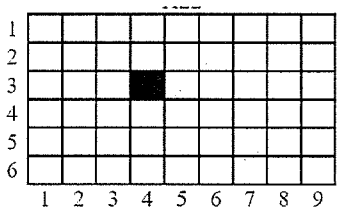
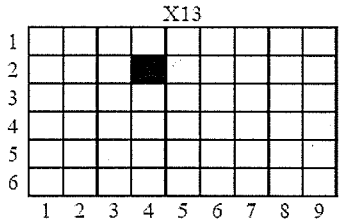
Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 2 Page 4 of 4

Event Description: 3A S/G pressure transmitter PT-3-475 fails high. The crew manually controls 3A S/G level manually to maintain plant operation using the ARP and 3-ONOP-49.1. The SRO Enters LCO 3.3.1 Action 6 and 3.3.2 Action 15

Time	Position	Applicant's Actions or Behavior					
		FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
		1 Safety Injection (Feedwater Isolation)					
		e. High Differential Pressure Between the Steam Line Header and any Steam Line	3/steam line	2/steam line in any steam line	2/steam line	1 2, 3*	15
		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
		Steam Generator Pressure--Low	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
		4. Steam Line Isolation					
		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.: 2010-301 Scenario No.: 2 Event No.: 3 Page 1 of 1

Event Description: Aux Bldg A Exhaust Fan Trips, the crew responds to restore Aux Bldg HVAC using the ARP.

Time	Position	Applicant's Actions or Behavior
Direct facility operator to trigger lesson step "EVENT 3 - Aux Bldg A Exhaust Fan Trip (actuates TFK7Z68 T)"		
	BOP	Observes annunciator X 4/3
		 Page 21 of 54 Panel X AUX/RADWASTE BUILDING EXHAUST FAN TRIPPED
		 ATTACHMENT 5 Page 20 of 54 Panel X AUX/RADWASTE BUILDING SUPPLY FAN TRIPPED
	SRO	Directs evolution
	RO	1. Verify alarm by checking the following: a. Auxiliary building exhaust fan green indicating lights on.
	RO	2. Corrective actions: a. Start standby auxiliary building exhaust fan.
	RO	Places handswitch for the 3B Aux Bldg Exhaust fan to START
		2. Corrective actions: b. Start auxiliary building supply fan(s) if necessary.
	RO	Places handswitch for the 3B Aux Bldg Supply fan to START
	CREW	2. Corrective actions: c. Dispatch an operator to investigate the cause of the exhaust fan trip. d. IF trip was due to motor overload, THEN notify Electrical Dept.
		Examiner note: Proceed to Event 4-Drop Rod

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 4 Page 1 of 13

Event Description: Control Bank D rod (L5) drops into the core the crew responds using 3-ONOP-028.3 to lower main turbine load

Time	Position	Applicant's Actions or Behavior
Direct facility operator to trigger lesson step "EVENT 4 - DROP CBD ROD L5" (actuates TFLISB31=T).		
	RO	Observes rod L5 fully inserted.
	BOP	Addresses Alarm Response for B-2/2, B-2/3, B-6/4, B-7/1, B-9/3 A-9/2
	SRO	Directs response using 3-ONOP-028.3
		NOTES • *Foldout page is required to be monitored throughout this procedure.* • *Misaligned rods are addressed by 3-ONOP-028.1, RCC Misalignment.*
	CREW	Reviews foldout page –see next page
	RO	**1** **Check Number Of RCCs DROPPED - More Than One** a. Check the following * More than one rod bottom light - ON **OR** * More than one rod position indicator – AT ZERO b. Manually trip the Reactor and Turbine c. Go to 3-EOP-E-0, Reactor Trip or Safety Injection a. Go to Step 2.
	RO	**2** **Check Reactor In Mode 1** **IF** in Mode 2 or Mode 3, **THEN** perform the following: a. Stop all rod motion and dilution. b. Ensure reactor power is stable or decreasing. 1) **IF** startup rate is positive and/or reactor power is increasing, **THEN** manually trip the Reactor and go to 3-EOP-E-0, Reactor Trip or Safety Injection. c. Commence boration to the ARO Hot Standby RCS boron concentration specified in the Plant Curve Book, Section 3, Figure 7.

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 4 Page 2 of 13

Event Description: Control Bank D rod (L5) drops into the core the crew responds using 3-ONOP-028.3 to lower main turbine load

Time	Position	Applicant's Actions or Behavior
	CREW	**FOLDOUT FOR PROCEDURE ONOP-028.3** Following is a list of applicable Technical Specification LCOs and procedure steps that verify compliance. These need to be reviewed by the Shift Manager to ensure compliance. 1. **T.S. 3.1.1.1 - SHUTDOWN MARGIN** • Covered in Steps 11 and 13 • 1 hour to verify AND repeat every 12 hours. 2. **T.S. 3.1.3.1 - GROUP ROD HEIGHT** • Covered in Steps 1, 7, 8, 9, and 15, Attachment 1 Steps 3 and 13 • 1 hour - to restore **OR** declare inoperable AND be less than 75% power, 72 hours - to perform Flux Map, and 5 days – to perform re-analysis of accidents. • If 2 Control Rods, 7 hours - to be in Hot Standby • If 2 or more Shutdown Rods are not fully withdrawn, apply Tech Spec 3.0.3. • If Rod Deviation Monitor is inoperable, compare RPIs to Step Counters every 4 hours. 3. **T.S. 3.1.3.5 - SHUTDOWN ROD INSERTION LIMIT** • Covered in Steps 7 and 9 • 1 hour - to restore **OR** declare inoperable. • If 2 or more Shutdown Rods are not fully withdrawn, apply Tech Spec 3.0.3. • If Rod Deviation Monitor is inoperable, compare RPIs to Step Counters every 4 hours. 4. **T.S. 3.1.3.6 - CONTROL ROD INSERTION LIMIT** • Covered in Steps 8 and 9. • 2 hours - to restore **OR** to reduce power to within guidelines of COLR. • If Rod Deviation Monitor is inoperable, compare RPIs to Step Counters every 4 hours. 5. **T.S. 3.2.1 - AXIAL FLUX DIFFERENCE** • Covered in Steps 5 and 8. • 30 minutes to get power less than 50% AND the next 4 hours to set the NIS trip setpoint to 55%. 6. **T.S. 3.2.4 - QUADRANT POWER TILT RATIO** • Covered in Step 6. • 1 hour to perform AND required every hour thereafter while QPTR exceeds 2%. • If QPTR is greater than 9%, reduce power 3% for every 1% QPTR exceeds 1 within 30 minutes. • If QPTR is greater then 2%, reduce power 3% for every 1% QPTR exceeds 1 within 2 hours. • Reduce the NIS trip setpoints the same amount within the next 4 hours.

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 4 Page 3 of 13

Event Description: Control Bank D rod (L5) drops into the core the crew responds using 3-ONOP-028.3 to lower main turbine load

Time	Position	Applicant's Actions or Behavior
	RO	**3** **Place Rod Motion Control Selector Switch To MANUAL**
		CAUTIONS • *Do NOT dilute the RCS while performing this procedure until the SHUTDOWN MARGIN calculation has been performed using 0-OP-028.2, SHUTDOWN MARGIN CALCULATION.* • *Do NOT increase reactor power while performing this procedure.* • *Do NOT use control rods for power or temperature adjustments until the cause of the dropped rod is identified and determined not to affect any other rods.*
	RO/BOP	**4** **Verify Automatic Controls Are Functioning To Stabilize The Unit AND No Transient Is In Progress** a. Tavg/Tref within 3°F — a. Reduce turbine load to control temperature. b. PZR level/pressure trending to program — b. Manually control systems to stabilize the unit. c. S/G level trending to program — c. Manually control systems to stabilize the unit.
	RO	Verifies PLCS and PPCS controlling in AUTO
	BOP	Reduces main turbine load as needed to match Tavg & Tref within 3 degrees.
	BOP	Verifies FWCS controlling in AUTO

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 4 Page 4 of 13

Event Description: Control Bank D rod (L5) drops into the core the crew responds using 3-ONOP-028.3 to lower main turbine load

Time	Position	Applicant's Actions or Behavior
	RO	**5** **Check AFD Within RAOC** • G 5/1, AXIAL FLUX T.S. LIMIT EXCEEDED - OFF • At least 3 channels of AFD indicating within the RAOC limit as defined in the Plant Curve Book, Section 5, Figure 1 Within 30 minutes, reduce reactor power to less than 50% using 3-ONOP-100, FAST LOAD REDUCTION, while continuing with this procedure.
	STA	**6** **Initiate Hourly QPTR Determination Using 3-OSP-059.10, DETERMINATION OF QUADRANT POWER TILT RATIO Until Either QPTR Results Are Satisfactory OR Reactor Power Is Less Than 50%**
		EXAMINER NOTE: Satisfies compliance with LCO 3.2.4
	SRO	**7** **Declare The Dropped RCC Inoperable**
		EXAMINER NOTE: See next page for applicable TS L.C.O.

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 4 Page 5 of 13

Event Description: Control Bank D rod (L5) drops into the core the crew responds using 3-ONOP-028.3 to lower main turbine load

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: 3.1.3.1 All full length (shutdown and control) rods shall be OPERABLE and positioned within the Allowed Rod Misalignment between the Analog Rod Position Indication and the group step counter demand position within one hour after rod motion. The Allowed Rod Misalignment shall be defined as: b. for THERMAL POWER greater than 90% of RATED THERMAL POWER, the Allowed Rod Misalignment is ± 12 steps. APPLICABILITY: MODES 1* and 2* ACTION: d. With one full length rod inoperable due to causes other than addressed by ACTION a, above, or misaligned from its group step counter demand position by more than the Allowed Rod Misalignment of Specification 3.1.3.1, POWER OPERATION may continue provided that within one hour either: 1. The rod is restored to OPERABLE status within the Allowed Rod Misalignment of Specification 3.1.3.1, or 2. The remainder of the rods in the bank with the inoperable rod are aligned to within the Allowed Rod Misalignment of Specification 3.1.3.1 of the inoperable rod while maintaining the rod sequence and insertion limits of Specification 3.1.3.6; the THERMAL POWER level shall be restricted pursuant to Specification 3.1.3.6 during subsequent operation, or 3. The rod is declared inoperable and the SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied. POWER OPERATION may then continue provided that:
		a) The THERMAL POWER level is reduced to less than or equal to 75% of RATED THERMAL POWER within one hour and within the next 4 hours the power range neutron flux high trip setpoint is reduced to less than or equal to 85% of RATED THERMAL POWER. THERMAL POWER shall be maintained less than or equal to 75% of RATED THERMAL POWER until compliance with ACTIONS 3.1.3.1.d.3.c and 3.1.3.1.d.3.d below are demonstrated, and b) The SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is determined at least once per 12 hours, and c) A power distribution map is obtained from the movable incore detectors and FQ (Z) and FN ΔH are verified to be within their limits within 72 hours

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 4 Page 6 of 13

Event Description: Control Bank D rod (L5) drops into the core the crew responds using 3-ONOP-028.3 to lower main turbine load

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE : LCO 3.1.3.6 The control banks shall be limited in physical insertion specified in the Rod Bank Insertion Limits curve, defined in the CORE OPERATING LIMITS REPORT. APPLICABILITY: MODES 1* and 2* ** ACTION: With the control banks inserted beyond the above insertion limits, except for surveillance testing pursuant to Specification 4.1.3.1.2 either: a. Restore the control banks to within the limits within 2 hours, or b. Reduce THERMAL POWER within two hours to less than or equal to that fraction of RATED THERMAL POWER which is allowed by the bank position specified in the Rod Bank Insertion Limits curve, defined in the CORE OPERATING LIMITS REPORT, or c. Be in at least HOT STANDBY within 6 hours.
		EXAMINER NOTE : Reducing power to within the limits of the COLR satisfies compliance with LCO 3.1.3.6 action b

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 4 Page 7 of 13

Event Description: Control Bank D rod (L5) drops into the core the crew responds using 3-ONOP-028.3 to lower main turbine load

Time	Position	Applicant's Actions or Behavior
	CREW	**8** **Reduce Reactor Power To Less Than 50% Within 1 Hour** a. Within one hour, reduce reactor power to less than 50% using 3-ONOP-100, FAST LOAD REDUCTION, while continuing with this procedure
	SRO	Transitions to 3-ONOP-100 while continuing in 3-ONOP-28.3 see page 10 for 3-ONOP-100 details
	RO	**9** **Check The Following:** • Rod Position and Insertion Monitors - Operable • Annunciator B 8/1, ROD BANK A/B/C/D LO LIMIT - Not Locked In • Annunciator B 9/3, SHUTDOWN ROD OFF TOP/DEVIATION - Not Locked In Compare RPIs to group step counters every 4 hours to comply with Technical Specification Surveillances 4.1.3.1.1 and 4.1.3.6.
		EXAMINER NOTE Compare RPIs to group step counters every 4 hours to comply with Technical Specification Surveillances 4.1.3.1.1 and 4.1.3.6.
	CREW	**10** **Notify Reactor Engineering Of Dropped RCC**
		NOTE *SHUTDOWN MARGIN shall be verified within 1 hour of a DROPPED RCC and every 12 hours thereafter.*
	STA	**11** **Verify Shutdown Margin Adequate** a. Check RCS boron concentration * Greater than or equal to pre-event value OR * Greater than the Minimum Shutdown Boron Versus RCS Temperature as a Function of Burnup Requirements in the Plant Curve Book, Section 3, Figure 5 b. Log SHUTDOWN MARGIN satisfied in the Unit Narrative Log a. Notify Reactor Engineering to evaluate SHUTDOWN MARGIN using 0-OP-028.2, SHUTDOWN MARGIN CALCULATION.

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 4 Page 8 of 13

Event Description: Control Bank D rod (L5) drops into the core the crew responds using 3-ONOP-028.3 to lower main turbine load

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE : Satisfies compliance with LCO 3.1.1.1
		NOTE *PWO will NOT be required; setpoint will be adjusted using 3-OSP-059.4, POWER RANGE NUCLEAR INSTRUMENTATION ANALOG CHANNEL OPERATIONAL TEST.*
	CREW	**12** **Notify I&C Of Dropped RCC AND Potential Need To Reset POWER RANGE HI FLUX TRIP SETPOINT**
	STA	**13** **Calculate Shutdown Margin** a. Perform 0-OP-028.2, SHUTDOWN MARGIN CALCULATION, while continuing with this procedure
	RO	**14** **Check Annunciator B 7/1, NIS/RPI Rod Drop Rod Stop - CLEAR** Perform the following: a. Check Power Range Drawers N-41 through N-44. b. IF the Rod Bottom Bistable Light is ON for any channel, THEN place the associated Dropped Rod Mode switch to RESET AND back to NORMAL.
		EXAMINER NOTE: When power has been sufficiently reduced using 3-ONOP-100 , proceed to EVENT 5- 3B MSLB Inside Containment

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 4 Page 9 of 13

Event Description: The crew will initiate a boration and reduce turbine load using 3-ONOP-100 in response to the dropped rod.

Time	Position	Applicant's Actions or Behavior
	SRO	Directs response using 3-ONOP-100.
	SRO	**1** **Brief Control Room Personnel Using Attachment 3** (See page for briefing sheet)
	CREW	Reviews 3-ONOP-100 foldout page actions (See next page)
	SRO	Determines 18 gal/% boric acid addition is requires 75-90 gallons total.
	RO	**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.
	CREW	**3** **Notify The Following** • System Dispatcher • Plant personnel using the Page Boost
	RO BOP CREW	**4** **Reduce Unit Load** a. Check for boration effects (reducing Tavg) 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 a. IF boration is used, THEN wait for effects before starting load reduction. 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.
	RO	**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.

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 4 Page 10 of 13

Event Description: The crew will initiate a boration and reduce turbine load using 3-ONOP-100 in response to the dropped rod.

Time	Position	Applicant's Actions or Behavior
	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.: 2010-301 Scenario No.: 2 Event No.: 4 Page 11 of 13

Event Description: The crew will initiate a boration and reduce turbine load using 3-ONOP-100 in response to the dropped rod.

Time	Position	Applicant's Actions or Behavior
	CREW	**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
		NOTE *Axial flux difference is allowed to exceed the Target Band during the load reduction without entering 0-OP-059.9, Operation Within the Axial Flux Difference Operational Space.*
	RO	**7** **Check Plant Response** a. Check pressurizer level following program a. **IF** directed by the Unit Supervisor, **THEN** increase charging flow as follows: 1) Throttle open TCV-144, NRHX Temp Control Valve, bypass valve 3-834 to raise flow to approximately 600 gpm. 2) Start an additional charging pump. 3) Place an additional letdown orifice in service. 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.
	RO	**8** **Energize Pressurizer Backup Heaters**
	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
		Examiner Note: The SRO may implement the following steps.
	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 5- SLB Inside Containment

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 4 Page 12 of 13

Event Description: The crew will initiate a boration and reduce turbine load using 3-ONOP-100 in response to the dropped rod.

Time	Position	Applicant's Actions or Behavior

FAST LOAD REDUCTION BRIEF

1. Reason for load reduction _____
2. Target power level _____ % Power

Time to Shutdown from 100%	25 min	50 min	75 min	110 min
Load Reduction Rate MW/min	30 MW/min	15 MW/min	10 MW/min	7 MW/min
Load Reduction Rate %/min	4 % / min	2 % / min	1.33 % / min	1 % / min
Expected Tavg/Tref ΔT	4 °F	3 °F	2 °F	1 °F

3. Load reduction rate _____ Mw / minute

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.
5. Plant Control Parameters and Contingency Actions
   - Tavg / Tref expected ΔT band, not to exceed ±1 °F of expected, slow ramp to restore band.
   - If Annunciator B 8/1, ROD BANK LO LIMIT alarms, the load reduction shall be slowed.
6. EOP E-0 transition criteria – Manual reactor and turbine trip:
   - Tave > 578 °F
   - Tave 6 °F > Tref
   - Rod Insertion Limits (RIL) are exceeded
7. Review required actions from other procedures currently in effect (example, stop RCP).
8. Questions or crew input?
9. End of Brief

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 4 Page 13 of 13

Event Description: Control Bank D rod (L5) drops into the core the crew responds using 3-ONOP-028.3 to lower main turbine load

Time	Position	Applicant's Actions or Behavior
	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.: 2010-301 Scenario No.: 2 Event No.: 5 Page 1 of 16

Event Description: A Main Steam Line Leak downstream of the 3B MSIV begins and gradually degrades. The reactor trips and the crew responds using 3-EOP-E-0. During the performance of 3-EOP-E-0, the B Train of SI fails to actuate. The crew manually actuates SI to initiate Train B SI

Time	Position	Applicant's Actions or Behavior
Direct facility operator to trigger lesson step "EVENT 5 -- B S/G Inside Cont Steam Leak (actuates TVSBVL5 0.5 ramp 4:00)		
	CREW	Recognizes the onset of the main steam line leak
	SRO	Directs a manual trip of the reactor
	SRO	Directs response using 3-EOP-E-0
		NOTE *Steps 1 through 4 are IMMEDIATE ACTION steps.*
	RO	**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.
	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).
	BOP	Manually closes MSR steam supply MOVs
	BOP	May manually close the 3B MSIV 3-PV-2605 –ADM-211

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 5 Page 2 of 16

Event Description: A Main Steam Line Leak inside containment of the 3B MSIV begins and gradually degrades. The reactor trips and the crew responds using 3-EOP-E-0. During the performance of 3-EOP-E-0, the B Train of SI fails to actuate. The crew manually actuates SI to initiate Train B SI

Time	Position	Applicant's Actions or Behavior
	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.: 2010-301 Scenario No.: 2 Event No.: 5 Page 3 of 16

Event Description: A Main Steam Line Leak inside containment upstream of the 3B MSIV begins and gradually degrades. The reactor trips and the crew responds using 3-EOP-E-0. During the performance of 3-EOP-E-0, the B Train of SI fails to actuate. The crew manually actuates SI to initiate Train B SI

Time	Position	Applicant's Actions or Behavior
	RO	**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.
	RO	Manually actuates Train B SI by depressing the SI Initiation pushbutton. Manually actuates Phase A
		NOTE *FOLDOUT Page shall be monitored for the remainder of this procedure.*
	CREW	Monitors 3-EOP-E-0 Foldout page (see next page)

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 5 Page 4 of 16

Event Description: A Main Steam Line Leak upstream of the 3B MSIV begins and gradually degrades. The reactor trips and the crew responds using 3-EOP-E-0. During the performance of 3-EOP-E-0, the B Train of SI fails to actuate. The crew manually actuates SI to initiate Train B SI

Time	Position	Applicant's Actions or Behavior

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-OP-018.1, CONDENSATE STORAGE TANK.

7. **RHR SYSTEM OPERATION CRITERIA**

   IF RCS pressure is greater than 250 PSIG [650 PSIG] AND 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.: 2010-301 Scenario No.: 2 Event No.: 5 Page 5 of 16

Event Description: A Main Steam Line Leak upstream of the 3B MSIV begins and gradually degrades. The reactor trips and the crew responds using 3-EOP-E-0. During the performance of 3-EOP-E-0, the B Train of SI fails to actuate. The crew manually actuates SI to initiate Train B SI

Time	Position	Applicant's Actions or Behavior
	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 11
		Examiner Note: The SRO and RO will complete the remaining steps in 3-EOP-E-0, while the BOP performs 3-EOP-E-0 prompt action verifications using attachment 3
	BOP	Stops AFW flow to the 3B S/G based on foldout page requirements.
	RO	Stops RCPs if subcooling is less than 25 °F (65°F) with HHSI flowpath verified and HHSI pumps running based on foldout page requirements.
	RO or BOP	Provides the RO with stabilization S/G pressure information.
	RO	Stabilizes RCS temperature using Steam Dump to Atmosphere Valves based on foldout page requirements
	RO	**6** **Check AFW Pumps - AT LEAST TWO RUNNING** Perform the following: a. Manually open valves to establish two AFW pumps running. b. <u>IF</u> an AFW pump is tripped, <u>THEN</u> dispatch an operator to locally reset the AFW turbine trips. c. <u>IF</u> both units require AFW <u>AND</u> only one AFW pump is available, <u>THEN</u> 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.
	RO	**7** **Verify AFW Valve Alignment - PROPER EMERGENCY ALIGNMENT** Manually align valves to establish proper AFW alignment.

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 5 Page 6 of 16

Event Description: A Main Steam Line Leak upstream of the 3B MSIV begins and gradually degrades. The reactor trips and the crew responds using 3-EOP-E-0. During the performance of 3-EOP-E-0, the B Train of SI fails to actuate. The crew manually actuates SI to initiate Train B SI

Time	Position	Applicant's Actions or Behavior
	RO	**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.
	RO	b. Maintain feed flow to S/G narrow range levels between 15%[32%] and 50%.

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 5 Page 7 of 16

Event Description: A Main Steam Line Leak upstream of the 3B MSIV begins and gradually degrades. The reactor trips and the crew responds using 3-EOP-E-0. During the performance of 3-EOP-E-0, the B Train of SI fails to actuate. The crew manually actuates SI to initiate Train B SI

Time	Position	Applicant's Actions or Behavior
	RO	**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 Start one charging pump for seal injection

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 5 Page 8 of 16

Event Description: A Main Steam Line Leak upstream of the 3B MSIV begins and gradually degrades. The reactor trips and the crew responds using 3-EOP-E-0. During the performance of 3-EOP-E-0, the B Train of SI fails to actuate. The crew manually actuates SI to initiate Train B SI

Time	Position	Applicant's Actions or Behavior
	RO	**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) Limit 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.
	RO	Adjusts total AFW flow to 345 gpm to "A" & "C" S/G.

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 5 Page 9 of 16

Event Description: A Main Steam Line Leak upstream of the 3B MSIV begins and gradually degrades. The reactor trips and the crew responds using 3-EOP-E-0. During the performance of 3-EOP-E-0, the B Train of SI fails to actuate. The crew manually actuates SI to initiate Train B SI

Time	Position	Applicant's Actions or Behavior
	RO	**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).
	RO	**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
	RO	Stops RCPs if subcooling is less than 25°F (65°F)with HHSI flowpath verified and HHSI pumps running.

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 5 Page 10 of 16

Event Description: A Main Steam Line Leak upstream of the 3B MSIV begins and gradually degrades. The reactor trips and the crew responds using 3-EOP-E-0. During the performance of 3-EOP-E-0, the B Train of SI fails to actuate. The crew manually actuates SI to initiate Train B SI

Time	Position	Applicant's Actions or Behavior
	RO	**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
	CREW	Diagnoses the B S/G faulted based on 3B S/G Level and Pressure decreasing in an uncontrolled manner.
	SRO	Transitions to 3-EOP-E-2
	BOP	Continues performance of 3-EOP-E-0 Attachment 3 Prompt Action Verification
	STA	Provides the RO with stabilization S/G pressure information.
	RO or BOP	Stabilizes RCS temperature using Steam Dump to Atmosphere Valves based on foldout page requirements
		Examiner note: 3-EOP-E-2 details are continued on event 5a page 1

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 5 Page 11 of 16

Event Description: A Main Steam Line Leak upstream of the 3B MSIV begins and gradually degrades. The reactor trips and the crew responds using 3-EOP-E-0. During the performance of 3-EOP-E-0, the B Train of SI fails to actuate. The crew manually actuates SI to initiate Train B SI

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	Manually closes the 3B MSIV 3-PV-2605 if open
	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).

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 5 Page 12 of 16

Event Description: A Main Steam Line Leak upstream of the 3B MSIV begins and gradually degrades. The reactor trips and the crew responds using 3-EOP-E-0. During the performance of 3-EOP-E-0, the B Train of SI fails to actuate. The crew manually actuates SI to initiate Train B 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	May manually start Train B Safeguards equipment of RO did not manually actuate SI.
	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.

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 5 Page 13 of 16

Event Description: A Main Steam Line Leak upstream of the 3B MSIV begins and gradually degrades. The reactor trips and the crew responds using 3-EOP-E-0. During the performance of 3-EOP-E-0, the B Train of SI fails to actuate. The crew manually actuates SI to initiate Train B SI

Time	Position	Applicant's Actions or Behavior
	BOP	May manually start Train B Safeguards equipment
	BOP	**7. Verify SI Pump Operation** a. At least two high head pumps running — a. Manually start high-head pump(s). b. Both RHR pumps running — b. Manually start RHR pump(s).
	BOP	May manually start Train B Safeguards equipment
	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 <u>AND</u> 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 <u>AND</u> 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 <u>AND</u> place in standby
	BOP	May manually start Train B Safeguards equipment
	BOP	Manually stops both Unit 4 HHSI pumps

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 5 Page 14 of 16

Event Description: A Main Steam Line Leak upstream of the 3B MSIV begins and gradually degrades. The reactor trips and the crew responds using 3-EOP-E-0. During the performance of 3-EOP-E-0, the B Train of SI fails to actuate. The crew manually actuates SI to initiate Train B 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	a. Go to step 15.
		b. Open CCW to normal containment cooler valves • MOV-3-1417 • MOV-3-1418	b. Stop all RCPs
		c. Reset and start normal containment coolers	c. Stop all RCPs

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 5 Page 15 of 16

Event Description: A Main Steam Line Leak upstream of the 3B MSIV begins and gradually degrades. The reactor trips and the crew responds using 3-EOP-E-0. During the performance of 3-EOP-E-0, the B Train of SI fails to actuate. The crew manually actuates SI to initiate Train B 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.
		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-OP-094, CONTAINMENT POST ACCIDENT MONITORING SYSTEM**
	BOP	**18. Verify All Four EDGs – RUNNING** EMERGENCY START any available EDG NOT running.

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 5 Page 16 of 16

Event Description: A Main Steam Line Leak upstream of the 3B MSIV begins and gradually degrades. The reactor trips and the crew responds using 3-EOP-E-0. During the performance of 3-EOP-E-0, the B Train of SI fails to actuate. The crew manually actuates SI to initiate Train B 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 Note Any Actions That Had To Be Taken**

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 5a Page 1 of 3

Event Description: Transition is made to 3-EOP-E-2, the 3B MSIV fails to auto close. The crew will manually close 3B MSIV and isolate feed to the faulted S/G.

Time	Position	Applicant's Actions or Behavior
	SRO	Directs response using 3-EOP-E-2
		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.*
		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.*
	RO	**1** **Verify The Main Steamline Isolation AND Bypass Valves On Faulted S/G(s) - CLOSED** — Manually close valves.
	RO/BOP	Manually closes 3-PV-2605 "B" S/G MSIV (if not already closed)
	RO/BOP	**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.
	RO/BOP	**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
	RO/BOP	Verifies "B" S/G completely depressurized.
		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.*

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 5a Page 2 of 3

Event Description: Transition is made to 3-EOP-E-2, the 3B MSIV fails to auto close. The crew will manually close 3B MSIV and isolate feed to the faulted S/G.

Time	Position	Applicant's Actions or Behavior
	RO/BOP	**4 Isolate Faulted S/G(s)** a. Isolate main feedline — a. Manually isolate main feedline. • Close feedwater isolation valve • Close feedwater bypass valve 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
	RO/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 in one S/G is attained. (May have already been completed in 3-EOP-E-0)
	RO/BOP	Directs SNPO/TO/FS to de-energize by opening breaker 30833 & closing 3B SG AFW steam supply isolation MOV-3-1404.
		Crew Critical Task Isolate feed and steam for the faulted SG prior to transitioning from E-2.
	RO/BOP	**5 Check CST Level - GREATER THAN 10%** — Add to makeup to CST using 3-OP-018.1, CONDENSATE STORAGE TANK.

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 5a Page 3 of 3

Event Description: Transition is made to 3-EOP-E-2, the 3B MSIV fails to auto close. The crew will manually close 3B MSIV and isolate feed to the faulted S/G.

Time	Position	Applicant's Actions or Behavior
	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 d. Go to 3-EOP-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.
	SRO	**7** **Go To 3-EOP-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1**
	SRO	Transitions to 3-EOP-E-1.

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 6 Page 1 of 9

Event Description: Once the 3B S/G has been isolated, the crew will transition to 3-EOP-E-1 and subsequently to 3-EOP-ES 1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior
	SRO	Transitions to 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)
	RO	**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
	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.
		The SRO and BOP determine the B S/G was faulted and isolated in 3-EOP-E-2
	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.

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 6 Page 2 of 9

Event Description: Once the 3B S/G has been isolated, the crew will transition to 3-EOP-E-1 and subsequently to 3-EOP-ES 1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior

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 10^8 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-OP-018.1, Condensate Storage Tank.

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 RCS pressure is greater than 250 PSIG [650 PSIG] AND 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.: 2010-301 Scenario No.: 2 Event No.: 6 Page 3 of 9

Event Description: Once the 3B S/G has been isolated, the crew will transition to 3-EOP-E-1 and subsequently to 3-EOP-ES 1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior
	CREW	**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.
		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.***
	RO	**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.
	RO	**6 Verify SI - RESET**
	RO	**7 Reset Containment Isolation Phase A AND Phase B**
	RO	**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.

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 6 Page 4 of 9

Event Description: Once the 3B S/G has been isolated, the crew will transition to 3-EOP-E-1 and subsequently to 3-EOP-ES 1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior	
	RO	**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.
	RO	**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	

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 6 Page 5 of 9

Event Description: Once the 3B S/G has been isolated, the crew will transition to 3-EOP-E-1 and subsequently to 3-EOP-ES 1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior
	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**	

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 6 Page 6 of 9

Event Description: Once the 3B S/G has been isolated, the crew will transition to 3-EOP-E-1 and subsequently to 3-EOP-ES 1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior
	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	Transitions to 3-EOP-ES-1.1

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 6 Page 7 of 9

Event Description: Once the 3B S/G has been isolated, the crew will transition to 3-EOP-E-1 and subsequently to 3-EOP-ES 1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior
	SRO	Directs response using 3-EOP-ES-1.1
		NOTE *Foldout page is required to be monitored throughout this procedure*
	CREW	Monitors 3-EOP-ES-1.1 Foldout page (see next page)
	RO	**1** **Verify SI - RESET**
	RO	**2** **Reset Containment Isolation Phase A And Phase B**
	RO BOP	**3** **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 OFINSTRUMENT AIR, while continuing with this procedure.

Op-Test No.: 2010-301	Scenario No.: 2	Event No.: 6	Page 8 of 9

Event Description: Once the 3B S/G has been isolated, the crew will transition 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 ES-1.1

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 10^8 Rads.

2. **SI RE-INITIATION CRITERIA**
IF either condition listed below occurs following SI termination, THEN manually start SI pumps as necessary to restore RCS subcooling and PRZ level, AND go to 3-EOP-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1:
* RCS subcooling based on core exit TCs - LESS THAN 30°F[See below Table]

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

OR
* PRZ level – CAN **NOT** BE MAINTAINED GREATER THAN 17%[50%]

3. **CST MAKEUP WATER CRITERIA**
IF CST level decreases to less than 10%, THEN add makeup to CST using 3-OP-018.1, CONDENSATE STORAGE TANK.

4. **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.

Op-Test No.: 2010-301 Scenario No.: 2 Event No.: 6 Page 9 of 9

Event Description: Once the 3B S/G has been isolated, the crew will transition to 3-EOP-E-1 and subsequently to 3-EOP-ES 1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior
	RO	**4 Check If Charging Flow Has Been Established** a. Charging pumps - AT LEAST ONE RUNNING b. Establish desired charging flow 1) Start additional charging pumps as necessary to establish desired charging flow 2) Adjust charging pump speed controllers to establish desired charging flow
	RO	**5 Stop The Following Pumps AND Place In Standby** • RHR pumps • High-head SI pumps
	RO	Places the handswitches for the 3A and 3B HHSI pumps to STOP
	RO	Places the handswitches for the 3A and 3B RHR pumps to STOP
		CREW CRITICAL TASK: Limit HHSI operating time at shutoff head on minimum flow recirculation during a steamline break by terminating Safety Injection prior to completing step 5 of 3-EOP-ES-1.1.
		EXAMINER NOTE The scenario is terminated when Safety Injection is terminated in 3-EOP-ES-1.1.

Facility: Turkey Point Scenario No.: 3 Op Test No.: 2010-301

Examiners: _____ Candidates: _____ US

_____ _____ RO

_____ _____ BOP

Initial Conditions: Mode 1, 75% Power, MOL, 3-GOP-301 in use complete through step 5.96 for return to 100% power following a turbine valve test.

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.

Maintain 75% as directed by the System dispatcher.

Online risk – green

B train protected both units

Event No.		Event Type*	Event Description
1	TFH1TV60=T	(I) RO (TS) ,(I) SRO	LT-3-460 fails low which isolates letdown. The RO responds using the ARP, 3-ONOP-041.6 and 3-ONOP-49.1 to remove LT-3-460 from service. The RO restores normal letdown and PZR heaters The SRO will address LCO 3.3.1.
2	V8CI29ON=T TVKKB1=0.34	(C) BOP (C) SRO	Circ water pump 3B1 motor bearing high temperature. The crew will lower reactor power to < 60%. The BOP will secure the 3B1 CW pump using 3-OP-010.
3		(R) RO (N) BOP	The RO will initiate a boration and the BOP will reduce turbine load to 60% using 3-ONOP-100.
4	TFF1MACH=T	(I)BOP/SRO	3C S/G level transmitter LT-3-498 fails high. The BOP manually controls 3C S/G level to maintain plant operation using the ARP and 3-ONOP-49.1.
5	TFH1TU56	(C) RO (C) SRO (TS) SRO	PT-3-445 fails high, the RO responds using the ARP and 3-ONOP-49.1 to manually close PORV-455C. The SRO will address LCO 3.2.5.b when RCS pressure decreases to 2200 psig
6	TVHV455C=1.0 5 min delay 5 min ramp	(M) ALL	During plant stabilization a SBLOCA develops when a safety valve fails opens. The crew responds using 3-EOP-E-0, transition to 3-EOP-E-1 and the RO will trip RCPs.
6a	TAFK339=0		During the performance of 3-EOP-E-0, AFW flow to the 3C S/G is blocked. The crew will direct a local reset of the B AFW pump turbine and establish greater than 345 gpm total to the 3A and 3B S/G.

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

Rec'd 8/23/10

Gr 26 NRC Scenario #3

Event 1 LT-3-460 fails low which isolates letdown. The RO responds using the ARP, 3-ONOP-041.6 and 3-ONOP-49.1 to remove LT-3-460 from service. The RO restores normal letdown and PZR heaters The SRO will address LCO 3.3.1.

Event 2 – Circulating water pump 3B1 motor bearing high temperature. The crew will lower reactor power to < 60%. The BOP will secure the 3B1 CW pump using 3-OP-010.

Event 3 – The RO will initiate a boration and the BOP will reduce turbine load to 60% using 3-ONOP-100.

Event 4 – 3C S/G level transmitter LT-3-498 fails high. The BOP manually controls 3C S/G level to maintain plant operation using the ARP and 3-ONOP-49.1.

Event 5 – PT-3-445 fails high, the RO responds using the ARP and 3-ONOP-49.1 to manually close PORV-455C. The SRO will address LCO 3.2.5.b when RCS pressure decreases to 2200 psig

Event 6 – During plant stabilization a SBLOCA develops when a safety valve opens. The crew responds using 3-EOP-E-0, transition to 3-EOP-E-1 and the RO will trip RCP's. **CRITICAL TASK**

Event 6a – During the performance of 3-EOP-E-0, AFW flow to the 3C S/G is blocked. The crew will direct a local reset of the B AFW pump turbine and establish greater than 345 gpm total to the 3A and 3B S/G. **CRITICAL TASK**

Gr 26 NRC Scenario 3 Simulator Operating Instructions

Setup

IC-16 (75% MOL)

Place simulator in run.

Open & execute lesson file Gr 26 NRC Scenario 3

Manually stop the 3B2 Circulating Water pump

Trigger lesson steps:

- SETUP - Valve 3-20-339 CLOSED B and C AFW Fail to Start (actuates TAFK339 0.0, TFFXCGVC T, TCF5MTB T)
- SETUP - 3B2 CWP OOS (actuates TAK4DP = 3)
- SETUP-3C ECC Fails to AUTO Start
- Clearance Tag on 3B2 CW Hand Switch

Place simulator in freeze.

Provide shift turnover checklists

Perform Simulator Operator Checklist

Event 1 – LT-3-460 fails low

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

When directed, trigger lesson step **EVENT 1 - PZR LEVEL LT-3-460 FAILS LOW** **(actuates TFH1TV60 = T).**

If directed, respond as WCC/FS about LT-3-460 troubleshooting & repair.

Event 2 – 3B1 CWP loss of lube oil / motor bearing failure

Circulating water pump 3B1 motor bearing high temperature. The crew will lower reactor power to < 60%. The BOP will secure the 3B1 CW pump using 3-OP-010.

When directed, trigger lesson step **EVENT 2 - 3B1 CWP BRNG HOT** **(actuates V8CI29ON = T).** *This actuates annunciator I-2/4.*

If directed, respond as TO to inspect 3B1 CWP. Report that the lower motor bearing oil sight glass is nearly empty and bearing temp is 225°F and slowly increasing (increase from last set of rounds).

When directed, trigger lesson step **EVENT 2 - 3B1 CWP BRNG FAIL** **(actuates TVKKB1 = 0.34 on 3 min. ramp).** This will slowly increase pump amps to bring in 3B1 CWP overload alarm (I-2/1) without tripping pump.

If directed, respond as TO to close valves 3-30-003 & 005. Wait 1-3 min & trigger lesson step **EVENT 2 - CLOSE SJAE SUCTIONS 3-30-003 / 005** **(actuates TAFB003 = 0.0 on 30 sec ramp & TAFB005 = 0.0 on 30 sec ramp after 1 min delay).**

If directed, respond as TO and report satisfactory closure of SV-3-1414 (liquid radwaste dischg).

If directed, respond as TO to open waterbox cathodic protection breakers (no sim IF action).

If directed, respond as TO to secure aux stm & vent priming jets. Wait 1-3 min and **trigger** lesson step **EVENT 2 - Secure AS and Vent Priming Jets** **(actuates TAKKV66 = 0.0 on 20 sec ramp, TAKKV81 = 0.0 on 20 sec ramp after 40 sec delay, TAKKV63 = 1.0 on 20 sec ramp after 80 sec delay & TAKKV78 = 1.0 on 20 sec ramp after 2 min delay).**

If directed, respond as OCC/WCC/FS if called about 3B1 CWP troubleshooting & repair.

If directed, respond as TO to rack out breaker 3AB16. Wait 8-12 min, then **trigger** lesson step **EVENT 2 - RACK OUT 3B1 CWP BKR** (actuates TAK4CP = 3).

Event 3 – Power reduction to 60%

The RO will initiate a boration and the BOP will reduce turbine load to 60% using 3-ONOP-100.

If directed, respond as System when called about load reduction.

If directed, respond as SM when told to review 0-EPIP-20101 & 0-ADM-115 for notification requirements. State that the NRC Resident will be notified of the fast load reduction.

If directed, respond as chemistry to take samples. No response back required.

If directed, respond as FS/NSO to align aux steam using attachment 1. No response back required.

Event 4 - LT-3-498 Fails High

3C S/G level transmitter LT-3-498 fails high. The BOP manually controls 3C S/G level to maintain plant operation using the ARP and 3-ONOP-49.1.

When directed, **trigger lesson step EVENT 4 LT-3-498 Fails High,** (actuates TFF1MACH T)

If directed, respond as WCC if requested to prepare a PWO/Clearance and notify I&C.

If directed, respond as I&C and acknowledge request to troubleshoot and repair LT-3-498.

Event 5 – PT-3-445 fails high

When directed, **trigger lesson step EVENT 5 - PT-3-445 fails high** (actuates TFH1TU45 T)

PT-3-445 fails high, the RO responds using the ARP and 3-ONOP-49.1 to manually close PORV-455C. The SRO will address LCO 3.2.5.b when RCS pressure decreases to 2200 psig

If directed, respond as WCC if requested to prepare a PWO/Clearance and notify I&C.

If directed, respond as I&C and acknowledge request to troubleshoot and repair PT-3-445.

Event 6 – PORV-455C Drifts Open/SBLOCA

During plant stabilization a SBLOCA develops when PORV 455C drifts opens. The crew responds using 3-EOP-E-0, transition to 3-EOP-E-1 and the RO will trip RCP's.

When directed, **trigger lesson step Event 6 - PORV-455C Drifts Open** (actuates TVHV455C 1.0 5 min ramp T)

During plant stabilization a SBLOCA develops when PORV 455C prematurely opens. The crew responds using 3-EOP-E-0 and will transition to 3-EOP-E-1 and trip RCP's..

If directed, respond as as SNPO, align PAHM using 3-OP-094. Wait 10-15 min **then trigger lesson step EVENT 6 - ALIGN PAHM** (actuates TAC2V02A = 1.0, TAC2V02B = 1.0, TAAAV21 = 1.0, TAAAV22 = 1.0 & TACA005 = 0.0). Report when complete.

If directed, respond as respond as Chemistry/HP regarding S/G sampling & surveys. Report no contamination.

If directed, respond as respond as FS/SNPO when directed to close in cold leg recirc breakers. Wait 1-3 min, then **trigger lesson step EVENT 6 - CLOSE CL RECIRC BKRS** (actuates TCM2D06M = T, TCM1D09M = T after 5 sec delay, TCM2D04M = T after 15 sec delay, TCM1D11M = T after 20 sec delay, TCM1D03M = T after 30 sec delay, TCM1D04M = T after 35 sec delay, TCM1D10M = T after 45 sec delay, TCM2D05M = T after 50 sec delay, TCM1D12M = T after 60 sec delay & TCM2D03M = T after 65 sec delay).

If directed, respond as respond affirmatively as PO when asked to verify containment spray & charging pump room doors closed.

If directed, respond as respond as HP when directed to survey pipe & valve and electrical penetration rooms for radiation.

If directed, respond as respond as Chemistry when directed to align PASS for on-line sampling/analysis of the RCS.

Event 6a - AFW flow to the 3C S/G is blocked.

During the performance of 3-EOP-E-0, AFW flow to the 3C S/G is blocked. The crew will direct a local reset of the B AFW pump turbine and establish greater than 345 gpm total to the 3A and 3B S/G.

If directed, respond as FS/TO and acknowledge failure. Wait three minutes and report the B and C AFW pumps are not running, the B AFW pump turbine tripped on overspeed.

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	--
1. Total malfunctions (5–8)	6
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)	0
7. Critical tasks (2–3)	2

Op-Test No.: 2010-301 Scenario No.: 3 Event No.: 1 Page 1 of 3

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 - PZR LEVEL LT-3-460 FAILS LOW (actuates TFH1TV60 = T)."		
	RO	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 deenergize
		A35 PZR LO-LO LEVEL ALERT CAUSES: 1. PZR Level control malfunction 2. LOCA/Excessive RCS leakage 3. Steam Break 4. RCS Refueling operations in mid-loop
	RO	OPERATOR ACTIONS: 1. Verify alarm by checking the following: a. Check PZR level indicators LI-459A/460/461 equal to or less than 6% (VPA).
		A36 PZR LO LEVEL/ HEATER OFF/ LTDN SECURED CAUSES: 1. RCS leak/LOCA 2. Steam line leak/break 3. PZR level control malfunction 4. Instrument failure
	RO	OPERATOR ACTIONS: 1. Verify alarm by checking the following: a. LCV-3-460 closed (VPA). b. CV-3-200A, B, and C closed (VPA). c. Control and Backup heaters OFF.
	RO	2. Corrective actions: c. IF due to an instrument failure, THEN restore letdown and heaters to service using 3-ONOP-041.6, PRESSURIZER LEVEL CONTROL MALFUNCTION.
	SRO	Directs response using 3-ONOP-041.6, Pressurizer Level Control Malfunction and 3-ONOP-49.1 to remove LT-3-460 from service.

Op-Test No.: 2010-301 Scenario No.: 3 Event No.: 1 Page 2 of 3

Event Description: The crew restores normal letdown and PZR heaters following LT-3-460 failure using 3-ONOP-041.6.

Time	Position	Applicant's Actions or Behavior
		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.*
	RO	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.
		Observes indicator LI-3-460 failing low and compares to LI-3-459 AND LI-3-461
	RO	Places CHANNEL SELECT PRESSURIZER LEVEL CONTROL switch to position 2
	RO	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.
	RO/BOP	Restores Letdown to service and places PCV-3-145 to AUTO
	RO	5.7 **IF** control malfunction caused pressurizer heaters to deenergize, **THEN** restore PRZ heaters to automatic operation or take manual control.
	RO	Restores Pressurizer Heaters to service
		5.9 Perform actions required by 3-ONOP-049.1, DEVIATION OR FAILURE OF SAFETY RELATED OR REACTOR PROTECTION CHANNELS.

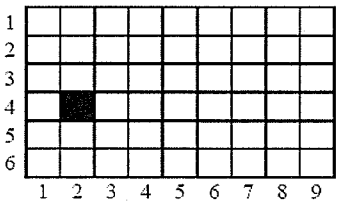
Op-Test No.: 2010-301 Scenario No.: 3 Event No.: 1 Page 3 of 3

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
		Directs response using 3-ONOP-049.1.
		Refers to LCO 3.3.1, Table 3.3-1, Functional Unit 9 action 13
		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.*
		Makes determination to trip the following bistables within 6 hours. • BS-3-460A-1 & BS-460A-2
		EXAMINER NOTE: When the SRO selects which bistables to trip, proceed to event 2- 3B1 Hot Bearing.
		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 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.

Op-Test No.: 2010-301 Scenario No.: 3 Event No.: 2 Page 1 of 3

Event Description: Circ water pump 3B1 motor bearing high temperature. 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 CWP BRNG HOT (actuates V8CI29ON = T).		
	BOP	Observes alarm I-2/4.
		 Page 10 of 54 Panel I CWP B1 MOTOR BRG HI TEMP
	SRO	Directs response using the ARP and 3-OP-010
	BOP	OPERATOR ACTIONS: 1. Verify alarm by checking the following: a. No Control Room indications. 2. Corrective actions: a. Check the following at 3B1 CWP: (1) TS-3-4113, -4114, and -4115 equal to or greater than 235°F. (2) Bearing oil level. (3) Pump/motor vibration/noise. b. IF bearing temperature exceeds 248°F, THEN stop the 3B1 CWP using 3-OP-010, CIRCULATING WATER SYSTEM.
	BOP	Notes that if bearing temp >248°F then stop CWP 3B1 using 3-NOP-010.
		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	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.
		Examiner Note: 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 page Event 3 page 1 for power reduction details.)**

Op-Test No.: 2010-301 Scenario No.: 3 Event No.: 2 Page 2 of 3

Event Description: Circ water pump 3B1 motor bearing high temperature. 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	3. **ENSURE** Amertap System is shutdown per 3-NOP-015.01, Amertap Condenser Tube Cleaning Operation.
		NOTE DCS/P1612X indicates Main Condenser backpressure. To determine vacuum from backpressure: Main Condenser Vacuum = 30 in Hg - DCS/P1612X_A
		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
	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
	BOP	Directs FS/TO to secure SJAE isolation valves **after** power is reduced to < 60%.
		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.
		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
	BOP	Places handswitch for the CWP 3B1 to STOP **after** power is below 60% AND **after** SJAE isolation valves are shut.

Op-Test No.: 2010-301 Scenario No.: 3 Event No.: 2 Page 3 of 3

Event Description: Circ water pump 3B1 motor bearing high temperature. 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: If the crew does not decrease load in a timely fashion, annunciator I-2/1 CWP B1/B2 MOTOR OVERLOAD ALARM will alarm on high current without automatically tripping the pump. If alarm comes in, BOP reports this alarm and consults the ARP
	BOP	8. **CHECK** the affected Circulating Water Pump stops when its discharge MOV is approximately 5% OPEN. 9. **CHECK** the affected Circulating Water Pump discharge MOV continues to fully CLOSED after the pump stops.
		EXAMINER NOTE: When power has been sufficiently reduced and the 3B1 CW pump has been shutdown, proceed to EVENT 4 (page 1)

Op-Test No.: 2010-301 Scenario No.: 3 Event No.: 3 Page 1 of 4

Event Description: The crew will initiate a boration and reduce turbine load to 60% using 3-ONOP-100.

Time	Position	Applicant's Actions or Behavior
	SRO	Directs response using 3-ONOP-100.
	SRO	**1** **Brief Control Room Personnel Using Attachment 3** (See page for briefing sheet)
	CREW	Reviews 3-ONOP-100 foldout page actions (See next page)
	SRO	Determines 9 gal/% boric acid addition is required 135 gallons total.
	RO	**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.
	CREW	**3** **Notify The Following** • System Dispatcher • Plant personnel using the Page Boost
	RO BOP CREW	**4** **Reduce Unit Load** a. Check for boration effects (reducing Tavg) 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 a. IF boration is used, THEN wait for effects before starting load reduction. 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.
	RO	**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.

Op-Test No.: 2010-301 Scenario No.: 3 Event No.: 3 Page 2 of 4

Event Description: The crew will initiate a boration and reduce turbine load to 60% using 3-ONOP-100.

Time	Position	Applicant's Actions or Behavior
	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
	RCO	Restores Blender to AUTO after the boration is complete.

Op-Test No.: 2010-301 Scenario No.: 3 Event No.: 3 Page 3 of 4

Event Description: The crew will initiate a boration and reduce turbine load to 60% using 3-ONOP-100.

Time	Position	Applicant's Actions or Behavior
	CREW	**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
		NOTE *Axial flux difference is allowed to exceed the Target Band during the load reduction without entering 0-OP-059.9, Operation Within the Axial Flux Difference Operational Space.*
	RO	**7** **Check Plant Response** a. Check pressurizer level following program — a. IF directed by the Unit Supervisor, THEN increase charging flow as follows: 1) Throttle open TCV-144, NRHX Temp Control Valve, bypass valve 3-834 to raise flow to approximately 600 gpm. 2) Start an additional charging pump. 3) Place an additional letdown orifice in service. 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.
	RO	**8** **Energize Pressurizer Backup Heaters**
	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.
		Examiner Note: The SRO may implement the following steps.
	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)

Op-Test No.: 2010-301 Scenario No.: 3 Event No.: 3 Page 4 of 4

Event Description: The crew will initiate a boration and reduce turbine load to 60% using 3-ONOP-100.

Time	Position	Applicant's Actions or Behavior

FAST LOAD REDUCTION BRIEF

1. Reason for load reduction _____
2. Target power level _____ % Power

Time to Shutdown from 100%	25 min	50 min	75 min	110 min
Load Reduction Rate MW/min	30 MW/min	15 MW/min	10 MW/min	7 MW/min
Load Reduction Rate %/min	4 % / min	2 % / min	1.33 % / min	1 % / min
Expected Tavg/Tref ΔT	4 °F	3 °F	2 °F	1 °F

3. Load reduction rate _____ Mw / minute

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.
5. Plant Control Parameters and Contingency Actions
   - Tavg / Tref expected ΔT band, not to exceed ±1 °F of expected, slow ramp to restore band.
   - If Annunciator B 8/1, ROD BANK LO LIMIT alarms, the load reduction shall be slowed.
6. EOP E-0 transition criteria – Manual reactor and turbine trip:
   - Tave > 578 °F
   - Tave 6 °F > Tref
   - Rod Insertion Limits (RIL) are exceeded
7. Review required actions from other procedures currently in effect (example, stop RCP).
8. Questions or crew input?
9. End of Brief

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 4 Page 1 of 1

Event Description: 3C S/G level transmitter LT-3-498 fails high. The crew controls 3C S/G level manually to maintain plant operation using 3-ONOP-49.1.

Time	Position	Applicant's Actions or Behavior
Direct facility operator to trigger lesson step "EVENT 4 – LT-3-498 Fails High" (actuates TFF1MACH=T)		
	BOP	Observes alarms C-5/3 & 6/3, & D-7/6
	SRO	Directs response using 3-ONOP-049.1.
	BOP	SUBSEQUENT ACTIONS 5.1 Verify instrument loop failure by comparison to adjacent loops and known plant parameters and conditions.
	SRO	Observes indicator LT-3-498 failing low and compares 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.
	SRO	Verifies no off-normal conditions exist on the adjacent channels.
	BOP	Manually controls FCV-3-498 and returns S/G level to program using 3-ARP-097.CR
	BOP	5.3 Verify applicable control transfer switches are in the position which eliminates the failed loop.
	BOP	When 3C S/G level on program, selects LT-3-496 for FCV-3-498 control.
	BOP	5.4 IF a control function was placed in manual control due to the failure, THEN verify the control function is returned to automatic.
	BOP	Places FCV-3-498 to AUTO.
	SRO	Refers to LCO 3.3.1, Table 3.3-1, and Table 3.3-2 and determines the minimum channels for S/G level are OPERABLE.
		EXAMINER NOTE When the SRO determines the minimum channels of S/G level are OPERABLE, proceed to Event 5.

Op-Test No.: 2010-301 Scenario No.: 3 Event No.: 5 Page 1 of 5

Event Description: PT-3-445 fails high, the crew responds using the ARP and 3-ONOP-49.1 to manually close PORV-456. The SRO will address LCO 3.2.5.b when RCS pressure decreases to 2200 psig

Time	Position	Applicant's Actions or Behavior
Direct facility operator to trigger lesson step "EVENT 5 PT-3-445 FAIL HIGH (actuates TFH1TU45 T)		
	RO	Observes the following: • RCS pressure decreasing. • PZR pressure control channel PT-3-445 pegged high • one PORV (PCV-3-456) open with no actual high pressure condition • Pressurizer High Pressure PC 456A bistable lights ON.
	RO	Observes annunciator : A-4/1, A-9/2, A-9/5
	SRO	Directs response using the ARP and 3-ONOP-41.5
	RO	Alarm Response actions: • Closes PORV PCV-3-456
		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.***
	CREW	Reviews 3-ONOP-41.5 foldout page actions (See next page)

Op-Test No.: 2010-301 Scenario No.: 3 Event No.: 5 Page 2 of 5

Event Description: PT-3-445 fails high, the crew responds using the ARP and 3-ONOP-49.1 to manually close PORV-456. The SRO will address LCO 3.2.5.b when RCS pressure decreases to 2200 psig.

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.: 2010-301 Scenario No.: 3 Event No.: 5 Page 3 of 5

Event Description: PT-3-445 fails high, the crew responds using the ARP and 3-ONOP-49.1 to manually close PORV-456. The SRO will address LCO 3.2.5.b when RCS pressure decreases to 2200 psig

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: Steps annotated with * may have already been performed in the ARP.
	RO	* **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. *
	RO	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.
	RO	Closes PORV PCV-3-456 (if not already done)
	RO	**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.: 2010-301 Scenario No.: 3 Event No.: 5 Page 4 of 5

Event Description: PT-3-445 fails high, the crew responds using the ARP and 3-ONOP-49.1 to manually close PORV-456. The SRO will address LCO 3.2.5.b when RCS pressure decreases to 2200 psig

Time	Position	Applicant's Actions or Behavior
	RO	**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	Determines Pressurizer pressure can be maintained greater then 2000 psig.
	SRO	Recognizes requirement for LCO 3.2.5 Action b entry.
		EXAMINER NOTE: 3.2.5 The following DNB-related parameters shall be maintained within the following limits: b. Pressurizer Pressure ≥ 2200 psig 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.: 2010-301 Scenario No.: 3 Event No.: 5 Page 5 of 5

Event Description: PT-3-445 fails high, the crew responds using the ARP and 3-ONOP-49.1 to manually close PORV-456. The SRO will address LCO 3.2.5.b when RCS pressure decreases to 2200 psig

Time	Position	Applicant's Actions or Behavior
	RO	**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
	RO	**5** **Check PZR Pressure Stable Or Increasing** Perform the following: • Continue efforts to restore PZR pressure control.
		EXAMINER NOTE: When the crew has stabilized Pressurizer pressure proceed to event 6.

Op-Test No.: 2010-301 Scenario No.: 3 Event No.: 6 Page 1 of 19

Event Description: During plant stabilization a SBLOCA develops when a safety opens. The crew responds using 3-EOP-E-0 and will transition to 3-EOP-E-1 and trip RCP's.

Time	Position	Applicant's Actions or Behavior
Direct facility operator to trigger lesson step "EVENT 5 Safety Valve Opens (actuates TVHV455C 1.0 5 min ramp T)		
	SRO	Directs response using 3-EOP-E-0 starting at step 1.
		NOTE *Steps 1 through 4 are IMMEDIATE ACTION steps.*
	RO	**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.
	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).
	BOP	Manually closes MSR steam supply MOVs

Op-Test No.: 2010-301 Scenario No.: 3 Event No.: 6 Page 2 of 19

Event Description: During plant stabilization a SBLOCA develops when a safety valve opens. The crew responds using 3-EOP-E-0 and will transition to 3-EOP-E-1 and trip RCP's.

Applicant's Actions or Behavior

Time	Position	Applicant's Actions or Behavior
	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.: 2010-301 Scenario No.: 3 Event No.: 6 Page 3 of 19

Event Description: During plant stabilization a SBLOCA develops when a safety valve opens.. The crew responds using 3-EOP-E-0 and will transition to 3-EOP-E-1 and trip RCP's.

Time	Position	Applicant's Actions or Behavior
	RO	**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.
		NOTE *FOLDOUT Page shall be monitored for the remainder of this procedure.*
	CREW	Monitors 3-EOP-E-0 Foldout page (see next page)
	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
		Examiner Note: The SRO and RO will complete the remaining steps in 3-EOP-E-0, while the BOP performs 3-EOP-E-0 prompt action verifications using attachment 3

Op-Test No.: 2010-301	Scenario No.: 3	Event No.: 6	Page 4 of 19
Event Description: During plant stabilization a SBLOCA develops when a safety valve opens. The crew responds using 3-EOP-E-0 and will transition to 3-EOP-E-1 and trip RCP's.			

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-OP-018.1, CONDENSATE STORAGE TANK.

7. **RHR SYSTEM OPERATION CRITERIA**

   IF RCS pressure is greater than 250 PSIG [650 PSIG] AND 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.: 2010-301 Scenario No.: 3 Event No.: 6 Page 5 of 19

Event Description: During plant stabilization a SBLOCA develops when a safety valve opens. The crew responds using 3-EOP-E-0 and will transition to 3-EOP-E-1 and trip RCP's.

Time	Position	Applicant's Actions or Behavior
	RO	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.
	RO	**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.
	RO	**7** **Verify AFW Valve Alignment - PROPER EMERGENCY ALIGNMENT** Manually align valves to establish proper AFW alignment.

Op-Test No.: 2010-301 Scenario No.: 3 Event No.: 6 a Page 6 of 19

Event Description: During the performance of 3-EOP-E-0, AFW flow to the 3C S/G is blocked. The crew will establish greater than 345 gpm total to the 3A and 3B S/G.

Time	Position	Applicant's Actions or Behavior
	RO	**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.
	RO	b. Maintain feed flow to S/G narrow range levels between 15%[32%] and 50%.
	RO	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 345gpm prior to transitioning out of 3-EOP-E-0.

Op-Test No.: 2010-301 Scenario No.: 3 Event No.: 6 Page 7 of 19

Event Description: During plant stabilization a SBLOCA develops when a safety valve opens. The crew responds using 3-EOP-E-0 and will transition to 3-EOP-E-1 and trip RCP's.

Time	Position	Applicant's Actions or Behavior
	RO	**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.: 2010-301 Scenario No.: 3 Event No.: 6 Page 8 of 19

Event Description: During plant stabilization a SBLOCA develops when a safety valve opens. The crew responds using 3-EOP-E-0 and will transition to 3-EOP-E-1 and trip RCP's.

Time	Position	Applicant's Actions or Behavior
	RO	**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) Limit 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.
	RO	Reduces total AFW flow to 345 gpm max for all S/G's.

Op-Test No.: 2010-301 Scenario No.: 3 Event No.: 6 Page 9 of 19

Event Description: During plant stabilization a SBLOCA develops when a safety valve opens. The crew responds using 3-EOP-E-0 and will transition to 3-EOP-E-1 and trip RCP's.

Time	Position	Applicant's Actions or Behavior
	RO	**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).
	RO	**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
	RO	Stops RCPs if subcooling is less than 25°F (65°F) 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.

Op-Test No.: 2010-301 Scenario No.: 3 Event No.: 6 Page 10 of 19

Event Description: During plant stabilization a SBLOCA develops when a safety valve opens. The crew responds using 3-EOP-E-0 and will transition to 3-EOP-E-1 and trip RCP's.

Time	Position	Applicant's Actions or Behavior
	RO	**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
	RO	**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 * ERDADS 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.: 2010-301 Scenario No.: 3 Event No.: 6 Page 11 of 19

Event Description: During plant stabilization a SBLOCA develops when a safety valve opens. The crew responds using 3-EOP-E-0 and will transition to 3-EOP-E-1 and trip RCP's.

Time	Position	Applicant's Actions or Behavior
	RO	**15** **Check If RCS Is Intact** a. Containment radiation - NORMAL b. Containment pressure - NORMAL c. 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 page 18

Op-Test No.: 2010-301 Scenario No.: 3 Event No.: 6 Page 12 of 19

Event Description: During plant stabilization a SBLOCA develops when a safety valve opens. The crew responds using 3-EOP-E-0 and will transition to 3-EOP-E-1 and trip RCP's.

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).

Op-Test No.: 2010-301 Scenario No.: 3 Event No.: 6 Page 13 of 19

Event Description: During plant stabilization a SBLOCA develops when a safety valve opens. The crew responds using 3-EOP-E-0 and will transition to 3-EOP-E-1 and trip RCP's.

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

Op-Test No.: 2010-301 Scenario No.: 3 Event No.: 6 Page 14 of 19

Event Description: During plant stabilization a SBLOCA develops when a safety valve opens. The crew responds using 3-EOP-E-0 and will transition to 3-EOP-E-1 and trip RCP's.

Time	Position	Applicant's Actions or Behavior
	BOP	**7. Verify SI Pump Operation** a. At least two high head 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 <u>AND</u> 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 <u>AND</u> 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 <u>AND</u> place in standby
	BOP	Places the handswitches for the 4A and 4B HHSI pumps to STOP.

Op-Test No.: 2010-301 Scenario No.: 3 Event No.: 6 Page 15 of 19

Event Description: During plant stabilization a SBLOCA develops when a safety valve opens. The crew responds using 3-EOP-E-0 and will transition to 3-EOP-E-1 and trip RCP's.

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.: 2010-301 Scenario No.: 3 Event No.: 6 Page 16 of 19

Event Description: During plant stabilization a SBLOCA develops when a safety valve opens. The crew responds using 3-EOP-E-0 and will transition to 3-EOP-E-1 and trip RCP's.

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 b. Verify Control Room ventilation status panel - PROPER EMERGENCY RECIRCULATION ALIGNMENT a. Manually stop fans. b. Manually align equipment for Control Room emergency recirculation.
		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-OP-094, CONTAINMENT POST ACCIDENT MONITORING SYSTEM**
	BOP	**18. Verify All Four EDGs – RUNNING** EMERGENCY START any available EDG NOT running.

Op-Test No.: 2010-301 Scenario No.: 3 Event No.: 6 Page 17 of 19

Event Description: During plant stabilization a SBLOCA develops when a safety valve opens. The crew responds using 3-EOP-E-0 and will transition to 3-EOP-E-1 and trip RCP's.

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 Note Any Actions That Had To Be Taken**

Op-Test No.: 2010-301 Scenario No.: 3 Event No.: 6 Page 18 of 19

Event Description: During plant stabilization a SBLOCA develops when a safety valve opens. The crew responds using 3-EOP-E-0 and will transition to 3-EOP-E-1 and trip RCP's.

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)
	RO	**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
	RO	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.
		EXAMINER NOTE: The scenario is terminated when transition has been made to 3-EOP-E-1 and the RCP's have been tripped, or earlier based on the discretion of the lead examiner.

Op-Test No.: 2010-301	Scenario No.: 3	Event No.: 6	Page 19 of 19
Time	Position	Applicant Actions or Behavior	

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 10^8 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-OP-018.1, Condensate Storage Tank.

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 RCS pressure is greater than 250 PSIG [650 PSIG] AND RHR flow is less than 1000 gpm, THEN the RHR pumps shall be shut down within 44 minutes of the initial start signal.

Facility: Turkey Point | Scenario No.: 4 | Op Test No.: 2010-301

Examiners: _____ Candidates: _____ US

_____ _____ RO

_____ _____ BOP

Initial Conditions: Mode 1, 75% Power, 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.

Immediately after shift turnover perform monthly surveillance on 3A ECC using 3-OSP-055.1 section 4.2 beginning at step 4.2.1.11. IST and remote valve position verification not required. The Shift Manager has granted permission to perform the test. Operators required for this evolution have been briefed and are in the field.

Maintain 75%

Online risk – green

B train protected both units

Event No.		Event Type*	Event Description
1	TFC1DOG t	(TS) SRO	3A ECC monthly surveillance performed using 3-OSP-055.1 section 4.2.1. 3A ECC fan trips and the 3A ECC is declared OOS. The SRO enters LCO 3.6.2.2 action a.
2	TFL1T8CH = T	(I) RO (I) SRO	TM-3-408C (Tavg input to rod control) fails high. The RO responds using 3-ONOP-028 and takes rods to manual to stop continuous inward rod movement.
3	TVKD001X 1, 3 min ramp	(C) BOP (C) SRO	The A TPCW pump bearing fails, the BOP manually starts the 3B TPCW pump.
4	TCE6DS2C & TFEG6G215	(C) RO (C) BOP (C,TS) SRO	120V vital instrument bus 3P07 main feeder breaker fails open. The RO responds using 3-ONOP-3.7 to restore Letdown and the BOP manually controls feedwater to the 3B S/G. The SRO enters LCO 3.0.3 and 3.8.1.1
5		(R) RO (N) BOP	The RO will initiate a boration and the BOP will reduce turbine load using 3-ONOP-100.
6	TAHUVBSB=22 TAHUVBMB= 6		The 3B RCP develops high vibration. The crew responds using 3-ONOP-041.1. Once vibration reaches the trip setpoint, the crew manually trips the reactor and immediate actions of 3-EOP-E-0 are performed.
7	TVHHHLB = 0.1 TFQ634AF = T	(M) ALL	When 3B RCP is tripped, 3B 4kV bus is de-energized and a large break LOCA occurs. The crew completes 3-EOP-E-0 and transitions to 3-EOP-FR-P.1, then FR-Z.1 and subsequently 3-EOP-E-1. Once CSFSTs are monitored for implementation, if containment pressure is still above 20 psig, the crew will transition to 3-EOP-FR-Z.1 if no higher red or orange path exists.
7a		(C) BOP	An automatic SI occurs but train A sequencer fails due to the loss of 3P07. The BOP manually starts train 3A RHR and the 3A Containment Spray pumps.

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

Rev'd 8/23/10

2010-301 NRC Scenario #4

Event 1 - 3A ECC monthly surveillance performed using 3-OSP-055.1 section 4.2.1. 3A ECC fan trips and the 3A ECC is declared OOS. The SRO enters LCO 3.6.2.2 action a.

Event 2 - TM-3-408C (Tavg input to rod control) fails high. The RO responds using 3-ONOP-028 and takes rods to manual to stop continuous inward rod movement.

Event 3 - 3A TPCW Trip. The A TPCW pump bearing fails, the BOP manually starts the 3B TPCW pump.

Event 4 - 120V vital instrument bus 3P07 main feeder breaker fails open. The RO responds using 3-ONOP-3.7 to restore Letdown and the BOP manually controls feedwater to the 3B S/G. The SRO enters LCO 3.0.3 and 3.8.1.1

Event 5 - The RO will initiate a boration and the BOP will reduce turbine load using 3-ONOP-100.

Event 6 - The 3B RCP develops high vibration. The crew responds using 3-ONOP-041.1. Once vibration reaches the trip setpoint, the crew manually trips the reactor and immediate actions of 3-EOP-E-0 are performed.

Event 7 - When 3B RCP is tripped, 3B 4kV bus is lost and a large break LOCA occurs. An automatic SI occurs but train A sequencer fails due to the loss of 3P07.

Event 7a - The Train A RHR **(CRITICAL TASK)** and Containment Spray **(CRITICAL TASK)** pumps must be manually started. The crew completes 3-EOP-E-0 and transitions to 3-EOP-FR-P.1 and subsequently 3-EOP-E-1.

Event 7a - Once CSFSTs are monitored for implementation, if containment pressure is still above 20 psig, the crew will transition to 3-EOP-FR-Z.1 if no higher red or orange path exists.

Rec'd 8/23/10

2010-301 NRC Scenario #4 Simulator Operating Instructions

Setup

Restore IC-16 (75% MOL)

Open and execute lesson file Gr 26 NRC Scenario 4.lsn

Place simulator in run

Manually stop the 3B2 Circulating Water pump

Trigger lesson steps:

- SETUP - 3B2 CWP OOS (actuates TAK4DP = 3)
- SETUP - 3B TPCW Fail to Auto Start (actuates TFK3B11S T)
- Place Clearance Tag on 3B2 Hand Switch

Perform of 3-OSP-055.1 section 4.2 steps 7 and 8.

Provide a copy of 3-OSP-055.1 section 4.2 & Attachment 1 filled out thru step 4.2.1.10. 3-OSP-055.1 is being performed without quarterly IST or remote position verification required.

Place simulator in freeze.

Provide shift turnover checklists

Perform Simulator Operator Checklist

Event 1 - 3A ECC OSP failure

3A ECC monthly surveillance performed using 3-OSP-055.1 section 4.2.1. 3A ECC fan trips and the 3A ECC is declared OOS. The SRO enters LCO 3.6.2.2 action a.

When the RO manually starts the 3A ECC fan ensure, lesson step **EVENT 1 - 3A ECC Fan Trip** (actuates TFC1DOG t) Auto inserts

If directed respond as TO

If directed, respond as WCC to have Electrical maintenance investigate failure of the 3A ECC fan.

If directed, respond as WCC to position 3A ECC breaker 30650 to OFF and place it under clearance. After 5 min, **trigger** lesson step **EVENT 1 - 3A ECC BKR TO OFF** (actuates TCC1DMG = F)

Event 2 - TM-3-408C Tavg input to rod control fails high

TM-3-408C (Tavg input to rod control) fails high. The RO responds using 3-ONOP-028 and takes rods to manual to stop continuous inward rod movement.

When directed, trigger lesson step **EVENT 2 - TM-3-408C FAILS HIGH** (actuates TFL1T8CH = T).

If directed, respond as WCC to have I&C investigate failure of rod control.

If directed, respond as WCC if directed to generate a caution tag to be hung on the rod control selector switch

Event 3 – 3A TPCW Pump Trip

The A TPCW pump bearing fails, the BOP manually starts the 3B TPCW pump.

When directed, trigger lesson step **Event 3 - 3A TPCW Trip** Event 7

If directed, respond as the FS/TO, report the 3A TPCW pump is not running and the pump inboard bearing is hot

If directed, respond as WCC to have Mechanical maintenance investigate failure of the 3A TPCW.

If directed, respond as WCC if directed to generate a PWO

Event 4 - Loss of 3P07

120V vital instrument bus 3P07 main feeder breaker fails open. The RO responds using 3-ONOP-3.7 to restore Letdown and the BOP manually controls feedwater to the 3B S/G. The SRO enters LCO 3.0.3 and 3.8.1.1

When directed, **trigger lesson step EVENT 4 - LOSS OF 3P07** (actuates TCE6DS2C & TFEG6G215)

When directed, respond as TO/FS. Report 3P07 Main Feeder and breakers 10 and 15 were found open, no apparent cause.

When directed to perform 3-ONOP-003.7 Attachment 1, respond as FS, use time compression **and trigger lesson step, EVENT 4 – OPEN 3P07 BREAKERS.** (actuates TCE6DG4C=F & TCE6215S=T)

When directed to perform 3-ONOP-003.7 Attachment 1, respond as FS, use time compression **and trigger lesson step, EVENT 4 Close 3P07 Main Breaker**

When directed to perform 3-ONOP-003.7 Attachment 1, respond as FS, use time compression **and trigger lesson step, EVENT 4 Align 3P07 to AS Inverter**

When directed to perform 3-ONOP-003.7 Attachment 1, respond as FS, use time compression **and trigger lesson step Event 4 - Close 3 P07 Breakers**

When directed, respond as TO/FS, use time compression notify the crew that 3P07 breakers 10 and 15 will not re-close no apparent cause Estimated time to repair is at least 10 hrs.

When directed, respond as WCC acknowledge direction to investigate the cause of the 3P07 breaker trip and to contact Electrical Maintenance and to generate PWO and clearance.

When directed, respond as management/System if called about forced shutdown.

Event 5 –Fast load reduction

The RO will initiate a boration and the BOP will reduce turbine load using 3-ONOP-100.

If directed, respond as System when called about load reduction.

If directed, respond as SM when told to review 0-EPIP-20101 & 0-ADM-115 for notification requirements. State that the NRC Resident will be notified of the fast laod reduction.

If directed, respond as chemistry to take samples. No response back required.

If directed, respond as FS/NSO to align aux steam using attachment 1. No response back required.

Event 6 - 3B RCP high vibration / Reactor trip

The 3B RCP develops high vibration. The crew responds using 3-ONOP-041.1. Once vibration reaches either shaft or motor trip setpoint, the crew manually trips the reactor and immediate actions of 3-EOP-E-0 are performed.

When directed, trigger lesson step **EVENT 5 - 3B RCP HIGH VIBRATION** (actuates TAHUVBSB = 22.0 on 5 min ramp & TAHUVBMB = 6.0 on 5 min ramp).

When directed, respond if notified as system engineer of increasing vibration on 3B RCP motor & shaft.

Event 7 - Large break LOCA / Loss of 3B 4kv Bus

Tripping 3B RCP auto triggers lesson step EVENT 6 - LARGE BREAK LOCA (actuates TVHHHLB = 0.1) **and EVENT 6 - 3B 4KV BUS LOCKOUT** (actuates TFE2Z51S = T).

The 3B 4kV bus is lost and a large break LOCA occurs. An automatic SI occurs but train A sequencer fails due to the loss of 3P07. Train A RHR and Containment Spray pumps must be manually started. The crew completes 3-EOP-E-0 and transitions to 3-EOP-FR-P.1 and subsequently followed by 3-EOP-E-1.

When directed, respond as TO to locally close MOV-3-1407. After 4-6 min, **trigger** lesson step **EVENT 7 - CLOSE MOV-3-1407** (actuates TFVV07C = F). Report when complete.

When directed, respond as SNPO to locally open MOV-3-843B. After 1-3 min., **trigger** lesson step **EVENT 7 - OPEN MOV-3-843B** (actuates TFMVV02O = T). Report when complete.

When directed, respond as U4 RO to perform 3-EOP-E-0 Att 1 to align U4 HHSIPs to U3 RWST. After 1-3 min, **trigger** lesson step **EVENT 7 - ALIGN U4 HHSIP TO U3 RWST** (actuates TAMH1V41 = 1.0, TAMH1V46 = 1.0 after 1 min delay, TAMH1V37 = 0.0 after 2 min delay, TAMH4856 = 0.0 after 3 min delay). Report when complete.

When directed, respond as SNPO when directed to locally verify phase A valves MOV-3-1417, 1418, 1425 & 381 closed (all of which are in the U3 Pipe & Valve Room). After 1-3 min, **trigger** lesson step **EVENT 7 - CLOSE PHASE A ISOL VALVES** (actuates TFKV417C = T, TFKV418C = T after 1 min delay, TFBV60 = T after 2 min delay & TFSWVM5B = T after 3 min delay). Report when complete.

When directed, respond as SNPO to locally verify phase B valves MOV-3-626, 716B & 730 closed(all of which are in the U3 Pipe & Valve Room). After 1-3 min, **trigger** lesson step **EVENT 7 - CLOSE PHASE B ISOL VALVES** (actuates TFKV626C = T, TFKV16BC = T after 1 min delay & TFKV730C = T after 2 min delay). Report when complete.

When directed, respond as SNPO to place PAHMS in service on unit 3. After 8-12 minutes, **trigger** lesson step **EVENT 7 - PLACE U3 PAHMS IN SERVICE** (actuates TAC2V02A = 1.0, TAC2V02B = 1.0, TAAAV21 = 1.0, TAAAV22 = 1.0 & TACA005 = 0.0). Report when complete.

Transition is made from 3-EOP-E-0 to 3-EOP-FR-P.1 which is quickly exited due to the presence of low head SI flow in response to the LBLOCA.

Event 7 - Respond to High Containment Pressure

Once CSFSTs are monitored for implementation, if containment pressure is still above 20 psig, the crew the crew will transition to 3-EOP-FR-Z.1 if no higher red or orange path exists.

When directed, respond as SNPO to check CSP suction & discharge valves open. After 1-3 min., report that 3A CSP suction & discharge valves are open.

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	--
1. Total malfunctions (5–8)	7
2. Malfunctions after EOP entry (1–2)	2
3. Abnormal events (2–4)	5
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)	2

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 1 Page 1 of 1

Event Description: 3A ECC monthly surveillance is being performed using 3-OSP-055.1 section 4.2 at step 42.1.11 when the 3A ECC fan trips and the 3A ECC is declared OOS. The SRO enters LCO 3.6.2.2 action a.

Time	Position	Applicant's Actions or Behavior
		2.1 **Precautions** 1. Only one Emergency Containment Cooler shall be tested at a time. 2. A 72-hour Action Statement applies to a single ECC declared inoperable. • If Inservice Testing is required in MODES 1, 2, 3, or 4, entry to a 72-hour Action Statement will occur for a single ECC declared inoperable. • If the Control switch for 3A or 3C ECC is placed in STOP, the affected ECC must be declared inoperable.
	BOP	4.2 **3A Emergency Containment Cooler Test** INITIAL 4.2.1 **3A ECC Test Performance** 11. Simultaneously **START** the following: • 3A ECC Fan _____ • The stopwatch _____
	BOP	Places the handswitch for the 3A ECC fan to START
	BOP	Observes that the 3A ECC Fan trips.
	SRO	Directs the BOP to place the handswitch to stop.
	BOP	Places the handswitch for the 3A ECC fan to STOP
		EXAMINER NOTE: The Crew may leave switch in STOP rather than return to AUTO since 3A ECC OOS.
	SRO	Determines the 3A ECC is INOPERABLE and enters LCO 3.6.2.2 action a.
		3.6.2.2 Three emergency containment cooling units shall be OPERABLE. APPLICABILITY: MODES 1, 2, 3, and 4. a. With one of the above required emergency containment cooling units inoperable restore the inoperable cooling unit to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

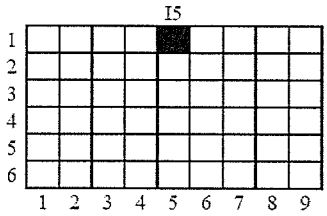
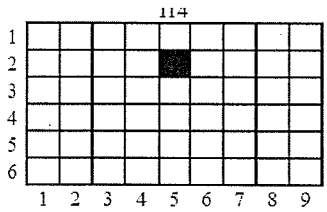
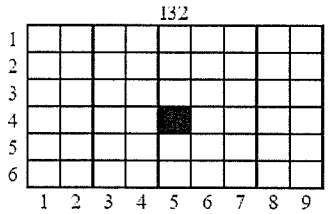
Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 2 Page 1 of 1

Event Description: TM-3-408C (Tavg input to rod control) fails high. Crew responds using 3-ONOP-028 and takes rods to manual to stop continuous inward rod movement.

Time	Position	Applicant's Actions or Behavior
Direct facility operator to trigger lesson step EVENT 2 - TM-3-408C FAILS HIGH (actuates TFL1T8CH = T)		
	RO	Observes continuous control rod auto insertion with no demand present.
	SRO	Directs response using 3-ONOP-028.
	RO	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.
	RO	Places Rod Motion Control Selector to MAN
	RO	Observes continuous control rod auto insertion has stopped.
	RO	5.0 SUBSEQUENT ACTIONS 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. 5.3.3 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.
	RO or BOP	Positions Control Rods or Reduce Turbine Load as directed to restore RCS Temperature.
	RO	Place a caution tag on Rod control Selector Switch stating that placing rods in AUTO may result in undesired rod motion.
	BOP	Notify I&C of problem with rod control.
		Examiner Note: Proceed to Event 3-3B TPCW Bearing Failure

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 3 Page 1 of 2

Event Description: The B TPCW bearing fails, the BOP will start the A TPCW pump using the ARP or 3-ONOP-008 to maintain plant operation

Time	Position	Applicant's Actions or Behavior
Direct facility operator to trigger lesson step EVENT 3 – 3B TPCW Pump Bearing Fails (actuates TVKD001X 1 with a 3 min ramp).		
	RO	Observes annunciators I-5/1, 5/2 & 5/4
		 ATTACHMENT 9 Page 25 of 54 Panel I — TPCWP A/B MOTOR OVERLOAD
		 ATTACHMENT 9 Page 26 of 54 Panel I — TPCWP A/B TRIP
		 ATTACHMENT 9 Page 28 of 54 Panel I — TPCW HI TEMP/ LO PRESS
	BOP	May start the 3A and stop the 3B TPCW pump using the ARP
	SRO	Directs response using 3-ONOP-008 or the ARP

Op-Test No.: 2010-301	Scenario No.: 4	Event No.: 3	Page 1 of 2

Event Description: The B TPCW bearing fails, the BOP will start the A TPCW pump using the ARP or 3-ONOP-008 to maintain plant operation

Time	Position	Applicant's Actions or Behavior
		CAUTIONS • *If a turbine plant cooling water pump is stopped in this procedure and the reason for stopping the pump has not been corrected, that pump is not available for starting in subsequent procedure steps.* • *Monitoring Main Generator RTDs is required if TPCW flow or temperature is changed due to the effect on Main Generator hydrogen leakage. An increase in hydrogen leakage is expected if the gas temperature to rotor temperature gradient increases. (Reference CR 2008-803)* **NOTE** *If turbine lube oil cooler outlet temperature increases to greater than 125 °F, emergency cooling may be established using ATTACHMENT 1.*
	BOP	1 Check All Turbine Plant Cooling Water Pump Alarms - OFF • I 5/1, TPCWP A/B MOTOR OVERLOAD • I 5/2, TPCWP A/B TRIP • I 5/3, TPCWP A/B MOTOR BRG HI TEMP Perform the following: a. Determine affected turbine plant cooling water pump. b. Check if standby turbine plant cooling water pump auto-started. IF standby turbine plant cooling water pump did not auto-start AND offsite power is available, THEN start standby turbine plant cooling water pump. c. Stop affected turbine plant cooling water pump.
	BOP	2 Verify Turbine Plant Cooling Water Pumps - AT LEAST ONE RUNNING Perform the following: a. IF offsite power is available, THEN start one turbine plant cooling water pump. b. IF neither turbine plant cooling water pump can be started, THEN manually trip reactor AND main turbine.
		EXAMINER NOTE: When the crew starts the 3A TPCW pump, proceed to EVENT 4- Loss of 3 P07

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 4 Page 1 of 6

Event Description: 120V vital instrument bus 3P07 main feeder breaker fails open. The crew responds using 3-ONOP-3.7 to restore Letdown and control feedwater to the 3B S/G. The SRO enters LOC 3.0.3 and 3.8.1.1

Time	Position	Applicant's Actions or Behavior
Direct facility operator to trigger lesson step EVENT 4 - LOSS OF 3P07 (actuates TCE6DS2C & TFEG6G215)		
		F10 VITAL AC BUS INVERTER TROUBLE CAUSES: 1. Low DC Voltage 2. Low AC Voltage 3. Inverter Off Frequency 4. Line 1 to Grnd 5. Line 2 to Grnd 6. Out of Sync 7. High Temp 8. Overcurrent (Transferred to CVT) 9. Man. Bypass in Alt. Position
	BOP	Observes annunciators F-1/2, B 9/2 and 9/3
	CREW	Observes the following: • RPS Status Logic Lights for Channel I & II OFF • Loss of Channel II Instrumentation (White) • Loss of Auto Control of 3B Feedwater Control Valve, FCV-3-488 • Auto VCT makeup will occur due to LT-3-115 failure
	RO	Reviews action required by the ARP.
		OPERATOR ACTIONS: 1. Verify alarm by checking the following: a. Inverter status lights below X panel. 2. Verify the following automatic actions have occurred: a. Auto transfer to the CVT
		NOTE *24 hour LCO for operation on CVT, see TS 3.8.3*

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 4 Page 2 of 6

Event Description: 120V vital instrument bus 3P07 main feeder breaker fails open. The crew responds using 3-ONOP-3.7 to restore Letdown and control feedwater to the 3B S/G. The SRO enters LOC 3.0.3 and 3.8.1.1

Time	Position	Applicant's Actions or Behavior
	SRO	Directs response using 3-ONOP-003.7
		NOTES • *Step 1 is an immediate action step.* • *All 3P07 (WHITE) channel indication/controls are affected by failure of 3P07. Enclosure 1 provides a listing of lost functions, indications, and controls.*
	CREW	Performs IOAs, Determines reactor trip not occurred nor required
	CREW	Reviews Foldout Page
		FOLDOUT PAGE FOR PROCEDURE -ONOP-003.7 1. Dispatch an operator to restore power to 3P07 using Attachment 1. 2. Due to the failure of LT-3-115, place RCS Make Up Control Switch to STOP.
	RO	Directs TO/FS perform Attachment 1 to strip and restore 3P07.
		Examiner Note: See page 6 of event 3 for Attachment 1
		Examiner Note: The crew will be unable to restore all of 3P07 due to the failure of the main feeder breaker and breakers 10 and 15.
	SRO	**2 Check Unit Operating In Modes 1 Through 3 Prior To Loss Of 3P07** Perform the following: a. IF OMS is in LOW PRESSURE OPS, THEN verify RCS pressure is less than OMS setpoint AND place PORV-3-455C control switch to CLOSE. b. Monitor #1 seal ΔP for RCP trip criteria. c. Monitor RCS pressure. d. IF RCS pressure exceeds the OMS setpoint AND PORV-3-456 does NOT AUTO open, THEN operate PORV–3–455C as necessary to reduce RCS pressure.
		NOTE *If the Pressurizer Level Control Selector Switch was NOT in Position 2 (CH 1 and CH 3), letdown isolation will have occurred.*

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 4 Page 3 of 6

Event Description: 120V vital instrument bus 3P07 main feeder breaker fails open. The crew responds using 3-ONOP-3.7 to restore Letdown and control feedwater to the 3B S/G. The SRO enters LOC 3.0.3 and 3.8.1.1

Time	Position	Applicant's Actions or Behavior
		3 **Control Pressurizer Parameters As Follows** a. Place Pressurizer Level Control Selector Switch on VPA in Position 2 (CH1 and CH3) b. Check 3A or 3C Charging Pump operating — b. Operate 3A or 3C Charging pump(s) as necessary to maintain Pressurizer Level. c. Check normal letdown in service — c. Restore Normal Letdown flow using Attachment 4. d. Maintain Pressurizer Level – IN REQUIRED CONTROL BAND e. Check Pressurizer Pressure - IN REQUIRED CONTROL BAND — e. Perform the following: 1) Operate pressurizer heaters **AND** spray valves as necessary to maintain pressure in the required control band. 2) **IF** RCS is solid, **THEN** operate charging pumps and letdown flow as necessary to maintain pressure in the required control band.
	RO	Places PZR level control switch to position 2 (CH1 and CH3)
	RO	Maintains PZR press on program using heaters & spray as required

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 4 Page 4 of 6

Event Description: 120V vital instrument bus 3P07 main feeder breaker fails open. The crew responds using 3-ONOP-3.7 to restore Letdown and control feedwater to the 3B S/G. The SRO enters LOC 3.0.3 and 3.8.1.1

Time	Position	Applicant's Actions or Behavior
		ATTACHMENT 4 (Page 1 of 1) **RESTORATION OF NORMAL LETDOWN FLOW** 1. Throttle Low Pressure LTDN Controller, PCV-3-145, as necessary to prevent Letdown Relief Valve from lifting (approximately 50% open). 2. Manually control Low Pressure LTDN Control Valve, PCV-3-145, as necessary limit pressure spike. 3. Open High Pressure L/D Isol. Vlv., LCV-3-460. **CAUTION** ***To prevent channeling of demineralizer resin, DO NOT exceed 120 GPM letdown flow. When placing letdown in service, DO NOT open both 60 GPM Letdown Orifices Isolation.*** 4. Open the following Letdown Isolation Valves, as required, to restore pressurizer level to program level without exceeding 120 GPM letdown flow: * 45 GPM L/D Isolation Valve, CV-3-200A * 60 GPM L/D Isolation Valve, CV-3-200B * 60 GPM L/D Isolation Valve, CV-3-200C 5. Return Low Pressure Letdown Control Valve, PCV-3-145 to Automatic.
	RO	Restores normal letdown using Attachment 4
		CAUTIONS • ***Reducing feed flow to less than steam flow by 655,000 lbs/hr will result in a reactor trip due to low level trip logic on Channel 2 of each Steam Generator.*** • ***3B Steam Generator Level Recorder is - DE-ENERGIZED.*** • ***Main Generator load should be maintained as stable as possible until all FW Control Valves are restored to automatic control.***
		NOTES • *3B Steam Generator level controller is in MANUAL.* • *3A and 3C Steam Generator level controller should remain in AUTOMATIC.*
	BOP	Controls 3B FRV-3-488 to maintain 3B S/G level on program US should give BOP a band to control SG level in.

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 4 Page 5 of 6

Event Description: 120V vital instrument bus 3P07 main feeder breaker fails open. The crew responds using 3-ONOP-3.7 to restore Letdown and control feedwater to the 3B S/G. The SRO enters LOC 3.0.3 and 3.8.1.1

Time	Position	Applicant's Actions or Behavior
	CREW	**5** **Maintain The Following Plant Parameters - STABLE** • Tavg • Reactor power • Pressurizer Pressure • Pressurizer Water level • Steam generator Water level IF any Reactor trip setpoint is approached or exceeded, THEN trip the reactor AND perform 3-EOP-E-0, REACTOR TRIP OR SAFETY INJECTION, while continuing with this procedure.
	SRO	**6** **Check Power Restored To 3P07** Perform the following: a. Continue efforts to restore power to 3P07. b. IF power can NOT be restored to 3P07 within 1 hour, THEN perform the actions required by Technical Specifications as directed by the NPS. c. Return to Step 1.
	SRO	Investigate the consequence of loss of power to 3P07.
		NOTES *3A bus sequencer is out of service, due to Vital Panel 3P07 deenergized, resulting in the following Tech Spec implications:* *1) AFW actuation signals from bus stripping on 3A 4KV bus will NOT be generated, placing the unit in Tech Spec 3.0.3 (Tech Spec 3.3.2, Table 3.3-2, Functional Unit 6d action 23 invokes Tech Spec 3.0.3.)* *2) Loss of Power signals are lost via the 3A bus sequencer, placing the unit in Tech Spec 3.0.3 (Tech Spec 3.3.2, Table 3.3-2, Functional Unit 7a, b, and c.)* *3) Bus stripping will NOT automatically occur, 3A EDG will NOT automatically close in on the bus and is out of service (actions of Tech Spec 3.8.1.1 apply).*
	SRO	Reviews Enclosure 1 affected equipment and note regarding Tech Specs
	SRO	Directs WCC arrange for Electrical Maint investigation of power restoration to the sequencer.
		Examiner Note: When the SRO has addressed Tech Specs, proceed to Event 5-3-ONOP-100 Shutdown when the BOP places the feed regulating valve back in AUTO.

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 4 Page 6 of 6

Event Description: 120V vital instrument bus 3P07 main feeder breaker fails open. The crew responds using 3-ONOP-3.7 to restore Letdown and control feedwater to the 3B S/G. The SRO enters LOC 3.0.3 and 3.8.1.1

Time	Position	Applicant's Actions or Behavior
		ATTACHMENT 1 (Page 1 of 2) **Restoration of 3P07 Vital Instrument AC Bus** 1. In the Inverter Room, perform the following: a. Proceed to the 3A failed inverter. b. Open the 3A inverter System Output breaker CB6. 2. In the Cable Spreading Room, perform the following: a. At Vital Instrument Panel 3P07, place **ALL** breakers to OFF, including main panel breaker. b. At Subpanel 3P22, place all breakers to OFF. 3. Check 4P07 being powered by AS Inverter at 4P07A Vital Instrument AC Selector Switch in the Cable Spreading Room. 4. IF 4P07 is powered by the AS Inverter, THEN notify the Nuclear Plant Supervisor. **CAUTION** ***Do NOT proceed with this procedure if 4P07 is powered by the AS Inverter*** 5. IF 4P07 is NOT powered from AS Inverter, THEN place spare inverter AS in service to supply 3P07 Vital Instrument AC Bus load as follows: a. At Vital Instrument Panel 3P07A, in the Cable Spreading Room, place Vital Instrument AC Selector Switch 3P07A to the ALTERNATE SUPPLY STANDBY STATIC INVERTER AS (AC LINE) position.

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 5 Page 1 of 4

Event Description- Loss of the sequencer requires a 3.03 shutdown. The crew will have to perform an 3-ONOP-100, Rapid Load Reduction.

Time	Position	Applicant's Actions or Behavior
	SRO	Directs response using 3-ONOP-100.
	SRO	**1** **Brief Control Room Personnel Using Attachment 3** (See page for briefing sheet)
	CREW	Reviews 3-ONOP-100 foldout page actions (See next page)
	SRO	Determines 18 gal/% boric acid addition is required 1350-1600 gallons total.
	RO	**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
	CREW	**3** **Notify The Following** • System Dispatcher • Plant personnel using the Page Boost
	RO BOP 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 t expected Tavg/Tref ΔT of Attachment 3.
	RO	**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 an make adjustments as necessary.

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 5 Page 2 of 4

Event Description- Loss of the sequencer requires a 3.03 shutdown. The crew will have to perform an 3-ONOP-100, Rapid Load Reduction.

Time	Position	Applicant's Actions or Behavior
	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.: 2010-301 Scenario No.: 4 Event No.: 5 Page 3 of 4

Event Description- Loss of the sequencer requires a 3.03 shutdown. The crew will have to perform an 3-ONOP-100, Rapid Load Reduction.

Time	Position	Applicant's Actions or Behavior
	CREW	**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
		NOTE *Axial flux difference is allowed to exceed the Target Band during the load reduction without entering 0-OP-059.9, Operation Within the Axial Flux Difference Operational Space.*
	RO	**7** **Check Plant Response** a. Check pressurizer level following program — a. IF directed by the Unit Supervisor, THEN increase charging flow as follows: 1) Throttle open TCV-144, NRHX Temp Control Valve, bypass valve 3-834 to raise flow to approximately 600 gpm. 2) Start an additional charging pump. 3) Place an additional letdown orifice in service. 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.
	RO	**8** **Energize Pressurizer Backup Heaters**
	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.
		Examiner Note: The SRO may implement the following steps.
	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**

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 5 Page 4 of 4

Event Description- Loss of the sequencer requires a 3.03 shutdown. The crew will have to perform an 3-ONOP-100, Rapid Load Reduction.

Time	Position	Applicant's Actions or Behavior

FAST LOAD REDUCTION BRIEF

1. Reason for load reduction _____
2. Target power level _____ % Power

Time to Shutdown from 100%	25 min	50 min	75 min	110 min
Load Reduction Rate MW/min	30 MW/min	15 MW/min	10 MW/min	7 MW/min
Load Reduction Rate %/min	4 % / min	2 % / min	1.33 % / min	1 % / min
Expected Tavg/Tref ΔT	4 °F	3 °F	2 °F	1 °F

3. Load reduction rate _____ Mw / minute

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.
5. Plant Control Parameters and Contingency Actions
   - Tavg / Tref expected ΔT band, not to exceed ±1 °F of expected, slow ramp to restore band.
   - If Annunciator B 8/1, ROD BANK LO LIMIT alarms, the load reduction shall be slowed.
6. EOP E-0 transition criteria – Manual reactor and turbine trip:
   - Tave > 578 °F
   - Tave 6 °F > Tref
   - Rod Insertion Limits (RIL) are exceeded
7. Review required actions from other procedures currently in effect (example, stop RCP).
8. Questions or crew input?
9. End of Brief

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 6 Page 1 of 2

Event Description: The 3B RCP develops high vibration. The crew responds using 3-ONOP-041.1. Once vibration reaches either shaft or motor trip setpoint, the crew manually trips the reactor and immediate actions of 3-EOP-E-0 are performed.

Time	Position	Applicant's Actions or Behavior
Direct facility operator to trigger lesson step EVENT 6 - 3B RCP HIGH VIBRATION (actuates TAHUVBSB = 22.0 on 5 min ramp & TAHUVBMB = 6.0 on 5 min ramp)		
		F1 RCP MOTOR/SHAFT HI VIB CAUSES: 1. RCP high vibration 2. Failed probe or spiking due to electrical transients
	RO	Observes annunciator F 1/1 Determines rising shaft & motor vibration on 3B RCP
	CREW	OPERATOR ACTIONS: 1. Verify alarm by checking the following: a. RCP Vibration recorder R-3-369. 2. Corrective actions a. Dispatch operator to check vibration indications in the cable spreading room. b. IF vibration is above the alarm setpoint, THEN go to 3-ONOP-041.1, Reactor Coolant Pump Off-Normal. c. IF vibration is below the alarm setpoint, THEN have operator reset the Bently Nevada using the Common Reset toggle switch.
		NOTES • *Foldout Page is required to be monitored throughout this procedure.* • *Off-normal RCP Conditions that require shutdown of a RCP shall be verified by cross-checking all RCP parameters.* • *If either 3B or 3C RCPs are stopped by the performance of this procedure, then the associated RCS loop pressurizer spray valve should be closed to prevent back-flow through the valve.*
	CREW	FOLDOUT PAGE FOR PROCEDURE 3-ONOP-041.1 2. RCP STOPPING CRITERIA • RCP shaft vibration, R-369 (Points 3, 7, 11) - GREATER THAN OR EQUAL TO 20 MILS Note exception in Foldout Page Item 4.
	SRO	Directs response using 3-ONOP-041.1 foldout page
	SRO	Directs RO to manually trip the reactor and to trip the 3B RCP

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 6 Page 1 of 2

Event Description: The 3B RCP develops high vibration. The crew responds using 3-ONOP-041.1. Once vibration reaches either shaft or motor trip setpoint, the crew manually trips the reactor and immediate actions of 3-EOP-E-0 are performed.

Time	Position	Applicant's Actions or Behavior
	RO	Manually trips the reactor, verifies the reactor tripped, then trips the 3B RCP.
		Examiner Note: Proceed to Event 7-LBLOCA

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 7 Page 1 of 13

Event Description: The 3B RCP develops high vibration. The crew responds using 3-ONOP-041.1. Once vibration reaches either shaft or motor trip setpoint, the crew manually trips the reactor and immediate actions of 3-EOP-E-0 are performed.

Time	Position	Applicant's Actions or Behavior
Direct facility operator to trigger lesson step "EVENT 6 LBLOCA" **(actuates TVHHCLB= 2.0 / 3:00 ramp)**		
	SRO	Directs response using 3-EOP-E-0
		NOTE *Steps 1 through 4 are IMMEDIATE ACTION steps.*
	RO	**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 pow 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.
	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 affect breaker(s).

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 7 Page 2 of 13

Event Description: When 3B RCP is tripped, 3B 4kV bus is lost and a large break LOCA occurs. An automatic SI occurs but train A sequencer fails due to the loss of 3P07. Train A RHR and Containment Spray pumps must be manually started. The crew completes 3-EOP-E-0 and transitions to 3-EOP-FR-P.1, then FR-Z.1 and subsequently 3-EOP-E-1.

Time	Position	Applicant's Actions or Behavior
	BOP	Manually closes MSIVs to isolate the MSRs.
	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.
	BOP	Manually aligns the 3D 4KV Bus to the 3A 4 KV Bus.

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 7 Page 3 of 13

Event Description: When 3B RCP is tripped, 3B 4kV bus is lost and a large break LOCA occurs. An automatic SI occurs but train A sequencer fails due to the loss of 3P07. Train A RHR and Containment Spray pumps must be manually started. The crew completes 3-EOP-E-0 and transitions to 3-EOP-FR-P.1, and subsequently 3-EOP-E-1.

Time	Position	Applicant's Actions or Behavior
	RO	**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.
	RO	Places handswitch for the 3B RCP to STOP if not already done.
	CREW	Observes RCS pressure decreasing rapidly with an automatic SI and Phase A Isolation
	CREW	Observes loss of 3B 4kV bus.
	CREW	Monitors 3-EOP-E-0 Foldout page (see next page)
	BOP	**5** **Continue With Attachment 3 To Complete The Prompt Action Verifications While Performing This Procedure**
		Examiner Note: Attachment 3 commences at page 1 event 7

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 7 Page 4 of 13

Event Description: When 3B RCP is tripped, 3B 4kV bus is lost and a large break LOCA occurs. An automatic SI occurs but train A sequencer fails due to the loss of 3P07. Train A RHR and Containment Spray pumps must be manually started. The crew completes 3-EOP-E-0 and transitions to 3-EOP-FR-P.1 and subsequently 3-EOP-E-1.

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-OP-018.1, CONDENSATE STORAGE TANK.

7. **RHR SYSTEM OPERATION CRITERIA**

   IF RCS pressure is greater than 250 PSIG [650 PSIG] **AND** 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.: 2010-301 Scenario No.: 4 Event No.: 7 Page 5 of 13

Event Description: When 3B RCP is tripped, 3B 4kV bus is lost and a large break LOCA occurs. An automatic SI occurs but train A sequencer fails due to the loss of 3P07. Train A RHR and Containment Spray pumps must be manually started. The crew completes 3-EOP-E-0 and transitions to 3-EOP-FR-P.1 and subsequently 3-EOP-E-1.

Time	Position	Applicant's Actions or Behavior
		Examiner Note: The SRO and RO will complete the remaining steps in 3-EOP-E-0, while the BOP performs 3-EOP-E-0 prompt action verifications using attachment 3
	RO	Stops the 3A RCP when subcooling is less than 25°F (65°F) HHSI flowpath verified and HHSI pumps running or on Phase B based on foldout page requirements.
	RO	**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.
	RO	**7** **Verify AFW Valve Alignment - PROPER EMERGENCY ALIGNMENT** Manually align valves to establish proper AFW alignment.

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 7 Page 6 of 13

Event Description: When 3B RCP is tripped, 3B 4kV bus is lost and a large break LOCA occurs. An automatic SI occurs but train A sequencer fails due to the loss of 3P07. Train A RHR and Containment Spray pumps must be manually started. The crew completes 3-EOP-E-0 and transitions to 3-EOP-FR-P.1 and subsequently 3-EOP-E-1.

Time	Position	Applicant's Actions or Behavior
	RO	**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.
	RO	b. Maintain feed flow to S/G narrow range levels between 15%[32%] and 50%.

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 7 Page 7 of 13

Event Description: When 3B RCP is tripped, 3B 4kV bus is lost and a large break LOCA occurs. An automatic SI occurs but train A sequencer fails due to the loss of 3P07. Train A RHR and Containment Spray pumps must be manually started. The crew completes 3-EOP-E-0 and transitions to 3-EOP-FR-P.1 and subsequently 3-EOP-E-1.

Time	Position	Applicant's Actions or Behavior
	RO	**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.: 2010-301 Scenario No.: 4 Event No.: 7 Page 8 of 13

Event Description: When 3B RCP is tripped, 3B 4kV bus is lost and a large break LOCA occurs. An automatic SI occurs but train A sequencer fails due to the loss of 3P07. Train A RHR and Containment Spray pumps must be manually started. The crew completes 3-EOP-E-0 and transitions to 3-EOP-FR-P.1 and subsequently 3-EOP-E-1.

Time	Position	Applicant's Actions or Behavior
	RO	**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) Limit 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.
	RO	Adjusts total AFW flow to 345 gpm max.

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 7 Page 9 of 13

Event Description: When 3B RCP is tripped, 3B 4kV bus is lost and a large break LOCA occurs. An automatic SI occurs but train A sequencer fails due to the loss of 3P07. Train A RHR and Containment Spray pumps must be manually started. The crew completes 3-EOP-E-0 and transitions to 3-EOP-FR-P.1 and subsequently 3-EOP-E-1.

Time	Position	Applicant's Actions or Behavior
	RO	**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).

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 7 Page 10 of 13

Event Description: When 3B RCP is tripped, 3B 4kV bus is lost and a large break LOCA occurs. An automatic SI occurs but train A sequencer fails due to the loss of 3P07. Train A RHR and Containment Spray pumps must be manually started. The crew completes 3-EOP-E-0 and transitions to 3-EOP-FR-P.1 and subsequently 3-EOP-E-1.

Time	Position	Applicant's Actions or Behavior
	RO	**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
	RO	Stops RCPs when subcooling is less than 25°F (65°F) with HHSI flowpath verified and HHSI pumps running based on foldout page requirements.
	RO	**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

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 7 Page 11 of 13

Event Description: When 3B RCP is tripped, 3B 4kV bus is lost and a large break LOCA occurs. An automatic SI occurs but train A sequencer fails due to the loss of 3P07. Train A RHR and Containment Spray pumps must be manually started. The crew completes 3-EOP-E-0 and transitions to 3-EOP-FR-P.1 and subsequently 3-EOP-E-1.

Time	Position	Applicant's Actions or Behavior
	RO	**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 * ERDADS 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.: 2010-301 Scenario No.: 4 Event No.: 7 Page 12 of 13

Event Description: When 3B RCP is tripped, 3B 4kV bus is lost and a large break LOCA occurs. An automatic SI occurs but train A sequencer fails due to the loss of 3P07. Train A RHR and Containment Spray pumps must be manually started. The crew completes 3-EOP-E-0 and transitions to 3-EOP-FR-P.1 and subsequently 3-EOP-E-1.

Time	Position	Applicant's Actions or Behavior
	RO	**15** **Check If RCS Is Intact** a. Containment radiation - NORMAL b. Containment pressure - NORMAL c. 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 LOCA due to Containment Pressure and sump level increasing.
	BOP	Continues performance of 3-EOP-E-0 Attachment 3 Prompt Action Verification
	STA	STA observes a RED PATH for Containment Integrity and an Orange Path for Containment Pressure, recommends entry to 3-FRP-P-1
	SRO	Transitions to 3-FRP-P.1
	SRO	Directs 3-FRP-P.1 response
		CAUTION *If CST level decreases to less than 10%, makeup water sources for the CST will be necessary to maintain secondary heatsink.*
		1 **Check RCS Pressure - GREATER THAN 250 PSIG[650 PSIG]** IF RHR Flow greater than 1000 gpm, THEN return to procedure AND step in effect.
	SRO	**Transitions out of 3-EOP-FR-P.1** (due to LBLOCA indication)
		EXAMNIER NOTE: If containment pressure is still > 20 psig, and no higher red or orange path exists, transitions to and directs response using 3-EOP-FR-Z.1
	SRO	Transitions to 3-FRP-Z.1
		Examiner Note: 3-EOP-E-1 details start at page 37

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 7 Page 13 of 13

Event Description: When 3B RCP is tripped, 3B 4kV bus is lost and a large break LOCA occurs. An automatic SI occurs but train A sequencer fails due to the loss of 3P07. Train A RHR and Containment Spray pumps must be manually started. The crew completes 3-EOP-E-0 and transitions to 3-EOP-FR-P.1 and subsequently 3-EOP-E-1.

Time	Position	Applicant's Actions or Behavior
	SRO	Transitions to 3-EOP-E-1.
		Examiner Note: 3-EOP-E-1 details start at page 37

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 7a Page 1 of 7

Event Description: When 3B RCP is tripped, 3B 4kV bus is lost and a large break LOCA occurs. An automatic SI occurs but train A sequencer fails due to the loss of 3P07. Train A RHR and Containment Spray pumps must be manually started. The crew completes 3-EOP-E-0 and transitions to 3-EOP-FR-P.1 and subsequently 3-EOP-E-1.

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 • High steam flow with either low S/G pressure 614 psig **OR** low Tavg 543 F **OR** • Hi-Hi containment pressure 20 PSIG	b. Go to Step 3.
		c. Verify main steam isolation and bypass valves - CLOSED	c. Push manual Steamline Isolation push buttons on VPB **OR** manually close valves.

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 7a Page 2 of 7

Event Description: When 3B RCP is tripped, 3B 4kV bus is lost and a large break LOCA occurs. An automatic SI occurs but train A sequencer fails due to the loss of 3P07. Train A RHR and Containment Spray pumps must be manually started. The crew completes 3-EOP-E-0 and transitions to 3-EOP-FR-P.1 and subsequently 3-EOP-E-1.

Time	Position	Applicant's Actions or Behavior
	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).
		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 handswitches for the 3A and 3C ICW pumps to START

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 7a Page 3 of 7

Event Description: When 3B RCP is tripped, 3B 4kV bus is lost and a large break LOCA occurs. An automatic SI occurs but train A sequencer fails due to the loss of 3P07. Train A RHR and Containment Spray pumps must be manually started. The crew completes 3-EOP-E-0 and transitions to 3-EOP-FR-P.1 and subsequently 3-EOP-E-1.

Time	Position	Applicant's Actions or Behavior
		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	Places handswitch for the 3C CCW pump to START
		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 handswitch for the 3A and3C ECC fan to START

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 7a Page 4 of 7

Event Description: When 3B RCP is tripped, 3B 4kV bus is lost and a large break LOCA occurs. An automatic SI occurs but train A sequencer fails due to the loss of 3P07. Train A RHR and Containment Spray pumps must be manually started. The crew completes 3-EOP-E-0 and transitions to 3-EOP-FR-P.1 and subsequently 3-EOP-E-1.

Time	Position	Applicant's Actions or Behavior
	BOP	**7. Verify SI Pump Operation** a. At least two high head pumps running — a. Manually start high-head pump(s). b. Both RHR pumps running — b. Manually start RHR pump(s).
	BOP	Places the 3A RHR pump handswitch to START.
	BOP	**CREW CRITICAL TASK: Manually start at least one RHR pump following a large LOCA prior to completing E-0 Attachment 3 step 7.**
	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 <u>AND</u> 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 <u>AND</u> 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 <u>AND</u> place in standby
	BOP	Directs the Unit 4 RO to align the Unit 4 HHSI suction to the Unit 3 RWST

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 7a Page 5 of 7

Event Description: When 3B RCP is tripped, 3B 4kV bus is lost and a large break LOCA occurs. An automatic SI occurs but train A sequencer fails due to the loss of 3P07. Train A RHR and Containment Spray pumps must be manually started. The crew completes 3-EOP-E-0 and transitions to 3-EOP-FR-P.1 and subsequently 3-EOP-E-1.

Time	Position	Applicant's Actions or Behavior	
	BOP	Manually stops the 4A or the 4B HHSI pumps.	
	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	Directs SNPO to locally verify phase A valves MOV-3-1417, 1418, 1425 & 381 closed	
	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.: 2010-301 Scenario No.: 4 Event No.: 7 a Page 6 of 7

Event Description: When 3B RCP is tripped, 3B 4kV bus is lost and a large break LOCA occurs. An automatic SI occurs but train A sequencer fails due to the loss of 3P07. Train A RHR and Containment Spray pumps must be manually started. The crew completes 3-EOP-E-0 and transitions to 3-EOP-FR-P.1 and subsequently 3-EOP-E-1.

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	Places the 3A Containment Spray pump handswitch to START.
	BOP	Verify phase B valves MOV-3-626, 716B & 730 are closed.
	BOP	**CREW CRITICAL TASK: Manually start at least one Train of Containment Spray following a large LOCA prior to completing E-0 Attachment 3 step 15.**
	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.
		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.*

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 7a Page 7 of 7

Event Description: When 3B RCP is tripped, 3B 4kV bus is lost and a large break LOCA occurs. An automatic SI occurs but train A sequencer fails due to the loss of 3P07. Train A RHR and Containment Spray pumps must be manually started. The crew completes 3-EOP-E-0 and transitions to 3-EOP-FR-P.1 and subsequently 3-EOP-E-1.

Time	Position	Applicant's Actions or Behavior	
	BOP	**17. Place Hydrogen Monitors In Service Using 3-OP-094, CONTAINMENT POST ACCIDENT MONITORING SYSTEM**	
	BOP	**18. Verify All Four EDGs – RUNNING**	EMERGENCY START any available EDG **NOT** running.
	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 Note Any Actions That Had To Be Taken**	

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 7 Page 1 of 6

Event Description: When 3B RCP is tripped, 3B 4kV bus is lost and a large break LOCA occurs. An automatic SI occurs but train A sequencer fails due to the loss of 3P07. Train A RHR and Containment Spray pumps must be manually started. The crew completes 3-EOP-E-0 and transitions to 3-EOP-FR-P.1 and subsequently 3-EOP-E-1.

Time	Position	Applicant's Actions or Behavior
	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)
	RO	**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
	RO/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.

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 7 Page 2 of 6

Event Description: 3B 4kV bus is lost and a large break LOCA occurs.

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 10^8 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-OP-018.1, Condensate Storage Tank.

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 RCS pressure is greater than 250 PSIG [650 PSIG] AND 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.: 2010-301 Scenario No.: 4 Event No.: 7 Page 3 of 6

Event Description: When 3B RCP is tripped, 3B 4kV bus is lost and a large break LOCA occurs. An automatic SI occurs but train A sequencer fails due to the loss of 3P07. Train A RHR and Containment Spray pumps must be manually started. The crew completes 3-EOP-E-0 and transitions to 3-EOP-FR-P.1 and subsequently 3-EOP-E-1.

Time	Position	Applicant's Actions or Behavior
	RO/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.
	RO/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.
		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.*
	RO	**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.

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 7 Page 4 of 6

Event Description: When 3B RCP is tripped, 3B 4kV bus is lost and a large break LOCA occurs. An automatic SI occurs but train A sequencer fails due to the loss of 3P07. Train A RHR and Containment Spray pumps must be manually started. The crew completes 3-EOP-E-0 and transitions to 3-EOP-FR-P.1 and subsequently 3-EOP-E-1.

Time	Position	Applicant's Actions or Behavior	
	RO	**6** **Verify SI - RESET**	
	RO	**7** **Reset Containment Isolation Phase A AND Phase B**	
	RO	**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.
	RO	**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.
	RO	**10** **Check Charging Flow Established** a. Charging pumps - AT LEAST ONE RUNNING 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	a. Perform Attachment 4 to establish charging.

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 7 Page 5 of 6

Event Description: When 3B RCP is tripped, 3B 4kV bus is lost and a large break LOCA occurs. An automatic SI occurs but train A sequencer fails due to the loss of 3P07. Train A RHR and Containment Spray pumps must be manually started. The crew completes 3-EOP-E-0 and transitions to 3-EOP-FR-P.1 and subsequently 3-EOP-E-1.

Time	Position	Applicant's Actions or Behavior
	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**	

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 7 Page 6 of 6

Event Description: When 3B RCP is tripped, 3B 4kV bus is lost and a large break LOCA occurs. An automatic SI occurs but train A sequencer fails due to the loss of 3P07. Train A RHR and Containment Spray pumps must be manually started. The crew completes 3-EOP-E-0 and transitions to 3-EOP-FR-P.1 and subsequently 3-EOP-E-1.

Time	Position	Applicant's Actions or Behavior
	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
		EXAMINER NOTE: The scenario is terminated when the crew determines Safety Injection can not be terminated.

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 6a Page 2 of _2_

Event Description: Once CSFSTs are monitored for implementation, if containment pressure is still above 20 psig, the crew will transition to 3-EOP-FR-Z.1 if no higher red or orange path exists.

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: The scenario is terminated when the crew enters 3-EOP-FR-Z.1

Facility: Turkey Point Scenario No.: 5 Op Test No.: 2010-301

Examiners: _____ Candidates: _____ US

_____ _____ RO

_____ _____ BOP

Initial Conditions: Mode 1, 75% 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.

Maintain 100%

On line risk is green

B train protected

Event No.		Event Type*	Event Description
1	TFN1P4AH=T	(I) RO /(I)BOP (TS,I) SRO	PR Channel N44 gain fails high, the RO responds using 3-ONOP-59.8 to stop control rod motion by placing rod control to manual. The SRO enters LCO 3.3.1 Action 2
2	TVHHSGC=0.003	(C) RO (TS,C) SRO	A 50-70 gpm tube leak develops on the 3C S/G, the crew transitions to 3-ONOP-071.2. The RO increases letdown and starts additional charging pumps in response to the SGTL. The SRO will enter LCO 3.4.6.2
3		(R) RO (N) BOP	The RO will initiate a boration and the BOP will reduce turbine load using 3-ONOP-71.2 in response to the SGTL.
4	TVS1M3ED -1.0	(I) BOP (TS,I)SRO	FT-3-484 Drifts low causing 3B steam generator level to decrease. The BOP will place the 3B S/G feed regulating valve FCV-3-479 in manual to return 3B S/G level to program. The SRO enters LCO 3.3.1 & 3.3.2
5	TFP8D7MT=T	(C) BOP (C) SRO	Generator Breaker 8W68 spuriously opens. The BOP re-closes open breaker 8W68.
6	TVHHSGC = 3.0000	(M) ALL	The tube leak on 3C S/G will degrade into a tube rupture, the crew will trip the reactor and respond using 3-EOP-E-0, Reactor Trip or Safety Injection and stop feeding the 3C S/G. The crew will transition to 3-EOP-E-3 to isolate the 3C S/G and cooldown the RCS or transitions to 3-EOP-ECA-3.1.
6a	TFQ634BF	(C) BOP	The B Train Sequencer will fail to automatically actuate, the BOP will manually start the B Train Safeguards equipment using 3-EOP-E-0 Att 3.
6b	TFSWVM5A T		3C S/G Sample isolation MOV-3-1425 will fail to AUTO close, the BOP will manually close MOV-3-1425 using 3-EOP-E-0 Att 3.

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

Rec'd 8/23/10

Gr 26 NRC Scenario #6

Event 1 PR Channel N44 gain fails high, the RO responds using 3-ONOP-59.8 to stop control rod motion by placing rod control to manual. The SRO enters LCO 3.3.1 Action 2

Event 2 – A tube leak develops on the 3C S/G, the crew transitions to 3-ONOP-071.2. The crew increases letdown and starts additional charging pumps in response to the SGTL. The SRO will enter LCO 3.4.6.2

Event 3 – The crew will initiate a power reduction using 3 -ONOP-71.2

Event 4 – FT-3-484 Drifts low causing 3B steam generator level to decrease. The BOP will place the 3B S/G feed regulating valve FCV-3-479 in manual to return 3B S/G level to program. 3-ONOP-049.1 is used to shift controlling channels and return 3B FRV to automatic control. The SRO enters LCO 3.3.1 & 3.3.2

Event 5 – Generator Breaker 8W68 opens. Bop contacts Systems and is informed that the breaker opened due to spuriously fault. The breaker may be re-closed. The BOP re-closes the breaker.

Event 6 – The tube leak on 3C S/G will degrade into a tube rupture, the crew will trip the reactor and respond using 3-EOP-E-0, Reactor Trip or Safety Injection and stop feeding the 3C S/G. The crew will transition to 3-EOP-E-3 to isolate the 3C S/G **(CRITICAL TASK)** and cooldown the RCS **(CRITICAL TASK)** or transitions to 3-EOP-ECA-3.1.

Event 6a – The B Train Sequencer will fail to automatically actuate, the BOP will manually start the B Train Safeguards equipment using 3-EOP-E-0 Att 3.

Event 6b –3C S/G Sample isolation MOV-3-1425 will fail to AUTO close, the BOP will manually close MOV-3-1425 using 3-EOP-E-0 Att 3.

Rec'd 8/23/10

Gr 26 NRC Scenario 5 Simulator Operating Instructions

Setup

Restore IC-1 (Mode 1 MOL)

Open & execute lesson file Gr 26 NRC Scenario 6.lsn

Place simulator in run

Manually stop the 3B2 Circulating Water pump

Trigger lesson steps:

- SETUP - 3B2 Circ Water Pump OOS
- SETUP - 3-MOV-3-1425 FAIL AsIs (actuatesTFSWVM5A T)
- SETUP - Train B Sequencer Failure (actuates TFQ634BF T)
- Place Clearance on 3B2 Hand Switch

Place simulator in freeze.

Provide shift turnover checklists

Perform Simulator Operator Checklist

Event 1 – PR Channel N44 Gain Fails High

PR Channel N44 Gain Fails High, the RO responds using 3-ONOP-59.8 to stop control rod motion by placing rod control to manual. The SRO enters LCO 3.3.1 Action 2

When directed by the lead examiner, **Trigger lesson step Event 1 - PR Channel N44 Gain Fails High** (Actuates IAN1D6R2 10 with a 2 min ramp)

If directed respond as Work Control and acknowledge the failure of N-44.

If directed as I&C, direct the crew not to pull fuses until I&C investigates.

Event 2 – 3C SG TUBE LEAK

A tube leak develops on the 3C S/G, the crew transitions to 3-ONOP-071.2. The crew increases letdown and starts additional charging pumps in response to the SGTL. The SRO will enter LCO 3.4.6.2

When directed by the lead examiner, **trigger lesson step EVENT 2 – 3C SG TUBE LEAK (actuates TVHHSGC=0.08)**

If directed, respond as HP to perform surveys. After 10 minutes respond as HP that 3"C" S/G is the affected SG.

If directed, respond as Chemistry to perform 0-NCAP-104, increase sampling frequency of S/G and to monitor DAM-1 and SPNG. After 10-15 min., confirm 3C S/G tube leak increase.

If directed as Chemistry, respond that no sample flow is indicated in the cold chem. Lab.

Caution-Attachment 2 – Acknowledge direction to close AFSS-3-006 and open AFSS-3-007. After 5 minutes, **Trigger** lesson step, **ALIGN TRAIN 1 AFW.** Report to CR when completed.

Attachment 2 - Acknowledge direction to open MOV-3-1405 breaker 3D01-27 and verify valve closed locally, After 2 minutes, **Trigger** lesson step, **OPEN MOV-3-1405 BREAKER**. Inform CR when completed.

Event 3 –Power reduction using 3 - ONOP-71.2

The crew will initiate a boration and reduce turbine load using 3-ONOP-71.2 in response to the SGTL.

If directed, respond as System when called about load reduction.

If directed, respond as SM when told to review 0-EPIP-20101 & 0-ADM-115 for notification requirements. State that the NRC Resident will be notified of the fast load reduction.

If directed, respond as chemistry to take samples. No response back required.

When directed as FS/TO to locally downpower and close MOV-3-1405 wait 3 minutes and **trigger lesson step EVENT 2 - CLOSE/DEENERGIZE MOV-3-1405** **(actuates TCF5M527=F & after 2 min delay TFFXC04=T)**. Report when complete.

When directed, respond as FS/TO to align aux steam supply from U4. Wait 5 min and report when complete, no action required.

Event 4 – FT-3-484 Drifts low

FT-3-484 Drifts low causing 3B steam generator level to decrease. The BOP will place the 3B S/G feed regulating valve FCV-3-479 in manual to return 3B S/G level to program. 3-ONOP-049.1 is used to shift controlling channels and return 3B FRV to automatic control. The SRO enters LCO 3.3.1 & 3.3.2

When directed by the lead examiner **Trigger lesson step EVENT 4 - FT-3-484 Drifts Low** **(Actuates TVS1M3ED -1.0)**

If directed, respond as work control; acknowledge the failure of FT-3-474 and the direction to initiate a PWO, and to inform I&C Supervisor.

Event 5 – Generator Breaker 8W68 spuriously opens.

8W68 spuriously opens. BOP contact System. When directed, BOP re-closes 8W68.

When directed by the lead examiner **Trigger lesson step Event 5 – 8W68 Opens** **(Actuates TFP8D7MT=T)**

Event 6 – 3C S/GTR

The tube leak on 3C S/G will degrade into a tube rupture, the crew will trip the reactor and respond using 3-EOP-E-0, Reactor Trip or Safety Injection and stop feeding the 3C S/G. The crew will transition to 3-EOP-E-3 to isolate the 3C S/G and cooldown the RCS or transitions to 3-EOP-ECA-3.1. The B Train Sequencer will fail to automatically actuate, the BOP will manually start the B Train Safeguards equipment using 3-EOP-E-0 Att 3.

When directed - Trigger lesson step **EVENT 6 – 3C SG TUBE RUPTURE** (actuates TVHHSGC 3.0)

3-EOP-E-0 Attachment 3

Step 17 – acknowledge direction to place PAHM in service using 3-OP-094

When directed, respond as SNPO, **Trigger lesson step, PLACE PAHM IN SERVICE**, report when complete

3-EOP-E- 3

Step 2.a - Respond as Radiation Protection, Acknowledge direction to take radiation readings on main steam lines.

Step 2.b - Respond as Chemistry, Acknowledge direction to sample steam lines for activity

Step 5.b RNO – Respond as NSO, Acknowledge direction to use 3-EOP-E-3 attachment 5 to align aux. steam supply from unit 4. After 5 minutes, Report to CR attachment 5 alignment complete. No action required.

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	--
1. Total malfunctions (5–8)	6
2. Malfunctions after EOP entry (1–2)	2
3. Abnormal events (2–4)	2
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)	2

STA In fiop-Test No.: Gr 26 Audit Scenario No.: 5 Event No.: 1 Page 1 of 4

Event Description: PR Channel N44 Gain fails high, the RO responds using 3-ONOP-59.8 to stop control rod motion by placing rod control to manual. The BOP removes the PR Channel N44 Upper Detector from service using 3-ONOP-59.8.

Time	Position	Applicant's Actions or Behavior
Direct facility operator to trigger lesson step "EVENT 5 - N44 Gain Fails High" (actuates TFN1P4AH=T)		
	RO	Observes the following: • Annunciators B-2/2, 6/1, 6/3, 6/4, G4/3 • N-44 power range channel indication on console fails high • N-44 axial flux indication on console drifting high • N-44 upper indication on NIS racks failing high
	SRO	Transitions to 3-ONOP-59.8
	SRO	Directs response using 3-ONOP-59.8 or 3-ONOP-28 as required to position the Control Rod Selector Switch to MANUAL
	RO	4.0 IMMEDIATE ACTIONS 4.1 Mode 1 - Power Operation 4.1.1 Malfunction of ONE channel: 1. IF failed channel is PR 4, THEN transfer ROD MOTION CONTROL SELECTOR to MAN position.
	RO	Places ROD MOTION CONTROL SELECTOR to MANUAL
	BOP	5.0 SUBSEQUENT ACTIONS 5.1 Mode 1 - Power Operation 5.1.1 Malfunction of ONE channel: 1. Place the DROPPED ROD MODE switch for the failed channel in the BYPASS position. 2. Place the applicable ROD STOP BYPASS switch to the failed channel BYPASS position.
	BOP	Places the DROPPED ROD MODE switch for N-44 in the BYPASS position.
	BOP	Places right rod stop bypass switch to bypass N-44.

Op-Test No.: Gr 26 Audit Scenario No.: 5 Event No.: 1 Page 2 of 4

Event Description: PR Channel N44 Gain fails high, the RO responds using 3-ONOP-59.8 to stop control rod motion by placing rod control to manual. The BOP removes the PR Channel N44 Upper Detector from service using 3-ONOP-59.8.

Time	Position	Applicant's Actions or Behavior
		NOTE *If an **Upper Section Deviation** or **Lower Section Deviation** alarm occurs, or if ANNUNCIATORS B-2/2 or B-2/3 annunciate, the actions of 3-OSP-059.10, Determination of Quadrant Power Tilt Ratio, need to be performed if power is greater than 50 percent.*
	BOP	3. Transfer the UPPER SECTION comparator defeat switch to the failed channel. 4. Transfer the LOWER SECTION comparator defeat switch to the failed channel. 5. Transfer applicable POWER MISMATCH BYPASS switch to BYPASS the failed channel. 6. Transfer the COMPARATOR CHANNEL DEFEAT switch to the failed channel.
	BOP	Places the UPPER SECTION comparator defeat switch to N-44
	BOP	Places the LOWER SECTION comparator defeat switch to N-44
	BOP	Places right power mismatch bypass switch to bypass N-44.
	BOP	Places the COMPARATOR CHANNEL DEFEAT switch to N-44
	SRO	May direct manual rod withdrawal to restore Tavg within 3°F of Tref as needed using 3-ONOP-028
	RO	Manually withdraws control rods as directed by SRO to restore Tavg within 3°F of Tref as directed
	RO	7. **IF** rod control is in manual due to failed Power Range N-44 channel **AND** automatic operation is desired, **THEN** transfer Rod Motion Control Selector switch to AUTO.
	RO	Places the ROD MOTION CONTROL SELECTOR to AUTO
		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.
		9. Notify I&C.
	SRO	Refers to LCO 3.3.1, Table 3.3-1, Functional Unit 2 Action 2

Op-Test No.: Gr 26 Audit Scenario No.: 5 Event No.: 1 Page 3 of 4

Event Description: PR Channel N44 Gain fails high, the RO responds using 3-ONOP-59.8 to stop control rod motion by placing rod control to manual. The BOP removes the PR Channel N44 Upper Detector from service using 3-ONOP-59.8.

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE See next two pages for applicable Tech Specs.
	SRO	Directs performance of monitoring the Quadrant Power Tilt Ratio using 3-OSP-059.10, DETERMINATION OF QUADRANT POWER TILT RATIO. (Per Tech Spec 4.2.4.2)
		EXAMINER NOTE: When the crew has restored Tave proceed to Event 6.

Op-Test No.: Gr 26 Audit Scenario No.: 5 Event No.: 1 Page 4 of 4

Event Description: PR Channel N44 Gain fails high, the RO responds using 3-ONOP-59.8 to stop control rod motion by placing rod control to manual. The BOP removes the PR Channel N44 Upper Detector from service using 3-ONOP-59.8.

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: 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.

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

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:

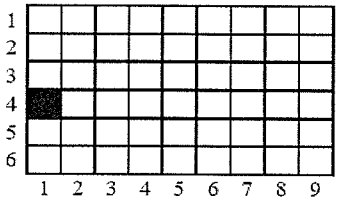
a. The inoperable channel is placed in the tripped condition within 6 hours,

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.

Op-Test No.: 2010-301 Scenario No.: 5 Event No.: 2 Page 1 of 9

Event Description: A 50-70 gpm tube leak develops on the 3C S/G, the crew transitions to 3-ONOP-071.2. The crew increases letdown and starts additional charging pumps in response to the SGTL. The SRO will enter LCO 3.4.6.2

Time	Position	Applicant's Actions or Behavior
Direct facility operator to trigger lesson step "EVENT 3 3C SG 50-70 GPM TUBE LEAK" **(actuates TVHHSGC=0.003).**		
		 Page 4 of 54 Panel H PRMS HI RADIATION
	RO/BOP	Observes increase in 3C SG tube leak rate • Annunciator H-1/4 (PRMS HI radiation) • R-3-15 SJAE effluent PRMS rising/alarming • R-3-19 SGBD PRMS rising/alarming (eventually) • SJAE SPING RAD-3-6417 rising/alarming (see ERDADS) • Slight increase in charging flow to maintain PZR level • Charging/letdown flow mismatch increases to 3 gpm on ERDADS
		OPERATOR ACTIONS: 1. Verify alarm by checking the following: a. Countrate meter on each PRMS drawer in rack QR-66. b. Alarm indicators on each drawer in rack QR-66.
		2. Verify the following automatic actions have occurred: b. Refer to 3-ONOP-071.2, Steam Generator Tube Leakage, for an alarm on R-15 <u>OR</u> R-19.
	SRO	Directs response using 3-ONOP-71.2.
		<u>NOTE</u> *Foldout Page shall be monitored throughout this procedure.*
	CREW	Reviews 3-ONOP-71.2 foldout page actions (See next page)

Op-Test No.: 2010-301 Scenario No.: 5 Event No.: 2 Page 2 of 9

Event Description: A 50-70 gpm tube leak develops on the 3C S/G, the crew transitions to 3-ONOP-071.2. The crew increases letdown and starts additional charging pumps in response to the SGTL. The SRO will enter LCO 3.4.6.2

CREW

FOLDOUT PAGE

1. **3-EOP-E-0 TRANSITION CRITERIA**

   a) 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.
      1) RCS Tavg GREATER THAN 578 Deg
      2) RCS Tavg GREATER THAN Tref by 6 degrees F
      3) The REQUIRED shutdown rate violates Rod Insertion Limits

   b) IF any of the following limits are reached, THEN trip the Reactor and Turbine, initiate Safety Injection and Phase A, AND go to 3-EOP-E-0, REACTOR TRIP OR SAFETY INJECTION.
      1) RCS Leakage greater than Charging Pump capacity AND letdown isolated
      2) PZR Level can NOT be maintained within 10% of program

2. **STANDARD BRIEFING**

   a) Specify shutdown rate.

Time for S/D from 100%	30 min	1 hr.	1.5 hrs.	2 hrs.
Approx. Load Ramp Rate	30 MW/min	15 MW/min	10 MW/min	7 MW/min

   b) Target Power Level – If the unit is not to be taken off-line
   c) Current S/G Tube Leakage and affected S/G
   d) Cover any actions required after the unit is off-line. (Example – Feed flow to the affected and unaffected S/Gs)
   e) Method of Reactivity Control – Control Rods, Boration, or Both.

3. **PLANT ANNOUNCEMENT**

   Notify plant personnel via the plant page of any potential hazardous effluent release AND to stand clear of the SJAE and Blowdown piping. Notify non-essential personnel to stay clear of the Power Block.

4. **BLOWDOWN RELEASE PATH ISOLATION**

   IF PRMS R-19 Count Rate is increasing OR High Alarm is present, THEN verify the following:
   a) Steam Generator Blowdown Flow Control Valves are Closed
      - FCV-3-6278A
      - FCV-3-6278B
      - FCV-3-6278C
   b) Blowdown Tank to Canal Level Control Valve, LCV-3-6265B is closed
   c) WHEN R-19 High Alarm is present, THEN verify NO FLOW on S/G Sample Flow Indicators at the Cold Chem Lab (Ensures Sample Valves SV-3-2800, SV-3-2801, SV-3-2802 are closed.)

5. **AFW STEAM SUPPLY RELEASE PATH ISOLATION**

   WHEN the affected Steam Generator is identified, THEN perform the following:
   a) Verify Steam Supply aligned to both trains of AFW from the Intact Steam Generators
   b) Verify closed AND de-energize the affected Steam Generator AFW Steam Supply MOV using Attachment 2.

BOP — Directs TO/FS to open breaker 3D01-27 and close MOV-3-1405.

BOP — Directs SNPO/TO/FS to open AFSS-006 and AFSS-007

Op-Test No.: 2010-301 Scenario No.: 5 Event No.: 2 Page 3 of 9

Event Description: A 50-70 gpm tube leak develops on the 3C S/G, the crew transitions to 3-ONOP-071.2. The crew increases letdown and starts additional charging pumps in response to the SGTL. The SRO will enter LCO 3.4.6.2

Time	Position	Applicant's Actions or Behavior
	BOP	**1** **Check High Alarm ON For The Following PRMS Channels** — Go to Step 3. * R-15 High Alarm light – ON * R-19 High Alarm light - ON
		NOTE *A PRMS source check on a channel with a HIGH Alarm may be inconclusive since the effect of the source may not cause a noticeable change in the readout.*
	BOP	**2** **Check Affected PRMS Channel Alarm Valid As Follows** a. Check readout on affected channel - GREATER THAN OR EQUAL TO ALARM SETPOINT b. Check R-15 operability as follows: 1) RDU green OPERATE LED - ON 2) Plus sign (+) - ROTATING c. Check R-19 operability as follows 1) Depress and hold the FAIL/TEST pushbutton on the affected PRMS Channel 2) Check readout equal to 288K **OR** 289K 3) Release the FAIL/TEST pushbutton d. Observe CAUTION prior to Step 6 **AND** go to Step 6
		EXAMINER NOTE: R-3-15 is the only channel in alarm
		EXAMINER NOTE: the trend on 3-R-19 begins increasing approximately 5-10 minutes after the SGTL commences.
		CAUTIONS • *Maximum allowed specific activity of secondary coolant is less than or equal to 0.10 μCi/gm Dose Equivalent I-131. (Reference T.S. 3.7.1.4.)* • *Use of the Steam Dump to Atmospheric valves should be limited to minimize uncontrolled release of radionuclides to the environment. If S/G Steam Dumps to Atmosphere must be used, use only the unaffected S/G dump valves if possible.*

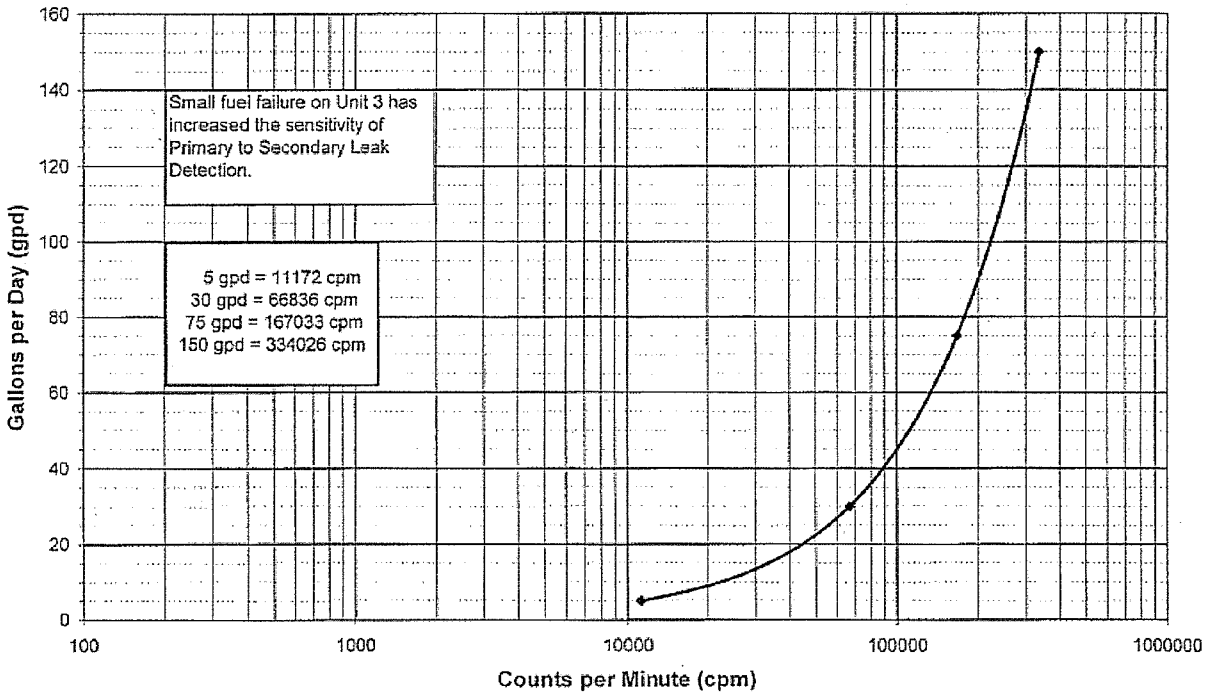
Op-Test No.: 2010-301 Scenario No.: 5 Event No.: 2 Page 4 of 9

Event Description: A 50-70 gpm tube leak develops on the 3C S/G, the crew transitions to 3-ONOP-071.2. The crew increases letdown and starts additional charging pumps in response to the SGTL. The SRO will enter LCO 3.4.6.2

Time	Position	Applicant's Actions or Behavior
	RO	**6** **Monitor Affected Plant Parameters** a. Check PRZ level – STABLE <u>OR</u> INCREASING b. Maintain PRZ level – MAINTAIN STABLE <u>OR</u> INCREASING
	RO	Starts 2nd Charging Pump. May also start the third charging pump at this time.
	BOP	c. Check R-3-19 HI ALARM – CLEAR c. Perform the following: 1) Verify S/G Blowdown Flow Control Valves FCV-3-6278A, B, and C – CLOSED 2) Blowdown Tank to Canal Level Control Valve, LCV-3-6265B – CLOSED. 3) Verify S/G Sample Total Flow Indicator at the Cold Chem Lab Bldg indicate flow has stopped. (Ensures Blowdown Sample Valves, SV–3–2800, 2801, 2802 are CLOSED.)
	BOP	4. <u>BLOWDOWN RELEASE PATH ISOLATION</u> <u>IF</u> PRMS R-19 Count Rate is increasing <u>OR</u> High Alarm is present, <u>THEN</u> verify the following: a) Steam Generator Blowdown Flow Control Valves are Closed • FCV-3-6278A • FCV-3-6278B • FCV-3-6278C b) Blowdown Tank to Canal Level Control Valve, LCV-3-6265B is closed c) <u>WHEN</u> R-19 High Alarm is present, <u>THEN</u> verify NO FLOW on S/G Sample Flow Indicators at the Cold Chem Lab. (Ensures Sample Valves SV-3-2800, SV-3-2801, SV-3-2802 are closed.)

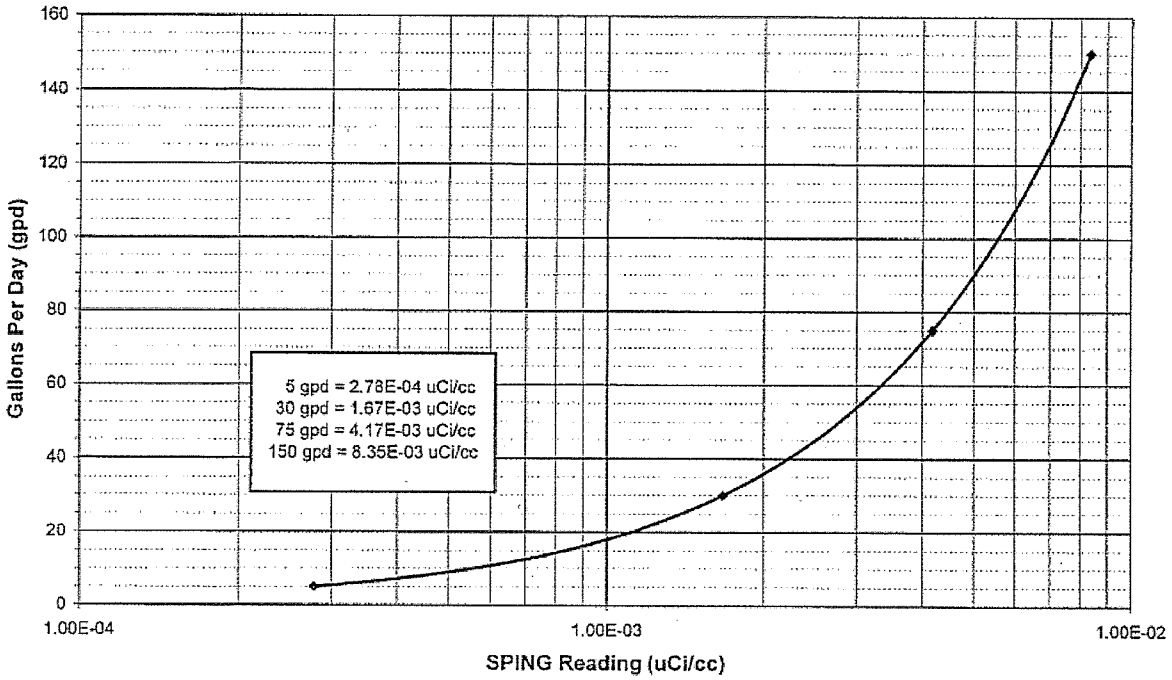
	CREW	7	**Direct The Shift Engineer To Approximate Tube Leakage Using All Of The Following** • 3-OSP-041.1, RCS LEAK RATE CALCULATION • Unit 3 SJAE SPING Primary to Secondary Leak Rate Graph in the Plant Curve Book (Section 5, Figure 14) AND record on Attachment 5 • Unit 3 R-15 Primary to Secondary Leak Rate Graph in the Plant Curve Book (Section 5, Figure 15) AND record on Attachment 5

Unit 3
R-15 Primary to Secondary Leak Rate Graph



Unit 3

SJAE SPING Primary to Secondary Leak Rate Graph



Op-Test No.: 2010-301 Scenario No.: 5 Event No: 2 Page 5 of 9

Event Description: A 50-70 gpm tube leak develops on the 3C S/G, the crew transitions to 3-ONOP-071.2. The crew increases letdown and starts additional charging pumps in response to the SGTL. The SRO will enter LCO 3.4.6.2

Time	Position	Applicant's Actions or Behavior
		NOTES • *Additional Chemistry personnel may be needed for sampling and analysis.* • *SJAE SPING and R-15 are the quickest indications of increasing leak due to radioactive gases being carried over in the steam to the condenser. Air in-leakage greater than 5.5 SCFM will dilute this indication.* • *DAM-1 and R-19 are slower and may take several hours to stabilize for accurate indication due to the process delay times.*
	CREW	8 **Identify Leaking S/G** a. Monitor the following for S/G tube leak indications * Unexplained increase in any S/G level * High radiation detected on a S/G sample * High radiation detected on a main steam line * High radiation detected on AFW steam supply line (if running) * High radiation detected from a S/G Blowdown line * Unexplained difference between steam flow and feedwater flow * Increasing radiation levels indicated on R-15, R-19, SPING, AND DAM-1 b. Direct Radiation Protection to perform the following • Monitor radiation levels on Main Steam Lines • Monitor radiation levels on AFW steam supply line (if running) • Monitor radiation levels on S/G Blowdown lines • Monitor airborne activity at Steam Jet Air Ejectors c. Direct Nuclear Chemistry to perform the following • Perform 0-NCAP-104, PRIMARY TO SECONDARY LEAK RATE CALCULATION • Increase S/G sampling frequency as determined by Nuclear Chemistry • Monitor DAM-1 and SJAE SPING readings
	Crew	Identifies that 3C S/G has the tube leak.

Op-Test No.: 2010-301 Scenario No.: 5 Event No.: 2 Page 6 of 9

Event Description: A 50-70 gpm tube leak develops on the 3C S/G, the crew transitions to 3-ONOP-071.2. The crew increases letdown and starts additional charging pumps in response to the SGTL. The SRO will enter LCO 3.4.6.2

Time	Position	Applicant's Actions or Behavior
		NOTES • *Sampling of Condenser water for activity is required prior to dumping/rejecting water.* • *The following step is to provide guidance for continued unit operation when Primary-to-Secondary leakage has been CONFIRMED. These actions are to ensure that an identified leak is isolated prior to S/G tube failure.* • *Any tube leakage rate-of-change determination should be performed over at least a 30-minute period to eliminate the possibility of inappropriate actions being taken in the case of instrument spikes.*
		9 **Determine If Operation May Continue** a. S/G Tube Leakage – LESS THAN Values required by Attachment 1 a. Perform the following: 1) Actions recommended by Attachment 1. 2) IF a Unit load reduction is required, THEN go to Step 10.
		Action Level 3B(2): Leak Rate ≥150 gpd (≥6.25 gph or ≥0.1 gpm); Increasing Leak Rate (1): ; Action Required: • Be in Mode 3 within 3 hours • Increase monitoring of PRMS channel to every 15 minutes. • Coordinate with RP to contain activity in secondary systems
	SRO	Determines a shutdown is required due to the SGTL being greater than 150 gpd and goes to step 10
		EXAMINER NOTE: **3.4.6.2 Reactor Coolant System operational leakage shall be limited to:** **c. 150 gallons using day primary-to-secondary leakage through any one steam generator (SG),** **APPLICABILITY: MODES 1, 2, 3 and 4.** **ACTION:** **a. With any PRESSURE BOUNDARY LEAKAGE, or with primary-to-secondary leakage not within limit, be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.**

Op-Test No.: 2010-301 Scenario No.: 5 Event No.: 2 Page 7 of 9

Event Description: A 50-70 gpm tube leak develops on the 3C S/G, the crew transitions to 3-ONOP-071.2. The crew increases letdown and starts additional charging pumps in response to the SGTL. The SRO will enter LCO 3.4.6.2

Time	Position	Applicant's Actions or Behavior
	CREW	**10** **Perform the Following Prior to Commencing Load Reduction** a. Notify the System Dispatcher that load reduction is commencing b. Brief Control Room personnel using the Foldout Page as guidance c. Notify plant personnel of the load reduction using Page Boost
	CREW	**11** **Notify the Shift Manager to Review the Following Procedures AND Make Any Required Notifications** • 0-EPIP-20101, Duties of Emergency Coordinator • 0-ADM-115, Notification of Plant Events • Verify NRC Resident notified of Fast Load Reduction and S/G Tube Leakage
		CAUTIONS • *For a shutdown at the maximum rate, boration should be initiated PROMPTLY to avoid exceeding rod insertion limits.* • *Shutdown rates greater than 5% full power per minute (~35 Mwe/Min) may place the unit in an uncontrolled condition and should be avoided.* • *Control Rod motion may cause axial flux difference to deviate outside of the Target Band without necessitating corrective actions until the load reduction is terminated.*

Op-Test No.: 2010-301 Scenario No.: 5 Event No.: 3 Page 8 of 9

Event Description: The crew will initiate a boration and reduce turbine load using 3-ONOP-71.2 in response to the SGTL.

Time	Position	Applicant's Actions or Behavior
		CAUTIONS • *For a shutdown at the maximum rate, boration should be initiated PROMPTLY to avoid exceeding rod insertion limits.* • *Shutdown rates greater than 5% full power per minute (~35 Mwe/Min) may place the unit in an uncontrolled condition and should be avoided.* • *Control Rod motion may cause axial flux difference to deviate outside of the Target Band without necessitating corrective actions until the load reduction is terminated.*
	RO	**12** **Initiate Boration** a. Establish the desired boration rate using the normal boration flowpath 1) Place the Reactor Makeup Selector Switch to BORATE 2) Place the RCS Makeup Control Switch to START 3) Set FC-3-113A potentiometer to 8.0 or as directed by the Shift Manager b. Set the Boric Acid Totalizer to the desired amount of Boric Acid to be added as determined using the following table a. Refer to 3-ONOP-046.4, Malfunction of Boron Concentration Control System, while continuing with this procedure.

Amount of Boric Acid for Desired Power Reduction

Core Burnup, MWD	BOL 0-3000	MOL 3000-9000	EOL 9000-End of Cycle
Without Rod Motion	160 gallons per 10%	170 gallons per 10%	230 gallons per 10%
With Rod Motion	80 gallons per 10%	85 gallons per 10%	115 gallons per 10%

	SRO	Determines approximately 850 gal of boric acid required to shutdown for present conditions.
		NOTES • *A shutdown at maximum rate will require that boration be stopped approximately 10% above target power.* • *If the unit is to be taken off-line, boration should be stopped prior to reducing power below 25%.*

Op-Test No.: 2010-301 Scenario No.: 5 Event No.: 3 Page 9 of 9

Event Description: The crew will initiate a boration and reduce turbine load using 3-ONOP-71.2 in response to the SGTL.

Time	Position	Applicant's Actions or Behavior
	BOP RO	**13** **Reduce Plant Load At A Rate Determined By The Shift Manager As Follows** a. Reduce turbine load while verifying Auto Rod Insertion (Tavg should not exceed Tref by more than 5°F) a. IF rods fail to insert properly, THEN take manual control and insert rods as required to lower Tavg. b. Monitor Control Rod Position 1) Rod Position – Remains above ROD BANK LO LIMIT alarm (Annunciator B-8/1) 1) Reduce the rate of power reduction as needed to avoid receipt of ROD BANK EXTRA LO LIMIT alarm (Annunciator B-8/2) 2) Rod Position – Remains above ROD BANK EXTRA LO LIMIT alarm (Annunciator B-8/2) 2) Perform the following: • Place Control Rods in Manual AND reduce turbine load until rods are approximately 10 steps above the RILs. • IF the required shutdown rate forces continued violation of the RILs, THEN trip the Reactor and Turbine and go to 3-EOP-E-0, REACTOR TRIP OR SAFETY INJECTION.
	RO	**14** **Perform The Following To Increase Charging Flow** a. Start additional Charging Pumps b. Place additional letdown orifice in service c. Increase Component Cooling Water flow to the NRHX • Throttle open 3-834, Non-Regen HX Temp Control Vlv, TCV-144, Bypass (NOT to exceed 840 gpm)
	RO	Manually starts the 3A Charging Pump if not done previously. Places an additional letdown orifice in service Directs SNPO to increase CCW flow to the NRHX
		EXAMINER NOTE: When power has been reduced a sufficient amount, proceed to EVENT 4.

Direct facility operator to trigger lesson step EVENT 4 – FT-3-484 Low (actuates TVS1MED-1.0)

Op-Test No.: 2010-301 Scenario No.: 5 Event No.: 4 Page 1 of 4

Event Description: Controlling steam flow channel for 3B S/G, FT-3-484 drifts low, the BOP takes manual control of 3B SG level control. FT-3-484 is removed from service using 3-ONOP-049.1 and FCV-3-479 is returned to automatic.

Time	Position	Applicant's Actions or Behavior
Direct facility operator to trigger lesson step "EVENT 5 FT-3-484 Fails Low." (actuates TVS1MED-1.0)		
	BOP	Observes alarms C-4/2, 6/1& 6/2, & D-7/1
	SRO	Directs response using 3-ONOP-049.1.
	BOP	SUBSEQUENT ACTIONS 5.1 Verify instrument loop failure by comparison to adjacent loops and known plant parameters and conditions.
	SRO	Observes indicator FT-3-484 failing low and compares 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.
	SRO	Verifies no off-normal conditions exist on the adjacent channels.
	BOP	Manually controls FCV-3-479 and returns S/G level to program using 3-ARP-097.CR
	BOP	Maintains RCS temperature as directed by the SRO Tavg ± 4° of Tref
	SRO	May stop the down boration and the power reduction.
	BOP	5.3 Verify applicable control transfer switches are in the position which eliminates the failed loop.
	BOP	When 3BS/G level on program, selects FT-3-475 (channel 4 steam flow) for FCV-3-479 control.
	BOP	5.4 IF a control function was placed in manual control due to the failure, THEN verify the control function is returned to automatic.
	BOP	Places FCV-3-479 in AUTO
	SRO	5.5 Refer to Technical Specifications 3/4.3, Instrumentation, AND verify the minimum channels operable. 5.5.1 Take appropriate actions as specified in Technical Specifications.

Op-Test No.: 2010-301 Scenario No.: 5 Event No.: 4 Page 2 of 4

Event Description: Controlling steam flow channel for 3B S/G, FT-3-484 drifts low, the BOP takes manual control of 3B SG level control. FT-3-484 is removed from service using 3-ONOP-049.1 and FCV-3-479 is returned to automatic.

Time	Position	Applicant's Actions or Behavior
	SRO	Refers to LCO 3.3.1, Table 3.3-1, Functional Unit 12 action 6 & LCO 3.3.2, Table 3.3-2 Functional Unit 1f/ 4d action 15 (b/s trip in 6 hr)
	SRO	Makes determination to trip the following bistables within 6 hours. • BS-3-474 (rack 16) & BS-478B1 / 478B2 / 478C (rack 17)
		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.*
		EXAMINER NOTE: When the SRO selects which bistables to trip, proceed to next event.
		EXAMINER NOTE: See next two pages for applicable Tech Specs.

Op-Test No.: 2010-301 Scenario No.: 5 Event No.: 4 Page 3 of 4

Event Description: Controlling steam flow channel for 3B S/G, FT-3-484 drifts low, the BOP takes manual control of 3B SG level control. FT-3-484 is removed from service using 3-ONOP-049.1 and FCV-3-479 is returned to automatic.

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: 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.

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.
		EXAMINER NOTE: 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: As shown in Table 3.3-2.

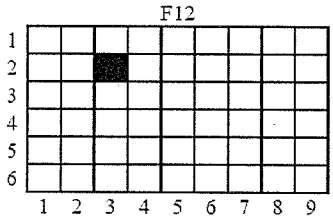
Op-Test No.: 2010 Scenario No.: 5 Event No.:4 Page 4 of 4

Event Description: Controlling steam flow channel for 3B S/G, FT-3-484 drifts low, the BOP takes manual control of 3B SG level control. FT-3-484 is removed from service using 3-ONOP-049.1 and FCV-3-479 is returned to automatic.

Time	Position	Applicant's Actions or Behavior					
		FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
		1 Safety Injection (Feedwater Isolation)					
		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
		Steam Generator Pressure--Low	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
		4. Steam Line Isolation					
		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.: 2010-301 Scenario No.: 5 Event No.: 5 Page 1 of 1

Event Description: The Main Generator experiences a transient on the grid. The generator mid GCB opens.

Time	Position	Applicant's Actions or Behavior
Direct facility operator to trigger lesson step Event 5 – 8W68 Opens		
	BOP	Observes alarm F3/2
	SRO	Directs response using the ARP F3/2
	BOP	 ATTACHMENT 6 Page 14 of 54 Panel F GEN BKR 8W68 TRIPPED
	BOP	1. Verify alarm by checking the following: a. Breaker indicating lamps (console). b. Gen. lockout relay, blue flashing lamp (VPA). c. Underfrequency lockout relay, blue flashing lamp (VPA).
	BOP	2. Verify the following automatic actions have occurred: a. No auto actions (unless both bkrs for that unit are open). **NOTE** *Matching flag on control switch will not clear the alarm.*
	BOP	3. Corrective Actions: a. IF both bkrs for that unit are open due to generator lockout relay action THEN verify Turbine Trip, Reactor trip if above P-7. b. IF both bkrs on that unit are open due to underfrequency, THEN see ANNUN. E1/6. c. IF 8W33 (east bus breaker) is still closed AND generator or underfrequency lockout relays have NOT actuated, THEN contact division dispatch office for further instructions.
	BOP	Re-closes 8W68 when informed by System that the breaker opening was spurious.

	BOP	5.63 Perform the following to close the Mid/East Bus Breaker: 5.63.1 Place the Generator Synch Mid/East Bus Breaker control in the MANUAL position. 5.63.2 Verify incoming and running voltages are matched with the synchroscope locked at 12 o'clock. 5.63.3 **WHEN** both synchronizing lights are out, **THEN** close the Generator GCB Mid/EastBus Breaker. 5.63.4 Observe the Generator GCB Mid Bus Breaker indicating lights to verify breaker closure (red on, green off). 5.63.5 Place the Generator Synch Mid Bus Breaker control to the OFF position.
		EXAMINER NOTE: When the BOP closes the Mid/East GCB proceed to EVENT 6-SGTR 3C SG,

Op-Test No.: 2010-301 Scenario No.: 5 Event No.: 6 Page 1 of 27

Event Description: The tube leak on 3C S/G will degrade into a tube rupture, the crew will respond using 3-EOP-E-0, Reactor Trip or Safety Injection and stop feeding the 3C S/G. The crew will transition to 3-EOP-E-3 to isolate the 3C S/G and cooldown the RCS or transitions to 3-EOP-ECA-3.1.

	SRO	Directs response using 3-EOP-E-0
		NOTE *Steps 1 through 4 are IMMEDIATE ACTION steps.*
	RO	**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.
	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).
	BOP	Manually closes MSR steam supply MOVs

Op-Test No.: 2010-301 Scenario No.: 5 Event No.: 6 Page 2 of 27

Event Description: The tube leak on 3C S/G will degrade into a tube rupture, the crew will respond using 3-EOP-E-0, Reactor Trip or Safety Injection and stop feeding the 3C S/G. The crew will transition to 3-EOP-E-3 to isolate the 3C S/G and cooldown the RCS or transitions to 3-EOP-ECA-3.1.

Time	Position	Applicant's Actions or Behavior
	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.: 2010-301 Scenario No.: 5 Event No.: 6 Page 3 of 27

Event Description: The tube leak on 3C S/G will degrade into a tube rupture, the crew will respond using 3-EOP-E-0, Reactor Trip or Safety Injection and stop feeding the 3C S/G. The crew will transition to 3-EOP-E-3 to isolate the 3C S/G and cooldown the RCS or transitions to 3-EOP-ECA-3.1.

Time	Position	Applicant's Actions or Behavior
	RO	**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.

Op-Test No.: 2010-301 Scenario No.: 5 Event No.: 6 Page 4 of 27

Event Description: The tube leak on 3C S/G will degrade into a tube rupture, the crew will respond using 3-EOP-E-0, Reactor Trip or Safety Injection and stop feeding the 3C S/G. The crew will transition to 3-EOP-E-3 to isolate the 3C S/G and cooldown the RCS or transitions to 3-EOP-ECA-3.1.

Time	Position	Applicant's Actions or Behavior
		NOTE *FOLDOUT Page shall be monitored for the remainder of this procedure.*
	CREW	Monitors 3-EOP-E-0 Foldout page (see next page)
	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 35
		Examiner Note: The SRO and RO will complete the remaining steps in 3-EOP-E-0, while the BOP performs 3-EOP-E-0 prompt action verifications using attachment 3
	RO	Stops AFW flow to the 3C S/G based on foldout page requirements.
	RO	Stops RCPs when subcooling is less than 25° with HHSI flowpath verified and HHSI pumps running based on foldout page requirements.

Op-Test No.: 2010-301 Scenario No.: 5 Event No.: 6 Page 5 of 27

Event Description: The tube leak on 3C S/G will degrade into a tube rupture, the crew will respond using 3-EOP-E-0, Reactor Trip or Safety Injection and stop feeding the 3C S/G. The crew will transition to 3-EOP-E-3 to isolate the 3C S/G and cooldown the RCS or transitions to 3-EOP-ECA-3.1.

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-OP-018.1, CONDENSATE STORAGE TANK.

7. **RHR SYSTEM OPERATION CRITERIA**

   IF RCS pressure is greater than 250 PSIG [650 PSIG] AND 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.: 2010-301 Scenario No.: 5 Event No.: 6 Page 6 of 27

Event Description: The tube leak on 3C S/G will degrade into a tube rupture, the crew will respond using 3-EOP-E-0, Reactor Trip or Safety Injection and stop feeding the 3C S/G. The crew will transition to 3-EOP-E-3 to isolate the 3C S/G and cooldown the RCS or transitions to 3-EOP-ECA-3.1.

Time	Position	Applicant's Actions or Behavior	
	RO	**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.
	RO	**7** **Verify AFW Valve Alignment - PROPER EMERGENCY ALIGNMENT**	Manually align valves to establish proper AFW alignment.
	RO	**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.

Op-Test No.: 2010-301 Scenario No.: 5 Event No.: 6 Page 7 of 27

Event Description: The tube leak on 3C S/G will degrade into a tube rupture, the crew will respond using 3-EOP-E-0, Reactor Trip or Safety Injection and stop feeding the 3C S/G. The crew will transition to 3-EOP-E-3 to isolate the 3C S/G and cooldown the RCS or transitions to 3-EOP-ECA-3.1.

Time	Position	Applicant's Actions or Behavior
	RO	b. Maintain feed flow to S/G narrow range levels between 15%[32%] and 50%.
	RO	**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.: 2010-301 Scenario No.: 6 Event No.: 6 Page 8 of 27

Event Description: The tube leak on 3C S/G will degrade into a tube rupture, the crew will respond using 3-EOP-E-0, Reactor Trip or Safety Injection and stop feeding the 3C S/G. The crew will transition to 3-EOP-E-3 to isolate the 3C S/G and cooldown the RCS or transitions to 3-EOP-ECA-3.1.

Time	Position	Applicant's Actions or Behavior
	RO	**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) Limit 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.
	RO	Reduces total AFW to the 3A & 3B S/G to 345 gpm.

Op-Test No.: 2010-301 Scenario No.: 5 Event No.: 6 Page 9 of 27

Event Description: The tube leak on 3C S/G will degrade into a tube rupture, the crew will respond using 3-EOP-E-0, Reactor Trip or Safety Injection and stop feeding the 3C S/G. The crew will transition to 3-EOP-E-3 to isolate the 3C S/G and cooldown the RCS or transitions to 3-EOP-ECA-3.1.

Time	Position	Applicant's Actions or Behavior
	RO	**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).
	RO	**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
	RO	Stops RCPs when subcooling is less than 25°F(65°F) with HHSI flowpath verified and HHSI pumps running if not done off the fold out page.

Op-Test No.: 2010-301 Scenario No.: 5 Event No.: 6 Page 10 of 27

Event Description: The tube leak on 3C S/G will degrade into a tube rupture, the crew will respond using 3-EOP-E-0, Reactor Trip or Safety Injection and stop feeding the 3C S/G. The crew will transition to 3-EOP-E-3 to isolate the 3C S/G and cooldown the RCS or transitions to 3-EOP-ECA-3.1.

Time	Position	Applicant's Actions or Behavior
	RO	**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
	RO	**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 * ERDADS 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.: 2010-301 Scenario No.: 5 Event No.: 6 Page 11 of 27

Event Description: The tube leak on 3C S/G will degrade into a tube rupture, the crew will respond using 3-EOP-E-0, Reactor Trip or Safety Injection and stop feeding the 3C S/G. The crew will transition to 3-EOP-E-3 to isolate the 3C S/G and cooldown the RCS or transitions to 3-EOP-ECA-3.1.

Time	Position	Applicant's Actions or Behavior
	SRO	Diagnoses the SGTR on the 3C S/G based on rising S/G level concurrent with decreasing RCS pressure and decreasing Pressurizer level.
	SRO	Transitions to 3-EOP-E-3
	BOP	Continues performance of 3-EOP-E-0 Attachment 3 Prompt Action Verification
		Examiner note: 3-EOP-E-3 details start on page 18.

Op-Test No.: 2010-301 Scenario No.: 5 Event No.: 6 Page 12 of 27

Event Description: The tube leak on 3C S/G will degrade into a tube rupture, the crew will respond using 3-EOP-E-0, Reactor Trip or Safety Injection and stop feeding the 3C S/G. The crew will transition to 3-EOP-E-3 to isolate the 3C S/G and cooldown the RCS or transitions to 3-EOP-ECA-3.1.

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).

Op-Test No.: 2010-301 Scenario No.: 5 Event No.: 6 Page 13 of 27

Event Description: The tube leak on 3C S/G will degrade into a tube rupture, the crew will respond using 3-EOP-E-0, Reactor Trip or Safety Injection and stop feeding the 3C S/G. The crew will transition to 3-EOP-E-3 to isolate the 3C S/G and cooldown the RCS or transitions to 3-EOP-ECA-3.1.

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.

Op-Test No.: 2010-301 Scenario No.: 5 Event No.: 6a Page 14 of 27

Event Description: The B Train Sequencer will fail to automatically actuate, the BOP will manually start the B Train Safeguards equipment using 3-EOP-E-0 Att 3.

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	Places the handswitch for the 3A or 3B ECC fan to START
	BOP	**7. Verify SI Pump Operation** a. At least two high head pumps running — a. Manually start high-head pump(s). b. Both RHR pumps running — b. Manually start RHR pump(s).
	BOP	Places the handswitch for the 3B HHSI pump to START
	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 <u>AND</u> 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 <u>AND</u> align valves to establish an injection flowpath.

Op-Test No.: 2010-301 Scenario No.: 5 Event No.: 6a Page 14 of 27

Event Description: The B Train Sequencer will fail to automatically actuate, the BOP will manually start the B Train Safeguards equipment using 3-EOP-E-0 Att 3.

Time	Position	Applicant's Actions or Behavior
	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 handswitch for the 3B RHR pump to START
	BOP	Places the handswitch for the 4A & 4B HHSI pumps to STOP.
	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	Places the handswitch for MOV-3-1425 to CLOSE
	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

Op-Test No.: 2010-301 Scenario No.: 5 Event No.:6a Page 16 of 27

Event Description: The tube leak on 3C S/G will degrade into a tube rupture, the crew will respond using 3-EOP-E-0, Reactor Trip or Safety Injection and stop feeding the 3C S/G. The crew will transition to 3-EOP-E-3 to isolate the 3C S/G and cooldown the RCS or transitions to 3-EOP-ECA-3.1.

Time	Position	Applicant's Actions or Behavior	
	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 • MOV-3-1417 • MOV-3-1418	b. Stop all RCPs
		c. Reset and start normal containment coolers	c. Stop all RCPs
	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.

Op-Test No.: 2010-301 Scenario No.: 5 Event No.: 6a Page 16 of 27

Event Description: The tube leak on 3C S/G will degrade into a tube rupture, the crew will respond using 3-EOP-E-0, Reactor Trip or Safety Injection and stop feeding the 3C S/G. The crew will transition to 3-EOP-E-3 to isolate the 3C S/G and cooldown the RCS or transitions to 3-EOP-ECA-3.1.

Time	Position	Applicant's Actions or Behavior
		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-OP-094, CONTAINMENT POST ACCIDENT MONITORING SYSTEM**
	BOP	**18. Verify All Four EDGs – RUNNING** EMERGENCY START any available EDG **NOT** running.
	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 Note Any Actions That Had To Be Taken**

Op-Test No.: 2010-301 Scenario No.: 5 Event No.: 6 Page 18 of 27

Event Description: The tube leak on 3C S/G will degrade into a tube rupture, the crew will respond using 3-EOP-E-0, Reactor Trip or Safety Injection and stop feeding the 3C S/G. The crew will transition to 3-EOP-E-3 to isolate the 3C S/G and cooldown the RCS or transitions to 3-EOP-ECA-3.1.

Time	Position	Applicant's Actions or Behavior
	SRO	Directs response using 3-EOP-E-3.
		NOTES • *FOLDOUT Page shall be monitored for the remainder of this procedure.* • *Personnel will be necessary for sampling during this procedure.*
	CREW	Monitors 3-EOP-E-3 Foldout page (see next page)
	RO	**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** INITIATED — d. Go to Step 2. e. Stop all RCPs
	RO	Stops RCPs if subcooling is less than 25°F (65°F) with HHSI flowpath verified and HHSI pumps running. (Should already been stopped in 3-EOP-E-0)

Op-Test No.: 2010-301 Scenario No.: 5 Event No.: 6 Page 19 of 27

Event Description: The tube leak on 3C S/G will degrade into a tube rupture, the crew will respond using 3-EOP-E-0, Reactor Trip or Safety Injection and stop feeding the 3C S/G. The crew will transition to 3-EOP-E-3 to isolate the 3C S/G and cooldown the RCS or transitions to 3-EOP-ECA-3.1.

FOLDOUT FOR PROCEDURE E-3

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 AND the TSC has determined that containment integrated dose rate has not exceeded 10^6 Rads, THEN normal setpoints can be used.

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 not initiated
b. IF phase B actuated, THEN trip all RCPs.

3. SI REINITIATION CRITERIA
IF SI has been terminated AND either condition listed below occurs, THEN manually start SI pumps as necessary to restore RCS subcooling and PRZ level AND go to 3-EOP-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, Step 1:
* RCS subcooling based on core exit TCs - LESS THAN 30°F[210°F]
  OR
* PRZ level – CAN NOT BE MAINTAINED 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. MULTIPLE TUBE RUPTURE CRITERIA
IF any intact S/G level increases in an uncontrolled manner OR any intact S/G has abnormal radiation, THEN stabilize the plant AND return 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. CST MAKEUP WATER CRITERIA
IF CST level decreases to less than 10%, THEN add makeup to CST using 3-OP-018.1, CONDENSATE STORAGE TANK.

8. 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.

Op-Test No.: 2010-301 Scenario No.: 5 Event No.: 6 Page 20 of 27

Event Description: The tube leak on 3C S/G will degrade into a tube rupture, the crew will respond using 3-EOP-E-0, Reactor Trip or Safety Injection and stop feeding the 3C S/G. The crew will transition to 3-EOP-E-3 to isolate the 3C S/G and cooldown the RCS or transitions to 3-EOP-ECA-3.1.

Time	Position	Applicant's Actions or Behavior
	RO	**2** **Identify Ruptured S/G(s)** a. Direct Radiation Protection to take radiation readings on main steam lines AND blowdown lines b. Direct Chemistry to sample the steamlines for activity c. Determine which S/G(s) is ruptured * Unexpected mismatch between steamflow and feedflow OR * Unexpected increase in any S/G narrow range level OR * High radiation from any S/G steamline sample OR * High radiation from any S/G blowdown line sample OR * High radiation on RP local readings of main steamlines OR blowdown lines c. WHEN ruptured S/G(s) identified, THEN observe CAUTIONS prior to Step 3 AND do Steps 3 through 11. Continue with Steps 12 through 18.
	SRO	Determines the 3C S/G is ruptured due to an unexpected increase in narrow range level or was previously identified in 3-ONOP-071.2.

Op-Test No.: 2010-301 Scenario No.: 5 Event No.: 6 Page 21 of 27

Event Description: The tube leak on 3C S/G will degrade into a tube rupture, the crew will respond using 3-EOP-E-0, Reactor Trip or Safety Injection and stop feeding the 3C S/G. The crew will transition to 3-EOP-E-3 to isolate the 3C S/G and cooldown the RCS or transitions to 3-EOP-ECA-3.1.

Time	Position	Applicant's Actions or Behavior
		CAUTIONS • *If the AFW pumps are the only available source of feedwater flow, the steam supply to the AFW pumps must be maintained from at least one S/G.* • *At least one S/G must be maintained available for RCS cooldown.*
	BOP	**3** **Control Ruptured S/G(s) Steam Dump To Atmosphere Valve** a. Adjust ruptured S/G(s) steam dump to atmosphere controller setpoint to 1060 psig b. Check ruptured S/G(s) steam dump to atmosphere - CLOSED b. **WHEN** ruptured S/G pressure is less than 1060 psig, **THEN** perform the following: 1) Verify S/G steam dump to atmosphere – CLOSED. 2) **IF** S/G steam dump to atmosphere does **NOT** close, **THEN** place steam dump to atmosphere controller in MANUAL **AND** close the steam dump to atmosphere. 3) **IF** steam dump to atmosphere can **NOT** be closed, **THEN** locally close affected steam dump to atmosphere isolation valve: * 3-10-001 for S/G A * 3-10-002 for S/G B * 3-10-003 for S/G C
	BOP	Adjusts 3C SG steam dump to atmosphere setpoint to 1060 psig.

Op-Test No.: 2010-301 Scenario No.: 5 Event No.: 6 Page 22 of 27

Event Description: The tube leak on 3C S/G will degrade into a tube rupture, the crew will respond using 3-EOP-E-0, Reactor Trip or Safety Injection and stop feeding the 3C S/G. The crew will transition to 3-EOP-E-3 to isolate the 3C S/G and cooldown the RCS or transitions to 3-EOP-ECA-3.1.

Time	Position	Applicant's Actions or Behavior
	BOP	**4 Isolate Steam From Ruptured S/G(s) To AFW Pumps** a. Verify SI - RESET — a. Reset SI. b. Verify AMSAC - RESET — b. Reset AMSAC. c. Verify steam supply aligned to both trains of AFW pumps from intact S/G(s) — c. 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 d. Close AFW pump steam supply MOV on ruptured S/G(s) e. Dispatch an operator to perform the following 1) Open AFW pump steam supply MOV breaker on ruptured S/G(s) 2) Verify AFW pump steam supply MOV on ruptured S/G(s) - CLOSED
	BOP	Directs SNPO/TO/FS to open AFSS-006 and close AFSS-007 if not done in 3-ONOP-071.2
	BOP	Directs SNPO/TO/FS to de-energize by opening breaker 3D01-27 & closing 3C SG AFW steam supply isolation MOV-3-1405 if not done in 3-ONOP-071.2.
	RO	**5 Isolate Miscellaneous Flowpaths From Ruptured S/G(s)** a. Verify blowdown isolation valve(s) from ruptured S/G(s) - CLOSED — a. Locally close associated manual isolation valve: * SGB-3-007 for S/G A * SGB-3-008 for S/G B * SGB-3-009 for S/G C b. Check auxiliary steam - SUPPLIED FROM ANOTHER UNIT — b. Perform Attachment 5 while continuing with Step 6.

Op-Test No.: 2010-301 Scenario No.: 5 Event No.: 6 Page 23 of 27

Event Description: The tube leak on 3C S/G will degrade into a tube rupture, the crew will respond using 3-EOP-E-0, Reactor Trip or Safety Injection and stop feeding the 3C S/G. The crew will transition to 3-EOP-E-3 to isolate the 3C S/G and cooldown the RCS or transitions to 3-EOP-ECA-3.1.

Time	Position	Applicant's Actions or Behavior
	BOP	**6** **Close Ruptured S/G(s) Main Steamline Isolation AND Bypass Valves** Perform the following: a. Close all remaining main steam line isolation **AND** bypass valves. b. Perform the following: • Verify turbine stop valves - CLOSED. • Verify turbine control valves – CLOSED. • Verify condenser steam dump valves – CLOSED. • Verify MSR Main Steam Supply Stop MOVs – CLOSED. • Verify reheater timing cam – CLOSED. • Locally close Main Steam To Aux Steam Header Isolation Valve, 3-10-007. • Locally isolate Steam Traps 1 through 13. c. Use intact S/G(s) steam dump to atmosphere valve(s) for steam dump. d. **IF** any ruptured S/G can **NOT** be isolated from at least one intact S/G, **THEN** go to 3-EOP-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT-SUBCOOLED RECOVERY DESIRED, Step 1.
	BOP	Manually closes 3C S/G MSIV POV-3-2606.
		CAUTION *All steam generator blowdown sample lines must be isolated within the first 30 minutes of a Steam Generator Tube Rupture event to prevent release of contaminated fluid through unmonitored vent paths.*

Op-Test No.: 2010-301 Scenario No.: 5 Event No.: 6 Page 24 of 27

Event Description: The tube leak on 3C S/G will degrade into a tube rupture, the crew will respond using 3-EOP-E-0, Reactor Trip or Safety Injection and stop feeding the 3C S/G. The crew will transition to 3-EOP-E-3 to isolate the 3C S/G and cooldown the RCS or transitions to 3-EOP-ECA-3.1. The B Train Sequencer will fail to automatically actuate, the BOP will manually start the B Train Safeguards equipment using 3-EOP-E-0 Att 3.

Time	Position	Applicant's Actions or Behavior
	RO	**7** **Verify S/G Blowdown Sample Stop Valves - CLOSED** • MOV-3-1427 • MOV-3-1426 • MOV-3-1425 Isolate the affected S/G Blowdown Sample Stop Valve(s) as follows: a. Direct the SNPO to locally close the valve(s). b. **IF** any S/G blowdown sample line can **NOT** be isolated, **THEN** perform the following: 1) Direct the SNPO to close the applicable sample cooler isolation valves (sample room): * For MOV-3-1427, close valves: • 3-20-507 • 3-20-489 * For MOV-3-1426, close valves: • 3-20-505 • 3-20-487 * For MOV-3-1425, close valves: • 3-20-503 • 3-20-485 2) Direct the Turbine Operator to close the applicable sample cooler (mezzanine) isolation valves: * For MOV-3-1427, close valves: • 3-20-495 • 3-20-501 * For MOV-3-1426, close valves: • 3-20-493 • 3-20-499 * For MOV-3-1425, close valves: • 3-20-491 • 3-20-497
	BOP	**Manually closes MOV-3-1425**
		CREW CRITICAL TASK Isolate steam flow out of a ruptured the 3C S/G prior to completing step 7 of 3-EOP-E-3

Op-Test No.: 2010-301 Scenario No.: 5 Event No.: 6 Page 25 of 27

Event Description: The tube leak on 3C S/G will degrade into a tube rupture, the crew will respond using 3-EOP-E-0, Reactor Trip or Safety Injection and stop feeding the 3C S/G. The crew will transition to 3-EOP-E-3 to isolate the 3C S/G and cooldown the RCS or transitions to 3-EOP-ECA-3.1.

Time	Position	Applicant's Actions or Behavior
		CAUTION *If any ruptured S/G is also faulted and is NOT needed for RCS cooldown, feed flow to that S/G is required to be maintained isolated during subsequent recovery actions.*
	BOP	**8** **Control Ruptured S/G(s) Level** a. Narrow range level – GREATER THAN 6%[32%] a. Perform the following: 1) Maintain feed flow to ruptured S/G until level is greater than 6%[32%]. 2) WHEN ruptured S/G level is greater than 6%[32%], THEN stop feed flow to ruptured S/G(s). 3) Continue with Step 9. b. Stop feed flow to ruptured S/G(s)
	BOP	Stops AFW flow to the 3C S/G. (Should have already been completed in 3-EOP-E-0
		CREW CRITICAL TASK: Isolate feedwater flow into the 3C S/G prior to completing step 8 of 3-EOP-E-3
	BOP	**9** **Verify Ruptured S/G(s) – ISOLATED FROM INTACT S/Gs** • Ruptured S/G(s) Main Steamline Isolation and Bypass Valves - CLOSED • Ruptured S/G(s) AFW Steam Supply MOV(s) - CLOSED Do NOT continue until each ruptured S/G(s) is isolated from at least one intact S/G(s) to be used for RCS cooldown. IF any ruptured S/G(s) can NOT be isolated from at least one intact S/G, THEN go to 3-EOP-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT-SUBCOOLED RECOVERY DESIRED, Step 1.
	RO	**10** **Check Ruptured S/G(s) Pressure - GREATER THAN 500 PSIG** Go to 3-EOP-ECA-3 1, SGTR WITH LOSS OF REACTOR COOLANT-SUBCOOLED RECOVERY DESIRED, Step 1.
		NOTE *If RCPs are not running, the following steps may cause a false Integrity Status Tree indication for the ruptured loop. Disregard the ruptured loop T-cold indication until after performing Step 34.*

Op-Test No.: 2010-301 Scenario No.: 5 Event No.: 6 Page 26 of 27

Event Description: The tube leak on 3C S/G will degrade into a tube rupture, the crew will respond using 3-EOP-E-0, Reactor Trip or Safety Injection and stop feeding the 3C S/G. The crew will transition to 3-EOP-E-3 to isolate the 3C S/G and cooldown the RCS or transitions to 3-EOP-ECA-3.1.

Time	Position	Applicant's Actions or Behavior
	BOP	**11** **Initiate RCS Cooldown**

a. Determine required core exit temperature

LOWEST RUPTURED S/G PRESSURE (PSIG)	REQUIRED CORE EXIT TEMPERATURE (°F)
Greater than or equal to 1100	513°F [466°F]
1000 to 1099	501°F [447°F]
900 to 999	488°F [426°F]
800 to 899	474°F [400°F]
700 to 799	458°F [385°F]
600 to 699	441°F [369°F]
500 to 599	420°F [350°F]

b. Dump steam to condenser from intact S/G(s) at maximum rate **NOT** to exceed 350,000 lbm/hr per S/G (Bottom of green band)

b. Manually dump steam to atmosphere from intact S/G(s) at maximum rate. **IF** no intact S/G available, **THEN** perform one of the following:

- Use faulted S/G.

  OR

- Go to 3-EOP-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT-SUBCOOLED RECOVERY DESIRED, Step 1.

c. Core exit TCs - LESS THAN REQUIRED TEMPERATURE

c. **WHEN** core exit TCs less than required, **THEN** do Steps 11d and 11e. Continue with Step 12.

d. Stop RCS cooldown

e. Maintain core exit TCs – LESS THAN REQUIRED TEMPERATURE

	BOP	Adjusts output on the Steam Dump to Condenser controllers to attain a cooldown rate within the limits of step 11.
		EXAMINER NOTE: The scenario is terminated when the RCS cooldown has been stopped or at the discretion of the lead examiner.

Op-Test No.: 2010-301 Scenario No.: 5 Event No.: 6 Page 27 of 27

Event Description: The tube leak on 3C S/G will degrade into a tube rupture, the crew will respond using 3-EOP-E-0, Reactor Trip or Safety Injection and stop feeding the 3C S/G. The crew will transition to 3-EOP-E-3 to isolate the 3C S/G and cooldown the RCS or transitions to 3-EOP-ECA-3.1.

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: Entered if the 3C S/G decreases to less than 500 psig during event 6
	SRO	Transitions to 3-EOP-ECA-3.1.
		EXAMINER NOTE: The scenario is terminated when the crew transitions to 3-EOP-ECA-3.1

CREW CRITICAL TASK Isolate steam flow out of a ruptured the 3C S/G prior to completing step 7 of 3-EOP-E-3

CREW CRITICAL TASK: Isolate feedwater flow into the 3C S/G prior to completing step 8 of 3-EOP-E-3

Facility: Turkey Point Scenario No.: 6 Op Test No.: 2010-301

Examiners: _____ Candidates: _____ US

_____ _____ RO

_____ _____ BOP

Initial Conditions: Mode 2, 2-3% power, MOL. Ready to raise power to 5-6% to roll the turbine and sync to the grid

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.

Immediately after shift turnover raise Reactor Power to between 5-6%. The shift manager has granted permission to perform the evolution.

Event No.		Event Type*	Event Description
1		(R) RO (N) BOP	The RO will raise Reactor Power to 5% and the BOP will manually control Steam Generator levels using 3-GOP-301.
2	TVS1SALO 1	(TS,I)	LT-3-474 will fail low, the crew will respond using the ARP and 3-ONOP-049.1 to address the failed channel. The SRO will enter LCO 3.3.1 Action 6
3	TFK2B17T T	(C) BOP (C,TS) SRO	3B ICW Pump shaft shears, crew manually starts the 3A ICW pump using the ARP or 3-ONOP-19.
4	TVBVLK40=1.0	(C) RO (C) SRO	CVCS relief valve, RV-3-203, fails open, the RO isolates Letdown using the ARP and will re-seat the relief valve. The RO will establish Letdown once the relief valve is re-seated
5	TVS1SR3O 1	(C) BOP (C) SRO	PT-3-1608 fails high which causes CV-3-1608 to fail open and increases steam flow 3-4%. The BOP will place the controller for CV-3-1608 to manual and reduce output to close the valve.
6	TFL2XASE = T TFL2XBSE = T TFL4AF = T	(M)ALL	An inadvertent Train A SI occurs with a failure of the Reactor Protection System to actuate. The crew responds using 3-EOP-E-0 and transitions to 3-EOP-FR-S-1 to initiate a local reactor trip.
6a	TFBVS63 T TABM356 1)	(C) RO	The RO will align charging pump suction to the manual emergency boration path to initiate boration.

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

Rev'd 8/23/10

Turkey Point 2010-301 Scenario #6

Event 1 - The RO will raise Reactor Power and the BOP will manually control Steam Generator levels using 3-GOP-301.

Event 2 – LT-3-474 will fail low, the crew will respond using the ARP and 3-ONOP-049.1 to address the failed channel. The SRO will enter LCO 3.3.1 Action 6

Event 3 - The 3B ICW Pump shaft shears, the crew manually starts the 3A ICW pump using the ARP or 3-ONOP-19.

Event 4 - CVCS relief valve, RV-3-203, fails open, the RO isolates Letdown using the ARP and will re-seat the relief valve. The RO will establish Letdown once the relief valve is re-seated

Event 5 - PT-3-1608 fails high which causes CV-3-1608 to fail open and increases steam flow 3-4%. The BOP will place the controller for CV-3-1608 to manual and reduce output to close the valve.

Event 6 - An inadvertent Train A SI occurs with a failure of the Reactor Protection System to actuate. The crew responds using 3-EOP-E-0 and transitions to 3-EOP-FR-S-1 to initiate a local reactor trip.

Critical Task: The RO will drive rods in manual and will align charging pump suction to the manual emergency boration path to initiate emergency boration.

Critical Task. The BOP will lower AFW flow to all Steam Generators.to prevent overfill **(NR greater than 100%)**

Critical Task: The RO will stop the RHR pumps prior to 44 minutes off the E-0, Foldout Page.

Neid 8/23/10

Gr 26 NRC Scenario # 6 Simulator Operating Instructions
Setup

Restore IC- 20 (19)

Place simulator in run

Open and execute lesson file Gr 26 NRC Scenario 7.lsn

Manually stop the 3B2 Circulating Water pump

Trigger lesson steps:

- SETUP - MOV-3-350 Fails Closed **(actuates TFBVS63 T)**
- SETUP - 3B2 CWP OOS **(actuates TAK4DP = 3)**
- SETUP – ATWS **(actuates TFL2XASE = T, TFL2XBSE = T TFL4AF=T)**
- Clearance Tag on 3B2 Hand Switch

Provide a copy of -GOP-301 complete to step 5.44

Provide power ascension guidelines

Place simulator in freeze.

Provide shift turnover checklists

Perform Simulator Operator Checklist

Event 1 – Raise Reactor Power

Initiated by crew based on shift turnover.

The RO will raise Reactor Power to 5% power and the BOP will manually control Steam Generator levels using 3-GOP-301.

Event 2 – LT-3-474 fails low

LT-3-474 will fail low, the crew will respond using the ARP and 3-ONOP-049.1 to address the failed channel. The SRO will enter LCO 3.3.1 Action 6

When directed, trigger lesson step EVENT 2 - LT-3-474 Fails Low (actuates TVS1SALO 1on 3 min ramp).

If directed as FS/TO to reset AMSAC **trigger lesson step EVENT 2 RESET AMSAC TROUBLE** (actuates TCL4RST T, TCL4P1BA T, TCL4P1BB T)

Event 3 - 3B ICW Pump Trip

When directed, trigger lesson step EVENT 3 - B ICW Pump Trip (actuates TFK2B17T T).

If directed, respond as WCC to initiate a PWO and contact I&C. Also respond as WCC if directed to generate an ECO.

Event 4. CVCS Relief Valve, RV-3-203, Fails Open

When directed, trigger lesson step EVENT 4 CVCS Relief Valve, RV-3-203, Fails Open (actuates TVBVLK40 1)

If directed, respond as WCC to generate a work order and contact maintenance.

Event 5 - PT-3-1608 fails high

When directed, trigger lesson step EVENT 5 - PT-3-1608 FAILS HIGH (actuates TVS1SR3O 1).

PT-3-1608 fails high which causes CV-3-1608 to fail open and increases steam flow 3-4%. The BOP will place the controller for CV-3-1608 to manual and reduce output to close the valve.

Event 6 –Inadvertent SI / ATWS

An inadvertent Train A SI occurs with a failure of the Reactor Protection System to actuate. The crew responds using 3-EOP-E-0 and transitions to 3-EOP-FR-S-1 to initiate a local reactor trip. The RO will align charging pump suction to the manual emergency boration path to initiate boration. The BOP will lower AFW flow to all Steam Generators.

When directed by the lead examiner, **trigger lesson step EVENT 6 – Inadvertent Train A Safety Injection.** (actuates TFL2XASE = T TFL2XBSE = T TFL4AF = T)

If directed to locally open Manual Emergency Boration Valve, 3-356 respond as SNPO **trigger lesson step EVENT 6 – LOCALLY Open 3-356** **(actuates TABM356 1)** Report when complete.

If directed to locally trip the reactor, respond as TO/FS. When directed by the lead evaluator, **trigger lesson step EVENT 6 - LOCALLY OPEN RX TRIP BKRS** **(actuates TFL2XASE=F then TFL2XBSE=F 15 sec later)**. Report when complete.

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

Op-Test No.: 2010-301 Scenario No.: 6 Event No.: 1 Page 1 of 1

Event Description: The crew performs 3-GOP-301 beginning at step 5.52.3 to synchronize generator to grid, increase power and swap S/G level control to main feed reg valves controlling in automatic.

Time	Position	Applicant's Actions or Behavior
	SRO	Directs the evolution
	RCO	5.44 In preparation for rolling the main turbine, increase Reactor Power to 3 to 5 percent by dilution using 0-OP-046, CVCS - Boron Concentration Control, **OR** by withdrawing control rods
	BOP	Adjust feedwater flow on the bypasses as reactor power is raised to 5%.
	BOP	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.
		NOTE *The following step may be performed as SDTA controllers are adjusted and steam generator levels are stabilized.*
		Once Plant is stable at 5%, Proceed to event 2-LT-3-474 failing low.

Op-Test No.: 2010-301 Scenario No.: 6 Event No.: 2 Page 1 of 2

LT-3-474 will fail low, the crew will respond using the ARP and 3-ONOP-049.1 to address the failed channel. The SRO will enter LCO 3.3.1, Action 6 and TS 3.3.2,Action 15.

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Observes C-1/1, D 7/6
		C1 SG A NARROW RANGE LO/LO-LO LEVEL CAUSES: 1. Steam Generator Level Control Malfunction 2. Instrument Failure
		D52 AMSAC TROUBLE/ ACTUATED CAUSES: 1. AMSAC actuated demand for reactor trip 2. Processor trouble, loss of voltage, or bypass switch NOT in normal 3. Instrument failures
	SRO	Enters 3-ONOP-049.1,Deviation or failure of safety related or Reactor Protection Channels
	BOP	5.1 Verify instrument loop failure by comparison to adjacent loops and known plan parameters and conditions.
	BOP	5.2 Verify no off-normal conditions exist on the adjacent channels which are to remain in service.
	BOP	5.3 Verify applicable control transfer switches are in the position which eliminates the failed loop.
	BOP	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	5.5 Refer to Technical Specifications 3/4.3, Instrumentation, **AND** verify the minimum channels operable. 5.5.1 Take appropriate actions as specified in Technical Specifications.
	SRO	Enters LCO 3.3.1

Op-Test No.: 2010-301 Scenario No.: 6 Event No.: 2 Page 2 of 2

LT-3-474 will fail low, the crew will respond using the ARP and 3-ONOP-049.1 to address the failed channel. The SRO will enter LCO 3.3.1, Action 6 and Ts 3.3.2, Action 15.

Time	Position	Applicant's Actions or Behavior
	BOP	5.6 **IF** a 4KV bus/480V load center undervoltage channel has failed, **THEN** perform Attachment 1.
	BOP	5.7 **IF** a turbine stop valve closure channel has failed, **THEN** perform Attachment 2.
	BOP	5.8 **IF** a turbine auto stop oil channel has failed, **THEN** perform Attachment 3.
	SRO	5.9 **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.
	BOP	5.12 **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: 5.12.1 Any Steam Generator Level Channel I (LI-3-474, LI-3-484, or LI-3-494) **OR** 5.12.2 Any Steam Generator Level Channel II (LI-3-475, LI-3-485, or LI-3-495) **OR** 5.12.3 PT-3-446 **OR** 5.12.4 PT-3-447
	BOP	May Bypass AMSAC using ARP D7/6

ATTACHMENT 4
(Page 25 of 53)

FAILED CHANNEL BISTABLE LIST

L-3-474	Steam Generator A Narrow Range Level					Ref Dwgs 5610-T-D-17; 5610-T-L1, Sh 3 and 19
Max Deviation As Compared to other Channels			10% LEVEL DEVIATION			
RACK No.	BISTABLE No.	BISTABLE FUNCTION	STATUS LIGHT	ANNUNCIATOR	FUNC-TION	LOGIC AFFECTED
3	BS-3-474-1	HI Level Logic	S/G A HI LEVEL LC474-1		P	2/3 channels on 1/3 S/G, high S/G level (N/R 80%) for turbine trip, with P-7 satisfied causing reactor trip signal
3	BS-3-474-2	HI Level Alarm		C 2/1 SG A NARROW RANGE HI LEVEL	C	
3	BS-3-474A-1	Lo Lo Level Logic	S/G A LO LO LEVEL LC474A1		P	2/3 channels on 1/3 S/G, low low level (10%)
3	BS-3-474A-2	Lo Lo Level Alarm		C 1/1 SG A NARROW RANGE LO/LO-LO LEVEL	C	
3	BS-3-474B-1	Lo Level Logic	S/G A LO LEVEL LC474B1		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
3	BS-3-474B-2	Lo Level Alarm		C 1/1 SG A NARROW RANGE LO/LO-LO LEVEL	C	

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

TABLE 3.3-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
11. Steam Generator Water Level--Low-Low	3/stm. gen.	2/stm. gen.	2/stm. gen.	1, 2	6
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
13. Undervoltage--4.16 KV Busses A and B (Above P-7)	2/bus	1/bus on both busses	2/bus	1	12
14. Underfrequency-Trip of Reactor Coolant Pump Breaker(s) Open (Above P-7)	2/bus	1 to trip RCPs***	2/bus	1	11
15. Turbine Trip (Above P-7)					
a. Autostop Oil Pressure	3	2	2	1	12
b. Turbine Stop Valve Closure	2	2	2	1	12

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
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
5. Feedwater Isolation					
a. Automatic Actuation Logic and Actuation Relays	2	1	2	1, 2	22
b. Safety-Injection	See Item 1. above for all Safety Injection initiating functions and requirements.				
c. Steam Generator Water Level -- High-High# # # #	3/steam generator	2/steam generator in any operating steam generator	2/steam generator in any operating steam generator	1, 2	15
6. Auxiliary Feedwater# # #					
a. Automatic Actuation Logic and Actuation Relays	2	1	2	1, 2, 3	20

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
6. Auxiliary Feedwater### (Continued)					
b. Stm. Gen. Water Level--Low-Low	3/steam generator	2/steam generator in any steam generator	2/steam generator	1, 2, 3	15
c. Safety Injection	See Item 1. above for all Safety Injection initiating functions and requirements.				
d. Bus Stripping	1/bus	1/bus	1/bus	1, 2, 3	23
e. Trip of all Main Feed-water Pumps Breakers	1/breaker	(1/breaker) /operating pump	(1/breaker) /operating pump	1, 2	23
7. Loss of Power					
a. 4.16 kV Busses A and B (Loss of Voltage)	2/bus	2/bus	2/bus	1, 2, 3, 4	18
b. 480 V Load Centers 3A, 3B, 3C, 3D and 4A, 4B, 4C, 4D Undervoltage	2 per load center	2 on any load center	2 per load center	1, 2, 3, 4	18
Coincident with: Safety Injection	See Item 1. above for all Safety Injection initiating functions and requirements.				

TABLE 3.3-2 (Continued)

TABLE NOTATION

\# Trip function may be blocked in this MODE below the Pressurizer Pressure Interlock Setpoint of 2000 psig.

\# \# Channels are for particulate radioactivity and for gaseous radioactivity.

\# \# \# Auxiliary feedwater manual initiation is included in Specification 3.7.1.2.

\# \# \# \# Steam Generator overfill protection is not part of the Engineered Safety Features Actuation System (ESFAS), and is added to the Technical Specifications only in accordance with NRC Generic Letter 89-19.

* Trip function may be blocked in this MODE below the T_{avg}–Low Interlock Setpoint.

** Only during CORE ALTERATIONS or movement of irradiated fuel within the containment.

ACTION STATEMENTS

ACTION 14 - With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, be in at least HOT STANDBY within 12 hours and in COLD SHUTDOWN within the following 30 hours; however, one channel may be bypassed for up to 8 hours for surveillance testing per Specification 4.3.2.1, provided the other channel is OPERABLE.

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.

ACTION 16 - With less than the Minimum Channels OPERABLE requirement, comply with the ACTION statement requirements of Specification 3.3.3.1 Item 1a of Table 3.3-4.

ACTION 17 - With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, restore the inoperable channel to OPERABLE status within 48 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

Op-Test No.: 2010-301 Scenario No.: 6 Event No.: 3 Page 1 of 4

Event Description: The 3B ICW Pump shaft shears, the crew manually starts the 3A ICW pump using the ARP or 3-ONOP-19. SRO enters LCO 3.7.3a,actions a and b.

Time	Position	Applicant's Actions or Behavior
Direct facility operator to trigger lesson step EVENT 2 3B ICWP SHAFT SHEAR (actuates TFKCSMB = T).		
	BOP	Observes reduced 3B ICWP amps & annunciator I-4/4
	BOP	Refers to ARP for annunciator I-4/4
	SRO	Directs response using 3-ONOP-019. May direct response from the ARP.
	BOP	ARP Actions 2. Corrective actions: a. Start the standby ICW pump using 3-NOP-019, Intake Cooling Water System.
	BOP	3-NOP-019 Actions 4. IF starting 3A ICW PUMP, THEN: A. **ENSURE** 3-50-312, 3A ICW PP DISCH ISOL is OPEN. B. **START** 3A ICW PUMP from VPA. C. **CHECK** 3A ICW PUMP Motor Amps at VPA stabilizes to less than 49 amps. D. **CHECK** PI-3-1450, PRESS IND FOR INTAKE COOLING WTR PUMP A indicates between 11 and 35 psig.
	BOP	7. **PLACE** offgoing ICW PUMP to STOP at VPA.
	BOP	Manually starts 3A ICW Pump, stops the 3B ICW pump.
		Examiner Note: If 3-ONOP-19 is NOT entered, observe 3A ICW pump is started and go to page 4 for TS LCO entry.

Op-Test No.: 2010-301 Scenario No.: 6 Event No.: 2 Page 2 of 4

Event Description: The 3B ICW Pump shaft shears, the crew manually starts the 3A ICW pump using the ARP or 3-ONOP-19.

Time	Position	Applicant's Actions or Behavior
	CREW	Reviews 3-ONOP-19 foldout page actions (See next page)
		CAUTIONS • *If the cause of the Intake Cooling Water Malfunction is determined to be due to high differential pressure on the traveling screens, then 3-ONOP-011, SCREEN WASH SYSTEM/INTAKE MALFUNCTION, should be used.* • *If an Intake Cooling Water Pump is stopped in this procedure and the reason for stopping the pump has not been corrected, that pump is not available for starting in subsequent procedure steps.* • *Monitoring Main Generator RTDs is required if TPCW flow or temperature is changed due to the effect on Main Generator hydrogen leakage. An increase in hydrogen leakage is expected if the gas temperature to rotor temperature gradient increases. (Reference CR 2008-803)*
	RO	1 **Verify All Intake Cooling Water Pump Alarms - OFF** • I 4/1, ICWP A/B/C MOTOR OVERLOAD • I 4/2, ICWP A/B/C TRIP • I 4/3, ICWP A/B/C MOTOR BRG HI TEMP Perform the following: 1. Have operator check pump(s) locally 2. Determine affected intake cooling water pump. 3. Start standby intake cooling water pump. 4. Stop affected intake cooling water pump.
		FOLDOUT PAGE FOR 3-ONOP-019 1. TRIP CRITERIA • Component Cooling Water temperature as read on TI-3-607A and TI-3-607B cannot be maintained less than 120°F. • Turbine or Generator bearing temperatures cannot be maintained less than 180°F. 2. MINIMUM FLOW REQUIREMENTS FOR CCW HXs While isolating a CCW/ICW strainer, ICW flow less than minimum required through the CCW HXs can be tolerated without entry into Technical Specification Action 3.0.3, provided flow is restored to the minimum allowable, as determined by 3-NOP-019, Intake Cooling Water System, in less than 5 minutes by reopening the strainer isolation valves. If flow is below the minimum allowable value for greater than 5 minutes, then entry into Technical Specification Action 3.0.3 is started at the point where flow first fell below the minimum value. [Reference 3.1.4]

Op-Test No.: 2010-301 Scenario No.: 4 Event No.: 2 Page 3 of 4

Event Description: The 3B ICW Pump shaft shears, the crew manually starts the 3A ICW pump using the ARP or 3-ONOP-19.

Time	Position	Applicant's Actions or Behavior
	BOP	**2** **Check Traveling Screens - CLEAN** — Go to 3-ONOP-011, SCREEN WASH SYSTEM/INTAKE MALFUNCTION • Alarm I 3/3, Traveling Screen HI ΔP - OFF • Traveling Screen DP - LESS THAN 7.5 INCHES OF WATER
	BOP	**3** **Verify Intake Cooling Water Pumps - AT LEAST ONE RUNNING**
	BOP	**4** **Verify Intake Cooling Water Pumps - TWO RUNNING** — Perform the following: a) Manually start any available Intake Cooling Water Pump to establish TWO RUNNING.
	BOP	Manually starts 3A ICW Pump, stops the 3B ICW pump.
	SRO	Implements LCO 3.7.3.a actions a & b (72 hr until 3B ICW pump bkr racked out then 14 day with 3A & 3C ICWP on independent power supplies)
	CREW	Notifies WCC to initiate PWO & repair

Op-Test No.: 2010-302 Scenario No.: 6 Event No.: 2 Page 4 of 4

Event Description: The 3B ICW Pump shaft shears, the crew manually starts the 3A ICW pump using the ARP or 3-ONOP-19.

Time	Position	Applicant's Actions or Behavior
	SRO	EXAMINER NOTE: LCO 3.7.3 a The Intake Cooling Water System (ICW) shall be OPERABLE with Three ICW pumps Action b With only one ICW pump OPERABLE or with two ICW 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. Then to: Action a With only two ICW pumps with independent power supplies OPERABLE, restore the inoperable ICW pump to OPERABLE status within 14 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. (Once the 3B ICW pump breaker is racked out.)
		EXAMINER NOTE: When the crew has started the 3A ICW pump, proceed to EVENT 4

Op-Test No.: 2010-301 Scenario No.: 6 Event No.: 4 Page 1 of 2

CVCS relief valve, RV-3-203, fails open, the RO isolates Letdown using the ARP and will re-seat the relief valve. The RO will establish Letdown once the relief valve is re-seated

Time	Position	Applicant's Action or behavior
		A50 CVCS LP LTDN LINE RELIEF HI TEMP CAUSES: 1. Hi letdown flow rate 2. PCV-3-145 failure 3. RV-3-203 setpoint drift low 4. CV-3-204 fail closed
		ALARM CONFIRMATION
	RO	1. CHECK TI-3-141, LTDN RELIEF TO PRT TEMP greater than 150°F on VPA.
	RO	2. CHECK PRT in leakage has increased.
	RO	3. CHECK for an increase in charging flow.
	RO	4. CHECK increased calculated RCS leakage using 3-OSP-041.1, Reactor Coolant System Leak Rate Calculation.
	RO	5. CHECK for a decrease of indicated letdown flow.
	SRO	NOTE The decision to isolate letdown should be based on unacceptable RV-3-203 leakage and Shift Manager discretion.
		OPERATOR ACTIONS
	RO	1. ENSURE CV-3-204, L/D FROM RHX ISOL VALVE is OPEN.
		2. RESEAT RV-3-203 as follows: A. CLOSE all letdown orifices. B. IF PCV-3-145 LOW PRESSURE LTDN CONTROLLER does NOT operate properly, THEN USE 3-309C, BYPASS VALVE. C. CHECK TI-3-141 NOT increasing. D. OPEN the required number of orifices while controlling PCV-3-145 or 3-309C.

Op-Test No.: 2010-301 Scenario No.: 6 Event No.: 4 Page 4 of 4

CVCS relief valve, RV-3-203, fails open, the RO isolates Letdown using the ARP and will re-seat the relief valve. The RO will establish Letdown once the relief valve is re-seated

Time	Position	Applicant's Action or behavior
		3. CHECK RV-3-203 is CLOSED as follows: A. CHECK TI-3-141 indication decreasing. B. CHECK FI-3-150, LOW PRESS LTDN FLOW stable.
		Examiner Note: When the letdown relief valve is reseated, proceed to event 5.

Op-Test No.: 2010-301 Scenario No.: 6 Event No.: 5 Page 1 of 2

Event Description PT-3-1608 fails high. CV-3-1608 fails open and increases steam flow 3-4%. The crew will eventually direct local isolation of CV-3-1608.

Time	Position	Applicant's Actions or Behavior
	BOP	Observes lowering generator MW and PT-3-1608 failed high & CV-3-1608 failed open as evident by: • PT-3-1608 indication • CV-3-1608 position indication on ERDADS • Steam noise present • 3C SG steam flow indication • Primary plant responses, Tavg indication, reactor power increase
	RO	Observes 3-4% reactor power increase Observes Tavg < Tref
	SRO	Determines CV-3-1608 failure open caused Tavg-Tref deviation Directs taking manual control of CV-3-1608.
	BOP	Takes manual control of CV-3-1608 and attempts to close the valve. valve. Reports that the valve has failed open.
	SRO	When informed of CV-3-1608 failure, directs local isolation of CV-3-1608

Op-Test No.: 2010-301 Scenario No.: 6 Event No.: 5 Page 2 of 2

Event Description PT-3-1608 fails high. CV-3-1608 fails open and increases steam flow 3-4%. The crew will eventually direct local isolation of CV-3-1608.

Time	Position	Applicant's Actions or Behavior
	BOP	Reduces turbine load to match Tavg = Tref Attempts manual closure of CV-3-1608 & determines CV-3-1608 failed open Directs NSO locally investigate CV-3-1608 Relays report from NSO of steam coming from unit 3 silencer Directs NSO locally close CV-3-1608 isolation valve Relays report from NSO that steam flow not completely stopped with isolation valve closed. Adjusts turbine load as necessary to match Tavg = Tref
	SRO	Determines CV-3-1608 isolation valve leaking by Directs WCC have Mechanical maintenance investigate CV-3-1608 Directs caution tag generated for CV-3-1608 in manual

When the crew has stabilized power, direct the facility operator to trigger EVENT 6 – Inadvertent SI

Op-Test No.: Gr 26 Audit Scenario No.: 6 Event No.: 6 Page 1 of 6

Event Description: An inadvertent SI occurs. The reactor fails to automatically trip due to an ATWS. Crew enters 3-FRP-S1 to initiate a manual boration.

Time	Position	Applicant's Actions or Behavior
Direct facility operator to trigger lesson step EVENT 6 – Inadvertent SI (actuates TFL2XASE = T TFL2XBSE = T TFL4AF = T)		
	RO/BOP	Observes SI components operate without any first out annunciators.
	SRO	Directs manual reactor trip when SI Actuates.
	SRO	Directs response using 3-EOP-E-0
		NOTE *Steps 1 through 4 are IMMEDIATE ACTION steps.*
	RO	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.
	RO	Attempts to manually trip the reactor by placing the Reactor Trip switch to TRIP.

Op-Test No.: 2010-301 Scenario No.: 6 Event No.: 6b Page 2 of 6

Event Description: An inadvertent SI occurs. The reactor fails to automatically trip due to an ATWS. Crew enters 3-FRP-S1 to initiate a manual boration.

Time	Position	Applicant's Actions or Behavior
	SRO	Transition to 3-EOP-FR-S.1.
	SRO	Directs response using 3-EOP-FR-S.1
		CAUTION *RCPs should not be tripped with reactor power GREATER THAN 5%.*
		NOTE *Steps 1 and 2 are IMMEDIATE ACTION steps.*
	RO	**1 Verify Reactor Trip** • Rod bottom lights - ON • Reactor trip and bypass breakers - OPEN • Rod position indicators – AT ZERO • Neutron flux - DECREASING Perform the following: a. Manually trip reactor. b. IF reactor will NOT trip, THEN ensure control rod insertion in Auto or Manual.
	RO	Ensures control rod insertion by placing the Rod Control switch to INSERT
	BOP	**2 Verify Turbine Trip** a. All turbine stop valves - CLOSED a. Perform the following: 1) Manually trip the turbine. 2) IF turbine will NOT trip, THEN close main steamline isolation and bypass valves. 3) Go to Step 3. b. Verify Moisture Separator Steam Valves – CLOSED • MSR Main Steam Supply Stop MOVs • Reheater Timing Valves • MSR Purge Steam Valves b. Perform the following: 1) Manually close valves. 2) IF any MSR valve can NOT be closed, THEN close main steamline isolation and bypass valves.
	BOP	Turbine is not Latch

Op-Test No.: Gr 26 Audit Scenario No.: 6 Event No.: 6b Page 3 of 6

Event Description: An inadvertent SI occurs. The reactor fails to automatically trip due to an ATWS. Crew enters 3-FRP-S1 to initiate a manual boration.

Time	Position	Applicant's Actions or Behavior
	BOP	**3** **Check AFW Pumps - ALL RUNNING** — Manually open steam supply valves.
	RO	**4** **Initiate Emergency Boration Of RCS** a. Verify charging pumps – AT LEAST ONE RUNNING IN MANUAL b. Stop makeup system c. Manually start Boric Acid Pump 3A or 3B — c. Align charging pump suction to the RWST as follows: 1) Hold closed LCV-3-115C control switch. 2) Direct an operator to open Breaker 30669 for LCV-3-115C. 3) **WHEN** 30669 is open, **THEN** release LCV-3-115C control switch. 4) Go to Step 4e. d. Open Emergency Boration Valve, MOV-3-350 — d. Perform the following: 1) Open Boric Acid To Blender, FCV-3-113A. 2) Open Blender Flow To Charging Pump, FCV-3-113B. 3) Locally open Manual Emergency Boration Valve, 3-356. 4) **WHEN** Manual Emergency Boration Valve, 3-356, is open, **THEN** close Blender To Charging Pump, FCV-3-113B. 5) Continue with Step 4e. e. Open Charging Flow To Regen Heat Exchanger, HCV-3-121 f. Verify Loop A Charging Isolation, CV-3-310A – OPEN — f. Open Loop C Charging Isolation, CV-3-310B. g. Establish emergency boration flow — g. Start additional charging pumps **AND** align valves as necessary to establish emergency boration flow. • FI-3-110 – GREATER THAN 60 GPM • FI-3-122A – GREATER THAN 45 GPM
	RO	Places Rx Makeup Control switch to STOP Manually starts Boric Acid Pump 3B Manually attempts to open Emergency Boration Valve, MOV-3-350 Opens FCV-3-133A and FCV-3-113B Locally opens 3-356 Closes Blender to Charging Pump FCV-3-133B

Op-Test No.: 2010-301 Scenario No.: 6 Event No.: 6b Page 4 of 6

Event Description: An inadvertent SI occurs. The reactor fails to automatically trip due to an ATWS. Crew enters 3-FRP-S1 to initiate a manual boration.

Time	Position	Applicant's Actions or Behavior
	RO	SI has actuated, then manually resets SI SI has actuated, then manually starts one Charging pump at maximum speed.
		CREW CRITICAL TASK: Insert negative reactivity into the core by manually inserting RCCAs or establishing emergency boration flow to the RCS prior to completing step 4 of 3-EOP-FR-S.1.
	RO	**5** **Check PRZ Pressure - LESS THAN 2335 PSIG** Perform the following: a. Verify PRZ PORVs and block valves open. b. IF PRZ PORVs and block valves are NOT open, THEN open PRZ PORVs and block valves until PRZ pressure less than 2135 psig.
	RO	**6** **Verify Containment Ventilation – ISOLATED** a. Verify Unit 3 containment purge exhaust and supply fans – OFF b. Verify Containment Purge Supply and Exhaust Isolation valves – CLOSED • POV-3-2600 • POV-3-2601 • POV-3-2602 • POV-3-2603 b. IF any purge valve can NOT be closed, THEN pull fuse(s) for any open purge valve(s) from behind VPB: • XEP for POV-3-2600 • XLAG for POV-3-2601 • XEQ for POV-3-2602 • XLAH for POV-3-2603 c. Verify Containment Instrument Air Bleed Isolation valves - CLOSED • CV-3-2819 • CV-3-2826 c. IF neither valve can be closed, THEN locally close Containment Air Bleed to Purge Air Return Line Isolation, MPAS-3-005.
	RO	Verifies Containment Instrument Air Bleed valves CV-3-2819 and CV-3-2826 are closed.
		CAUTION *If an SI signal exists or occurs and the reactor is subcritical, proper safeguards equipment alignment is required to be verified using Attachment 3 of 3-EOP-E-0, REACTOR TRIP OR SAFETY INJECTION, while continuing with this procedure.*

Op-Test No.: 2010-301 Scenario No.: 6 Event No.: 6b Page 5 of 6

Event Description: An inadvertent SI occurs. The reactor fails to automatically trip due to an ATWS. Crew enters 3-FRP-S1 to initiate a manual boration.

Time	Position	Applicant's Actions or Behavior
	BOP	If SI has actuated performs 3-EOP-E-0 Attachment 3, see page 37 for details.
	RO BOP BOP	**7** **Check If The Following Trips Have Occurred** a. Reactor trip — a. In 3B MCC room, locally trip reactor as follows: • Open 3A and 3B Reactor Trip Breakers. • Open 3A and 3B Reactor Trip Bypass Breakers. • Open A/B MG set generator output breakers. • Open A/B MG set motor input breakers. b. Turbine trip — b. Locally trip turbine at turbine front standard. c. Mid and East GCBs – OPEN (Normally 30 seconds delay) — c. Perform the following: 1) Manually open breakers. 2) IF breakers do NOT open THEN actuate Emergency Gen Bkr Trip Switch for the affected breaker(s). 3) IF breaker position indication is NOT available AND turbine speed is NOT decreasing, THEN direct Field Operator to perform the following: a) Obtain key 17 from the Shift Manager key locker. b) Locally trip Mid and East GCBs from the switchyard. • 8W33 • 8W68
	CREW	Directs the FS/TO locally trip the Reactor Trip Breakers & MG set input & output breakers
		Examiner note: When the crew directs AND when the emergency boration has been established, direct the facility operator to **trigger lesson step EVENT 5 - LOCALLY OPEN RX TRIP BKRS** (actuates TFL2XASE=F then TFL2XBSE=F 15 sec later).
		NOTE *When adverse containment conditions exist, Gamma-Metrics indication needs to be used.*

Op-Test No.: 2010-301 Scenario No.: 6 Event No.: 6 b Page 6 of 6

Event Description: An inadvertent SI occurs. The reactor fails to automatically trip due to an ATWS. Crew enters 3-FRP-S1 to initiate a manual boration.

Time	Position	Applicant's Actions or Behavior
	RO	**8** **Monitor Reactor Subcritical** a. Power range channels – LESS THAN 5% — a. Observe Caution prior to Step 9 and go to Step 9. b. Intermediate range channels – NEGATIVE STARTUP RATE — b. Observe Caution prior to Step 9 and go to Step 9. c. Observe Caution prior to Step 17 and go to Step 17
	SRO	Observes Caution prior to Step 17 and goes to Step 17
		CAUTION *Boration should continue during subsequent actions until adequate shutdown margin is obtained.*
		17 **Return To Procedure And Step In Effect**
	SRO	Transitions to 3-EOP-E-0 step 1

Op-Test No.: 2010-301 Scenario No.: 6 Event No.: 6 Page 1 of 19

Event Description: The crew transitions to 3-EOP-E-0 once the reactor is tripped. The crew will complete E-0 and transition to ES-1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior
	SRO	Transitions to 3-EOP-E-0 step 1
	SRO	Directs response using 3-EOP-E-0
		NOTE *Steps 1 through 4 are IMMEDIATE ACTION steps.*
	RO	**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.
	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.: Gr 26 Audit Scenario No.: 6 Event No.: 6a Page 2 of 19

Event Description: The crew transitions to 3-EOP-E-0 once the reactor is tripped. The crew will complete E-0 and transition to ES-1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior
	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.: 2010-301 Scenario No.: 6 Event No.: 6a Page 3 of 19

Event Description: The crew transitions to 3-EOP-E-0 once the reactor is tripped. A SBLOCA will develop through a gradually degrading code safety valve. Once the reactor is tripped, the crew will transition to 3-EOP-E-1 and trip the reactor coolant pumps.

Time	Position	Applicant's Actions or Behavior
	RO	**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.
		NOTE *FOLDOUT Page shall be monitored for the remainder of this procedure.*
	CREW	Monitors 3-EOP-E-0 Foldout page (see next page)
	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 37
		Examiner Note: The SRO and RO will complete the remaining steps in 3-EOP-E-0, while the BOP performs 3-EOP-E-0 prompt action verifications using attachment 3

Op-Test No.: 2010-301 Scenario No.: 6 Event No.: 6a Page 4 of 19

Event Description: The crew transitions to 3-EOP-E-0 once the reactor is tripped. A SBLOCA will develop through a gradually degrading code safety valve. Once the reactor is tripped, the crew will transition to 3-EOP-E-1 and trip the reactor coolant pumps.

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-OP-018.1, CONDENSATE STORAGE TANK.

7. **RHR SYSTEM OPERATION CRITERIA**

   IF RCS pressure is greater than 250 PSIG [650 PSIG] AND 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.: 2010-301 Scenario No.: 6 Event No.: 6a Page 5 of 19

Event Description: The crew transitions to 3-EOP-E-0 once the reactor is tripped. The crew will complete E-0 and transition to ES-1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior		
	RO	Stops RCPs if subcooling is less than 25°F(65°F) wiith HHSI flowpath verified and HHSI pumps running based on foldout page requirements.		
	RO	**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.
	RO	**7**	**Verify AFW Valve Alignment - PROPER EMERGENCY ALIGNMENT**	Manually align valves to establish proper AFW alignment.

Op-Test No.: 2010-301 Scenario No.: 6 Event No.: 6a Page 6 of 19

Event Description: The crew transitions to 3-EOP-E-0 once the reactor is tripped. The crew will complete E-0 and transition to ES-1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior
	RO	**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.
	RO	b. Maintain feed flow to S/G narrow range levels between 15%[32%] and 50%.
	CREW	**CREW CRITICAL TASK: STOP AFW flow to the SGs to prevent SG overfill (Off –scale high)**

Op-Test No.: 2010-301 Scenario No.: 6 Event No.: 6 Page 7 of 19

Event Description: The crew transitions to 3-EOP-E-0 once the reactor is tripped. The crew will complete E-0 and transition to ES-1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior
	RO	**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 No2010-301 Scenario No.: 6 Event No.: 6 Page 8 of 19

Event Description: The crew transitions to 3-EOP-E-0 once the reactor is tripped. The crew will complete E-0 and transition to ES-1.1 to terminate SI..

Time	Position	Applicant's Actions or Behavior
	RO	**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) Limit 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.
	RO	Reduces total AFW flow to 345 gpm max for all S/G's. **CREW CRITICAL TASK: STOP AFW flow to the SGs to prevent SG overfill (Off –scale high) if not already done.**

Op-Test No.: 2010-301 Scenario No.: 6 Event No.: 6 Page 9 of 19

Event Description: The crew transitions to 3-EOP-E-0 once the reactor is tripped. A SBLOCA will develop through a gradually degrading code safety valve. Once the reactor is tripped, the crew will transition to 3-EOP-E-1 and trip the reactor coolant pumps.

Time	Position	Applicant's Actions or Behavior
	RO	**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).
	RO	**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
	RO	Stops RCPs if subcooling is less than 25° with HHSI flowpath verified and HHSI pumps running.

Op-Test No.: 2010-031 Scenario No.: 6 Event No.: 6 Page 10 of 19

Event Description: The crew transitions to 3-EOP-E-0 once the reactor is tripped. The crew will complete E-0 and transition to ES-1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior
	RO	**13** **Check If S/Gs Are Faulted** a. Check pressures in all SGs – * ANY SG PRESSURE DECREASING IN AN UNCONTROLLED MANNER OR * ANY SG COMPLETELY DEPRESSURIZED a. Go to Step 14. 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
	RO	**14** **Check If S/G Tubes Are Ruptured** a. Check levels in all S/Gs and secondary radiation levels: * 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 * ERDADS SG or secondary radiation readings – HIGHER THAN NORMAL OR * Local steamline radiation – HIGHER THAN NORMAL a. Go to Step 15. 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.: 2010-301 Scenario No.: 6 Event No.: 6 Page 11 of 19

Event Description: The crew transitions to 3-EOP-E-0 once the reactor is tripped. The crew will complete E-0 and transition to ES-1.1 to terminate SI..

Time	Position	Applicant's Actions or Behavior
	RO	**15** **Check If RCS Is Intact** a. Containment radiation - NORMAL b. Containment pressure - NORMAL c. 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.
	RO	**16** **Check If SI Should Be Terminated**
	STA	**17** **Monitor Critical Safety Functions Using 3-EOP-F-0, CRITICAL SAFETY FUNCTION STATUS TREES**
	BOP	**18** **Check S/G Levels** a. Narrow range level - GREATER THAN 6% b. Control feed flow to maintain narrow range level between 15% and 50% c. Narrow range level - LESS THAN 50% a. Maintain total feed flow greater than 345 gpm until narrow range level greater than 6% in at least one S/G. 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.
	BOP	**19** **Check Secondary Radiation** a. Direct Nuclear Chemistry to take periodic activity samples of all S/Gs b. Direct Radiation Protection to take radiation readings on main steamlines c. Secondary radiation - NORMAL NEAR ROUTINE OPERATION VALUE
	RO	**20** **Check Auxiliary Building Radiation-NORMAL** Evaluate cause of abnormal conditions. IF the cause is a loss of RCS inventory outside containment, THEN go to 3-EOP-ECA-1.2, LOCA OUTSIDE CONTAINMENT, Step 1

Op-Test No.: 2010-301 Scenario No.: 6 Event No.: 6 Page 11 of 19

Event Description: The crew transitions to 3-EOP-E-0 once the reactor is tripped. The crew will complete E-0 and transition to ES-1.1 to terminate SI..

Time	Position	Applicant's Actions or Behavior
	RO	**21** Check PRT Conditions - NORMAL — Evaluate cause of abnormal conditions.
	SRO	**CAUTION** *If offsite power is lost after SI reset, manual action may be required to restart safeguards equipment using Attachment 3.*
	RO	**22** Verify SI - RESET — Reset SI
	BOP	**23** Verify Containment Isolation Phase A and Phase B – RESET — Reset Phase A and Phase B
	RO	**24** 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	**CAUTION** *If RCS pressure decreases in an uncontrolled manner to less than 250 psig[650 psig], manual action will be required to restart the RHR pumps after they have been secured.*
	BOP	**25** Monitor RCS Pressure To Check If RHR Pumps Should Be Stopped a. Check RCS pressure 1) Pressure - GREATER THAN 250 PSIG[650 PSIG] — 1) Go to 3-EOP-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1. 2) Pressure - STABLE OR INCREASING — 2) Go to Step 26. b. Stop RHR pumps AND place in Standby c. Check RCS pressure – GREATER THAN 250 PSIG[650 PSIG] — c. IF RCS pressure decreases to less than 250 PSIG[650 PSIG], THEN manually start both RHR pumps
	RO	**CREW CRITICAL TASK: Stop the RHR pumps within 44 minutes of the inadvertent SI**

		26 Check Power Supply To Charging Pumps - ALIGNED TO OFFSITE POWER Perform the following: a. Check diesel capacity adequate to run at least one charging pump. b. IF diesel capacity is NOT adequate, THEN shed nonessential loads. Refer to ATTACHMENT 2 for component KW load rating.
		27 Check Charging Flow Established
	BOP	Performance of 3-EOP-E-0 Attachment 3 Prompt Action Verification

Op-Test No.: 2010-301 Scenario No.: 6 Event No.: 6 Page 12 of 19

Event Description: The crew transitions to 3-EOP-E-0 once the reactor is tripped. The crew will complete E-0 and transition to ES-1.1 to terminate SI.

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).

Op-Test No.: 2010-301 Scenario No.: 6 Event No.: 6 Page 13 of 19

Event Description: The crew transitions to 3-EOP-E-0 once the reactor is tripped. The crew will complete E-0 and transition to 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	Directs FS/TO to locally close 3-50-319
	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.: 2010-301 Scenario No.: 6 Event No.: 6 Page 14 of 19

Event Description: The crew transitions to 3-EOP-E-0 once the reactor is tripped. The crew will complete E-0 and transition to ES-1.1 to terminate SI.

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 SI Pump Operation** a. At least two high head 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 <u>AND</u> 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 <u>AND</u> 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 <u>AND</u> place in standby
	BOP	Places the handswitches for the 4A and 4B HHSI pumps to STOP.

Op-Test No.: 2010-301 Scenario No.: 6 Event No.: 6 Page 15 of 19

Event Description: The crew transitions to 3-EOP-E-0 once the reactor is tripped. The crew will complete E-0 and transition to 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	a. Go to step 15.
		b. Open CCW to normal containment cooler valves • MOV-3-1417 • MOV-3-1418	b. Stop all RCPs
		c. Reset and start normal containment coolers	c. Stop all RCPs

Op-Test No.: 2010-301 Scenario No.: 6 Event No.: 6 Page 16 of 19

Event Description: The crew transitions to 3-EOP-E-0 once the reactor is tripped. The crew will complete E-0 and transition to 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 b. Verify Control Room ventilation status panel - PROPER EMERGENCY RECIRCULATION ALIGNMENT a. Manually stop fans. b. Manually align equipment for Control Room emergency recirculation.
		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-OP-094, CONTAINMENT POST ACCIDENT MONITORING SYSTEM**
	BOP	**18. Verify All Four EDGs – RUNNING** EMERGENCY START any available EDG NOT running.

Op-Test No.: 2010-301 Scenario No.: 6 Event No.: 6 Page 17 of 19

Event Description: The crew transitions to 3-EOP-E-0 once the reactor is tripped. The crew will complete E-0 and transition to 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 Note Any Actions That Had To Be Taken**

Op-Test No.: 2010-301 Scenario No.: 6 Event No.: 6 Page 18 of 19

Event Description: The crew transitions to 3-EOP-E-0 once the reactor is tripped. The crew will complete E-0 and transition to ES-1.1 to terminate SI.

Time	Position	Applicant's Actions or Behavior
	SRO	Transitions to 3-EOP-ES-1.1
	SRO	Directs response using 3-EOP-ES-1.1
		NOTE *Foldout page is required to be monitored throughout this procedure.*
	CREW	Monitors 3-EOP-ES-1.1 Foldout page (see next page for foldout)
	RO	**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
	RO	Stops RCPs if subcooling is less than 25°F (65°F) with HHSI flowpath verified and HHSI pumps running.
		CREW CRITICAL TASK:
		CREW CRITICAL TASK: Stop the RHR pumps within 44 minutes of the inadvertent SI

Op-Test No.: 2010-301 Scenario No.: 6 Event No.: 6 Page 19 of 19

Event Description: The crew transitions to 3-EOP-E-0 once the reactor is tripped. A SBLOCA will develop through a gradually degrading code safety valve. Once the reactor is tripped, the crew will transition to 3-EOP-E-1 and trip the reactor coolant pumps.

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-OP-018.1, Condensate Storage Tank.

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.

CREW CRITICAL TASK: Insert negative reactivity into the core by manually inserting RCCAs or establishing emergency boration flow to the RCS prior to completing step 4 of 3-EOP-FR-S.1.

CREW CRITICAL TASK: Stop the RHR pumps within 44 minutes of the inadvertent SI

or

CREW CRITICAL TASK: STOP AFW flow to the SGs to prevent SG overfill (Off –scale high)