Facility:	Turkey Point	Scenario No.:	1	Op Test No.:	2007-301
Examiners:	_____	Candidates:	_____		US
	_____		_____		RO
	_____		_____		BOP

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

Turnover: Equipment OOS: 3B EDG due to failed fuel pump (OOS 2 days; next 0-OSP-023.3 Att 1 & 9 in 4 hrs); B AFW Pump due to bearing failure (OOS 4 hrs; ETR 24 hrs; both trains verified operable); 3B CSP due to failed IST - low discharge pressure (OOS 12 hr; ETR 36 hr)

Perform 3C ICWP isolation valve cycling test per step 7.1.3 of 3-OSP-019.3. Steps 7.1.1 & 7.1.2 for 3A and 3B ICWP are not scheduled for this shift.

Known tube leak in 3A S/G (2 gpd) – unchanged for last week. Chemistry samples are being taken per 3-ONOP-071.2, Attachment 1. The current sample, just completed indicates no significant change in leak rate. MOV-3-1403 remains open at management direction due to small size and stability of tube leak rate.

Event No.		Event Type*	Event Description
1		(N) SRO/BOP	3C ICWP discharge isolation valve cycling test per 3-OSP-019.3 step 7.1.3.
2	TFN1P4AH = T	(I) RO (TS,I) SRO	Power range NI channel N-44 upper detector fails high. The crew responds per 3-ONOP-059.8.
3	TFS1ML3L = T	See event 4a below	PT-3-1604 fails low. The crew responds per 3-ARP-097.CR for annunciator D-7/4.
4	TFE2Z52S = T	(C) BOP (C, TS) SRO	Loss of 3C 4kV bus. The crew responds per 3-ONOP-004.4. TS are evaluated for loss of the A SSGFWP.
4a		(R) SRO/RO (I) BOP*	Automatic runback fails due to PT-3-1604 failure and requires manual action to reduce power < 60 % to avoid reactor trip on s/g lo-lo level. The crew responds per 3-ONOP-089.
5	TVFACN3 = 0.1 TFVV98M = T TCF1D09M = F TFL2XASE = T TFL2XBSE = T	(M) ALL (C) RO/SRO	Once reactor power stabilized < 60% power, a 3C SG feed break occurs inside containment. A manual reactor trip is required before any SG level drops < 10% since the automatic reactor trip is failed. 3-EOP-E-0 is performed. The MOV-3-1409 breaker trips & FCV-3-498 fails to close leaving an uncontrolled feed path to 3C SG if 3A SGFP started.
6	TAFXSRPC = 6300.0 TCF5MTC = T	(M) ALL	C AFWP trips on overspeed prematurely at 6300 RPM (from setup). The trip can not be reset. B AFWP is OOS. A AFWP starts, but runs out of steam pressure from the 3C feed line fault. Efforts to realign A AFWP to train 2 steam are prevented by AFSS-3-007 stuck closed. SSGFW can not be used due to loss of 3C 4kV bus and a dead battery on B SSGFWP. The crew transitions to 3-EOP-FR-H.1 when AFW flow < 345 gpm and is eventually required to initiate feed & bleed since all SGs < 32% narrow range with adverse containment conditions.

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

* - BOP action to either manually close CV-3-2011 in event 3 or manually reduce load in event 4a due to automatic turbine runback failure satisfies the BOP PT-3-1604 instrument failure manipulation.

Turkey Point 2007-301 Scenario #1

Event 1 - 3C ICWP discharge isolation valve cycling test per 3-OSP-019.3 step 7.1.3

Event 2 - Power range NI channel N-44 upper detector fails high. The crew responds per 3-ONOP-059.8.

Event 3 - PT-3-1604 fails low. The crew responds per 3-ARP-097.CR for annunciator D-7/4.

Event 4 - Loss of 3C 4kV bus. The crew responds per 3-ONOP-004.4. TS are evaluated for loss of the A SSGFWP.

Event 4a - Automatic runback fails due to PT-3-1604 failure and requires manual action to reduce power < 60 % to avoid reactor trip on s/g lo-lo level. The crew responds per 3-ONOP-089.

Event 5 - Once reactor power stabilized < 60% power, a 3C SG feed break occurs inside containment. A manual reactor trip is required before any SG level drops < 10% since the automatic reactor trip is failed. 3-EOP-E-0 is performed. The MOV-3-1409 breaker trips & FCV-3-498 fails to close leaving an uncontrolled feed path to 3C SG if 3A SGFP started.

Event 6 - C AFWP trips on overspeed prematurely at 6300 RPM (from setup). The trip can not be reset. B AFWP is OOS. A AFWP starts, but runs out of steam pressure from the 3C feed line fault. Efforts to realign A AFWP to train 2 steam are prevented by AFSS-3-007 stuck closed. SSGFW can not be used due to loss of 3C 4kV bus and a dead battery on B SSGFWP. The crew transitions to 3-EOP-FR-H.1 when AFW flow < 345 gpm and is eventually required to initiate feed & bleed since all SGs < 32% narrow range with adverse containment conditions.

Scenario XXIII NRC 1

Simulator Operating Instructions

Setup

IC-16 (75% MOL)

Open & execute lesson file SRO_XXIII_NRC_1.lsn

Place simulator in run

Trigger lesson steps:

SETUP - AUTO REACTOR TRIP FAIL (actuates TFL2XASE = T, TFL2XBSE = T, TFL2XASE = F when IML2CRXT & TFL2XBSE = F when IML2CRXT)

SETUP - 3B EDG OOS (actuates TAQ5LRSB = OFF (0) & TAQ5B20P = RACKOUT (3))

SETUP - B AFWP OOS (actuates TAFK244 = 0.0, TAFK002 = 0.0, TAFF01B = 0.0, TCF5MTB = T)

SETUP - 3A SG 2 GPD LEAK (actuates TVHHSGA = 0.0000013)

SETUP - 3B CSP OOS (actuates TAM1DPOB = RACKOUT (3) & TCM1D41M = FALSE)

SETUP - C AFWP OVERSPEED TRIP (actuates TAFXSRPC =6300.0, TCF5MTC = T when F50SIAFC EQ 6290)

Start 3A ICWP and stop 3B ICWP. (Leave 3A & 3C ICWP running). Start train A chilled water and secure train B chilled water (CR HVAC panel).

Acknowledge annunciators F-9/2 & F-9/5 (3B EDG) and place simulator in freeze.

Place clearance info tags on 3B EDG normal start switch, B AFWP T&T valve control switch & 3B CSP control switch.

Remove AFW train 2 orange tag from B AFWP tachometer just below ann. panel X.

Provide shift turnover checklists, blank 3-OSP-019.3 and 3-ONOP-071.2 open to Att 1.

Select 3A QSPDS to page 211 (SAT) and 3B QSPDS to page 212 (RVL). Set ERDADS on VPA to Tavg/Tref (TAV) and at the RCO desk to ENVRN (ED3).

Fill in blender & shutdown boron addition placards at console blender station. Data for each IC may be found in the ECC & Shutdown Guidelines Book in the simulator I/F.

Event 1 - 3C ICWP discharge isolation valve test

Initiated from shift turnover immediately after shift turnover.

The crew will start 3B ICWP & stop 3C ICWP per 3-OP-019 section 5.3, then NSO begins performing 3-OSP-019.3 step 7.1.3.

Respond as NSO if directed to perform pre-start checks for 3B ICWP & post-shutdown checks for 3C ICWP. Report all checks satisfactory.

Step 7.1.3.1 - Done by securing 3C ICWP.

Step 7.1.3.2 - Call as NSO and request RO log 3C ICWP inoperable.

Step 7.1.3.3 - **Trigger** lesson step **EVENT 1 - REMOVE 3AD05 CLOSE CKT FUSES** (actuates TFK2G05A = T)
Step 7.1.3.4 - **Trigger** lesson step **EVENT 1 - CLOSE 3-50-332** (actuates TAKB332 = 0.0 on 60 sec ramp), **then trigger** lesson step **EVENT 1 - OPEN 3-50-332** (actuates TAKB332 = 1.0 on 60 sec ramp).
Step 7.1.3.5 - **Trigger** lesson step **EVENT 1 - INSTALL 3AD05 CLOSE CKT FUSES** (actuates TFK2G05A = F).
Step 7.1.3.6 - NSO field verification of lights on 3AD05.
Step 7.1.3.7 - Respond as NSO when directed to do 3C ICWP pre-start checks. Report pump ready for start. Respond as NSO when directed to do post-start checks and report pump post-start checks satisfactory.
Step 7.1.3.9 - Respond as NSO when directed to perform post-shutdown checks on ICWP just shutdown. Report pump shutdown checks satisfactory.

Event 2 - PRNI N-44 upper detetctor fails high

Once 3-OSP-019.3 step 7.1.3 complete, trigger lesson step **EVENT 2 - PRNI N-44 UPPER DET FAILS HIGH** (actuates TFN1P4AH = T).
This actuates annunciators B-2/2, 6/1, 6/3, 6/4, 9/2
The crew responds per 3-ONOP-059.8 and takes PRNI N-44 out of service per steps 5.1.1.1 thru 5.1.1.7.
Step 5.1.1.1 actuates B-8/4.
Step 5.1.1.2 clears B-6/3.
Step 5.1.1.3 clears B-2/2.
Step 5.1.1.6 clears B-6/4.
Step 5.1.1.7.a - Respond as AOM/I&C if asked whether or not to pull instrument fuses. Reply that fuses should be pulled. *All annunciators clear except B-6/1, 6/5 & 8/4.*
Step 5.1.1.8 - Respond as WCC/I&C when called regarding N-44 failure.
Step 5.1.1.9 - Respond as Rx Eng/STA when directed to perform 3-OSP-059.10(QPTR)
Step 5.1.1.10 - Not applicable.
Step 5.1.1.11 - Respond as WCC if directed to generate ECO for tripped bistables.

Event 3 - PT-3-1604 fails low

After PRNI N-44 taken out of service, trigger lesson step **EVENT 3 - PT-3-1604 FAILS LOW** (actuates TFS1ML3L = T).
PT-3-1604 failure causes CV-3-2011 to automatically open. The crew responds per 3-ARP-097.CR for annunciator D-7/4.

Respond as NSO if directed to verify CV-3-1900 closed. Click on Schema→ FEEDWATER HEATING→HIGH PRESS FW HEATERS & RHTR & HTR DRAIN TANKS→report CV-3-1900 position (see far right side of mimic).

Crew should determine SGFP suction pressure > 260 psig with 2 HDPs running so fast load reduction is not required.

Event 4 - Loss of 3C 4kV bus

The plant is stabilized following CV-3-2011 failure open, trigger lesson step **EVENT 4 - LOSS OF 3C 4KV BUS** (actuates TFE2Z52S = T).
This causes a loss of 3B SGFP. The crew may take the 3B SGFP control switch to STOP which ordinarily would open the breaker and initiate automatic turbine runback. Since the PT-3-1604 failure in event 3 also defeats the automatic loss of SGFP turbine runback, the BOP must manually run back load and the RO drive rods to reduce power < 60% per 3-ONOP-089. The crew should also respond per 3-ONOP-004.4 due to loss of the 3C 4kV bus. TS are evaluated for the loss of the A SSGFWP.

If the reactor is tripped in response to this event, then proceed directly to Event 5.

Respond if called as NSO to investigate 3C 4kV bus. After 1-3 min, report that the lockout relay has actuated and the bus enclosure smells of overheated insulation. If directed to reset 3C 4kV bus lockout relay, report that the lockout will not reset.

Respond if called as WCC/Electrical to investigate 3C 4kV bus lockout. Do not fix this malfunction before the end of the scenario.

Respond if called as System & Duty Call Supervisor per 0-ADM-115.

Respond if called as SM to review 0-ADM-011 regarding need for an ERT.

Respond if called as Chemistry about RCS sampling following a > 15% power change.

Respond as NSO if directed to cross-tie E MCCs per 3-OP-007 sect 7.1. No further action required during this scenario.

Event 5 - 3C SG main feed line failures

After the plant is stabilized < 60% power, at lead examiner direction, trigger lesson step **EVENT 5 - 3C FW LINE FAIL** (actuates TVFACN3 = 0.1, TFVV98M = T & TCF1D09M = F). *A main feed break occurs on 3C feed line inside containment. A manual reactor trip is required before any SG level drops < 10% since the automatic reactor trip is failed. 3-EOP-E-0 is performed. The MOV-3-1409 breaker trips & FCV-3-498 fails to close. This creates a feed path to the faulted 3C SG should feed be restored.*

Events 6 – Loss of AFW / Heat sink

Entered upon completion of 3-EOP-E-0 steps 1-4.

C AFWP trips on overspeed prematurely at 6300 RPM (from setup). The trip can not be reset. B AFWP is OOS. A AFWP starts, but runs out of steam pressure from the feed line fault on 3C feed line. Efforts to realign A AFWP to train 2 steam is prevented by AFSS-3-007 being stuck closed. SSGFW can not be used due to a dead battery on B SSGFWP (A SSGFWP not available due to loss of 3C 4kV bus). The crew transitions to 3-EOP-FR-H.1 when AFW flow < 345 gpm and is eventually required to initiate feed & bleed since SG levels are < 32% narrow range with adverse containment conditions.

If asked as NSO to locally reset C AFWP overspeed trip (3-ONOP-075 Attachment 4), respond that the C AFWP overspeed trip can not be reset.

If asked as NSO to align train 2 steam to the A AFWP by opening AFSS-3-007, report that AFSS-3-007 will not open. Request mechanical maintenance assistance.

Respond as WCC/Mechanical Maintenance if asked to troubleshoot/fix C AFWP mechanical trip and AFSS-3-007.

Respond as NSO if asked to locally close MOV-3-1409 or 3-20-333. Delay local closure of these valves until after feed & bleed initiated then **trigger** lesson step **EVENT 6 - LOCALLY CLOSE MOV-3-1409** (actuates TFFVV09C = T) and report when complete.

3A SGFP should not be started since an uncontrollable feed path exists to 3C SG. With level < [33%] wide range, feed flow must be limited to 100 gpm to the faulted SG (3-EOP-FR-H.1 step 4 caution 2).

Respond as NSO when directed to place PAHMS in service on unit 3. After 8-12 minutes, **trigger** lesson step **EVENT 6 - PLACE U3 PAHMS IN SERVICE** (actuates TAC2V02A = 1.0, TAC2V02B = 1.0, TAAAV21 = 1.0, TAAAV22 = 1.0 & TACA005 = 0.0). Report when complete.

Op-Test No.: 2007-301 Scenario No.: 1 Event No.: 1 Page 1 of 1

Event Description: 3C ICWP discharge isolation valve cycling test per 3-OSP-019.3 step 7.1.3.

Time	Position	Applicant's Actions or Behavior
	US	Directs BOP to have NSO cycle 3C ICWP discharge isolation valve, 3-50-332 per 3-OSP-019.3, section 7.1. Directs BOP start 3B ICWP & s/d 3C ICWP per 3-OP-019 section 5.3.
	BOP	Obtains copies of 3-OSP-019.3, section 7.1 & 3-OP-019, section 5.3. Performs actions as follows: 1. Starts 3B ICWP & stops 3C ICWP per 3-OP-019 section 5.3 a. Verifies NSO understands ICWPs to be started/stopped b. Directs NSO verify oil in 3B ICWP sightglass & 3B ICWP discharge valve open c. Starts 3B ICWP & checks VPA ammeter > zero d. Directs NSO locally check 3B ICWP visible packing leakoff e. Stops 3C ICWP & checks VPA ammeter = zero f. Directs NSO locally do post-stop check 2. Has RO record 3C ICWP as inoperable. 3. Directs NSO perform steps 7.1.3.3 thru 7.1.3.6 ***NOTE:*** *NSO has signoff procedure copy in field and will perform steps 7.1.3.3 thru 7.1.3.6 and will notify BOP when these steps are done.* 4. Starts 3C ICWP per 3-OP-019 section 5.3 to verify operability. a. Verifies NSO understands ICWPs to be started/stopped b. Directs NSO verify oil in 3C ICWP sightglass & 3C ICWP discharge valve open c. Starts 3C ICWP & checks VPA ammeter > zero d. Directs NSO locally check 3C ICWP visible packing leakoff 5. Has RO record 3C ICWP as back in service. 6. Since this is the last ICWP discharge valve to be cycled, stops 3B or 3C ICWP per 3-OP-019 section 5.3. a. Stops 3B or 3C ICWP & checks VPA ammeter = zero b. Directs NSO locally do post-stop check
	RO	Records 3C ICWP OOS and return to service when advised by BOP.

Op-Test No.: 2007-301 Scenario No.: 1 Event No.: 2 Page 1 of 2

Event Description: Power range NI channel N-44 upper detector fails high. The crew responds per 3-ONOP-059.8.

Time	Position	Applicant's Actions or Behavior
	RO	Recognizes / reports PRNI channel N-44 upper detector failed high. • annunciator B-2/2, 6/1, 6/3, 6/4, 9/2 & G-5/1, 5/2 • N-44 power range channel indication on console fails high • N-44 axial flux indication on console fails high • N-44 upper detector indication on NIS racks fails high Performs immediate actions of 3-ONOP-059.8: • Takes rod motion control selector switch to MAN *(to stop automatic continuous inward rod motion)*
	US	Directs response per 3-ONOP-059.8
	RO/ BOP	Performs subsequent actions of 3-ONOP-059.8 as directed by US: 1. Places dropped rod mode switch for N-44 in BYPASS. 2. Places right rod stop bypass switch to bypass N-44. 3. Transfers upper section comparator defeat switch to N-44. 4. Transfers lower section comparator defeat switch to N-44. 5. Transfers right power mismatch bypass switch to bypass N-44. 6. Transfers comparator channel defeat switch to N-44. 7. Pulls instrument power fuses from N-44 drawer B
	US	Evaluates impact per TS 3.3.1. Table 3.3-1 functional units 2 &17 apply. Actions 2 (6hr) & 7 (1hr) both in effect. Conducts crew brief regarding effects of N-44 failure Directs manual rod withdrawal or turbine load reduction to restore Tavg within 3°F of Tref as needed per 3-ONOP-028
	RO	Manually withdraws control rods as directed by US to restore Tavg within 3°F of Tref as needed per 3-ONOP-028.

Op-Test No.: 2007-301 Scenario No.: 1 Event No.: 2 Page 2 of 2

Event Description: Power range NI channel N-44 upper detector fails high. The crew responds per 3-ONOP-059.8.

Time	Position	Applicant's Actions or Behavior
	BOP	Manually reduces turbine load as directed by US to restore Tavg within 3°F of Tref as needed per 3-ONOP-028.
	US	1. Directs notification of I&C 2. Directs STA monitor QPTR per 3-OSP-059.10 (reactor power approx. 75%) 3. Directs WCC generate clearance for tripped bistables

Op-Test No.: 2007-301 Scenario No.: 1 Event No.: 3 Page 1 of 1

Event Description: PT-3-1604 fails low. The crew responds per 3-ARP-097.CR for annunciator D-7/4.

Time	Position	Applicant's Actions or Behavior
	BOP	Acknowledges alarm D-7/4. Perform actions of 3-ARP-097.CR for annunciator D-7/4. 1. Recognizes/reports CV-3-2011 open and PT-3-1604 failed. 2. Determines no other automatic actions have occurred. 3. Determines reactor power increased due to CV-3-2011 failure but still < 100% 4. Determines SGFP suction pressure > 260 psig. 5. When directed by US, closes CV-3-2011. ***NOTE:*** *CV-3-2011 closure may be delayed pending plant stabilization and conduct of pre-brief to address potential for secondary plant transient caused by valve closure.* 6. Directs NSO verify CV-3-1900 closed. 7. Determines 2 HDPs running as required since turbine load > 450 MWe
	RO	Reads 3-ARP-097.CR for annunciator D-7/4 Observes decrease in Tavg & increase in reactor power due to CV-3-2011 failure
	US	Considers closure of CV-3-2011 once it has been determined that SGFP suction pressure > 260 psig *(see **NOTE** above)* Determines effects of PT-3-1604 failure (e.g, no turbine runback on loss of SGFP). Conducts crew brief regarding effects of PT-3-1604 failure. Directs WCC have I&C investigate / fix PT-3-1604 failure. If QPTR directed in event 2, then allows power > 75%

Op-Test No.: 2007-301 Scenario No.: 1 Event No.: 4/4a Page 1 of 2

Event Description: Loss of 3C 4kV bus. 3B SGFP is lost. Automatic runback fails due to PT-3-1604 failure and requires manual action to reduce power < 60 % to avoid reactor trip on s/g lo-lo level. The crew responds per 3-ONOP-089 and 3-ONOP-004.4. TS are evaluated for loss of the A SSGFWP.

Time	Position	Applicant's Actions or Behavior
	BOP	Recognizes/reports loss of 3B SGFP • Annunciator D-6/2 (B SGFP low flow) • Annunciators C-5/1 thru 5/3 (SG steam > feed flow) • Annunciators D-6/1 thru 6/3 (SG level deviations) • 3B SGFP breaker open indication with ammeter = 0 • Indicated feedwater flow < steam flow for all SGs • Slowly dropping level in all SGs Notices absence of runback and takes 3B SGFP control switch to trip. Recognizes/reports failure of turbine to runback.
	US	Directs performance of immediate actions per 3-ONOP-089 including manual turbine runback to < 60% turbine load or as needed to reduce steam flow < available feedwater flow.
	BOP	Verifies automatic actions per 3-ONOP-089: 1. Manually reduces turbine load 2. Performs fast load reduction to < 60% turbine load or as needed to reduce steam flow < available feedwater flow. 3. Verifies condenser steam dumps open as necessary based on Tavg-Tref mismatch. 4. Verifies main FW regulating valves throttle as necessary to return SG level to program (60%).
	RO	Verifies automatic actions per 3-ONOP-089: 1. Verifies auto rod insertion in response to turbine load reduction to reduce Tavg/Tref mismatch 2. Verifies PZR level & pressure control: a. Charging pump speed changes to maintain PZR level b. PZR heaters / normal spray function as needed to maintain PZR pressure approx 2235 psig

Op-Test No.: 2007-301 Scenario No.: 1 Event No.: 4/4a Page 2 of 2

Event Description: Loss of 3C 4kV bus. 3B SGFP is lost. Automatic runback fails due to PT-3-1604 failure and requires manual action to reduce power < 60 % to avoid reactor trip on s/g lo-lo level. The crew responds per 3-ONOP-089 and 3-ONOP-004.4. TS are evaluated for loss of the A SSGFWP.

Time	Position	Applicant's Actions or Behavior
	US	Directs subsequent actions per 3-ONOP-089. ***NOTE:*** *Slow RO/BOP action to manually insert control rods and/or reduce turbine load may result in the need for a manual reactor trip. If this occurs proceed to Event 5.*
	BOP	Performs remainder of subsequent actions per 3-ONOP-089. 1. Verifies SG levels and pressures stabilized 2. Verifies steam dumps closed. 3. Marks control room charts with date/time/cause of runback
	RO	Performs remainder of subsequent actions per 3-ONOP-089. 1. Verifies Tavg matches Tref 2. Verifies PZR level & pressure stabilized. 3. Marks control room charts with date/time/cause of runback
	BOP	Determines loss of 3B SGFP due to loss of 3C 4kV bus
	US	Directs actions per 3-ONOP-004.4
	BOP	Performs actions as directed by US per 3-ONOP-004.4: 1. Stabilizes plant following manual turbine runback 2. Determines 3A & 3B 4kV buses both energized 3. Determines 3C 4kV bus lockout tripped ***NOTE:*** *Attempts made to reset lockout will be unsuccessful.* 4. Directs FS/NSO locally investigate 3C 4kV bus
	US	Directs WCC have Electrical maint. investigate 3C 4kV bus lockout. Determines no further actions per 3-ONOP-004.4 can be performed until 3C 4kV bus lockout reset. Directs SM to review 0-ADM-011 to see if ERT should be activated. Directs System & DCS 0-ADM-115 notification about runback. Directs Chemistry notification to sample RCS (15% power change) Determines TS 3.7.1.6 Action a. (30 days) applies for A SSGFWP *(if time permits this evaluation).* Conducts crew brief regarding effects of loss of 3C 4kV bus.

Op-Test No.: 2007-301 Scenario No.: 1 Event No.: 5 Page 1 of 4

Event Description: Once reactor power stabilized < 60% power, a 3C SG feed break occurs inside containment. A manual reactor trip is required before any SG level drops < 10% since the automatic reactor trip is failed. 3-EOP-E-0 is performed. The MOV-3-1409 breaker trips & FCV-3-498 fails to close leaving an uncontrolled feed path to 3C SG if 3A SGFP started.

Time	Position	Applicant's Actions or Behavior
	BOP	Recognizes and reports dropping 3C SG levels and feedwater flows • Annunciators C-5/1 thru 5/3 (SG steam > feed flow) • Annunciators D-6/1 thru 6/3 (SG level deviations) • Indicated feedwater flow < steam flow for all SGs • Slowly dropping level in all SGs Recommends manual rx trip before any SG level drops < 10% NR.
	US Critical	Determines a loss of FW flow is occurring and **directs RO to manually trip the reactor before any SG level drops < 10% NR.** Directs crew perform 3-EOP-E-0 immediate actions & foldout page.
	RO	Performs immediate actions of 3-EOP-E-0: 1. Verifies reactor trip • Rod bottom lights on & RPIs at zero • Rx trip & bypass bkrs open • Neutron flux decreasing 2. Determines SI eventually actuates on SG pressure ΔP>100 psi
	BOP	Performs immediate actions of 3-EOP-E-0: 1. Verifies turbine tripped • Turbine stop valves closed • Closes MSR main steam stop MOVs • Mid & East GCBs open 2. Verifies power to emergency 4kV buses 3. Determines both 3A & 3B 4kV buses energized with 3D 4kV bus energized from 3B 4kV bus
	RO	Trips RCPs if subcooling < 25[65]°F per 3-EOP-E-0 foldout page.

Op-Test No.: 2007-301 Scenario No.: 1 Event No.: 5 Page 2 of 4

Event Description: Once reactor power stabilized < 60% power, a 3C SG feed break occurs inside containment. A manual reactor trip is required before any SG level drops < 10% since the automatic reactor trip is failed. 3-EOP-E-0 is performed. The MOV-3-1409 breaker trips & FCV-3-498 fails to close leaving an uncontrolled feed path to 3C SG if 3A SGFP started.

Time	Position	Applicant's Actions or Behavior
	BOP	Performs 3-EOP-E-0 foldout page actions when directed by US 1. Isolates AFW to 3C (faulted) SG 2. Opens ADVs on 3A & 3B SG to stabilize RCS hot leg temp.
	US	Directs BOP verify prompt actions per 3-EOP-E-0 Attachment 3. Directs RO continue performance of 3-EOP-E-0 subsequent actions.
	BOP	Verifies prompt actions per 3-EOP-E-0 Attachment 3: 1. Determines 3A, 3B, 3C, 3D & 3H 480V LCs energized 2. Determines status of MSIVs (still open) and closes them if any MS isolation signal actuated (should not be). 3. Verifies FW isolation: a. Places 3A SGFP control switch in STOP b. Determines FCV-3-498 not closed. Attempts unsuccessfully to close valve using controller. Determines other 2 main FW regulating valves closed. c. Determines all main FW regulating bypass valves closed. d. Closes MOV-3-1407 & 1408. Determines MOV-3-1409 has no power. Directs NSO to locally close valve. e. Determines A SSGFWP not available & B SSGFWP off. 4. Verifies at least 2 ICWPs running, POV-3-4882 & 4883 closed with ICW headers tied together. 5. Verifies 3 CCWHXs in service, 3A & 3B CCWPs running, CCW headers tied together & MOV-3-626 open. 6. Determines 2 ECCs & all 3 ECFs running. 7. Determines all 4 HHSIPs & 2 RHRPs running 8. Determines RCS pressure > 1600 psig (no HHSI flow) 9. Determines both U3 HHSIPs running & shuts down both U4 HHSIPs

Op-Test No.: 2007-301 Scenario No.: 1 Event No.: 5 Page 3 of 4

Event Description: Once reactor power stabilized < 60% power, a 3C SG feed break occurs inside containment. A manual reactor trip is required before any SG level drops < 10% since the automatic reactor trip is failed. 3-EOP-E-0 is performed. The MOV-3-1409 breaker trips & FCV-3-498 fails to close leaving an uncontrolled feed path to 3C SG if 3A SGFP started.

Time	Position	Applicant's Actions or Behavior
	BOP	Continues prompt action verification per 3-EOP-E-0 Attachment 3: 10. Determines all containment isolation phase A valves closed. 11. Determines all SI valves in proper injection alignment 12. Resets SI & containment isolation phase A. 13. If RCPs running, opens MOV-3-1417 & 1418 then resets/starts all available NCCs. 14. Determines containment pressure remained < 20 psig. 15. Determines containment ventilation isolated and control room ventilation in proper emergency recirculation alignment. 16. Directs NSO place PAHMS in service per 3-OP-094. 17. Verifies 3A & both U4 EDGs running (3B EDG is OOS). 18. Determines 3A, 3B & 3D 4kV buses still energized. 19. Notifies US that prompt action verification complete.
	RO	**Performs subsequent actions of 3-EOP-E-0 as directed:** 1. Determines no AFWPs will be running. a. A AFWP slowly losing steam supply as 3C SG depressurizes through the FW break into containment. b. B AFWP OOS c. C AFWP started, increased speed but then mechanically tripped. Directs NSO investigate C AFWP and attempt to reset trip (3-ONOP-075 Att. 4 may be used for guidance). 2. Determines AFW valve alignment proper **3. Recognizes/reports SGs levels & decreasing AFW flow** 4. Determines RCP thermal barrier alarms off. 5. Determines RCS temp dropping due to feed break. Limits AFW flow to ≈345 gpm if directed to reduce cooldown. 6. Determines PZR PORVs, normal spray, aux spray & excess letdown isolation valves closed. 7. Stops RCPs if running & trip criteria met

Op-Test No.: 2007-301 Scenario No.: 1 Event No.: 5 Page 4 of 4

Event Description: Once reactor power stabilized < 60% power, a 3C SG feed break occurs inside containment. A manual reactor trip is required before any SG level drops < 10% since the automatic reactor trip is failed. 3-EOP-E-0 is performed. The MOV-3-1409 breaker trips & FCV-3-498 fails to close leaving an uncontrolled feed path to 3C SG if 3A SGFP started.

Time	Position	Applicant's Actions or Behavior
	RO	**Completes performing subsequent actions of 3-EOP-E-0 by determining 3C SG faulted.**
	US	**1. If all SG levels < 6[32]% and AFW flow < 345 gpm at 3-EOP-E-0 step 8, directs transition to 3-EOP-FR-H.1.** **2. Determines 3C SG faulted** 3. Directs STA monitor CSFSTs (red path on Heat Sink CSF) **4. Directs transition to 3-EOP-FR.H.1**

Op-Test No.: 2007-301 Scenario No.: 1 Event No.: 6 Page 1 of 2

Event Description: C AFWP trips on overspeed prematurely at 6300 RPM (from setup). The trip can not be reset. B AFWP is OOS. A AFWP starts, but runs out of steam pressure from the 3C feed line fault. Efforts to realign A AFWP to train 2 steam are prevented by AFSS-3-007 stuck closed. SSGFW can not be used due to loss of 3C 4kV bus and a dead battery on B SSGFWP. The crew transitions to 3-EOP-FR-H.1 when AFW flow < 345 gpm and is eventually required to initiate feed & bleed since all SGs < 32% narrow range with adverse containment conditions.

Time	Position	Applicant's Actions or Behavior
	US	Directs response per 3-EOP-FR-H.1.
	RCO	Performs actions per 3-EOP-FR-H.1 as directed by US: 1. Determines RCS pressure > intact SG pressure 2. Determines RCS Tavg >350°F
	BOP	**Performs actions per 3-EOP-FR-H.1 as directed by US:** **1. Per step 2 Caution, informs US that all SG narrow range level < 32%**
	US **Critical**	**Since all narrow range SG levels < 32%, directs immediate transition to steps 11-19 of 3-EOP-FR-H.1.** **Directs initiation of feed & bleed per steps 11-19 of 3-EOP-FR-H.1.**
	RO **Critical** **Critical**	**Performs actions of 3-EOP-FR-H.1 as directed by US:** 1. Determines SI & containment isolation phase A already initiated **2. Stops all running RCPs** 3. Determines 2 HHSIPs running & SI valves in proper injection alignment 4. Determines PORV block MOVs open and energized **5. Opens both PORVs for adequate RCS bleed path.** 6. Determines CV-3-2803 open (IA to containment) 7. Determines SI & containment isolation phase A already reset. 8. Determines both unit 3 HHSIPs running & both unit 4 HHSIPs already stopped and in standby.

Op-Test No.: 2007-301 Scenario No.: 1 Event No.: 6 Page 2 of 2

Event Description: C AFWP trips on overspeed prematurely at 6300 RPM (from setup). The trip can not be reset. B AFWP is OOS. A AFWP starts, but runs out of steam pressure from the 3C feed line fault. Efforts to realign A AFWP to train 2 steam are prevented by AFSS-3-007 stuck closed. SSGFW can not be used due to loss of 3C 4kV bus and a dead battery on B SSGFWP. The crew transitions to 3-EOP-FR-H.1 when AFW flow < 345 gpm and is eventually required to initiate feed & bleed since all SGs < 32% narrow range with adverse containment conditions.

Time	Position	Applicant's Actions or Behavior
	BOP	Performs actions of 3-EOP-FR-H.1 as directed by US: 1 . Reverifies SI & phase A equipment actuated using 3-EOP-E-0 Attachment 3 (performed with same results as in event 5). 2. Determines status of placing PAHMS in service (directed NSO to do this in event 5). Completes PAHMS alignment in control room per 3-OP-094 if NSO reports field actions complete.
	US	Determines RCS heat removal adequate.
	TERMINATING CUE	**Scenario terminated when feed & bleed alignment complete (3-EOP-FR-H.1 step 22).**

Facility: Turkey Point Scenario No.: 2 Op Test No.: 2007-301

Examiners: _____ Candidates: _____ US

_____ _____ RO

_____ _____ BOP

Initial Conditions: Mode 1, 50% Power, MOL. Power on hold at 50% following inadvertent trip of 3B SGFP while investigation in progress.

Turnover: Equipment OOS: 3B EDG due to failed fuel pump (OOS 2 days; next 0-OSP-023.3 Att 1 & 9 in 4 hrs); B AFW Pump due to bearing failure (OOS 4 hrs; ETR 24 hrs; both trains verified operable); 3B CSP due to failed IST - low discharge pressure (OOS 12 hr; ETR 36 hr)

Need to swap 3D 4kV bus power supply to 3A 4kV bus per 3-OP-005 section 7.4 after shift turnover to support possible emergent maintenance on 3A CCW pump (vibration increase last shift).

Known tube leak in 3A S/G (2 gpd) – unchanged for last week. Chemistry samples are being taken per 3-ONOP-071.2, Attachment 1. The current sample, just completed indicates no significant change in leak rate. MOV-3-1403 remains open at management direction due to small size and stability of tube leak rate.

Event No.		Event Type*	Event Description
1		(N) SRO/BOP	Swap 3D 4kV bus power supply to 3A 4kV bus per 3-OP-005 section 7.4.
2	TFS1MABL = T	(I) BOP (TS,I) SRO	First stage impulse pressure channel PT-3-446 fails low. The crew responds per 3-ONOP-028 to stop inward rod movement by taking rod control to manual and then 3-ONOP-049.1.
3	TFE6X06F = T TCE6DI1C = T	(C) ALL	120VAC power panel 3P09 normal inverter fails. The auto swap to the CVT also fails leaving 3P09 deenergized. The crew responds per 3-ONOP-003.9. 3P09 is swapped over to the spare inverter per 3-ONOP-003.9 Attachment 1.
4	TFCMM2A4 = T TVHHSGA = 0.002	(C) ALL (TS) SRO	The 3A steam generator tube leak grows to 2 gpm. R-3-19 fails to respond. The crew responds per 3-ONOP-071.2
4a		(R) ALL	A fast load reduction from 50% power is initiated and performed per 3-ONOP-071.2
5	TVHHSGA = 0.4 TFSVV33C = T	(M) ALL (C) SRO/BOP	The 3A steam generator tube leak grows from 2 gpm into a rupture. The reactor is tripped and 3-EOP-E-0 performed. MOV-3-1433 fails to close requiring manual isolation of MSIVs.
6	TFQ5A20A = T TAQ5LRSB = T TFP1S38S = T	(C) ALL	When transition is made from 3-EOP-E-0 to 3-EOP-E-3, the startup transformer locks out. 3A EDG starts but the output breaker does not automatically close, and 3-EOP-ECA-0.0 is entered. 3A EDG output breaker is manually closed and the crew transitions back to 3-EOP-E-3. Only 3A & 3D 4kV bus are now available from 3A EDG. 3-EOP-E-3 is performed to cooldown and depressurize the RCS to stop primary-secondary leak flow.

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

Turkey Point 2007-301 Scenario #2

Event 1 - Swap 3D 4kV bus power supply to 3A 4kV bus per 3-OP-005 section 7.4.

Event 2 - First stage impulse pressure channel PT-3-446 fails low. The crew responds per 3-ONOP-028 to stop inward rod movement by taking rod control to manual and then 3-ONOP-049.1.

Event 3 - 120VAC power panel 3P09 normal inverter fails. The auto swap to the CVT also fails leaving 3P09 deenergized. The crew responds per 3-ONOP-003.9. 3P09 is swapped over to the spare inverter per 3-ONOP-003.9 Attachment 1.

Event 4 - The 3A steam generator tube leak grows to 2 gpm. R-3-19 fails to respond. The crew responds per 3-ONOP-071.2.

Event 4a - A fast load reduction from 50% power is initiated and performed per 3-ONOP-071.2.

Event 5 - The 3A steam generator tube leak grows from 2 gpm into a rupture. The reactor is tripped and 3-EOP-E-0 performed. MOV-3-1433 fails to close requiring manual isolation of MSIVs.

Event 6 - When transition is made from 3-EOP-E-0 to 3-EOP-E-3, the startup transformer locks out. 3A EDG starts but the output breaker does not automatically close, and 3-EOP-ECA-0.0 is entered. 3A EDG output breaker is manually closed and the crew transitions back to 3-EOP-E-3. Only 3A & 3D 4kV bus are now available from 3A EDG. 3-EOP-E-3 is performed to cooldown and depressurize the RCS to stop primary-secondary leak flow.

Scenario XXIII NRC 2

Simulator Operating Instructions

Setup

IC-2 (50% MOL)

Open & execute lesson file SRO_XXIII_NRC_2.lsn

Place simulator in run.

Trigger lesson steps:
SETUP - 3B EDG OOS (actuates TAQ5LRSB = OFF (0) & TAQ5B20P = RACKOUT (3))
SETUP - B AFWP OOS (actuates TAFK244 = 0.0, TAFK002 = 0.0, TAFF01B = 0.0, TCF5MTB = T)
SETUP - 3A SG 2 GPD LEAK (actuates TVHHSGA = 0.0000013)
SETUP - 3B CSP OOS (actuates TAM1DPOB = RACKOUT (3) & TCM1D41M = FALSE)
SETUP - 3P09 AUTO SWAP TO CVT FAIL (actuates TFE6X06F = T)
SETUP - R-3-19 FAIL AS IS (actuates TFCMM2A4 = T)
SETUP - MOV-3-1433 FAIL AS IS (actuates TFSVV33C = T)
SETUP - 3A EDG BKR AUTO CLOSE FAIL (actuates TFQ5A20A = T then = F when IMQ5A20C)

Select channel III as the 1st stage turbine impulse pressure controlling channel on VPA.

Start train A chilled water and secure train B chilled water (CR HVAC panel).

Close CV-3-200B and stop 3C charging pump. Leave CV-3-200A open and 3A charging pump running.

Acknowledge any alarms (B-2/2, B-2/3, D-6/2 & E-2/5 normal for 50% power; F-9/2 & F-9/5 due to 3B EDG OOS) and place simulator in freeze.

Place clearance info tags on 3B EDG normal start switch, B AFWP T&T valve control switch & 3B CSP control switch.

Remove AFW train 2 orange tag from B AFWP tachometer just below ann. panel X.

Provide shift turnover checklists, a blank copy of 3-OP-005 section 7.4 and 3-ONOP-071.2 Att 1.

Select 3A QSPDS to page 211 (SAT) and 3B QSPDS to page 212 (RVL). Set ERDADS on VPA to Tavg/Tref (TAV) and at the RCO desk to ENVRN (ED3).

Fill in blender & shutdown boron addition placards at console blender station. Data for each IC may be found in the ECC & Shutdown Guidelines Book in the simulator I/F.

Event 1 - Swap 3D 4kV bus to 3A 4kV bus

Initiated by crew per shift turnover *using 3-OP-005 sect 7.4.*
Crew must start 3A ICWP and secure 3C ICWP per 3-OP-019.

Respond if directed as NSO to perform pre-start and post-start checks for 3A ICWP and post-shutdown checks for 3C ICWP. Report all checks satisfactory.

Respond if directed to locally verify voltage on 3D 4kV bus. Click on Schema→MAIN POWER DISTRIBUTION→4KV & 480V AC→3D 4KV BUS→Report voltage indicated on 3D bus mimic.

Respond if directed as NSO to perform pre-start checks for 3C ICWP and post-shutdown checks for 3C ICWP. Report all conditions normal.

Event 2 - PT-3-446 (channel III 1st stage impulse pressure) fails low

Following transfer of 3D 4kV bus to 3A 4kV bus, trigger lesson step **EVENT 2 - PT-3-446 FAILS LOW** (actuates TFS1MABL = T).
Crew will respond per 3-ONOP-028 and take rod control to manual to stop inward rod movement. Then the crew will respond to the instrument failure per 3-ONOP-049.1.

Respond if directed as NSO to reset AMSAC trouble. After 1-3 min, **trigger** lesson step **EVENT 2 - BYPASS AMSAC POWER 1** (actuate TCL4P1BA = T then TCL4P1BB = T after 30 sec and TCL4RST = T after an additional 30 sec). *Resets annunciator D-7/6.* Report when complete.

Respond if directed as WCC to initiate PWO and notify I&C. Also respond as WCC if directed to generate a clearance for bistables tripped for PT-3-446 failure.

Annunciator C-8/3 alarms when PT-3-446 fails.
Annunciators C-6/1, 6/2 & 6/3 alarm until ch IV 1st stage impulse pressure selected for control.
Annunciators C-7/1, 7/2, 7/3 alarm due to tripping bistables.

Event 3 - Loss of 3P09

After crew brief for PT-3-446 failure, at lead examiner direction, trigger lesson step **EVENT 3 - LOSS OF 3D INV/3P09** (actuates TCE6DI1C = T).

This deenergizes 3D inverter. Since the auto transfer to CVT was failed at setup, 120V vital instrument panel 3P09 is deenergized. The crew responds per 3-ONOP-003.9 and reenergizes 3P09 from the DS inverter.

Respond as FS/NSO when directed to check out 3P09 & 3D inverter. After 1-3 min, report 3P09 deenergized with no other unusual conditions and 3D inverter DC input breaker CB1 tripped.

Respond as WCC if directed to have Electrical check out 3P09 for reenergization. After 8-12 min, report 3P09 okay to reenergize from DS inverter.

When directed as FS/NSO to reenergize 3P09 from DS inverter, wait 1-3 min then **trigger** the following **lesson steps per 3-ONOP-003.9 Att. 1**:

Step 1: **EVENT 3 - OPEN 3D INVERTER CB6** (actuates TCEDI4C = F)

Step 2a: **EVENT 3 - OPEN ALL 3P09 BREAKERS** (actuates TCE6217S = T)

Step 2b: **EVENT 3 - OPEN ALL 3P24 BREAKERS** (actuates TCC2DLM3 = F, TCC2DLM = F, TCM2DX3M = F, TCC2DLE = F, TCC2DPE = F, TCF1DA3M = F, TCK72407 = F, TCCMP248 = F, TCN1409M = F, TCN1410M = F & TCN1411M = F)

Step 5a: **EVENT 3 - 3P09A SWITCH TO ALTERNATE** (actuates TAE6X34 = ALTERNATE)

Step 6: Call as NSO & request RO take both groups of PZR backup heaters to OFF.

Step 7: **EVENT 3 - CLOSE 3P09 MAIN/13/02** (actuates TCE6DS4C = T, TCF1DA2M = T after 5 sec & TCH1902M = T after 10 sec)

Step 8: **EVENT 3 - CLOSE OTHER 3P09 BREAKERS** (actuates TCE6DP2C = T, TCE6DP3C = T after 5 sec, TCE6DP4C = T after 10 sec, TCM2D95M = T after 15 sec, TCE6DP5C = T after 20 sec, TCE6DP6C = T after 25 sec, TCE6DP7C = T after 30 sec, TCCMDRE = T after 35 sec, TCE6DP8C = T after 40 sec, TCN1911M = T after 45 sec, TCN1912M = T after 50 sec, TCCMDRE3 = T after 55 sec, TCB2M915 = T after 60 sec, TCE6D58C = T after 65 sec, TCD2MCCL = T after 70 sec, TCE6DP9C = T after 75 sec, TCM2D9TM = T after 80 sec & TCE6D56C = T after 85 sec)

Step 9: **EVENT 3 - CLOSE 3P24 BREAKERS** (actuates TCC2DLM3 = F, TCC2DLM = F after 5 sec, TCM2DX3M = F after 10 sec, TCC2DLE = F after 15 sec, TCC2DPE = F after 20 sec, TCF1DA3M = F after 25 sec, TCK72407 = F after 30 sec, TCCMP248 = F after 35 sec, TCN1409M = F after 40 sec, TCN1410M = F after 45 sec & TCN1411M = F after 50 sec)

Step 10: **EVENT 3 - 3Y07B SWITCH TO BACKUP DS INVERTER** (actuates TAE6X24 = ALTERNATE)

Step 12: Call as NSO and report Att.1 complete.

Respond as NSO if directed to depress and hold relay LC459X to allow restoration of letdown and PZR pressure/level control. After 1-3 min, **trigger** lesson step **EVENT 3 - PRESS / HOLD LC459CX** (actuates TCH2459C = T). When directed to release LC459CX, **trigger** lesson step **EVENT 3 - RELEASE LC459CX** (actuates TCH2459C = F). If crew does not allow NSO to release LC459CX by end of this event, call to remind them.

Annunciator F-1/2 remains in due to failure of 3D inverter. Annunciator B-7/1 will remain on until PRNI N-44 rod stop bypass switch is taken to reset.

Event 4/4a - 3A SG 2 gpm tube leak

Once the process of 3P09 restoration has begun (crew brief complete), trigger lesson step **EVENT 4 - 3A SG 2GPM TUBE LEAK** (actuates TVHHSGA = 0.002)
Crew should see R-3-15 & SJAE SPING readings increase and respond per 3-ONOP-071.2. Ann. H-1/4 alarms soon after leak rate increase. R-3-19 failure entered at setup means actions triggered by R-3-19 high rad alarm must be performed manually locally. The crew should initiate downpower per 3-ONOP-071.2 to remove the unit from service.

Respond as NSO if asked to check unit 3 condenser air inleakage. Report 0 scfm.

Respond as Chemistry when directed to sample SGs and MS lines per 0-NCAP-104. After 15-20 min, identify elevated activity in the 3A SG.

Respond as HP when directed to perform rad readings on MS & blowdown lines. After 10-15 min, report radiation slightly > background on 3A MS line. HP may also be directed to survey Turbine Deck around SJAE effluent & rope off contaminated areas.

If directed as FS/NSO to deenergize MOV-3-1403 by opening bkr 4D01-28, after 1-3 min, **trigger** lesson step **EVENT 6 - DEENERGIZE MOV-3-1403** (actuates TCF5MB28 = F). Report when complete. If directed to verify MOV-3-1403 closed, after 1-3 min, report that this is the case.

Respond as NSO when directed to realign aux steam to Unit 4 per 3-ONOP-071.2 Att. 3. After 2-4 min, **trigger** lesson step **EVENT 4 - ALIGN AUX STEAM FROM U4** (actuates TAFF075 = 0.0, TAFF02 = 1.0 after 60 sec & TAFF007 = 0.0 after 120 sec). Report when complete.
Annunciator D-4/6 will alarm during this process.

Respond as NSO when directed to locally check CV-3-1500 & bypass valve 3-20-014. After 1-3 min, report both valves closed.

Respond as System when notified that Unit 3 is to be removed from service.

Respond as SM when notified to refer to 0-EPIP-20101 & 0-ADM-115.

Event 5 - 3A SGTR / Reactor trip / Safety injection

At evaluator direction after 5-10% power reduction (before reaching 25% power), trigger lesson step **EVENT 5 - 3A SG TUBE RUPTURE** (actuates TVHHSGA = 0.4).
The crew should recognize the increase in tube leakage to > charging pump capacity. Per 3-ONOP-071.2, the crew should trip the reactor and enter 3-EOP-E-0. MSR main steam stop MOV-3-1433 failure to close requires manual closure of all MSIVs. PZR level < 12% requires manual safety injection.

Respond as NSO when directed to place U3 PAHMS in service. After 8-12 minutes, **trigger** lesson step **EVENT 5 - PLACE U3 PAHMS IN SERVICE** (actuates TAC2V02A = 1.0, TAC2V02B = 1.0, TAAAV21 = 1.0, TAAAV22 = 1.0 & TACA005 = 0.0). Report when complete.

Event 6 - Loss of offsite power / 3A EDG auto start fails

Immediately after entry into 3-EOP-E-3, trigger lesson step **EVENT 6 - U3 SUT LOCKOUT / LOOP** (actuates TFP1S38S = T)

A spurious lockout on the unit 3 SUT combined with 3A EDG output breaker auto close failure (from setup) and 3B EDG OOS (also from setup) causes a momentary loss of all AC power. 3-EOP-ECA-0.0 is entered and the 3A EDG output breaker is manually closed after which the crew returns to 3-EOP-E-3 to complete response to the SGTR.

Respond as NSO if directed to check the condition of the 3A EDG. After 1-3 min, report 3A EDG running unloaded, otherwise nothing unusual. If asked to monitor 3A EDG after manual output breaker closure, report EDG running satisfactorily.

Respond as System/SAO if asked about U3 SUT lockout. Report that personnel are being dispatched to check out the transformer (switchyard still available).

Respond as U4 RO when directed to perform 3-EOP-E-0 Att 1 to align U4 HHSIPs to U3 RWST. After 1-3 min, **trigger** lesson step **EVENT 6 - 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.

Respond as NSO when directed to locally verify MOV-3-1417 & 1418 closed (in the U3 Pipe & Valve Room). After 1-3 min, **trigger** lesson step **EVENT 6 - CLOSE MOV-3-1417 & 1418** (actuates TFKV417C = T & TFKV418C = T after 1 min delay). Report when complete.

Respond as NSO when directed to locally close LCV-3-115C. After 1-3 min, **trigger** lesson step **EVENT 6 - LOCALLY CLOSE LCV-3-115C** (actuates TFBVC62 = T). Report when complete.

If directed as FS/NSO to deenergize MOV-3-1403 by opening bkr 4D01-28 (may be previously done in event 4a), after 1-3 min, **trigger** lesson step **EVENT 6 - DEENERGIZE MOV-3-1403** (actuates TCF5MB28 = F). Report when complete. If directed to verify MOV-3-1403 closed, after 1-3 min, report that this is the case.

If directed to align auxiliary steam supply from U4, either report that this is already done or after 2-4 min, **trigger** lesson step **EVENT 4 - ALIGN AUX STEAM FROM U4** (actuates TAFF075 = 0.0, TAFF02 = 1.0 after 60 sec & TAFF007 = 0.0 after 120 sec). Report when complete. *Annunciator D-4/6 will alarm during this process.*

If asked as NSO to locally verify MOV-3-1425 closed, after 1-3 min, report that this is the case.

The crew may try to reenergize 3B 4kV bus using 3-ONOP-004.3. Since 3B EDG is OOS and the U3 SUT is locked out, such attempts will be unsuccessful.

Op-Test No.: 2007-301 Scenario No.: 2 Event No.: 1 Page 1 of 1

Event Description: Swap 3D 4kV bus power supply to 3A 4kV bus per 3-OP-005 section 7.4.

Time	Position	Applicant's Actions or Behavior
	US	Directs BOP to transfer 3D 4kV bus supply from 3B 4kV bus to 3A 4kV bus per 3-OP-005 section 7.4. Directs BOP start 3A ICWP & s/d 3C ICWP per 3-OP-019 section 5.3.
	BOP	Obtains copies of 3-OP-005, section 7.4 & 3-OP-019, section 5.3. Performs actions as follows: 1. Starts 3A ICWP & stops 3C ICWP per 3-OP-019 section 5.3 a. Verifies NSO understands ICWPs to be started/stopped b. Directs NSO verify oil in 3A ICWP sightglass & 3A ICWP discharge valve open c. Starts 3A ICWP & checks for amperage on VPA ammeter d. Directs NSO locally check 3A ICWP visible packing leakoff e. Stops 3C ICWP & checks zero amperage on VPA ammeter f. Directs NSO locally do post-stop check 2. Opens 3AB19 and then 3AD06 ***NOTE:*** *3C CCWP & 3C ICWP are OOS while 3D 4kV bus is deenergized TS 3.7.2 - 7 day action statement & TS 3.7.3 - 30 day action statement.* 3. Closes 3AD01 and then 3AA17 4. Directs NSO to locally check 3D 4kV bus voltage 3744-4576 volts on cubicle 3AD08. 5. Starts 3C ICWP per 3-OP-019 section 5.3 to verify operability. a. Verifies NSO understands ICWPs to be started/stopped b. Directs NSO verify oil in 3C ICWP sightglass & 3C ICWP discharge valve open c. Starts 3C ICWP & checks for amperage on VPA ammeter d. Directs NSO locally check 3C ICWP visible packing leakoff 6. As directed at turnover, stops 3C ICWP per 3-OP-019 sect. 5.3. a. Stops 3C ICWP & checks zero amperage on VPA ammeter b. Directs NSO locally do post-stop check
	RO	Assists BOP as directed by US.

Op-Test No.: 2007-301 Scenario No.: 2 Event No.: 2 Page 1 of 2

Event Description: First stage impulse pressure channel PT-3-446 fails low. The crew responds per 3-ONOP-028 to stop inward rod movement by taking rod control to manual and then 3-ONOP-049.1.

Time	Position	Applicant's Actions or Behavior
	BOP	Recognizes/reports ch III first stage impulse pressure PT-3-446 failed low. • annunciators C-6/1, 6/2, 6/3 (due to change in SG level program setpoint from 60% to 50%) • C-7/1, 7/2, 7/3 steam line hi flow & C-8/3 stm dump due to failure • PI-3-446 indication on VPA fails low • Control rods inserting in automatic
	RO	Recognizes/reports control rods inserting in automatic When PT-3-446 failure recognized, performs immediate action of 3-ONOP-028 for continuous insertion of an RCC control bank: Places rod control in MANUAL and verifies rods stop moving.
	US	Directs response per 3-ONOP-028
	RO	Performs subsequent actions of 3-ONOP-028 as directed by US: 1. If directed, withdraws control rods to restore Tavg = Tref 2. Determines rods above RIL from VPA recorder (or PCB section VII figure 3). 3. Determines PRNI N-44 did not fail 4. After PT-3-447 selected for 1st stage pressure control, places rods back in auto 5. Determines TM-408 median Tavg selector not failed
	BOP	Performs subsequent actions of 3-ONOP-028 as directed by US: 1. If directed, reduces turbine load to restore Tavg = Tref 2. Selects Channel Select First Stage Control to ch IV (PT-3-447)
	US	Directs WCC notify I&C of PT-3-446 failure. Directs response per 3-ONOP-049.1

Op-Test No.: 2007-301 Scenario No.: 2 Event No.: 2 Page 2 of 2

Event Description: First stage impulse pressure channel PT-3-446 fails low. The crew responds per 3-ONOP-028 to stop inward rod movement by taking rod control to manual and then 3-ONOP-049.1.

Time	Position	Applicant's Actions or Behavior
	BOP	Performs actions of 3-ONOP-049.1 as directed by US: 1. Determine PT-3-446 failed by comparison to PT-3-447, PT-3-1604 and expected value based on turbine load. 2. Verifies PT-3-447 selected for 1st stage impulse pressure control 3. Verifies PT-3-447 reading normally
	US	Evaluates impact per TS: 3.3.1. Table 3.3-1 functional unit 17b applies. Actions 6 (6hr) & 7 (1hr) in effect. 3.3.2. Table 3.3-2 functional units 1f & 4d. Action 15 (6hr) applies. Conducts crew brief regarding effects of PT-3-446 failure and of tripping bistables as directed in 3-ONOP-049.1 Attachment 4
	BOP	Continues performing actions of 3-ONOP-049.1 as directed by US: Obtains keys, opens door to and trips following bistables in protection channel III, rack 16: • BS-3-446-1 (Turbine power >10% input to P-7) • BS-3-446-2 (70% turb load limit runback permissive) • BS-3-474 (SG A hi steam flow) • BS-3-484 (SG B hi steam flow) • BS-3-494 (SG C hi steam flow) Closes protection rack door when done. Places Steam Dump to Condenser Mode switch in MANUAL
	RO	Monitors bistable status lights and annunciator panels for expected indications while bistables being tripped.
	US	1. Directs NSO bypass power 1 on AMSAC per Attachment 5 2. Directs notification of I&C 3. Directs WCC generate clearance for tripped bistables

Op-Test No.: 2007-301 Scenario No.: 2 Event No.: 3 Page 1 of 3

Event Description: 120VAC power panel 3P09 normal inverter fails. The auto swap to the CVT also fails leaving 3P09 deenergized. The crew responds per 3-ONOP-003.9. 3P09 is swapped over to the spare inverter per 3-ONOP-003.9 Attachment 1.

Time	Position	Applicant's Actions or Behavior
	BOP	Recognizes / reports loss of 3P09 120VAC vital inst bus • Annunciator F-1/2 • Loss of all ch IV instrumentation (yellow labels) • Loss of controller for B SG FRV
	RO	Recognizes / reports loss of 3P09 120VAC vital inst bus • Annunciators B-6/5 & B-7/1 • Loss of all ch IV instrumentation (yellow labels) • Loss of controllers for PZR pressure, level & spray valves • Letdown isolation Determines a reactor trip has not occurred
	US	Directs performance of 3-ONOP-003.9 Determines unit operating in mode 1 Directs FS/NSO to restore power to 3P09 per Attachment 1 & RO restore PZR pressure and level control per Attachment 4.
	RO	Performs actions of 3-ONOP-003.9 as directed by US: 1. Places rods in MANUAL 2. Reduces charging flow to minimum req'd for seal injection using a charging pump in manual speed control 3. Determines PORVs closed 4. Maintains Tavg, rx power, PZR pressure & PZR level in normal control bands
	BOP	Performs actions of 3-ONOP-003.9 as directed by US: 1. Determines steam dump to condenser mode already in MAN 2. Determines 3B SG in auto lockup. Increases 3B SG blowdown flow as necessary to control 3B SG level. 3. Maintains SG levels in normal control band

Op-Test No.: 2007-301 Scenario No.: 2 Event No.: 3 Page 2 of 3

Event Description: 120VAC power panel 3P09 normal inverter fails. The auto swap to the CVT also fails leaving 3P09 deenergized. The crew responds per 3-ONOP-003.9. 3P09 is swapped over to the spare inverter per 3-ONOP-003.9 Attachment 1.

Time	Position	Applicant's Actions or Behavior
	RO	Performs 3-ONOP-003.9 Attachment 4 when directed by US: 1. Determines PORVs closed 2. Directs FS/NSO go to rack 46 & press/hold in relay LC459CX 3. Manually operate PZR heaters to return pressure to normal. 4. Restores letdown a. Determines B CCW header flow normal. b. Determines letdown orifice isolation valves closed c. Opens CV-3-204 then opens LCV-3-460 d. Manually controls PCV-3-145 to control letdown pressure e. Opens letdown orifice isolation valve(s) for desired flow
	US	Briefs crew on effects of loss of 3P09 using Enclosure 1. Evaluates TS impact: 3.8.3.1.j applies. Action c. (2hr to reenergize; 24 hr to reenergize from inverter).
	BOP	Coordinates with FS/NSO to restore 3P09 per 3-ONOP-003.9 Att 1. 1. Informs FS/NSO that DS inverter not currently in use 2. When informed that 3P09 about to be reenergized, turns off both groups of PZR backup heaters 3. Observes components reenergizing as 3P09/3P24 breakers closed in 4. Relays notification from FS/NSO that all 3P09/3P24 breakers closed in
		NOTE: *Auto/Manual controllers should not be returned to AUTO until vital power completely restored. When power is restored to an Auto/Manual station, the AUTO light will turn on for approx. 15 sec after which the MANUAL light turns on indicating that manual control is now available.*

Op-Test No.: 2007-301 Scenario No.: 2 Event No.: 3 Page 3 of 3

Event Description: 120VAC power panel 3P09 normal inverter fails. The auto swap to the CVT also fails leaving 3P09 deenergized. The crew responds per 3-ONOP-003.9. 3P09 is swapped over to the spare inverter per 3-ONOP-003.9 Attachment 1.

Time	Position	Applicant's Actions or Behavior
	RO	Restores auto controls on Encl 1 as 3P09 breakers are closed in: 1. Restores auto PZR pressure control per Att 4 section 2 a. Directs NSO release LC459CX b. Restore charging pumps, PZR heaters & spray valves to auto control 2. Determines annunciators indicate correctly for plant conditions 3. Returns rods to auto once PRNI N-44 reenergized
	BOP	Restores auto controls on Encl 1 as 3P09 breakers are closed in: 1. Returns 3B SG level control to automatic a. Manually control FCV-3-488 to return SG level to 60±5% and match feed flow = steam flow b. Places 3B SG level control in auto 2. Places steam dump to condenser mode selector to RESET and then to AUTO 3. Determines annunciators indicate correctly for plant conditions

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Event Description: The 3A steam generator tube leak grows to 2 gpm. R-3-19 fails to respond. The crew responds per 3-ONOP-071.2.

Time	Position	Applicant's Actions or Behavior
	BOP	Recognizes/reports increase in 3A SG tube leak rate • Annunciator H-1/4 (PRMS hi radiation) • R-3-15 SJAE effluent PRMS rising/alarming • SJAE SPING RAD-3-6417 rising/alarming (see ERDADS) ***NOTE:*** *R-3-19 is failed as is*
	RO	Recognizes/reports increase in 3A SG tube leak rate • Annunciator H-1/4 (PRMS hi radiation) • Slight increase in charging flow to maintain PZR level • Charging/letdown flow mismatch increases to 2 gpm (see ERDADS)
	US	Directs performance of 3-ONOP-071.2
	BOP	Performs actions of 3-ONOP-071.2 as directed by US: 1. Checks R-3-15 validity a. Checks readout on alarming R-3-15 ≥ ALARM SETPOINT b. Checks channel operability: 1) Depresses and holds FAIL/TEST pushbutton on alarming R-3-15. 2) Checks readout = 288K **OR** 289K 3) Releases FAIL/TEST pushbutton c. Observes CAUTION prior to Step 6 **AND** go to Step 6 2. If R-3-19 failure recognized, may close FCV-3-6278A/B/C & LCV-3-6265B as directed by US.
	RO	Performs actions of 3-ONOP-071.2 as directed by US: 1. Determines PZR level – STABLE and can be maintained that way since charging can keep up with 2 gpm tube leak

Op-Test No.: 2007-301 Scenario No.: 2 Event No.: 4 Page 2 of 2

Event Description: The 3A steam generator tube leak grows to 2 gpm. R-3-19 fails to respond. The crew responds per 3-ONOP-071.2.

Time	Position	Applicant's Actions or Behavior
	US	Directs Shift Engineer Approximate Tube Leakage Using 3-OSP-041.1, RCS LEAK RATE CALCULATION ***NOTE:*** *SJAE SPING ACTIVITY vs SG TUBE LEAKAGE & R-3-15 ACTIVITY vs SG TUBE LEAKAGE curves in the Plant Curve Book not applicable since leak > 150 gpd* Identifies leaking S/G: a. Monitors the following for S/G tube leak indications: • Unexplained increase in any S/G level • High radiation detected on a S/G sample, main steam line, AFW steam supply line (if running) or S/G Blowdown line • Unexplained difference between steam and feed flow • Increasing radiation levels indicated on R-15, R-19, SPING, **AND** DAM-1
	BOP	Continues performing actions of 3-ONOP-071.2 as directed by US: b. Directs Health Physics to perform the following: • Monitor radiation levels on Main Steam Lines, AFW steam supply line (if running) & S/G Blowdown lines • Monitor airborne activity at Steam Jet Air Ejectors c. Directs 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
	US	Determines S/G Tube Leakage > T.S. Limits – TS 3.4.6.2.c action b. applicable (4 hrs to fix or HSBY next 6 hr & CSD following 30 hr) Determines need to be in Mode 3 within 1 hour (more restrictive than applicable TS action statement). Goes to Step 10.

Op-Test No.: 2007-301 Scenario No.: 2 Event No.: 4a Page 1 of 2

Event Description: A fast load reduction from 50% power is initiated and performed per 3-ONOP-071.2.

Time	Position	Applicant's Actions or Behavior
	US	Performs the following prior to commencing load reduction: a. Notifies System Dispatcher about load reduction b. Briefs Control Room personnel using Foldout Page 1) Specifies s/d rate (e.g.,15 MW/min for 1 hr to s/d) 2) Unit to be taken off line 3) 3C s/g leaking at 2 gpm 4) Actions required after unit off-line 5) Using control rods & boration c. Uses page boost to notify plant personnel of load reduction Notifies SM 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 **UNUSUAL EVENT per 0-EPIP-20101, Encl 1, Cat 2 Item A.2 now applicable.**
	RO	Initiates boration per 3-ONOP-071.2: a. Establishes desired boration rate using normal boration flowpath 1) Places Reactor Makeup Selector Switch to BORATE 2) Places RCS Makeup Control Switch to START 3) Sets FC-3-113A potentiometer to 8.0 or as directed b. Sets Boric Acid Totalizer to desired amount of Boric Acid to be added as directed by US
	US	**Determines amount of Boric Acid for desired power reduction** ***NOTE:*** *For s/d from 50% MOL, up to 425 gal boric acid required*

Op-Test No.: 2007-301 Scenario No.: 2 Event No.: 4a Page 2 of 2

Event Description: A fast load reduction from 50% power is initiated and performed per 3-ONOP-071.2.

Time	Position	Applicant's Actions or Behavior
	BOP/RO	Reduces plant load at a rate determined by SM as follows: a. Reduces turbine load (BOP) while manually inserting rods (RO) to lower Tavg (Tavg not > Tref by more than 5°F) b. Monitors Control Rod Position (RO) > RIL (Ann. B-8/1 & 2) ***NOTE:*** *For s/d from 50% MOL, rods should remain > RIL*
	RO	***NOTE:*** *Actions performed depend on point when SGTR inserted* When directed per 3-ONOP-071.2 1. Checks PZR level following program. If not increases charging flow and/or places an additional letdown orifice in service 2. Determines NRHX CCW flow already increased (from setup) 3. Verifies load reduction rate & auto rod control maintaining T_{avg}-T_{ref} per expected value as discussed in crew brief 4. Energizes PZR backup heaters. 5. Places station service loads on U3 SUT 6. Closes blowdown isolation valve for leaking (3A) SG 7. Ensures aux steam supplied from U4, then directs NSO locally open SLWU-3-001 and close 3-10-007 8. Determines turbine load < 400MW & verifies non-running SGFP recirc valve control switch in closed/auto 9. Verifies both HDPs stopped < 300 MWe 10. Stops 1 condensate pump < 275 MWe 11. Opens SGFP recirc valves on running SGFP < 200 MWe 12. Opens turbine drain valves < 150 MWe 13. When directed by US (required boration complete or load decreased to 25% power), secures boration: a. Places rx m/u selector switch in AUTO b. Sets FC-3-113A potentiometer to directed value c. Places RCS m/u control switch to START 14. After 3A SG identified as leaking, per FOP, directs NSO to deenergize & close MOV-3-1403 (isolates 3A SG AFWSS)

Op-Test No.: 2007-301 Scenario No.: 2 Event No.: 5 Page 1 of 3

Event Description: The 3A steam generator tube leak grows from 2 gpm into a rupture. The reactor is tripped and 3-EOP-E-0 performed. MOV-3-1433 fails to close requiring manual isolation of MSIVs.

Time	Position	Applicant's Actions or Behavior
	RO	Recognizes / reports falling PZR levels and rising charging flows
	US	Determines an increase in SG tube leak rate is occurring and directs response per 3-ONOP-071.2 Foldout Page item 1b
	RO	Responds per 3-ONOP-071.2 to dropping PZR level: 1. Starts 3rd charging pump and establishes maximum flow rate 2. Isolates letdown flow 3. Determines PZR level still dropping 4. Recommends reactor trip due to inability to maintain PZR level
	US	**Directs RO to manually trip the reactor per 3-ONOP-071.2 due to inability to maintain PZR level.** Directs crew perform immediate actions of 3-EOP-E-0.
	RO	Performs immediate actions of 3-EOP-E-0: 1. Verifies reactor trip • Rod bottom lights on & RPIs at zero • Rx trip & bypass bkrs open • Neutron flux decreasing 2. Actuates SI & phase A due PZR level not maintained <12%
	BOP	Performs immediate actions of 3-EOP-E-0: 1. Verifies turbine tripped • Turbine stop valves closed • Attempts closing MSR main steam stop MOVs. **Recognizes MOV-3-1433 failed to close & closes MSIVs** • Mid & East GCBs open 2. Verifies power to emergency 4kV buses • Determines both 3A & 3B 4kV buses energized • Determines 3D 4kV bus energized from 3B 4kV bus

Op-Test No.: 2007-301 Scenario No.: 2 Event No.: 5 Page 2 of 3

Event Description: The 3A steam generator tube leak grows from 2 gpm into a rupture. The reactor is tripped and 3-EOP-E-0 performed. MOV-3-1433 fails to close requiring manual isolation of MSIVs.

Time	Position	Applicant's Actions or Behavior
	US	Directs BOP verify prompt actions per 3-EOP-E-0 Attachment 3. Directs RO continue with performance of 3-EOP-E-0 subsequent actions.
	BOP	Verifies prompt actions per 3-EOP-E-0 Attachment 3: 1. Determines 3A, 3B, 3C, 3D & 3H 480V LCs energized 2. Determines MSIVs all closed 3. Verifies FW isolation: a. Places running SGFP switch in STOP. b. Determines all main FW regulating & bypass valves closed. c. Closes FW isolation valves. d. Determines both SSGFWPs off. 4. Verifies 3A & 3B ICWPs running, POV-3-4882 & 4883 closed with ICW headers tied together. 5. Verifies 3 CCWHXs in service, 3A & 3B CCWPs running, CCW headers tied together & MOV-3-626 open. 6. Determines 2 ECCs & all 3 ECFs running. 7. Determines all 4 HHSIPs & 2 RHRPs running 8. Checks for HHSI flow if RCS pressure < 1600 psig 9. Determines both U3 HHSIPs running & stops both U4 HHSIPs 10. Determines all containment isolation phase A valves closed. 11. Determines all SI valves in proper injection alignment 12. Resets SI & containment isolation phase A. 13. If RCPs running, opens MOV-3-1417 & 1418 then resets/starts all available NCCs. 14. Determines containment pressure remained < 20 psig. 15. Determines containment ventilation isolated and control room ventilation in proper emergency recirculation alignment.

Op-Test No.: 2007-301 Scenario No.: 2 Event No.: 5 Page 3 of 3

Event Description: The 3A steam generator tube leak grows from 2 gpm into a rupture. The reactor is tripped and 3-EOP-E-0 performed. MOV-3-1433 fails to close requiring manual isolation of MSIVs.

Time	Position	Applicant's Actions or Behavior
	BOP	Continues prompt action verification per 3-EOP-E-0 Attachment 3: 16. Directs NSO place PAHMS in service per 3-OP-094. 17. Verifies 3A & both U4 EDGs running (3B EDG is OOS). 18. Determines 3A, 3B & 3D 4kV buses still energized. 19. Notifies US that prompt action verification complete.
	RO **Critical**	Performs foldout page actions of 3-EOP-E-0 as directed: 1. Trips RCPs if RCS subcooling < 25°F with HHSIP running and SI flowpath verified **2. Identifies 3A SG level increasing in an uncontrolled manner >6% and isolates all FW flow to 3A SG** Performs subsequent actions of 3-EOP-E-0 as directed 1. Determines 2 AFWPs (A & C) running. 2. Determines AFW valve alignment proper 3. Determines at least 3A SG level > 6%. Controls AFW flow to intact SGs (3B & 3C) to maintain levels 15-50% 4. Determines annunciators A-1/1,1/2 & 1/3 all off. 5. Determines Tc stable. 6. Determines PORVs, normal spray, aux spray & excess letdown isolation valves closed 7. Trips RCPs if RCS subcooling < 25°F with HHSIP running and SI flowpath verified 8. Determines no SGs depressurized or depressurizing **9. Determines SG tube ruptured (R-3-15 alarm & 3A SG level)**
	US	**Based on SG tube rupture:** 1. Directs STA monitor CSFSTs **2. Directs transition to 3-EOP-E-3.**

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Event Description: When transition is made from 3-EOP-E-0 to 3-EOP-E-3, the startup transformer locks out. 3A EDG starts but the output breaker does not automatically close, and 3-EOP-ECA-0.0 is entered. 3A EDG output breaker is manually closed and the crew transitions back to 3-EOP-E-3. Only 3A & 3D 4kV bus are now available from 3A EDG. 3-EOP-E-3 is performed to cooldown and depressurize the RCS to stop primary-secondary leak flow.

Time	Position	Applicant's Actions or Behavior
	BOP	Recognizes/reports LOOP causing loss of all AC power: • 3A 4kV bus deenergized. 3A EDG did not start. • 3B 4kV bus deenergized. 3B EDG OOS.
	US	**Determines loss of all AC power exists and directs performance of 3-EOP-ECA-0.0 beginning with step 3** 1. Determines reactor & turbine already tripped per 3-EOP-E-0 2. Determines RCS Tavg >350°F
	RCO	Performs actions per 3-EOP-ECA-0.0 as directed by US: 1. Determines PORVs closed, letdown & excess letdown isolated 2. Determines SI reset
	BOP **Critical**	Performs actions per 3-EOP-ECA-0.0 as directed by US: 1. Determines 2 AFWPs running 2. Increases AFW flow to 345 gpm to intact SGs 3. Verifies 4kV bus stripping using Attachments 1 & 2. 4. Determines 3A & 3B 4kV buses both deenergized with lockout relays reset 5. Determines 3A EDG lockout reset & 3B EDG OOS 6. Determines 3A EDG running, 3A 4kV bus stripped & SI reset **7. Manually closes 3AA20 and energizes 3A 4kV bus**
	BOP	Determines 3D 4kV bus energized from 3A 4kV bus

Op-Test No.: 2007-301 Scenario No.: 2 Event No.: 6 Page 2 of 4

Event Description: When transition is made from 3-EOP-E-0 to 3-EOP-E-3, the startup transformer locks out. 3A EDG starts but the output breaker does not automatically close, and 3-EOP-ECA-0.0 is entered. 3A EDG output breaker is manually closed and the crew transitions back to 3-EOP-E-3. Only 3A & 3D 4kV bus are now available from 3A EDG. 3-EOP-E-3 is performed to cooldown and depressurize the RCS to stop primary-secondary leak flow.

Time	Position	Applicant's Actions or Behavior
	RCO/BOP	**Restarts ECCS loads on 3A EDG as directed by US:** • **Energizes 3A, 3C & 3H 480V LC** • **3A & either U4 HHSIP, 3A RHRP** • **3A & 3C CCWPs, 3A & 3C ICWPs** • **3B & 3C ECCs, 3B & 3C ECFs**
	US	Directs monitoring of CSFs for implementation. **Directs transition to and performance of 3-EOP-E-3.** Defers performance of 3-ONOP-004.3 since there is no source of power and stopping pri-sec leak is higher priority **Determines from 3-ONOP-071.2 (event 4) that 3A SG is ruptured.**
	RO	Performs actions of 3-EOP-E-3 as directed by US: 1. Determines RCPs not running 2. Verifies SI reset
	BOP **Critical**	**Performs actions of 3-EOP-E-3 as directed by US:** 1 . Adjusts 3A SG steam dump to atmosphere setpoint to 1060 psig and determines CV-3-1606 closed 2. Verifies AMSAC reset. 3. Determines AFWSS train 1 from 3C SG & train 2 from 3B SG **4. Closes MOV-3-1403 then directs NSO open breaker 4D01-28 and verify MOV-3-1403 closed** (may already be done per event 4 using 3-ONOP-071.2 FOP guidance) 5. Determines CV-3-6275A closed 6. Verifies aux steam supplied from U4 directed per 3-ONOP-071.2 7. Determines 3A MSIV & MOV-3-1427/1426/1425 already closed 8. Determines 3A SG level > 6% and FW flow to 3A SG isolated

Op-Test No.: 2007-301 Scenario No.: 2 Event No.: 6 Page 3 of 4

Event Description: When transition is made from 3-EOP-E-0 to 3-EOP-E-3, the startup transformer locks out. 3A EDG starts but the output breaker does not automatically close, and 3-EOP-ECA-0.0 is entered. 3A EDG output breaker is manually closed and the crew transitions back to 3-EOP-E-3. Only 3A & 3D 4kV bus are now available from 3A EDG. 3-EOP-E-3 is performed to cooldown and depressurize the RCS to stop primary-secondary leak flow.

Time	Position	Applicant's Actions or Behavior
	BOP	Continues performing actions of 3-EOP-E-3 as directed by US: 9. Determines 3A MSIV & AFWSS isolated 10. Determines 3A SG pressure > 500 psig
	US	**Determines required CET temperature for cooldown based on 3A SG pressure per 3-EOP-E-3 step 11a table.**
	BOP Critical	**Fully opens 3B & 3C steam dumps to atmosphere.**
	BOP	Continues performance of 3-EOP-E-3 actions as directed by US. 1. Controls AFW flow to intact SGs to maintain NR level 15-50% 2. Determines CV-3-2803 open & IA pressure > 95 psig
	RO	Continues performance of 3-EOP-E-3 actions as directed by US: 1. Determines power to one PORV block MOV available, PORVs closed & both PORV block MOVs open 2. Verifies SI & phase A reset (phase B not actuated) 3. Determines RCS pressure > 250 psig & stops 3A RHRP 4. Starts 3A or 3C charging pump, stops RCS makeup, takes running charging pump speed to maximum & adjusts HCV-3-121 for proper seal injection flow. 5. Opens LCV-3-115B & directs NSO locally close MOV-3-115C 6. Informs US when CET temperature < value from step 11a table 7. Determines RCS CET subcooling > 50°F
	BOP	**Continues performance of 3-EOP-E-3 actions as directed by US:** **1. Closes 3B & 3C SG steam dump to atmosphere when CET temperature < value from step 11a table** 2. Determines 3A SG pressure stable/increasing.

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Event Description: When transition is made from 3-EOP-E-0 to 3-EOP-E-3, the startup transformer locks out. 3A EDG starts but the output breaker does not automatically close, and 3-EOP-ECA-0.0 is entered. 3A EDG output breaker is manually closed and the crew transitions back to 3-EOP-E-3. Only 3A & 3D 4kV bus are now available from 3A EDG. 3-EOP-E-3 is performed to cooldown and depressurize the RCS to stop primary-secondary leak flow.

Time	Position	Applicant's Actions or Behavior
	RO	Continues performance of 3-EOP-E-3 actions as directed by US: 1. Determines RCS CET subcooling > 50°F
	US **Critical**	Depressurizes RCS to stop primary-secondary leak per 3-EOP-E-3 1. Determines normal spray not available **2. Directs use of one PZR PORV to depressurize the RCS** 3. Directs SI termination when criteria met
	RO	**Continues performance of 3-EOP-E-3 actions as directed by US:** **1. Opens one PORV. Closes PORV when RCS pressure < SG pressure with PZR level > 17% OR PZR level > 71% OR RCS CET subcooling <30°F.** 2. Determines RCS pressure increasing 3. Determines SI termination criteria met. 4. Stops 3A & U4 HHSIPs.
	TERMINATION CUE	**SI terminated after stopping primary-secondary leak.**

Facility: Turkey Point Scenario No.: 3 Op Test No.: 2007-301

Examiners: _____ Candidates: _____ US

_____ _____ RO

_____ _____ BOP

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

Turnover: Equipment OOS: 3B EDG due to failed fuel pump (OOS 2 days; next 0-OSP-023.3 Att 1 & 9 in 4 hrs); B AFW Pump due to bearing failure (OOS 4 hrs; ETR 24 hrs; both trains verified operable); 3B CSP due to failed IST - low discharge pressure (OOS 12 hr; ETR 36 hr)

Perform monthly surveillance on 3A ECC per 3-OSP-055.1 section 7.1 immediately after shift turnover. IST and remote valve position verification not required.

Known tube leak in 3A S/G (2 gpd) – unchanged for last week. Chemistry samples are being taken per 3-ONOP-071.2, Attachment 1. The current sample, just completed indicates no significant change in leak rate. MOV-3-1403 remains open at management direction due to small size and stability of tube leak rate.

Event No.		Event Type*	Event Description
1	TFKV905A = T	(N) BOP (N,TS) SRO	3A ECC monthly surveillance performed per 3-OSP-055.1 section 7.1. 3A ECC inlet valve CV-3-2905 fails to open and 3A ECC is declared OOS.
2	TFL1T8CH = T	(I) SRO/RO	TM-3-408C (Tavg input to rod control) fails high. Crew responds per 3-ONOP-028 and takes rods to manual to stop continuous inward rod movement.
3	TFE3D37A = T TFE3D38T = T	(C) RO/BOP (C,TS) SRO	Loss of 3H 480V LC. Also takes 3C charging pump, 3B ECC, 3B ECF & 3D NCC OOS. Requires starting another charging pump or securing the in service 60 gpm orifice. The crew responds per 3-ARP-097.CR for annunciators F-9/6, A-5/4, I-9/3 or I-9/4.
4	TAKPXA1=10.0 TAKPXA2 = 4.0	(C) SRO/BOP	3A1 Intake screen high Δp. Crew responds per 3-ONOP-011. 3A1 CWP is secured.
4a	TAKPXA2 = 1.0	(R) ALL	3A2 Intake screen high Δp. Fast load reduction per 3-ONOP-100 to 60% for the purpose of securing 3A2 CWP. Manual rod control must be used due to rod control Tavg failure.
5	TAHUVBSB=22 TAHUVBMB= 6	(M) ALL	3B RCP high vibration. The crew responds per 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.
6	TFE2Z51S = T TVHHCLB = 0.1 TFQ634AF = T	(M) ALL (cont'd from event 5) (C) ALL	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. Train A ECCS equipment must be manually started. The crew completes 3-EOP-E-0 and transitions to applicable FRPs followed by 3-EOP-E-1.
6a			Once CSFSTs are monitored for implementation, if containment pressure is still above 20 psig, the crew immediately transitions to 3-EOP-FR-Z.1 if no higher red or orange path exists.
6b	TFM1D3AT = T	(C) SRO/RO	3-EOP-E-1 is entered after which 3A RHRP trips. Since neither RHRP is running, transition is made to 3-EOP-ECA-1.1. Measures are taken to minimize the loss of RWST inventory.

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

Turkey Point 2007-301 Scenario #3

Event 1 - 3A ECC monthly surveillance performed per 3-OSP-055.1 section 7.1. 3A ECC inlet valve CV-3-2905 fails to open and 3A ECC is declared OOS.

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

Event 3 - Loss of 3H 480V LC. Also takes 3C charging pump, 3B ECC, 3B ECF & 3D NCC OOS. Requires starting another charging pump or securing the in service 60 gpm orifice. The crew responds per 3-ARP-097.CR for annunciators F-9/6, A-5/4, I-9/3 or I-9/4.

Event 4 - 3A1 intake screen high Δp. Crew responds per 3-ONOP-011. 3A1 CWP is secured.

Event 4a - 3A2 intake screen high Δp. Fast load reduction per 3-ONOP-100 to 60% for the purpose of securing 3A2 CWP. Manual rod control must be used due to rod control Tavg failure.

Event 5 - 3B RCP high vibration. The crew responds per 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.

Event 6 - 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. Train A ECCS equipment must be manually started. The crew completes 3-EOP-E-0 and transitions to applicable FRPs followed by 3-EOP-E-1.

Event 6a - Once CSFSTs are monitored for implementation, if containment pressure is still above 20 psig, the crew immediately transitions to 3-EOP-FR-Z.1 if no higher red or orange path exists.

Event 6b - 3-EOP-E-1 is entered after which 3A RHRP trips. Since neither RHRP is running, transition is made to 3-EOP-ECA-1.1. Measures are taken to minimize the loss of RWST inventory.

Scenario XXIII NRC 3

Simulator Operating Instructions

Setup

IC-16 (75% MOL)

Open and execute lesson file SRO_XXIII_NRC_3.lsn

Place simulator in run

Trigger lesson steps:
SETUP - 3B EDG OOS (actuates TAQ5LRSB = OFF & TAQ5B20P = RACKOUT)
SETUP - B AFWP OOS (actuates TAFK244 = 0.0, TAFK002 = 0.0, TAFF01B = 0.0, TCF5MTB = T)
SETUP - 3A SG 2 GPD LEAK (actuates TVHHSGA = 0.0000013)
SETUP - 3B CSP OOS (actuates TAM1DPOB = RACKOUT (3) & TCM1D41M = FALSE (0))
SETUP - TRAIN A SEQUENCER FAIL (actuates TFQ634AF = T)

Acknowledge annunciators F-9/2 & 9/5 (3B EDG OOS). Start train A chilled water and secure train B chilled water (CR HVAC panel). Place simulator in freeze.

Place clearance info tags on 3B EDG normal start switch, B AFWP T&T valve control switch & 3B CSP control switch.

Remove AFW train 2 orange tag from B AFWP tachometer just below ann. panel X.

Provide shift turnover checklists, 3-ONOP-071.2 Att 1 and a copy of 3-OSP-055.1 section 7.1 & Attachment 1 filled out thru step 7.1.5. 3-OSP-055.1 is being performed without quarterly IST or remote position verification required.

Select 3A QSPDS to page 211 (SAT) and 3B QSPDS to page 212 (RVL). Set ERDADS on VPA to Tavg/Tref (TAV) and at the RCO desk to ENVRN (ED3).

Fill in blender & shutdown boron addition placards at console blender station. Data for each IC may be found in the ECC & Shutdown Guidelines Book in the simulator I/F.

Event 1 - 3A ECC OSP failure

Initiated at crew direction based on shift turnover beginning at step 7.1.6.
Immediately after CV-3-2905 closes in response taking 3A ECC to STOP, trigger lesson step **EVENT 1 - 3A ECC INLET FAIL AS IS** (actuates TFKV905A = T).*The crew performs 3-OSP-055.1 sect. 7.1 to test 3A ECC beginning at step 7.1.6. Quarterly IST and remote position verification are not required. Inlet valve CV-3-2905 fails to open. 3A ECC is stopped and declared OOS.*

Respond as NSO for steps 7.1.14 & 7.1.15. Indicate that he has portable ammeter in hand. When directed to measure 3A ECC fan current at 3B MCC (bkr 30650), report 22 amps indicated.

Respond as NSO if asked to locally check Train A ECC CCW flow on FI-3-1472. After 1-3 minutes, report that flow indicates zero.

Respond as WCC when directed to have Mechanical maintenance investigate failure of CV-3-2905 to open.

Respond as WCC if directed to take 3A ECC breaker 30650 to OFF and place it under clearance. After 8-12 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

Once 3A ECC stopped and declared OOS, trigger lesson step **EVENT 2 - TM-3-408C FAILS HIGH** (actuates TFL1T8CH = T).

This fails Tavg input to rod control high causing maximum speed control rod insertion. The operators respond per 3-ONOP-028 and take rod control to manual to stop inward rod movement. This failure does not fail median Tavg for other control purposes. Tavg-Tref recorder TR-3-408 continues to function.

Respond as WCC when directed to have I&C investigate failure of rod control.

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

Event 3 - Loss of 3H 480V LC

After TM-3-408C failure brief, trigger lesson step **EVENT 3 - LOSS OF 3H LC** (actuates TFE3D37A = T, then TFE3D38T = T after a 5 sec delay).

This causes a loss of 3H 480V LC and along with it 3C charging pump, 3B ECC, 3B ECF & 3D NCC.

The crew responds per 3-ARP-097.CR for annunciators F-9/6, I-9/3, I-9/4 or A-5/4 and may enter 3-ONOP-041.6.

Since 3C charging pump was running, crew either starts 3B charging pump or closes CV-3-200B.

Failure also puts plant in a 1hr shutdown plant action statement per TS 3.6.2.2.b since only 1 ECC is left operable.

Respond if directed to check out 3H 480V LC. After 1-3 min, report bkr 35001 feeder from 3D 480V LC tripped open with scorch marks and a burnt insulation smell. 35007 doesn't appear to have closed in (still open). Report no evidence of fire.

Respond as WCC when directed to have electrical check into the loss of 3H LC. After 8-12 min, call as WCC and relay recommendation from Electrical maintenance that 3H 480V LC remain deenergized until further evaluation of the LC can be performed.

Respond as NSO if directed to do pre-start & post-start checks on 3B charging pump. Report all conditions normal.

Respond as NSO if directed to locally control CCW to NRHX flow to maintain letdown temperature. Click on Schema→COMMON SERVICES→COMPONENT COOLING→ valve 834→TAKA834 BYP AROUND TCV-144→adjust value as desired and INSERT.

Respond as WCC/Mechanical if asked about status of 3A ECC since plant is now in 1hr shutdown action statement. Report mechanics are investigating the CV-3-2905 failure.

Event 4/4a – 3A1/3A2 intake screen clogging / Fast load reduction

Upon completion of TM-3-408C crew brief, trigger lesson step **EVENT 4 - 3A1/3A2 INTAKE CLOGGING** (actuates TAKPXA1 = 10.0 & TAKPXA2 = 4.0).
The crew responds per 3-ONOP-011. First 3A1 CWP is secured per 3-ONOP-011.

When directed as NSO to check screen wash pump basket strainer Δp, click on Schema→COMMON SERVICES→INTAKE AREA & SCREEN WASH→report strainer Δp's in lower right corner of intake area & screen wash system mimic. Value reported should be < 10 psid.

When directed as NSO to report status of unit 3 traveling screens, report that they are operating in high gear, are rotating. Specific data such as waterfall height, screen Δp and screen wash pressure can be determined from the intake area & screen wash system mimic accessed earlier.

ICW to CCW/TPCW flows and basket strainer Δp's can be determined by clicking on Schema→COMMON SERVICES→INTAKE COOLING→report requested parameters shown on the ICW system mimic.

If directed, notify BOP when waterfall height in the 3A1 intake well reaches 2.5 feet as determined by subtracting 3A1 intake well level from indicated intake level as shown on the intake area & screen wash system mimic.

Respond if called as FS/WCC regarding issuance of an ECO and manual cleaning of on 3A1 traveling screen. To take 3A1 traveling screen out of service, **trigger** lesson step **EVENT 4 - 3A1 TRAVELING SCREEN OOS FOR CLEANING** (actuates TCKPD24M = F). To return 3A1 traveling screen to service, **trigger** lesson step **EVENT 4 - 3A1 TRAVELING SCREEN RETURN TO SERVICE** (actuates TCKPD24M = T).

Immediately after 3A1 CWP secured, trigger lesson step **EVENT 4 - 3A2 INTAKE REDUCED CLOGGING** (actuates TAKPXA2 = 2.0).

The crew reduces power per 3-ONOP-100 from 75% to <60% for the purpose of securing 3A2 CWP.

In view of the slowly increasing Δp on 3A2 traveling screen, crew should elect to perform a fast load reduction per 3-ONOP-100. At lead examiner direction, prompt this decision if necessary by calling as SM and asking for status to help crew understand problem is not going away. Additionally, call as NSO at intake structure and report debris still coming down intake canal collecting mostly around the canal banks.

Respond as NSO if directed to close 3-30-002 & 3-30-004 to allow stopping the 3A2 CWP. After 1-3 min, **trigger** lesson step **EVENT 4 - CLOSE 3-30-002 / 004** (actuates TAFB002 = 0.0 then TAFB004 = 0.0 30 sec later.) Report when complete.

Respond as NSO if directed to listen for seal well solenoid valve closure.

Event 5 - 3B RCP high vibration / Reactor trip

After a 5-10% power change, trigger lesson step **EVENT 5 - 3B RCP HIGH VIBRATION** (actuates TAHUVBSB = 22.0 on 5 min ramp & TAHUVBMB = 6.0 on 5 min ramp).
The crew responds per 3-ONOP-041.1. Once motor & shaft vibration reach the trip setpoint, the crew manually trips the reactor and immediate actions of 3-EOP-E-0 are performed.

Respond if notified as system engineer of increasing vibration on 3B RCP motor & shaft.

Event 6 - Large break LOCA / Loss of emergency coolant recirculation

Tripping 3B RCP auto triggers lesson step EVENT 6 - LARGE BREAK LOCA *(actuates TVHHCLB = 0.1 when H20L09G)* ***and EVENT 6 - 3B 4KV BUS LOCKOUT*** *(actuates TFE2Z51S = T when H20L09G).*
The crew performs 3-EOP-E-0 and must manually start train A ECCS loads due to failure of 3A sequencer entered at setup. 3A 4kV bus remains on offsite power.

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

Respond as NSO if directed to locally open MOV-3-843B. After 1-3 min., **trigger** lesson step **EVENT 6 - OPEN MOV-3-843B** (actuates TFMVV02O = T). Report when complete.

Respond as U4 RO when directed to perform 3-EOP-E-0 Att 1 to align U4 HHSIPs to U3 RWST. After 1-3 min, **trigger** lesson step **EVENT 6 - 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.

Respond as NSO 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 6 - 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.

Respond as NSO when directs 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 6 - CLOSE PHASE B ISOL VALVES** (actuates TFKV626C = T, TFKV16BC = T after 1 min delay & TFKV730C = T after 2 min delay). Report when complete.

Respond as NSO when directed to place PAHMS in service on unit 3. After 8-12 minutes, **trigger** lesson step **EVENT 6 - 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 6a - Respond to High Containment Pressure

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

Respond as NSO if directed to check CSP suction & discharge valves open. After 1-3 min., report that 3A CSP suction & discharge valves are open while 3B CSP suction & discharge valves are closed and under an ECO.

Event 6b - Respond to LBLOCA with no emergency coolant recirc

The crew transitions to 3-EOP-E-1 and then to 3-EOP-ECA-1.1 after it is determined that neither RHRP is available to support cold leg recirculation

After 3-EOP-E-1 is entered, trigger lesson step **EVENT 6b - 3A RHRP TRIP** (actuates TFM1D3AT = T). Respond as NSO when directed to investigate loss of 3A RHRP. After 1-3 min., report back motor very hot especially at bottom of motor casing (failed bearing).

Respond as Chemistry when directed to sample SGs for activity & check DAM-1 and as HP when directed to perform radiation readings on main steam lines. After 10-15 min. report no signs of activity or radiation levels above background.

Respond as NSO when directed to locally close 3-297A/B/C. After 1-3 min, **trigger** lesson step **EVENT 6b - LOCALLY CLOSE 3-297A/B/C** (actuates TAHN97A = 0.0, TAHN97B = 0.0 1 min. later & TAHN97C = 0.0 2 min. later.).

Respond as NSO when directed to locally close LCV-3-115C. After 1-3 min, **trigger** lesson step **EVENT 6b - LOCALLY CLOSE LCV-3-115C** (actuates TFBVC62 = T). Report when complete.

Respond as U4 RO when directed to start one train of chilled water for computer room cooling.

Respond as U4 RO when directed to shutdown U4 EDGs. Respond as NSO when directed to complete shutdown of 3A, 4A & 4B EDGs per 3/4-OP-023.

Respond as NSO when directed to verify 3-356 closed, then open 3-365A & B. After 1-3 min., **trigger** lesson step **EVENT 6b - ALIGN CVCS M/U TO RWST** (actuates TABM365B = 1.0). Report when complete.

Respond as NSO when asked to verify MOV-3-350 closed. After 1-3 min., report valve closed.

Respond as NSO when directed to locally open MOV-3-1417 & 1418. After 1-3 min, **trigger** lesson step **EVENT 6b - OPEN CCW TO NCCs** (actuates TFKV417C = F, TFKV418C = F, TFKV417O = T after 5 sec delay & TFKV418O = T after 65 sec delay). Report when complete.

Respond as NSO when directed to locally throttle discharge of the running HHSIP (most likely 3A using valve 888B). Click on Schema→SAFETY SYSTEM→SAFETY INJECTION PROC→click on 888 valve for running HHSIP→TAMH888B(C or D) 888B(C or D) VALVE PORT AREA→adjust value consistent with ordered flow rate from 3-EOP-ECA-1.1 Figure 1 then INSERT. Repeat as necessary to achieve desired flow as shown at F943 on SAFETY INJECTION PROC system mimic.

Op-Test No.: 2007-301 Scenario No.: 3 Event No.: 1 Page 1 of 1

Event Description: 3A ECC monthly surveillance performed per 3-OSP-055.1 section 7.1. 3A ECC inlet valve CV-3-2905 fails to open and 3A ECC is declared OOS.

Time	Position	Applicant's Actions or Behavior
	US	Obtains SM permission and directs BOP to perform 3A ECC monthly operability test per 3-OSP-055.1 section 7.1 beginning at step 7.1.6.
	BOP	Obtains copy of 3-OSP-055.1 section 7.1. Performs actions as follows beginning at step 7.1.6: 1. Places 3A ECC switch to STOP 2. Determines CV-3-2905, CV-3-2814 & CV-3-2908 all closed. 3. Determines steps 7.1.10, 11 & 13 n/a since IST & remote position verification not required. 4. Starts 3A ECC & records start time on Att. 1 5. Directs NSO perform steps 7.1.14 & 15 to measure current 6. Recognizes & reports CV-3-2905 did not open 7. Stops 3A ECC fan & records time on Att.1 ***NOTE:*** *May leave switch in STOP rather than return to AUTO since 3A ECC OOS with CV-3-2905 failed closed* 8. Determines CV-3-2814 open & CV-3-2908 closed 9. Determines CCW flow on FI-3-1470 is zero & records on Att. 1 10. Notifies US 3A ECC failed test due to CV-3-2905 failure to open
	US	Notifies SM 3A ECC OOS Directs WCC have Mechanical investigate/fix CV-3-2905. Determines TS 3.6.2.2 action a. applies (72 hr) May directs WCC place 3A ECC under ECO

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

Time	Position	Applicant's Actions or Behavior
	RO	Recognizes/reports control rods inserting in automatic Performs immediate action of 3-ONOP-028 for continuous insertion of an RCC control bank: Places rod control in MANUAL and verifies rods stop moving.
	US	Directs response per 3-ONOP-028
	RO	Performs subsequent actions of 3-ONOP-028 as directed by US: 1. If directed, withdraws control rods to restore Tavg = Tref 2. Determines rods above RIL from VPA recorder (or PCB section VII figure 3). 3. Determines PRNI N-44 did not fail 4. Determines RCS Tavg TI-3-412D, 422D & 432D not failed
	BOP	Performs subsequent actions of 3-ONOP-028 as directed by US: 1. If directed, reduces turbine load to restore Tavg = Tref 2. Determines PT-3-446 & 447 did not fail
	US	Directs WCC notify I&C of rod control failure. Directs WCC hang caution tag on rod control selector to leave switch in MANUAL ***NOTE:*** *Rods stay in MANUAL for rest of scenario.* Performs applicable actions of 3-ONOP-049.1 if TM-3-408 failure suspected 1. Determines RCS Tavg TI-3-412D, 422D & 432D not failed 2. Determines no control switches require transfer 3. Evaluates no impact per TS 4. Determines no bistable switches require tripping per Att 4, no AMSAC-related channels failed and PT-3-446/447 did not fail 5. Conducts crew brief regarding effects of rod control failure

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Event Description: Loss of 3H 480V LC. Also takes 3C charging pump, 3B ECC, 3B ECF & 3D NCC OOS. Requires starting another charging pump or securing the in service 60 gpm orifice. The crew responds per 3-ARP-097.CR for annunciators F-9/6, A-5/4, I-9/3 or I-9/4.

Time	Position	Applicant's Actions or Behavior
	BOP	Recognizes/reports annunciator F-9/6, X-2/6 & X-5/1. Recognizes/reports both 3H 480V LC feeder breakers open indicating loss of power to that LC.
	RO	Recognizes/reports annunciator I-9/3, I-9/4, J-7/1 & J-8/1 (later A-5/4) Directs actions from 3-ARP-097.CR for annunciator F-9/6 Recognizes/reports loss of 3C charging pump, 3B ECC, 3B ECF, 3D NCC and 3D 480V MCC.
	BOP	Performs actions per 3-ARP-097.CR for annunciator F-9/6 1. Determines 3H 480V LC auto bus transfer failed 2. Determines 3C & 3D 480V LC both energized
	US	Directs WCC have Electrical investigate loss of 3H 480V LC
	BOP	Directs 3-ONOP-041.6 entry from 3-ARP-097.CR for annunciator A-9/3
	US	Directs response per 3-ONOP-041.6
	RO	Performs actions per 3-ONOP-041.6 as directed by US: 1. Starts standby (3B) charging pump
	US	Evaluates TS 3.8.3.1.a or b as applicable (c from U4 point of view) On U3 - Action a. applies (8 hr) On U4 - Table 3.8-2 72 hr action since 4A2/4B2 battery chargers not required by 3.8.2.1.c or d Evaluates TS 3.6.2.2.b requiring plant 1 hr shutdown since only 1 ECC left operable Evaluates TS 3.6.3 requires 7 day action to restore 3B ECF Conducts crew brief regarding effects of loss of 3H 480V LC & 3D 480V MCC and requirement to commence action to shutdown plant.

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Event Description: 3A1 Intake screen high Δp. Crew responds per 3-ONOP-011. 3A1 CWP is secured.

Time	Position	Applicant's Actions or Behavior
	BOP/RO	Recognizes/reports rising Δp on 3A1 CWP Reports annunciator I-3/3 when it alarms
	US	Directs performance of 3-ONOP-011
	BOP	Performs actions of 3-ONOP-011 as directed by US: 1. Verifies 2 screen wash pumps running 2. Directs NSO monitor & report screen wash pump basket strainers Δp 3. Directs NSO verify all traveling screens rotating in high gear 4. Directs NSO to monitor & report presence of traveling screen waterfall, debris carryover, screen wash water pressure (> 60 psig) and nozzle spray over entire screen ***NOTE:*** *If a waterfall is reported or 3A1 traveling screen Δp pegged high, crew should skip ICW/CCW & ICW/TPCW checks and go to step 7 to check for conditions to stop a CWP. May secure a CWP if associated indicated screen Δp pegged high.* 5. Directs NSOs report: a. ICW flows to CCWHXs & basket strainer Δp's b. ICW flows to TPCWHXs & basket strainer Δp's
	US	Determines 3A1 traveling screen Δp still well above normal Loops between steps 1 & 7 until 3A1 traveling screen waterfall height reported > 2.5 ft When 3A1 traveling screen waterfall reported > 2.5 ft, directs shutdown of 3A1 CWP
	BOP	Continues performing actions of 3-ONOP-011 as directed by US: 6. Stops 3A1 CWP when directed by US in response to report of waterfall > 2.5 ft 7. Determines ICWP secured in 3A1 intake well
	US	Directs FS/WCC coordinate performance of Att. 1 to clean 3A1 intake well. Notifies plant management.

Op-Test No.: 2007-301 Scenario No.: 3 Event No.: 4a Page 1 of 2

Event Description: 3A2 intake screen high Δp. Fast load reduction per 3-ONOP-100 to 60% for the purpose of securing 3A2 CWP. Manual rod control must be used due to rod control Tavg failure.

Time	Position	Applicant's Actions or Behavior
	BOP	Recognizes / reports rising 3A2 traveling screen Δp
	US	Determines that conditions will soon require securing 3A2 CWP and directs performance of a fast load reduction per 3-ONOP-100 to <60% to allow shutdown of the 2nd CWP. Contacts FS/WCC and determines 3A1 intake well cleaning not complete so 3A1 CWP can not be started. Conducts crew brief per 3-ONOP-100 Attachment 3: • Provides reason (2 gpm tube leak requiring plant s/d) • Target power level = offline • Specifies load reduction rate • Specifies boration amount & rate • Covers plant control parameters & contingency actions • Covers E-0 transition criteria • Reviews req'd actions from 3-ONOP-071.2 • Solicits crew questions & input Ensures load dispatcher notified of load decrease.
	RO	When directed, initiates boration per 3-ONOP-100: 1. Sets BA Totalizer to amount directed 2. Sets FC-3-113A pot setting = 8.0 3. Places Rx M/U Selector Switch to BORATE 4. Places Rx M/U Control Switch to START
	BOP	When directed per 3-ONOP-100: 1. Notifies load dispatcher of load reduction when directed by US 2. Makes plant page announcement regarding load reduction

Op-Test No.: 2007-301 Scenario No.: 3 Event No.: 4a Page 2 of 2

Event Description: 3A2 intake screen high Δp. Fast load reduction per 3-ONOP-100 to 60% for the purpose of securing 3A2 CWP. Manual rod control must be used due to rod control Tavg failure.

Time	Position	Applicant's Actions or Behavior
	RO	When directed, continues fast load reduction per 3-ONOP-100: 1. Checks for T_{avg} reduction from boration 2. Sets FC-3-113A for BA flow rate as directed
	BOP	Reduces turbine load per 3-ONOP-100 at rate directed by US.
	RO	When directed, continues fast load reduction per 3-ONOP-100: 1. Manually inserts rods in response to turbine load reduction. ***NOTE:*** *Rods < RIL not expected at this power level*
	US	Per 3-ONOP-100, notifies SM to review 0-EPIP-20101 & 0-ADM-115 and ensure required notifications made
	RO	When directed per 3-ONOP-100 1. Checks PZR level following program. If not increases charging flow and/or places an additional letdown orifice in service 2. Determines NRHX CCW flow already increased (from setup) 3. Verifies load reduction rate & manual rod control maintaining T_{avg}-T_{ref} per expected value as discussed in crew brief 4. Energizes PZR backup heaters. 5. Determines turbine load < 570MW & verifies non-running SGFP recirc valve open 6. When directed by US (≥ 60% power), secures boration: a. Places rx m/u selector switch in AUTO b. Sets FC-3-113A potentiometer to directed value c. Places RCS m/u control switch to START 7. Stops one HDP when < 450MWe
	US	Determines that transferring station service loads to SUT and aligning aux steam to unit 4 not required due to stabilization of reactor power at 50-60%.

Op-Test No.: 2007-301 Scenario No.: 3 Event No.: 5 Page 1 of 1

Event Description: 3B RCP high vibration. The crew responds per 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	Recognizes / reports annunciator F-1/1 alarming Determines rising shaft & motor vibration on 3B RCP
	US	**Directs response per 3-ONOP-041.1 foldout page** **Directs RO to manually trip the reactor per 3-ONOP-041.1 due to RCP motor vibration > 5 mils or shaft vibration > 20 mils.**
	RO	**Performs 3-ONOP-041.1 foldout page actions as directed by US:** **1. Reports when either motor vibration > 5 mils or shaft vibration > 20 mils** **2. Trips the reactor when directed**
	US	Directs crew perform immediate actions of 3-EOP-E-0.
	RO	Performs immediate actions of 3-EOP-E-0: 1. Verifies reactor trip • Rod bottom lights on & RPIs at zero • Rx trip & bypass bkrs open • Neutron flux decreasing 2. Actuates SI & phase A if PZR level not maintained <12%
	BOP	Performs immediate actions of 3-EOP-E-0: 1. Verifies turbine tripped • Turbine stop valves closed • Closes MSR main steam stop MOVs. • Mid & East GCBs open 2. Verifies power to emergency 4kV buses • Determines both 3A & 3B 4kV buses energized • Determines 3D 4kV bus energized from 3B 4kV bus

Op-Test No.: 2007-301 Scenario No.: 3 Event No.: 6 Page 1 of 3

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. Train A ECCS equipment must be manually started. The crew completes 3-EOP-E-0 and transitions to applicable FRPs followed by 3-EOP-E-1.

Time	Position	Applicant's Actions or Behavior
	RO	Secures 3B RCP Recognizes / reports rapidly falling RCS pressure and automatic SI ***NOTE:*** *RO may manually actuate SI & phase A in response to train A sequencer failure.*
	BOP	Recognizes / reports loss of 3B 4kV bus with 3B EDG OOS.
	US	**Directs BOP restore 3D 4kV bus per step 3c RNO then verify prompt actions per 3-EOP-E-0 Attachment 3.** Directs RO continue performing 3-EOP-E-0 subsequent actions.
	BOP	**Restores 3D 4kV bus per 3-EOP-E-0 step 3c RNO:** 1. Determines no lockout on 3D 4kV bus 2. Verifies 3C CCWP & 3C ICWP breakers open **3. Opens 3AB19 & 3AD06** **4. Closes 3AD01 & 3AA17** **Verifies prompt actions per 3-EOP-E-0 Attachment 3:** 1. Determines only 3A & 3C 480V LCs energized 2. Determines MSIVs all closed (on hi-hi containment pressure) 3. Verifies FW isolation: a. Places both SGFP switches in STOP. b. Determines all main FW regulating & bypass valves closed. c. Closes FW isolation valves MOV-3-1408 & 1409. Directs NSO locally close MOV-3-1407. d. Determines both SSGFWPs off.
	Critical	**4. Determines no ICWP running and starts 3A & 3C ICWP** 5. Determines POV-3-4882 & 4883 closed with ICW headers tied together.

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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. Train A ECCS equipment must be manually started. The crew completes 3-EOP-E-0 and transitions to applicable FRPs followed by 3-EOP-E-1.

Time	Position	Applicant's Actions or Behavior
	BOP	**Continues prompt action verification per 3-EOP-E-0 Att. 3:**
	Critical	**6. Determines only 3A CCWP running and starts 3C CCWP.**
		7. Verifies 3 CCWHXs in service, CCW headers tied together & MOV-3-626 open (no power).
		8. Determines no ECC or ECF running. Starts 3C ECC & 3C ECF. No power available to start a 2nd ECC or ECF.
		NOTE: *May start 3A HHSIP but not required at this point.*
		9. Determines only the U4 HHSIPs & no RHRPs running. Starts 3A RHRP.
		10. Determines adequate HHSI flow present, but no RHR flow present even though RCS pressure < 250[650] psig.
		11. Starts 3A HHSIP. Shuts down either unit 4 HHSIP. Directs U4 RO realign U4 HHSIP suction to U3 RWST per Att. 1.
		12. Determines not all containment isolation phase A valves closed. Directs NSO to locally verify phase A valves MOV-3-1417, 1418, 1425 & 381 closed
		13. Determines train A SI valves in proper injection alignment
		14. Resets SI & containment isolation phase A. Determines containment isolation phase B actuated. Resets phase B when containment pressure < 20 psig.
		15. Determines no RCPs running (should have been tripped by RO due to inadequate RCS subcooling)
		16. Determines containment pressure > 20 psig.
	Critical	**a. Manually starts 3A CSP.** Determines MOV-3-880A open.
		b. Directs NSO to locally verify phase B valves MOV-3-626, 716B & 730 closed
		c. Verifies all RCPs stopped
		17. Determines containment ventilation isolated and verifies control room ventilation in proper emergency recirculation alignment.

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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. Train A ECCS equipment must be manually started. The crew completes 3-EOP-E-0 and transitions to applicable FRPs followed by 3-EOP-E-1.

Time	Position	Applicant's Actions or Behavior
	BOP	Continues prompt action verification per 3-EOP-E-0 Attachment 3: 18. Directs NSO place PAHMS in service per 3-OP-094. 19. Verifies 3A & both U4 EDGs running (3B EDG is OOS). 20. Determines 3A & 3D 4kV buses still energized. 21. Notifies US that prompt action verification complete.
	RO	Performs foldout page actions of 3-EOP-E-0 as directed: 1. Determines containment conditions adverse (>180°F) 2. Trips RCPs since RCS subcooling < 25[65]°F with U4 HHSIPs running and SI flowpath verified **Performs subsequent actions of 3-EOP-E-0 as directed** 1. Determines 2 AFWPs (A & C) running. 2. Determines AFW valve alignment proper except that MOV-3-1404 did not open. 3. Determines SG levels < 6[32]%. Controls AFW flow > 345 gpm until level > 6[32]% then maintains levels 15-50%. 4. Determines annunciators A-1/2 and/or 1/3 on. If RCP seal return temps all < 235°F, verifies SI reset then starts 3A charging pump at minimum speed and adjusts HCV-3-121 for proper seal injection flow 5. Determines Tc trend. If decreasing, reduces AFW flow to ≈ 345 gpm until any SG level > 6[32]%. 6. Determines PORVs, normal spray, aux spray & excess letdown isolation valves closed 7. Verifies RCPs tripped (tripped earlier on foldout page) 8. Determines no SGs depressurized or depressurizing 9. Determines no SG tube ruptures **10. Determines RCS not intact; containment radiation, pressure & sump level all not normal.**

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

Time	Position	Applicant's Actions or Behavior
	US	Directs monitoring of CSFs for implementation. **If any RCS cold leg temperature drops below 320°F (orange) or 290°F (red) transitions to and directs response per 3-EOP-FR-P.1**
	RO	Performs actions per 3-EOP-FR-P.1 as directed by US: 1. Determines RCS pressure < 250[650] psig with > 1000 gpm RHR flow (indication of LBLOCA)
	US	**Transitions out of 3-EOP-FR-P.1** (due to LBLOCA indication) **If containment pressure > 20 psig, CSFSTs are being monitored for implementation and no higher red or orange path exists, transitions to and directs response per 3-EOP-FR-Z.1**
	RO	Performs actions of 3-EOP-FR-Z.1 as directed by US: 1. Determines all RCPs secured. 2. Stops any running NCCs 3. Determines containment isolation phases A & B already verified 4. Determines containment ventilation isolated and verifies control room ventilation in proper emergency recirculation alignment.
	US	Determines no RHRP available. If 3-EOP-ECA-1.1 entered, determines number of CSPs required from 3-EOP-ECA-1.1 and skips to step 9.
	RO	Continues performing 3-EOP-FR-Z.1 actions as directed by US: 1. Determines RWST level > 155000 gal & MOV-3-864A/B open 2. Determines 3A CSP running & 3B CSP OOS 3. Determines MOV-3-880A open & MOV-3-880B closed/ deenergized under ECO 4. Determines 3 CCWHX in service & 2 CCWP running (3A & 3C) 5. Determines only 3C ECC running (no power to other two) with associated bypass, inlet & outlet open. 6. Determines only 3C ECF running (no power to other two)

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

Time	Position	Applicant's Actions or Behavior
	BOP	Performs actions of 3-EOP-FR-Z.1 as directed by US: 1. Directs NSO verify CSP suction & discharge valves open. 2. Determines MSIVs closed 3. Determines no SGs faulted
	US	**Directs return to procedure and step in effect**

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Event Description: 3-EOP-E-1 is entered after which 3A RHRP trips. Since neither RHRP is running, transition is made to 3-EOP-ECA-1.1. Measures are taken to minimize the loss of RWST inventory.

Time	Position	Applicant's Actions or Behavior
	US	**Directs transition to and performance of 3-EOP-E-1.** ***NOTE:*** *Performance of 3-ONOP-004.3 is optional since there is no source of power and EOP actions are higher priority.* Conducts crew brief.
	RO	Performs actions of 3-EOP-E-1 as directed by US: 1. Determines RCPs not running 2. Determines power to one PORV block MOV available, PORVs closed & both PORV block MOVs open 3. Verifies SI reset 4. Determines only 3A charging pump has power available and pump is running at minimum speed for seal injection. 5. Places RCS makeup control switch to stop 6. Establishes maximum flow using 3A charging pump 7. Opens LCV-3-115B & directs NSO locally close MOV-3-115C.
	BOP	Performs actions of 3-EOP-E-1 as directed by US: 1 . Determines SGs not faulted. 2. Controls AFW flow > 345 gpm until level > 6[32]% then maintains levels 15-50%. 3. Directs Chemistry sample SGs for activity & check DAM-1 4. Directs HP take radiation readings on main steam lines 5. Verifies containment isolation phase A & B reset. 6. Verifies CV-3-2803 open & IA pressure > 95 psig
	US	Determines SI can not be terminated (inadequate subcooling, RCS pressure & PZR level)

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Event Description: 3-EOP-E-1 is entered after which 3A RHRP trips. Since neither RHRP is running, transition is made to 3-EOP-ECA-1.1. Measures are taken to minimize the loss of RWST inventory.

Time	Position	Applicant's Actions or Behavior
	RO	Continues performing 3-EOP-E-1 actions as directed by US. 1. Determines 3A CSP should continue running since containment temperature > 122°F. 2. Determines RCS pressure < 250[650] psig. Recognizes/reports 3A RHRP tripped with RHR flow < 1000 gpm 3. Determines RCS pressure stable/decreasing
	BOP	Continues performing 3-EOP-E-1 actions as directed by US: 1. Determines SG pressures stable 2. Determines 3A 4kV bus on offsite power & 3B 4kV bus deenergized 3. Directs U4 RO verify one computer room chiller running 4. Stops 3A EDG. Directs NSO complete shutdown per 3-OP-023. Directs U4 RO stop U4 EDGs and have them placed in standby.
	US	**Determines no RHRP available. Directs transition to 3-EOP-ECA-1.1** Conducts EOP transition crew brief
	RO **Critical**	**Performs actions of 3-EOP-ECA-1.1 as directed by US:** 1. Determines RWST level > 60000 gallons 2. Determines cold leg recirc capability not available **3. Aligns makeup to U3 RWST** a. Determines CVCS makeup stopped **b. Directs NSO verify 3-356 closed, then open 3-365A & B** **c. Places FCV-3-113A in AUTO, FCV-3-114A in OPEN, FCV-3-113B & 114B in CLOSE** d. Determines MOV-3-350 closed. **e. Places FCV-3-113A & 114A controllers in MANUAL** **f. Places RCS makeup selector switch to BORATE** **g. Sets BA totalizer to maximum and starts makeup** **h. Adjusts PW & BA flow for max flow at 1.5:1 blend**

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Event Description: 3-EOP-E-1 is entered after which 3A RHRP trips. Since neither RHRP is running, transition is made to 3-EOP-ECA-1.1. Measures are taken to minimize the loss of RWST inventory.

Time	Position	Applicant's Actions or Behavior
	BOP	Perform actions of 3-EOP-ECA-1.1 as directed by US. 1. Controls AFW flow > 345 gpm until level > 6[32]% then maintains levels 15-50%.
	US	Determines RCS cooldown rate has exceeded 100°F/hr and no additional forced cooldown required
	RO	Continues performing 3-EOP-ECA-1.1 actions as directed by US: 1. Determines only 1 ECC running & available. a. Determines phase A reset b. Directs NSO open MOV-3-1417 & 1418 c. Resets & starts 2 available NCCs 2. Directs U4 RO verify at least 1 computer room chiller running
	US	Determines CSP suction aligned to RWST. Directs running CSP secured if containment pressure < 14 psig.
	RO **Critical**	**Continues performing 3-EOP-ECA-1.1 actions as directed by US:** 1. Determines 2 HHSIPs running (3A & one U4 pump) 2. Verifies SI reset **3. Stops 1 HHSIP** 4. Determines RCS pressure < 250[650] psig, RHR flow < 1000 gpm and no RHRPs available 5. Determines no recirc sump suction lines open. Closes MOV-3-862A (no power to 862B)
	US **Critical**	**1. Determines RCS subcooling inadequate for RCP start & SI termination.** **2. Determines minimum SI flow per Figure 1. Directs NSO throttle running HHSIP discharge to achieve minimum SI flow**
	TERMINATING CUE	**Scenario is complete when HHSI flow is reduced to minimum.**