Facility: Surry Power Station Scenario No.: 1 Op-Test No.: 2016-001
Examiners: _____ Operators: _____
_____ _____
_____ _____

Initial Conditions: Unit 1 and 2 at 100% power; MOL, 760 ppm boron.

- Controlling channels have been shifted to CH IV in preparation for Channel III testing.
- 1-SI-P-1B, "B" LHSI Pump, Tagged out for breaker PMs.
- Containment Smoke and heat detectors are non-functional due to local fire panel failure. TRM Section 3.3.1, Fire Detection Instrumentation, Condition B, Smoke Detectors, and Condition C, Heat Detectors is in effect. Containment air temperatures monitored once/hour, and restore to Functional status in 14 days

Turnover: The Team will pre-brief the scenario Initial Conditions prior to Simulator Entry.

Event No.	Malf. No.	Event Type*	Event Description
1	MS0806, -1	I (BOP/SRO) TS (SRO)	SG C STM FLOW TRNSMTR MS-FT-495 Fails Low (AP-53.00) **(CT-1)**
2	NI1004, +1	I (RO/SRO) TS (SRO) N (BOP)	Power Range CHNL N44 Fails High (AP-53.00, AP-4.00)
3	CH2101, +1	I (RO/SRO)	VCT Level Transmitter, LT-1112 Fails High (AP-53.00)
4	SD0202, TRUE	C (BOP/SRO	Loss of 1-SD-P-1B, "B" HPD (AP-18.00) **(CT-2)**
5	N/A	R (RO/SRO) N (BOP)	Downpower Ramp to <75% power (AP-23.00)
6	MS0102, 20% MS22,23, 24 RC5601, 5602,5603 RD17 TRUE FW09 TRUE FW48 TRUE FW49 TRUE	M (All)	B SG Steam Line Break at Header in Turbine Building (E-0) Disable A,B,C MSTV Auto closure on HSF **(CT-4)** RCP Breakers trip. Reactor Trip Fail, (FR-S.1) **(CT-3)** FW-P-2 Trip/Throttle Valve Trips Closed Disable AFWP3A Auto Start Disable AFWP3B Auto Start

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

Event 1: "C" SG CH IV Steam Flow Fails Low. (I – BOP/SRO, TS – SRO).

When the Evaluation Team is ready, the malfunction for the failure is implemented. The BOP will diagnose the failure based on alarms and indications received and perform the Immediate Action Steps of 0-AP-53.00, Loss of Vital Instrumentation/Controls. The "C" FRV will be placed in manual and adjusted to match steam and feed flow in "C" SG, and return "C" SG level to program. The RO will swap the controlling Steam Flow Channel for "C" FRV to Channel III. The BOP will return "C" FRV to auto.

Verifiable Actions(s):

1) BOP – Place the "C" FRV in manual and raise feed flow to match steam flow (**CT-1**).
2) RO – Swap SF for "C" FRV to CH III.
3) BOP – Return "C" FRV to Auto.

Critical Task CT-1: If the BOP fails to take timely action in response to the SF channel failure, an automatic reactor trip on SG NR low level will occur; an unanticipated reactor trip should be considered as failure criteria. An Operations representative will be available for consultation as necessary.

Technical Specifications:

1) TS Table 3.7-1, Item 17, Operator Action 6. Place the Inoperable Channel in trip within 72 hours; inoperable channel may be bypassed for 12 hours for surveillance testing; if conditions not satisfied, be in HOT SHUTDOWN in 6 hours.
2) TS Table 3.7-2, Item 1.e, Operator Action 20. Place the Inoperable Channel in trip within 72 hours; inoperable channel may be bypassed for 12 hours for surveillance testing; if conditions not satisfied, be in HSD in 6 hours and be less than 350°/450 psig in the following 12 hours.
3) TS Table 3.7-3, Item 2.a, See item #1.e Table 3/7-2 for operability requirements.

TRM Actions:

1) None.

Reg. Guide 1.97:

1) Main Steam Flow, 1-MS-Loop-F-1495, D-19 Variable, 1 CH per SG required. **(RG 1.97 check is an STA/SM function, recommend evaluation of RG requirements as follow-up question Post-Scenario, at Evaluator discretion.)**

VPAP-2802, Reportability

None.

Equipment Important to Emergency Response (EP-AA-303).

No Impact.

Event 2: Power Range Channel N44 Fails High. (I – RO/SRO, N – BOP)

When the Evaluating Team is ready, the malfunction is implemented. The failure will cause N44 indication to fail high and "D" bank control rods to step in at 72 steps per minute. The RO will diagnose the failure based on alarms and indications received and place rod control in manual to stop inward rod motion. The Team will respond by implementing 0-AP-53.00, Loss of Vital Instrumentation/Controls and transition to 1-AP-4.00, Nuclear Instrumentation Malfunction.

Verifiable Action(s):

1) RO – Place Rod Control in manual to stop inward rod motion.
2) BOP – Perform Control Room Actions to remove N-44 from service IAW 1-AP-4.00, Attachment 1.

Technical Specifications:

1) TS Table 3.7-1, Item 2, Operator Action 2. Place the inoperable channel in trip in 72 hours; channel may be bypassed for 12 hours for surveillance testing; either reduce reactor power to ≤ 75% and reduce neutron flux trip setpoint ≤ 85% of rated power in 78 hours, or monitor **Quadrant Power Tilt once per 12 hours** (more limiting than TS 3.12 D once per day requirement – see 4) below.).
2) TS Table 3.7-1, Item 5 (6), Operator Action 6. Place the inoperable channel in trip in 72 hours; channel may be bypassed for 12 hours for surveillance testing; if conditions not satisfied, be in HSD in 6 hours.
3) TS Table 3.7-1, item 20, Operator Action 13. Not Applicable, Minimum Number of Operable Channels requirement is met for P-7, P-8, and P-10.
4) TS 3.12.D. Quadrant Power Tilt. Item 1, if reactor operating above 75% with one excore channel out of service, QPTR shall be determined once per day or more than 30 inches of control rod motion. Item 2, QPTR is determined using movable detectors (2 per quadrant).

Technical Requirements Manual.
No requirement.
Reg. Guide 1.97:
No requirement.
VPAP-2802, Reportability:
No requirement.
Equipment Important to Emergency Response (EP-AA-303).
No required Action. Att. 6, Reactor Power Level Determination, adequate alternate indications available. **This is an STA/SM function, recommend evaluation of EP-AA-300 requirements as follow-up question Post-Scenario, at Evaluator discretion.**

Event #3: **VCT Level Transmitter, LT-1112 Fails High** (I – RO/SRO)
When the Evaluating Team is ready, the malfunction is implemented. VCT Level Transmitter LT-1112 Fails high, causing 1-CH-LCV-1115A to fail to Divert position. Team will respond IAW 0-AP-53.00, Loss of Vital Instrumentation/Controls, and manually position 1-LCV-1115A to VCT positon.
Verifiable Actions:
1) Manually place 1-CH-LCV-1115A to the VCT position.
2) Manually control 1-CH-LCV-1115A to control VCT level.

Technical Specifications/Technical Requirements Manual:
None.

Event 4: **Loss of 1-SD-P-1B, "B" HPD pump. (**C – BOP/SRO)
When the Evaluating Team is ready, the failure is implemented to trip the running HPD pump. The BOP will identify the failure using alarms and indications received. The Team will respond IAW 1-AP-18.00, Loss of HP Heater Drain Pump / Network 90 Failure. 1-AP-18.00 will require a power reduction to < 75% to allow return of the Polishing Building to service (Event 6).
Verifiable Action(s):
1) BOP – Start third Condensate Pump as required for plant conditions (SF/FF mismatch).
2) BOP – reduce Turbine load by 50 MW using Valve Position Limiter or Turbine Manual to control reactor power less than 100%. Further reductions may be required to maintain Loop ΔTs less than 100%.

Critical Task CT-2: Start an additional Condensate pump and verify feed flow returns to normal before a Steam Generator Level Reactor Trip. (Scenario specific CT)

Event #5: **Ramp of Unit to < 75% power.** (R – RO/SRO, N - BOP)

1-AP-18.00, Step 5, will require the Team to reduce reactor power to less than 75% IAW 0-AP-23.00, Rapid Load Reduction. The Team will perform a short brief and commence a ramp at 1% per minute.

Verifiable Actions:

1) RO - Move control rods as necessary to control Tave and Delta Flux during the power reduction.
2) RO – Emergency Borate for ~ 25 seconds to begin the Tave reduction, and then manipulate the CVCS Blender controls to begin a manual borate to add the required amount of Boric Acid for the power reduction.
3) BOP – manipulate Turbine Controls to begin the power reduction.

VPAP-2802, Reportability: None.

Event #6: **Steam Break in Turbine Building, Reactor Trip Failure, FR-S.1 (ATWS).** (M – All).

After the Evaluating Team is ready for the next event, the malfunction is implemented for a Steam Break on the "B" Steam line in the Turbine Building; the steam break will cause an automatic trip of the MFPs with the TDAFW pump trip throttle valve tripping on startup, and the failure of the MDAFW pumps to auto start; leading to a loss of Feed ATWS. The Team will respond based upon alarms and indications received, attempt to trip the reactor and transition to FR-S.1, Response to Nuclear Generation/ATWS. After the reactor is subcritical, the team will transition from FR-S.1 to E-0. In E-0 the Team will be directed to take action to isolate steam and feed to the faulted SG. Isolation of steam flow is complicated by the failure of all MSTVs to auto trip on the HSF SI. Steam flow is isolated by closing the A, B, and C Main Steam Trip valves

Verifiable Actions:

1) RO – Perform Immediate Actions of FR-S.1:
   a. Place Rod Control in Automatic on discovery that Reactor will not manually trip.
   b. Manually Trip the Main Turbine.
   c. Place Rod Control in Manual and insert control rods at 48 steps per minute when Rod Speed lowers shortly following the Turbine Trip.
   d. Close Main Steam Trip Valves; 1-MS-TV-101A, 101B, and 101C.
   e. Close 1-FW-MOV-151C/D to isolate AFW to the Faulted SG.
2) BOP – Manually start AFW pumps.

Critical Task:

CT-3: Manually start AFW pumps as needed before SG WR level decreases to <7% on both intact S/Gs.

Safety Significance: Following the steam break outside containment, a High Steam Flow SI will occur which will trip all Feed pumps. All S/G levels will lower rapidly and with no operator action all S/Gs will dry out (<7%) in approximately 5 minutes. The Turbine Drive Auxiliary Feed pump will auto start but will trip shortly afterwards due to a failure in its trip throttle valve. The Motor Driven Auxiliary Feed pumps will fail to automatically start which will require the operator to manually start them.

CT-4: Close Main Steam Trip valves prior to reaching an orange path on Integrity (FR-P.1). Critical Task **begins** when the Main Steamline rupture occurs and **ends** when the Main Steam Trip valves are closed.

The Scenario is terminated on Evaluating Team Cue, and Main Steam trip valves closed.

Initial Conditions: Initial Conditions: Unit 1 and 2 are at 100% power, MOL. The unit has been at 100% power for > 30 days.

Turnover: The Team will brief the shift of the running CH Pump SW pumps IAW 1-OP-51.5.3, Section 6.1 prior to Simulator entry.

Pre-load malfunctions: (Trigger 30's)

- RD17, ATWS WITH MANUAL RX TRIP PB DEFEATED.
- FW48, DISABLE AFWP3A AUTO START.
- FW49, DISABLE AFWP3B AUTO START.
- FP0301, PACP07 ALARM HORN FAILURE
- FP0302, FPS PC SPEAKER FAILURE
- MS22, DISABLE A MSTV AUTO CLOSURE ON HSF.
- MS23, DISABLE B MSTV AUTO CLOSURE ON HSF.
- MS24, DISABLE C MSTV AUTO CLOSURE ON HSF.
- SIP1B_BKRPOS, SI-P-1B BKR 14J3 CUBICLE POSITION

Equipment Status/ Procedures/ Alignments/ Data Sheets/ etc.:

Unit 1 is at 100% power. All systems and crossties are operable with the following exception:

- Containment Smoke and heat detectors are non-functional due to local fire panel failure. TRM Section 3.3.1, Fire Detection Instrumentation, Condition B, Smoke Detectors, and Condition C, Heat Detectors is in effect. Containment air temperatures monitored once/hour, and restore to Functional status in 14 days.
- 1-SI-P-1B, "B" LHSI pump tagged out for breaker PMs.
- Controlling channels have been shifted to CH IV in preparation for Channel III testing

Turnover:

- The Team will brief the shift of the running CH Pump SW pumps IAW 1-OP-51.5.3, Section 6.1 prior to Simulator entry.

Turnover: The performance of this procedure has been analyzed based on the current plant configurations and the PSA indicates green.

Event	Malf. #'s	Severity	Instructor Notes and Required Feedback
1	MS0803	-1	S/G "C" Steam Flow Transmitter, MS-FT-495 fails low. (AP-53.00) **(CT-1)**
2	NI1004	+1	Power Range channel N44 fails high. (AP-53.00, AP-4.00)
3	CH2101	+1	VCT Level transmitter, LT-1112 fails high. (AP-53.00)
4	SD0202	TRUE	Loss of "B" HPD pump, 1-SD-P-1B. (AP-18.00) **(CT-2)**
5	NA	NA	Ramp to 75% power. (AP-23.00)

6.	MS0102	20%	"B" Steam line break at the header in the Turbine Building. (E-0)
	MS22-24	TRUE	Main Steam Trip Valves fail to trip on HSF SI. **(CT-4)**
	RD17	TRUE	Auto and Manual Reactor trip fails from MCR (1-FR-S.1)
	FW48,49	TRUE	Both MDAFW pumps fail to auto start. **(CT-3)**
	RC5601-3	TRUE	RCPs spuriously trip.

SHIFT TURNOVER AND SEQUENCE

OPERATING PLAN:

The initial conditions have Unit 1 at 100% power with RCS boron concentration of 760 ppm.

Unit conditions have been stable at approximately 100% power since the last refueling outage.

All systems and crossties are operable with the following exception:

- Containment Smoke and heat detectors are non-functional due to local fire panel failure. TRM Section 3.3.1, Fire Detection Instrumentation, Condition B, Smoke Detectors, and Condition C, Heat Detectors is in effect. Containment air temperatures monitored once/hour, and restore to Functional status in 14 days.
- 1-SI-P-1B, “B” LHSI Pump, Tagged out for breaker PMs. Tech Spec 3.3.B.3 requires return to service within 72 hours. Expected completion of breaker PMs-later this shift.
- Controlling channels have been shifted to CH IV in preparation for Channel III testing

Unit #2 is at 100% power with all systems and crossties operable.

The last shift performed two 30 gallon dilutions, followed by manual makeups.

Shift orders are to maintain 100% power on Unit 1.

PWR Scenario:

Scenario Objectives:

A. Given a SG "C" Steam flow transmitter failure, respond in accordance with 0-AP-53.00, Loss of Vital Instrumentation/Controls to place "C" FRV in manual, control "C" SG level in manual, and return "C" FRV to automatic.
B. Given a Power range N44 failure, respond in accordance with 0-AP-53.00, Loss of Vital Instrumentation/Controls, and 1-AP-4.00 to stop rod motion and remove N-44 from service.
C. Given a failure of VCT Level transmitter, LT-1112, respond in accordance with 0-AP-53.00, Loss of Vital Instrumentation/Controls and return VCT level to normal.
D. Given a loss of 1-SD-P-1B, "B" HPD pump, respond in accordance with 1-AP-18.00 and return feed flow to normal.
E. Demonstrate the ability to ramp the unit in accordance with 0-AP-23.00, Rapid Load Reduction.
F. Given a Main steamline break with Reactor protection system failures, respond in accordance with FR-S.1, ATWS; and 1-E-0, Reactor trip or SI to shutdown and stabilize the plant.

Scenario Sequence

Event One: "C" SG CH IV Steam Flow Fails Low

When the Evaluation Team is ready, the malfunction for the failure is implemented. The BOP will diagnose the failure based on alarms and indications received and perform the Immediate Action Steps of 0-AP-53.00, Loss of Vital Instrumentation/Controls. The "C" FRV will be placed in manual and adjusted to match steam and feed flow in "C" SG, and return "C" SG level to program. The RO will swap the controlling Steam Flow Channel for "C" FRV to Channel III. The BOP will return "C" FRV to auto.

Malfunctions required: One MS0602

Objectives: (BOP) Place the "C" FRV in manual and raise feed flow to match steam flow.

(RO) Swap Steam flow channels for "C" FRV to CH III.

(SRO) Direct actions per 0-AP-53.00. Review Tech specs and identify 72 hour clock to place failed channel in TRIP. (Table 3.7-1, item 17; Table 3.7-2, item 1e)

Success Path: Perform Immediate Actions of 0-AP-53.00, assume manual control of "C" SG NR level, swap controlling channel of Steam Flow input to SGWLC system, and return "C" SG FRV to automatic.

Event Two: Power Range Channel N44 Fails High

When the Evaluating Team is ready, the malfunction is implemented. The failure will cause N44 indication to fail high and "D" bank control rods to step in at 72 steps per minute. The RO will diagnose the failure based on alarms and indications received and place rod control in manual to stop inward rod

motion. The Team will respond by implementing 0-AP-53.00, Loss of Vital Instrumentation/Controls and transition to 1-AP-4.00, Nuclear Instrumentation Malfunction.

Malfunctions required: One NI1004

Objectives: (RO) Place rod control in MANUAL to stop inward rod motion.

(BOP) Perform Control Room Actions to remove N-44 from service IAW 1-AP-4.00, Attachment 1.

(SRO) Direct actions per 0-AP-53.00, and 1-AP-4.00. Review Tech Specs and identify 72 hour clock. (Table 3.7-1 item2, item5)

Success Path: Inward rod motion is stopped, and N-44 is removed from service.

Event Three: VCT Level Transmitter, LT-1112 Fails High

When the Evaluating Team is ready, the malfunction is implemented. VCT Level Transmitter LT-1112 Fails high, causing 1-CH-LCV-1115A to fail to Divert position. Team will respond IAW 0-AP-53.00, Loss of Vital Instrumentation/Controls, and manually position 1-LCV-1115A to VCT positon.

Malfunctions required: One, CH2101

Objectives: (RO) Manually place 1-CH-LCV-1115A to the VCT position. Manually control 1-CH-LCV-1115A to control VCT level.

(SRO) Direct actions to recover VCT level per 0-AP-53.00.

Success Path: VCT level and control restored.

Event Four: Loss of 1-SD-P-1B, "B" HPD pump

Malfunctions required: One SD0202

Objectives: (BOP) Start third Condensate Pump as required for plant conditions (SF/FF mismatch). Reduce Turbine load by 50 MW using Valve Position Limiter or Turbine Manual to control reactor power less than 100%. Further reductions may be required to maintain Loop ΔTs less than 100%.

(SRO) Direct actions per 1-AP-18.00

Success Path: Additional Condensate pump started and S/G level returned to normal.

Event Five: Ramp Unit to < 75%.

The SRO will notify the Shift Manager of the requirement per AP-18.00 to ramp the unit below 75%. The SRO will conduct a Team brief to discuss the Reactivity Plan determined by the RO. The SRO will implement 0-AP-23.00, Rapid Load Reduction, to commence power reduction to be 70 – 74% power.

Malfunctions required: None.

Objectives: (RO) Manipulate the CVCS system to Emergency Borate and establish a continuous boration to control RCS Tave during the Turbine Ramp. Operate control rods to adjust delta flux and assist in RCS Tave control.

(BOP) Operate turbine controls to control the load ramp per AP-23.00.

(SRO) Direct actions to lower power in accordance with AP-23.00. Notify SEM of plant status and request Maintenance and Engineering support

Success Path: Maintain Tave/Tref mismatch within 5 ^{o}F of T_{ref}, and delta flux near target value

Event Six: Steam Break in Turbine Building, Reactor Trip Failure, FR-S.1 (ATWS)

After the Evaluating Team is ready for the next event, the malfunction is implemented for a Steam Break on the "B" Steam line in the Turbine Building; the steam break will cause an automatic trip of the MFPs with the TDAFW pump trip throttle valve tripping on startup, and the failure of the MDAFW pumps to auto start; leading to a loss of Feed ATWS. The Team will respond based upon alarms and indications received, attempt to trip the reactor and transition to FR-S.1, Response to Nuclear Generation/ATWS. After the reactor is subcritical, the team will transition from FR-S.1 to E-0. In E-0 the Team will be directed to take action to isolate steam and feed to the faulted SG. Isolation of steam flow is complicated by the failure of all MSTVs to auto trip on the HSF SI. Steam flow is isolated by closing the A, B, and C Main Steam Trip valves

Malfunctions required: Eleven (11)

- MS0102-, B' Steam line rupture at header.
- MS22, MS23, MS24: MSTV auto closure failure on Hi Steamflow SI.

- FW09, FW-P-2 Trip throttle valve trips closed.
- FW48, FW49; AFW P-3A, and P-3B fail to auto start.
- RC5601, RC5602, RC5603; RCPs spuriously trip due to steam break.
- RD17, ATWS with failure of Rx trip pushbuttons

Objectives: (RO) Perform immediate actions of FR-S.1.

a. Place Rod Control in Automatic on discovery that Reactor will not manually trip.
b. Manually Trip the Main Turbine.
c. Place Rod Control in Manual and insert control rods at 48 steps per minute when Rod Speed lowers shortly following the Turbine Trip.
d. Close Main Steam Trip Valves; 1-MS-TV-101A, 101B, and 101C.
e. Close 1-FW-MOV-151C/D to isolate AFW to the Faulted SG.

(BOP) Manually start AFW pumps.

(SRO) Direct actions using the EOP Network.

Success Path: AFW started, and Main Steam trip valves are tripped. Actions per FR-S.1, and E-0 taken to stabilize the plant.

Scenario Recapitulation

Total Malfunctions: 7
Abnormal Events: 5 (0-AP-53.00, 1-AP-4.00, 0-AP-53.00, 1-AP-18.00, 0-AP-23.00)
Major Transients: 1 (Main Steam line break, ATWS, Failure of AFW and HSF isolation)
EOPs Entered: 1 (E-0,)
EOP Contingencies: 1 (FR-S.1)

Event Description: "C" S/G Steam Flow Transmitter FT-495 fails low.

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
		Steam Flow "C" SG Fail Low
	Team	Diagnose this failure using the following alarms and indications: Annunciator 1F-C9, STM GEN 1C CH 3 FW < STM FLOW Annunciator 1H-E7, STM GEN 1C FW > < STM FLOW Annunciator 1H-G7, STM GEN 1C LVL Error Indicator 1-MS-FI-1495, failed low on Vertical Board "C" SG NR Level lowering on Vertical Board
		0-AP-53.00, Loss of Vital Instrumentation/Controls.
	BOP	Perform Immediate Actions of AP-53.00: [1] CHECK REDUNDANT INSTRUMENT CHANNEL(S) INDICATION – NORMAL. Identifies 1-MS-FI-1494 – NORMAL [2] PLACE AFFECTED CONTROL(S)/ COMPONENT(S) IN MANUAL CONTROL AND STABILIZE PARAMETER USING REDUNDANT INDICATION **Places "C" FRV in Manual and raises demand**. **Reports to SRO: Immediate Actions of AP-53.00 complete, "C" FRV in manual**. **Critical Task CT-1:** If the BOP fails to take timely action in response to the SF channel failure, an automatic reactor trip on SG NR low level will occur; an unanticipated reactor trip should be considered as failure criteria. *SRO Sets control band, monitoring frequency, and contingency actions*.
		0-AP-53.00
	SRO	Reads AP-53.00 Immediate Action Steps: [1] CHECK REDUNDANT INSTRUMENT CHANNEL(S) INDICATION – NORMAL
	BOP	Yes, 1-MS-FI-1494 - Normal.
	SRO	[2] PLACE AFFECTED CONTROL(S)/ COMPONENT(S) IN MANUAL CONTROL AND STABILIZE PARAMETER USING REDUNDANT INDICATION.
	BOP	Reports "C" FRV in manual, "C" SG NR level trending to 44%.
	SRO	Establishes control band of 44% ± 5% for "C" SG NR level.

Event Description: "C" S/G Steam Flow Transmitter FT-495 fails low.

Cue: By Examiner.

	SRO	0-AP-53.00 The SRO will lead a transient brief. During the brief, the failure of "C" SG Steam Flow LOW will be discussed. The RO/BOP will report Annunciators received related to the event, and Critical Parameters affected. The SRO will direct the BOP operator to maintain "C" S/G level ± 5% of program band. STA will have no input for the brief.
	SRO RO	0-AP-53.00 3. CHECK REACTOR POWER – LESS THAN OR EQUAL TO 100% Report reactor power is less than 100%, (provides current reactor power indication.)
	SRO	0-AP-53.00 Notes prior to Step 4. • Step 4 failures are listed in order of performance priority. Only the failed instrument/control and associated step number should be read aloud. • When the affected instrument/controller malfunction(s) has been addressed by this procedure, recovery actions should continue at Step 13. 4. DETERMINE THE FAILED INSTRUMENT / CONTROL AND GO TO APPROPRIATE STEP OR PROCEDURE: • SG Steam Flow, Step 7.
	SRO BOP	0-AP-53.00 **CAUTION Prior to Step 7**: When CALCALC is based on Feedwater, changes in feed flow will affect calorimetric power. Reactor power must be monitored when adjusting feed flow. Acknowledges CAUTION.
	SRO BOP SRO	0-AP-53.00 7. CHECK STEAM GENERATOR LEVEL CONTROL INSTRUMENTS – NORMAL • Steam Flow Reports No, 1-MS-FI-1495 Failed Low. Goes to STEP 7 RNO

Event Description: "C" S/G Steam Flow Transmitter FT-495 fails low.

Cue: By Examiner.

		0-AP-53.00
	SRO	7. RNO
		IF the selected steam flow, steam pressure, or feed flow input to the SG Water Level Control system has failed, THEN do the following: a) Place the associated Feed Reg Valve in MANUAL.
	BOP	Reports Yes, "C" FRV in manual.
	SRO	b) Control SG level at program level.
	BOP	Reports Yes.
	SRO	c) Select the redundant channel for affected SG(s)
	RO	**Selects Channel III SF input to "C" SG SGWLC system**.
	SRO	d) WHEN SG level returned to normal, THEN place the Feed Reg Valve in AUTOMATIC.
	BOP	**Returns "C" FRV to automatic when "C" SG NR level at program, and SF/FF are matched**.

Event Description: "C" S/G Steam Flow Transmitter FT-495 fails low.

Cue: By Examiner.

		0-AP-53.00
	SRO	7. RNO (Continued) Perform follow-up actions: a) Consult with Shift Manager on need to initiate 1-OP-RP-001, ALIGNING CONTROL SYSTEM FOR PERFORMANCE OF CHANNEL I, II, III, AND IV PROCESS AND PROTECTION TESTING. Recommends to Shift Manager to wait until I&C ready to troubleshoot before shifting channels. b) Refer to the following Tech Spec 3.7 items: **Table 3.7-1**, 12 and **17** **Table 3.7-2**, 1.c, **1.e**, and 3.a **Table 3.7-3, 2.a**, and 3.a Table 3.7-6, 15 and 16 TS Table 3.7-1, Item 17, Low steam generator water level with steam/feedwater flow mismatch, OA 6, Place failed channel in trip within 72 hours, channel may be bypassed for surveillance testing for up to 12 hours, if requirements not met, place the Unit in HSD in 6 hours. TS Table 3.7-2.1.e.1), Operator Action 20, Place failed channel in trip in 72 hours, channel may be bypassed for surveillance testing for up to 12 hours, if requirements not met, place the Unit in HSD in 6 hours, and reduce RCS temperature and pressure <350°/450 psig in the following 12 hours. TS Table 3.7-3.2.a., See Item #1.e Table 3.7-2 for operability requirements.
		0-AP-53.00
	SRO	7. RNO (Continued) c) Refer to Attachment 1. SRO hands out Attachment 1 for RO/BOP Review. d) IF no other instrumentation failure exists, THEN GO TO Step 13 SRO Goes to Step 13.
		0-AP-53.00
	SRO	13. CHECK CALORIMETRIC - FUNCTIONAL IAW (1)-OPT-RX-001, ATTACHMENT 4 Directs RO to Review 1-OPT-RX-001, Attachment 4.
	RO	Determines Calorimetric affected by SF failure, 1-OPT-RX-007, Shift Average Power Calculation. **Note**: *Unit 2 will assume responsibility for 1-OPT-RX-007 completion.*

Event Description: "C" S/G Steam Flow Transmitter FT-495 fails low.

Cue: By Examiner.

		0-AP-53.00
	SRO	14. REVIEW THE FOLLOWING: Tech Spec 3.7
		Previously completed (Step 7, Previous Page)
		VPAP-2802, NOTIFICATIONS AND REPORTS
	SRO	Directs STA to review VPAP-2802
		TRM SECTION 3.3, INSTRUMENTATION
		Directs STA to review TRM Section 3.3
		Reg Guide 1.97
		Directs STA to review Reg Guide 1.97
		• EP-AA-303, Equipment Important to Emergency Response
		Directs STA to review EP-AA-303
	STA	Reports that VPAP-2802, TRM Section 3.3, **Reg Guide 1.97**, and EP-AA-303; Results of Review discussed with Shift Manager.
		Reg Guide 1.97: Main Steam Flow, D-19 Variable, 1 Channel per SG is required; review of this procedure is usually accomplished by STA, recommend verification by SRO as follow-up following scenario completion, at Evaluator discretion.
		0-AP-53.00
	SRO	15. CHECK ADDITIONAL INSTRUMENT / CONTROLLER MALFUNCTION – EXISTS
	BOP	Reports No, no additional controller malfunction exists.
	SRO	Goes to Step 17.

Event Description: "C" S/G Steam Flow Transmitter FT-495 fails low.

Cue: By Examiner.

		0-AP-53.00
	SRO	17. PROVIDE NOTIFICATIONS AS NECESSARY: Shift Supervision OMOC STA (PRA determination) I&C
	SRO	Consults with Shift Manager for OMOC notification; request I&C support to place the failed channel in trip; and update for Unit status, AP-53.00 completion, and Tech Spec clocks in effect.
		---END OF EVENT 1---

Event Description: Power Range Channel N44 Fails high.

Cue: By Examiner

Time	Position	Applicant's Action or Behavior
		N44 Fail High
	Team	Diagnose this failure using the following alarms and indications: Annunciator 1G-E4, NIS PWR RNG CH AVG FLUX DEVIATION Annunciator 1G-G1, NIS PWR RNG HI FLUX ROD STOP Annunciator 1G-E4, NIS PWR RNG CH AVG FLUX DEVIATION Annunciator 1E-H5, NIS PWR RNG HI STPT CH 4 N44 indication on Benchboard and NI Drawer Fail HIGH. Rods Drive IN at 72 Steps/Minute. Evaluator Note: More than likely 0-AP-53.00 will be entered (continuing on this page). It is also acceptable to enter 0-AP-1.00, Rod Control Malfunction. If 0-AP-1.00 is entered continue on page 22.
		0-AP-53.00, Loss of Vital Instrumentation/Controls.
	RO	Perform Immediate Actions of AP-53.00: [1] CHECK REDUNDANT INSTRUMENT CHANNEL(S) INDICATION – NORMAL. **Places Rod Control switch in MANUAL to stop rod motion**. Identifies N41, N42, and N43 – NORMAL [2] PLACE AFFECTED CONTROL(S)/ COMPONENT(S) IN MANUAL CONTROL AND STABILIZE PARAMETER USING REDUNDANT INDICATION Checks Rod Motion Stopped. **Reports to SRO: Immediate Actions of AP-53.00 complete, N44 failed high, Rod Control in Manual**.
		0-AP-53.00
	SRO	Reads AP-53.00 Immediate Action Steps: [1] CHECK REDUNDANT INSTRUMENT CHANNEL(S) INDICATION – NORMAL
	RO	Reports N41, N42, N43 Normal.
	SRO	[2] PLACE AFFECTED CONTROL(S)/ COMPONENT(S) IN MANUAL CONTROL AND STABILIZE PARAMETER USING REDUNDANT INDICATION.
	RO	Reports Rod Control in Manual to stop inward rod motion.

Event Description: Power Range Channel N44 Fails high.

Cue: By Examiner

	SRO	0-AP-53.00 The SRO will lead a transient brief. During the brief, the failure of N44 will be discussed. The SRO will provide direction on maintaining Tave within a band of Tref (typically 3 or 4 degrees F). The RO/BOP will report Annunciators received related to the event, and Critical Parameters affected. STA will have no input for the brief.
	SRO RO	0-AP-53.00 3. CHECK REACTOR POWER – LESS THAN OR EQUAL TO 100% Report reactor power is less than 100%, and provides current reactor power indication.
	SRO	0-AP-53.00 Notes prior to Step 4. • Step 4 failures are listed in order of performance priority. Only the failed instrument/control and associated step number should be read aloud. • When the affected instrument/controller malfunction(s) has been addressed by this procedure, recovery actions should continue at Step 13. 4. DETERMINE THE FAILED INSTRUMENT / CONTROL AND GO TO APPROPRIATE STEP OR PROCEDURE: • NI Malfunction, 1-AP-4.00 ***SRO Transitions to AP-4.00***. (page 24)

Event Description: Power Range Channel N44 Fails high.

Cue: By Examiner

	RO	0-AP-1.00 Rod Control System Malfunction (Potential) Performs Immediate actions of 0-AP-1.00. [1] CHECK FOR EITHER OF THE FOLLOWING: • Continuous rod withdrawal • **Continuous rod insertion** [2] STOP ROD MOTION a) **Put ROD CONT MODE SEL switch in MANUAL** b) Check rod motion-STOPPED. **Reports to SRO: Immediate Actions of AP-1.00 complete, N44 failed high, Rod Control in Manual**.
	SRO RO SRO RO	0-AP-1.00 (Potential) Reads 0-AP-1.00 Immediate Actions. CAUTION prior to Step 1. • If Tave drops below 541 °F, 1-E-0, Reactor Trip or Safety Injection, must be implemented. [1] CHECK FOR EITHER OF THE FOLLOWING • Continuous rod withdrawal • Continuous rod insertion RO reports that rods were stepping IN. [2] STOP ROD MOTION RO reports that rod motion was stopped, RODS are in MANUAL.
	SRO	0-AP-1.00 (Potential) The SRO will lead a transient brief. During the brief, the failure of N44 will be discussed. The SRO will provide direction on maintaining Tave within a band of Tref (typically 3 or 4 degrees F). The RO/BOP will report Annunciators received related to the event, and Critical Parameters affected. STA will have no input for the brief.
	SRO	0-AP-1.00 (Potential) 3. CHECK ROD MOTION – DUE TO INSTRUMENTATION FAILURE • First Stage Impulse Pressure • Tave/Tref • **Nuclear Instrumentation.**

Event Description: Power Range Channel N44 Fails high.

Cue: By Examiner

		0-AP-1.00 (Potential)
	SRO	4 CHECK ROD MOTION DUE TO NUCLEAR INSTRUMENTATION FAILURE.
	RO	Reports that yes, Rod motion due to N-44 failing HIGH
	SRO	***SRO Transitions to AP-4.00***. (next page)

Event Description: Power Range Channel N44 Fails high.

Cue: By Examiner

		1-AP-4.00, Nuclear Instrument Malfunction
	SRO	SRO will conduct focus brief, changes to parameters or Unit status will be discussed. RO/BOP will provide input for Unit Status change. STA will have no input for the brief. SRO will continue 1-AP-4.00
		1-AP-4.00, Nuclear Instrument Malfunction
	SRO	NOTE Prior to STEP 1: Attachments 6, 7, and 8 show one-line diagrams of Nuclear Instrumentation.
	RO	Acknowledges Note.
		1-AP-4.00, Nuclear Instrument Malfunction.
	SRO	1 CHECK NI MALFUNCTION – POWER RANGE FAILURE.
	RO	Reports Yes, N44 Failed
		1-AP-4.00, Nuclear Instrument Malfunction.
	SRO	2. STABILIZE UNIT CONDITIONS
	RO	Reports Yes, Conditions Stable
		1-AP-4.00, Nuclear Instrument Malfunction.
	SRO	3. CHECK N-44 – FAILED
	RO	Reports Yes, N44 Failed
		1-AP-4.00, Nuclear Instrument Malfunction.
	SRO	4. CHECK ROD CONTROL - IN MANUAL
	RO	Reports Yes, Rod Control in Manual
		1-AP-4.00, Nuclear Instrument Malfunction.
	SRO	CAUTION Prior to Step 5: To prevent operation with delta flux outside of target band, delta flux must be monitored and maintained within band if rods have moved.
	RO	Acknowledges CAUTION

Event Description: Power Range Channel N44 Fails high.

Cue: By Examiner

		1-AP-4.00, Nuclear Instrument Malfunction.
	SRO	5. PLACE 1-MS-43-N16, REACTOR POWER SOURCE, IN THE N43 POSITION (SWITCH LOCATED ON NI PROTECTION CHNL III CABINET)
	BOP	Reports Yes, 1-MS-43-N16 in N43 Position.
		1-AP-4.00, Nuclear Instrument Malfunction.
	SRO	6. CHECK N-43 - FAILED
	RO	Reports NO, N43 NOT failed SRO GOES to Step 8
		1-AP-4.00, Nuclear Instrument Malfunction.
	SRO	8. CHECK POWER RANGE CHANNELS - ONLY ONE FAILED
	RO	Reports Yes, only N44 Failed.
		1-AP-4.00, Nuclear Instrument Malfunction.
	SRO	NOTE Prior to Step 9: Performance of Attachment 1 to place the failed Power Range Channel in trip requires I&C assistance for N-41, N-42, or N-43.
	BOP	Acknowledges NOTE.
		1-AP-4.00, Nuclear Instrument Malfunction.
	SRO	9. INITIATE ATTACHMENT 1 TO PLACE FAILED CHANNEL IN TRIP WITHIN 72 HOURS Directs BOP to perform 1-AP-4.00, Attachment 1, Part 1, 2, and 3. Attachment 1 actions begin on Page 27.
		1-AP-4.00, Nuclear Instrument Malfunction.
	SRO	10. CHECK NI MALFUNCTION – INTERMEDIATE RANGE FAILURE
	RO	Reports No, Power Range Failure SRO GOES to Step 19

Event Description: Power Range Channel N44 Fails high.

Cue: By Examiner

	SRO RO	1-AP-4.00, Nuclear Instrument Malfunction. 19. CHECK NI MALFUNCTION – SOURCE RANGE FAILURE Reports No, Power Range Failure SRO Goes to Step 38
	SRO	1-AP-4.00, Nuclear Instrument Malfunction. 38. NOTIFY THE FOLLOWING • Instrument Shop • OM on call
	SRO	SRO Consults Tech Specs and identifies: 1) TS Table 3.7-1, Item 2, Operator Action 2, Place Failed Channel in trip within 72 hours, Inoperable channel may be bypassed up to 12 hours for surveillance testing, Either Thermal Power restricted to ≤ 75% of rated power and Neutron Flux trip setpoint reduced to ≤ 85% of Rated Power within 78 hours; OR the Quadrant Power Tilt monitored at least once per 12 hours. QPT shall be monitored using the in-core detectors. 2) TS-3.12.D, Quadrant Power Tilt. If the reactor is operating above 75% power with one ex-core nuclear channel out of service, the QPT shall be determined once per day, or a change in power level > 10%, or 30 inches of control rod motion.
	SRO	Notifies Shift Manager of Unit status, procedures used, and Tech Spec Requirements. Requests that the Shift Manager notify I&C and the OMOC. **NOTE:** *Rod Control may remain in Manual.* **NOTE:** *May direct the RO to return control rods to previous event position and return rod control to Auto.*

Event Description: Power Range Channel N44 Fails high.

Cue: By Examiner

Time	Position	Applicant's Action or Behavior
		1-AP-4.00, Attachment 1: ONE POWER RANGE CHANNEL INOPERABLE 1. Record the following indications for the failed Power Range channel: Power Level _____ Delta Flux _____ Upper Detector Current _____ Lower Detector Current _____
	BOP	1-AP-4.00, Attachment 1: ONE POWER RANGE CHANNEL INOPERABLE 2 Perform the following at the NIS panel within 72 hours. • Comparator and Rate Drawer **a. Select the failed channel on the COMPARATOR CHANNEL DEFEAT switch. (N-44)** b. **Check annunciator 1G-E4, NIS PWR RANGE CH AVG FLUX DEVIATION - NOT LIT**. ***Annunciator will be NOT LIT***. • Miscellaneous Control and Indication Panel a. **Select the failed channel on the ROD STOP BYPASS switch. (N-44).** b. Check annunciator 1G-G1, NIS PWR RNG HI FLUX ROD STOP - NOT LIT. **Annunciator will be NOT LIT.** c**. Select the failed channel on the UPPER SECTION defeat switch. (N-44).** d. IF Reactor power greater than 50%, THEN check annunciator 1G-C4, UPPER ION CHAMBER DEVIATION OR AUTO DEFEAT < 50% - NOT LIT. (annunciator will remain LIT if any Power Range channel less than 50%) e**. Select the failed channel on the LOWER SECTION defeat switch. (N-44).** f. IF Reactor power greater than 50%, THEN check annunciator 1G-D4, LOWER ION CHAMBER DEVIATION OR AUTO DEFEAT < 50% - NOT LIT. (annunciator will remain LIT if any Power Range channel less than 50%)
	BOP	1-AP-4.00, Attachment 1: ONE POWER RANGE CHANNEL INOPERABLE NOTE Prior to Step 3 Annunciator NIS PWR RNG HI STPT (1E-E5, 1E-F5, 1E-G5, or 1E-H5) for the channel being placed in trip, NIS PWR RNG LOSS OF DET VOLT (1G-C3), and NIS DROPPED ROD FLUX DECREASE > 5% PER 2 SEC (1G-H1) will alarm when the instrument power fuses are pulled If Reactor power is less than 10%, annunciator NIS PWR RNG LO STPT HI FLUX (1E-D5) will alarm when the instrument power fuses are pulled. Acknowledges NOTE.

Event Description: Power Range Channel N44 Fails high.

Cue: By Examiner

	BOP	1-AP-4.00, Attachment 1: ONE POWER RANGE CHANNEL INOPERABLE BOP Notifies RO prior to Removing Instrument Fuses (a. Below) 3. Place the failed Power Range channel in trip IAW the following: a. **At the Power Range drawer, remove the INSTRUMENT POWER fuses. (N-44).** b. **At the Power Range drawer, put the POWER RANGE TEST switch in the TEST position. (N-44).** c. Check annunciator 1G-H1, NIS DROPPED ROD FLUX DECREASE > 5% PER 2 SEC - LIT. **Annunciator will be LIT.** d. Check annunciator 1G-C3, NIS PWR RNG LOSS OF DET VOLT - LIT. **Annunciator will be LIT.** e. IF Reactor power less than 10%, THEN check annunciator 1E-D5, NIS PWR RNG LO STPT HI FLUX - LIT**. Annunciator will not be NOT LIT.**
	BOP	1-AP-4.00, Attachment 1: ONE POWER RANGE CHANNEL INOPERABLE 4 Remove the following PCS points for the failed channel from scan: • N-41, N0041A and N0042A • N-42, N0043A and N0044A • N-43, N0045A and N0046A • **N-44, N0047A and N0048A** **The BOP will remove these points from scan at the Shift Manager PCS termina**l. ***Only N-44 points (in BOLD Above) will be taken off scan***.
		BOP will return Attachment to SRO and report Parts 1, 2, and 3 complete
		--- END OF EVENT 2 ---

Event Description: VCT Level Transmitter, LT-1112 Fails High

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
	RO	Diagnoses failure 1-CH-LT-1112 with the following indications/alarms: Indications: • Upscale indication on VCT level on channel 1-CH-LI-1112. • Lowering indication on VCT level on channel 1-CH-LI-1115. • VCT Level Divert valve, 1-CH-LCV-1115A diverting to PDT. • 1-CH-LC-1112C, VCT LEVEL CNTRL showing 100% Demand.
	SRO	0-AP-53.00 Enters 0-AP-53.00 LOSS OF VITAL INSTRUMENTATION / CONTROLS
	RO	0-AP-53.00 [1] CHECK REDUNDANT INSTRUMENT CHANNEL(S) INDICATION - NORMAL RO identifies Channel LI-1115 VCT Level indication is NORMAL.
	RO	0-AP-53.00 [2] PLACE AFFECTED CONTROL(S)/COMPONENT(S) IN MANUAL CONTROL AND STABILIZE PARAMETER USING REDUNDANT INDICATION **RO places 1-CH-LCV-1115A to NORM (VCT), OR places 1-CH-LC-1112C to MAN and LOWER to 0% demand to shift 1-CH-LCV-1115A to VCT.** Monitors VCT level to confirm VCT is stabilizing.
	SRO	0-AP-53.00 The SRO will lead a transient brief. During the brief, the failure of VCT Level channel will be discussed. The RO/BOP will report Annunciators received related to the event, and Critical Parameters affected. STA will have no input for the brief. Completes Brief and continues with AP-53.00.

Event Description: VCT Level Transmitter, LT-1112 Fails High

Cue: By Examiner.

	SRO	0-AP-53.00 May direct RO/BOP to dispatch Auxiliary Building Operator to locally check status of 1-CH-LT-1112.
	SRO RO	0-AP-53.00 *3 VERIFY REACTOR POWER – LESS THAN OR EQUAL TO 100% *Identify that reactor power is less than 100%.*
	SRO	0-AP-53.00 Notes Prior to Step 4: • Step 4 failures are listed in order of performance priority. Only the failed instrument/control and associated step number should be read aloud. • When the affected instrument/controller malfunction(s) has been addressed by this procedure, recovery actions should continue at Step 13.
	SRO RO	0-AP-53.00 *4 DETERMINE THE FAILED INSTRUMENT / CONTROL AND GO TO APPROPRIATE STEP OR PROCEDURE: VCT Level, Step 12e.
	SRO RO SRO	0-AP-53.00 12 e) VCT level Instrumentation – NORMAL *States 1-CH-LT-1112, VCT Level Channel affected*. Refer to Attachment 6

Event Description: VCT Level Transmitter, LT-1112 Fails High

Cue: By Examiner.

	SRO	0-AP-53.00 Attachment 6, 0-AP-53.00 If 1-CH-LT-1112 fails high, 1-CH-LCV-1115A will open. Automatic swap-over of the CHG pump suction from the VCT to the RWST will NOT function. • 1-CH-LT-1112 provides input to the following: a. Controller 1-CH-LC1112C for modulating 1-CH-LCV-1115A open at the setpoint set on the controller. b. CHG pump suction swap over to the RWST at 13% (2/2) Discusses with RO control of VCT level and monitoring of channel 1-CH-LT-1115. The SRO will set a band for maintaining VCT level.
	SRO SRO/RO	0-AP-53.00 13 CHECK CALORIMETRIC – FUNCTIONAL IAW 1-OPT-RX-001, Attachment 4. SRO/RO determines that OPT-RX-001, Attachment 4, is NOT impacted and OPT-RX-007 will NOT need to be performed.
	SRO STA	0-AP-53.00 14. Review the following: • TS 3.7 • VPAP-2802 • TRM Section 3.3, Instrumentation • Reg Guide 1.97 • EP-AA-303, Equipment Important to Emergency Response. SRO will consult Tech Specs and find no items affected. • Reports that VPAP-2802, TRM Section 3.3, Reg Guide 1.97, and EP-AA-303; Results of Review discussed with Shift Manager. • *Reg Guide 1.97 requires one channel of VCT level indication, 1-CH-LI-1115 is operable. There is no impact for VPAP-2802, and TRM section 3.3. EP-AA-303 does list VCT level and states that for comp measures verify alternate indication available (other channel provides that).*

Event Description: VCT Level Transmitter, LT-1112 Fails High

Cue: By Examiner.

		0-AP-53.00
	SRO	15. Check additional Instrument Malfunction exists.
	RO	Reports No goes to Step 17.
		0-AP-53.00
	SRO	17. Provide Notifications as necessary. • Shift Supervision • OMOC • STA (PRA determination) • I&C
		END EVENT 3

Event Description: Loss of High Pressure Drain Pump (1-AP-18.00).

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
	BOP	Diagnose the trip of the High Pressure Drain Pump, 1-SD-P-1B based on the following indications: • 1K-D4 4 KV BKR AUTO TRIP • 1H-F3 CN POLISHING SYS TRBL • 1H-D3 CN POLISHING BYPASS AOV OPEN • 1J-B4 HP HTR DR RCVR TK HI LVL • 1H-G5/6/7 SG 1A/1B/1C LVL ERROR • 1J-E1 FW HTR 4A HI LVL • 1J-F1 FW HTR 4B HI LVL
		Step 1, AP-18.00
	SRO	Enter 1-AP-18.00
		CHECK HP HEATER DRAIN PUMP STATUS:
	SRO	a) Check HP Heater Drain Pump – TRIPPED OR NOT PROVIDING SUFFICIENT FLOW
	BOP	*Reports that 1-SD-P-1B, HP Heater Drain pumps tripped.*
	SRO	b) Place pump control Switch in PTL
	BOP	**Places 1-SD-P-1B control switch in PTL**
		Step 2, 1-AP-18.00
	SRO	CHECK REACTOR POWER – GREATER THAN OR EQUAL TO 75%
	RO/BOP	*Reports reactor power at 100%*
		Step 3, AP-18.00
	SRO	START THIRD CONDENSATE PUMP AS REQUIRED BY PLANT CONDITIONS
	BOP	**Starts 1-CN-P-1A and verifies Proper Operation.**
		Critical Task CT-2: Start an additional Condensate pump and verify feed flow returns to normal before a Steam Generator Level Reactor Trip.

Event Description: Loss of High Pressure Drain Pump (1-AP-18.00).

Cue: By Examiner.

		Step 4, AP-18.00
	SRO	NOTE: With unit at 100% power, Turbine load should be decreased approximately 50 MW. REDUCE TURBINE LOAD AS NECESSARY TO MAINTAIN LOOP ΔTs - LESS THAN 100%. • *Use Valve Position Limiter* *OR* • *Reduce Turbine load using Turbine Manual*
	BOP	**Using Guidance of NOTE preceding the Step, Turbine load will be reduced approximately 50 MW.**
	SRO	Will direct the RO/BOP to dispatch a Service Building Operator to check the status of 1-SD-P-1B breaker; and dispatch the Turbine Building Operator to locally check the status of 1-SD-P-1B.
		Step 5, 1-AP-18.00
	SRO	NOTE: Ramping to 75% allows the Condensate Polishing Building to be placed fully in service. COMMENCE RAMP TO 75% POWER IAW 0-AP-23.00, RAPID LOAD REDUCTION
		Step 6, 1-AP-18.00
	SRO	* USE CONTROL RODS AND CHEMICAL SHIM TO MAINTAIN ΔFLUX IN BAND
		Step 7, 1-AP-18.00
	SRO	MONITOR MAIN FEED REG VALVE RESPONSE - MAINTAINING SG LEVEL IN BAND
	BOP	Acknowledges Step direction.
		Step 8, 1-AP-18.00
	SRO	CHECK CP BUILDING BYPASSED.
	BOP	Reports that the CP Building is bypassed.

Event Description: Loss of High Pressure Drain Pump (1-AP-18.00).

Cue: By Examiner.

		Step 9, 1-AP-18.00
	SRO	CHECK HP HEATER DRAIN PUMP TRIP CAUSED BY NETWORK 90 FAILURE.
	BOP	Reports that No, the HP Heater Drain pump trip was not caused by Network 90 failure.
	SRO	Goes to Step 11
		Step 11, 1-AP-18.00
	SRO	NOTIFY THE FOLLOWING: ❑ CP Building ❑ Energy Supply (MOC) ❑ Chemistry ❑ STA
	BOP	Notifies required parties as directed.
	SRO	Initiate AP-23.00, Rapid Load Reduction
		END EVENT #4

Event Description: Ramp Unit to < 75% per 0-AP-23.00.

Cue: When initiated by Team.

		Start of 0-AP-23.00
	SRO	The SRO will lead a transient brief summarizing the Event and Establish priorities. The RO/BOP will report Annunciators received related to the event, and Critical Parameters affected. STA will have no input for the brief.
	RO	Reactivity control during AP-23.00 Ramp: 154 gallons of Boric Acid needed to reduce power to 75%. 25 second Emergency Boration. Normal boration at an average rate of 6.2 gpm. Control Bank 'D' rod height at end of ramp 197 Steps. 1919 gallons of PG to stabilize at end of ramp.
	SRO	Completes Brief and continues with AP-23.00.
		0-AP-23.00
	SRO	Caution Prior to Step 1: • Conservative decision-making must be maintained during rapid load reductions. Refer to Attachment 1 for trip criteria. Notes Prior to Step 1: • Actions that can be completed independently of preceding steps may be performed out of sequence as directed by the SRO • When the Turbine is not being actively ramped, the REFERENCE and SETTER values must remain matched to prevent inadvertent ramp. • Pre-planned reactivity plans located in the Main Control Room will be used as guidance for ramping down to the desired power level. • The ramp rate in IMP OUT is nonlinear and therefore pre-planned reactivity plans based on IMP IN are not as accurate. However, total amounts of boration and dilution can be used as guidance. • For ramp rates greater than or equal to 1%/minute, Rod Control should remain in Automatic if available.
		0-AP-23.00
	RO	1. **TURN ON ALL PRZR HEATERS**

Event Description: Ramp Unit to < 75% per 0-AP-23.00.

Cue: When initiated by Team.

		0-AP-23.00
	BOP	2. INITIATE PLANT LOAD REDUCTION AT 2%/MINUTE OR LESS:
		a) Verify turbine valve position - NOT ON LIMITER
	RO	The turbine is NOT on the limiter.
	SRO/BOP	Note: If Turbine MAN was used. If the Limiter was used to reduce power then the team will have to ramp off of the limiter.
		b) Insert control rods in AUTO or MANUAL as necessary to maintain Tave and Tref within 5°F.
	BOP	c) **Verify or place turbine in IMP IN or IMP OUT as determined by Shift Supervision**
		Note: *SRO may direct BOP to place turbine in Operator Auto.*
	BOP	The SRO can choose IMP IN or IMP OUT.
		d) **Adjust SETTER to desired power level**
		e) **Adjust LOAD RATE %/MIN thumbwheel to desired ramp rate (1%/minute)**
		f) **Initiate Turbine load reduction using OPERATOR AUTO (pushes the GO button)**
		g) **Reduce Turbine Valve Position Limiter as load lowers**
		The BOP will periodically reduce the limiter setpoint during the ramp.
		0-AP-23.00
	SRO	3. CHECK EMERGENCY BORATION – REQUIRED
		The team may decide to emergency borate after the ramp has progressed to the point that Tave and Tref are matched (or close).
		0-AP-23.00
	SRO	Note Prior to Step 4: • Step 4 or Step 5 may be performed repeatedly to maintain Tave and Tref matched, ΔFlux in band, and control rod position above the LO-LO insertion limit.

Event Description: Ramp Unit to < 75% per 0-AP-23.00.

Cue: When initiated by Team.

	RO	0-AP-23.00 4. PERFORM AN EMERGENCY BORATION IAW THE FOLLOWING: a) Verify or raise CHG flow to greater than 75 gpm b) **Transfer the in-service BATP to FAST** c) **Open 1-CH-MOV-1350** SRO will direct nominal opening of approximately 25 seconds. d) Monitor EMRG BORATE FLOW • 1-CH-FI-1110 e) After required emergency boration, perform the following: 1) **Close 1-CH-MOV-1350** 2) **Transfer the in-service BATP to AUTO** 3) Restore Charging flow control to normal SRO may direct rod motion to maintain Δ Flux within specified band.
	RO	0-AP-23.00 5. ESTABLISH A NORMAL BORATION TO MAINTAIN CONTROL ROD POSITION ABOVE THE LO-LO INSERTION LIMITS IAW ATTACHMENT 4 Attachment 4 (Boration) and 5 (Manual Makeups) are at the end of this section. SRO may direct manual rod motion to maintain Δ flux within specified band.
	SRO	0-AP-23.00 Notes Prior to Step 6: • If at any time plant conditions no longer require rapid load reduction, actions should continue at Step 36. • RCS Tave must be maintained less than or equal to 577°F and RCS pressure must be maintained greater than or equal to 2205 psig. Tech Spec 3.12.F.1 should be reviewed if either parameter is exceeded. • I & C should be contacted to provide assistance with adjusting IRPIs.
	RO	0-AP-23.00 6. CONTROL RAMP RATE TO MAINTAIN RCS PRESSURE GREATER THAN 2205 PSIG

Event Description: Ramp Unit to < 75% per 0-AP-23.00.

Cue: When initiated by Team.

	RO	0-AP-23.00 *7. CHECK LETDOWN ORIFICES – TWO IN SERVICE *Evaluator note: two orifices will already be in service.*
	BOP	0-AP-23.00 8. MONITOR STEAM DUMPS FOR PROPER OPERATION
	SRO	0-AP-23.00 9. NOTIFY THE FOLLOWING: • Energy Supply (MOC) • Polishing Building • Chemistry • OMOC
	SRO	0-AP-23.00 10. EVALUATE THE FOLLOWING: • EPIP applicability *The Shift Manager will review EPIPs for applicability. They are not applicable.* • VPAP-2802, NOTIFICATIONS AND REPORTS, applicability *SRO directs STA to review VPAP-2802. The STA reports that review of VPAP-2802 is complete and no notifications are required.* *No further actions are required for this event.*
	SRO	0-AP-23.00 11. CHECK RAMP WILL BE TO LESS THAN APPROXIMATELY 35% REACTOR POWER No, go to step 12.
	SRO	0-AP-23.00 12. CHECK REACTOR POWER – HAS LOWERED MORE THAN 15% IN ONE HOUR. When reactor power has lowered >15%, then chemistry will be notified.

Event Description: Ramp Unit to < 75% per 0-AP-23.00.

Cue: When initiated by Team.

	SRO	0-AP-23.00 13. NOTIFY CHEMISTRY OF POWER CHANGE > 15% IN ONE HOUR. Chemistry notified of power change > 15% in one hour.
	SRO	0-AP-23.00 CAUTION: Secondary plant evolutions affecting Feedwater Flow or temperature will affect RCS temperature and Reactor Power. This effect will be greater at beginning of core life due to a lower value for isothermal temperature coefficient. The operating team must be prepared to mitigate the effects of the secondary evolutions on the RCS. *RO acknowledges the Caution.*
	SRO	0-AP-23.00 14. AT APPROXIMATELY 70% REACTOR POWER CHECK AUXILIARY STEAM MAINTAINING BETWEEN 160 AND 180 PSIG. *RO Acknowledges the step.*
		END EVENT #5

Event Description: Ramp Unit to < 75% per 0-AP-23.00.

Cue: When initiated by Team.

		0-AP-23.00 Attachment 4 (NORMAL BORATION) Actions
	RO	1. **Place the MAKE-UP MODE CNTRL switch in the STOP position.**
	RO	2. **Adjust 1-CH-YIC-1113 to desired total gallons**
	RO	3. **Adjust 1-CH-FC-1113A to desired flow rate.**
	RO	4. **Place the MAKE-UP MOD SEL switch in the BORATE position**.
	RO	5. **Place the MAKE MODE CNTRL switch in the START position.**
	RO	6. Verify proper valve positions.
	RO	7. Adjust boration rate using 1-CH-FC-1113A, as necessary.
	RO	8. WHEN boration is complete, THEN perform the following. IF boric acid is to remain in the Blender to support ramping the Unit, THEN enter N/A. a) Manually blend approximately 20 gallons to flush the boration path IAW Attachment 5, Manual Makeups. b) Enter N/A for the remaining steps in this Attachment. *Attachment 5 is on the next page*
	RO	9. Verify controllers for Primary Grade water and Boric Acid are set correctly.
	RO	10. **Place the MAKE-UP MODE SEL switch in the AUTO position.**
	RO	11. **Place the MAKE-UP MODE CNTRL switch in the START position.**
	RO	12. Notify Shift Supervision of blender status.

Event Description: Ramp Unit to < 75% per 0-AP-23.00.

Cue: When initiated by Team.

		0-AP-23.00 Attachment 5 (Manual Makeups) Actions
		1. Place the MAKE-UP MODE CNTRL switch in the STOP position.
		2. Check controllers for the flow rate of Boric Acid and Primary Grade water are set correctly.
		3. Check integrators for the gallons of Boric Acid and Primary Grade water are set correctly.
		4. Place the MAKE-UP MODE SEL switch in the MANUAL position.
		5. Place the MAKE-UP MODE CNTRL switch in the START position.
		6. Open 1-CH-FCV-1113B, BLENDER TO CHG PUMP.
		7. Check proper valve positions.
		8. WHEN the Manual Makeup operation is complete, THEN place 1-CH-FCV-1 113B in the AUTO position
		9. Place the MAKE-UP MODE CNTRL switch in the STOP position.
		10. Check or place the control switches in the AUTO position.
		11. Check controllers for Primary Grade water and Boric Acid are set correctly.
		12. Place the MAKE-UP MODE SEL switch in the AUTO position.
		13. Place the MAKE-UP MODE CNTRL switch in the START position.
		14. Notify Shift Supervision of blender status.

Event Description: Main Steamline Rupture with ATWS.

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
	Team	Diagnose the failure based upon the following alarms and indications: Annunciator 1H-A4, T AVG < > T REF DEVIATION Annunciator 1F-F4,(G4), STM GEN 1A CH3 (CH4) HI STM LINE FLOW Annunciator 1F-F5 (G5), STM GEN 1B CH3 (CH4) HI STM LINE FLOW Annunciator 1F-F6 (G6), STM GEN 1C CH3 (CH4) HI STM LINE FLOW Annunciator 1C-B8, PRZR LO PRESS All SG NR Level indications rising Note: All RCPs will trip in approximately 4 minutes.
	SRO	Direct RO to trip the reactor and perform the Immediate Actions of 1-E-0.
	RO	1-E-0, Reactor Trip or Safety Injection [1] CHECK REACTOR TRIP: a) Manually trip reactor **Presses reactor trip buttons (both).** *RO determines Rx Trip breakers do NOT open after BOTH Reactor trip buttons are depressed.* *RO enters 1-FR-S.1.*
	RO	1-FR-S.1 Step 1 [1] VERIFY REACTOR TRIP. No perform step 1 RNO. *RO performs step 1 RNO, and verifies control rods are in AUTO*
	RO	1-FR-S.1 Step 2 [2] MANUALLY TRIP THE TURBINE. ❑ Verify all Turbine stop valves closed *RO Manually trips the turbine and verifies all turbine stop valves closed.*

Event Description: Main Steamline Rupture with ATWS.

Cue: By Examiner.

		1-FR-S.1 Step 3
	RO	[3] VERFIES CONTROL RODS – INSERTING IN AUTO AT GREATER THAN 48 STEPS/MINUTE *RO continuously monitors rod insertion, and places rods in MANUAL and inserts rods if rod insertion drops to < 48 steps/minute.*
	BOP	*Contacts Field Operator and directs locally opening of the Unit 1 Reactor Trip breakers.* NOTE: this direction can occur earlier or later. FR-S.1 will procedurally direct this at step 8.
		1-FR-S.1 Step 4
	SRO	4. VERIFY AFW PUMPS RUNNING ❑ MD AFW pumps – RUNNING ❑ TD AFW pump – RUNNING IF NECESSARY.
	RO	*RO verifies no lockouts on MD AFW pumps, and starts 1-FW-P-3A, and 1-FW-P-3B.*
		Critical Task **CT-3:** Manually start AFW pumps as needed before SG WR level decreases to <7% on both intact S/Gs.
		1-FR-S.1 Step 5
	SRO	5. INITIATE EMERGENCY BORATION OF RCS ❑ Verify CHG flow – GREATER THAN 75 GPM. ❑ Align boration path:
	RO	o **Put BATP in FAST** o **Open 1-CH-MOV-1350** o Verify emergency borate flow. *RO initiates emergency boration.*

Event Description: Main Steamline Rupture with ATWS.

Cue: By Examiner.

		1-FR-S.1 Step 6
	SRO	6. CHECK IF SI INITIATED ❑ LHSI pumps RUNNING ❑ SI annunciators LIT (AF-3, AF-4)
	RO	*RO reports that SI is initiated.*
		1-FR-S.1 Step 7
	SRO	7. INITIATE ATTACHMENT 1.
	BOP	*BOP initiates Attachment 1, SRO continues in 1-FR-S.1 with RO.* Note: FR-S.1, Attachment 1 is included in next section.
		1-FR-S.1 Step 8
	SRO	8. CHECK IF THE FOLLOWING HAVE OCCURRED: ❑ Reactor Trip ❑ Turbine Trip
	RO/BOP	*RO/BOP reports that the reactor failed to auto trip or manual trip and dispatches operator to locally trip the reactor trip and bypass breakers.* Note: This action may have already been taken.
		1-FR-S.1 Step 9 Note before Step 9.
	SRO	If adverse CTMT conditions have been exceeded, the Gamma-Metrics Excore Neutron Monitor system (Source and Wide Ranges) should be used to monitor neutron flux for the duration of the event. 9. CHECK REACTOR SUBCRITICAL ❑ a. Check power range channels – LESS THAN 5% [Gamma-Metrics "Wide Range power – LESS THAN 5%] ❑ b. Check intermediate range channels –NEGATIVE STARTUP RATE [Gamma-Metrics Wide Range Power – DECREASING] ❑ c. GO TO Step 18
	RO	*RO reports that power range channels are < 5% and Intermediate Range startup rate is negative.* SRO goes to Step 18.

Event Description: Main Steamline Rupture with ATWS.

Cue: By Examiner.

	SRO	1-FR-S.1 Step 18 CAUTION before Step 18. Boration should be continued to obtain adequate shutdown margin during subsequent actions. 18. RETURN TO PROCEDURE AND STEP IN EFFECT. SRO goes to 1-E-0, directs RO to perform Immediate actions of E-0.

Event Description: Main Steamline Rupture with ATWS.

Cue: By Examiner.

		1-E-0 Step 1
	RO	[1] CHECK REACTOR TRIP: a) Manually trip reactor Presses reactor trip button. b) Check the following: All Rods On Bottom light – LIT Identifies All Rods on Bottom LIT on CERPI Screen. Reactor trip and bypass breakers – OPEN Identifies Reactor Trip and Bypass breakers Open on Benchboard Mimic. Neutron flux – LOWERING Identifies PR NI N41, N42, and N43 indications at ~0%; and IR indicators N35/N36 Lowering. Reports to SRO “Reactor Tripped”.

Event Description: Main Steamline Rupture with ATWS.

Cue: By Examiner.

	RO	1-E-0 Step 2 [2] CHECK TURBINE TRIP: a) Manually trip the turbine Presses both Turbine Trip pushbuttons – simultaneously. b) Check all turbine stop valves – CLOSED Identifies Turbine SVs closed using indication lights on Turbine Control section. c) Isolate reheaters by closing MSR steam supply SOV 1-MS-SOV-104 **Places 1-MS-SOV-104 control switch in close.** d) Check generator output breakers – OPEN (Time Delayed) Identifies Main generator output breakers open. Reports to SRO "Turbine is Tripped".
	RO	1-E-0 Step 3 [3] CHECK BOTH AC EMERGENCY BUSES – ENERGIZED Identifies "H" and "J" buses are energized by checking Voltage indicated on #1 and #3 EDG control panels. Reports "Both AC Emergency Buses energized."

Event Description: Main Steamline Rupture with ATWS.

Cue: By Examiner.

	RO	1-E-0 Step 4 [4] CHECK IF SI INITIATED: a) Check if SI is actuated: LHSI pumps – RUNNING Identifies A/B LHSI pumps running using breaker and amp indications. SI annunciators – LIT A-F-3 (SI Initiated Train A) A-F-4 (SI Initiated Train B) Identifies both Annunciators LIT. b) Manually initiate SI **Presses Manual SI buttons, Train "A" and Train "B".** Reports E-0 Immediate Actions are complete, Have SI flow to the core."
	SRO	1-E-0, Reactor Trip or Safety Injection Hands out Continuous Action Pages for E-0 to RO and BOP, provides Attachments 1, 2, and 3 to BOP. Leads a Transient Brief to describe the Plant Status, and asks RO/BOP if any items identified during the E-0 Immediate Actions would have higher priority than continuing with E-0. RO/BOP may identify MSTVs failing to close following safety injection. STA will have no input for the brief. SRO closes the Transient Brief and continues E-0 with the RO.

Event Description: Main Steamline Rupture with ATWS.

Cue: By Examiner.

		1-E-0 Step 5
	SRO	5. INITIATE ATTACHMENT 1 Directs BOP to perform E-0 Attachment 1, 2, and 3. E-0 Attachments and components BOP will identify and reposition begin in next section on page 55.
		Critical Task **CT-4**: Close Main Steam Trip valves prior to reaching an orange path on Integrity (FR-P.1). Critical Task **begins** when the Main Steamline rupture occurs and **ends** when the Main Steam Trip valves are closed. Note: It is anticipated that this critical task will be accomplished during Attachment 1 by the BOP OR at Step 6 by the RO.
		1-E-0 Step 6
	SRO RO	*6. CHECK RCS AVERAGE TEMPERATURE STABLE AT 547°F OR TRENDING TO 547°F
	SRO	Report NO, RCS Temperature lowering (and provide current Tave value). Goes to Step 6 RNO
	RO	IF temperature less than 547°F AND lowering, THEN do the following: a) Stop dumping steam. Reports Yes, Steam Dumps are closed.
	SRO	b) IF cooldown continues, THEN control total feed flow. Maintain total feed flow greater than 350 gpm [450 gpm] until narrow range level greater than 12% [18%] in at least one SG. Identify RCS Tave Lowering.
	RO	Direct RO to throttle AFW to each SG to ~120 gpm. Throttle AFW to the SGs to ~120 gpm per SG and report when complete.
	SRO	c) IF Cooldown continues, THEN close MSTVs.
	RO	**RO CLOSES MSTVs.**
		CT-4: Close Main Steam Trip valves prior to reaching an orange path on Integrity (FR-P.1).

Event Description: Main Steamline Rupture with ATWS.

Cue: By Examiner.

		1-E-0 Step 7
	SRO	7. CHECK PRZR PORVs AND SPRAY VALVES:
		a) PRZR PORVs – CLOSED
	RO	Reports Yes, PRZR PORVs closed.
	SRO	b) PRZR spray controls Demand at Zero OR Controlling pressure
	RO	Reports Yes, Demand at zero.
	SRO	c) PORV block valves - AT LEAST ONE OPEN
	RO	Reports Yes, both block valves open.
		1-E-0 Step 8
	SRO	NOTE Prior to Step 8: Seal injection flow should be maintained to all RCPs.
	RO	Acknowledges NOTE.
	SRO	*8. CHECK RCP TRIP AND MINIFLOW RECIRC CRITERIA:
		a) Charging Pumps - AT LEAST ONE RUNNING AND FLOWING TO RCS
	RO	Reports Yes, 3 running and flowing to the RCS. May report 2 running depending upon BOP speed of progression through E-0, Attachment 1.
	SRO	b) RCS subcooling - LESS THAN 30°F [85°F]
	RO	Reports No, subcooling is (provides actual subcooling value and trend.)
	SRO	Step 8 RNO: Goes to Step 9.

Event Description: Main Steamline Rupture with ATWS.

Cue: By Examiner.

	SRO	1-E-0 Step 9 9. CHECK IF SGs ARE NOT FAULTED: Check pressures in all SGs: STABLE OR RISING AND GREATER THAN 100 PSIG
	RO	Reports Yes, SG pressures are (current value) and not lowering. Note: It is anticipated that Main Steam Trip valves are isolated at this point. If crew has not isolated Main Steam Trip valves then they may believe that all SGs are faulted and enter E-2. The first 3 steps of E-2 are included at the end of this section, page 54.
	SRO	1-E-0 Step 10 10. CHECK IF SG TUBES ARE NOT RUPTURED: Condenser air ejector radiation - NORMAL SG blowdown radiation – NORMAL SG MS radiation – NORMAL TD AFW pump exhaust radiation – NORMAL SG NR level – NOT RISING IN AN UNCONTROLLED MANNER
	RO	Reports Yes, SG Tubes are not ruptured.
	SRO	1-E-0 Step 11 11. CHECK RCS - INTACT INSIDE CTMT CTMT radiation – NORMAL CTMT pressure – NORMAL CTMT RS sump level – NORMAL
	RO	Reports Yes, the RCS is intact inside containment.

Event Description: Main Steamline Rupture with ATWS.

Cue: By Examiner.

		1-E-0 Step 12
	SRO	12. CHECK RCS – HAS BEEN MAINTAINED INTACT OUTSIDE CTMT a) Radiation Monitors – Normal • MGPI vent-vent • Auxiliary Building Control Area b) Sump annunciators – NOT LIT • VSP-F4 • 1B-D1 • 1B-D2 • 1B-F3
	RO	Reports Yes, RCS has been maintained intact outside containment.
		1-E-0 Step 13
	SRO	13. CHECK IF SI FLOW SHOULD BE REDUCED. a) RCS subcooling based on CETCs – GREATER THAN 30°F b) Secondary heat sink: • Total feed flow to SGs – GREATER THAN 350 GPM OR • Narrow range level in at least one SG – GREATER THAN 12% c) RCS pressure – STABLE OR RISING d) PRZR level – GREATER THAN 22%
	RO	Reports to all Yes, SI flow should be reduced.
		1-E-0 Step 14
	SRO	14. HAVE STA INITIATE MONITORING OF CRITICAL SAFETY FUNCTION STATUS TREES. Directs STA to monitor Critical Safety Function Status Trees. STA acknowledges direction.
		1-E-0 Step 15
	SRO	15. RESET BOTH TRAINS OF SI.
	RO	Resets both trains of SI.
		1-E-0 Step 16
	SRO	16. RESET CLS: a) Check CTMT pressure – HAS EXCEEDED 17.7 psia.
	RO	Reports No CTMT pressure has not exceeded 17.7 psia. Goes to step 17

Event Description: Main Steamline Rupture with ATWS.

Cue: By Examiner.

		1-E-0 Step 17
	SRO	17. CHECK INSTRUMENT AIR AVAILABLE a) Check annunciator 1B-E6 – NOT LIT b) Check at least one CTMT IA compressor RUNNING • 1-IA-C-4A or 1-IA-C-4B c) Check 1-IA-TV-100 OPEN.
	RO	Reports that Instrument Air is available.
		1-E-0 Step 18
	SRO	18. STOP ALL BUT ONE CHG PUMP AND PUT IN AUTO.
	RO	Stops one Charging pump (anticipate RO stopping 1-CH-P-1B).
		1-E-0 Step 19
	SRO	19. CHECK RCS PRESSURE – STABLE OR RISING
	RO	Reports that RCS pressure is __ (report current value), and rising.
		1-E-0 Step 20
	SRO	20. ISOLATE HHSI TO COLD LEGS: a) Check CHG pump suctions from RWST OPEN: • 1-CH-MOV-1115B • 1-CH-MOV-1115D b) Check CHG pump miniflow recirc valves – OPEN. • 1-CH-MOV-1275A • 1-CH-MOV-1275B • 1-CH-MOV-1275C • 1-CH-MOV-1373 c) Close HHSI to Cold Leg: • **1-SI-MOV-1867C** • **1-SI-MOV-1867D** • **1-SI-MOV-1842**
	RO	Performs above actions to isolate HHSI to Cold Legs.

Event Description: Main Steamline Rupture with ATWS.

Cue: By Examiner.

	SRO RO	1-E-0 Step 21 21. ESTABLISH CHG FLOW a) Close CHG flow control • **1-CH-MOV-1122** b) Check CHG line isolation -OPEN • 1-CH-HCV-1310A c) Open CHG line isolation MOVs • **1-CH-MOV-1289A** • **1-CH-MOV-1289B** Performs actions to establish CHG flow.
		1-E-0 Step 22 22. CONTROL CHG FLOW TO MAINTAIN PRZR LEVEL Reports, controlling CHG flow to maintain PRZR level.
		1-E-0 Step 23 23. GO TO 1-ES-1.1, SI TERMINATION, STEP 9

Event Description: Main Steamline Rupture with ATWS.

Cue: By Examiner.

		1-ES-1.1, SI Termination
	SRO	The SRO will lead a transient brief summarizing the Event and Establish priorities. The RO/BOP will report Annunciators received related to the event, and Critical Parameters affected. STA will have no input for the brief.
		1-ES-1.1, SI Termination
	SRO	9. CHECK IF LHSI PUMPS SHOULD BE STOPPED: a) Check LHSI pumps - ANY RUNNING WITH SUCTION ALIGNED TO RWST
	RO	Reports Yes, LHSI pump suction aligned to RWST.
	SRO	b) Stop LHSI pumps and put in Auto
	RO	**Stops the running LHSI pump and places in auto**.
		1-ES-1.1, SI Termination
	SRO	10. CHECK SI FLOW NOT REQUIRED: a) RCS subcooling based on CETCs - GREATER THAN 30°F [85°F]
	RO	Reports Yes, and provides subcooling value and trend
	SRO	b) Control charging flow to maintain PRZR level greater than 22% [50%]
	RO	Reports Yes, and provides actual PRZR level and trend
		1-ES-1.1, SI Termination
	SRO	11. CHECK IF CS SHOULD BE STOPPED: a) Spray pumps - ANY RUNNING
	RO	Reports No, spray pumps not running
	SRO	Goes to Step 13.

Event Description: Main Steamline Rupture with ATWS.

Cue: By Examiner.

		1-ES-1.1, SI Termination
	SRO	13. CHECK CC SYSTEM STATUS: a) Check SW to RS HXs – ISOLATED
	RO	Reports Yes, SW to RSHXs isolated
	SRO	b) Check SW to CC HXs - IN SERVICE
	RO	Reports Yes, SW to CCHXs in service.
	SRO	c) Check CC pumps - AT LEAST ONE RUNNING
	RO	Reports Yes, 1-CC-P-1B running.
		1-ES-1.1, SI Termination
	SRO	14. CHECK PRZR LEVEL – GREATER THAN 35% [63%]
	RO	Reports Yes, and provides actual PRZR level and trend.
		1-ES-1.1, SI Termination
	SRO	15. ESTABLISH LETDOWN: a) Adjust CHG line flow to establish greater than 40 gpm.
	RO	**Adjusts 1-CH-FCV-1122 to approximately 45 gpm on 1-CH-FI-1122**.
	SRO	b) Open letdown line pressure control valve: • 1-CH-PCV-1145 **Places 1-CH-PCV-1145 in manual and lowers demand to 0**.
	SRO	c) Check closed or close letdown orifice isolation valves: • 1-CH-HCV-1200A • 1-CH-HCV-1200B • 1-CH-HCV-1200C
	RO	Identifies Letdown orifice isolation valves closed.
	SRO	d) Open letdown isolation valves: **• 1-CH-TV-1204A** **• 1-CH-TV-1204B** **• 1-CH-LCV-1460A** **• 1-CH-LCV-1460B**
	RO	Opens bolded valves above

Event Description: Main Steamline Rupture with ATWS.

Cue: By Examiner.

		1-ES-1.1, SI Termination, Step 15 (Continued).
	SRO	e) Open letdown orifice isolation valve(s).
	RO	**Open 1-CH-HCV-1200A and 1-CH-FCV-1200B**.
	SRO	f) Adjust letdown line pressure control valve to maintain letdown pressure: • 1-CH-PCV-1145
	RO	**Adjusts demand on 1-CH-PCV-1145 until Letdown Pressure on 1-CH-PI-1145 at approximately 300 psig and places 1-CH-PCV-1145 in Auto.**
	SRO	g) Adjust NRHX outlet temperature control valve to control letdown temperature, if necessary: • 1-CC-TCV-103
	RO	Checks 1-CC-TCV-103 controlling (1-CC-TCV-103 controller in Auto and demand approximately 70 – 90%. Note: *RO may place 1-CC-TCV-103 in manual, lower demand, and return controller to Auto to remove build-up of controller saturation.*
		END OF EVENT 6 **END OF SCENARIO**

Event Description: FOLDOUTS AND ATTACHMENTS

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NUMBER 1-FR-S.1	ATTACHMENT TITLE VERIFYING APPLICABLE STEPS OF 1-E-0	ATTACHMENT 1
REVISION 26		PAGE 1 of 8

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. ___	VERIFY REACTOR TRIP:	☐ Verify that an Operator has been sent to perform local trip.
	☐ a) Manually trip reactor	
	b) Check the following:	
	☐ • All Rods On Bottom light - LIT	
	☐ • Reactor trip and bypass breakers - OPEN	
	☐ • Neutron flux - DECREASING	
2. ___	VERIFY TURBINE TRIP:	
	☐ a) Manually trip turbine	
	☐ b) Verify all turbine stop valves - CLOSED	b) Verify either of the following: ☐ • All Turbine Governor Valves - CLOSED OR ☐ • Turbine speed - DECREASING OR ☐ • Generator Motoring - INITIATED ☐ IF turbine will NOT trip, THEN close MSTVs.
	c) Isolate reheaters by closing MSR steam supply SOV	☐ c) IF reheater FCVs will NOT close, THEN close MSR steam supply MOVs.
	☐ • 1-MS-S0V-104	
	☐ d) Verify generator output breakers - OPEN (Time Delayed)	☐ d) IF Generator Output Breakers do NOT open within 30 seconds, THEN manually open output breakers AND place the EXCITATION control switch in OFF.

Event Description: FOLDOUTS AND ATTACHMENTS

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NUMBER 1-FR-S.1	ATTACHMENT TITLE VERIFYING APPLICABLE STEPS OF 1-E-0	ATTACHMENT 1
REVISION 26		PAGE 2 of 8

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3. ___	VERIFY BOTH AC EMERGENCY BUSES - ENERGIZED	Do the following: ☐ a) IF no AC Emergency Bus is energized, THEN GO TO 1-ECA-0.0, LOSS OF ALL AC POWER. ☐ b) Try to restore power to deenergized AC Emergency Bus. Initiate 1-AP-10.07, LOSS OF UNIT 1 POWER.
4. ___	CHECK IF SI INITIATED: a) Check if SI is actuated: ☐ • LHSI pumps - RUNNING • Safety Injection system Initiated annunciators - LIT ☐ • A-F-3 ☐ • A-F-4 ☐ b) Manually initiate SI	a) Check if SI is required or imminent as indicated by any of the following: ☐ • Low PRZR pressure ☐ • High CTMT pressure ☐ • High steamline differential pressure ☐ • High steam flow with low Tave or low line pressure ☐ IF SI is required, THEN GO TO Step 4b. ☐ IF SI is NOT required, THEN GO TO 1-ES-0.1, REACTOR TRIP RESPONSE.

Event Description: FOLDOUTS AND ATTACHMENTS

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NUMBER 1-FR-S.1	ATTACHMENT TITLE VERIFYING APPLICABLE STEPS OF 1-E-0	ATTACHMENT 1
REVISION 26		PAGE 3 of 8

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5.	VERIFY FW ISOLATION: • Feed pump discharge MOVs - CLOSED ☐ • 1-FW-MOV-150A ☐ • 1-FW-MOV-150B ☐ • MFW pumps - TRIPPED ☐ • Feed REG valves - CLOSED ☐ • SG FW bypass flow valves - DEMAND AT ZERO ☐ • SG blowdown TVs - CLOSED	☐ Manually close valves and stop pumps.
6.	VERIFY CTMT ISOLATION PHASE I: ☐ • Phase I TVs - CLOSED ☐ • 1-CH-MOV-1381 - CLOSED ☐ • 1-SV-TV-102A - CLOSED • PAM isolation valves - CLOSED ☐ • 1-DA-TV-103A ☐ • 1-DA-TV-103B	☐ Manually close valves.
7.	VERIFY AFW PUMPS REQUIRED: ☐ a) MD AFW pumps - RUNNING (Time Delayed) ☐ b) TD AFW pump - RUNNING IF NECESSARY	☐ a) Manually start pumps. b) Manually open steam supply valves. ☐ • 1-MS-SOV-102A ☐ • 1-MS-SOV-102B

Event Description: FOLDOUTS AND ATTACHMENTS

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NUMBER 1-FR-S.1	ATTACHMENT TITLE	ATTACHMENT 1
REVISION 26	VERIFYING APPLICABLE STEPS OF 1-E-0	PAGE 4 of 8

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8.	VERIFY SI PUMPS RUNNING: ☐ • CHG pumps - RUNNING ☐ • LHSI pumps - RUNNING	☐ Manually start pumps.
9.	CHECK CHG PUMP AUXILIARIES: ☐ • CHG pump CC pump - RUNNING ☐ • CHG pump SW pump - RUNNING	☐ Manually start pumps.
10.	CHECK INTAKE CANAL: ☐ • Level - GREATER THAN 24 FT ☐ • Level - BEING MAINTAINED BY CIRC WATER PUMPS	☐ IF level is less than 24 FT OR decreasing in an uncontrolled manner, THEN initiate 0-AP-12.01, LOSS OF INTAKE CANAL LEVEL.

Event Description: FOLDOUTS AND ATTACHMENTS

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NUMBER 1-FR-S.1	ATTACHMENT TITLE	ATTACHMENT 1
REVISION 26	VERIFYING APPLICABLE STEPS OF 1-E-0	PAGE 5 of 8

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11. ___	CHECK IF MAIN STEAMLINES SHOULD BE ISOLATED:	
	a) Check if ANY of the following annunciators - HAVE BEEN LIT	a) Do the following:
	☐ • E-F-10 (High Steam Flow SI) ☐ • B-C-4 (Hi Hi CLS Train A) ☐ • B-C-5 (Hi Hi CLS Train B)	☐ IF annunciator E-H-10 (Hdr/Line SI) LIT, THEN GO TO Step 11d. ☐ IF annunciator E-H-10 NOT LIT, THEN GO TO Step 12.
	☐ b) Check MSTVs - CLOSED	☐ b) Manually close valves.
	c) Check either of the following - ACTUATED	☐ c) GO TO Step 12.
	☐ • Hi steam flow SI OR ☐ • Header to line SI	
	d) Verify RWST crosstie valves - OPEN	☐ d) Manually open valves.
	☐ • 1-SI-TV-102A ☐ • 1-SI-TV-102B ☐ • 2-SI-TV-202A ☐ • 2-SI-TV-202B	
	☐ e) Check RCS pressure - LESS THAN 185 PSIG	☐ e) Put BOTH RMT mode transfer switches in REFUEL.

Event Description: FOLDOUTS AND ATTACHMENTS

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NUMBER 1-FR-S.1	ATTACHMENT TITLE VERIFYING APPLICABLE STEPS OF 1-E-0	ATTACHMENT 1
REVISION 26		PAGE 6 of 8

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*12. ___	CHECK IF CS REQUIRED:	
	☐ a) CTMT pressure - HAS EXCEEDED 23 PSIA	a) Do the following: 1) IF CTMT pressure has exceeded 17.7 psia, THEN verify or align the following valves: ☐ • 1-RM-TV-100A - CLOSED ☐ • 1-RM-TV-100B - CLOSED ☐ • 1-RM-TV-100C - CLOSED ☐ • 1-SV-TV-102 - CLOSED ☐ • 1-IA-TV-101A - CLOSED ☐ • 1-IA-TV-101B - CLOSED ☐ • 1-IA-AOV-103 - OPEN ☐ 2) GO TO Step 14.
	☐ b) Manually initiate HI HI CLS	
	☐ c) Trip all RCPs	
	☐ d) Verify CS pumps - RUNNING	☐ d) Manually start pump(s).
	☐ e) Initiate Attachment 2	

Event Description: FOLDOUTS AND ATTACHMENTS

.

NUMBER 1-FR-S.1	ATTACHMENT TITLE	ATTACHMENT 1
REVISION 26	VERIFYING APPLICABLE STEPS OF 1-E-0	PAGE 7 of 8

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*13. ___	CHECK IF RS REQURIED:	
	☐ a) Check RWST level - LESS THAN OR EQUAL TO 60%	a) Do the following: ☐ 1) Continue to monitor RWST level. ☐ 2) GO TO Step 14. IF RWST level decreases to less than or equal to 60%, THEN perform Step 13b through Step 13d.
	☐ b) Check ISRS pumps - RUNNING	☐ b) Manually Start Pumps.
	☐ c) Check OSRS pumps - RUNNING (Time Delayed)	☐ c) Manually Start Pumps.
	☐ d) Check OSRS pumps - NOT CAVITATING	☐ d) Put affected OSRS pump in PTL.
*14. ___	BLOCK LOW PRZR PRESS SI SIGNAL:	
	☐ a) Check PRZR pressure - LESS THAN 2000 psig	☐ a) GO TO Step 15. WHEN PRZR pressure less than 2000 psig, THEN perform Steps 14b and 14c.
	☐ b) Turn both LO PRZR PRESS & STM HDR/LINE ΔP switches to block	
	☐ c) Verify Permissive Status light C-2 - LIT	
*15. ___	BLOCK LOW TAVE SI SIGNAL:	
	☐ a) Check RCS Tave - LESS THAN 543°F	☐ a) GO TO Step 16. WHEN Tave less than 543°F, THEN perform Steps 15b and 15c.
	☐ b) Turn both HI STM FLOW & LO TAVG OR LP switches to block	
	☐ c) Verify Permissive Status light F-1 - LIT	

Event Description: FOLDOUTS AND ATTACHMENTS

.

NUMBER 1-FR-S.1	ATTACHMENT TITLE	ATTACHMENT 1
REVISION 26	VERIFYING APPLICABLE STEPS OF 1-E-0	PAGE 8 of 8

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	NOTE: • CHG pumps should be run in the following order of priority: C, B, A. • Subsequent SI signals may be reset by reperforming Step 16.	
16.	VERIFY SI FLOW:	
	a) HHSI to cold legs - FLOW INDICATED ☐ • 1-SI-FI-1961 (NQ) ☐ • 1-SI-FI-1962 (NQ) ☐ • 1-SI-FI-1963 (NQ) ☐ • 1-SI-FI-1943 or 1-SI-FI-1943A	☐ a) Manually start pumps and align valves. IF flow NOT established, THEN consult with Shift Supervision to establish another high pressure injection flowpath while continuing with this procedure. ☐ • Alternate SI to cold legs ☐ • Hot leg injection
	☐ b) Check CHG pumps - THREE RUNNING	☐ b) GO TO Step 16e.
	☐ c) Reset SI	
	☐ d) Stop one CHG pump and put in AUTO	
	☐ e) RCS pressure - LESS THAN 185 PSIG	e) IF two LHSI pumps are running, THEN do the following: ☐ 1) Verify reset or reset SI. ☐ 2) Stop one LHSI pump and put in AUTO. ☐ 3) RETURN TO procedure step in effect. IF one LHSI pump running, THEN RETURN TO procedure step in effect.
	☐ f) LHSI flow - INDICATED	☐ f) Manually start pumps and align valves.

Event Description: FOLDOUTS AND ATTACHMENTS

.

NUMBER 1-E-0	ATTACHMENT TITLE	ATTACHMENT 1
REVISION 71	SYSTEM ALIGNMENT VERIFICATION	PAGE 1 of 7

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. ___	CHECK FW ISOLATION:	☐ Manually close valves and stop pumps.
	• Feed pump discharge MOVs - CLOSED	
☐	• 1-FW-MOV-150A	
☐	• 1-FW-MOV-150B	
☐	• MFW pumps - TRIPPED	
☐	• Feed REG valves - CLOSED	
☐	• SG FW bypass flow valves - DEMAND AT ZERO	
☐	• SG blowdown TVs - CLOSED	
2. ___	CHECK CTMT ISOLATION PHASE I:	☐ Manually close valves.
☐	• Phase I TVs - CLOSED	
☐	• 1-CH-MOV-1381 - CLOSED	
☐	• 1-SV-TV-102A - CLOSED	
	• PAM isolation valves - CLOSED	
☐	• 1-DA-TV-103A	
☐	• 1-DA-TV-103B	
3. ___	CHECK AFW PUMPS RUNNING:	
☐	a) MD AFW pumps - RUNNING (Time Delayed)	☐ a) Manually start pumps.
☐	b) TD AFW pump - RUNNING IF NECESSARY	b) Manually open steam supply valves.
		☐ • 1-MS-SOV-102A
		☐ • 1-MS-SOV-102B

Event Description: FOLDOUTS AND ATTACHMENTS

.

NUMBER 1-E-0	ATTACHMENT TITLE SYSTEM ALIGNMENT VERIFICATION	ATTACHMENT 1
REVISION 71		PAGE 2 of 7

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. ___	CHECK SI PUMPS RUNNING: ☐ • CHG pumps - RUNNING ☐ • LHSI pumps - RUNNING	☐ Manually start pumps.
5. ___	CHECK CHG PUMP AUXILIARIES: ☐ • CHG pump CC pump - RUNNING ☐ • CHG pump SW pump - RUNNING	☐ Manually start pumps.
6. ___	CHECK INTAKE CANAL: ☐ • Level - GREATER THAN 24 FT ☐ • Level - BEING MAINTAINED BY CIRC WATER PUMPS	☐ IF level is less than 24 ft OR lowering in an uncontrolled manner, THEN initiate 0-AP-12.01, LOSS OF INTAKE CANAL LEVEL.

Event Description: FOLDOUTS AND ATTACHMENTS

.

NUMBER 1-E-0	ATTACHMENT TITLE SYSTEM ALIGNMENT VERIFICATION	ATTACHMENT 1
REVISION 71		PAGE 3 of 7

STEP	ACTION/ EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. ___	CHECK IF MAIN STEAMLINES SHOULD BE ISOLATED:	
	a) Check if ANY of the following annunciators - HAVE BEEN LIT	a) Do the following:
☐	• E-F-10 (High Steam Flow SI)	☐ IF annunciator E-H-10 (Hdr/Line SI) LIT, THEN GO TO Step 7d.
☐	• B-C-4 (Hi Hi CLS Train A)	☐ IF annunciator E-H-10 NOT LIT, THEN GO TO Step 8.
☐	• B-C-5 (Hi Hi CLS Train B)	
☐	b) Check MSTVs - CLOSED	☐ b) Manually close valves.
	c) Check either of the following - ACTUATED	☐ c) GO TO Step 8.
☐	• Hi steam flow SI	
	OR	
☐	• Header to line SI	
	d) Check RWST crosstie valves - OPEN	☐ d) Manually open valves.
☐	• 1-SI-TV-102A	
☐	• 1-SI-TV-102B	
☐	• 2-SI-TV-202A	
☐	• 2-SI-TV-202B	
☐	e) Check RCS pressure - LESS THAN 185 PSIG	☐ e) Put BOTH RMT mode transfer switches in REFUEL.

Event Description: FOLDOUTS AND ATTACHMENTS

.

NUMBER 1-E-0	ATTACHMENT TITLE SYSTEM ALIGNMENT VERIFICATION	ATTACHMENT 1
REVISION 71		PAGE 4 of 7

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*8. ___	CHECK IF CS REQUIRED:	
	☐ a) CTMT pressure - HAS EXCEEDED 23 PSIA	a) Do the following: 1) IF CTMT pressure has exceeded 17.7 psia, THEN check or align the following valves: ☐ • 1-RM-TV-100A - CLOSED ☐ • 1-RM-TV-100B - CLOSED ☐ • 1-RM-TV-100C - CLOSED ☐ • 1-SV-TV-102 - CLOSED ☐ • 1-IA-TV-101A - CLOSED ☐ • 1-IA-TV-101B - CLOSED ☐ • 1-IA-AOV-103 - OPEN ☐ 2) GO TO Step 10.
	☐ b) Manually initiate HI HI CLS	
	☐ c) Trip all RCPs	
	☐ d) Check CS pumps - RUNNING	☐ d) Manually start pump(s).
	☐ e) Initiate Attachment 4	

Event Description: FOLDOUTS AND ATTACHMENTS

.

NUMBER 1-E-0	ATTACHMENT TITLE	ATTACHMENT 1
REVISION 71	SYSTEM ALIGNMENT VERIFICATION	PAGE 5 of 7

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*9. ___	CHECK IF RS REQURIED:	
	☐ a) Check RWST level - LESS THAN OR EQUAL TO 60%	a) Do the following: ☐ 1) Continue to monitor RWST level. 2) GO TO Step 10. IF RWST level lowers to less than or equal to 60%, THEN perform Step 9b through Step 9d.
	☐ b) Check ISRS pumps - RUNNING	☐ b) Manually Start Pumps.
	☐ c) Check OSRS pumps - RUNNING (Time Delayed)	☐ c) Manually Start Pumps.
	☐ d) Check OSRS pumps - NOT CAVITATING	☐ d) Put affected OSRS pump in PTL.
*10. ___	BLOCK LOW PRZR PRESS SI SIGNAL:	
	☐ a) Check PRZR pressure - LESS THAN 2000 psig	☐ a) GO TO Step 11. WHEN PRZR pressure less than 2000 psig, THEN perform Steps 10b and 10c.
	☐ b) Turn both LO PRZR PRESS & STM HDR/LINE ΔP switches to block	
	☐ c) Check Permissive Status light C-2 - LIT	
*11. ___	BLOCK LOW TAVE SI SIGNAL:	
	☐ a) Check RCS Tave - LESS THAN 543°F	☐ a) GO TO Step 12. WHEN Tave less than 543°F, THEN perform Steps 11b and 11c.
	☐ b) Turn both HI STM FLOW & LO TAVG OR LP switches to block	
	☐ c) Check Permissive Status light F-1 - LIT	

Event Description: FOLDOUTS AND ATTACHMENTS

.

NUMBER 1-E-0	ATTACHMENT TITLE	ATTACHMENT 1
REVISION 71	SYSTEM ALIGNMENT VERIFICATION	PAGE 6 of 7

STEP	ACTION/ EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	NOTE: • CHG pumps should be run in the following order of priority: C, B, A. • Subsequent SI signals may be reset by reperforming Step 12.	
12. ___	CHECK SI FLOW:	
	a) HHSI to cold legs - FLOW INDICATED ☐ • 1-SI-FI-1961 (NQ) ☐ • 1-SI-FI-1962 (NQ) ☐ • 1-SI-FI-1963 (NQ) ☐ • 1-SI-FI-1943 or 1-SI-FI-1943A	☐ a) Manually start pumps and align valves. IF flow NOT established, THEN consult with Shift Supervision to establish another high pressure injection flowpath while continuing with this procedure. ☐ • Alternate SI to cold legs ☐ • Hot leg injection
	☐ b) Check CHG pumps - THREE RUNNING	☐ b) GO TO Step 12e.
	☐ c) Reset SI	
	☐ d) Stop one CHG pump and put in AUTO	
	☐ e) RCS pressure - LESS THAN 185 PSIG	e) IF two LHSI pumps are running, THEN do the following: ☐ 1) Check reset or reset SI. ☐ 2) Stop one LHSI pump and put in AUTO. ☐ 3) GO TO Step 13. ☐ IF one LHSI pump running, THEN GO TO Step 13.
	☐ f) LHSI flow - INDICATED	☐ f) Manually start pumps and align valves.

Event Description: FOLDOUTS AND ATTACHMENTS

.

NUMBER 1-E-0	ATTACHMENT TITLE	ATTACHMENT 1
REVISION 71	SYSTEM ALIGNMENT VERIFICATION	PAGE 7 of 7

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13. ___	CHECK TOTAL AFW FLOW - GREATER THAN 350 GPM [450 GPM]	☐ IF SG narrow range level greater than 12% [18%] in any SG, THEN control feed flow to maintain narrow range level AND GO TO Step 14. ☐ IF SG narrow range level less than 12% [18%] in all SGs, THEN manually start pumps AND align valves as necessary. ☐ IF AFW flow greater than 350 GPM [450 GPM] can NOT be established, THEN GO TO 1-FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK.
14. ___	CHECK AFW MOVs - OPEN	☐ Manually align valves as necessary.
15. ___	INITIATE SI VALVE ALIGNMENT IAW ATTACHMENT 2	
16. ___	INITIATE VENTILATION, AC POWER, AND SFP STATUS CHECKS IAW ATTACHMENT 3	

Event Description: FOLDOUTS AND ATTACHMENTS

.

NUMBER 1-E-0	ATTACHMENT TITLE CHECKING SI VALVE ALIGNMENT	ATTACHMENT 2
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NOTE: Components previously aligned by SI termination steps, must not be realigned by this Attachment.

1. ___ Check opened or open CHG pump suction from RWST MOVs.
   - ☐ • 1-CH-MOV-1115B
   - ☐ • 1-CH-MOV-1115D

2. ___ Check closed or close CHG pump suction from VCT MOVs.
   - ☐ • 1-CH-MOV-1115C
   - ☐ • 1-CH-MOV-1115E

3. ___ Check running or start at least two CHG pumps. (listed in preferred order)
   - ☐ • 1-CH-P-1C
   - ☐ • 1-CH-P-1B
   - ☐ • 1-CH-P-1A

4. ___ Check opened or open HHSI to cold legs MOVs.
   - ☐ • 1-SI-MOV-1867C
   - ☐ • 1-SI-MOV-1867D

5. ___ Check closed or close CHG line isolation MOVs.
   - ☐ • 1-CH-MOV-1289A
   - ☐ • 1-CH-MOV-1289B

6. ___ Check closed or close Letdown orifice isolation valves.
   - ☐ • 1-CH-HCV-1200A
   - ☐ • 1-CH-HCV-1200B
   - ☐ • 1-CH-HCV-1200C

7. ___ Check opened or open LHSI suction from RWST MOVs.
   - ☐ • 1-SI-MOV-1862A
   - ☐ • 1-SI-MOV-1862B

Event Description: FOLDOUTS AND ATTACHMENTS

.

NUMBER 1-E-0	ATTACHMENT TITLE CHECKING SI VALVE ALIGNMENT	ATTACHMENT 2
REVISION 71		PAGE 2 of 2

8. ___ Check opened or open LHSI to cold legs MOVs.
   - ☐ • 1-SI-MOV-1864A
   - ☐ • 1-SI-MOV-1864B

9. ___ Check running or start at least one LHSI pump.
   - ☐ • 1-SI-P-1A
   - ☐ • 1-SI-P-1B

10. ___ Check High Head SI flow to cold legs indicated.
    - ☐ • 1-SI-FI-1961
    - ☐ • 1-SI-FI-1962
    - ☐ • 1-SI-FI-1963
    - ☐ • 1-SI-FI-1943 or 1-SI-FI-1943A

11. ___ IF flow not indicated, THEN manually start pumps and align valves. IF flow NOT established, THEN consult with Shift Supervision to establish another high pressure injection flow path while continuing with this procedure.
    - ☐ • Alternate SI to Cold legs
    - ☐ • Hot leg injection

Event Description: FOLDOUTS AND ATTACHMENTS

.

NUMBER 1-E-0	ATTACHMENT TITLE	ATTACHMENT 3
REVISION 71	AUXILIARY VENTILATION, AC POWER, AND SFP STATUS CHECKS	PAGE 1 of 6

1. ___ Check or place REFUEL SFTY MODE switches in NORMAL.

2. ___ Check ventilation alignment IAW Tables 1 and 2.

TABLE 1
UNIT #1 VENTILATION PANEL

	MARK NUMBER	EQUIPMENT STATUS
☐	1-VS-F-4A & B	OFF
☐	1-VS-HV-1A & B	OFF
☐	1-VS-F-8A & B	OFF
☐	1-VS-F-9A & B	GREEN
☐	1-VS-F-59	GREEN
☐	1-VS-F-6	OFF
☐	1-VS-F-39	GREEN
☐	1-VS-F-7A & B	GREEN
☐	1-VS-HV-5	GREEN
☐	1-VS-F-56A & B	GREEN
☐	1-VS-F-40A & B	GREEN
☐	1-VS-HV-4	OFF
☐	2-VS-F-40A or B	RED
☐	2-VS-HV-4	OFF

Event Description: FOLDOUTS AND ATTACHMENTS

.

NUMBER 1-E-0	ATTACHMENT TITLE	ATTACHMENT 3
REVISION 71	AUXILIARY VENTILATION, AC POWER, AND SFP STATUS CHECKS	PAGE 2 of 6

TABLE 2
VNTX PANEL

	MARK NUMBER	EXPECTED EQUIPMENT STATUS		RESPONSE NOT OBTAINED
☐	a. AOD-VS-107A & B AOD-VS-108	RED GREEN	☐	a.Place AUX BLDG CENTRAL AREA MODE switch to FILTER.
☐	b. MOD-VS-100A & B AOD-VS-106	RED GREEN	☐	b. • Place MOD-VS-100A to FILTER. • Place MOD-VS-100B to FILTER.
☐	c. MOD-VS-200A & B AOD-VS-206	GREEN RED	☐	c. • Place MOD-VS-200A to UNFILTER. • Place MOD-VS-200B to UNFILTER.
☐	d. AOD-VS-103A & B AOD-VS-104	GREEN GREEN	☐	d. • Place AOD-VS-103A in UNFILTER. • Place AOD-VS-103B in UNFILTER. • Place AOD-VS-104 in FILTER.
☐	e. AOD-VS-101A & B AOD-VS-102	GREEN GREEN	☐	e.Place AOD-VS-101A and 101B in UNFILTER.
☐	f. AOD-VS-111A & B	GREEN	☐	f.Place COMBINE CONTAINMENT EXHAUST in ISOLATE.
☐	g. AOD-VS-110	GREEN	☐	g.Place AOD-VS-109A and 109B in FILTER.
☐	h. AOD-VS-112A & B	GREEN	☐	h. • Place AOD-VS-112A in CLOSE. • Place AOD-VS-112B in CLOSE.
☐	i. MOD-VS-58A & B 1-VS-F-58A & B	RED RED	☐	i.Start 1-VS-F-58A and 1-VS-F-58B.

3. ___ Check filtered exhaust flow: (as read on FI-VS-117A and FI-VS-117B)

☐ • Total flow - GREATER THAN 32400 cfm

AND

☐ • Flow through each filter bank - LESS THAN 39600 cfm

Event Description: FOLDOUTS AND ATTACHMENTS

.

NUMBER 1-E-0	ATTACHMENT TITLE	ATTACHMENT 3
REVISION 71	AUXILIARY VENTILATION, AC POWER, AND SFP STATUS CHECKS	PAGE 3 of 6

4. ___ Check all Station Service Buses - ENERGIZED. IF NOT, THEN initiate 1-AP-10.07, LOSS OF UNIT 1 POWER.

5. ___ Check annunciator VSP-J2 - LIT.

6. ___ Check Unit 1 RSST LTC time delay bypass light - LIT.

7. ___ Check stopped or stop 1-VS-AC-4.

8. ___ Place 1-VS-43-VS103X, MCR ISOLATION switch to the OFF position.

9. ___ Check closed or close MCR isolation dampers.
   - ☐ • 1-VS-MOD-103A
   - ☐ • 1-VS-MOD-103B
   - ☐ • 1-VS-MOD-103C
   - ☐ • 1-VS-MOD-103D

Event Description: FOLDOUTS AND ATTACHMENTS

.

NUMBER 1-E-0	ATTACHMENT TITLE	ATTACHMENT 3
REVISION 71	AUXILIARY VENTILATION, AC POWER, AND SFP STATUS CHECKS	PAGE 4 of 6

* *

CAUTION:

- Only one Emergency Supply Fan must be started in the following step.
- Chilled Water flow to the in-service Unit 1 MCR AHU must be throttled to at least 15 gpm when the Emergency Supply fan is started.
- Chilled Water flow to the in-service Unit 2 MCR AHU must be throttled to at least 25 gpm when the Emergency Supply fan is started.
- An Emergency Supply Fan must not be started if the filter is wet.

* *

10. Immediately start ONE Emergency Supply Fan IAW the following: (1-VS-F-41 or 2-VS-F-41 preferred)

a. IF 1-VS-F-41, CONT RM EMERG SUP FAN, will be used, THEN perform the following substeps.

___ 1. Open 1-VS-MOD-104A, CONT RM EMERG SUP MOD.

___ 2. Start 1-VS-F-41.

b. IF 2-VS-F-41, CONT RM EMERG SUP FAN, will be used, THEN perform the following substeps.

___ 1. Open 2-VS-MOD-204A, CONT RM EMERG SUP MOD.

___ 2. Start 2-VS-F-41.

c. IF 1-VS-F-42, CONT RM EMERG SUP FAN, will be used, THEN perform the following substeps.

___ 1. Open 1-VS-MOD-104B, CONT RM EMERG SUP MOD.

___ 2. Start 1-VS-F-42.

d. IF 2-VS-F-42, CONT RM EMERG SUP FAN, will be used, THEN perform the following substeps.

___ 1. Open 2-VS-MOD-204B, CONT RM EMERG SUP MOD.

___ 2. Start 2-VS-F-42.

e. ___ Adjust Chilled Water flow to MCR AHUs IAW Step 10 Caution.

Event Description: FOLDOUTS AND ATTACHMENTS

.

NUMBER 1-E-0	ATTACHMENT TITLE	ATTACHMENT 3
REVISION 71	AUXILIARY VENTILATION, AC POWER, AND SFP STATUS CHECKS	PAGE 5 of 6

11. ___ Check readings on the following Differential Pressure Indicators - POSITIVE PRESSURE INDICATED.

- ☐ • PDI-VS-100, D.P.-U1CR/U1TB (Unit 2 Turbine Ventilation Panel)
- ☐ • PDI-VS-101, D.P.-U1RR/U1TB (Unit 2 Turbine Ventilation Panel)
- ☐ • PDI-VS-200, D.P.-U2CR/U2TB (Unit 2 Turbine Ventilation Panel)
- ☐ • PDI-VS-201, D.P.-U2RR/U2TB (Unit 2 Turbine Ventilation Panel)
- ☐ • 1-VS-PDI-118 (Unit 1 Computer Room)
- ☐ • 1-VS-PDI-116 (Near Unit 1 Semi-Vital Bus)
- ☐ • 2-VS-PDI-215 (Unit 2 AC Room)
- ☐ • 2-VS-PDI-206 (Near Unit 2 Semi-Vital Bus)

Unit 2 Operator will state that Indications are similar to the four (4) Indicators above.

12. ___ IF any reading NOT positive, THEN initiate Attachment 6 to secure MCR boundary fans.

13. ___ Check initiated or initiate 0-AP-50.00, OPPOSITE UNIT EMERGENCY.

Unit 2 Operator will state that 0-AP-50.00 has been initiated

14. ___ Check the following MCR and ESGR air conditioning equipment operating. IF NOT, THEN start equipment within 1 hour IAW the appropriate subsection of 0-OP-VS-006, CONTROL ROOM AND RELAY ROOM VENTILATION SYSTEM.

- ☐ • One Control Room chiller
- ☐ • One Unit 1 Control Room AHU
- ☐ • One Unit 2 Control Room AHU
- ☐ • One Unit 1 ESGR AHU
- ☐ • One Unit 2 ESGR AHU

15. ___ IF both of the following conditions exist, THEN check that Load Shed is activated.

- ☐ • Unit 2 - SUPPLIED BY RSST
- ☐ • Unit 2 RCPs - RUNNING

16. ___ IF Load Shed is required and not activated, THEN initiate 0-AP-10.10, LOSS OF AUTO LOAD SHED.

Event Description: FOLDOUTS AND ATTACHMENTS

.

NUMBER 1-E-0	ATTACHMENT TITLE	ATTACHMENT 3
REVISION 71	AUXILIARY VENTILATION, AC POWER, AND SFP STATUS CHECKS	PAGE 6 of 6

NOTE:
- SFP checks should be initiated WITHIN ONE TO TWO HOURS of EOP entry.
- Loss of power may render SFP indications and alarms non-functional and require local checks. Power supplies are as follows:
  - TI-FC-103, Unit 1 Semi-Vital Bus
  - TI-FC-203, Unit 2 Semi-Vital Bus
  - 1-FC-LIS-104, Panel 1ABDA1
- Loss of AC Power to the SFP level indicator is indicated if both low and high level alarms are in simultaneously. (0-VSP-C4 and 0-VSP-D4)
- 1-DRP-003, CURVE BOOK, provides a graph for SFP time to 200°F if loss of SFP cooling occurs.

Unit 2 Operator will assume responsibility for the remainder of this attachment

17. ___ Initiate monitoring SFP parameters:
- ☐ • SFP level - Greater than Cooling Pump suction AND Stable
- ☐ • SFP temperature - Stable or Lowering
- ☐ • SFP Cooling Pumps - Either Running
- ☐ • Component Cooling - Normal
- ☐ • SFP Radiation - Normal

18. ___ Continue to monitor parameters every one to two hours or until authorized to terminate monitoring by the Station Emergency Manager and/or the Shift Manager.

19. ___ Notify the Station Emergency Manager and/or the Shift Manager of the status and trend of SFP parameters.

20. ___ IF any abnormality or adverse trend is identified, THEN initiate 0-AP-22.02, MALFUNCTION OF SPENT FUEL PIT SYSTEMS.

Event Description: FOLDOUTS AND ATTACHMENTS

.

NUMBER 1-E-0	ATTACHMENT TITLE TRANSIENT AFW FLOW CONTROL	ATTACHMENT 7
REVISION 71		PAGE 1 of 1

1. ___ Check SI is in progress. IF SI NOT in progress, THEN RETURN TO procedure step in effect.

2. ___ Check running or start AFW Pumps, as necessary.

   ☐ • 1-FW-P-3A

   ☐ • 1-FW-P-3B

   ☐ • 1-FW-P-2

3. ___ Maintain at least 350 gpm [450 gpm] AFW flow untill one SG Narrow Range Level is greater than 12% [18%].

   NOTE: AFW to idle loop(s) (RCP secured), should be throttled to prevent depressurization of the SG and subsequent Header / Line SI. AFW flow between approximately 60 gpm and 100 gpm should be adequate to prevent a Header / Line SI.

4. ___ When minimum heat sink has been verified, AFW MOVs should be controlled to maintain intact SG Narrow Range levels between 22% and 50% by throttling AFW Isolation MOVs:

   ☐ • SG A, 1-FW-MOV-151E and 1-FW-MOV-151F

   ☐ • SG B, 1-FW-MOV-151C and 1-FW-MOV-151D

   ☐ • SG C, 1-FW-MOV-151A and 1-FW-MOV-151B

5. ___ Isolate AFW header with deenergized Emergency Bus MOVs by closing the following header isolation valves:

   ☐ • Emergency Bus H deenergized: 1-FW-141, 1-FW-156, 1-FW-171

   ☐ • Emergency Bus J deenergized: 1-FW-140, 1-FW-155, 1-FW-170

Event Description: FOLDOUTS AND ATTACHMENTS

.

NUMBER 1-E-0	CONTINUOUS ACTIONS PAGE	REVISION 71

1. RCP TRIP CRITERIA
   Trip all RCPs if BOTH conditions listed below occur:
   a. Charging Pumps - AT LEAST ONE RUNNING AND FLOWING TO RCS
   b. RCS Subcooling - LESS THAN 30°F [85°F]
2. MINIFLOW RECIRC CRITERIA
   a. CLOSED - When RCS pressure is less than 1275 psig [1475 psig] AND RCP Trip Criteria are met (RCPs OFF).
   b. OPEN - When RCS pressure is greater than 2000 psig.
3. ADVERSE CONTAINMENT CRITERIA
   Use Adverse Containment setpoints if EITHER condition listed below occurs:
   - Containment Pressure - GREATER THAN 20 PSIA
   - Containment Radiation - GREATER THAN 1.0E5 R/HR
4. COLD LEG RECIRCULATION SWITCHOVER CRITERIA
   GO TO 1-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, if RWST level lowers to less than 20%.

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1. AMSAC RESET CRITERIA
   AMSAC may be manually reset when level in all three SGs is greater than 13% or six minutes have elapsed since the Reactor trip. When AMSAC is reset, AMSAC ARMED annunciator H-D-1 should clear and affected components may be realigned as needed.
2. TD AFW PUMP SHUTDOWN CRITERIA
   The TD AFW pump may be secured when SG NR level is greater than 22% in at least 2 SGs, AMSAC is reset, and no auto-start signal exists. To secure the pump, the pump SOV control switches must be taken to OPEN-RESET and then to CLOSE.
3. MANUAL SI ALIGNMENT
   If SI fails to automatically align, Attachment 2 may be used for guidance on manual SI valve alignment.
4. * TRANSIENT AFW FLOW CONTROL (IF SI in progress)
   Attachment 7 may be used for guidance on transient AFW flow control.
5. * FAULTED SG ISOLATION AND AFW FLOW CONTROL (IF SI in progress)
   Attachment 8 may be used for guidance on faulted SG(s) isolation and AFW flow control.
6. * RUPTURED SG ISOLATION AND AFW FLOW CONTROL (IF SI in progress)
   Attachment 9 may be used for guidance on ruptured SG(s) isolation and AFW flow control.
7. * LOSS OF RCP SUPPORT CONDITIONS
   Trip RCPs if a loss of a support condition occurs. (for example, loss of CC)

* Preemptive Actions

Event Description: FOLDOUTS AND ATTACHMENTS

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NUMBER	CONTINUOUS ACTION STEPS	REVISION
1-E-0		71

1. Check RCS Average Temperature - STABLE AT OR TRENDING TO 547°F. (E-0, Step 6)
2. Monitor RCP Trip and Miniflow Recirc Criteria. (E-0, Step 8)
3. Check SG Narrow Range Level - ANY SG GREATER THAN 12%. (Control feed flow to maintain Narrow Range Level between 22% and 50%) (E-0, Step 25)
4. Monitor LHSI pumps and secure as necessary. (E-0, Step 30)

NOTE: Subsequent SI signals may be reset by reperforming Step 12 of Attachment 1.

5. Monitor CTMT pressure and check CLS initiation as necessary. (Attachment 1, Step 8)
6. Monitor RWST level and check RS initiation as necessary. (Attachment 1, Step 9)
7. Block Low PRZR Pressure SI signal when less than 2000 psig. (Attachment 1, Step 10)
8. Block Low Tave SI signal when less than 543°F. (Attachment 1, Step 11)

Event Description: FOLDOUTS AND ATTACHMENTS

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CONTINUOUS ACTIONS PAGE FOR 1-ES-1.1

1. SI REINITIATION CRITERIA

   Following SI termination at Step 10, manually start SI pumps as necessary AND GO TO 1-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, if EITHER condition listed below occurs:

   - RCS subcooling based on CETCs - LESS THAN 30°F [85°F]
   - PRZR level - CANNOT BE MAINTAINED GREATER THAN 22% [50%]

2. MINIFLOW RECIRC CRITERIA
   a. CLOSED - When RCS pressure is less than 1275 psig [1475 psig] AND RCP Trip Criteria are met (RCPs OFF).
   b. OPEN - When RCS pressure is greater than 2000 psig.

3. ADVERSE CONTAINMENT CRITERIA

   Use Adverse Containment setpoints if EITHER condition listed below occurs:

   - Containment Pressure - GREATER THAN 20 PSIA
   - Containment Radiation - GREATER THAN 1.0E5 R/HR

4. SECONDARY INTEGRITY CRITERIA

   Manually start SI pumps as necessary and GO TO 1-E-2, FAULTED STEAM GENERATOR ISOLATION, if any SG pressure is lowering in an uncontrolled manner or has completely depressurized, and has not been isolated.

5. COLD LEG RECIRCULATION SWITCHOVER CRITERIA

   GO TO 1-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, if RWST level lowers to less than 20%.

6. AFW SUPPLY SWITCHOVER CRITERIA (Refer to Attachment 5)

   Transfer to one of the following alternate AFW water supplies if ECST level lowers to less than 20%.
   a. 1-CN-TK-2, using 1-CN-150.
   b. 1-CN-TK-3, using AFW Booster Pumps.
   c. AFW Crosstie.
   d. Firemain.

7. RCP START CRITERIA

   - Following a loss of all seal cooling, affected RCP(s) should NOT be started without prior status evaluation.
   - RCPs should be run in the following order of priority to provide PRZR spray: C, A and B.

SIMULATOR OPERATOR'S GUIDE

Simulator Setup

Initial Conditions:

Recall IC -373 **and implement TRIGGER #30 to activate all passive malfunctions and verify Trigger #30 implemented.**

Open the SIMVIEW window and add the following points to it:

- Asp_ao_off

Enter/Verify the following MALFUNCTIONS:

Malfunction	Delay	Ramp	Trigger	Value	Final	Trigger Type (Auto or Manual)
MS0806 SG C STM FLOW TRNSMTR MS-FT-595 FAILURE	10	60	1		1	MAN
NI1004 POWER RANGE CHNL N44 FAILURE	10	30	3		1	MAN
CH2101 VCT LEVEL TRANSMITTER LT-1112 FAILS	10	30	5		1	MAN
SD0202 HP HTR DRN PP SD-P-1B TRIPS:OVR-CURRENT	10		7		TRUE	MAN
FW09 FW-P-2 TRIP/THROTTLE VALVE TRIPS CLOSED			9		TRUE	AUTO
MS0102 'B' MAIN STM LINE RUPTURE AT HEADER	10	3:00	11		20	MAN
RC5601 RC-P-1A BKR SPURIOUS TRIP	4:00		11		TRUE	MAN
RC5602 RC-P-1B BKR SPURIOUS TRIP	4:15		11		TRUE	MAN
RC5603 RC-P-1C BKR SPURIOUS TRIP	4:30		11		TRUE	MAN
RD17 ATWS WITH MANUAL RX TRIP PB DEFEATED			11		TRUE	MAN
MS22 DISABLE A MSTV AUTO CLOSURE ON HSF			30		TRUE	MAN
MS23 DISABLE B MSTV AUTO CLOSURE ON HSF			30		TRUE	MAN
MS24 DISABLE C MSTV AUTO CLOSURE ON HSF			30		TRUE	MAN
FW48 DISABLE AFW P3A AUTO START			30		TRUE	MAN
FW49 DISABLE AFWP3B AUTO START			30		TRUE	MAN
FP0301 FPS FACP07 ALARM HORN FAILURE			30		TRUE	MAN
FP0302 FPS PC SPEAKER FAILURE			30		TRUE	MAN

SIMULATOR OPERATOR'S GUIDE

Enter the following Remote Functions

Description	Delay	Ramp	Trigger	Value	Final	Trigger Type (Auto or Manual)
RX_RTA_OPEN RX-RTA_OPEN REACTOR TRIP BREAKER	2:00		15		TRUE	M
RX_RTB_OPEN RX-RTB_OPEN REACTOR TRIP BREAKER	2:00		15		TRUE	M
SIP1B_BKRPOS SIP1B_BKRPOS SI-P-1B BKR 14J3 CUBICLE POSITION			30		RACK OPEN	M

Enter the following EVENT TRIGGERS:

Trigger#	EVENT	Command
9	fwp2_spd .gt. 0.5	Trigger 9 goes active

TRIGGER	TYPE	DESCRIPTION
1	Manual	SG "C" Steam Flow transmitter FT-495 fails high.
3	Manual	Power Range NI channel 44 fails high
5	Manual	VCT Level transmitter LT-1112 fails high
7	Manual	HP Heater Drain pump 1-SC-P-1B trips on overcurrent.
9	Auto	AFW pump P-2 Trip throttle valve fails closed.
11	Manual	"B" Main Steam line rupture at header (Turbine bldg..).
15	Manual	Locally open Reactor Trip Breaker RTA, and RTB.
30	Manual	1-SI-P-1B Breaker racked out.
30	Manual	FPS alarms fails.
30	Manual	Disable Main Steam Trip valves Auto closure on HSF
30	Manual	ATWS with failure of RX Trip PB.
30	Manual	Disable AFW Pump P-3A, and P-3B, auto starts.

SIMULATOR OPERATOR'S GUIDE

Verify the following control room setup:

- ❑ Place the simulator in RUN and verify normal 100% power operation indications.
- ❑ Reset the ROD CONTROL SYSTEM
- ❑ Verify Controlling channels selected to **IV.**
- ❑ Verify Red Magnets on the following components:

1-SI-P-1B

- ❑ Verify 1-RM-RI-112 aligned to A/B SG and 1-RM-RI-113 aligned to C SG (magnets).
- ❑ Verify Ovation System operating.
- ❑ Reset ICCMs.
- ❑ Verify Component Switch Flags.
- ❑ Verify Brass Caps properly placed.
- ❑ Verify SG PORVs set for 1035 psig.
- ❑ Verify Rod Control Group Step Counters indicate properly.
- ❑ Verify Ovation CRT display.
- ❑ Advance Charts
- ❑ Verify Turbine Thumb Wheel Settings @120 rpm/min and Position 6
- ❑ Verify Containment Instrument Air Compressors are on Inside Suction (all RMs reset)
- ❑ Verify all ARPs have been cleaned

❑ 1E-H5	❑ 1F-C9	❑ 1G-E4	❑ 1G-G1
❑ 1G-G4	❑ 1H-D3	❑ 1H-E7	❑ 1H-F3
❑ 1H-G5	❑ 1H-G6	❑ 1H-G7	❑ 1J-B4
❑ 1J-E1	❑ 1J-F1	❑ 1K-D4	❑

- ❑ Verify CLEAN copies of the following procedures are in place:

❑ 0-AP-1.00	❑ 0-AP-53.00 (3)	❑ 1-AP-4.00	❑ 1-AP-18.00
❑ 0-AP-23.00	❑ 1-E-0	❑ 1-FR-S.1	❑ 1-ES-1.1

SIMULATOR OPERATOR'S GUIDE

- ❑ **Verify Reactivity Placard is current.**
- ❑ Verify ALL PINK MAGNETS are accounted for.
- ❑ Reset Blender Integrators for Boric Acid to 100 and PG 1000.

SIMULATOR OPERATOR'S GUIDE

Brief

This simulator performance scenario is performed in the EVALUATION MODE. You should not direct questions to the evaluators. Otherwise, you should perform as if you were in the MCR.

Your ability to maintain a log is not being graded, but maintaining a rough log is recommended to help during briefs.

If you need to communicate with the Unit 2 operator, verbally state, "Unit 2" and an instructor will locate to the Unit 2 area and respond to you as quickly as possible.

In the unlikely event that the simulator fails such that illogical indications result, the session will be terminated. In other words, respond to what you see. If there is a problem with the simulation, the session will be terminated or adjusted as appropriate based on the specific problem.

Assign operating positions.

Ask for and answer questions.

Conduct shift turnover:

The initial conditions have Unit 1 at 100% power with RCS boron concentration of 760 ppm.

Unit conditions have been stable at approximately 100% power since the last refueling outage.

All systems and crossties are operable with the following exception:

- Containment Smoke and heat detectors are non-functional due to local fire panel failure. TRM Section 3.3.1, Fire Detection Instrumentation, Condition B, Smoke Detectors, and Condition C, Heat Detectors is in effect. Containment air temperatures monitored once/hour, and restore to Functional status in 14 days.
- 1-SI-P-1B, "B" LHSI Pump, Tagged out for breaker PMs. Tech Spec 3.3.B.3 requires return to service within 72 hours. Expected completion of breaker PMs-later this shift.
- Controlling channels have been shifted to CH IV in preparation for Channel III testing

Unit #2 is at 100% power with all systems and crossties operable.

The last shift performed two 30 gallon dilutions, followed by manual makeups.

Shift orders are to maintain 100% power on Unit 1.

Session Conduct:

- Ensure conditions in Simulator Set-up are established.
- **Ensure Trigger 30 is active prior to team entering the simulator.**
- Verify Exam Security has been established and ASP_AO_OFF = True.

EVENT 1 **"C" SG Steam Flow Channel fails low**

When cued by examiner, implement Trigger #1.

Critical Task CT-1: If the BOP fails to take timely action in response to the SF channel failure, an automatic reactor trip on SG NR low level will occur; an unanticipated reactor trip should be considered as failure criteria.

Operations Supervisor/Management:

- **If contacted**, acknowledge the failure of the steam flow channel.
- **If contacted,** will notify I&C of the failure, will notify the OMOC.
- **When notified**: acknowledge but do not imply agreement with Tech Spec requirements as identified by the SRO.
- **If contacted**: will take responsibility for submitting CR.
- **If contacted**: Ask for recommendation concerning shifting channels IAW 1-OP-RP-001, agree to wait until I&C is ready to place the channel in trip if recommended.

STA:

- **If contacted**, acknowledge the failure of the steam flow channel.
- **When notified**: acknowledge but do not imply agreement with Tech Spec requirements as identified by the SRO.
- **If the team has a transient brief:** The STA will have no input for the brief.
- **If directed,** will take responsibility for submitting CR.

I&C:

- **If requested**: will prepare for placing the channel in trip.

Maintenance/ Work Week Coordinator:

- **If contacted**, will the notify I&C of the channel failure, place the channel in trip, and initiate investigation of the failure,

Unit 2:

- Unit 2 will assume responsibility for 1-OPT-RX-007, Shift Average Power Calculation.

Role play as other individuals as needed.

SIMULATOR OPERATOR'S GUIDE

EVENT 2 PR Channel N-44 Fail High

When cued by examiner, and rod control in automatic, implement **Trigger #3**.

Operations Supervisor/Management:

- **If contacted**, acknowledge N-44 failure.
- **If contacted,** will notify I&C of the failure, will notify the OMOC.
- **When notified**: acknowledge but do not imply agreement with Tech Spec requirements as identified by the SRO.
- **If contacted,** will take responsibility for writing the CR.
- **If asked:** will notify Reactor Engineering of need to perform flux map.
- **If asked:** SM will confer with the OMOC concerning continuing the ramp.

STA:

- **If contacted**, acknowledge Tech Spec requirements for the failure, but do not imply agreement with requirements identified by the SRO.
- **If directed,** will take responsibility for writing the CR.
- **If the team has a transient brief:** The STA will have no input for the brief.
- **If asked:** will notify Reactor Engineering of need to perform flux map.

Maintenance/Work Week Coordinator:

- **If contacted**, will acknowledge instrumentation failure and commence investigations and/or efforts to place the channel in trip.

Role play as other individuals as needed.

EVENT 3 VCT Level Transmitter, LT-1112 Fails High.

When cued by examiner, implement **Trigger #5.**

Operations Supervisor/Management:

- **If contacted**, will acknowledge the failure of 1-CH-LT-1112 high.
- **If contacted,** will take responsibility for writing the CR.

STA:

- **If contacted**, will acknowledge the failure of 1-CH-LT-1112 high.
- **If contacted,** acknowledge the direction to review; Tech Specs, TRM, VPAP-2802, RG 1.97, EP-AA-303, and CEP 99-0029.
- **After directed,** the STA will report that all reviews have been completed and discussed with the Shift Manager.
- **If contacted,** will take responsibility for writing the CR.
- **If the team has a transient brief:** The STA will have no input for the brief.

Field Operators: (Wait 4 minutes from time of direction to report).

- **If contacted**, to check the status of 1-CH-LT-1112 locally, report no obvious abnormal condition with the transmitter.

Maintenance/Work Week Coordinator:

- **If contacted**, will acknowledge the failure and commence investigations.

Unit 2 Operator:

- **If contacted**, will acknowledge the failure of 1-CH-LT-1112 high.

Role play as other individuals as needed.

SIMULATOR OPERATOR'S GUIDE

EVENT 4 **Loss of HPD Pump, 1-SD-P-1B. (1-AP-18.00)**

When the Evaluator indicates Ready, Activate Trigger #7.

Critical Task CT-2: Start an additional Condensate pump and verify feed flow returns to normal before a Steam Generator Level Reactor Trip.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the trip of 1-SD-P-1B, and the need to ramp at 1%/minute to 75% power.
- **If asked** for a recommended ramp rate, ask what the Unit Supervisor recommends. When authorized by the NRC, the Shift Manager will direct a 1%/minute ramp rate.

STA:

- **If contacted**, will acknowledge the trip of 1-SD P-1B and the need to ramp at 1%/minute to 75% power.
- **If asked,** the STA will acknowledge the need to borate and use rods (will acknowledge the team review of pre-planned reactivity plans and OP-RX-010, if performed). If asked to perform the OP-RX-010 review, the STA will state that he is not able to at this time.
- **After directed,** the STA will report that he has reviewed VPAP-2802 and no notifications were required.
- **If contacted,** will take responsibility for writing the CR.
- **If the team has a transient brief:** The STA will have no input for the brief other discussion of Unit status with the Shift Manager.
- **When contacted:** EPIPs have been reviewed with the Shift Manager.

Maintenance/ Work Week Coordinator:

- **If contacted**, will acknowledge the failure and notify electrical maintenance to investigate.
- **If contacted,** will acknowledge the requirements to reduce reactor power.

Field Operators:

If contacted, as Service Building Operator, breaker 1-EP-BKR-15C6 has a phase "A" overcurrent drop. (**Wait 3 minutes from direction to report of breaker condition**).

If contacted, as Turbine Building Operator, report that there is no obvious cause for 1-SD-P-1B tripping locally at the pump. (**Wait 3 minutes from direction to report of pump condition**).

EVENTS 5 Ramp to < 75% power.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the ramp to 70% - 74%.
- **If contacted,** will take responsibility for writing the CR.
- **If asked** for a recommended ramp rate, ask what the Unit Supervisor recommends. When authorized by the NRC, the Shift Manager will direct a 1%/minute ramp rate.

Unit 2 Operator:

If notified, acknowledge the failure and impending ramp of Unit 1.

STA:

- **If contacted**, will acknowledge the Reactivity Plan reported by the RO.
- **If contacted,** will take responsibility for writing the WR and CR.
- **If the team has a transient brief:** The STA will, "nothing to add".
- If contacted, STA review of VPAP-2802 complete, reviewed with Shift Manager, no notifications required.

Maintenance/ Work Week Coordinator:

- **If contacted**, will acknowledge the requirements to reduce reactor power.

Chemistry

- **If contacted,** acknowledge the ramp.

SIMULATOR OPERATOR'S GUIDE

Field Operators:

- **If contacted**, as the Turbine Building Operator to walkdown the Turbine during the ramp, acknowledge the direction.
- **If contacted,** as the polishing building operator, acknowledge the direction to monitor polisher DP. (Polisher D/P can be monitored on XtremeView, Drawing Index, Condensate Polishing - CN2).

Role play as other individuals as needed.

EVENT 6 Main Steamline Rupture with ATWS.

When cued by examiner, implement **Trigger #11**.

Booth Note:

- Verify Trigger 9 automatically initiates following TD AFW pump start to cause Trip Throttle valves to close.
- Verify that RCPs trip following time delay (A-4:00, B-4:15, C-4:30)

Critical Tasks:

CT-3: Manually start AFW pumps as needed before SG WR level decreases to <7% on both intact S/G.

CT-4: Close Main Steam Trip valves prior to reaching an orange path on Integrity (FR-P.1).
Critical Task **begins** when the Main Steamline rupture occurs and **ends** when the Main Steam Trip valves are closed.

Operations Supervisor/Management:

- **If contacted:** Acknowledge MSL rupture and agree to notify the OMOC.
- **If contacted:** Acknowledge Failure to automatically or manually Trip the Reactor agree to notify the OMOC.

Unit 2 Operator:

- **If asked**, RWST cross-ties on Unit 2 are open.
- **If asked,** Simulate manually opening Unit 2 RWST cross-tie valves.
- **If asked,** External MCR D/P indicators indicate the same as indicated pressure on Unit 2 Vent Panel.
- **If requested**, Chilled Water flows have been adjusted per caution prior to Step 10 of E-0, Attachment 3.
- **If contacted,** Unit Two has implemented AP-50.00, and all conditions on U2 are normal.
- **When:** BOP reaches Page 6 of E-0, Attachment 3, you will take responsibility for the Attachment at this point.
- **If asked:** Unit 1 main steam and condenser A/E radiation is normal.

Field Operators:

- **If directed,** to locally open the Unit 1 Rx. Trip and Bypass breakers, **initiate Trigger 15** (this will open Rx Trip breakers following 2 min time delay). Report to MCR that Reactor trip and bypass breakers are open.

Maintenance/ Work Week Coordinator:

- **If contacted**, will acknowledge the failure(s), contact Maintenance to commence investigation

Role play as other individuals as needed.

The scenario will end when letdown restored in 1-ES-1.1 or at the lead examiners discretion.

Facility: Surry Power Station Scenario No.: 2 Op-Test No.: 2016-002
Examiners: _____ Operators: _____
_____ _____
_____ _____

Initial Conditions: Unit 1 and 2 at 100% power; MOL 760 ppm Boron.

- C CH running on Alt, A CH in Auto, B CH pump Tagged out for breaker PMs.
- Controlling channels are aligned to CH IV for channel III testing.
- Containment Smoke and heat detectors are non-functional due to local fire panel failure. TRM Section 3.3.1, Fire Detection Instrumentation, Condition B, Smoke Detectors, and Condition C, Heat Detectors is in effect. Containment air temperatures monitored once/hour, and restore to Functional status in 14 days.

Turnover: The Team will brief the swap of the BC pumps IAW 1-OP-BC-001, Section 5.3, prior to Simulator entry.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N (BOP/SRO)	Swap Running BC pumps IAW 1-OP-BC-001, Section 5.3
2	RC4901 +1	I (RO/SRO) TS (SRO)	PRZR Level CH 1 Fails High (AP-53.00)
3	FW1804 -1	I (BOP/SRO) TS (SRO)	B SG CH IV FF Fail Low (AP-53.00) **(CT-1)**
4	CN0102 TRUE CN1501 TRUE	C (BOP/SRO)	1-CN-P-1B Trip overcurrent 1-CN-P-1A Auto Start Fails **(CT-2)**
5	RD1244 TRUE	C (RO/SRO) TS (SRO)	Dropped RCCA, P-8, Control Bank D (AP-1.00)
6	N/A	R (RO/SRO) N (BOP)	Ramp Unit to < 75%, due to dropped rod
7	RC04 16.0%	M (ALL)	RCS Leak ~ 200 GPM (AP-16.00, E-0 with SI)
8	RC0103, 5.0%-30% SI4001,SI 4002, CH4601, CH0504	M(ALL)	LBLOCA, E-1, FR-Z.1 Failure of SI and HI-HI-CLS **(CT-3)**

9	CH59		1-CH-MOV-1381 Auto Close Failure (BOP)	
	CH6401		1-CH-P-1A Auto Start Failure (BOP)	
	RS1001	Team Failures	HI HI CLS FAIL to ACTUATE Train A	**(CT-4)**
	RS1002		HI HI CLS FAIL to ACTUATE Train B	
	CS0801		1-CS-P-1A Trip on Overcurrent	
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor				

Event 1: Swap Running BC Pumps IAW 1-OP-BC-001, Section 5.3). (N- BOP/SRO)

This evolution will be pre-briefed by the Team prior to Simulator Entry. 1-BC-P-1B, "B" BC Pump, initially running; 1-BC-P-1A, "A" BC Pump, secured. At end of evolution, the "A" BC Pump will be running in Auto, the "B" BC Pump secured. The RO will peer check the switch manipulations and monitor PCS for abnormal indications. The SRO will supervise the evolution.

Verifiable Action(s):

1) BOP – Manipulate BC Pump control switches to start "A' BC Pump and Secure "B" BC pump.

Technical Specifications/TRM/Reg Guide 1.97/VPAP-2802:

None.

Event 2: PRZR Level CH 1 Fail High (Selected Upper Channel). (I – RO, TS – SRO).

When the Evaluation Team is ready, the malfunction will be actuated. The malfunction will cause PRZR CH 1 to Fail High. The RO is expected to diagnose the failure based on alarms and indications received and take manual control of CH flow.

Verifiable Actions(s):

1) RO – Manual Control of CH flow.
2) RO – Change the position of the PRZR Level Channel Selector Switch to Position 3 (CH3/CH2).
3) RO – Restore CH flow to Auto.

Technical Specifications:

1) Tech Spec 3.7, Table 3.7-1, Item 9, Operator Action 7, With the number of OPERABLE channels less than the Total Number of Channels, REACTOR CRITICAL and POWER OPERATION may proceed provided the following conditions are satisfied: The inoperable channel is placed in the tripped condition within 72 hours, the inoperable channel may be bypassed for up to 12 hours for surveillance testing, If the conditions are not satisfied in the time permitted, reduce power to less than the P-7 setpoint within the next 6 hours.
2) Tech Spec Table 3.7-6, Item 13, 2 Pressurizer level, 2 Channels required. Tech Spec is met.

TRM Actions:

- TRM 3.3.2.A.1, and A.2: Less than the minimum Primary Instruments or the minimum Alternate Instruments in Table 3.3.2-1 are functional. **RA A.1**: Implement a fire watch in the Cable Vault and Tunnel and the Emergency Switchgear room of the affected

unit in accordance with TRM Section 5.2 within 14 days. **RA A.2**: Restore instrument to functional status within 60 days.

Reg. Guide 1.97:

- 1-RC-LOOP-1459, A-13 Variable, 2 Channels required
- 2 Channels required, Refer to TS Table 3.7-6.
- RG 1.97 requirements are a SM/STA function **(recommend evaluating item as a follow-up at Evaluator discretion, Post scenario)**.

VPAP-2802, Reportability

None.

Equipment Important to Emergency Response (EP-AA-303).

1-RC-LI-1459A, PRZR Level Channel 1, Category B, Verify alternate indication available, 2 Operable channels are available, requirement met. (Requirement is a SM/STA function (recommend evaluating item as a follow-up at Evaluator discretion, Post scenario)

***Event 3: B SG* Feed Flow Channel IV Fail Low.** (I-BOP/SRO, TS-SRO)

When the Evaluation Team is ready, the malfunction is implemented. This malfunction will cause the channel IV, selected cannel feed flow to fail low on the B SG. The BOP is expected to diagnose the failure based on alarms and indications received and perform the Immediate Actions of 0-AP-53.00, Loss of Vital Instrumentation/Controls; place the B FRV in manual, and adjust feed flow to control B SG NR level at program.

Verifiable Action(s):

1) BOP – place the B SG FRV in manual and control feed flow to the B SG.
2) RO – Swap controlling channels from channel IV to channel III.
3) BOP – When B SG NR level has been returned to program, return the B FRV to automatic.

Critical Task:

(CT-1): If the BOP fails to take timely action in response to the FF channel failure, an automatic reactor trip on SG NR high level will occur; an unanticipated reactor trip should be considered as failure criteria. An Operations representative will be available for consultation as necessary.

Technical Specifications:

Tech Spec Table 3.7-1, Item 17 Low SG level with SF/FF mismatch, Operator Action 6. With the number of OPERABLE channels less than the Total Number of Channels, REACTOR CRITICAL and POWER OPERATION may proceed provided the following conditions are satisfied: The inoperable channel is placed in the tripped condition within 72 hours, the inoperable channel may be bypassed for up to 12 hours for surveillance testing, If the conditions are not satisfied in the time permitted, be in at least Hot Shutdown within 6 hours.

Technical Requirements Manual.

None.

Reg. Guide 1.97:

1) Main Feed flow, 1-FW-LOOP-F-1486, D-20 variable, 1 channel per SG required, requirement is met.
2) RG 1.97 requirements are a SM/STA function (recommend evaluating item as a follow-up at Evaluator discretion, Post scenario)

VPAP-2802, Reportability:

None.

Equipment Important to Emergency Response (EP-AA-303).

None.

Event #4: 1-CN-P-1B Trip ("B" CN Pump), 1-CN-P-1A ("A" CN pump) fail to auto start (C – BOP/SRO)

When the Evaluating Team is ready, the malfunction is implemented. This malfunction will cause the trip of the "B" CN pump on overcurrent with the failure of the "A" CN pump to auto start. The BOP is expected to identify the failure based on alarms and indications received. The SRO is expected to direct the BOP to perform the Immediate Actions of 1-AP-21.00, Loss of Main Feedwater Flow. The BOP will start the "A" CN pump and verify Feed flow returns to normal. The Team will direct an operator to check the status of "B" and "A" CN pump, and dispatch an operator to check the condition of the "B" CN pump breaker

Verifiable Actions:

1) BOP – Start the "A" CN pump.

Critical Task:

(CT-2): Start an additional Condensate pump and verify feed flow returns to normal before a Steam Generator Level Reactor Trip. (Scenario specific CT)

Technical Specifications/ Technical Requirements Manual/ Reg. Guide 1.97/ VPAP-2802, Reportability/ Equipment Important to Emergency Response (EP-AA-303).

None.

Event 5: **Dropped Rod, P-8, Control Bank D*****.*** ***(***C – RO/SRO, TS-SRO)

When the Evaluating Team is ready, the malfunction is implemented. The malfunction will cause Control Rod P-8, Control Bank D, to drop into the core. The RO is expected to diagnose the dropped rod based on alarms and indications received. The Team will implement AP-1.00 in response to the dropped rod.

Verifiable Action(s):

1) RO – Place Rod Control in Manual to stop outward rod motion.

Technical Specifications:

1) Tech Spec 3.12.C.3; Startup and POWER OPERATION may continue with one control rod assembly inoperable provided that within one hour either:
   a. The control rod assembly is restored to OPERABLE status, as defined in Specification 3.12.C.1 and 2, or
   b. shutdown margin requirement of Specification 3.12.A.3.c is satisfied. POWER OPERATION may then continue provided that: either reactor power shall be reduced to <75% of Rated Power within one hour, and the High Neutron Flux trip setpoint shall be reduced to ≤ 85% within the next four hours; or the remaining rods in the group shall be aligned within 12 steps of the inoperable control rod within one hour.
2) Tech Spec 3.12.F.2 (potential DNB); When any of the parameters in Specification 3.12.F.1 (Tave, Press, Flow) has been determined to exceed its limit, either restore the parameter to within its limit within 2 hours or reduce Thermal Power to less than 5% of rated power within the next 6 hours.

Technical Requirements Manual/ Reg. Guide 1.97/ Equipment Important to Emergency Response (EP-AA-303)/ VPAP-2802, Reportability.

None

Event #6: **Ramp Unit to < 75%.** (R – RO/SRO, N - BOP)

The SRO will notify the Shift Manager the dropped rod and Tech Spec requirements.
The SRO will conduct a Team brief to discuss the Reactivity Plan determined by the RO.
The SRO will implement 0-AP-23.00, Rapid Load Reduction, to commence power reduction to be 70 – 74% power within one hour.

Verifiable Actions:

1) RO – manipulate control rods and CVCS blender to maintain RCS Tave and ∆flux in band.
2) BOP – Manipulate Turbine Controls to commence the down power ramp at 1% per minute.

Technical Requirements Manual/ Reg. Guide 1.97/ Equipment Important to Emergency Response (EP-AA-303)/ VPAP-2802, Reportability.

None.

Event #7: **RCS Leakage of approximately 200 gpm.** (M – ALL)

When the Evaluating Team is satisfied with the Teams ability to control the ramp, and the Evaluating Team is ready, the RCS leakage malfunction will be implemented. This malfunction causes RCS leakage of ~200 gpm. The RO will diagnose the RCS leakage based on indications and alarms received. The RO will perform the Immediate Actions of 1-AP-16.00, quantify RCS leakage in excess of the capability of a single CH pump, Trip the reactor, perform the Immediate Actions of E-0, and manually Safety Inject on Step 4 of E-0.

Verifiable Actions:

1) RO – Isolate letdown and place CH flow in manual to quantify RCS leakage.
2) RO - Trip the Reactor and manually initiate Safety Injection.
3) BOP – During performance of E-0 Attachments, the BOP will Identify the following: 1-CH-MOV-1381, Seal Return MOV, will fail to close on the SI and require manual closure. The "A: HHSI pump will fail to auto start requiring a manual start of the pump. The "C" Charging pump will trip on overcurrent. The 'A' and 'B' LHSI pumps will fail to auto start.

Event #8: **Large Break LOCA/FR-Z.1** (M – ALL)

On Transition to 1-E-1, the RCS leakage will rise to a LBLOCA. The Teams response will be complicated by the failure of Hi-Hi CLS to automatically or manually actuate when CTMT pressure reaches 23 psia; requiring manual action by the RO/BOP to align Hi-Hi CLS components. With no CTMT cooling in service, the Team will transition to FR-Z.1 to start the CS pumps ("A" CS pump will trip on overcurrent when started), the "B" CS pump will start manually, manually align SW to the RSHXs, and when RWST level reaches 60% the RS pumps will require manual start. The Team will complete actions required in FR-Z.1, and return to 1-E-1.

Critical Tasks:

CT-3: Restore SI flow to the core prior to transitioning to FR-C.2, Response to Degraded Core Cooling.
Safety Significance: Failures to the HHSI and LHSI pumps will result in NO SI flow to the core until the operator manually starts HHSI and LHSI pumps.

Critical task **begins** when SI is manually initiated and **ends** when SI flow is restored to the core.

CT-4: Manually Actuate Containment Spray. Establish CS flow from at least one CS pump prior to 60% RWST level.
Job Aid 17, Critical Task Development, CT-3 based on Pressurized Water Reactor Owners Group Westinghouse Emergency Response Guideline -Based Critical Tasks (PWROG-14043-NP) Appendix B Critical Task CT-3.

Safety Significance: Restoration of Containment Spray and Recirc Spray is necessary in order to protect the Containment and provide long term core cooling.

Critical Task **begins** when CTMT Pressure exceeds 23 psia; and **ends** when at least one Containment Spray pump and one Train of Recirc Spray is established.

The Scenario is terminated on Evaluating Team cue when CTs have been met and the Team has returned to 1-E-1.

Initial Conditions: Initial Conditions: Unit 1 and 2 are at 100% power, MOL. The unit has been at 100% power for > 30 days.

Turnover: The Team will brief the swap of the BC pumps IAW 1-OP-BC-001, Section 5.3, prior to Simulator entry.

Pre-load malfunctions: (Trigger 30's)

- CH 59, DISABLE CH-MOV-381 AUTO CLOSURE
- RS1001, TRN A HI HI CLS FAILS TO ACTIVATE
- RS1002 TRN B HI HI CLS FAILS TO ACTIVATE
- SI4001, DISABLE LHSI PUMP SI-P-1A AUTO START
- SI4002, DISABLE LHSI PUMP SI-P-1B AUTO START
- FP0301, FPS FACP07 ALARM HORN FAILURE
- FP0302, FPS PC SPEAKER FAILURE

Equipment Status/ Procedures/ Alignments/ Data Sheets/ etc.:

Unit 1 is at 100% power. All systems and crossties are operable with the following exception:

- Containment Smoke and heat detectors are non-functional due to local fire panel failure. TRM Section 3.3.1, Fire Detection Instrumentation, Condition B, Smoke Detectors, and Condition C, Heat Detectors is in effect. Containment air temperatures monitored once/hour, and restore to Functional status in 14 days.
- C Charging pump running on Alt, A Charging in Auto, B Charging pump tagged out for breaker PMs.
- Controlling channels have been shifted to CH IV in preparation for Channel III testing.

Turnover:

- The Team will brief the swap of the BC pumps IAW 1-OP-BC-001, Section 5.3, prior to Simulator entry.

The performance of this procedure has been analyzed based on the current plant configurations and the PSA indicates green.

Event	Malf. #'s	Severity	Instructor Notes and Required Feedback
1	N/A	N/A	Swap Running BC pumps IAW 1-OP-BC-001, Section 5.3
2	RC4901	+1	PRZR Level CH 1 Fails High (AP-53.00)
3	FW1804	-1	B SG CH IV FF Fail Low (AP-53.00) **(CT-1)**
4	CN0102 CN1501	TRUE TRUE	1-CN-P-1B Trip overcurrent 1-CN-P-1A Auto Start Fails **(CT-2)**
5	RD1244	TRUE	Dropped RCCA, P-8, Control Bank D
6	N/A	N/A	Ramp Unit to < 75%, due to dropped rod
7.	RC04	16.0%	RCS Leak ~ 200 GPM (AP-16.00, E-0 with SI) **(CT-3)**

8	RC0103 SI4001,SI4002, CH6401, CH0504	5.0% / 30% TRUE TRUE TRUE	LBLOCA, E-1, FR-Z.1 Failure of SI and HI-HI-CLS Failure of “A” and “B” LHSI pump auto start, 1-CH-P-1C trip, 1-CH-P-1A auto start failure
9	CH59 RS1001 RS1002 CS0801	TRUE	1-CH-MOV-1381 Auto Close Failure (BOP) HI HI CLS FAIL to ACTUATE Train A **(CT-4)** HI HI CLS FAIL to ACTUATE Train B 1-CS-P-1A Trip on Overcurrent

SHIFT TURNOVER AND SEQUENCE

OPERATING PLAN:

The initial conditions have Unit 1 at 100% power with RCS boron concentration of 760 ppm.

Unit conditions have been stable at approximately 100% power since the last refueling outage.

All systems and crossties are operable with the following exception:

- Containment Smoke and heat detectors are non-functional due to local fire panel failure. TRM Section 3.3.1, Fire Detection Instrumentation, Condition B, Smoke Detectors, and Condition C, Heat Detectors is in effect. Containment air temperatures monitored once/hour, and restore to Functional status in 14 days.
- C Charging pump running on Alt, A Charging in Auto, B Charging pump tagged out for breaker PMs.
- Controlling channels have been shifted to CH IV in preparation for Channel III test

Unit #2 is at 100% power with all systems and crossties operable.

Shift orders are to maintain 100% power on Unit #1 and upon relieving the watch, perform a swap of the BC pumps IAW 1-OP-BC-001, Section 5.3. PSA analyzed for current plant conditions.

The last shift performed two 30 gallon dilutions, followed by manual makeups.

PWR Scenario 2: Large Break LOCA with failure of HI HI CLS to actuate.

Scenario Objectives:

A. Given a Pressurizer Level channel failure, respond in accordance with 0-AP-53.00, Loss of Vital Instrumentation/Controls and restore Pressurizer Level control to Normal.
B. Given a SG "B" Feed flow transmitter failure, respond in accordance with 0-AP-53.00, Loss of Vital Instrumentation/Controls to place "B" FRV in manual, control "B" SG level in manual, and return "B" FRV to automatic.
C. Given a Condensate Pump trip, respond in accordance with 1-AP-21.00 and restore SG level to normal.
D. Given a Dropped rod, respond in accordance with 0-AP-1.00, Rod Control System Malfunctions.
E. Demonstrate the ability to ramp the unit in accordance with 0-AP-23.00, Rapid Load Reduction.
F. Given a Large Break LOCA demonstrate the ability to respond to the event and perform mitigative actions in accordance with E-0, E-1, and FR-Z.1.
G. Given multiple failures of auto plant functions, demonstrate the ability to identify and correct any failed components by utilizing the appropriate attachment.

Scenario Sequence

Event One: Swap Running BC Pumps IAW 1-OP-BC-001, Section 5.3

On Lead Evaluator cue, the crew will swap BC pumps by starting the "A" BC pump and securing the B BC pump.

Malfunctions required: None

Objectives: BOP-Start the "A" BC pump and secure the "B" BC pump.

Success Path: "B" BC pump running and the "A" BC pump in standby

Event Two: PRZR Level CH 1 Fail High (Selected Upper Channel)

On Lead Evaluator cue the Pressurizer level Ch 1 will fail high. This will cause charging flow to lower which causes actual Pressurizer level to lower. The team will perform AP-53.00, stabilize Pressurizer level and switch to an operable Pressurizer level.

Malfunctions required: One, RC4901.

Objectives: (RO) Identify the failure and place CH Flow in manual and restore Pressurizer level to normal band.

(RO) Selects Operable Channel combination of PRZR level input to level control system.

(SRO) Review Tech Specs; TS Table 3.7-1, Item 9 Pressurizer Hi Level, Operator Action 7. With the number of OPERABLE channels less than the Total Number of Channels, REACTOR CRITICAL and POWER OPERATION may proceed provided the following conditions are

satisfied: 1) The inoperable channel is placed in the tripped condition within 72 hours. 2) The Minimum OPERABLE Channels requirement is met; however, the inoperable channel may be bypassed for up to 12 hours for surveillance testing per Specification 4.1. If the conditions are not satisfied in the time permitted, reduce power to less than the P-7 setpoint within the next 6 hours

Success Path: Crew restores Pressurizer level to normal band, shifts to new controlling Pressurizer level channel, and shifts charging flow control back to automatic.

Event Three: *B SG* Feed Flow Channel IV Fail Low

When actions associated with previous failure are complete and Lead Evaluator Cue, the malfunction is initiated. This failure will cause the "B" Feed flow transmitter to fail low. This will be sensed by SGWLC causing the "B" FRV to open. The BOP operator will diagnose this failure, take manual control of the "B" FRV and restore SG level to normal in accordance with 0-AP-53.00. The RO will shift the controlling FF input to the SGWLC system and when "B" SG level has been returned to normal the "B" FRV will be shifted back to automatic. The SRO will consult Tech Specs and identify TS Table 3.7-A, Item 17, Operator Action 6, is applicable; which requires placing channel in trip in 72 hours.

Malfunctions required: One. FW1804.

Objectives: (*BOP)* Identify failure based on alarms and indications received, and perform the Immediate Actions of 0-AP-53.00 to place the "B" FRV in manual and control "B" SG level near program.

(RO) Swap Feed Flow input to the "B" SGWLC system.

(BOP) Return the "B" FRV to automatic when SF/FF matched and SG NR level at program.

(SRO) Review Tech Specs and Identify one (1) 72 hour clocks in effect to place the affected channel in trip, and notify the Team and Shift Manager of the Tech Spec Requirements.

Success Path: Perform Immediate Actions of 0-AP-53.00, assume manual control of "B" SG NR level, swap controlling channel of Feed Flow input to SGWLC system, and return "B" SG FRV to automatic.

Event Four: Loss of one running Condensate pump with failure of Auto start of standby pump

Malfunctions required: Two: CN0102, and CN1501.

Objectives: *(BOP)* Identify trip of running and failure of standby CN pump to auto start based on alarms and indications received. Perform Immediate Actions on 1-AP-21.00, Loss of Main Feedwater Flow, to start the standby CN pump and restore feed flow to the SG.

(SRO) Monitor performance of 1-AP-21.00 Immediate Actions, conduct a Team brief, direct actions to perform local investigation of "B" CN pump and power supply breaker; and notify Shift Manager of failure, procedure entered, and Unit status.

Success Path: Perform Immediate Actions steps of 1-AP-21.00, start the standby CN pump to restore feedflow to normal.

Event Five: Dropped Rod, P-8, Control Bank D

When the Evaluation team is ready, the malfunction is implemented. The malfunction will cause Control Rod P-8, Control Bank D, to drop into the core. This in turn will cause power and temperature perturbations which will cause Rods to step out automatically. The RO is expected to diagnose the dropped rod based on alarms and indications received. The Team will implement AP-1.00 in response to the dropped rod.

Malfunctions required: One, RD1244.

Objectives: (RO) Identify the dropped rod from indications and perform immediate actions of 0-AP-1.00, Rod Control malfunctions. Stop auto rod withdrawal by placing Rod Control switch to MANUAL.

(SRO) Review Tech Specs and identify that per Tech Spec 3.13.C.3; Startup and POWER OPERATION may continue with one control rod assembly inoperable provided that within one hour either:

a. The control rod assembly is restored to OPERABLE status, as defined in Specification 3.12.C.1 and 2, or
b. Shutdown margin requirement of Specification 3.12.A.3.c is satisfied. POWER OPERATION may then continue provided that: either reactor power shall be reduced to <75% of Rated Power within one hour, and the High Neutron Flux trip setpoint shall be reduced to ≤ 85% within the next four hours; or the remaining rods in the group shall be aligned within 12 steps of the inoperable control rod within one hour.

(SRO) Determines that a ramp to < 75% power is required.

Success Path: Stabilizes the plant per 0-AP-1.00 and ensures that all control parameters, temperature and Delta flux are within their required bands.

Event Six: Ramp Unit to < 75%

The SRO will notify the Shift Manager the dropped rod and Tech Spec requirements. The SRO will conduct a Team brief to discuss the Reactivity Plan determined by the RO. The SRO will implement 0-AP-23.00, Rapid Load Reduction, to commence power reduction to be 70 – 74% power within one hour.

Malfunctions required: None.

Objectives: (RO) Manipulate the CVCS system to Emergency Borate and establish a continuous boration to control RCS Tave during the Turbine Ramp. Operate control rods to adjust delta flux and assist in RCS Tave control.

(BOP) Operate turbine controls to control the load ramp per AP-23.00.

(SRO) Direct actions to lower power in accordance with AP-23.00. Notify SEM of plant status and request Maintenance and Engineering support

Success Path: Maintain Tave/Tref mismatch within 5 ^{o}F and delta flux near target value.

Event Seven: RCS Leakage of approximately 200 gpm

When the Evaluating Team is satisfied with the Teams ability to control the ramp, and the Evaluating Team is ready, the RCS leakage malfunction will be implemented. This malfunction causes RCS leakage of ~200 gpm. The RO will diagnose the RCS leakage based on indications and alarms received. The RO will perform the Immediate Actions of 1-AP-16.00, quantify RCS leakage in excess of the capability of a single CH pump, Trip the reactor, perform the Immediate Actions of E-0, and manually Safety Inject on Step 4 of E-0. Both LHSI and HHSI pumps will fail. The 'A' HHSI pump will fail to auto start, and the 'C' HHSI pump will trip on overcurrent. Both LHSI pumps will fail to auto start.

Malfunctions required: One, RC04 (200 gpm leak)

Objectives: (RO) Identify leakage and perform actions of 1-AP-16.00, RCS Leak. Determine that leakage is greater than 50 gpm, initiate a Reactor Trip and SI at step 4 of E-0.

(BOP) Manage alarms and peer check RO while performing immediate actions of E-0.

(SRO) Stabilize the plant per E-0, and direct actions per E-0, and E-1.

Success Path: Letdown is isolated per AP-16.00, Reactor Trip and SI performed and crew identifies leak is > 150 gpm.

Event Eight: Large Break LOCA/FR-Z.1

On Transition to 1-E-1, the RCS leakage will rise to a LBLOCA. The Teams response will be complicated by the failure of Hi-Hi CLS to automatically or manually actuate when CTMT pressure reaches 23 psia; requiring manual action by the RO/BOP to align Hi-Hi CLS components. With no CTMT cooling in service, the Team will transition to FR-Z.1 to start the CS pumps ("A" CS pump will trip on overcurrent when started), the "B" CS pump will start manually, manually align SW to the RSHXs, and when RWST level reaches 60% the RS pumps will require manual start. The Team will complete actions required in FR-Z.1, and return to 1-E-1.

Malfunctions required: Nine:

- SI14001, SI14002: Disable LHSI PUMP 'A', AND 'B' AUTO START.
- RC0103, RCS COLD LEG RUPTURE.
- CH6401, DISABLE CH-P-1A AUTO START.
- CH0504, OVER-CURRENT TRIP CHP PUMP CH-P-1C
- RS1001, RS1002: TRN A,B HI HI CLS FAILS TO ACTIVATE.
- CS0801, CS-P-1A OVERCURRENT TRIP.
- CH59, DISABLE CH-MOV-1381 AUTO CLOSURE

Objectives: (RO) Identify that there is no SI Flow to the core. Take actions per E-0 Attachments to restore SI flow to the core. Identify that HI HI CLS has not initiated.

(BOP) Take action per E-0 Attachments as directed. Identify that CH-MOV-1381 did not auto close and manually close CH-MOV-1381.

Success Path: Restore SI flow to the core prior to meeting FR-C.2 entry. Manually actuate Containment Spray and Recirc spray before RMT.

SHIFT TURNOVER AND SEQUENCE

Scenario Recapitulation

Total Malfunctions: 6
Abnormal Events: 5 (0-AP-53.00, 0-AP-53.00, 1-AP-21.00, 0-AP-1.00, 1-AP-16.00)
Major Transients: 1 (LBLOCA, Failure of SI and HI HI CLS)
EOPs Entered: 2 (E-0, E-1)
EOP Contingencies: 1 (FR-Z.1)

Event Description: Swap running BC pumps IAW 1-OP-BC-001, Section 5.3.

Cue: When Exam team ready.

Time	Position	Applicant's Action or Behavior
	SRO/BOP	1-OP-BC-001 Team will pre-brief Initial Conditions, Precautions and Limitations, and procedure prior to entering simulator.
	BOP	1-OP-BC-001, step 5.3.1 Record the equipment location of the Bearing Cooling Water pump to be started: *BOP records 1-BC-P-1A as the pump to be started.*
	BOP	1-OP-BC-001, step 5.3.2 Check the oil level in the inboard and outboard pump bearing of the pump to be started is approximately 50% level on the sight glass. *BOP contacts Turbine 1 who confirms that there is adequate oil in the sight glass.*
	BOP	1-OP-BC-001, step 5.3.3 Place the following pump bearing temperature points on the PCS for the pump to be started. (T2700A, T2701A, T2702A, T2703A) *BOP inserts bearing temps for the 'A' BC pump on PCS.*
	BOP	1-OP-BC-001, step 5.3.4 Place the standby pump to be started in PTL. *BOP places 1-BC-P-1A in PTL.*
	BOP	1-OP-BC-001, step 5.3.5 Close the discharge valve for the standby pump to be started. *BOP directs TB1 to close 1-BC-70, BC Pump 1A discharge valve.* *TB1 reports to BOP after 2 minutes that 1-BC-70 is closed.*
	BOP	1-OP-BC-001, step 5.36. Throttle open two turns of the discharge valve for the standby pump to be started. *BOP directs TB1 to throttle open two turns 1-BC-70. TB1 reports after 30 seconds that 1-BC-70 is throttled two turns open.*

Event Description: Swap running BC pumps IAW 1-OP-BC-001, Section 5.3.

Cue: When Exam team ready.

	BOP	1-OP-BC-001, step 5.3.7 Direct the Turbine Building operator to monitor the BC pump start. *BOP directs TB1 To monitor the BC pump start. TB1 acknowledges direction.*
	BOP	1-OP-BC-001, step 5.3.8 Start the selected BC pump and monitor the pump and bearing temperatures. **BOP starts 1-BC-P-1A** *and monitors bearing temperatures. TB1 reports that after pump start of 1-BC-P-1A is normal.*
	BOP	1-OP-BC-001, step 5.3.9 Slowly open the discharge valve of the BC pump started. *BOP directs TB1 to slowly open 1-BC-70. TB1 opens 1-BC-70 and reports that after 30 seconds.*
	BOP	1-OP-BC-001, step 5.3.10 Monitor BC Heat Exchanger BC outlet temperature and adjust SW flow through the in-service heat exchanger as required. *BOP directs TB1 to monitor BC outlet temperatures. TB1 acknowledges direction and reports after 30 seconds that BC outlet temperatures are normal.*
	BOP	1-OP-BC-001, step 5.3.11 When the BC Pump started in step 5.3.8 is running normally, THEN stop the BC pump to be secured and place in AUTO. **BOP stops 1-BC-P-1B** *and places it in AUTO.* **END EVENT 1**

Event Description: PRZR Level Ch1 Fails High (Selected Upper Channel)

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
	TEAM	PRZR Level Channel 1 Fails High. Diagnose the failure based on the following alarms and indications: • Annunciator 1E-F3, RX TRIP CH-1 PRZR HI LVL • Annunciator 1C-C8, PRZR HI LVL HTRS ON • Pressurizer level indication on 1-RC-LI-1459A fails high. • Charging line flow on 1-CH-FI-1122A is trending down. • Pressurizer level indication on 1-RC-LI-1460 is trending down.
	RO SRO	0-AP-53.00 Perform Immediate Actions of AP-53.00: [1] CHECK REDUNDANT INSTRUMENT CHANNEL(S) INDICATION – NORMAL Identifies 1-RC-LI-1460 and 1-RC-LI-1461 – NORMAL [2] PLACE AFFECTED CONTROL(S)/ COMPONENT(S) IN MANUAL CONTROL AND STABILIZE PARAMETER USING REDUNDANT INDICATION **Places CH Flow Control valve 1-CH-FCV-1122 in manual and opens the valve**. Reports Immediate Actions of AP-53.00 complete, CH flow in manual and set at xx gpm. Sets Control Band for PRZR level Control, program level ± 5%. **NOTE**: *Pressurizer level will lower until charging flow restored.*
	SRO BOP SRO RO	0-AP-53.00 Reads AP-53.00 Immediate Action Steps: [1] CHECK REDUNDANT INSTRUMENT CHANNEL(S) INDICATION – NORMAL Reports, 1-RC-LI-1460 and 1-RC-LI-1461 – NORMAL [2] PLACE AFFECTED CONTROL(S)/ COMPONENT(S) IN MANUAL CONTROL AND STABILIZE PARAMETER USING REDUNDANT INDICATION. Reports 1-CH-FCV-1122 in manual and opened to raise the rate of PRZR fill.
	SRO	0-AP-53.00 The SRO will lead a transient brief. During the brief, the failure of the PRZR Level Channel 1 High will be discussed. The RO/BOP will report Annunciators received related to the event, and Critical

Event Description: PRZR Level Ch1 Fails High (Selected Upper Channel)

Cue: By Examiner.

		Parameters affected. STA will have no input for the brief.
		0-AP-53.00
	SRO	3. Check Reactor Power – Less than or equal to 100%.
	RO	Reports power is less than 100%.
		0-AP-53.00
	SRO	Notes prior to Step 4. • Step 4 failures are listed in order of performance priority. Only the failed instrument/control and associated step number should be read aloud. • When the affected instrument/controller malfunction(s) has been addressed by this procedure, recovery actions should continue at Step 13. 4. DETERMINE THE FAILED INSTRUMENT / CONTROL AND GO TO APPROPRIATE STEP OR PROCEDURE: PRZR Level Control, Step 11 ***SRO Goes to Step 11***.
		0-AP-53.00
	SRO	11. CHECK PRZR LEVEL CONTROL CHANNELS – NORM a) Check PRZR LVL Instrumentation- NORMAL
	RO	Reports No, Channel 3, 1-RC-LI-1459A, Failed high.
	SRO	Goes to Step 11 a) RNO a) Do the following, as necessary: 1) Place either of the following in MANUAL: (1)-CH-FC-(1)122C, CHG FLOW CNTRL OR (1)-CH-LC-(1)459G, PRZR LEVEL CNTRL
	RO	Reports Yes, 1-CH-FC-1122C in Manual
	SRO	2) Control PRZR level at program level.
	RO	Reports Yes, PRZR level at program (states current PRZR level).

Event Description: PRZR Level Ch1 Fails High (Selected Upper Channel)

Cue: By Examiner.

		0-AP-53.00 Step 11 a) RNO (Continued)
	SRO	3) Move PRZR LVL - CH SEL switch to defeat the failed channel. Directs BOP to place the selector switch in Position 3 (Channel 3 / 2).
	BOP	**Places selector switch in Position 3.**
	SRO	4) Check or place recorder (1)-RC-LR-(1)459 on an operable channel.
	BOP	**Selects either Channel 2 or 3 on recorder**.
	SRO	5) Refer to Tech Spec 3.1.A.5 (if Pressurizer heaters deenergized), Table 3.7-1, Item 9 and Table 3.7-6, Item 13. a) TS 3.1.A.5.b. Pressurizer, With the pressurizer inoperable due to inoperable pressurizer heaters, restore the inoperable heaters within 72 hours or be in at least HOT SHUTDOWN within 6 hours and the Reactor Coolant System temperature and pressure less than 350°F and 450 psig, respectively, within the following 12 hours. This TS is met. b) **TS Table 3.7-1, Item 9 Pressurizer Hi Level, Operator Action 7.** With the number of OPERABLE channels less than the Total Number of Channels, REACTOR CRITICAL and POWER OPERATION may proceed provided the following conditions are satisfied: 1) The inoperable channel is placed in the tripped condition within 72 hours. 2) The Minimum OPERABLE Channels requirement is met; however, the inoperable channel may be bypassed for up to 12 hours for surveillance testing per Specification 4.1. If the conditions are not satisfied in the time permitted, reduce power to less than the P-7 setpoint within the next 6 hours. c) TS Table 3.7-6, item 13, Pressurizer Level. Required Channels 2. This TS is met. 6) Refer to Attachment 3
	SRO	Hands out Attachment 3 to RO/BOP for review.
		0-AP-53.00
	SRO	Step 11 b) Check Pressurizer Heaters - ENERGIZED
	RO	Reports Yes, Pressurizer heaters are energized.
		0-AP-53.00
	SRO	Step 11 c) Check letdown - IN SERVICE
	RO	Reports Yes, Letdown is in service.

Event Description: PRZR Level Ch1 Fails High (Selected Upper Channel)

Cue: By Examiner.

		0-AP-53.00
	SRO	Step 11 d) Check PRZR level control – IN AUTOMATIC Step 11 d) RNO: d) Do the following as required: 1) Check PRZR level restored to program. 2) Unsaturate (1)-CH-LC-(1)459G, PRZR LEVEL CNTRL, as required. 3) Return (1)-CH-FCV-(1)122 to AUTOMATIC by checking or placing the following in AUTOMATIC: (1)-CH-FC-( )122C, CHG FLOW CNTRL (1)-CH-LC-( )459G, PRZR LEVEL CNTRL
	RO	**Returns PRZR level control to Automatic when level at program.**
	SRO	Goes to Step 13 based on NOTE Prior to Step 4.
		0-AP-53.00
	SRO	13. CHECK CALORIMETRIC – FUNCTIONAL IAW (1)-OPT-RX-001, ATTACHMENT 4
	RO	Reports Yes, Calorimetric is functional.
		0-AP-53.00
	SRO	14. REVIEW THE FOLLOWING: Tech Spec 3.7 VPAP-2802, NOTIFICATIONS AND REPORTS-None.
	STA	TRM SECTION 3.3, INSTRUMENTATION (Potential follow-up question) **TRM 3.3.2.A.1, and A.2:** Less than the minimum Primary Instruments or the minimum Alternate Instruments in Table 3.3.2-1 are functional. **RA A.1**: Implement a fire watch in the Cable Vault and Tunnel and the Emergency Switchgear room of the affected unit in accordance with TRM Section 5.2 within 14 days. **RA A.2**: Restore instrument to functional status within 60 days. Reg Guide 1.97 (Potential follow-up question) • 1-RC-LOOP-1459, A-13 Variable, 2 Channels required • 2 Channels required, Refer to TS Table 3.7-6. • RG 1.97 requirements are a SM/STA function EP-AA-303, Equipment Important to Emergency Response (Potential follow-up question) 1-RC-LI-1459A, PRZR Level Channel 1, Category B, Verify alternate indication available, 2 Operable channels are available, requirement met. (Requirement is a SM/STA function).

Event Description: PRZR Level Ch1 Fails High (Selected Upper Channel)

Cue: By Examiner.

		Directs STA to review items listed above. STA will report items have been reviewed and results have been discussed with the Shift Manager.
	SRO BOP SRO	0-AP-53.00 15. CHECK ADDITIONAL INSTRUMENT / CONTROLLER MALFUNCTION – EXISTS Reports No, no additional failures exist. SRO Goes to Step 17.
	SRO	0-AP-53.00 17. PROVIDE NOTIFICATIONS AS NECESSARY: Shift Supervision OMOC STA (PRA determination) I&C Confers with Shift Manager concerning required notifications. Confers with Shift Manager concerning Unit Status, procedure used and TS requirements**.**
	SRO	**END EVENT #2**

Event Description: "B" SG Feed Flow Channel IV fails low.

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
	BOP	Diagnoses failure FT-1497 with the following indications/alarms: Alarms: • 1H-E6 STM GEN 1B FW >< STM FLOW • 1F-D8 STM GEN 1B CH 4 FW < STM FLOW • 1H-G6 STM GEN 1B LVL ERROR. Indications: • Step decrease in 1B SG Feed Flow indication CH-4 • increase in 1B SG Feed Flow indication CH-3 • rising level on 'B' SG.
	SRO	Enters 0-AP-53.00 LOSS OF VITAL INSTRUMENTATION / CONTROLS
	BOP	Step 1, AP-53.00 [1] CHECK REDUNDANT INSTRUMENT CHANNEL(S) INDICATION - NORMAL BOP identifies Channel III indication for feed flow is NORMAL.
	BOP	Step 2, AP-53.00 [2] PLACE AFFECTED CONTROL(S)/COMPONENT(S) IN MANUAL CONTROL AND STABILIZE PARAMETER USING REDUNDANT INDICATION **BOP takes manual control of 'B' SG feed reg valve and lowers demand (FF < SF) to restore level to program using Channel III indication.** **CT-1: Take manual control of feed flow; control feed flow to prevent a Steam Generator Level reactor trip. (Scenario specific CT)**
	SRO	Conduct a Brief using the Briefing Placard and obtains Critical Parameter information from the RO and BOP. The SRO will update the Shift Manager during AP-progression. SRO will provide a band for control of "B" SG level with "B" FRV in MANUAL. *The STA will state "nothing to add".*

Event Description: "B" SG Feed Flow Channel IV fails low.

Cue: By Examiner.

		Step 3, AP-53.00
	SRO	* VERIFY REACTOR POWER – LESS THAN OR EQUAL TO 100%
	RO	*Checks Reactor Power < 100% using PCS Calorimetric. Due to restoration of FF on 1B SG, power increase may be noted. As required, the SRO may direct the BOP to reduce turbine load to prevent exceeding 100% Calorimetric power.*
		Step 4, AP-53.00, Notes
	SRO	NOTE: • Step 4 failures are listed in order of performance priority. Only the failed instrument/control and associated step number should be read aloud. • When the affected instrument/controller malfunction has been addressed by this procedure, recovery actions may continue at Step 13.
		Step 4, AP-53.00
	SRO	DETERMINE THE FAILED INSTRUMENT / CONTROL AND GO TO APPROPRIATE STEP OR PROCEDURE:
	RO/BOP	*Identifies 1B SG Feed Flow affected.*
	SRO	Goes to Step 7.
		Step 7, AP-53.00
	SRO	CAUTION: When CALCALC is based on Feedwater, changes in feed flow will affect calorimetric power. Reactor power must be monitored when adjusting feed flow.
	SRO	CHECK STEAM GENERATOR LEVEL CONTROL INSTRUMENTS – NORMAL • Steam Pressure • Steam Flow • **Feed Flow** • Steam Generator Level
	BOP	*Determines CH IV Feed flow instrumentation for 'B' SG is NOT normal.*
	SRO	Step 7. RNO, AP-53.00 IF the selected steam flow, steam pressure, or feed flow input to the SG Water Level Control system has failed, THEN do the following: **a) Place the associated Feed Reg Valve in MANUAL.**
	BOP	*Verifies 'B' SG MFRV controller, 1-FW-FCV-1488, in manual*
	SRO	b) Control SG level at program level (44%, a band will be given).
	BOP	*Verifies 'B' SG NR level is returning to program level.*

Event Description: "B" SG Feed Flow Channel IV fails low.

Cue: By Examiner.

	SRO	c) Select the redundant channel for affected SG(s)
	RO	**Selects Channel III Feed Flow for 'B' SG using two-position selector switch on Vertical Board 1-2 (applicant may also place the associated Steam Flow channel in Channel III)**
	SRO	d) WHEN SG level returned to normal, THEN place the Feed Reg Valve in AUTOMATIC.
	BOP	**Places 'B' SG FRV controller, 1-FW-FCV-1488, in automatic control.**
		Step 7, RNO, AP-53.00 (Continued)
	SRO	Perform follow-up actions: a) Consult with Shift Manager on need to initiate ( )-OP-RP-001, ALIGNING CONTROL SYSTEM FOR PERFORMANCE OF CHANNEL I, II, III, AND IV PROCESS AND PROTECTION TESTING. *If asked the Shift Manager will recommend not performing 1-OP-RP-001 at this time.*
	SRO	b) Refer to the following Tech Spec 3.7 items: • Table 3.7-1, 12 and **17** • Table 3.7-2, 1.c, 1.e, and 3.a • Table 3.7-3, 2.a, and 3.a • Table 3.7-6, 15 and 16
	SRO	**Determines Table 3.7-1 item 17, is applicable.** **1. Tech Specs Section 3.7, Table 3.7-1, Item 17**, Low steam generator water level with steam/feedwater flow mismatch, Operator Action 6. With the number of Operable channels one less than the total number of channels, Power Operation may proceed provided the channel is **placed in the trip condition in 72 hours**, the channel may be bypassed for 12 hours for surveillance; if these requirements are not met, the Unit must be placed in Hot Shutdown within 6 hours. c) Refer to Attachment 1. d) IF no other instrumentation failure exists, THEN GO TO Step 13.

Event Description: "B" SG Feed Flow Channel IV fails low.

Cue: By Examiner.

		Step 13, AP-53.00
	SRO RO	13. Check Calorimetric – Functional IAW 1-OPT-RX-001, Attachment 4. *Determines that Calorimetric is functional.* Note: 1-OPT-RX-001, Attachment 4 is included on next page.
	SRO STA	0-AP-53.00 14. REVIEW THE FOLLOWING • Tech Spec 3.7 *Determines Table 3.7-1 item 17, Operator action 6, is applicable (place channel in trip w/in 72 hours).* VPAP-2802, NOTIFICATIONS - None TRM SECTION 3.3, INSTRUMENTATION – None. Reg. Guide 1.97: (Potential follow up question) • Main Feed flow, 1-FW-LOOP-F-1486, D-20 variable, 1 channel per SG required, requirement is met. • RG 1.97 requirements are a SM/STA function EP-AA-303, EQ. IMPORTANT TO EMERGENCY RESPONSE - None *The STA reports he has completed review and has discussed the results with the Shift Manager.*
	SRO BOP SRO	0-AP-53.00 15 CHECK ADDITIONAL INSTRUMENT / CONTROLLER MALFUNCTION – EXISTS Reports no additional failure exists GOES TO Step 17
	SRO	0-AP-53.00 17. PROVIDE NOTIFICATIONS AS NECESSARY: • Shift Supervision • OMOC • STA (PRA determination) • I&C

Event Description: "B" SG Feed Flow Channel IV fails low.

Cue: By Examiner.

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Attachment 4
CALORIMETRIC PROGRAM OPERABILITY

NOTE: TRM 3.3.5 shall be reviewed for required actions for non-functionality of the UFM Calorimetric, Normalized Feedwater Venturi, or PCS Calorimetric. Power reduction to less than 98.4% may be required.

1. To check the Primary Plant Performance Program (PP) operability perform the following:

_____ a. Open Programs - Operator Display / Engineering Display

_____ b. Open PP Output Summary - (Operator Display - Primary Plant Poke)

_____ c. Check short timed values for selected basis, Steam Flow (1-OPT-RX-002 box) or Feedflow (1-OPT-RX-003 box), are updating and either good or fair quality.

_____ d. IF selected basis NOT updating and either good or fair quality, THEN contact Reactor Engineering (if available), and then select another calorimetric basis IAW Step 6.3.1. Otherwise, enter N/A.

2. To check the Flow Corrections Program (FL) operability perform the following:

_____ a. Open Programs - Operator Display / Engineering Display

_____ b. Open FL Output Summary (Operator Display - Flow Corr Poke)

_____ c. Check FL Program Status is OK. IF NOT OK, THEN perform the following to check status of different bases.

_____ 1. Open FL0101 - Output Summary (FL Summary Poke)

_____ 2. Compare displayed values to the FL0101 Table below and check selected calorimetric values are updating and either good or fair quality.

_____ 3. IF selected basis NOT operable, THEN contact Reactor Engineering (if available), and then select another calorimetric basis IAW Step 6.3.1.

Event Description: "B" SG Feed Flow Channel IV fails low.

Cue: By Examiner.

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Attachment 4

CALORIMETRIC PROGRAM OPERABILITY

FL0101 Table				
Flow Correction List	**Normalized Feedwater**	**UFM Feedwater**	**Venturi Feedwater**	**Steam Flow**
Charging Line Flow Corr	X	X	X	X
Letdown Line Flow Corr	X	X	X	X
SG A-1 FF CORR		X	X	
SG A-2 FF CORR		X	X	
SG B-1 FF CORR		X	X	
SG B-2 FF CORR		X	X	
SG C-1 FF CORR		X	X	
SG C-2 FF CORR		X	X	
SG A-1 SF CORR				X
SG A-2 SF CORR				X
SG B-1 SF CORR				X
SG B-2 SF CORR				X
SG C-1 SF CORR				X
SG C-2 SF CORR				X
SG A-1 FF CORR NORM	X			
SG A-2 FF CORR NORM	X			
SG B-1 FF CORR NORM	X			
SG B-2 FF CORR NORM	X			
SG C-1 FF CORR NORM	X			
SG C-2 FF CORR NORM	X			

		END EVENT #3

Event Description: "B" Condensate pump trip with failure of "A" Condensate pump to auto start.

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
	Team	Trip "B" CN Pump, "A" CN pump Fails to auto start Diagnose the failure based on the following alarms and indications: • Annunciator 1K-D4, 4KV BKR AUTO TRIP. • Feed flow less than Steam flow on all SGs. • SG NR level lowering on all three SGs • Feed pump suction rising (as Polisher is bypassed)
	BOP	1-AP-21.00 Perform Immediate Actions of 1-AP-21.00. [1] CHECK MAIN FEED PUMP STATUS: a) Check Reactor Power – GREATER THAN 80% Identify Reactor power greater than 80% ***NOTE***: Step 1 a) RNO added for case where power not yet raised >80% at time of event initiation. a) RNO: IF at least one Main Feed Pump running, THEN GO TO Step 2. b) Check Main Feed Pumps – TWO RUNNING Identify two feed pumps running. ***NOTE***: Step 1b) RNO added for case where BOP fails to identify two (2) MFPs running. b) RNO: GO TO 1-E-0, REACTOR TRIP OR SAFETY INJECTION. *SRO may have to direct BOP to perform AP-21.00 Immediate Action*s.
	BOP	1-AP-21.00 [2] START AN ADDITIONAL CONDENSATE PUMP Identify 1-CN-P-1A, "A" CN Pump, failed to auto start. **Start 1-CN-P-1A**. **(CT-2): Start an additional Condensate pump and verify feed flow returns to normal before a Steam Generator Level Reactor Trip. (Scenario specific CT)**

Event Description: "B" Condensate pump trip with failure of "A" Condensate pump to auto start.

Cue: By Examiner.

		1-AP-21.00
	BOP	[3] REDUCE TURBINE LOAD TO MATCH STEAM FLOW WITH FEED FLOW Use Valve Position Limiter OR Reduce Turbine load using Turbine Manual Monitor Feed flow/Steam flow mismatch and determine load reduction is not necessary. Report Immediate Actions of AP-21.00 are complete add SG levels are trending to program level.
		AP-21.00
	SRO	Read Immediate Actions steps of AP-21.00.
		[1] CHECK MAIN FEED PUMP STATUS: a) Check Reactor Power – GREATER THAN 80%
	BOP	Report Reactor power greater than 80% (Provide Actual Reactor Power)
	SRO	***NOTE***: Step 1 a) RNO added for case where power not yet raised >80% at time of event initiation.
	BOP	a) RNO: IF at least one Main Feed Pump running, THEN GO TO Step 2.
	SRO	b) Check Main Feed Pumps – TWO RUNNING
	BOP	Report two feed pumps running
		NOTE: Step 1b) RNO added for case where BOP fails to identify two (2) MFPs running. b) RNO: GO TO 1-E-0, REACTOR TRIP OR SAFETY INJECTION.
	SRO	[2] START AN ADDITIONAL CONDENSATE PUMP
	BOP	Report 1-CN-P-1A failed to auto start, manually started "A" CN Pump.
	SRO	[3] REDUCE TURBINE LOAD TO MATCH STEAM FLOW WITH FEED FLOW Use Valve Position Limiter OR Reduce Turbine load using Turbine Manual
	BOP	Report Feed Flow matched without reducing turbine load.
	SRO	**NOTE:** SRO may direct Load Reduction using 1-OPT-RX-001, Attachment 3. *1-OPT-RX-001, Attachment 3 actions located at end of this section.*

Event Description: "B" Condensate pump trip with failure of "A" Condensate pump to auto start.

Cue: By Examiner.

		AP-21.00
	SRO	Conduct Transient Brief, describe event that occurred, procedure used, procedure used to continue further actions. RO/BOP will provide alarms received during the event and Critical Parameters. STA will provide no input. SRO will finalize the Transient Brief, direct the RO to contact the Unit 1 Turbine Building Operator and the Service Building Operator to perform local checks on the "A" CN pump (post start), "B" CN pump (indications of cause for tripping) and status of "A" CN pump breaker. SRO will then continue with AP-21.00. **NOTE**: Team may use 1K-D4 ARP to place the "B" CN pump in PTL; common alarm for a number of loads; allows alarm to be received if other loads subsequently trip.
		AP-21.00
	SRO	4. CHECK CONDENSATE POLISHING BLDG BYPASS - REQUIRED Main Feed Pump Suction Pressure - LESS THAN 400 PSIG Note: 1-CP-MOV-100 will be open or stroking open at this time. Goes to Step 5.
		AP-21.00
	SRO BOP	5. OPEN 1-CP-MOV-100 Reports that 1-CP-MOV-100 is open (or stroking open). Note: Actions for 1H-D3, CN POLISHING BYPASS AOV OPEN is at the end of this section.
		AP-21.00
	SRO RO	6. ENERGIZE ALL PRZR HEATERS Reports all pressurizer heaters energized.
		AP-21.00
	SRO BOP	7. CHECK STEAM DUMP OPERATION - REDUCING TAVE/TREF MISMATCH BASED ON DEMAND SIGNAL Reports Yes, steam dumps operating properly.

Event Description: "B" Condensate pump trip with failure of "A" Condensate pump to auto start.

Cue: By Examiner.

		AP-21.00
	SRO	**NOTE Prior to Step 8**: Depending on initial plant conditions, rod insertion or boration may be used to stabilize RCS temperature and maintain ΔFlux in band.
	RO	Acknowledges NOTE.
	SRO	8. CHECK CONTROL RODS - INSERTING IF NECESSARY
	RO	Reports No, not necessary
		AP-21.00
	SRO	9. CHECK ANNUNCIATOR 1E-E3, ΔFLUX DEVIATION - NOT LIT
	RO	Reports Yes, Not Lit.
		AP-21.00
	SRO	10. CHECK ALL SG FLOWS - STEAM FLOW IS LESS THAN OR EQUAL TO FEED FLOW
	BOP	Reports Yes, Steam Flow is equal to Feed Flow.
		AP-21.00
	SRO	11. CHECK ALL SG LEVELS - AT OR TRENDING TO PROGRAMMED LEVEL
	BOP	Reports Yes, all SGs are ~ 44%.
		AP-21.00
	SRO	12. CHECK TAVE - MATCHED WITH TREF
	RO	Reports Yes, (will provide actual Tave/Tref mismatch.)
		AP-21.00
	SRO	13. CHECK FEED HEADER TO STEAM HEADER ΔP - AT LEAST 50 PSID
	BOP	Yes, (will provide actual ΔP indicated.)
		AP-21.00
	SRO	14. CHECK AMPs ON EACH MOTOR OF THE RUNNING MAIN FEED PUMP(s) – LESS THAN 420 AMPS
	BOP	Reports Yes, (provides actual MFP amps indicated.)

Event Description: "B" Condensate pump trip with failure of "A" Condensate pump to auto start.

Cue: By Examiner.

		AP-21.00
	SRO	15. CHECK OPERATION OF MAIN FEED PUMP(s)
	BOP	Recirc valve position (**Closed**) Discharge MOV position (**Open**) Pump amps (Normal, may provide actual MFP Amp indication.)
		AP-21.00
	SRO	16. CHECK REACTOR POWER CHANGE – LESS THAN 15% IN ONE HOUR
	RO	Reports Yes, (will provide indicated reactor power.)
		AP-21.00
	SRO	17. NOTIFY THE FOLLOWING: OMOC Maintenance Foreman SRO notifies Shift Manage of Plant Status, Completion of AP-21.00, Report results of local investigation of "B" CN pump and breaker, and requests OMOC and Maintenance Foreman be notified of the event.
		END EVENT #4

Event Description: "B" Condensate pump trip with failure of "A" Condensate pump to auto start.

Cue: By Examiner.

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Attachment 3

PROMPT ACTIONS TO REDUCE REACTOR POWER

MITIGATING RISES IN REACTOR POWER CAUSED BY SECONDARY TRANSIENTS

NOTE: A rise in Reactor power due to a Main Steam malfunction is addressed by 1-AP-38.00, Main Steam System Control Malfunction. A rise in Reactor power due to instrumentation or controller malfunction is addressed by 0-AP-53.00, Loss of Vital Instrumentation / Controls.

1. IF Turbine control is in Operator Auto, THEN mitigate rises in Reactor Power caused by secondary transients by lowering steam demand or Turbine load as follows:

_____ a. Reduce the Turbine Setter by an appropriate amount.

_____ b. Place the Load Rate Selector thumbwheel to 1% / min.

_____ c. Depress the GO pushbutton.

Event Description: "B" Condensate pump trip with failure of "A" Condensate pump to auto start.

Cue: By Examiner.

NUMBER	PROCEDURE TITLE	REVISION
1H-D3	CN POLISHING BYPASS AOV OPEN	3
		PAGE 2 of 3

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

1. ___	VERIFY PLANT CONDITIONS:
	• 1-CP-MOV-100 - NOT FULLY OPEN
	AND
	• One of the following has occurred:
	  • Feedwater Suction Pressure - LESS THAN 300 PSIG
	  • Sudden loss of load - GREATER THAN 10% IN 2 MINUTES
		Do the following:
		a) Verify or adjust controller setpoint for 1-CP-AOV-122 to 62 psid.
		b) IF 1-CP-AOV-122 closes, THEN GO TO Step 6.
		c) IF 1-CP-AOV-122 failed open, THEN initiate a Work Request AND GO TO Step 6.
		d) IF 1-CP-AOV-122 open due to differential pressure across polishing vessels, THEN monitor SG chemistry.
		e) IF 1-CP-AOV-122 NOT open, THEN initiate a Work Request AND GO TO Step 6.

2. ___	VERIFY 1-CP-MOV-100 - OPENING	Do the following: a) Verify or place 1-CP-MOV-100 sudden loss of load switch in NORMAL position. b) Verify or place 1-CP-MOV-100 control switch in OPEN position.
3. ___	NOTIFY CP OPERATOR THAT 1-CP-MOV-100 IS OPEN	
4. ___	CHECK CONDITION CAUSING BYPASS - CLEAR • Feed Pump Suction - GREATER THAN 425 psig • Load Stable	Do the following: a) GO TO Step 6. b) WHEN conditions allow restoration of CP Bldg, THEN perform Step 4 and 5 IAW Unit Supervisor direction.

Event Description: "B" Condensate pump trip with failure of "A" Condensate pump to auto start.

Cue: By Examiner.

NUMBER	PROCEDURE TITLE	REVISION
1H-D3	CN POLISHING BYPASS AOV OPEN	3
		PAGE 3 of 3

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

5.___ RESTORE CN POLISHING FLOW

a) Verify or place 1-CP-AOV-122 in Manual

b) Open or verify open 1-CP-AOV-122

c) Close 1-CP-MOV-100

d) WHILE monitoring CP Bldg DP, THEN slowly close 1-CP-AOV-122

e) Place 1-CP-AOV-122 in Auto

6.___ PROVIDE NOTIFICATIONS AS NECESSARY:

- OMOC
- STA
- Shift Supervision
- Chemistry

- END -

Event Description: DROPPED ROD, P-8, CONTROL BANK D

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
	Team	Diagnoses the dropped rod with the following indications/alarms: Alarms: • 1G-B5, COMPUTER PRINTOUT ROD CONT SYS. • 1G-C4, UPPER ION CHAMBER DEVIATION OR AUTO DEFEAT <50%. • 1G-D4, LOWER ION CHAMBER DEVIATION OR AUTO DEFEAT <50%. • 1E-E4, NIS PWR RNF CH AVG FLUX DEVIATION. • 1C-B8 – PRZR LO PRESS • 1G-H1 - NIS DROPPED ROD FLUX DECREASE ≥ 5% PER 2 SEC • 1G-H2 – RPI ROD BOTTOM <20 STEPS • 1G-F8, ROD BANK D WITHDRAWAL.
	RO	Indications: • Outward Rod Motion. • RCS Temperature and Pressure decrease. • Flux Variations (radial). • CERPI indication that Control Rod P-8 is at 0 steps. In accordance with the immediate actions of 1-AP-1.00 (Rod Control System Malfunction) the **RO will place Control Rods in MANUAL to stop the outward rod motion.** **RCS pressure <2205 psig places the unit in a 2 hour clock iaw TS. 3.12.F.1 (and COLR) – it is expected that the SRO will track this clock (entry/exit times).**
	SRO	0-AP-1.00 Enters 0-AP-1.00 (Rod Control System Malfunction).
	SRO	CAUTION prior to Step 1: • If Tave decreases below 530 °F, 1-E-0, Reactor Trip or Safety Injection, must be implemented.
	RO	[1] CHECK FOR EITHER OF THE FOLLOWING: • Continuous rod withdrawal • Continuous rod insertion RO will note that there was a continuous rod withdrawal.

Event Description: DROPPED ROD, P-8, CONTROL BANK D

Cue: By Examiner.

	RO	[2] STOP ROD MOTION a. **Put ROD CONT MODE SEL switch in MANUAL** b. Verify rod motion – STOPPED RO will place control rods in MANUAL and note that Rods stopped moving.
	SRO	0-AP-1.00 Conduct Transient Brief, describe event that occurred, procedure used, procedure used to continue further actions. RO/BOP will provide alarms received during the event and Critical Parameters. STA will provide no input.
	RO	0-AP-1.00 3. CHECK ROD MOTION - DUE TO INSTRUMENTATION FAILURE • First Stage Impulse Pressure • Tave/Tref • Nuclear Instrumentation RO will note that an instrumentation failure did not exist. The team will transition to the RNO for Step 3.
	RO	0-AP-1.00 3. RNO If rod motion due to a dropped rod, THEN GO TO Step 6. RO will note that dropped rod caused the rod motion.

Event Description: DROPPED ROD, P-8, CONTROL BANK D

Cue: By Examiner.

	RO	0-AP-1.00 6. CHECK IF ANY ROD DROPPED: • **Annunciator ( )G-H2, RPI ROD BOTTOM ≤ 20 STEPS - LIT** OR • **Annunciator ( )G-H1, NIS DROPPED ROD FLUX DECREASE ≥ 5% PER 2 SEC - LIT** OR • **Rod Bottom Lights - ANY LIT** OR • **Any Rod On Bottom light - LIT** OR • Indication of a partially dropped rod in the core The RO will note that they have multiple indications of a dropped rod in the core.
	RO	0-AP-1.00 7. CHECK REACTOR STATUS PRIOR TO FAILURE – CRITICAL
	RO	0-AP-1.00 8. CHECK ONLY ONE ROD AFFECTED
	RO	0-AP-1.00 9. CHECK REACTOR POWER – GREATER THAN 25%
	BOP/RO	0-AP-1.00 10. CHECK UNIT CONDITIONS – STABLE
	RO	0-AP-1.00 11. PLACE ROD CONTROL IN MANUAL (Rods in manual when rod dropped).
	RO/BOP	0-AP-1.00 12. CHECK POWER RANGE NIs – ANY DROPPED ROD SIGNAL PRESENT
	BOP	0-AP-1.00 13. **RESET NIS DROPPED ROD SIGNAL IAW ATTACHMENT 4** Attachment 4 of AP-1.00 is located towards the end of this event.

Event Description: DROPPED ROD, P-8, CONTROL BANK D

Cue: By Examiner.

	RO	0-AP-1.00 14. CHECK ANNUNCIATOR 1G-F8, ROD BANK D WITHDRAWAL – NOT LIT If alarm is LIT, then the RNO will direct the team to initiate Attachment 5 – This attachment follows attachment 4 at the end of this event. **Note**: *This may not be lit if the RO quickly placed rods in MANUAL when withdrawing*.
	SRO	0-AP-1.00 Note prior to Step 15: • Quadrant power tilt may cause unit ramp requirements to be more restrictive.
	SRO	0-AP-1.00 15. VERIFY QUADRANT POWER TILT RATIO • Initiate Attachment 6, QUADRANT POWER TILT CALCULATION • Review Technical Specification 3.12.B.6 SRO will direct the STA to perform the QPTR in accordance with Attachment 6 and review TS 3.12. *Summary of applicable Tech Specs are found following Step 18 (Next Page).*
	SRO	0-AP-1.00 Notes prior to Step 16: • Checking that the unit is operating between Hot Zero Power and Hot Full Power, that there is only one fully dropped (less than 10 steps) control rod, and that all other rods are above the rod insertion limit, checks that adequate SDM exists. • SDM must be re-verified using 1-OP-RX-001 every 12 hours after the control rod was dropped until the Reactor is shutdown or the rod is declared operable.
	SRO	0-AP-1.00 16. VERIFY SHUTDOWN MARGIN (WITHIN ONE HOUR) • The fully dropped rod (less than 10 steps) is the only inoperable rod <u>AND</u> • All other rods are greater than the Rod Insertion Limit
	SRO	0-AP-1.00 17. MAKE NARRATIVE LOG ENTRY THAT SDM IS MET

Event Description: DROPPED ROD, P-8, CONTROL BANK D

Cue: By Examiner.

	SRO	0-AP-1.00 Caution prior to Step 18: • Loop ΔT is the most accurate measure of Reactor power with a mis-aligned rod, and must be monitored during the ramp and used as a basis for stabilizing power.
	RO	0-AP-1.00 18. CHECK REACTOR POWER – LESS THAN OR EQUAL TO 75% Step 18 RNO actions: Do the following: a. Reduce Reactor Power to between 70% - 74% within one hour. b. Reduce NIS High Flux trip setpoints to less than or equal to 85% within the following four hours. c. WHEN Reactor Power has been reduced, THEN GO TO Step 19. The team will enter AP-23.00 to reduce reactor power. **GO TO EVENT 6**
	SRO	0-AP-1.00 Applicable Tech Specs for Dropped Rod: 3.12.B.6: (Quadrant Power Tilt) If, except for operation at THERMAL POWER < 50% or for physics and control rod assembly surveillance testing, the QUADRANT POWER TILT exceeds 2%, then: a. Within 2 hours, either the hot channel factors shall be determined and the power level adjusted to meet the requirement of Specification 3.12.B.1, or b. The power level shall be reduced from RATED POWER 2% for each percent of QUADRANT POWER TILT. The high neutron flux trip setpoint shall be similarly reduced within the following 4 hours. c. If the QUADRANT POWER TILT exceeds 10%, the power level shall be reduced from RATED POWER 2% for each percent of QUADRANT POWER TILT within the next 30 minutes. The high neutron flux trip setpoint shall be similarly reduced within the following 4 hours.

Event Description: DROPPED ROD, P-8, CONTROL BANK D

Cue: By Examiner.

		0-AP-1.00 Applicable Tech Specs for Dropped Rod: (Continued) 3.12.C.3: (Inoperable rod) Startup and POWER OPERATION may continue with one control rod assembly inoperable provided that within one hour either: a. The control rod assembly is restored to OPERABLE status, as defined in Specification 3.12.C.1 and 2, or b. the shutdown margin requirement of Specification 3.12.A.3.c is satisfied. c. POWER OPERATION may then continue provided that: 1) either: a) power shall be reduced to less than 75% of RATED POWER within one (1) hour, and the High Neutron Flux trip setpoint shall be reduced to less than or equal to 85% of RATED POWER within the next four (4) hours, or b) the remainder of the control rod assemblies in the group with the inoperable control rod assembly are aligned to within 12 steps of the inoperable rod within one (1) hour while maintaining the control rod assembly sequence and insertion limits specified in the CORE OPERATING LIMITS REPORT; the THERMAL POWER level shall be restricted pursuant to Specification 3.12.A during subsequent operation. 2) the shutdown margin requirement of Specification 3.12.A.3.c is determined to be met within one hour and at least once per 12 hours thereafter. 3) the hot channel factors are shown to be with the design limits of TS 3.12.B.1 within 72 hours. 4) a reevaluation of each accident analysis of Table 3.12-1 is performed within 5 days.

Event Description: DROPPED ROD, P-8, CONTROL BANK D

Cue: By Examiner.

	BOP	ATTACHMENT 4 of AP-1.00 – RESETTING NIS DROPPED ROD SIGNALS Perform the following for each NI with a dropped rod status light lit. 1. N41 RESET a) Place the Power Range Test Switch in RESET. b) Check the Dropped Rod Status Light on N41 - NOT LIT. c) Return the Power Range Test Switch to NORMAL. 2. N42 RESET a) Place the Power Range Test Switch in RESET. b) Check the Dropped Rod Status Light on N42 - NOT LIT. c) Return the Power Range Test Switch to NORMAL. 3 N43 RESET a) Place the Power Range Test Switch in RESET. b) Check the Dropped Rod Status Light on N43 - NOT LIT. c) Return the Power Range Test Switch to NORMAL. 4. N44 RESET a) Place the Power Range Test Switch in RESET. b) Check the Dropped Rod Status Light on N44- NOT LIT. c) Return the Power Range Test Switch to NORMAL. 5. Check annunciator 1G-H1, NIS DROPPED ROD FLUX DECREASE >5% PER SEC - NOT LIT 6. Check annunciator 1G-F8, ROD BANK D WITHDRAWAL - NOT LIT 7. IF 1G-F8, ROD BANK D WITHDRAWAL is LIT, THEN initiate Attachment 5.

Event Description: DROPPED ROD, P-8, CONTROL BANK D

Cue: By Examiner.

	BOP	ATTACHMENT 5 of AP-1.00 – RESPONSE TO ROD BANK D WITHDRAWAL (Rev. 27)

ACTION / EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. ___ CHECK ALARM - ROD DEMAND POSITION GREATER THAN OR EQUAL TO 228 STEPS ON CONTROL BANK D - GP 1 DEMAND POSTN	
2. ___ CHECK ROD CONTROL MODE SEL SWITCH IN MANUAL	
3. ___ CHECK BOTH CONTROL BANK D STEP COUNTERS - LESS THAN OR EQUAL TO 230 STEPS	Do the following: ☐ a) Step rods out to make both Bank D Step Counters equal. (Group step counters must be equalized by stepping out only, to prevent Rod Group Sequence Error) ☐ b) Reset Bank D Step Counters to 230 steps. (Refer to Attachment 3)
NOTE: Rods may have to be stepped in as many as two steps below the fully withdrawn position to clear Annunciator ( )G-F8.	
4. ___ STEP CONTROL BANK D RODS IN AS NECESSARY TO CLEAR ( )G-F8, ROD BANK D WITHDRAWAL	
5. ___ POSITION CONTROL BANK D RODS AS DETERMINED BY SHIFT SUPERVISION	
NOTE: Both group step counters for Control Bank D should be the same before performing Step 6.	
6. ___ LOCALLY CHECK THE BANK OVERLAP COUNTER - AT 384 PLUS CURRENT CONTROL BANK D DEMAND POSITION	☐ Notify I&C to reset the Bank Overlap Counter.
7. ___ NOTIFY UNIT SRO THAT ROD OVERSTEP HAS BEEN RESET	
- END -	

Event Description: 0-AP-23.00, RAMP UNIT TO < 75% power.

Cue: When initiated by Team.

Time	Position	Applicant's Action or Behavior
		Start of 0-AP-23.00
	SRO	Conducts a Brief summarizing the Event and Establish priorities. RO/BOP will provide Critical Parameters *The STA will have no input for the brief.*
	RO	Reactivity control during AP-23.00 Ramp: 154 gallons of Boric Acid needed to reduce power to 75%. If Rod drop resulted in 4 degree drop in Tave, boration can subtract 38 gal (9.5 gal/^{o}F) for total of 116 gal. boration. If 30 gallons added during Emergency Boration (estimate), that this leaves 86 gallons to be added using normal boration at an average rate of 5.8 gpm. Control Bank 'D' rod height at end of ramp 197 Steps.
	SRO	Note: This is just an example of Boric Acid & rods needed for this ramp. Actual amount may vary based on team response. Completes Brief and continues with AP-23.00.
	SRO	0-AP-23.00 Caution Prior to Step 1: • Conservative decision-making must be maintained during rapid load reductions. Refer to Attachment 1 for trip criteria. Notes Prior to Step 1: • Actions that can be completed independently of preceding steps may be performed out of sequence as directed by the SRO • When the Turbine is not being actively ramped, the REFERENCE and SETTER values must remain matched to prevent inadvertent ramp. • Pre-planned reactivity plans located in the Main Control Room will be used as guidance for ramping down to the desired power level. • The ramp rate in IMP OUT is nonlinear and therefore pre-planned reactivity plans based on IMP IN are not as accurate. However, total amounts of boration and dilution can be used as guidance. • For ramp rates greater than or equal to 1%/minute, Rod Control should remain in Automatic if available.
	RO	0-AP-23.00 1. **TURN ON ALL PRZR HEATERS**

Event Description: 0-AP-23.00, RAMP UNIT TO < 75% power.

Cue: When initiated by Team.

		0-AP-23.00
	BOP	2. INITIATE PLANT LOAD REDUCTION AT 2%/MINUTE OR LESS:
		a) Verify turbine valve position - NOT ON LIMITER
	RO	The turbine is NOT on the limiter.
		b) Insert control rods in AUTO or MANUAL as necessary to maintain Tave and Tref within 5°F.
	SRO/BOP	c) **Verify or place turbine in IMP IN or IMP OUT as determined by Shift Supervision**
		The SRO can choose IMP IN or IMP OUT.
	BOP	d) **Adjust SETTER to desired power level**
		e) **Adjust LOAD RATE %/MIN thumbwheel to desired ramp rate (1%/minute)**
		f) **Initiate Turbine load reduction using OPERATOR AUTO (pushes the GO button)**
		g) **Reduce Turbine Valve Position Limiter as load decreases**
		The BOP will periodically reduce the limiter setpoint during the ramp.
		0-AP-23.00
	SRO	3. CHECK EMERGENCY BORATION – REQUIRED
		The team may decide not to emergency borate or may borate after the ramp has progressed to the point that Tave and Tref are matched (or close).
		0-AP-23.00
	SRO	Note Prior to Step 4: • Step 4 or Step 5 may be performed repeatedly to maintain Tave and Tref matched, ΔFlux in band, and control rod position above the LO-LO insertion limit.

Event Description: 0-AP-23.00, RAMP UNIT TO < 75% power.

Cue: When initiated by Team.

	RO	0-AP-23.00 4. PERFORM AN EMERGENCY BORATION IAW THE FOLLOWING: a) Verify or raise CHG flow to greater than 75 gpm b) **Transfer the in-service BATP to FAST** c) **Open 1-CH-MOV-1350** SRO will direct nominal opening of approximately 25 seconds. d) Monitor EMRG BORATE FLOW • 1-CH-FI-1110 e) After required emergency boration, perform the following: 1) **Close 1-CH-MOV-1350** 2) **Transfer the in-service BATP to AUTO** 3) Restore Charging flow control to normal SRO may direct rod motion to maintain Δ Flux within specified band.
	RO	0-AP-23.00 5. ESTABLISH A NORMAL BORATION TO MAINTAIN CONTROL ROD POSITION ABOVE THE LO-LO INSERTION LIMITS IAW ATTACHMENT 4 Attachment 4 (Boration) and 5 (Manual Makeups) are at the end of this section. SRO may direct manual rod motion to maintain Δ flux within specified band.
	SRO	0-AP-23.00 Notes Prior to Step 6: • If at any time plant conditions no longer require rapid load reduction, actions should continue at Step 35. • RCS Tave must be maintained less than or equal to 577°F and RCS pressure must be maintained greater than or equal to 2205 psig. Tech Spec 3.12.F.1 should be reviewed if either parameter is exceeded. • I & C should be contacted to provide assistance with adjusting IRPIs.
	RO	0-AP-23.00 6. CONTROL RAMP RATE TO MAINTAIN RCS PRESSURE GREATER THAN 2205 PSIG

Event Description: 0-AP-23.00, RAMP UNIT TO < 75% power.

Cue: When initiated by Team.

	RO	0-AP-23.00 *7. CHECK LETDOWN ORIFICES – TWO IN SERVICE *Evaluator note: two orifices will already be in service.*
	BOP	0-AP-23.00 8. MONITOR STEAM DUMPS FOR PROPER OPERATION
	SRO	0-AP-23.00 9. NOTIFY THE FOLLOWING: • Energy Supply (MOC) • Polishing Building • Chemistry • OMOC
	SRO	0-AP-23.00 10. EVALUATE THE FOLLOWING: • EPIP applicability *The Shift Manager will review EPIPs for applicability. They are not applicable.* • VPAP-2802, NOTIFICATIONS AND REPORTS, applicability *SRO directs STA to review VPAP-2802. The STA reports completion of the review of VPAP-2802 and no notifications are required.* *No further actions are required for this event.*
	SRO	0-AP-23.00 11. CHECK RAMP WILL BE TO LESS THAN APPROXIMATELY 35% REACTOR POWER No, go to step 12.
	SRO	0-AP-23.00 12. CHECK REACTOR POWER – HAS LOWERED MORE THAN 15% IN ONE HOUR. When reactor power has lowered >15%, then chemistry will be notified.
	SRO	0-AP-23.00 13. NOTIFY CHEMISTRY OF POWER CHANGE > 15% IN ONE HOUR. Chemistry notified of power change > 15% in one hour.

Event Description: 0-AP-23.00, RAMP UNIT TO < 75% power.

Cue: When initiated by Team.

	SRO	0-AP-23.00 CAUTION: Secondary plant evolutions affecting Feedwater Flow or temperature will affect RCS temperature and Reactor Power. This effect will be greater at beginning of core life due to a lower value for isothermal temperature coefficient. The operating team must be prepared to mitigate the effects of the secondary evolutions on the RCS. *RO acknowledges the Caution.*
	SRO	0-AP-23.00 14. AT APPROXIMATELY 70% REACTOR POWER CHECK AUXILIARY STEAM MAINTAINING BETWEEN 160 AND 180 PSIG. *RO Acknowledges the step.*
		END EVENT #6

Event Description: 0-AP-23.00, RAMP UNIT TO < 75% power.

Cue: When initiated by Team.

		0-AP-23.00 Attachment 4 (NORMAL BORATION) Actions
	RO	1. **Place the MAKE-UP MODE CNTRL switch in the STOP position.**
	RO	2. **Adjust 1-CH-YIC-1113 to desired total gallons**
	RO	3. **Adjust 1-CH-FC-1113A to desired flow rate.**
	RO	4. **Place the MAKE-UP MOD SEL switch in the BORATE position**.
	RO	5. **Place the MAKE MODE CNTRL switch in the START position.**
	RO	6. Verify proper valve positions.
	RO	7. Adjust boration rate using 1-CH-FC-1113A, as necessary.
	RO	8. WHEN boration is complete, THEN perform the following. IF boric acid is to remain in the Blender to support ramping the Unit, THEN enter N/A. a) Manually blend approximately 20 gallons to flush the boration path IAW Attachment 5, Manual Makeups. b) Enter N/A for the remaining steps in this Attachment. *Attachment 5 is on the next page*
	RO	9. Verify controllers for Primary Grade water and Boric Acid are set correctly.
	RO	10. **Place the MAKE-UP MODE SEL switch in the AUTO position.**
	RO	11. **Place the MAKE-UP MODE CNTRL switch in the START position.**
	RO	12. Notify Shift Supervision of blender status.

Event Description: 0-AP-23.00, RAMP UNIT TO < 75% power.

Cue: When initiated by Team.

		0-AP-23.00 Attachment 5 (Manual Makeups) Actions
		1. Place the MAKE-UP MODE CNTRL switch in the STOP position.
		2. Check controllers for the flow rate of Boric Acid and Primary Grade water are set correctly.
		3. Check integrators for the gallons of Boric Acid and Primary Grade water are set correctly.
		4. Place the MAKE-UP MODE SEL switch in the MANUAL position.
		5. Place the MAKE-UP MODE CNTRL switch in the START position.
		6. Open 1-CH-FCV-1113B, BLENDER TO CHG PUMP.
		7. Check proper valve positions.
		8. WHEN the Manual Makeup operation is complete, THEN place 1-CH-FCV-1 113B in the AUTO position
		9. Place the MAKE-UP MODE CNTRL switch in the STOP position.
		10. Check or place the control switches in the AUTO position.
		11. Check controllers for Primary Grade water and Boric Acid are set correctly.
		12. Place the MAKE-UP MODE SEL switch in the AUTO position.
		13. Place the MAKE-UP MODE CNTRL switch in the START position.
		14. Notify Shift Supervision of blender status.

Event Description: RCS LEAK OF 200 GPM. 1-AP-16.00.

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
	Team	Diagnoses the failure with the following indications: Alarms: • RM-Q7 – CTMT PART ALERT/FAILURE • RM-Q8 – CTMT GAS ALERT/FAILURE • RM-R8 – CTMT GAS RM-RI-160 HIGH **Indications:** • CTMT Sump Level increasing • 1-DA-P-4A running continuously *Unit 2 will perform RM ARPs, but will be unable to perform Auto Action verification.*
	SRO	1-AP-16.00 Direct initiation of 1-AP-16.00, EXCESSIVE RCS LEAKAGE
	SRO	1-AP-16.00 Notes Prior to Step 1: • If SI Accumulators are isolated, 1-AP-16.01, Shutdown LOCA, should be used for guidance. • RCS average temperature has a direct impact on pressurizer level.
	RO	1-AP-16.00 [1] MAINTAIN PRZR LEVEL: • **Isolate Letdown** • **Control Charging flow** **RO closes 1-CH-LCV-1460A and 1-CH-LCV-1460B to isolate letdown. The RO will take manual control of 1-CH-FCV-1122 to stabilize pressurizer level.**
	RO	1-AP-16.00 2. CHECK THE FOLLOWING PARAMETERS – STABLE OR INCREASING • PRZR Level • PRZR Pressure • RCS Subcooling Identifies that not all parameters are stable under the control of the operator. Team should identify RCS leak rate greater than 150 gpm. **Team goes to 1-E-0.**

Event Description: RCS LEAK OF 200 GPM. 1-AP-16.00.

Cue: By Examiner.

	SRO SRO	GO TO 1-E-0, REACTOR TRIP OR SAFETY INJECTION **Directs RO to trip the reactor, perform E-0, and Manually Safety Inject on Step 4.**
	RO	**1-E-0 – Reactor Trip or Safety Injection** [1] CHECK REACTOR TRIP: a) Manually trip reactor **Pushes the reactor trip push buttons.** b) Check the following: • All Rods On Bottom light – LIT • Reactor trip and bypass breakers – OPEN • Neutron flux - DECREASING
	RO RO	1-E-0 [2] CHECK TURBINE TRIP: a) Manually trip the turbine **Pushes the turbine trip push buttons.** b) Verify all turbine stop valves - CLOSED c) Isolate reheaters by closing MSR steam supply SOV • 1-MS-SOV-104 d) Verify generator output breakers – OPEN (Time Delayed)

Event Description: RCS LEAK OF 200 GPM. 1-AP-16.00.

Cue: By Examiner.

	RO	1-E-0 [3] CHECK BOTH AC EMERGENCY BUSES – ENERGIZED RO confirms that both AC emergency buses are energized.
	RO RO	1-E-0 [4] CHECK IF SI INITIATED: a) Check if SI is actuated: • LHSI pumps – RUNNING • SI annunciators – LIT • A-F-3 SI INITIATED – TRAIN A • A-F-4 SI INITIATED – TRAIN B 4b) **Manually initiate SI** **The RO will manually initiate SI at step 4 by pushing both SI pushbuttons.** After the immediate actions of 1-E-0 are reported as complete, the SRO will check off immediate action steps in his copy of 1-E-0. After the immediate actions are verified, the SRO will conduct a commensurate brief by polling the Team to determine whether a higher priority exists other than establishing SI flow. The SRO will close the brief and continue. RO should identify that there is NO SI flow to the core. *The STA will have no input for the brief.*

Event Description: RCS LEAK OF 200 GPM. 1-AP-16.00.

Cue: By Examiner.

	SRO/BOP	1-E-0 5. Initiate Attachment 1 (***Attachment 1, 2, and 7 actions contained at the end of this section***). **Note:** SRO will hand Attachment 2 to the RO, and Attachments 1 and 3 to the BOP. **CT-3: Restore SI flow to the core prior to transitioning to FR-C.2, Response to Degraded Core Cooling.** **Critical task begins when SI is manually initiated and ends when SI flow is restored to the core.**
	SRO/RO	NOTE: SRO may direct the RO to perform Attachment 7 of 1-E-0 for Transient AFW Control following completion of Attachment 2 of 1-E-0, or opt to throttle AFW as part of E-0, Step 6.
	RO	1-E-0 *6. CHECK RCS AVERAGE TEMPERATURE • STABLE AT 547°F OR • TRENDING TO 547°F The team will identify that RCS temperature is decreasing. The team should attribute this to the injection of SI into the RCS and AFW flow to the SGs. It is acceptable for the team to enter the RNO portion of this step and perform the applicable steps (summarized below): Stop dumping steam **Reduce AFW flow to the SGs** Close MSTVs if cooldown continues
	RO	1-E-0 7. CHECK PRZR PORVs AND SPRAY VALVES: a) PRZR PORVs – CLOSED b) PRZR spray controls • Demand at Zero (or) • Controlling Pressure c) PORV block valves - AT LEAST ONE OPEN

Event Description: RCS LEAK OF 200 GPM. 1-AP-16.00.

Cue: By Examiner.

	SRO RO	1-E-0 **NOTE:** Seal injection flow should be maintained to all RCPs. *8. CHECK RCP TRIP AND MINIFLOW RECIRC CRITERIA: a) Charging Pumps – AT LEAST ONE RUNNING AND FLOWING TO RCS Two or three Charging pumps will be running and flowing to the RCS. b) RCS subcooling - LESS THAN 30°F [85°F] RCS subcooling may or may not be less than 30 °F at this time. RNO for the step is to go to step 9. **NOTE**: If RCP trip Criteria are met prior to reaching this Step, the Continuous Actions Page (CAP) contains these criteria. After this Step is read, this step or the CAP can be used for criteria as long as the Team is performing E-0.
	RO	1-E-0 9. CHECK IF SGs ARE NOT FAULTED: • Check pressures in all SGs a) STABLE OR INCREASING AND b) GREATER THAN 100 PSIG RO will observe a slightly decreasing trend on SG pressures. This will be attributed to the RCS cooldown. The team will not transition to 1-E-2.

Event Description: RCS LEAK OF 200 GPM. 1-AP-16.00.

Cue: By Examiner.

	SRO Unit 2 Unit 2 RO	1-E-0 10. CHECK IF SG TUBES ARE NOT RUPTURED: • Condenser air ejector radiation – NORMAL • SG blowdown radiation – NORMAL • SG MS radiation – NORMAL • TD AFW pump exhaust radiation – NORMAL • SG NR Level - NOT INCREASING IN AN UNCONTROLLED MANNER RO will use PCS indication for MS and TDAFW Exhaust radiation. Unit 2 will be used to report Condenser A/E and SG Blowdown radiation trend.
	SRO RO SRO	1-E-0 11 CHECK RCS - INTACT INSIDE CTMT • CTMT radiation - NORMAL • CTMT pressure - NORMAL • CTMT RS sump level – NORMAL Identify CTMT conditions as abnormal GO TO 1-E-1, LOSS OF REACTOR OR SECONDARY COOLANT.
	SRO	1-E-1 Conducts a Brief summarizing the Event and Establish priorities. RO/BOP will provide Critical Parameters *The STA will have no input for the brief.* The SRO will complete the Brief and continue with E-1.
		END OF EVENT 7

Event Description: RCS LEAK OF 200 GPM. 1-AP-16.00.

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
		Attachment 1 of E-0
	BOP	1 CHECK FW ISOLATION: • Feed pump discharge MOVs - CLOSED • 1-FW-MOV-150A • 1-FW-MOV-150B • MFW pumps - TRIPPED • Feed REG valves - CLOSED • SG FW bypass flow valves - DEMAND AT ZERO • SG blowdown TVs – CLOSED
		Attachment 1 of E-0
	BOP	2 CHECK CTMT ISOLATION PHASE I: • Phase I TVs - CLOSED • 1-CH-MOV-1381 – CLOSED *Identifies that 1-CH-MOV-1381 did not close and manually closes MOV.* • 1-SV-TV-102A - CLOSED • PAM isolation valves - CLOSED • 1-DA-TV-103A • 1-DA-TV-103B
		Attachment 1 of E-0
	BOP	3 CHECK AFW PUMPS RUNNING: a) MD AFW pumps - RUNNING (Time Delayed) b) TD AFW pump - RUNNING IF NECESSARY

Event Description: RCS LEAK OF 200 GPM. 1-AP-16.00.

Cue: By Examiner.

	BOP	**Attachment 1 of E-0** 4. CHECK SI PUMPS RUNNING: • CHG pumps – NOT RUNNING • LHSI pumps – NOT RUNNING Manually starts LHSI and HHSI pumps. **CT-3: Restore SI flow to the core prior to transitioning to FR-C.2, Response to Degraded Core Cooling.**
	BOP	**Attachment 1 of E-0** 5. CHECK CHG PUMP AUXILIARIES: • CHG pump CC pump – RUNNING • CHG pump SW pump - RUNNING
	BOP	**Attachment 1 of E-0** 6. CHECK INTAKE CANAL: • Level - GREATER THAN 24 FT • Level - BEING MAINTAINED BY CIRC WATER PUMPS
	BOP	**Attachment 1 of E-0** 7. CHECK IF MAIN STEAMLINES SHOULD BE ISOLATED: a) Check if ANY of the following annunciators - HAVE BEEN LIT • E-F-10 (High Steam Flow SI) • B-C-4 (Hi Hi CLS Train A) • B-C-5 (Hi Hi CLS Train B) Identifies annunciators not lit and goes to step 8.
	BOP	**Attachment 1 of E-0** *8. CHECK IF CS REQUIRED: a) CTMT pressure – HAS EXCEEDED 23 PSIA Identifies pressure has not exceeded 23 or 17.7 psia and goes to step 10. Note: Continuous action step, when press > 23 psia, should re-perform, if in E-0.

Event Description: RCS LEAK OF 200 GPM. 1-AP-16.00.

Cue: By Examiner.

	BOP	**Attachment 1 of E-0** *10. BLOCK LOW PRZR PRESS SI SIGNAL: a) Check PRZR pressure – LESS THAN 2000 psig b) Turn both LO PRZR PRESS & STM HDR/LINE ΔP switches to block c) Check Permissive Status light C-2 - LIT BOP may block the low pressurizer pressure SI signal depending on current RCS pressure.
	BOP	**Attachment 1 of E-0** *11. BLOCK LOW TAVE SI SIGNAL: Step may not be performed at this time (if Tave is greater than 543°F). a) Check RCS Tave - LESS THAN 543°F b) Turn both HI STM FLOW & LO TAVG OR LP switches to block c) Check Permissive Status light F-1 - LIT
	BOP	**Attachment 1 of E-0** **NOTE:** • CHG pumps should be run in the following order of priority: C, B, A. • Subsequent SI signals may be reset by re-performing Step 12. 12. CHECK SI FLOW: a) HHSI to cold legs - FLOW INDICATED • 1-SI-FI-1961 (NQ) • 1-SI-FI-1962 (NQ) • 1-SI-FI-1963 (NQ) • 1-SI-FI-1943 or 1-SI-FI-1943A b) Check CHG pumps - THREE RUNNING *No, only one Chg pump running. Go to step 12e.*

Event Description: RCS LEAK OF 200 GPM. 1-AP-16.00.

Cue: By Examiner.

		Step 12, Attachment 1 of E-0, Continued e) RCS pressure - LESS THAN 185 PSIG RNO: e) IF two LHSI pumps are running, THEN do the following: 1) Verify reset or reset SI. 2) Stop one LHSI pump and put in AUTO. 3) GO TO Step 13.
	BOP	**Attachment 1 of E-0** 13. CHECK TOTAL AFW FLOW - GREATER THAN 350 GPM [450 GPM]
	BOP	**Attachment 1 of E-0** 14. CHECK AFW MOVs - OPEN BOP will identify that all AFW MOVS are not open and will read the RNO portion of this step and manually align valves as necessary.
	BOP	**Attachment 1 of E-0** 15. INITIATE SI VALVE ALIGNMENT IAW ATTACHMENT 2 See attached copy of Attachment 2. (Next Page of this guide) Depending on timing, this attachment may have already been completed.
	BOP	**Attachment 1 of E-0** 16. INITIATE VENTILATION, AC POWER, AND SFP STATUS CHECKS IAW ATTACHMENT 3 *Attachment 3 follows Attachment 2 on next page* *Unit 2 Operator will state that Unit 2 is at 100% power (if asked)* *Unit 2 will also accept responsibility to complete Attachment 3 if it is given to Unit 2 at the point where differential pressure indications are requested.*

Event Description: RCS LEAK OF 200 GPM. 1-AP-16.00.

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
		ATTACHMENT 2 of 1-E-0 **NOTE:** Components previously aligned by SI termination steps, must not be realigned by this Attachment.
	RO	ATTACHMENT 2 of 1-E-0 1. Check opened or open CHG pump suction from RWST MOVs. • 1-CH-MOV-1115B • 1-CH-MOV-1115D
	RO	ATTACHMENT 2 of 1-E-0 2. Check closed or close CHG pump suction from VCT MOVs. • 1-CH-MOV-1115C • 1-CH-MOV-1115E
	RO	ATTACHMENT 2 of 1-E-0 3. Check running or start at least two CHG pumps. (listed in preferred order) • 1-CH-P-1C • 1-CH-P-1B • **Starts 1-CH-P-1A**
	RO	ATTACHMENT 2 of 1-E-0 4. Check opened or open HHSI to cold legs MOVs. • 1-SI-MOV-1867C • 1-SI-MOV-1867D
	RO	ATTACHMENT 2 of 1-E-0 5. Check closed or close CHG line isolation MOVs. • 1-CH-MOV-1289A • 1-CH-MOV-1289B

Event Description: RCS LEAK OF 200 GPM. 1-AP-16.00.

Cue: By Examiner.

	RO	ATTACHMENT 2 of 1-E-0 6. Check closed or close Letdown orifice isolation valves. • 1-CH-HCV-1200A • 1-CH-HCV-1200B • 1-CH-HCV-1200C
	RO	ATTACHMENT 2 of 1-E-0 7. Check opened or open LHSI suction from RWST MOVs. • 1-SI-MOV-1862A • 1-SI-MOV-1862B
	RO	ATTACHMENT 2 of 1-E-0 8. Check opened or open LHSI to cold legs MOVs. • 1-SI-MOV-1864A • 1-SI-MOV-1864B
	RO	ATTACHMENT 2 of 1-E-0 9. Check running or **start at least one LHSI pump**. • 1-SI-P-1A • 1-SI-P-1B
	RO	ATTACHMENT 2 of 1-E-0 10. Check High Head SI flow to cold legs indicated. • 1-SI-FI-1961 • 1-SI-FI-1962 • 1-SI-FI-1963 • 1-SI-FI-1943 or 1-SI-FI-1943A

Event Description: RCS LEAK OF 200 GPM. 1-AP-16.00.

Cue: By Examiner.

	RO	ATTACHMENT 7 of 1-E-0 1. Check SI is in progress. IF SI NOT in progress, THEN RETURN TO procedure step in effect. Identifies SI in progress, GOES TO STEP 2.
	RO	ATTACHMENT 7 of 1-E-0 2. Check running or start AFW Pumps, as necessary. 1-FW-P-3A 1-FW-P-3B 1-FW-P-2 Identifies AFW PUMPs Running.
	RO	ATTACHMENT 7 of 1-E-0 3. Maintain at least 350 gpm [450 gpm] AFW flow until one SG Narrow Range Level is greater than 12% [18%]. Confers with SRO to determine AFW flow requirement. **Throttles AFW Flow to achieve ~120 gpm per SG**.
	RO	ATTACHMENT 7 of 1-E-0 NOTE: AFW to idle loop(s) (RCP secured), should be throttled to prevent depressurization of the SG and subsequent Header / Line SI. AFW flow between approximately 60 gpm and 100 gpm should be adequate to prevent a Header / Line SI. Acknowledges NOTE. 4. When minimum heat sink has been verified, AFW MOVs should be controlled to maintain intact SG Narrow Range levels between 22% and 50% by throttling AFW Isolation MOVs: SG A, 1-FW-MOV-151E and 1-FW-MOV-151F SG B, 1-FW-MOV-151C and 1-FW-MOV-151D SG C, 1-FW-MOV-151A and 1-FW-MOV-151B Checks AG WR level rising and continues to Step 5.

Event Description: RCS LEAK OF 200 GPM. 1-AP-16.00.

Cue: By Examiner.

		ATTACHMENT 7 of 1-E-0
	RO	5. Isolate AFW header with deenergized Emergency Bus MOVs by closing the following header isolation valves: Emergency Bus H deenergized: 1-FW-141, 1-FW-156, 1-FW-171 Emergency Bus J deenergized: 1-FW-140, 1-FW-155, 1-FW-170 Identifies Both Emergency Buses energized, returns Attachment 7 to SRO.

Event Description: LARGE BREAK LOCA FR-Z.1

Cue: When crew enters 1-E-1 (step 4) or Evaluator cue.

Time	Position	Applicant's Action or Behavior
	TEAM	Diagnose SBLOCA change to LBLOCA based upon: Rapid drop in RCS pressure Rapid rise in CTMT pressure
	STA	Identify Entry Criteria met for FR-P.1 to SRO.
	SRO	Announces Transition to FR-P.1.
		1-FR-P.1
	SRO	1-FR-P.1, PTS is entered; SRO determines at step 1 that RCS pressure is < 185 psig, and LHSI flow is > 1000 gpm and exits FR-P.1
	STA	Identify Entry Criteria for FR-Z.1 to SRO.
	SRO	Announce Transition to FR-Z.1
		1-FR-Z.1 Actions
		CAUTION: If 1-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, is in effect, containment spray systems should be operated as directed by 1-ECA-1.1, instead of Step 1 below.
	SRO	1 CHECK IF CS REQUIRED: a) Check CTMT pressure - HAS INCREASED TO GREATER THAN 23 PSIA
		b) Check CS pumps - RUNNING — b) IF RWST level greater than 3%, THEN start CS pumps. IF any CS pump can NOT be started, THEN monitor OSRS pumps for cavitation.
	RO	**Starts 1-CS-P-1A / 1B** — IF cavitation is indicated, THEN put affected OSRS pump in PTL
		NOTE: 1-CS-P-1A will auto trip on overcurrent. NOTE: **1-CS-P-1B will manually start.**
	RO	c) Check CS system valves - OPEN — c) Manually align CS valves. • 1-CS-MOV-100A • 1-CS-MOV-100B • **1-CS-MOV-101A and B** • **1-CS-MOV-101C and D** • **1-CS-MOV-102A and B**
	RO	**Opens Valves Listed Above (BOLDED)**.

Event Description: LARGE BREAK LOCA FR-Z.1

Cue: When crew enters 1-E-1 (step 4) or Evaluator cue.

		Critical Task: **CT-4:** Manually Actuate Containment Spray. **Establish CS flow from at least one CS pump** prior to 60% RWST level. d) Stop all RCPs *Stops RCPS and acknowledges Loop Low Flow Alarms.*
	SRO RO RO	1-FR-Z.1 Actions 2 CHECK SW FLOW TO RS HXs - GREATER THAN 4750 GPM — Align valves as necessary. *Checks flow > 4750 GPM following the Opening of the SW Valves Listed below*. a) Check the following valves – OPEN • 1-SW-MOV-103A, B, C, and D • 1-SW-MOV-104A, B, C, and D • 1-SW-MOV-105A, B, C, and D **Open the SW MOVs listed above.**
	SRO	1-FR-Z.1 Actions 3 CHECK RS SYSTEMS: a) Check RWST level -LESS THAN 60% — a) Do the following: 1) Monitor RWST level. 2) WHEN RWST level is less than 60%, THEN perform Steps 3b and 3c.
	SRO RO	1-FR-Z.1 Actions 4 CHECK INTAKE CANAL LEVEL – GREATER THAN 24 FT *Reports Intake Canal Level 29 feet and Stable*.

Event Description: LARGE BREAK LOCA FR-Z.1

Cue: When crew enters 1-E-1 (step 4) or Evaluator cue.

		1-FR-Z.1 Actions
	SRO	5 CHECK CTMT ISOLATION VALVES - CLOSED IAW ATTACHMENT 1 — IF flow path NOT necessary, THEN close valves
	BOP	Aligns Valves as necessary.
		NOTE: BOP and SRO may confer on leaving 1-IA-TV-100 open. **NOTE**: FR-Z.1, Attachment 1 Actions located at the end of this section.
		1-FR-Z.1 Actions
	SRO	6. ___ CHECK MSTVs - CLOSED — Manually close MSTVs.
	RO/BOP	**Closes MSTVs if not already performed**.
		1-FR-Z.1 Actions
		CAUTION: • At least one SG must be maintained available for RCS cooldown. • If all SGs are faulted, at least 60 gpm [100 gpm] feed flow should be maintained to each SG.
	SRO	7. ___ CHECK IF FEED FLOW SHOULD BE ISOLATED TO ANY SG(s):
		a) Check pressures in all SGs: • ANY SG PRESSURE DECREASING IN AN UNCONTROLLED MANNER OR • ANY SG COMPLETELY DEPRESSURIZED — a) GO TO Step 8
	RO/BOP	*Reports SGs NOT Faulted*.
		1-FR-Z.1 Actions
	SRO	8 CHECK SERVICE WATER AVAILABLE: a) Check Intake Canal level – BEING MAINTAINED BY CIRC WATER PUMPS
	RO/BOP	Reports Intake Canal Level 29 feet and Stable. Being maintained by CW pumps.
		b) RETURN TO procedure and step in effect
	SRO	**Returns to 1-E-1, Step In Effect.**
		END OF EVENT 8 **END OF SCENARIO 2**

Event Description: LARGE BREAK LOCA FR-Z.1

Cue: When crew enters 1-E-1 (step 4) or Evaluator cue.

NUMBER 1-FR-Z.1	ATTACHMENT TITLE	ATTACHMENT 1
REVISION 20	CONTAINMENT ISOLATION VALVES	PAGE 1 of 1

LOCATION: Vertical Board

LIGHTS: GREEN

___ 1-BD-TV-100A	___ 1-SS-TV-106A	___ 1-SS-TV-100A	___ 1-VG-TV-109A	___ 1-SI-TV-101A
___ 1-BD-TV-100B	___ 1-SS-TV-106B	___ 1-SS-TV-100B	___ 1-VG-TV-109B	___ 1-SI-TV-101B
___ 1-BD-TV-100C	___ 1-SS-TV-102A	___ 1-SS-TV-101A	___ 1-DG-TV-108A	___ 1-RC-TV-1519A
___ 1-BD-TV-100D	___ 1-SS-TV-102B	___ 1-SS-TV-101B	___ 1-DG-TV-108B	___ 1-SI-TV-100
___ 1-BD-TV-100E	___ 1-SS-TV-104A	___ 1-SS-TV-103A	___ 1-CC-TV-109A	___ 1-CH-TV-1204A
___ 1-BD-TV-100F	___ 1-SS-TV-104B	___ 1-SS-TV-103B	___ 1-CC-TV-109B	___ 1-CH-TV-1204B
___ 1-RM-TV-100C	___ 1-LM-TV-100A	___ 1-LM-TV-100E		___ 1-CV-TV-150A
___ 1-RM-TV-100B	___ 1-LM-TV-100B	___ 1-LM-TV-100F		___ 1-CV-TV-150B
___ 1-RM-TV-100A	___ 1-LM-TV-100C	___ 1-LM-TV-100G	___ 1-DA-TV-100A	___ 1-CV-TV-150C
___ 1-CC-TV-105A	___ 1-LM-TV-100D	___ 1-LM-TV-100H	___ 1-DA-TV-100B	___ 1-CV-TV-150D
___ 1-CC-TV-105B	___ 1-CC-TV-140A	___ 1-CC-TV-110A	___ 1-MS-TV-110	___ 1-MS-TV-109
___ 1-CC-TV-105C	___ 1-CC-TV-140B	___ 1-CC-TV-110B	___ 1-CC-TV-110C	___ 1-IA-TV-100
___ 1-SV-TV-102A	___ 1-SV-TV-102	___ 1-IA-TV-101A		___ 1-IA-TV-101B
				___ 1-CH-MOV-1381

Valves Operated for Hi CLS Failure.

Valves Operated for Hi Hi CLS Failure.

Valve BOP/SRO may confer and leave open.

Event Description: LARGE BREAK LOCA FR-Z.1

Cue: When crew enters 1-E-1 (step 4) or Evaluator cue.

NUMBER 1-E-0	ATTACHMENT TITLE	ATTACHMENT 4
REVISION 69	CLS COMPONENT VERIFICATION	PAGE 1 of 2

LOCATION: Vertical Board — VALVE POSITION: CLOSED; LIGHTS: GREEN

__ 1-RM-TV-100C
__ 1-RM-TV-100B
__ 1-RM-TV-100A

Valves Operated for Hi CLS Failure.

Valves Operated for Hi Hi CLS Failure.

Valve BOP/SRO may confer and leave open.

__ 1-CC-TV-105A
__ 1-CC-TV-105B __ 1-CC-TV-140A __ 1-CC-TV-110A
__ 1-CC-TV-105C __ 1-CC-TV-140B __ 1-CC-TV-110B __ 1-CC-TV-110C

__ 1-IA-TV-100

__ 1-SV-TV-102 __ 1-IA-TV-101A __ 1-IA-TV-101B

LOCATION: Unit 1 Vent Panel — RECIRC FAN STATUS: OFF; LIGHTS: AMBER

__ 1-VS-F-1A __ 1-VS-F-1B

LOCATION: Bench Board — VALVE POSITION: OPEN; LIGHTS: RED

__ 1-SW-MOV-105A __ 1-SW-MOV-105B __ 1-SW-MOV-105C __ 1-SW-MOV-105D
__ 1-SW-MOV-104A __ 1-SW-MOV-104B __ 1-SW-MOV-104C __ 1-SW-MOV-104D
__ 1-SW-MOV-103A __ 1-SW-MOV-103B __ 1-SW-MOV-103C __ 1-SW-MOV-103D

Check SW Outlet flow from RS HXs between 6,000 gpm and 12,500 gpm:

- 1-SW-FI-106A, RS HX A
- 1-SW-FI-106B, RS HX B
- 1-SW-FI-106C, RS HX C
- 1-SW-FI-106D, RS HX D

LOCATION: Radiation Monitoring Panel — PUMPS: RUNNING (Time delayed)

__ 1-SW-P-5A __ 1-SW-P-5B __ 1-SW-P-5C __ 1-SW-P-5D

Event Description: LARGE BREAK LOCA FR-Z.1

Cue: When crew enters 1-E-1 (step 4) or Evaluator cue.

NUMBER 1-E-0	ATTACHMENT TITLE	ATTACHMENT 4
REVISION 69	CLS COMPONENT VERIFICATION	PAGE 2 of 2

LOCATION: Annunciator Panel A ALARMS: CLEAR

__ A-D-6 RS HX 1A RAD MON PP NO FLOW

__ A-E-6 RS HX 1B RAD MON PP NO FLOW

__ A-F-6 RS HX 1C RAD MON PP NO FLOW

__ A-G-6 RS HX 1D RAD MON PP NO FLOW

☐IF alarm is LIT, THEN stop associated rad monitor pump AND monitor SW activity using RI-SW-120.

LOCATION: Bench Board VALVE POSITION: OPEN
LIGHTS: RED

__ 1-CS-MOV-102A __ 1-CS-MOV-102B

__ 1-RS-MOV-156A __ 1-RS-MOV-156B

__ 1-CS-MOV-101B __ 1-CS-MOV-101D

__ 1-CS-MOV-101A __ 1-CS-MOV-101C

__ 1-RS-MOV-155A __ 1-RS-MOV-155B __ 1-CS-MOV-100A __ 1-CS-MOV-100B

---------- IF EVENT - CLS HI HI AND LOSS OF RSS ----------

LOCATION: Bench Board VALVE POSITION: CLOSED
LIGHTS: GREEN

__ 1-CW-MOV-100A __ 1-CW-MOV-100B __ 1-CW-MOV-100C __ 1-CW-MOV-100D

__ 1-CW-MOV-106A __ 1-CW-MOV-106B __ 1-CW-MOV-106C __ 1-CW-MOV-106D

__ 1-SW-MOV-101A __ 1-SW-MOV-101B __ 1-SW-MOV-102A __ 1-SW-MOV-102B

Section Not Performed for this Scenario.

Event Description: LARGE BREAK LOCA FR-Z.1

Cue: When crew enters 1-E-1 (step 4) or Evaluator cue.

		END OF EVENT 8. **END OF SCENARIO 2**

FOLDOUT PAGES FOR REFERENCED PROCEDURES

NUMBER 1-E-0	CONTINUOUS ACTIONS PAGE	REVISION 71

1. RCP TRIP CRITERIA
   Trip all RCPs if BOTH conditions listed below occur:
   a. Charging Pumps - AT LEAST ONE RUNNING AND FLOWING TO RCS
   b. RCS Subcooling - LESS THAN 30°F [85°F]

2. MINIFLOW RECIRC CRITERIA
   a. CLOSED - When RCS pressure is less than 1275 psig [1475 psig] AND RCP Trip Criteria are met (RCPs OFF).
   b. OPEN - When RCS pressure is greater than 2000 psig.

3. ADVERSE CONTAINMENT CRITERIA
   Use Adverse Containment setpoints if EITHER condition listed below occurs:
   - Containment Pressure - GREATER THAN 20 PSIA
   - Containment Radiation - GREATER THAN 1.0E5 R/HR

4. COLD LEG RECIRCULATION SWITCHOVER CRITERIA
   GO TO 1-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, if RWST level lowers to less than 20%.

---

1. AMSAC RESET CRITERIA
   AMSAC may be manually reset when level in all three SGs is greater than 13% or six minutes have elapsed since the Reactor trip. When AMSAC is reset, AMSAC ARMED annunciator H-D-1 should clear and affected components may be realigned as needed.

2. TD AFW PUMP SHUTDOWN CRITERIA
   The TD AFW pump may be secured when SG NR level is greater than 22% in at least 2 SGs, AMSAC is reset, and no auto-start signal exists. To secure the pump, the pump SOV control switches must be taken to OPEN-RESET and then to CLOSE.

3. MANUAL SI ALIGNMENT
   If SI fails to automatically align, Attachment 2 may be used for guidance on manual SI valve alignment.

4. * TRANSIENT AFW FLOW CONTROL (IF SI in progress)
   Attachment 7 may be used for guidance on transient AFW flow control.

5. * FAULTED SG ISOLATION AND AFW FLOW CONTROL (IF SI in progress)
   Attachment 8 may be used for guidance on faulted SG(s) isolation and AFW flow control.

6. * RUPTURED SG ISOLATION AND AFW FLOW CONTROL (IF SI in progress)
   Attachment 9 may be used for guidance on ruptured SG(s) isolation and AFW flow control.

7. * LOSS OF RCP SUPPORT CONDITIONS
   Trip RCPs if a loss of a support condition occurs. (for example, loss of CC)

* Preemptive Actions

FOLDOUT PAGES FOR REFERENCED PROCEDURES

NUMBER	CONTINUOUS ACTION STEPS	REVISION
1-E-0		71

1. Check RCS Average Temperature - STABLE AT OR TRENDING TO 547°F. (E-0, Step 6)
2. Monitor RCP Trip and Miniflow Recirc Criteria. (E-0, Step 8)
3. Check SG Narrow Range Level - ANY SG GREATER THAN 12%. (Control feed flow to maintain Narrow Range Level between 22% and 50%) (E-0, Step 25)
4. Monitor LHSI pumps and secure as necessary. (E-0, Step 30)

NOTE: Subsequent SI signals may be reset by reperforming Step 12 of Attachment 1.

5. Monitor CTMT pressure and check CLS initiation as necessary. (Attachment 1, Step 8)
6. Monitor RWST level and check RS initiation as necessary. (Attachment 1, Step 9)
7. Block Low PRZR Pressure SI signal when less than 2000 psig. (Attachment 1, Step 10)
8. Block Low Tave SI signal when less than 543°F. (Attachment 1, Step 11)

FOLDOUT PAGES FOR REFERENCED PROCEDURES

CONTINUOUS ACTIONS PAGE FOR 1-E-1

1. RCP TRIP CRITERIA
   Trip all RCPs if BOTH conditions listed below occur:
   a. Charging Pumps - AT LEAST ONE RUNNING AND FLOWING TO RCS
   b. RCS Subcooling - LESS THAN 30°F [85°F]

2. SI REINITIATION CRITERIA
   Following SI termination or SI flow reduction, manually start SI pumps and align valves as necessary if EITHER condition listed below occurs:
   - RCS subcooling based on CETCs - LESS THAN 30°F [85°F]
   - PRZR level - CANNOT BE MAINTAINED GREATER THAN 22% [50%]

3. MINIFLOW RECIRC CRITERIA
   a. CLOSED - When RCS pressure is less than 1275 psig [1475 psig] AND RCP Trip Criteria are met (RCPs OFF).
   b. OPEN - When RCS pressure is greater than 2000 psig.

4. ADVERSE CONTAINMENT CRITERIA
   Use Adverse Containment setpoints if EITHER condition listed below occurs:
   - Containment Pressure - GREATER THAN 20 PSIA
   - Containment Radiation - GREATER THAN 1.0E5 R/HR

5. SECONDARY INTEGRITY CRITERIA
   Manually start SI pumps as necessary and GO TO 1-E-2, FAULTED STEAM GENERATOR ISOLATION, if any SG pressure is lowering in an uncontrolled manner or has completely depressurized, and has not been isolated.

6. E-3, TRANSITION CRITERIA
   Manually start SI pumps as necessary and GO TO 1-E-3, STEAM GENERATOR TUBE RUPTURE, if any SG level rises in an uncontrolled manner or any SG has abnormal radiation.

7. COLD LEG RECIRCULATION SWITCHOVER CRITERIA
   GO TO 1-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, if RWST level lowers to less than 20%.

8. AFW SUPPLY SWITCHOVER CRITERIA (Refer to Attachment 5)
   Transfer to one of the following alternate AFW water supplies if ECST level lowers to less than 20%.
   a. 1-CN-TK-2, using 1-CN-150.
   b. 1-CN-TK-3, using AFW Booster Pumps.
   c. AFW Crosstie.
   d. Firemain.

9. RCP SEAL INJECTION CRITERIA

   Seal Injection flow should be maintained to all RCPs.

10. LOSS OF RCP SUPPORT CONDITIONS
    Trip RCPs if a loss of a support condition occurs. (for example, loss of CC)

SIMULATOR OPERATOR'S GUIDE

Simulator Setup

Initial Conditions:

Recall IC -374 **and implement TRIGGER #30 to activate all passive malfunctions and verify Trigger #30 implemented.**

Open the SimView window and add the following point to it:

- asp_ao_off

Enter the following MALFUNCTIONS:

Malfunction	Delay	Ramp	Trigger	Value	Final	Trigger Type (Auto or Manual)
RS1001, TRN A HI HI CLS FAILS TO ACTIVATE			30		TRUE	
RS1002, TRN B HI HI CLS FAILS TO ACTIVATE			30		TRUE	
SI4001, DISABLE LHSI PUMP SI-P-1A AUTO START			30		TRUE	
SI4002, DISABLE LHSI PUMP SI-P-1B AUTO START			30		TRUE	
FP0301, FPS FACP07 ALARM HORN FAILURE			30		TRUE	
FP0302, FPS PC SPEAKER FAILURE			30		TRUE	
CH59, DOSAB;E CH-MOV-381 AUTO CLOSURE			30		TRUE	
RC4901, PRZR LEVEL XMTR CH1 FAILURE	10		1		1	MAN
FW1804, B S/G MN FD FLOW XMTR FT-1486 FAILS	10	2:00	3		-1	MAN
CN0102, MAIN CN PUMP CN-P-1B TRIPS:OVER-CURRENT	10		5		TRUE	MAN
CN1501, DISABLE CN-P-1A AUTO START			5		TRUE	MAN
RD1244, DROPPED RCCA P-8 CONTROL BANK D	10		7		TRUE	MAN
RC04, RCS LEAK NONISOLABLE (0-1200 GPM)	10	1:00	9		16	MAN
RC0103, RCS COLD LEG C PIPE RUPTURE	5:00	25:00	9		5	MAN
CH6401, DISABLE CH-P-1A AUTO START			9		TRUE	MAN
CS0801, CS-P-1A BKR 14H5 OVERCURRENT TRIP	30		13		TRUE	AUTO
CH0504, OVER-CURRENT TRIP CHG PUMP CH-P-1C (ALT)			15		TRUE	AUTO

SIMULATOR OPERATOR'S GUIDE

Enter the following Remote Functions

Description	Delay	Ramp	Trigger	Value	Final	Trigger Type (Auto or Manual)
BC70, BEARING COOLING WATER PUMP BC-P-1A OUTLET ISOLATION VALVE			30		10%	

SIMULATOR OPERATOR'S GUIDE

Enter the following EVENT TRIGGERS:

Trigger#	EVENT	Command
13	csp1a_spd .gt. 0.5	
15	SI4: SI Train 'A' actuated	

Trigger Summary:

TRIGGER	TYPE	DESCRIPTION
1	MAN	Initiates RC4901, Pressurizer Level Xmtr 459 fails high.
3	MAN	Initiates FW1804, B S/G Feed Flow Xmtr 1486 fails low.
5	MAN	Initiates CN0102, 1-CN-P-1B over current trip, and CN1501, Disable CN-P-1A auto start.
7	MAN	Initiates RD1244, P-8 dropped rod.
9	MAN	Initiates RC04, RCS Leak, and RC0103, RCS Cold leg C rupture.
13	AUTO	Initiates 1-CS-P-1A over current trip.
15	AUTO	Initiates 1-CH-P-1C over current trip.
30	PRE-SCENARIO	Initiates: RS1001, RS1002, SI4001, SI4002, CH59, FP0301, FP0302, BC_70.

SIMULATOR OPERATOR'S GUIDE

Verify the following control room setup:

- ❑ Place the simulator in RUN and verify normal 100% power operation indications.
- ❑ Reset the ROD CONTROL SYSTEM
- ❑ Verify Controlling channels selected to **IV**
- ❑ Verify PRZR Level Recorder, **1-RC-LR-1459 is selected to CH I**
- ❑ Verify Red Magnets on the following components:

1-CH-P-1B, 'B' Chg pump	**1-CH-MOV-1286B**	**1-CH-MOV-1287B**

- ❑ Verify 1-RM-RI-112 aligned to A/B SG and 1-RM-RI-113 aligned to C SG (magnets).
- ❑ Verify Ovation System operating.
- ❑ Reset ICCMs.
- ❑ Verify Component Switch Flags.
- ❑ Verify Brass Caps properly placed.
- ❑ Verify SG PORVs set for 1035 psig. ('A'-1038, 'B'-1036, 'C'-1034)
- ❑ Verify Rod Control Group Step Counters indicate properly.
- ❑ Verify PCS Delta Flux is approximately -3.5%.
- ❑ Verify Ovation CRT display.
- ❑ Advance Charts
- ❑ Verify Turbine Thumb Wheel Settings @120 rpm/min and Position 6
- ❑ Verify Containment Instrument Air Compressors are on Inside Suction (all RMs reset)
- ❑ Verify all ARPs have been cleaned

❑ 1C-B8	❑ 1C-C8	❑ 1C-E8	❑ 1E-F3
❑ 1H-B5	❑ 1H-C4	❑ 1H-D3	❑ 1H-D4
❑ 1H-E4	❑ 1H-E6	❑ 1H-F8	❑ 1H-G6
❑ 1J-E1	❑ 1J-F1	❑ 1K-D4	❑

- ❑ Verify CLEAN copies of the following procedures are in place:

SIMULATOR OPERATOR'S GUIDE

❑ 1-OP-BC-001	❑ 0-AP-53.00	❑ 1-AP-21.00	❑ 0-AP-1.00
❑ 0-AP-23.00	❑ 1-AP-16.00	❑ 1-E-0	❑ 1-E-1
❑ 1-FR-Z.1	❑	❑	❑

❑ **Verify Reactivity Placard is current.**

❑ Verify ALL PINK MAGNETS are accounted for.

❑ Reset Blender Integrators for Boric Acid to 100 and PG 1000.

SIMULATOR OPERATOR'S GUIDE

Brief

This simulator performance scenario is performed in the EVALUATION MODE. You should not direct questions to the evaluators. Otherwise, you should perform as if you were in the MCR.

Your ability to maintain a log is not being graded, but maintaining a rough log is recommended to help during briefs.

If you need to communicate with the Unit 2 operator, verbally state, "Unit 2" and an instructor will locate to the Unit 2 area and respond to you as quickly as possible.

In the unlikely event that the simulator fails such that illogical indications result, the session will be terminated. In other words, respond to what you see. If there is a problem with the simulation, the session will be terminated or adjusted as appropriate based on the specific problem.

Assign operating positions.

Ask for and answer questions.

Conduct shift turnover:

The initial conditions have Unit 1 at 100% power with RCS boron concentration of 760 ppm.

Unit conditions have been stable at approximately 100% power since the last refueling outage.

All systems and crossties are operable with the following exception:

- Containment Smoke and heat detectors are non-functional due to local fire panel failure. TRM Section 3.3.1, Fire Detection Instrumentation, Condition B, Smoke Detectors, and Condition C, Heat Detectors is in effect. Containment air temperatures monitored once/hour, and restore to Functional status in 14 days.
- C CH running on Alt, A CH in Auto, B CH pump Tagged out for breaker PMs.
- Controlling channels have been shifted to CH IV in preparation for Channel III testing

Unit #2 is at 100% power with all systems and crossties operable.

The last shift performed one 30 gallon dilution, followed by a manual makeup. Previous to this, shifts had been performing two 30 gallon dilutions.

Shift orders are to maintain 100% power on Unit 1, and swap BC pumps IAW 1-OP-BC-001, Section 5.3.

SIMULATOR OPERATOR'S GUIDE

Session Conduct:

- Ensure conditions in Simulator Set-up are established.
- **Ensure Trigger 30 is active prior to team entering the simulator.**
- Verify Exam Security has been established and ASP_AO_OFF = True.

EVENT 1 Swap running BC pumps IAW 1-OP-BC-001, Section 5.3.

BOOTH: **When cued by the Evaluator place simulator in RUN if it isn't already in RUN.**

Field Operators: (*2 minute delay from request to answer, unless otherwise indicated*)

- If contacted regarding the BC pump swap, report that you have been briefed, and are standing by the BC pump to be started.
- When contacted to check the oil level for 1-BC-P-1A, report that you have already checked it and the oil level is approximately 50% on the sight glass. (Step 5.3.2)
- When contacted to close 1-BC-70, acknowledge direction, wait 2 minutes then, **Report to operator,** that 1-BC-70 is CLOSED. Booth Note: 1-BC-70 was closed to 10% OPEN by T 30 during Sim setup in preparation for this task. (Step 5.3.5)
- When contacted to open two turns on 1-BC-70. **Report to operator after approx. 30 sec.** that 1-BC-70 is open two turns. (Step 5.3.6)
- When directed to monitor the pump start **report to the operator** that you are standing by.
- When directed to slowly open 1-BC-70. **Open 1-BC-70 (100%, 60 sec ramp). After 1-BC-70 is full open, Report to the operator** that 1-BC-70 is full open, and 1-BC-P-1A is running normally. (Step 5.3.9).
- When directed to monitor the BC Heat Exchanger outlet temperatures. **Report to the operator** that BC Heat exchanger outlet temperatures are normal.

Role play as other individuals as needed.

SIMULATOR OPERATOR'S GUIDE

EVENT 2 PRZR Level CH 1 Fails High (Selected upper channel)

When cued by examiner, implement Trigger #1.

Operations Supervisor/Management:

- **If contacted**, acknowledge failure of PRZR level channel.
- **If asked,** will notify I&C of the failure.
- **If asked,** will notify the OMOC.
- **When notified,** acknowledge Tech Spec requirements for the channel failure, but do not imply concurrence with SRO Tech Spec determination.

STA:

- **If contacted**, acknowledge the failure, acknowledge the Tech Spec requirements for the failed channel, but do not imply concurrence with the Tech Spec determination by the SRO.
- **When notified,** VPAP-2802, Reg Guide 1.97, TRM Section 3.3, and EP-AA-303 have been reviewed and results discussed with the Shift Manager.
- **If the team has a transient brief:** The STA will have no input.

I&C:

- **If notified**, acknowledge the failure and the need to place the channel in trip.

Maintenance/Work Week Coordinator:

- **If contacted**, will notify I&C of the failed channel, have I&C prepare to place the channel in trip, and prepare to troubleshoot the cause of the failure.

Role play as other individuals as needed.

SIMULATOR OPERATOR'S GUIDE

EVENT 3 FEED FLOW CHANNEL IV "B" SG FAILS LOW.

When cued by examiner, implement Trigger #3.

BOOTH NOTE: **Critical Task: (CT-1):** If the BOP fails to take timely action in response to the FF channel failure, an automatic reactor trip on SG NR high level will occur; an unanticipated reactor trip should be considered as failure criteria.

Operations Supervisor/Management:

- **If contacted**, acknowledge feed flow channel failure. The individual(s) contacted will also acknowledge any TS LCOs.
- **If contacted,** will take responsibility for writing the CR.
- **If contacted,** will acknowledge entry into AP-53.00.
- **If contacted,** will recommend to the team that channels remain as they are for now (i.e., do not perform 1-OP-RP-001 at this time).

STA:

- **If contacted**, will acknowledge feed flow channel failure. The individual(s) contacted will also acknowledge any TS LCOs. The STA will not confirm or deny any TS decisions.
- **If contacted,** will take responsibility for writing the CR.
- **IF contacted:** regarding Regulatory procedure review. Acknowledge request. If asked for status, report that all reviews have been completed and discussed with the Shift Manager.
- **If the team has a transient brief:** The STA will state "nothing to add".

Field Operators:

- Will perform actions as directed.

Maintenance/ Work Week Coordinator:

- **If contacted**, will acknowledge the feed flow channel failure and contact I&C to commence preparation to place the failed channel in trip.

Unit 2:

- **If contacted**, will acknowledge the failure of the feed flow channel.

Role-play as other individuals as needed.

SIMULATOR OPERATOR'S GUIDE

EVENT 4 **1-CN-P-1B trip/Failure of 1-CN-P-1A to auto start-.**

When cued by examiner, implement Trigger #5.

BOOTH NOTE: **Critical Task: (CT-2):** Start an additional Condensate pump and verify feed flow returns to normal before a Steam. Generator Level Reactor Trip.

Operations Supervisor/Management:

- **If contacted**, Acknowledge failure.
- **If contacted:** Take responsibility for submitting CR.
- **If contacted:** Will notify Maintenance and OMOC of the failure.

Maintenance/ Work Week Coordinator:

If contacted, will acknowledge the failure, contact Maintenance to commence investigation.

STA:

- **If contacted**, Acknowledge the failure
- **If the team has a transient brief:** Will have no input for a transient brief.

Field Operators:

When contacted to check status of CN Pumps: Wait three (3) minutes and report 1-CN-P-1A conditions normal after start; 1-CN-P-1B exhibits no obvious cause for the trip.

When contacted to check status of 1-EP-BKR-15B4: Wait 3 minutes and report breaker 15B4 has an instantaneous overcurrent drop on "B" phase.

Condensate Polisher Operator:

If contacted regarding 1-CP-MOV-100 opened, acknowledge that the Polisher is bypassed.

If contacted regarding operation of 1-CP-AOV-122, acknowledge direction to open and close 1-CP-AOV-122 as directed. **To open 1-CP-AOV-122**; go to CN2, select CP-AOV-122, shift controller to manual and set demand to 100% (0 sec ramp). **To close CP-AOV-122**; select CP-AOV-122, set demand to 0% (60 sec ramp). Shift CP-AOV-122 to AUTO when directed.

Role play as other individuals as needed.

EVENT 5 DROPPED ROD, P-8 CBD.

When cued by examiner, implement Trigger #7.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the dropped rod and the need to ramp at 1%/minute to 70 - 74% power.
- **If asked** for a recommended ramp rate, ask what the Unit Supervisor recommends. When authorized by the NRC, the Shift Manager will direct a 1%/minute ramp rate.
- **If contacted,** will take responsibility for writing the WR and CR.

STA:

- **If asked,** the STA will perform a shutdown margin calculation.
- **If asked,** the STA will perform a QPTR. See AP-1.00, Attachment 6, attached.
- **If the team has a transient brief:** The STA will state that primary integrity is as the RO reported and that secondary integrity is as the BOP reported. The STA will state that radiological conditions are normal with the exception of the previously identified radiation monitor alarms. He will also state that containment conditions and the electrical conditions are as you see them.
- **If asked,** the STA will acknowledge the need to borate and use rods (will acknowledge the team review of pre-planned reactivity plans and OP-RX-010, if performed). If asked to perform the OP-RX-010 review, the STA will state that he is not able to at this time.
- **When contacted,** SRO directs STA to review VPAP-2802. The STA reports completion of VPAP-2802review and requirements have been discussed with the Shift Manager.

Unit Two:

- **If contacted,** all conditions on U2 are normal.

Field Operators:

- **If contacted**, Will perform actions as directed (i.e., may be asked to read bank overlap counter-RD 2).

I&C:

- If requested by MCR to reset the bank overlap – use RD2 drawing to set as requested.

Maintenance/Work Week Coordinator:

- **If contacted**, will acknowledge the failure and commence investigations.

Role play as other individuals as needed.

EVENTS 6 Ramp to < 75% power.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the ramp to 70% - 74%.
- **If contacted,** will take responsibility for writing the CR.
- **If asked** for a recommended ramp rate, ask what the Unit Supervisor recommends. When authorized by the NRC, the Shift Manager will direct a 1%/minute ramp rate.
- **If Asked,** Notify MOC, OMOC, Chemistry and Condensate Polisher of impending ramp.

Unit 2 Operator:

If notified, acknowledge the failure and impending ramp of Unit 1.

STA:

- **If contacted**, will acknowledge the Reactivity Plan reported by the RO.
- **If contacted,** will take responsibility for writing the WR and CR.
- **If the team has a transient brief:** The STA will, "nothing to add".
- If contacted, STA review of VPAP-2802 complete, reviewed with Shift Manager, no notifications required.

Maintenance/ Work Week Coordinator:

- **If contacted**, will acknowledge the requirements to reduce reactor power.

Chemistry

- **If contacted,** acknowledge the ramp.

SIMULATOR OPERATOR'S GUIDE

Field Operators:

- **If contacted**, as the Turbine Building Operator to walkdown the Turbine during the ramp, acknowledge the direction.
- **If contacted,** as the polishing building operator, acknowledge the direction to monitor polisher DP.

Role play as other individuals as needed.

EVENT 7 RCS leak of 200 gpm-

When cued by examiner, implement Trigger #9.

Booth Notes: After Trigger 9 is entered the following will occur:

- RC04 (0-1200 GPM) will ramp in over 60 sec to approx. 200 gpm.
- After 5 min.: RC0103, Cold Leg Rupture, leak rate will ramp to 5% over 25 min ramp.
- **Verify Trigger Trigger 15 goes active after SI Train A is actuated.**

Operations Supervisor/Management:

- **If contacted,** will take responsibility for writing the WR and CR.
- **If contacted,** will acknowledge entry into AP-16.00.
- **If contacted,** will acknowledge Unit shutdown imminent due to excessive RCS leakage.
- **If contacted,** will acknowledge EPIPs require evaluation.

STA:

- **If the team has a transient brief:** The STA will state that no Red or Orange Paths identified.
- **If directed,** acknowledge no SI flow evident to the core.
- **If directed,** monitor restoration of SI flow flow, and report PCS indicated flow when established.
- **When notified,** acknowledge that EPIPs require evaluation.

Unit Two:

- **When** radiation alarms sound on the radiation alarm panel, silence the alarms when directed and report the alarm to the Unit 1 SRO.
- **If directed** perform the associated RM ARP without leaving the confines of the Unit 2 control area. If actions or verifications are required on the Unit 1 side, inform the Unit 1 SRO/BOP.
- **If asked**, blowdown and air ejector RM readings are [*as indicated at the time*].
- **If contacted,** Unit Two has implemented AP-50.00, and all conditions on U2 are normal.

Field Operators:

- **If contacted**, field operators will perform valve manipulations as required:
- **If contacted,** regarding CH-P-1C overcurrent trip. Acknowledge and call back after 2 minutes and report that 1-CH-P-1C breaker has an overcurrent trip flag on 'C' phase.

Health Physics:

- **If contacted**, will acknowledge the leak of RCS coolant into containment.

Maintenance/Work Week Coordinator:

- **If contacted**, will acknowledge the failures to HHSI, and LHSI pumps failing to auto start.

EVENT 8: LARGE BREAK LOCA-

When cued by examiner, OR WHEN crew has entered **1-E-1 (step 4). Raise severity level of RC0103 to 30% (no time delay or ramp).** This will cause Containment pressure to rise rapidly to > 30 psia.

Booth Note: **Verify Trigger 13 goes active after 1-CS-P-1A is started and speed is > 50%.**

Critical Tasks: CT-3: Restore SI flow to the core prior to transitioning to FR-C.2, Response to Degraded Core Cooling. **CT-4:** Manually Actuate Containment Spray. Establish CS flow from at least one CS pump prior to 60% RWST level.

Booth Note: Notify Chief Examiner if either of the following occurs:

- **FR-C.2 criteria are met** (CT-3), and SI flow to the core has not been established.
- **Containment spray and Recirc Spray have not been established** and **ORS pump has started**.

Operations Supervisor/Management:

- **If contacted,** will acknowledge increase in LOCA severity.
- **If contacted,** will acknowledge failure of HI HI CLS to actuate.
- **If contacted,** will acknowledge EPIPs require evaluation.

STA:

- **If the team has a transient brief:** The STA will acknowledge monitoring of CSFSTs.
- **When notified,** acknowledge that EPIPs require evaluation.
- **When conditions are met for FR-P.1,** Inform SRO that conditions are met for FR-P.1 (red path).
- **When conditions are met for FR-Z.1.** Inform the SRO that conditions are met for FR-Z.1 (orange path).
- **If directed,** monitor PCS for CS flow, and report indicated flow when established.

Unit Two:

- **When** radiation alarms sound on the radiation alarm panel, silence the alarms when directed and report the alarm to the Unit 1 SRO.

- **If directed** perform the associated RM ARP without leaving the confines of the Unit 2 control area. If actions or verifications are required on the Unit 1 side, inform the Unit 1 SRO/BOP.
- **If asked to assist with EPIP actions,** perform actions as directed.

Field Operators:

- **If contacted**, field operators will perform valve manipulations as required:
- **If contacted,** regarding CH-P-1C overcurrent trip. Acknowledge and call back after 2 minutes and report that 1-CH-P-1C breaker has an overcurrent trip flag on 'C' phase.

Health Physics:

- **If contacted**, will acknowledge the leak of RCS coolant into containment.

Maintenance/Work Week Coordinator:

- **If contacted**, will acknowledge the failures to HHSI, and LHSI pumps failing to auto start..

Role play as other individuals as needed.

The scenario will end when actions have been performed for FR-Z.1 and the team has returned to 1-E-1. OR When the Lead NRC Evaluator is satisfied that all actions have been performed.

Facility: Surry Power Station Scenario No.: 3 Op-Test No.: 2016-003
Examiners: _____ Operators: _____
_____ _____
_____ _____

Initial Conditions: Unit 1 and 2 at 100% power; MOL, 760 ppm Boron.

- C CH running on Alt, A CH in Auto, B CH pump Tagged out for breaker PMs.
- Controlling channels are aligned to CH IV for channel III testing.
- Containment Smoke and heat detectors are non-functional due to local fire panel failure. TRM Section 3.3.1, Fire Detection Instrumentation, Condition B, Smoke Detectors, and Condition C, Heat Detectors is in effect. Containment air temperatures monitored once/hour, and restore to Functional status in 14 days

Turnover: The Team will pre-brief the swap of the running EHC pumps IAW 1-OP-EH-001, Section 5.6.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N – BOP/SRO	Swap running EHC pumps IAW 1-OP-EH-001, Section 5.6
2	RM0201, -1 CA03 CA06	I – BOP/SRO	Process Rad Monitor RI-RM-160 (CTMT Gas) fails low, Auto Close Failure 1-IA-TV-101A/B (ARP RM – Q8)
3	RC4802, +1	I-RO/SRO TS - SRO	PRZR Press Cont XMTR Failure (445) fails high **(CT-1)** 0-AP-53.00/1-AP-31.00
4	FW1303, +1	I – BOP/SRO TS - SRO	A S/G Nar Rng Lvl XMTR LT-476 fails high (AP-53.00) **(CT-2)**
5	SW0401 SW1202	C – RO/SRO TS-SRO	Overload Trip of Pump SW-P-10A (AP-12.00) Disable SW-P-10B Auto Start
6	N/A	R – RO/SRO N - BOP	Ramp to Hot Shutdown (AP-23.00)
7	SI1502, 20% SI1601 SI1604 SI34 SI35 CH50-53 CH0901	M - ALL	LOCA outside of CTMT (Isolable) **(CT-3, CT-4)** - SI-MOV-1867C, and 1867D not open - CH-MOV-1115B, and 1115D fail to AUTO open - CH-MOV-11152 and 1115E fail to AUTO close - Boric Acid Transfer pump Thermal overload
	BD01 BD02 VS0101	Team Failures	1-BD-TV-100A (BD “A” not closed on AFW start) 1-BD-TV-100B (BD “B” not closed on AFW Start) 1-VS-F-58A not auto start on SI

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

Event 1: **Swap of running EHC pumps**. (N- BOP/SRO)

The swap of the running EHC pumps will be pre-briefed prior to the Team entering the Simulator.

Verifiable Action(s):

BOP – Manipulate EH pump control switches to start MP-2 and secure MP-1.

Technical Specifications/ TRM Actions/ Reg. Guide 1.97/ VPAP-2802, Reportability/ Equipment Important to Emergency Response (EP-AA-303).
None.

Event 2: **CTMT Gas RM failed low 1-RM-RI-160 with auto action failed.** (I – BOP/SRO)
When the Evaluating Team is ready, the malfunction for CTMT Gas RM failure is implemented. This failure will cause the RM to fail low and after a 5 minute time delay the RM will fail and annunciator RM-Q8, CTMT GAS ALERT/FAILURE will alarm. The BOP is expected to silence the RM alarm and report to the SRO. The SRO will direct the BOP to perform the Annunciator Response Procedure for the alarm received.
Verifiable Action(s):
1) BOP – Close 1-IA-TV-101A and 1-IA-TV-101B, CTMT IA Compressor inside TVs, and check 1-IA-AOV-103, CTMT IA Compressor Outside Suction, open.

Technical Specifications:
None

Technical Requirements Manual.
None.
Reg. Guide 1.97:
None.
VPAP-2802, Reportability:
None.
Equipment Important to Emergency Response (EP-AA-303).
1-RM-RMS-160, Category B, verify alternate indications available within the group, no actions required. Identification is usually performed by SM/STA**. Recommended to evaluate SRO identification of this item post scenario as a follow-up at the Evaluator's discretion.**

Event 3: **Przr Pressure Control Channel Fails High (1-RC-PI-1445)**. (I – RO/SRO, TS – SRO).
When the Evaluation Team is ready, the malfunction is implemented. This failure causes Przr PORV 1-RC-PCV-1456 to open fully resulting in a lowering RCS pressure. The RO is expected to diagnose the failure based on the alarms and indications received, perform the Immediate Actions of 0-AP-53.00, Loss of Vital Instrumentation/Controls, or 1-AP-31.00, Increasing or Decreasing RCS Pressure, and place the control switch for 1-RC-PCV-1456 in close to stop the RCS pressure decrease. The Team will implement 0-AP-53.00/1-AP-31.00 in response to the failure.

Critical Task CT-1:
Should the RO fail to take action to close 1-RC-PCV-1456, an automatic reactor trip will occur on OTΔT. This would be considered failure criteria. An Operations representative will be available for consultation during the Scenario.

Verifiable Actions(s):
1) RO – Place the control switch for 1-RC-PCV-1456 in close.

2) RO/BOP – May place rod control switch in manual to stop rods stepping out due to the negative reactivity inserted by the decrease in RCS pressure.
3) RO – Close 1-RC-MOV-1535, Przr PORV 1-RC-PCV-1456 block valve.

Technical Specifications:

1) Tech Spec 3.12.F.2, DNB Parameters, RCS pressure < 2205 psig, Return RCS to >2205 psig within 2 hours or reduce Thermal Power to less than 5% of Rated Power within the next 6 hours.
2) Tech Spec 3.1.A.6.a, Relief Valves: With one or both power operated relief valves (PORVs) inoperable but capable of being manually cycled, within 1 hour either restore the PORV to Operable status or close the associated block valve and maintain power to the block valve.

TRM Actions / Reg. Guide 1.97/ VPAP-2802, Reportability/ Equipment Important to Emergency Response (EP-AA-303):

None.

Critical Task CT-4: The Reactor operator must close the open PORV prior to a Reactor Trip. If the RO fails to close the PORV, the reactor will trip due to OTΔT.

Event 4: **A SG NR Level Channel III Fail High.** (I – RO/SRO, TS - SRO)

When the Evaluating Team is ready, the next malfunction is implemented. This failure will cause the channel III NR level on A SG to fail high. The BOP is expected to diagnose the failure based on alarms and indications received, perform the Immediate Actions of 0-AP-53.00, Loss of Vital Instrumentation/Controls, place the A FRV in manual, and control the A SG level at program. A SG FRV will remain in manual control until Major event.

Critical Task CT-2:

Should the BOP fail to take action to control A SG NR level, an automatic reactor trip will occur. This would be considered failure criteria. An Operations representative will be available for consultation during the Scenario.

Verifiable Action(s):

1) BOP – Place the A SG FRV in manual and control level at program.

Technical Specifications:

1) Tech Spec Table 3.7-1, Item 12, Operator Action 6, With the number of OPERABLE channels less than the Total Number of Channels, REACTOR CRITICAL and POWER OPERATION may proceed provided the following conditions are satisfied: The inoperable channel is placed in the tripped condition within 72 hours, The Minimum OPERABLE Channels requirement is met; however, the inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels per Specification 4.1, If the conditions are not satisfied in the time permitted, be in at least HOT SHUTDOWN within 6 hours.
2) Tech Spec Table 3.7-2, Item 3.a.1) and 2), Operator Action 20; With the number of OPERABLE channels less than the Total Number of Channels, REACTOR RITICAL and/or POWER OPERATION may proceed provided the following conditions are satisfied: The inoperable channel is placed in the tripped condition within 72 hours, The Minimum OPERABLE Channels requirement is met; however, the inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels per Specification 4.1, If the conditions are not satisfied in the time permitted, be in HOT SHUTDOWN within the next 6 hours and reduce RCS

temperature & pressure to less than 350°F/450 psig, respectively in the following 12 hours.

3) Tech Spec Table 3.7-3, Item 3a, SG Water Level Hi-Hi, Operator Action 20; With the number of OPERABLE channels less than the Total Number of Channels, REACTOR RITICAL and/or POWER OPERATION may proceed provided the following conditions are satisfied: The inoperable channel is placed in the tripped condition within 72 hours, The Minimum OPERABLE Channels requirement is met; however, the inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels per Specification 4.1, If the conditions are not satisfied in the time permitted, be in HOT SHUTDOWN within the next 6 hours and reduce RCS temperature & pressure to less than 350°F/450 psig, respectively in the following 12 hours.
4) Tech Spec Table 3.7-6, Item 15, SG water level NR; 2 channels required. This requirement is met.

Technical Requirements Manual.

None.

Reg. Guide 1.97:

1) SG NR level, A-01 Variable, 2 Channel per SG required, see TS Table 3.7-6. Identification is usually performed by SM/STA**. Recommended to evaluate SRO identification of this item post scenario as a follow-up at the Evaluator's discretion.**

VPAP-2802, Reportability:

None.

Equipment Important to Emergency Response (EP-AA-303).

Heat Sink Capability, A SG NR Level CH III, Att. 6 Page 6 of 7, Category B variable, Alternate indications available within grouping, no action required. Identification is usually performed by SM/STA**. Recommended to evaluate SRO identification of this item post scenario as a follow-up at the Evaluator's discretion.**

Event #5: **Trip of the running CH pump SW pump, with failure of the redundant pump to auto start.** (C – RO/SRO, TS - SRO)

When the Evaluation Team is ready, the malfunction is implemented. This failure causes the running CH pump SW pump to trip, and the redundant pump fails to auto start on low pressure. The Team should respond by implementing ARP 1D-G5, SW OR CC PPS DISCH TO CHG PUMPS LO PRESS, start 1-SW-P-10B, and verify CH Pump SW flow restored.

Verifiable Actions:

RO - Start 1-SW-P-10B.

Technical Specifications:

1) Tech Spec 3.01, Place the Unit in HSD in 6 hours, CSD in the following 30 hours, in effect.
2) Tech Spec 3.2.C.1; No Boron injection subsystems OPERABLE, all CH pumps Inoperable due to the Inoperable CH PP SW pumps being Inoperable.

3) Tech Spec 3.3.B.3; No safety injection subsystem Operable, all HHSI pumps are also Inoperable due to the Inoperable CH PP SW pumps.

Technical Requirements Manual.

TRM Table 3.7.9-1, Sheet 16 of 17, 1-SW-P-10A, App R component, App R Fire Watch in Unit 1 ESR, Unit 1 and 2 Turbine Building North Wall, MER 3. Implement RMAs within 72 hours, and implement App R fire watch within 14 days. TRM requirements identified by SM/STA. **Recommended to evaluate SRO identification of this item post scenario as a follow-up at the Evaluator's discretion.**

Reg. Guide 1.97:

None.

VPAP-2802, Reportability:

A four hour report is required for initiation of a Plant shutdown required by Technical Specifications. Notification is a SM/STA function. **Recommend evaluation of VPAP-2802 requirement post scenario at Evaluator discretion**.

Equipment Important to Emergency Response (EP-AA-303).

None.

Technical Requirements Manual/ Reg. Guide 1.97/ Equipment Important to Emergency Response (EP-AA-303):

None

Event #6: **Ramp Unit to HSD. (**R – RO/SRO, N – BOP)

The SRO will notify the Shift Manager, and conduct a Team brief to discuss the Reactivity Plan determined by the RO. The SRO will implement 0-AP-23.00, Rapid Load Reduction, to commence power reduction to Hot Shutdown.

VPAP-2802, Reportability:

A 4 hour report is required per VPAP-2802, 6.3.4.a.1, Initiation of plant shutdown (reduction of power or temperature) required by Technical Specifications. Identification is usually performed by SM/STA**. Recommended to evaluate SRO identification of this item post scenario as a follow-up at the Evaluator's discretion.**

Event #7: **LOCA outside CTMT.** (M – ALL)

When the Evaluation Team is ready, the malfunction is implemented. The malfunction initiates a LOCA outside of CTMT. The RO will diagnose the LOCA based on alarms and indications received, perform the Immediate Actions of 1-AP-16.00, Excessive RCS Leakage, isolate letdown, and place CH in manual to quantify the leakage. When the RO determines that leakage is beyond the capability of a single CH pump, the SRO will direct the RO to trip the reactor and manually safety inject. Safety Injection will actuate, but failures to CH-MOV-1115B, 1115C, 1115D, 1115E, SI-MOV-1867C, and 1867D will result in a failure of HHSI to inject into the core and both charging pumps will start and take a suction from the VCT with no Letdown. Additionally the in-service Boric Acid Transfer pump will trip preventing any makeup to the VCT. This will result in the VCT drawing down at approximately 4%/minute. The team will initiate attachments 1-3 to restore SI flow to the core. The Team will perform E-0, transition to ECA-1.2. LOCA Outside CTMT where the leak is isolated, and then transition to 1-E-1 to assess SI termination Criteria.

Verifiable Actions:

1) RO - Isolate letdown.
2) RO - Place CH Flow in manual to quantify RCS leakrate.

3) RO - Manually trip the reactor and manually actuate Safety Injection.
4) BOP – Using E-0 Attachments, identify and close A SG BD TVs, Start 1-VS-F-58A filtered exhaust fan, and open 1-SI-MOV-1867D.

Critical Task:

1) **CT-3** Restore HHSI flow from the RWST to the core prior to air-binding of the HHSI pumps.

   Safety Significance: Failure of 1867C and D to open, and failure of the RWST and VCT suction valves to align result in the Charging pumps running with suction from the VCT with flow maintained to RCS. If candidate does not properly align the suction source prior to the VCT emptying the Charging pumps will be airbound and will start to cavitate. Furthermore because of the size of the LOCA, there will be NO SI flow to the core until the operator manually aligns the HHSI Cold leg discharge MOV s.

..

2) **CT-4** Isolate LOCA outside of Containment before power is lost to 1-SI-MOV-1890C.

   Safety Significance, delay in Team response will cause SFGDS sump to fill to a level where 1-SI-MOV-1890C (isolation source) power is lost, thereby preventing isolation of the LOCA outside CTMT. Approximately 30 minutes elapse from time of automatic reactor trip on low RCS pressure to 1-SI-MOV-1890C power loss. Critical Task **begins** on initiation of LOCA outside CTMT; and **ends** when Team has closed 1-SI-MOV-1890C and has verified LOCA isolated using RCS pressure rise.

The Scenario is terminated based on Evaluator Cue, and the Team has transitioned to 1-E-1.

Initial Conditions: Initial Conditions: Unit 1 and 2 are at 100% power, MOL. The unit has been at 100% power for > 30 days.

Turnover: The Team will brief the swap of the running EH pumps IAW 1-OP-EH-001, Section 5.6, prior to Simulator entry.

Pre-load malfunctions: (Trigger 30's)

- BD01, DISABLE BDTV100A AUTO CLOSURE
- BD02, DISABLE BDTV100B AUTO CLOSURE
- VS0101, PRESSURE SWITCH VS-P-127A STUCK AS IS
- SI34, DISABLE SI-MOV-867C AUTO OPEN
- SI35, DISABLE SI-MOV-867D AUTO OPEN
- CA03, DISABLE IA-TV-101A AUTO CLOSURE
- CA06, DISABLE IA-TV-101B AUTO CLOSURE
- CH50, DISABLE CH-MOV-115B AUTO OPEN
- CH51, DISABLE CH-MOV-115C AUTO CLOSE
- CH52, DISABLE CH-MOV-115D AUTO OPEN
- CH53, DISABLE CH-MOV-115E AUTO CLOSE
- FP0301, FPS FACP07 ALARM HORN FAILURE
- FP0302, FPS PC SPEAKER FAILURE

Equipment Status/ Procedures/ Alignments/ Data Sheets/ etc.:

Unit 1 is at 100% power. All systems and crossties are operable with the following exception:

- Containment Smoke and heat detectors are non-functional due to local fire panel failure. TRM Section 3.3.1, Fire Detection Instrumentation, Condition B, Smoke Detectors, and Condition C, Heat Detectors is in effect. Containment air temperatures monitored once/hour, and restore to Functional status in 14 days.
- C Charging pump running on Alt, A Charging in Auto, B Charging pump tagged out for breaker PMs.
- Controlling channels have been shifted to CH IV in preparation for Channel III testing.

Turnover:

The Team will pre-brief the swap of the running EHC pumps IAW 1-OP-EH-001, Section 5.6.

The performance of this procedure has been analyzed based on the current plant configurations and the PSA indicates green.

Turnover: The performance of this procedure has been analyzed based on the current plant configurations and the PSA indicates green.

Event	Malf. #'s	Severity	Instructor Notes and Required Feedback
1	N/A	N/A	Swap running EHC pumps IAW 1-OP-EH-001, Section 5.6.
2	RM0201	-1.0	Process Rad Monitor RI-RM-160 (CTMT Gas) fails low, Auto Close Failure 1-IA-TV-101A/B (ARP RM – Q8/R8)
3	RC4802	+1	PRZR Press Cont XMTR Failure (445) fails high. (AP-53.00, AP-31.00) **(CT-1)**
4	FW1303	+1	A S/G Nar Rng Lvl XMTR LT-476 fails high (AP-53.00). **(CT-2)**
5	SW0401 SW1202	TRUE	Overload Trip of Pump SW-P-10A (AP-12.00) Disable SW-P-10B Auto Start
6	N/A	N/A	Ramp to Hot Shutdown (AP-23.00)
7.	SI1502 SI1601 SI1604 SI34,35 CH50-53 CH0901	20% TRUE TRUE TRUE TRUE TRUE	LOCA outside CTMT (ISOLABLE). (E-0, ECA-1.2) **(CT-3, CT-4).** SI Cold leg check valves fail SI-MOV-1867C, and 1867D fail to auto open. CH-MOV-115B, and D fail to open. CH-MOV-115C, and E fail to close BORON XFER PP Thrml overload
8	BD01 BD02 VS0101	TRUE TRUE TRUE	Team failures: BD-TV-100A, and BD-TV-100B fail to auto close. 1-VS-F-58A fail to auto start.

OPERATING PLAN:

The initial conditions have Unit 1 is at 100% power with RCS boron concentration of 760 ppm.

Unit conditions have been stable at approximately 100% power since the last refueling outage.

All systems and crossties are operable with the following exception:

- Containment Smoke and heat detectors are non-functional due to local fire panel failure. TRM Section 3.3.1, Fire Detection Instrumentation, Condition B, Smoke Detectors, and Condition C, Heat Detectors is in effect. Containment air temperatures monitored once/hour, and restore to Functional status in 14 days.
- C Charging pump running on Alt, A Charging in Auto, B Charging pump tagged out for breaker PMs.
- Controlling channels have been shifted to CH IV in preparation for Channel III test

Unit #2 is at 100% power with all systems and crossties operable.

Shift orders are to maintain 100% power on Unit #1 and upon relieving the watch, perform a swap of the eh pumps IAW 1-OP-EH-001, Section 5.6. PSA analyzed for current plant conditions.

The last shift performed two 30 gallon dilutions, followed by manual makeups.

PWR Scenario 3: LOCA Outside Containment with failure of HHSI.

Scenario Objectives:

A. Given a failure of CTMG Gas RM, 1-RM-RI-160, respond in accordance with ARP RM-Q8 and verify auto actions have occurred.
B. Given a failure of Pressurizer press transmitter 1-RC-RT-1445, respond in accordance with 0-AP-53.00, Loss of Vital Instrumentation/Controls, and restore Pressurizer pressure to normal.
C. Given a SG "A" Level transmitter failure, respond in accordance with 0-AP-53.00, Loss of Vital Instrumentation/Controls to place "A" FRV in manual, control "A" SG level in manual, and return "A" FRV to automatic.
D. Given a Condensate Service Water Pump trip, respond in accordance with 1-AP-12.00 and restore Condensate SW to normal.
E. Demonstrate the ability to ramp the unit in accordance with 0-AP-23.00, Rapid Load Reduction.
F. Given a Large Break LOCA outside Containment, demonstrate the ability to respond to the event and perform mitigative actions in accordance with E-0, and ECA-1.2.
G. Given multiple failures of auto plant functions, demonstrate the ability to identify and correct any failed components by utilizing the appropriate attachment.

Scenario Sequence

Event One: Swap of running EHC pumps

The team will swap running EH pumps by starting MP-2 and securing MP-1.

Malfunctions required: None

Objectives: (BOP) Manipulate EH pump control switches to start MP-2 and secure MP-1.

Success Path: MP-2 running, and MP-1 secured.

Event Two: CTMT Gas RM failed low 1-RM-RI-160 with auto action failed.

When the Evaluating Team is ready, the malfunction for CTMT Gas RM failure is implemented. This failure will cause the RM fail low and go into Alert/Fail after 5 minutes causing RM-Q8 to alarm. The BOP is expected to silence the RM alarm and report to the SRO. The SRO will direct the BOP to perform the Annunciator Response Procedure for the alarm received

Malfunctions required: Three; RM0201 (1-RM-RI-160) fails low, CA03 (1-IA-TV-101A fails to auto close), CA06, (1-IA-TV-101B fails to auto close).

Objectives: (BOP) Identify the failure and take actions per the ARP to close 1-IA-TV-101A, B.

(SRO) Direct actions to perform the ARP.

Success Path: Close 1-IA-TV-101A, and B.

Event Three: Przr Pressure Control Channel Fails High (1-RC-PI-1445).

When the Evaluation Team is ready, the malfunction is implemented. This failure causes Przr PORV 1-RC-PCV-1456 to open fully resulting in a lowering RCS pressure. The RO is expected to diagnose the failure based on the alarms and indications received, perform the Immediate Actions of 0-AP-53.00, Loss of Vital Instrumentation/Controls, or 1-AP-31.00, Increasing or Decreasing RCS Pressure, and place the control switch for 1-RC-PCV-1456 in close to stop the RCS pressure decrease. The Team will implement 0-AP-53.00/1-AP-31.00 in response to the failure

Malfunctions required: One, RC4802.

Objectives: (RO) Identify the failure of PT-1145, and perform immediate actions of AP-53.00, or AP-31.00 to close PORV 1-RC-PCV-1456, and restore Pressurizer pressure.

(SRO) Direct actions per AP-53.00, AP-31.00 to close PORV 1-RC-PCV-1456 and restore Pressurizer pressure. Identify Tech Specs 3.1.A.6.a not met and direct required actions.

Success Path: Pressurizer PORV 1-RC-PCV-1456 is closed, Pressurizer pressure is restored to normal band, and Pressurizer block valve 1-RC-MOV-1535 is closed with power available.

Event Four: A SG NR Level Channel III Fail High.

When the Evaluating Team is ready, the next malfunction is implemented. This failure will cause the channel III NR level on A SG to fail high. The BOP is expected to diagnose the failure based on alarms and indications received, perform the Immediate Actions of 0-AP-53.00, Loss of Vital Instrumentation/Controls, place the A FRV in manual, and control the A SG level at program. A SG FRV will remain in manual control until Major event

Malfunctions required: One FW1804

Objectives: (BOP) Place the A SG FRV in manual and control level at program.

(SRO) Direct actions per 0-AP-53.00. Identify Tech Specs that are not met:

- TS Table 3.7-1, Item 12, Operator Action 6.
- TS Table 3.7-2, Item 3.a.1) and 2), Operator Action 20.
- TS Table 3.7-3, Item 3a, Operator Action 20.

Success Path: 'A' FRV in MANUAL, and SG 'A' level restored to normal band.

Event Five: Trip of the running CH pump SW pump, with failure of the redundant pump to auto start.

When the Evaluation Team is ready, the malfunction is implemented. This failure causes the running CH pump SW pump to trip, and the redundant pump fails to auto start on low pressure. The Team should respond by implementing ARP 1D-G5, SW OR CC PPS DISCH TO CHG PUMPS LO PRESS, start 1-SW-P-10B, and verify CH Pump SW flow restored

Malfunctions required: Two; SW0401 (Trip of SW-P-10A), SW1202 (SW-P-10B fails to auto start)

Objectives: (RO) Identify trip of SW-P-10A, and failure of SW-P-10B to auto start. Start SW-P-10B per ARP, OR 0-AP-12.00, OR as directed per Surry Standards (failure of auto action).

(SRO) Direct actions per ARP or 0-AP-12.00. Identify TS 3.3.B.3, and 3.2.C.1 not met. This will require placing the unit in HSD within 6 hours per TS 3.01.

Success Path: Start 1-SW-P-10B to restore cooling flow to Charging pumps.

Event Six: Ramp Unit to HSD.

The SRO will notify the Shift Manager, and conduct a Team brief to discuss the Reactivity Plan determined by the RO. The SRO will implement 0-AP-23.00, Rapid Load Reduction, to commence power reduction to Hot Shutdown

Malfunctions required: None.

Objectives: (RO) Manipulate the CVCS system to Emergency Borate and establish a continuous boration to control RCS Tave during the Turbine Ramp. Operate control rods to adjust delta flux and assist in RCS Tave control.

(BOP) Operate turbine controls to control the load ramp per AP-23.00.

(SRO) Direct actions to lower power in accordance with AP-23.00. Notify SEM of plant status and request Maintenance and Engineering support Success Path: Maintain Tave/Tref mismatch within 5 ^{o}F and delta flux near target value.

Success Path: Maintain Tave/Tref mismatch within 1.5 °F and delta flux near target value

Event Seven: LOCA outside CTMT.

When the Evaluation Team is ready, the malfunction is implemented. The malfunction initiates an LOCA outside of CTMT. The RO will diagnose the LOCA based on alarms and indications received, perform the Immediate Actions of 1-AP-16.00, Excessive RCS Leakage, isolate letdown, and place CH in manual to quantify the leakage. When the RO determines that leakage is beyond the capability of a single CH pump, the SRO will direct the RO to trip the reactor and manually safety inject. Safety Injection will actuate, but failures to CH-MOV-1115B, 1115C, 1115D, 1115E, SI-MOV-1867C, and 1867D will result in a failure of HHSI to inject into the core and two charging pumps will take a suction from the VCT with no Letdown. Additionally the in-service Boric Acid Transfer pump will trip preventing any makeup to the VCT. This will result in the VCT drawing down at approximately 4%/minute. The team will initiate attachments 1-3 to restore SI flow to the core. The Team will perform E-0, transition to ECA-1.2. LOCA Outside CTMT where the leak is isolated, and then transition to 1-E-1 to assess SI termination Criteria

Malfunctions required for MAJOR: Nine

- SI 1502, Cold leg rupture upstream of MOV-SI-1890C.
- SI 1601, Fail Check valve SI-79.
- SI1604, Fail Check valve SI-241.
- SI 34, Disable SI-MOV-1867C auto open.
- SI 35, Disable SI-MOV-1867D auto open.
- CH50, Disable CH-MOV-115B auto open.
- CH51, Disable CH-MOV-115C auto close.
- CH52, Disable CH-MOV-115D auto open.
- CH53, Disable CH-MOV-115E auto close.

Additional BOP malfunctions: Three

- BD01, 1-BD-TV-100A fails to auto close.
- BD02, 1-BD-TV-100B fails to auto close.
- VS0101, 1-VS-F-58A fails to auto start.

Objectives: (RO) Isolate letdown per AP-16.00. Quantify leakage as > 150 gpm, and perform immediate actions of tripping the reactor and manually initiating SI at step 4. Identify failure of HHSI to inject to the core. Restore HHSI as directed prior to loss of suction to the HHSI pumps.

(BOP) Using E-0 Attachments, identify and close A SG BD TVs, Start 1-VS-F-58A filtered exhaust fan, and restore HHSI as directed.

(SRO) Direct actions per E-0, ECA-1.2, and E-1 to isolate the leak and restore HHSI to the core before power is lost, or suction is lost to HHSI pumps.

Success Path: Leak is isolated, RCS pressure is stable or rising, and HHSI restored to the core.

Scenario Recapitulation

Total Malfunctions: 5
Abnormal Events: 5 (ARP RM-Q8, 1-AP-31.00, 0-AP-53.00, 0-AP-12.00, 1-AP-16.00)
Major Transients: 1 (LOCA outside Containment)
EOPs Entered: 2 (E-0, E-1)
EOP Contingencies: 1 (ECA-1.2)

Event Description: Swap Running EH Pumps per 1-OP-EH-001, section 5.6.

Cue: When team ready.

Time	Position	Applicant's Action or Behavior
	SRO/BOP	1-OP-EH-001, Section 5.6 Team will pre-brief Initial Conditions, Precautions and Limitations, and procedure prior to entering simulator.
	SRO/BOP	1-OP-EH-001, Precautions and Limitations **Note**: The following will be completed by the Team prior to Simulator entry. Precautions and Limitations of 1-OP-EH-001, Electro-Hydraulic Fluid System (EHC): 4.1 The EHC fluid (Fyrquel) has caustic properties. Adequate precautions must be used to avoid direct contact with Fyrquel EHC fluid. If contact with Fyrquel EHC fluid occurs, then the affected area should be immediately flushed with copious amounts of water. 4.2 The Fyrquel fluid removes paint and varnish, reacts with rubber and on most wire insulating material. Caution should always be used when handling the fluid, and spills must be cleaned up immediately. 4.3 Operation of the EHC Fluid System below 50°F is prohibited under any circumstances. External heaters must be used if the EHC Fluid supply system is operated in low ambient temperatures. 4.4 Prolonged operation with fluid temperature between 50°F and 70°F is NOT recommended. A Westinghouse vendor-supplied emergency startup procedure should be implemented in the EHC fluid temperature range of 50°F to 70°F.

Event Description: Swap Running EH Pumps per 1-OP-EH-001, section 5.6.

Cue: When team ready.

		1-OP-EH-001, Precautions and Limitations 4.5 All EHC fluid (Fyrquel) must be filtered before the fluid is added to the EHC Reservoir. 4.6 At an EHC Fluid high temperature alarm (1TS-C3, E-H FLUID RES HI TEMP) setpoint of 140°F, the Bearing Cooling Water to coolers, 1-EH-E-1 and 1-EH-E-2, should be checked for adequate bearing cooling water flow. 4.7 The EHC Reservoir should not be filled above the high alarm (1TS-C1, E-H FLUID RES HI LEVEL) setpoint of 22 inches (21.5 inches to 22.5 inches) from the bottom of the EHC Reservoir. This precaution is applicable when the Turbine is in the latched or unlatched condition. 4.8 The normal operating level in the EHC Reservoir is 5/8 to 11/16 full as indicated on local level gauge 1-EH-LI-100. The local level gauge should read approximately ¾ FULL at the alarm setpoint for high level alarm 1TS-C1, E-H FLUID RES HI LEVEL.
	SRO/BOP	1-OP-EH-001, Precautions and Limitations, Continued 4.9 The polishing filter system should be left in service continuously during normal operation. 4.10 The blocking device for 1-EH-14 alignment to left side cooler is stored in the Ops M&TE Locker. The device requires a 3/16 inch Allen wrench to remove or install. Blocking device is not required when aligned to both sides or right side.
	SRO/BOP	Step 5.6.1, 1-OP-EH-001 NOTE: High differential press across either of the EHC Pump, 1-EH-P-MP-1 or 1-EH-P-MP-2, discharge filters will cause alarm 1TS-C4, E-H STRAINERS HI DIFF PRESS, to actuate in the MCR at approximately 100 psi (90 psig to 110 psig). 5.6.1 Swap EHC Pumps IAW the following. Enter N/A if not required. a. Start the standby EHC Pump. (✓) 1-EH-P-MP-1 1-EH-P-MP-2 **BOP Starts 1-EH-MP-2** b. Stop the pump that was initially running. (✓) 1-EH-P-MP-1 1-EH-P-MP-2 **BOP Stops 1-EH-MP-1** **Evaluator Note: Recommend initiating Trigger 1 for next event (5 min time delay).**

Event Description: Swap Running EH Pumps per 1-OP-EH-001, section 5.6.

Cue: When team ready.

	SRO/BOP	Step 5.6.2, 1-OP-EH-001 NOTE: Alarm 1TS-D4, E-H FLUID DRN RET HI PRESS, will actuate in the MCR at approximately 30 psig (28.5 psig to 31.5 psig), indicating a dirty or clogged filter. 5.6.2 IF blocking device is installed on 1-EH-14, THEN remove blocking device. Otherwise, enter N/A. **BOP Enters N/A for this step.**
	SRO/BOP	Step 5.6.3, 1-OP-EH-001 5.6.3 Swap Drain Return Filters by repositioning 1-EH-14, EH DRAIN RET 3-WAY XFR VALVE TO EH CLRS, to allow flow through the alternate filter. Enter N/A if not required. **BOP Enters N/A for this Step.**
	SRO/BOP	Step 5.6.2, 1-OP-EH-001 5.6.4 IF 1-EH-14 is positioned to the left side cooler/filter, THEN install blocking device on 1-EH-14. Otherwise, enter N/A. **BOP Enters N/A for this Step**.
	SRO/BOP	1-OP-EH-001 BOP Signs and Dates Procedure Section. Reports completion of EH pump swap to SRO.
		END EVENT 1

Event Description: Containment gas RM fails low, no Auto Actions.

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
		1-RM-Q8
	Unit 2	Acknowledge RM Alarms and report Containment Gas Alert/Failure alarm to the SRO.
	SRO	Acknowledge receipt of RM alarms and direct BOP to perform RM-Q8 ARP.
		1-RM-Q8
		CAUTIONS and NOTES prior to step 1.
	BOP	CAUTION: An LCO will be entered if the Containment Gaseous monitor is failed IAW Tech Spec 3.10. *Tech Spec 3.10 applies to REFUELING OPERATIONS or irradiated fuel movement in the Fuel Building.*
		NOTES: • **If a monitor fails, the automatic functions associated with that monitor must be checked or performed.** • When HP has surveyed the area and declared radiation levels normal, the components that were realigned due to monitor failure may be returned to normal and activities in the affected area may continue. • If both 1-RM-RI-159 and 1-RM-RI-160 are inoperable, four hour CTMT atmosphere sampling is required when RCS is greater than 200 ^{o}F. This sampling requirement meets the intent of Tech Spec 3.1.C.
		Acknowledges CAUTIONS and NOTES.
		1-RM-Q8
	BOP	1. CHECK ALARM – READING ON MONITOR OR RECORDER GREATER THAN OR EQUAL TO ALERT SETPOINT OR RADIATION LEVEL HAS TRENDED UP.
		Determines that RM has failed due to the Fail light on the monitor and has failed low. Goes to step 1RNO

Event Description: Containment gas RM fails low, no Auto Actions.

Cue: By Examiner.

	BOP	1-RM-Q8 1 RNO. a) IF all EEEEEs indicated on display THEN GO TO 0-OPT-RM-001, Radiation Monitoring Equipment Check. *Determines that there are NO EEEEEs on display.* b) IF monitor failed, THEN do the following: 1) Stop Refueling operations as necessary. *No refueling operations.* 2) Increase surveillance of the following monitors: 1-RM-RI-159, 1-RM-RI-162, 1-RM-RI-163. *Acknowledges step and/or informs SRO.* 3) Review Tech Spec 3.10, Refueling as necessary. *Notifies SRO.* 4) IF 1-RM-RI-159 is also failed, THEN do the following: a. Inform HP of failure. b. Initiate 4-hour sampling IAW HP-3010.031. *RI-159 has not failed.* 5) Initiate a condition report. *Acknowledges need for condition report.* 6) **GO TO Step 2.**
	BOP	1-RM-Q8 2. EVACUATE CTMT AS NECESSARY. *Acknowledges step, unit at power so CTMT is not occupied.*
	BOP	1-RM-Q8 3. CHECK INITIATION OF AUTOMATIC FUNCTIONS – REQUIRED *Determines that per the Note the automatic functions are required.*

Event Description: Containment gas RM fails low, no Auto Actions.

Cue: By Examiner.

		1-RM-Q8 4 CHECK ISOLATED OR MANUALLY ISOLATE CTMT PURGE SYSTEM: a) Check closed or close CTMT PURGE SUP: • 1-VS-MOV-100A • 1-VS-MOV-100B • 1-VS-MOV-100C • 1-VS-MOV-100D *BOP will verify Purge valves closed on the Unit 1 Ventilation Panel by observing RED and GREEN lights extinguished, and GREEN magnet over Shut position indicating light signifying Valve Closed*. b) Check stopped or put CTMT PURGE SUP fans in STOP: • 1-VS-F-4A • 1-VS-F-4B *BOP will identify Purge Supply Fans secured by observing RED and GREEN indicating lights extinguished*. c) Check closed or close CTMT PURGE BYP valve: • 1-VS-MOV-101 *BOP will verify CTMT Purge Bypass valve closed on the Unit 1 Ventilation Panel by observing RED and GREEN lights extinguished, and GREEN magnet over Shut position indicating light signifying Valve Closed*.
		1-RM-Q8 5 CHECK CLOSED OR CLOSE CTMT INSTRUMENT AIR COMPRESSOR SUCTION VALVES: • 1-IA-TV-101A - CLOSED • 1-IA-TV-101B – CLOSED *Identifies 1-IA-TV-101A / B Open by observing position indicating lights on Unit 1 Vertical board RED Light LIT*. Manually Align Valves **BOP will close the valves by depressing and holding the GREEN indicating light until only the GREEN indicating light is lit.** **NOTE:** *When either 1-IA-TV-101A / B are closed, 1-IA-AOV-103 will open (checked in Step 5 below).*

Event Description: Containment gas RM fails low, no Auto Actions.

Cue: By Examiner.

	BOP	1-RM-Q8 6 CHECK CTMT IA COMPR OUTSIDE SUCT - OPEN • 1-IA-AOV-103 BOP will observe 1-IA-AOV-103 OPEN by observing RED position indicating light LIT.
	BOP/SRO	1-RM-Q8 7. NOTIFY HEALTH PHYSICS TO DO THE FOLLOWING: • Check area evacuated as necessary • Control access as necessary • Survey area as necessary • Investigate the cause *Contacts Health Physics*
	BOP/SRO	1-RM-Q8 8. OPERATE VENTILATION EQUIPMENT AS NECESSARY • Air Recirculation fans • Iodine filtration fans *Acknowledges step, not necessary to operate additional Ventilation equipment.*
	BOP/SRO	1-RM-Q8 9. CHECK REFUELING IN PROGRESS *Refueling is NOT in progress.*
	BOP/SRO	1-RM-Q8 10. CHECK REFUELING CAVITY LEVEL NORMAL *Refueling cavity level is normal (drained).*
	BOP/SRO	1-RM-Q8 11. CHECK WITH FUEL HANDLING PERSONNEL – ABNORMAL CONDITIONS *No abnormal conditions exists goes to step 13.*

Event Description: Containment gas RM fails low, no Auto Actions.

Cue: By Examiner.

		1-RM-Q8
	BOP/SRO	13. PROVIDE NOTIFICATIONS AS NECESSARY: Shift Supervision OMOC STA Health Physics Instrumentation Department Provide required notifications to SRO
	SRO	Update Shift Manager on RM-160 failure, and request notifications be completed.
		END EVENT 2

Event Description: Pressurizer Pressure control transmitter 1-RC-PT-1445 fails HIGH.

Cue: By Examiner

Time	Position	Applicant's Action or Behavior
	RO	Diagnoses the event by the following indications: Alarms: • 1C-F8, PRZR HI PRESS • 1D-H4, PRZR SFTY VV PWR RELIEF VV OPEN Indications: • 1-RC-PCV-1456, PRZR PORV, RED Open Lights LIT. • RCS Pressure Decreasing
	SRO	Enters 0-AP-53.00 LOSS OF VITAL INSTRUMENTATION / CONTROLS **Note: It is possible that the crew may enter 1-AP-31.00 directly before 0-AP-53.00. Either flowpath is correct. Actions per 1-AP-31.00 included after step 6.**
	RO	[1] Check REDUNDANT INSTRUMENT CHANNEL(S) INDICATION - NORMAL Identifies RCS Pressure decreasing using 1-RC-PI-1444 or RCS Wide Range Pressure Indicated on A / B ICCM Display.
	RO RO/BOP	[2] PLACE AFFECTED CONTROL(S)/COMPONENT(S) IN MANUAL CONTROL AND STABILIZE PARAMETER USING REDUNDANT INDICATION **Places 1-RC-PCV-1456 control switch in Close**. *Verifies 1-RC-PCV-1456 closes by GREEN Light LIT, RED Light off.* *During pressure transient, the Rod Control Switch may be placed in MANUAL due to Rods stepping OUT due to pressure coefficient*. **Critical Task CT-1: Close 1-RC-PCV-1456 prior to a Reactor Trip (OTΔT).**
	SRO	Conducts a Brief summarizing the Event and Establish priorities, the failure of the PRZR Pressure Control Channel will be discussed. The RO/BOP will report Annunciators received related to the event, and Critical Parameters affected. STA will have no input for the brief; will acknowledge SRO direction to monitor RCS pressure, if given. Completes Brief and continues with AP-53.00

Event Description: Pressurizer Pressure control transmitter 1-RC-PT-1445 fails HIGH.

Cue: By Examiner

	SRO RO	*3 VERIFY REACTOR POWER – LESS THAN OR EQUAL TO 100% *Identify that reactor power is less than 100%.*
	SRO	Notes Prior to Step 4: • Step 4 failures are listed in order of performance priority. Only the failed instrument/control and associated step number should be read aloud. • When the affected instrument/controller malfunction(s) has been addressed by this procedure, recovery actions should continue at Step 13.
	SRO RO	*4 DETERMINE THE FAILED INSTRUMENT / CONTROL AND GO TO APPROPRIATE STEP OR PROCEDURE: • PRZR Pressure Control, Step 5 *The RO will identify that 1-RC-PI-1445 failed high*.
	  SRO RO	NOTE: RCS pressure decrease will cause a slight decrease in RCS Tave due to negative reactivity from the moderator pressure coefficient. 5 CHECK PRZR SPRAY VALVE CONTROLLERS - NORMAL *RO identifies PRZR Spray Valves controllers normal*.
	SRO	6 GO TO ( )-AP-31.00, INCREASING OR DECREASING RCS PRESSURE **SRO announces transition to AP-31.00**.

Event Description: Pressurizer Pressure control transmitter 1-RC-PT-1445 fails HIGH.

Cue: By Examiner

		1-AP-31.00
	SRO	[1] ___ CHECK PRZR PORVS – CLOSED
	RO	*Identifies 1-RC-PCV-1456 closed*.
		1-AP-31.00
	SRO	Conducts a Brief summarizing the Event and Establish priorities. The RO/BOP will report Annunciators received related to the event, and Critical Parameters affected. STA will have no input for the brief. Completes Brief and continues with AP-31.00
		1-AP-31.00 **CAUTION**: A Safety Injection may occur if the unit is not tripped prior to RCS pressure decreasing below 2100 psig.
	SRO	2 CHECK RCS PRESSURE – DECREASING
	RO	*Identifies RCS Pressure rising following PORV Closure.* 2 RNO IF RCS pressure is stable or increasing following PORV closure, THEN GO TO Step 10.
		1-AP-31.00
	SRO	10 CHECK RCS PRESSURE - STABILIZING AT OR TRENDING TO 2235 PSIG
	RO	*Identifies RCS pressure trending to 2235 psig*.
		1-AP-31.00
	SRO	11. GO TO STEP 17

Event Description: Pressurizer Pressure control transmitter 1-RC-PT-1445 fails HIGH.

Cue: By Examiner

	SRO	1-AP-31.00 17 CHECK MASTER CONTROLLER - IN MANUAL GO TO Step 19
	RO	*Identifies Master Pressure Controller in Auto*
	SRO	1-AP-31.00 19 CHECK PRZR PORVS – EITHER INOPERABLE • 1-RC-PCV-1455C • 1-RC-PCV-1456
	RO	*Identifies 1-RC-PCV-1456 Inoperable*.
	SRO	1-AP-31.00 20 CLOSE BLOCK VALVE FOR INOPERABLE PORV • 1-RC-MOV-1535 if 1-RC-PCV-1456 inoperable
	RO	**Places 1-RC-MOV 1535 control switch in close. Monitors MOV until GREEN indicating light LIT and RED Light out**.
	SRO	1-AP-31.00 21 CHECK PRZR PORVS – EITHER INCAPABLE OF BEING MANUALLY CYCLED GO TO Step 23 • 1-RC-PCV-1455C • 1-RC-PCV-1456
	RO	States Both PORVs are capable of being manually cycled.
	SRO	1-AP-31.00 23 NOTIFY THE FOLLOWING: • OM on call • STA • I&C Notifies Shift Manager of the Event and requests notifications be made.

Event Description: Pressurizer Pressure control transmitter 1-RC-PT-1445 fails HIGH.

Cue: By Examiner

	SRO	1-AP-31.00 24 REFER TO TECH SPECS: • 3.1.A.5 • 3.1.A.6 • 3.1.C • 3.12.F 1) The SRO will consult Tech Specs, TS Section 3.1.A.6, and determine that 1-RC-PCV-1456 is Inoperable but capable of being manually cycled, and enter a one hour clock to close the block valve for the PORV. The block valve will remain energized. 2) Further consultation will find Tech Spec 3.12.F.1 to restore RCS pressure >2205 psig in 2 hours or reduce Thermal Power to less than 5% in the next 6 hours. The Core Operating Limits Report (COLR, DRP-21) provides the reference for 2205 psig RCS pressure. 3) Tech Spec 3.1.C limit on identified leakage was not met while 1-RC-PCV-1456 was open. This requires application of reduce leakage to within specified limits within 4 hours. **NOTE**: Following closure of block valve the 1 hour Tech Spec clock clears. RCS pressure decreases to < 2205 psig during the transient; once the PORV has been closed, pressure recovers quickly and goes above 2205 psig. *SRO updates the Team concerning the identified items in Tech Specs and updates the Shift manager*.
	SRO	1-AP-31.00 25 REVIEW APPLICABILITY: • VPAP-2802 • EAL Matrix SU6.1 *Notifies Shift Manager of need to review VPAP-2802 and EALs for this Event*.
	SRO	1-AP-31.00 26 RESTORE PRESSURE CONTROL SYSTEM(S) TO NORMAL
		END EVENT #3

Event Description: A SG NR Level Channel III fails HIGH.

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
	BOP	Diagnoses channel failure with the following indications/alarms: Alarms: • 1H-A5 – STM GEN 1A HI LVL • 1F-C10 – STM GEN 1A HI LVL CH 3 • 1H-G5 – STM GEN 1A LVL ERROR • 1H-E5 – STM GEN 1A FW>< STM FLOW • 1F-C7 – STM GEN 1A CH 3 FW< STM FLOW • 1F-D7 – STM GEN 1A CH 4 FW< STM FLOW Indications: • 1-FW-FCV-1478 respond to level channel failure by opening in automatic
	SRO	Enters 0-AP-53.00, Loss of Vital Instrumentation / Controls.
	RO	0-AP-53.00 [1] CHECK REDUNDANT INSTRUMENT CHANNEL(S) INDICATION - NORMAL Verifies Channel I and II are NORMAL.
	BOP	0-AP-53.00 [2] PLACE AFFECTED CONTROL(S)/COMPONENT(S) IN MANUAL CONTROL AND STABILIZE PARAMETER USING REDUNDANT INDICATION **BOP takes manual control of 'A' SG feed reg valve and raises demand (FF > SF) to restore level to program**. **Critical Task CT-2:** Should the BOP fail to take action to control A SG NR level, an automatic reactor trip will occur. This would be considered failure criteria.
	SRO	0-AP-53.00 The team will hold a transient brief. During the brief the failure of 1-FW-LI-1476 will be discussed. The RO/BOP will report Annunciators received related to the event, and Critical Parameters affected. STA will have no input for the brief.

Event Description: A SG NR Level Channel III fails HIGH.

Cue: By Examiner.

	RO	*3. VERIFY REACTOR POWER – LESS THAN OR EQUAL TO 100%. RO will identify that reactor power, by ΔT, is less than 100%.
	SRO RO	0-AP-53.00, Loss of Vital Instrumentation / Controls **NOTE:** • Step 4 failures are listed in order of performance priority. Only the failed instrument/control and associated step number should be read aloud. • When the affected instrument/controller malfunction(s) has been addressed by this procedure, recovery actions should continue at Step 13. *4 DETERMINE THE FAILED INSTRUMENT / CONTROL AND GO TO APPROPRIATE STEP OR PROCEDURE:. • SG NR Level, Step 7 The RO will identify that 1-FW-LT-1476 has failed <u>HIGH.</u>
	BOP	0-AP-53.00 7. CHECK STEAM GENERATOR LEVEL CONTROL INSTRUMENTS – NORMAL • Steam Pressure • Steam Flow • Feed Flow • **Steam Generator Level** *Determines CH III Steam Generator Level instrumentation for 'A' SG is NOT normal*

Event Description: A SG NR Level Channel III fails HIGH.

Cue: By Examiner.

		0-AP-53.00 Step 7. RNO
	SRO	IF the selected steam flow, steam pressure, or feed flow input to the SG Water Level Control system has failed, THEN do the following: *Determines that none of the listed instruments are affected and continues in the RNO column.*
	SRO	IF SG Level Channel III has failed, THEN do the following:
	BOP	a) Place the associated Feed Reg Valve in MANUAL.
		b) IF manual control of Feedwater is inoperable, THEN do the following: 1) Control SG level with Feedwater Isolation MOVs. 2) Consult with the Shift Manager concerning the need to place the MFRV on the jack.
	BOP	c) Control SG level at program level.
	BOP	d) Main Feed Reg Valve Bypass Valves may be used for fine control of SG level.
		Perform follow-up actions:
	SRO	a) Consult with Shift Manager on need to initiate ( )-OP-RP-001, ALIGNING CONTROL SYSTEM FOR PERFORMANCE OF CHANNEL I, II, III, AND IV PROCESS AND PROTECTION TESTING.
	SRO	b) Refer to the following Tech Spec 3.7 items: • Table 3.7-1, **12** and 17 • Table 3.7-2, 1.c, 1.e, and **3.a** • Table 3.7-3, 2.a, and **3.a** • Table 3.7-6 items 15 & 16

Event Description: A SG NR Level Channel III fails HIGH.

Cue: By Examiner.

		0-AP-53.00 Step 7. RNO (Continued)
	SRO	SRO should determine the follow Technical Specification implications for this failure:
	SRO	**Technical Specification:** • **Tech Spec Table 3.7-1, Item 12**, Operator Action 6, With the number of OPERABLE channels less than the Total Number of Channels, REACTOR CRITICAL and POWER OPERATION may proceed provided the following conditions are satisfied: The inoperable channel is placed in the tripped condition within 72 hours, The Minimum OPERABLE Channels requirement is met; however, the inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels per Specification 4.1, If the conditions are not satisfied in the time permitted, be in at least HOT SHUTDOWN within 6 hours
	SRO	• **Tech Spec Table 3.7-2, Item 3.a**, Operator Action 20; With the number of OPERABLE channels less than the Total Number of Channels, REACTOR RITICAL and/or POWER OPERATION may proceed provided the following conditions are satisfied: The inoperable channel is placed in the tripped condition within 72 hours, The Minimum OPERABLE Channels requirement is met; however, the inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels per Specification 4.1, If the conditions are not satisfied in the time permitted, be in HOT SHUTDOWN within the next 6 hours and reduce RCS temperature & pressure to less than 350°F/450 psig, respectively in the following 12 hours.
		• **Tech Spec Table 3.7-3, Item 3a,** SG Water Level Hi-Hi, Operator Action 20; With the number of OPERABLE channels less than the Total Number of Channels, REACTOR RITICAL and/or POWER OPERATION may proceed provided the following conditions are satisfied: The inoperable channel is placed in the tripped condition within 72 hours, The Minimum OPERABLE Channels requirement is met; however, the inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels per Specification 4.1, If the conditions are not satisfied in the time permitted, be in HOT SHUTDOWN within the next 6 hours and reduce RCS temperature & pressure to less than 350°F/450 psig, respectively in the following 12 hours. c) Refer to Attachment 1. d) IF no other instrumentation failure exists, THEN GO TO Step 13

Event Description: A SG NR Level Channel III fails HIGH.

Cue: By Examiner.

		0-AP-53.00
	SRO	13. CHECK CALORIMETRIC – FUNCTIONAL IAW ( )-OPT-RX-001 If the FRV bypass valves are manipulated, the SRO/RO determines that OPT-RX-001 is impacted and OPT-RX-007 will need to be performed. *If it appears that the SRO/RO will take action to perform 1-OPT-RX-007, the Unit 2 Operator will state that he will have the fourth RO perform 1-OPT-RX-007.* *A copy of 1-OPT-RX-001 is included following step 17.*
		0-AP-53.00
	SRO	14. REVIEW THE FOLLOWING • Tech Spec 3.7 *Determines Table 3.7-1 item 17, Operator action 6, is applicable (place channel in trip w/in 72 hours).* VPAP-2802, NOTIFICATIONS - None TRM SECTION 3.3, INSTRUMENTATION – None. Reg. Guide 1.97: (Potential follow up question) • SG NR level, A-01 Variable, 2 Channel per SG required, see TS Table 3.7-6. Identification is usually performed by SM/STA**.** EP-AA-303, EQ. IMPORTANT TO EMERGENCY RESPONSE (Potential follow up question). Heat Sink Capability, A SG NR Level CH III, Att. 6 Page 6 of 7, Category B variable, Alternate indications available within grouping, no action required. Identification is usually performed by SM/STA. *The STA reports completion of review and has discussed the results with the Shift Manager.*
		0-AP-53.00
	SRO	15 CHECK ADDITIONAL INSTRUMENT / CONTROLLER MALFUNCTION – EXISTS
	BOP	Reports no additional failure exists
	SRO	GOES TO Step 17

Event Description: A SG NR Level Channel III fails HIGH.

Cue: By Examiner.

	SRO	0-AP-53.00 17. PROVIDE NOTIFICATIONS AS NECESSARY: • Shift Supervision • OMOC • STA (PRA determination) • I&C

Event Description: A SG NR Level Channel III fails HIGH.

Cue: By Examiner.

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Attachment 4
CALORIMETRIC PROGRAM OPERABILITY

NOTE: TRM 3.3.5 shall be reviewed for required actions for non-functionality of the UFM Calorimetric, Normalized Feedwater Venturi, or PCS Calorimetric. Power reduction to less than 98.4% may be required.

1. To check the Primary Plant Performance Program (PP) operability perform the following:

_____ a. Open Programs - Operator Display / Engineering Display

_____ b. Open PP Output Summary - (Operator Display - Primary Plant Poke)

_____ c. Check short timed values for selected basis, Steam Flow (1-OPT-RX-002 box) or Feedflow (1-OPT-RX-003 box), are updating and either good or fair quality.

_____ d. IF selected basis NOT updating and either good or fair quality, THEN contact Reactor Engineering (if available), and then select another calorimetric basis IAW Step 6.3.1. Otherwise, enter N/A.

2. To check the Flow Corrections Program (FL) operability perform the following:

_____ a. Open Programs - Operator Display / Engineering Display

_____ b. Open FL Output Summary (Operator Display - Flow Corr Poke)

_____ c. Check FL Program Status is OK. IF NOT OK, THEN perform the following to check status of different bases.

_____ 1. Open FL0101 - Output Summary (FL Summary Poke)

_____ 2. Compare displayed values to the FL0101 Table below and check selected calorimetric values are updating and either good or fair quality.

_____ 3. IF selected basis NOT operable, THEN contact Reactor Engineering (if available), and then select another calorimetric basis IAW Step 6.3.1.

Event Description: A SG NR Level Channel III fails HIGH.

Cue: By Examiner.

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Attachment 4
CALORIMETRIC PROGRAM OPERABILITY

FL0101 Table				
Flow Correction List	Normalized Feedwater	UFM Feedwater	Venturi Feedwater	Steam Flow
Charging Line Flow Corr	X	X	X	X
Letdown Line Flow Corr	X	X	X	X
SG A-1 FF CORR		X	X	
SG A-2 FF CORR		X	X	
SG B-1 FF CORR		X	X	
SG B-2 FF CORR		X	X	
SG C-1 FF CORR		X	X	
SG C-2 FF CORR		X	X	
SG A-1 SF CORR				X
SG A-2 SF CORR				X
SG B-1 SF CORR				X
SG B-2 SF CORR				X
SG C-1 SF CORR				X
SG C-2 SF CORR				X
SG A-1 FF CORR NORM	X			
SG A-2 FF CORR NORM	X			
SG B-1 FF CORR NORM	X			
SG B-2 FF CORR NORM	X			
SG C-1 FF CORR NORM	X			
SG C-2 FF CORR NORM	X			

		END EVENT #4

Event Description: Trip of the running CH pump SW pump with failure of standby pump auto start.

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
		1-SW-P-10A overload trip / 1-SW-P-10B fail to auto start
	RO	Diagnose the failure based on the following alarms and indications: Annunciator 1D-G5, SW of CC PPS DISCH TO CHG PPS LO PRESS. 1-SW-P-10B NOT running. **Note**: SRO may conduct a Team brief and direct the start of 1-SW-P-10B. **Note**: SRO may direct the BOP to perform 0-AP-12.00, Service Water System Abnormal Conditions. AP-12.00 actions located at end of this section.
		1D-G5 Annunciator Response Procedure
	BOP	1. CHECK CHG PUMP CC OR SW PP(S) - TESTING IN PROGRESS
	RO	Reports No, testing not in progress. Step 1 RNO: Go TO Step 3.
		1D-G5 Annunciator Response Procedure **Note prior to Step 3**: The standby CHG Pump SW Pump will auto-start at 8 psig. **NOTE**: SRO may hold a focus brief for starting 1-SW-P-10B; RO starts 1-SW-P-10B following closure of the brief.
	BOP	3. CHECK STANDBY CHG PUMP CC PP OR SW PP - AUTO STARTED
	RO	Report No, 1-SW-P-10B not running.
		Step 3 RNO DO the following:
	BOP	a) Locally check CHG Pump CC and SW PPs.
	RO	Dispatch an Operator to check the status of the CH Pump CC and SW pumps.
	BOP	b) Monitor CHG Pump CC and SW flows on PCS (ERFCS if not removed): 1-CC-P-2A, F1CC003A 1-CC-P-2B, F1CC004A 1-SW-P-10A, F1SW007A 1-SW-P-10B, F1SW008A
	RO/BOP	RO/BOP Monitors parameters using the PCS
	BOP	c) IF CHG Pump CC and SW PPs are operating normally, THEN do the following:
	RO	Reports No, Pumps are not operating properly.
	BOP	d) IF CHG Pump CC or SW PP NOT operating normally, THEN do the following:
	BOP	1) Swap CHG CC or SW PPs.

Event Description: Trip of the running CH pump SW pump with failure of standby pump auto start.

Cue: By Examiner.

	RO	**Starts 1-SW-P-10B**
		1D-G5 Annunciator Response Procedure, Step 3 RNO (Continued).
	BOP	2) IF standby CHG Pump CC or SW PP unavailable, THEN return lead pump to service.
		Reports Yes standby pump is running.
	BOP	3) Submit Plant Issue and Work Request
	BOP	Notifies SRO that a CR and work request is required.
	BOP	4) GO TO Step 13.
		1D-G5 Annunciator Response Procedure
	BOP	13 PROVIDE NOTIFICATIONS: OMOC STA SYSTEM ENGINEERING Notifies SRO of required notifications. OMOC will recommend ramping the unit offline.
	SRO	Either Tech Spec 3.3.B.3 or 3.2.C.1 may be used by SRO to determine Required Action which is Tech Spec 3.01. Tech Specs: TS 3.3. B.3, allows ONE Train of HHSI pumps to be Inoperable. With Both Trains Inoperable **TS 3.01** is in effect, requiring the Unit be placed in HSD in 6 hours, and CSD in the next 30 hours. **Note**: Change of TS clock to 72 hours would be a Licensing/Station Management decision. Note: Tech Spec 3.2.C.1 is also applicable: No Boron injection subsystems OPERABLE, all CH pumps Inoperable due to the Inoperable CH PP SW pumps being Inoperable. With Both Trains Inoperable **TS 3.01** is in effect, requiring the Unit be placed in HSD in 6 hours, and CSD in the next 30 hours. TRM: 1-SW-P-10A, MRule – No, App 'R' – yes. TRM 3.7.9.A.2, Implement App R fire watch in the area(s) associated with the nonfunctional equipment in Table 3.7.9-1 in accordance with TRM Section 5.2 within 14 days and restore the equipment to functional status in 60 days. Hourly Fire Watch required in Unit 1 ESR, Unit 1 and 2 Turbine Buildings Basement North Wall, MER 3&4. **Recommend TRM referral post-scenario since this function is normally performed by the STA with consult with the Shift Manager**.

Event Description: Trip of the running CH pump SW pump with failure of standby pump auto start.

Cue: By Examiner.

	BOP	0-AP-12.00 Note: A copy of this procedure is located in MER 3. Acknowledges Note. 1. CHECK MER 3 OR 4 EQUIPMENT - AFFECTED • Charging Pump Service Water Pumps • MER 3 Chillers Identifies Charging Pump SW pumps affected, Goes to Step 2.
	BOP	0-AP-12.00 2. Check Charging Pump SW Pumps Affected. Continues to Step 3.
	BOP	0-AP-12.00 CAUTION: Charging pumps should be secured if bearing temperatures reach 185°F. NOTE: • Preparations should be made to shift charging pumps if bearing temperatures exceed 180°F. • The system engineer should be notified as soon as possible if charging pump bearing temperatures exceed 180°F. Acknowledges Caution and Notes.
	BOP	0-AP-12.00 3. CHECK CHG PUMP TEMPERATURES - LESS THAN 180°F Checks CH Pump temperatures using PCS.
	BOP	0-AP-12.00 Note: A vacuum condition in the SW header(s) is indicated by abnormal conditions on multiple SW header loads. 4. CHECK SW PARAMETERS – NORMAL a) MER 3 b) MER 4 Directs Service Building Operator to check status of MER 3 and 4 SW parameters using 0-AP-12.00, Pages 3 and 4.
	BOP	0-AP-12.00 5. Check CHG Pump SW Pumps – Abnormal Condition corrected. Identifies abnormal condition corrected.

Event Description: Trip of the running CH pump SW pump with failure of standby pump auto start.

Cue: By Examiner.

	BOP	0-AP-12.00 NOTE: MER Control Room Chiller(s) should be stopped if SW outlet temperature exceeds 125°F. 6. CHECK MER 3 CHILLER PARAMETERS – NORMAL Contacts Service Building Operator to check MER Chiller Parameters using 0-AP-12.00, Page 5.
	BOP	0-AP-12.00 7. CHECK CHG PUMP SW PUMP(S) - WERE AFFECTED a) Vent and place each standby CHG pump SW pump in service IAW 1-OP-51.5.2 and 2-OP-51.5.2, SHIFTING CHARGING PUMP COOLING WATER PUMPS b) Vent affected pump(s) until normal parameters established, as required. Identifies normal CHG pump parameters following standby CHG pump SW pump start.
	BOP	0-AP-12.00 8. CHECK MER 5 CHILLER PARAMETERS – NORMAL Directs Service Building Operator to check MER 5 Chiller parameters normal using 0-AP-12.00, Page 6.
	BOP	0-AP-12.00 9. CHECK 1-SW-S-10 - IN SERVICE Confer with SRO and determines 1-SW-S-10 not in service or required.
	BOP	0-AP-12.00 10. CHECK MER 3 AND MER 4 CHEMICAL INJECTION - NORMAL OPERATION IAW 0-OP-SW-006, MER 3 AND MER 4 SERVICE WATER SYSTEM CHEMICAL INJECTION OPERATION Directs Service Building Operator to check chemical injection system normal
	BOP	0-AP-12.00 Notifies SRO to Review TS 3.2, 3.3, 3.14, 3.23, and TRM 3.7.9.
		---END OF EVENT 5---

Event Description: Ramp Unit to HSD

Cue: When initiated by Team.

Time	Position	Applicant's Action or Behavior
		Start of 0-AP-23.00
	SRO	Conducts a Brief summarizing the Event and Establish priorities. The RO/BOP will report Annunciators received related to the event, and Critical Parameters affected. STA will have no input for the brief.
	RO	Reactivity control during AP-23.00 Ramp: 453 gallons of Boric Acid needed to reduce power to HSD. 50 gallons added during Emergency Boration (estimate), leaving 403 gallons to be added using normal boration at an average rate of 5.0 gpm. Control Bank 'D' rod height at end of ramp 165 Steps.
	SRO	Completes Brief and continues with AP-23.00.
	SRO	Caution Prior to Step 1: • Conservative decision-making must be maintained during rapid load reductions. Refer to Attachment 1 for trip criteria. Notes Prior to Step 1: • Actions that can be completed independently of preceding steps may be performed out of sequence as directed by the SRO • When the Turbine is not being actively ramped, the REFERENCE and SETTER values must remain matched to prevent inadvertent ramp. • Pre-planned reactivity plans located in the Main Control Room will be used as guidance for ramping down to the desired power level. • The ramp rate in IMP OUT is nonlinear and therefore pre-planned reactivity plans based on IMP IN are not as accurate. However, total amounts of boration and dilution can be used as guidance. • For ramp rates greater than or equal to 1%/minute, Rod Control should remain in Automatic if available.
	RO	0-AP-23.00 1. **TURN ON ALL PRZR HEATERS**

Event Description: Ramp Unit to HSD

Cue: When initiated by Team.

		2. INITIATE PLANT LOAD REDUCTION AT 2%/MINUTE OR LESS:
	BOP	a) Verify turbine valve position - NOT ON LIMITER The turbine is NOT on the limiter.
	RO	b) Insert control rods in AUTO or MANUAL as necessary to maintain Tave and Tref within 5°F.
	SRO/BOP	c) **Verify or place turbine in IMP IN or IMP OUT as determined by Shift Supervision** The SRO can choose IMP IN or IMP OUT.
	BOP	d) **Adjust SETTER to desired power level** NOTE: Setter may be adjusted to ~5% power; SRO may direct adjustment to other significant power level during down power ramp, e.g., 60% or 30%. e) **Adjust LOAD RATE %/MIN thumbwheel to desired ramp rate (1%/minute)** f) **Initiate Turbine load reduction using OPERATOR AUTO (pushes the GO button)** g) **Reduce Turbine Valve Position Limiter as load decreases** The BOP will periodically reduce the limiter setpoint during the ramp.
	SRO	3. CHECK EMERGENCY BORATION – REQUIRED The team may decide to emergency borate after the ramp has progressed to the point that Tave and Tref are matched (or close).
	SRO	Note Prior to Step 4: • Step 4 or Step 5 may be performed repeatedly to maintain Tave and Tref matched, ΔFlux in band, and control rod position above the LO-LO insertion limit.

Event Description: Ramp Unit to HSD

Cue: When initiated by Team.

		0-AP-23.00
	RO	4. PERFORM AN EMERGENCY BORATION IAW THE FOLLOWING: a) Verify or raise CHG flow to greater than 75 gpm b) **Transfer the in-service BATP to FAST** c) **Open 1-CH-MOV-1350** SRO will direct nominal opening of approximately 25 seconds. d) Monitor EMRG BORATE FLOW • ( )-CH-FI-( )110 e) After required emergency boration, perform the following: 1) **Close ( )-CH-MOV-( )350** 2) **Transfer the in-service BATP to AUTO** 3) Restore Charging flow control to normal SRO may direct rod motion to maintain Δ Flux within specified band.
	RO	5. ESTABLISH A NORMAL BORATION TO MAINTAIN CONTROL ROD POSITION ABOVE THE LO-LO INSERTION LIMITS IAW ATTACHMENT 4 Attachment 4 (Boration) and 5 (Manual Makeups) are at the end of this section. SRO may direct manual rod motion to maintain Δ flux within specified band.
	SRO	Notes Prior to Step 6: • If at any time plant conditions no longer require rapid load reduction, actions should continue at Step 36. • RCS Tave must be maintained less than or equal to 577°F and RCS pressure must be maintained greater than or equal to 2205 psig. Tech Spec 3.12.F.1 should be reviewed if either parameter is exceeded. • I & C should be contacted to provide assistance with adjusting IRPIs.
	RO	6. CONTROL RAMP RATE TO MAINTAIN RCS PRESSURE GREATER THAN 2205 PSIG

Event Description: Ramp Unit to HSD

Cue: When initiated by Team.

	RO	0-AP-23.00 *7. CHECK LETDOWN ORIFICES – TWO IN SERVICE *Evaluator note: two orifices will already be in service.*
	BOP	8. MONITOR STEAM DUMPS FOR PROPER OPERATION
	SRO	0-AP-23.00 9. NOTIFY THE FOLLOWING: • Energy Supply (MOC) • Polishing Building • Chemistry • OMOC
	SRO	10. EVALUATE THE FOLLOWING: • EPIP applicability *The Shift Manager will review EPIPs for applicability. They are not applicable.* • VPAP-2802, NOTIFICATIONS AND REPORTS, applicability *SRO directs STA to review VPAP-2802. The STA reports completion of review of VPAP-2802 and required notifications discussed with SM.* *No further actions are required for this event.*
	SRO	11. CHECK RAMP WILL BE TO LESS THAN APPROXIMATELY 35% REACTOR POWER Yes, Directs Unit 2 to initiate 0-OP-EP-004, Load Shed, to determine required position of LOAD SHED SYS Switch.
	SRO	12. CHECK REACTOR POWER – HAS LOWERED MORE THAN 15% IN ONE HOUR. When reactor power has lowered >15%, then chemistry will be notified.
	SRO	13. NOTIFY CHEMISTRY OF POWER CHANGE > 15% IN ONE HOUR. Chemistry notified of power change > 15% in one hour.

Event Description: Ramp Unit to HSD

Cue: When initiated by Team.

	SRO	0-AP-23.00 CAUTION: Secondary plant evolutions affecting Feedwater Flow or temperature will affect RCS temperature and Reactor Power. This effect will be greater at beginning of core life due to a lower value for isothermal temperature coefficient. The operating team must be prepared to mitigate the effects of the secondary evolutions on the RCS. *RO acknowledges the Caution.*
	SRO	0-AP-23.00 14. AT APPROXIMATELY 70% REACTOR POWER CHECK AUXILIARY STEAM MAINTAINING BETWEEN 160 AND 180 PSIG. *RO Acknowledges the step.*
		END EVENT #6

Event Description: Ramp Unit to HSD

Cue: When initiated by Team.

		0-AP-23.00 Attachment 4 (NORMAL BORATION) Actions
	RO	1. **Place the MAKE-UP MODE CNTRL switch in the STOP position.**
	RO	2. **Adjust 1-CH-YIC-1113 to desired total gallons**
	RO	3. **Adjust 1-CH-FC-1113A to desired flow rate.**
	RO	4. **Place the MAKE-UP MOD SEL switch in the BORATE position**.
	RO	5. **Place the MAKE MODE CNTRL switch in the START position.**
	RO	6. Verify proper valve positions.
	RO	7. Adjust boration rate using 1-CH-FC-1113A, as necessary.
	RO	8. WHEN boration is complete, THEN perform the following. IF boric acid is to remain in the Blender to support ramping the Unit, THEN enter N/A. a) Manually blend approximately 20 gallons to flush the boration path IAW Attachment 5, Manual Makeups. b) Enter N/A for the remaining steps in this Attachment. *Attachment 5 is on the next page*
	RO	9. Verify controllers for Primary Grade water and Boric Acid are set correctly.
	RO	10. **Place the MAKE-UP MODE SEL switch in the AUTO position.**
	RO	11. **Place the MAKE-UP MODE CNTRL switch in the START position.**
	RO	12. Notify Shift Supervision of blender status.

Event Description: Ramp Unit to HSD

Cue: When initiated by Team.

		0-AP-23.00 Attachment 5 (Manual Makeups) Actions
		1. Place the MAKE-UP MODE CNTRL switch in the STOP position.
		2. Check controllers for the flow rate of Boric Acid and Primary Grade water are set correctly.
		3. Check integrators for the gallons of Boric Acid and Primary Grade water are set correctly.
		4. Place the MAKE-UP MODE SEL switch in the MANUAL position.
		5. Place the MAKE-UP MODE CNTRL switch in the START position.
		6. Open 1-CH-FCV-1113B, BLENDER TO CHG PUMP.
		7. Check proper valve positions.
		8. WHEN the Manual Makeup operation is complete, THEN place 1-CH-FCV-1 113B in the AUTO position
		9. Place the MAKE-UP MODE CNTRL switch in the STOP position.
		10. Check or place the control switches in the AUTO position.
		11. Check controllers for Primary Grade water and Boric Acid are set correctly.
		12. Place the MAKE-UP MODE SEL switch in the AUTO position.
		13. Place the MAKE-UP MODE CNTRL switch in the START position.
		14. Notify Shift Supervision of blender status.

Event Description: LOCA Outside Containment

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
	Team	Identify Failure based on the following: Alarms: 1B-F3, SFGDS AREA SUMP HI LEVEL 1C-B-8, PRZR LO PRESS 1C-D8, PRZR LO LEVEL 1D-E5, CHG PP TO REGEN HX HI-LO FLOW RMA-D6, VENT STACK #2PART ALERT/HI RMA-D7, VENT STACK #2 NORM RNG GAS ALERT/HI Indications: Lowering PRZR Level Rising CH flow
	SRO	1-AP-16.00 Direct RO to perform the Immediate Actions of 1-AP-16.00.
	RO	1-AP-16.00 NOTE: • If SI Accumulators are isolated, 1-AP-16.01, SHUTDOWN LOCA, should be used for guidance. • RCS average temperature has a direct impact on pressurizer level. [1] MAINTAIN PRZR LEVEL: **• Isolate Letdown** Closes 1-CH-LCV-1460 A / B • Control Charging flow **Takes Manual control of 1-CH-FCV-1122 and raises CH Flow**.
	RO	Reports that CH flow at maximum value and PZR level decreasing.
	SRO	**Direct RO to perform the Immediate Action Steps of E-0, and Safety Inject on Step 4**.

Event Description: LOCA Outside Containment

Cue: By Examiner.

	RO	**1-E-0 – Reactor Trip or Safety Injection** [1] CHECK REACTOR TRIP: a) Manually trip reactor **Pushes the reactor trip push buttons.** b) Check the following: • All Rods On Bottom light – LIT • Reactor trip and bypass breakers – OPEN • Neutron flux – DECREASING Reports "Reactor Tripped".
	RO RO	[2] CHECK TURBINE TRIP: a) **Manually trip the turbine** **Pushes the turbine trip push buttons.** b) Verify all turbine stop valves - CLOSED c) Isolate reheaters by closing MSR steam supply SOV • 1-MS-SOV-104 d) Verify generator output breakers – OPEN (Time Delayed) Reports "Turbine Tripped"
	RO	[3] CHECK BOTH AC EMERGENCY BUSES – ENERGIZED RO reports that both AC emergency buses are energized.

Event Description: LOCA Outside Containment

Cue: By Examiner.

	RO	[4] CHECK IF SI INITIATED: a) Check if SI is actuated: • LHSI pumps – RUNNING • SI annunciators – LIT • A-F-3 SI INITIATED – TRAIN A • A-F-4 SI INITIATED – TRAIN B
	RO	4b) **Manually initiate SI** **The RO will manually initiate SI at step 4 by pushing both SI pushbuttons.** After the immediate actions of 1-E-0 are reported as complete, the SRO will check off immediate action steps in his copy of 1-E-0. After the immediate actions are verified, the team will conduct a brief. RO should identify that there is NO SI flow to the core. *The STA will have no input; will acknowledge SRO direction to monitor SI flow using PCS.*
	SRO	1-E-0 Will Check off the Immediate Action Steps of 1-E-0. SRO will conduct a commensurate Brief. Ensure the Team agrees that a LOCA outside of containment is in progress. Poll the Team as to any higher priority than continuing actions for a LOCA outside of containment. SRO closes the brief. **Directs BOP to perform Attachments 1, and 3 of 1-E-0**. BOP failures included in next section. **Directs RO to perform Attachment 2** *Attachment 1, 2, and 3 located in next Section.* Continues with 1-E-0 with RO. **Critical Task** **CT-3:** Restore HHSI flow from the RWST to the core prior to air-binding of the HHSI pumps. Note: Approx. 5 min after start of LOCA the Boric Xfer pump will trip. This will result in a rapid VCT level draw-down of approximately 4%/min.

Event Description: LOCA Outside Containment

Cue: By Examiner.

		1-E-0
	RO	Identify RCS Subcooling < 30 °F and SI flow indicated to all three loops.
	SRO	Using 1-E-0 Continuous Actions Page:
		1. RCP TRIP CRITERIA
		Trip all RCPs if BOTH conditions listed below occur:
		a. Charging Pumps - AT LEAST ONE RUNNING AND FLOWING TO RCS
		b. RCS Subcooling - LESS THAN 30°F [85°F]
	RO	Identifies RCP Trip Criteria exist.
	SRO	**Directs RO to Trip all RCPs**.
		2. MINIFLOW RECIRC CRITERIA
		a. CLOSED - When RCS pressure is less than 1275 psig [1475 psig] AND RCP Trip Criteria are met (RCPs OFF).
	RO	Identifies Criteria are met.
	SRO	Direct RO to close mini-flow recirc valves.
	SRO	*6. CHECK RCS AVERAGE TEMPERATURE • STABLE AT 547°F OR • TRENDING TO 547°F

Event Description: LOCA Outside Containment

Cue: By Examiner.

	SRO	7. CHECK PRZR PORVs AND SPRAY VALVES: a) PRZR PORVs – CLOSED b) PRZR spray controls • Demand at Zero (or) • Controlling Pressure c) PORV block valves - AT LEAST ONE OPEN
	SRO RO	**NOTE:** Seal injection flow should be maintained to all RCPs. *8. CHECK RCP TRIP AND MINIFLOW RECIRC CRITERIA: a) Charging Pumps – AT LEAST ONE RUNNING AND FLOWING TO RCS Reports two or three Charging pumps will be running and flowing to the RCS. b) RCS subcooling - LESS THAN 30°F [85°F] RCS subcooling will be less than 30 °F c) **Stop all RCPs** (if not stopped previously) d) RCS pressure - LESS THAN 1275 psig [1475 PSIG] e) **Close CHG pump miniflow recirc valves**: • 1-CH-MOV-1275A • 1-CH-MOV-1275B • 1-CH-MOV-1275C *Reports Mini-flow recirc valves closed*.
	SRO	9. CHECK IF SGs ARE NOT FAULTED: • Check pressures in all SGs a) STABLE OR INCREASING AND b) GREATER THAN 100 PSIG RO will observe a slightly decreasing trend on SG pressures. This will be attributed to the RCS cooldown. The team will not transition to 1-E-2.

Event Description: LOCA Outside Containment

Cue: By Examiner.

	SRO	10. CHECK IF SG TUBES ARE NOT RUPTURED: • Condenser air ejector radiation – NORMAL • SG blowdown radiation – NORMAL • SG MS radiation – NORMAL • TD AFW pump exhaust radiation – NORMAL • SG NR Level - NOT INCREASING IN AN UNCONTROLLED MANNER
	SRO	11 CHECK RCS - INTACT INSIDE CTMT • CTMT radiation - NORMAL • CTMT pressure - NORMAL • CTMT RS sump level – NORMAL
	RO	*Reports RCS intact inside CTMT*.
	SRO	12 CHECK RCS - HAS BEEN MAINTAINED INTACT OUTSIDE CTMT a) Radiation Monitors - NORMAL • MGPI vent-vent • Auxiliary Building Control Area
	RO	Reports MGPI Vent-Vent in Alarm b) Sump annunciators - NOT LIT • VSP-F-4 • B-D-1 • B-D-2 • B-F-3 Step 12 RNO Determine cause of abnormal conditions. IF the cause is a loss of RCS inventory outside CTMT, THEN GO TO 1-ECA-1.2, LOCA OUTSIDE CONTAINMENT.
	RO	Reports conditions caused by LOCA outside CTMT
	SRO	**Transitions to ECA-1.2**.

Event Description: LOCA Outside Containment

Cue: By Examiner.

		1-ECA-1.2 CAUTION: Depending on break location, higher than normal dose levels should be expected in the Auxiliary Building and the Safeguards after a LOCA outside CTMT. 1 VERIFY PROPER VALVE ALIGNMENT: a) Locally unlock and close the following breakers: • 1H1-2N 8A for 1-SI-MOV-1890A • 1J1-2E 8B for 1-SI-MOV-1890B • 1H1-2N 9A for 1-SI-MOV-1890C **Directs the BOP to contact the Shift Manager/Desk SRO and have an operator briefed and dispatched to remove tags and close the breakers for 1-SI-MOV-1890 A / B / C.** **NOTE**: *Booth will close breakers after 3 min. delay*. b) LHSI to hot legs - CLOSED • 1-SI-MOV-1890A • 1-SI-MOV-1890B *When Valves Energized, the valves indicate closed*. c) SI accumulator test valves - CLOSED • HCV-SI-1850A • HCV-SI-1850B • HCV-SI-1850C • HCV-SI-1850D • HCV-SI-1850E • HCV-SI-1850F *When Checked, Valves Indicate closed*.

Event Description: LOCA Outside Containment

Cue: By Examiner.

	SRO	1-ECA-1.2 NOTE: The SRO is expected to have a Focus Brief prior to this step. The SRO will bring the BOP into the discussion concerning the expected response of the RCS when 1-SI-MOV-1890C is closed. If closure of this valve isolates the RCS break, RCS pressure and LHSI flow is expected to increase. If the break remains isolated, RCS pressure and LHSI flow will remain the same or decrease. The SRO will complete the brief and continue ECA-1.2.
	RO	2 TRY TO IDENTIFY AND ISOLATE BREAK: a) Close LHSI to cold legs • **1-SI-MOV-1890C**
	Team	**Shortly after closure of 1-SI-MOV-1890C, the Team should identify that RCS pressure and LHSI flow is increasing.**
		Critical Task **CT-4: Isolate LOCA outside of Containment before power is lost to 1-SI-MOV-1890C.**
	SRO	b) Check RCS pressure – INCREASING
	RO	*RO will identify RCS pressure increasing.*
		c) Place LHSI pumps in PTL
		Places LHSI pumps in PTL.
	RO	d) Close LHSI pump suctions from RWST • 1-SI-MOV-1862A
	SRO	• 1-SI-MOV-1862B
		Closes 1-SI-MOV-1862A / B.
		e) GO TO 1-E-1, LOSS OF REACTOR OR SECONDARY COOLANT
		SRO Transitions to 1-E-1.

Event Description: LOCA Outside Containment

Cue: By Examiner.

	SRO	Conducts a Brief summarizing the Event and Establish priorities. The RO/BOP will report Annunciators received related to the event, and Critical Parameters affected. STA will have no input for the brief.
		1-E-1
	SRO	1. CHECK RCP TRIP AND MINIFLOW RECIRC CRITERIA: a) Charging Pumps - AT LEAST ONE RUNNING AND FLOWING TO RCS
	RO	Reports Yes, 2 CH pumps running and flowing to the RCS.
	SRO	b) RCS subcooling - LESS THAN 30°F [85°F]
	RO	Reports Yes, Subcooling < 30°F
	SRO	c) Stop all RCPs
	RO	Reports Yes, all RCPs secured.
	SRO	d) RCS pressure - LESS THAN 1275 PSIG [1475 PSIG]
	RO	Reports Yes, RCS pressure < 1275 psig.
	SRO	e) Close CHG pump miniflow recirc valves: • 1-CH-MOV-1275A • 1-CH-MOV-1275B • 1-CH-MOV-1275C
	RO	Reports Yes, all CHG pump miniflow receirc valves closed.
		1-E-1
	SRO	2. CHECK IF SGs ARE NOT FAULTED: • Check pressures in all SGs: • STABLE OR RISING AND • GREATER THAN 100 PSIG
	RO	Reports Yes, All SG pressures >100 psig and stable.

Event Description: LOCA Outside Containment

Cue: By Examiner.

		1-E-1
	SRO	3. CHECK INTACT SG LEVELS: a) Narrow range level – GREATER THAN 12% [18%]
	RO	Reports actual SG level and trend
	SRO	b) Check emergency buses – BOTH ENERGIZED
	RO	Reports Yes, both emergency buses energized.
	SRO	c) Control feed flow to maintain narrow range level between 22% and 50%
	RO	Acknowledges direction to control level 22%-50%.
		1-E-1
	SRO	4. CHECK IF SG TUBES ARE NOT RUPTURED: • Condenser air ejector radiation - NORMAL • SG blowdown radiation - NORMAL
	Unit 2	Reports Yes, Unit 1 Air ejector and blowdown radiation is normal
	SRO	• SG main steam radiation - NORMAL • TD AFW pump exhaust radiation - NORMAL • SG NR Level - NOT RISING IN AN UNCONTROLLED MANNER
	RO	Reports Yes, main steam, TDAFW and SG NR levels are normal.
		1-E-1
	SRO	**CAUTION** Prior to Step 5: If any PRZR PORV opens because of high PRZR pressure, the PORV must be verified closed or isolated after pressure lowers to less than 2335 psig.
	RO	Acknowledges CAUTION.
		1-E-1
	SRO	5. CHECK PRZR PORVs AND BLOCK VALVES: a) Power to PRZR PORV block valves – AVAILABLE
	RO	Reports Yes, power to both block valves available.
	SRO	b) PRZR PORVs – CLOSED
	RO	Reports Yes, both PORVs closed.
	SRO	c) PRZR PORV block valves - AT LEAST ONE OPEN
	RO	Reports Yes, one block valve open.
		1-E-1

Event Description: LOCA Outside Containment

Cue: By Examiner.

	SRO	6. ___ CHECK IF SI FLOW SHOULD BE REDUCED: a) RCS subcooling based on CETCs - GREATER THAN 30°F [85°F]
	RO	Reports No, Subcooling is (provides actual value and trend).
	SRO	Goes to Step 7
		END EVENT 7 **END of Scenario 3**

Event Description: EOP Attachments 1-3.

Cue: Pre-event failures.

Time	Position	Applicant's Action or Behavior
	BOP	**ATTACHMENT 1 OF E-0** 1. CHECK FW ISOLATION: • Feed pump discharge MOVs – CLOSED • 1-FW-MOV-150A • 1-FW-MOV-150B • MFW pumps – TRIPPED • Feed REG valves – CLOSED • SG FW bypass flow valves – DEMAND AT ZERO • SG blowdown TVs – CLOSED
	BOP	2. CHECK CTMT ISOLATION PHASE I: • Phase I TVs – CLOSED **Identifies 1-BD-TV-100A, 1- BD-TV-100B OPEN, Closes valves** • 1-CH-MOV-1381 – CLOSED • 1-SV-TV-102A – CLOSED • PAM isolation valves – CLOSED • 1-DA-TV-103A • 1-DA-TV-103B
	BOP	3. CHECK AFW PUMPS RUNNING: a) MD AFW pumps – RUNNING (Time Delayed) b) TD AFW pump - RUNNING IF NECESSARY

Event Description: EOP Attachments 1-3.

Cue: Pre-event failures.

	BOP	**Attachment 1 of E-0** 4. CHECK SI PUMPS RUNNING: • CHG pumps – RUNNING • LHSI pumps – RUNNING **Manually Starts 1-SI-P-1A.**
	BOP	5. CHECK CHG PUMP AUXILIARIES: • CHG pump CC pump – RUNNING • CHG pump SW pump - RUNNING
	BOP	6. CHECK INTAKE CANAL: • Level - GREATER THAN 24 FT • Level - BEING MAINTAINED BY CIRC WATER PUMPS
	BOP	7. CHECK IF MAIN STEAMLINES SHOULD BE ISOLATED: a) Check if ANY of the following annunciators - HAVE BEEN LIT • E-F-10 (High Steam Flow SI) • B-C-4 (Hi Hi CLS Train A) • B-C-5 (Hi Hi CLS Train B) Identifies annunciators not lit and goes to step 8.

Event Description: EOP Attachments 1-3.

Cue: Pre-event failures.

	BOP	*8 CHECK IF CS REQUIRED: a) CTMT pressure – HAS EXCEEDED 23 PSIA 8, a) RNO Do the following: 1) IF CTMT pressure has exceeded 17.7 psia, THEN check or align the following valves: Identifies CTMT pressure remains at normal pressure 2) GO TO Step 10.
	BOP	**Attachment 1 of E-0** *10. BLOCK LOW PRZR PRESS SI SIGNAL: a) Check PRZR pressure – LESS THAN 2000 psig b) **Turn both LO PRZR PRESS & STM HDR/LINE ΔP switches to block** c) Verify Permissive Status light C-2 - LIT BOP may block the low pressurizer pressure SI signal depending on current RCS pressure.
	BOP	*11. BLOCK LOW TAVE SI SIGNAL: Step may not be performed at this time (if Tave is greater than 543°F). a) Check RCS Tave - LESS THAN 543°F b) **Turn both HI STM FLOW & LO TAVG OR LP switches to block** c) Verify Permissive Status light F-1 - LIT

Event Description: EOP Attachments 1-3.

Cue: Pre-event failures.

	BOP	**NOTE:** • CHG pumps should be run in the following order of priority: C, B, A. • Subsequent SI signals may be reset by re-performing Step 12. 12. CHECK SI FLOW: a) HHSI to cold legs - FLOW INDICATED • 1-SI-FI-1961 (NQ) • 1-SI-FI-1962 (NQ) • 1-SI-FI-1963 (NQ) • 1-SI-FI-1943 or 1-SI-FI-1943A b) Check CHG pumps - THREE RUNNING c) Reset SI. d) Stop one CHG pump and out in AUTO
	BOP	**Attachment 1 of E-0** e) RCS pressure - LESS THAN 185 PSIG RNO: e) IF two LHSI pumps are running, THEN do the following: 1) Verify reset or reset SI. 2) Stop one LHSI pump and put in AUTO.
	BOP	13. CHECK TOTAL AFW FLOW - GREATER THAN 350 GPM [450 GPM]
	BOP	14. CHECK AFW MOVs - OPEN BOP will identify that all AFW MOVS are not open and will read the RNO portion of this step and manually align valves as necessary.
	BOP	15. INITIATE SI VALVE ALIGNMENT IAW ATTACHMENT 2 See attached copy of Attachment 2. (following this attachment) Depending on timing, this attachment should be completed by The RO.

Event Description: EOP Attachments 1-3.

Cue: Pre-event failures.

	BOP	16. INITIATE VENTILATION, AC POWER, AND SFP STATUS CHECKS IAW ATTACHMENT 3 *Attachment 3 follows Attachment 2.* *Unit 2 Operator will state that Unit 2 is at 100% power (if asked)* *Unit 2 will also accept responsibility to complete Attachment 3 if it is given to Unit 2 at the point where differential pressure indications are requested.*

Event Description: EOP Attachments 1-3.

Cue: Pre-event failures.

Time	Position	Applicant's Action or Behavior
	RO	ATTACHMENT 2 of 1-E-0 **NOTE:** Components previously aligned by SI termination steps, must not be realigned by this Attachment. **CT-3: Restore HHSI flow from the RWST to the core prior to air-binding of the HHSI pumps.**
	RO	ATTACHMENT 2 of 1-E-0 1. Check opened or open CHG pump suction from RWST MOVs. • **1-CH-MOV-1115B** • **1-CH-MOV-1115D**
	RO	ATTACHMENT 2 of 1-E-0 2. Check closed or close CHG pump suction from VCT MOVs. • **1-CH-MOV-1115C** • **1-CH-MOV-1115E**
	RO	ATTACHMENT 2 of 1-E-0 3. Check running or start at least two CHG pumps. (listed in preferred order) • 1-CH-P-1C • 1-CH-P-1B • 1-CH-P-1A
	RO	ATTACHMENT 2 of 1-E-0 4. Check opened or open HHSI to cold legs MOVs. • **1-SI-MOV-1867C** • **1-SI-MOV-1867D**
	RO	ATTACHMENT 2 of 1-E-0 5 Check closed or close CHG line isolation MOVs. • 1-CH-MOV-1289A • 1-CH-MOV-1289B

Event Description: EOP Attachments 1-3.

Cue: Pre-event failures.

	RO	ATTACHMENT 2 of 1-E-0 6. Check closed or close Letdown orifice isolation valves. • 1-CH-HCV-1200A • 1-CH-HCV-1200B • 1-CH-HCV-1200C
	RO	ATTACHMENT 2 of 1-E-0 7. Check opened or open LHSI suction from RWST MOVs. • 1-SI-MOV-1862A • 1-SI-MOV-1862B
	RO	ATTACHMENT 2 of 1-E-0 8. Check opened or open LHSI to cold legs MOVs. • 1-SI-MOV-1864A • 1-SI-MOV-1864B
	RO	ATTACHMENT 2 of 1-E-0 9. Check running or start at least one LHSI pump. • 1-SI-P-1A • 1-SI-P-1B
	RO	ATTACHMENT 2 of 1-E-0 10. Check High Head SI flow to cold legs indicated. • 1-SI-FI-1961 • 1-SI-FI-1962 • 1-SI-FI-1963 • 1-SI-FI-1943 or 1-SI-FI-1943A
	RO	ATTACHMENT 2 of 1-E-0 11. IF flow not indicated, THEN manually start pumps and align valves. IF flow NOT established, THEN consult with Shift Supervision to establish another high pressure injection flow path while continuing with this procedure. • Alternate SI to Cold legs • Hot leg injection

Event Description: EOP Attachments 1-3.

Cue: Pre-event failures.

NUMBER 1-E-0	ATTACHMENT TITLE	ATTACHMENT 3
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1. ___ Check or place REFUEL SFTY MODE switches in NORMAL.

2. ___ Check ventilation alignment IAW Tables 1 and 2.

TABLE 1
UNIT #1 VENTILATION PANEL

	MARK NUMBER	EQUIPMENT STATUS
☐	1-VS-F-4A & B	OFF
☐	1-VS-HV-1A & B	OFF
☐	1-VS-F-8A & B	OFF
☐	1-VS-F-9A & B	GREEN
☐	1-VS-F-59	GREEN
☐	1-VS-F-6	OFF
☐	1-VS-F-39	GREEN
☐	1-VS-F-7A & B	GREEN
☐	1-VS-HV-5	GREEN
☐	1-VS-F-56A & B	GREEN
☐	1-VS-F-40A & B	GREEN
☐	1-VS-HV-4	OFF
☐	2-VS-F-40A or B	RED
☐	2-VS-HV-4	OFF

Event Description: EOP Attachments 1-3.

Cue: Pre-event failures.

NUMBER 1-E-0	ATTACHMENT TITLE	ATTACHMENT 3
REVISION 71	AUXILIARY VENTILATION, AC POWER, AND SFP STATUS CHECKS	PAGE 2 of 6

TABLE 2
VNTX PANEL

MARK NUMBER	EXPECTED EQUIPMENT STATUS	RESPONSE NOT OBTAINED
☐ a. AOD-VS-107A & B AOD-VS-108	RED GREEN	☐ a. Place AUX BLDG CENTRAL AREA MODE switch to FILTER.
☐ b. MOD-VS-100A & B AOD-VS-106	RED GREEN	☐ b. • Place MOD-VS-100A to FILTER. • Place MOD-VS-100B to FILTER.
☐ c. MOD-VS-200A & B AOD-VS-206	GREEN RED	☐ c. • Place MOD-VS-200A to UNFILTER. • Place MOD-VS-200B to UNFILTER.
☐ d. AOD-VS-103A & B AOD-VS-104	GREEN GREEN	☐ d. • Place AOD-VS-103A in UNFILTER. • Place AOD-VS-103B in UNFILTER. • Place AOD-VS-104 in FILTER.
☐ e. AOD-VS-101A & B AOD-VS-102	GREEN GREEN	☐ e. Place AOD-VS-101A and 101B in UNFILTER.
☐ f. AOD-VS-111A & B	GREEN	☐ f. Place COMBINE CONTAINMENT EXHAUST in ISOLATE.
☐ g. AOD-VS-110	GREEN	☐ g. Place AOD-VS-109A and 109B in FILTER.
☐ h. AOD-VS-112A & B	GREEN	☐ h. • Place AOD-VS-112A in CLOSE. • Place AOD-VS-112B in CLOSE.
☐ i. MOD-VS-58A & B 1-VS-F-58A & B	RED RED	☐ i. Start 1-VS-F-58A and 1-VS-F-58B.

3. ___ Check filtered exhaust flow: (as read on FI-VS-117A and FI-VS-117B)

☐ • Total flow - GREATER THAN 32400 cfm

AND

☐ • Flow through each filter bank - LESS THAN 39600 cfm

Event Description: EOP Attachments 1-3.

Cue: Pre-event failures.

NUMBER 1-E-0	ATTACHMENT TITLE	ATTACHMENT 3
REVISION 71	AUXILIARY VENTILATION, AC POWER, AND SFP STATUS CHECKS	PAGE 3 of 6

4. ___ Check all Station Service Buses - ENERGIZED. IF NOT, THEN initiate 1-AP-10.07, LOSS OF UNIT 1 POWER.

5. ___ Check annunciator VSP-J2 - LIT.

6. ___ Check Unit 1 RSST LTC time delay bypass light - LIT.

7. ___ Check stopped or stop 1-VS-AC-4.

8. ___ Place 1-VS-43-VS103X, MCR ISOLATION switch to the OFF position.

9. ___ Check closed or close MCR isolation dampers.
   - ☐ • 1-VS-MOD-103A
   - ☐ • 1-VS-MOD-103B
   - ☐ • 1-VS-MOD-103C
   - ☐ • 1-VS-MOD-103D

Event Description: EOP Attachments 1-3.

Cue: Pre-event failures.

NUMBER 1-E-0	ATTACHMENT TITLE	ATTACHMENT 3
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* *

CAUTION: • Only one Emergency Supply Fan must be started in the following step.

- Chilled Water flow to the in-service Unit 1 MCR AHU must be throttled to at least 15 gpm when the Emergency Supply fan is started.
- Chilled Water flow to the in-service Unit 2 MCR AHU must be throttled to at least 25 gpm when the Emergency Supply fan is started.
- An Emergency Supply Fan must not be started if the filter is wet.

* *

10. Immediately start ONE Emergency Supply Fan IAW the following: (1-VS-F-41 or 2-VS-F-41 preferred)

a. IF 1-VS-F-41, CONT RM EMERG SUP FAN, will be used, THEN perform the following substeps.

___ 1. Open 1-VS-MOD-104A, CONT RM EMERG SUP MOD.

___ 2. Start 1-VS-F-41.

b. IF 2-VS-F-41, CONT RM EMERG SUP FAN, will be used, THEN perform the following substeps.

___ 1. Open 2-VS-MOD-204A, CONT RM EMERG SUP MOD.

___ 2. Start 2-VS-F-41.

c. IF 1-VS-F-42, CONT RM EMERG SUP FAN, will be used, THEN perform the following substeps.

___ 1. Open 1-VS-MOD-104B, CONT RM EMERG SUP MOD.

___ 2. Start 1-VS-F-42.

d. IF 2-VS-F-42, CONT RM EMERG SUP FAN, will be used, THEN perform the following substeps.

___ 1. Open 2-VS-MOD-204B, CONT RM EMERG SUP MOD.

___ 2. Start 2-VS-F-42.

e. ___ Adjust Chilled Water flow to MCR AHUs IAW Step 10 Caution.

Event Description: EOP Attachments 1-3.

Cue: Pre-event failures.

NUMBER 1-E-0	ATTACHMENT TITLE	ATTACHMENT 3
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11. ___ Check readings on the following Differential Pressure Indicators - POSITIVE PRESSURE INDICATED.
    - ☐ • PDI-VS-100, D.P.-U1CR/U1TB (Unit 2 Turbine Ventilation Panel)
    - ☐ • PDI-VS-101, D.P.-U1RR/U1TB (Unit 2 Turbine Ventilation Panel)
    - ☐ • PDI-VS-200, D.P.-U2CR/U2TB (Unit 2 Turbine Ventilation Panel)
    - ☐ • PDI-VS-201, D.P.-U2RR/U2TB (Unit 2 Turbine Ventilation Panel)
    - ☐ • 1-VS-PDI-118 (Unit 1 Computer Room)
    - ☐ • 1-VS-PDI-116 (Near Unit 1 Semi-Vital Bus)
    - ☐ • 2-VS-PDI-215 (Unit 2 AC Room)
    - ☐ • 2-VS-PDI-206 (Near Unit 2 Semi-Vital Bus)

Unit 2 will indicate that the four external MCR pressure indicators read the same as the internal indicators.

12. ___ IF any reading NOT positive, THEN initiate Attachment 6 to secure MCR boundary fans.

13. ___ Check initiated or initiate 0-AP-50.00, OPPOSITE UNIT EMERGENCY.

Unit 2 will state that Unit 2 conditions are normal and 0-AP-50.00 inititated.

14. ___ Check the following MCR and ESGR air conditioning equipment operating. IF NOT, THEN start equipment within 1 hour IAW the appropriate subsection of 0-OP-VS-006, CONTROL ROOM AND RELAY ROOM VENTILATION SYSTEM.
    - ☐ • One Control Room chiller
    - ☐ • One Unit 1 Control Room AHU
    - ☐ • One Unit 2 Control Room AHU
    - ☐ • One Unit 1 ESGR AHU
    - ☐ • One Unit 2 ESGR AHU

15. ___ IF both of the following conditions exist, THEN check that Load Shed is activated.
    - ☐ • Unit 2 - SUPPLIED BY RSST
    - ☐ • Unit 2 RCPs - RUNNING

16. ___ IF Load Shed is required and not activated, THEN initiate 0-AP-10.10, LOSS OF AUTO LOAD SHED.

Event Description: EOP Attachments 1-3.

Cue: Pre-event failures.

NUMBER 1-E-0	ATTACHMENT TITLE	ATTACHMENT 3
REVISION 71	AUXILIARY VENTILATION, AC POWER, AND SFP STATUS CHECKS	PAGE 6 of 6

NOTE:
- SFP checks should be initiated WITHIN ONE TO TWO HOURS of EOP entry.
- Loss of power may render SFP indications and alarms non-functional and require local checks. Power supplies are as follows:
  - TI-FC-103, Unit 1 Semi-Vital Bus
  - TI-FC-203, Unit 2 Semi-Vital Bus
  - 1-FC-LIS-104, Panel 1ABDA1
- Loss of AC Power to the SFP level indicator is indicated if both low and high level alarms are in simultaneously. (0-VSP-C4 and 0-VSP-D4)
- 1-DRP-003, CURVE BOOK, provides a graph for SFP time to 200°F if loss of SFP cooling occurs.

Unit 2 will assume responsibility for the remainder of the Attachment.

17. ___ Initiate monitoring SFP parameters:
    - ☐ • SFP level - Greater than Cooling Pump suction AND Stable
    - ☐ • SFP temperature - Stable or Lowering
    - ☐ • SFP Cooling Pumps - Either Running
    - ☐ • Component Cooling - Normal
    - ☐ • SFP Radiation - Normal

18. ___ Continue to monitor parameters every one to two hours or until authorized to terminate monitoring by the Station Emergency Manager and/or the Shift Manager.

19. ___ Notify the Station Emergency Manager and/or the Shift Manager of the status and trend of SFP parameters.

20. ___ IF any abnormality or adverse trend is identified, THEN initiate 0-AP-22.02, MALFUNCTION OF SPENT FUEL PIT SYSTEMS.

FOLDOUT PAGES FOR REFERENCED PROCEDURES

NUMBER 1-E-0	CONTINUOUS ACTIONS PAGE	REVISION 71

1. RCP TRIP CRITERIA
   Trip all RCPs if BOTH conditions listed below occur:
   a. Charging Pumps - AT LEAST ONE RUNNING AND FLOWING TO RCS
   b. RCS Subcooling - LESS THAN 30°F [85°F]

2. MINIFLOW RECIRC CRITERIA
   a. CLOSED - When RCS pressure is less than 1275 psig [1475 psig] AND RCP Trip Criteria are met (RCPs OFF).
   b. OPEN - When RCS pressure is greater than 2000 psig.

3. ADVERSE CONTAINMENT CRITERIA
   Use Adverse Containment setpoints if EITHER condition listed below occurs:
   - Containment Pressure - GREATER THAN 20 PSIA
   - Containment Radiation - GREATER THAN 1.0E5 R/HR

4. COLD LEG RECIRCULATION SWITCHOVER CRITERIA
   GO TO 1-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, if RWST level lowers to less than 20%.

---

1. AMSAC RESET CRITERIA
   AMSAC may be manually reset when level in all three SGs is greater than 13% or six minutes have elapsed since the Reactor trip. When AMSAC is reset, AMSAC ARMED annunciator H-D-1 should clear and affected components may be realigned as needed.

2. TD AFW PUMP SHUTDOWN CRITERIA
   The TD AFW pump may be secured when SG NR level is greater than 22% in at least 2 SGs, AMSAC is reset, and no auto-start signal exists. To secure the pump, the pump SOV control switches must be taken to OPEN-RESET and then to CLOSE.

3. MANUAL SI ALIGNMENT
   If SI fails to automatically align, Attachment 2 may be used for guidance on manual SI valve alignment.

4. * TRANSIENT AFW FLOW CONTROL (IF SI in progress)
   Attachment 7 may be used for guidance on transient AFW flow control.

5. * FAULTED SG ISOLATION AND AFW FLOW CONTROL (IF SI in progress)
   Attachment 8 may be used for guidance on faulted SG(s) isolation and AFW flow control.

6. * RUPTURED SG ISOLATION AND AFW FLOW CONTROL (IF SI in progress)
   Attachment 9 may be used for guidance on ruptured SG(s) isolation and AFW flow control.

7. * LOSS OF RCP SUPPORT CONDITIONS
   Trip RCPs if a loss of a support condition occurs. (for example, loss of CC)

* Preemptive Actions

FOLDOUT PAGES FOR REFERENCED PROCEDURES

NUMBER	CONTINUOUS ACTION STEPS	REVISION
1-E-0		71

1. Check RCS Average Temperature - STABLE AT OR TRENDING TO 547°F. (E-0, Step 6)
2. Monitor RCP Trip and Miniflow Recirc Criteria. (E-0, Step 8)
3. Check SG Narrow Range Level - ANY SG GREATER THAN 12%. (Control feed flow to maintain Narrow Range Level between 22% and 50%) (E-0, Step 25)
4. Monitor LHSI pumps and secure as necessary. (E-0, Step 30)

NOTE: Subsequent SI signals may be reset by reperforming Step 12 of Attachment 1.

5. Monitor CTMT pressure and check CLS initiation as necessary. (Attachment 1, Step 8)
6. Monitor RWST level and check RS initiation as necessary. (Attachment 1, Step 9)
7. Block Low PRZR Pressure SI signal when less than 2000 psig. (Attachment 1, Step 10)
8. Block Low Tave SI signal when less than 543°F. (Attachment 1, Step 11)

FOLDOUT PAGES FOR REFERENCED PROCEDURES

CONTINUOUS ACTIONS PAGE FOR 1-E-1

1. RCP TRIP CRITERIA
   Trip all RCPs if BOTH conditions listed below occur:
   a. Charging Pumps - AT LEAST ONE RUNNING AND FLOWING TO RCS
   b. RCS Subcooling - LESS THAN 30°F [85°F]

2. SI REINITIATION CRITERIA
   Following SI termination or SI flow reduction, manually start SI pumps and align valves as necessary if EITHER condition listed below occurs:
   - RCS subcooling based on CETCs - LESS THAN 30°F [85°F]
   - PRZR level - CANNOT BE MAINTAINED GREATER THAN 22% [50%]

3. MINIFLOW RECIRC CRITERIA
   a. CLOSED - When RCS pressure is less than 1275 psig [1475 psig] AND RCP Trip Criteria are met (RCPs OFF).
   b. OPEN - When RCS pressure is greater than 2000 psig.

4. ADVERSE CONTAINMENT CRITERIA
   Use Adverse Containment setpoints if EITHER condition listed below occurs:
   - Containment Pressure - GREATER THAN 20 PSIA
   - Containment Radiation - GREATER THAN 1.0E5 R/HR

5. SECONDARY INTEGRITY CRITERIA
   Manually start SI pumps as necessary and GO TO 1-E-2, FAULTED STEAM GENERATOR ISOLATION, if any SG pressure is lowering in an uncontrolled manner or has completely depressurized, and has not been isolated.

6. E-3, TRANSITION CRITERIA
   Manually start SI pumps as necessary and GO TO 1-E-3, STEAM GENERATOR TUBE RUPTURE, if any SG level rises in an uncontrolled manner or any SG has abnormal radiation.

7. COLD LEG RECIRCULATION SWITCHOVER CRITERIA
   GO TO 1-ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, if RWST level lowers to less than 20%.

8. AFW SUPPLY SWITCHOVER CRITERIA (Refer to Attachment 5)
   Transfer to one of the following alternate AFW water supplies if ECST level lowers to less than 20%.
   a. 1-CN-TK-2, using 1-CN-150.
   b. 1-CN-TK-3, using AFW Booster Pumps.
   c. AFW Crosstie.
   d. Firemain.

9. RCP SEAL INJECTION CRITERIA

   Seal Injection flow should be maintained to all RCPs.

10. LOSS OF RCP SUPPORT CONDITIONS
    Trip RCPs if a loss of a support condition occurs. (for example, loss of CC)

SIMULATOR OPERATOR'S GUIDE

Simulator Setup

Initial Conditions:

Recall IC -375 **and implement TRIGGER #30 to activate all passive malfunctions and verify Trigger #30 implemented.**

Open the SimView window and add the following points to it:

- asp_ao_off, chli112, chli115, u0981, u0982, u0983

Enter the following MALFUNCTIONS:

Malfunction	Delay	Ramp	Trigger	Value	Final	Trigger Type (Auto or Manual)
BD01, DISABLE BDTV100A AUTO CLOSURE			30		TRUE	
BD02, DISABLE BDTV100B AUTO CLOSURE			30		TRUE	
VS0101, PRESSURE SWITCH VS-P-127A STUCK AS IS			30		TRUE	
SI34, DISABLE SI-MOV-1867C AUTO OPEN			30		TRUE	
SI35, DISABLE SI-MOV-1867D AUTO OPEN			30		TRUE	
CA03, DISABLE IA-TV-101A AUTO CLOSURE			30		TRUE	
CA06, DISABLE IA-TV-101B AUTO CLOSURE			30		TRUE	
CH50, DISABLE CH-MOV-1115B AUTO OPEN			30		TRUE	
CH51, DISABLE CH-MOV-1115C AUTO CLOSED			30		TRUE	
CH52, DISABLE CH-MOV-1115D AUTO OPEN			30		TRUE	
CH53, DISABLE CH-MOV-1115E AUTO CLOSED			30		TRUE	
FP0301, FPS FACP07 ALARM HORN FAILURE			30		TRUE	
FP0302, FPS PC SPEAKER FAILURE			30		TRUE	
RM0201, PROCESS RAD MONITOR RI-RMS-160 FAILURE	10	60	1		-1	MAN
RC4802, PRZR PRESS CONT XMTR FAILURE (445)	10		3		1	MAN
FW1303, A S/G NAR RNG LVL XMTR LT-476 CH-3 FAILS	10	30	5		1	MAN

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SW0401, OVERLOAD TRIP OF PUMP SW-P-10A	10		7		TRUE	MAN
SW0402, DISABLE SW-P-10B AUTO START			7		TRUE	MAN
SI1601, FAIL CHECK VALVES SI-79			11		TRUE	MAN
SI1604, FAIL CHECK VALVES SI-241			11		TRUE	MAN
SI1502, SI COLD LEG HDR LEAK UPSTRM MOV-SI-1890C	10	60	11		20	MAN
CH0901, BORON XFER PP CH-P-2A THRML OVRLOAD TRIP	5:00		11		TRUE	MAN

Enter the following Remote Functions:

Override	Set Condition	Trigger
SIMOV890A, BKR SI-MOV-1890A	CLOSED	15
SIMOV890B, BKR SI-MOV-1890B	CLOSED	15
SIMOV890C, BKR SI-MOV-1890C	CLOSED	15

TRIGGER	TYPE	DESCRIPTION
1	MAN	Initiates RM0201, RI-160 failure
3	MAN	Initiates RC4802, Pressurizer press transmitter 455 failure
5	MAN	Initiates FW1303, A S/G LT-476 failure
7	MAN	Initiates SW0401, SW1202; SW-P-10A failure with auto start failure
11	MAN	Initiates LOCA outside Ctmt. with failure of Boron Xfer pump
30	PRE SCENARIO	Initiates failures to; CH-MOV-1115B-E, SI-MOV-1867C/D, BDTV100A/B, 1-VS-F-58A, IA-TV-101A/B, and Fire protection.

SIMULATOR OPERATOR'S GUIDE

Verify the following control room setup:

- ❑ Place the simulator in RUN and verify normal 100% power operation indications.
- ❑ Reset the ROD CONTROL SYSTEM
- ❑ Verify Controlling channels selected to **IV**
- ❑ Verify Red Magnets on the following components:

1-CH-P-1B, 'B' Chg pump

- ❑ Verify 1-RM-RI-112 aligned to A/B SG and 1-RM-RI-113 aligned to C SG (magnets).
- ❑ Verify Ovation System operating.
- ❑ Reset ICCMs.
- ❑ Verify Component Switch Flags.
- ❑ Verify Brass Caps properly placed.
- ❑ Verify SG PORVs set for 1035 psig.
- ❑ Verify Rod Control Group Step Counters indicate properly.
- ❑ Verify Ovation CRT display.
- ❑ Advance Charts
- ❑ Verify Turbine Thumb Wheel Settings @120 rpm/min and Position 6
- ❑ Verify Containment Instrument Air Compressors are on Inside Suction (all RMs reset)
- ❑ Verify all ARPs have been cleaned

❑ 1B-F3	❑ 1C-B8	❑ 1C-D8	❑ 1C-F7
❑ 1C-F8	❑ 1D-C5	❑ 1D-E5	❑ 1D-G5
❑ 1D-H4	❑ 1F-C7	❑ 1F-C10	❑ 1F-D7
❑ 1H-A5	❑ 1H-E5	❑ 1H-G5	❑ RMA-D7
❑ RMA-Q8	❑ RMA-R8	❑	❑

- ❑ Verify CLEAN copies of the following procedures are in place:

❑ 1-OP-EH-001	❑ 0-AP-53.00	❑ 1-AP-31.00	❑ 0-AP-12.00

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❑ 0-AP-23.00	❑ 1-AP-16.00	❑ 1-E-0	❑ 1-E-1
❑ 1-ECA-1.2	❑	❑	❑

❑ **Verify Reactivity Placard is current.**

❑ Verify ALL PINK MAGNETS are accounted for.

❑ Reset Blender Integrators for Boric Acid to 100 and PG 1000.

Brief

This simulator performance scenario is performed in the EVALUATION MODE. You should not direct questions to the evaluators. Otherwise, you should perform as if you were in the MCR.

Your ability to maintain a log is not being graded, but maintaining a rough log is recommended to help during briefs.

If you need to communicate with the Unit 2 operator, verbally state, "Unit 2" and an instructor will locate to the Unit 2 area and respond to you as quickly as possible.

In the unlikely event that the simulator fails such that illogical indications result, the session will be terminated. In other words, respond to what you see. If there is a problem with the simulation, the session will be terminated or adjusted as appropriate based on the specific problem.

Assign operating positions.

Ask for and answer questions.

Conduct shift turnover:

The initial conditions have Unit 1 at 100% power with RCS boron concentration of 760 ppm.

Unit conditions have been stable at approximately 100% power since the last refueling outage.

All systems and crossties are operable with the following exception:

- Containment Smoke and heat detectors are non-functional due to local fire panel failure. TRM Section 3.3.1, Fire Detection Instrumentation, Condition B, Smoke Detectors, and Condition C, Heat Detectors is in effect. Containment air temperatures monitored once/hour, and restore to Functional status in 14 days.
- 'C' Charging pump running on Alt, 'A' Charging pump is in Auto, 'B' Charging pump is tagged out for breaker PMs.
- SGWLC and Pimp Controlling channels have been shifted to CH IV in preparation for Channel III testing

Unit #2 is at 100% power with all systems and crossties operable.

The last shift performed two 30 gallon dilutions, followed by manual makeups.

Shift orders are to maintain 100% power on Unit 1, and swap EH pumps IAW 1-OP-EH-001, Section 5.6.

Session Conduct:

- Ensure conditions in Simulator Set-up are established.
- **Ensure Trigger 30 is active prior to team entering the simulator.**
- Verify Exam Security has been established and ASP_AO_OFF = True.

EVENT 1 Swap EH Pumps, section 5.6, 1-OP-EH-001.

BOOTH:
30 minutes prior to the beginning of the scenario, provide the team with a copy of 1-OP-EH-001, ELECTRO-HYDRAULIC FLUID SYSTEM (EHC). The team will pre-brief the OP prior to entering the simulator.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the completion of the evolution.

Field Operator: (*2 minute delay from request to answer*)

- **If Contacted**, EHC skid is clear of personnel.
- **If Contacted,** MP-2 is running normally.
- **If Contacted,** MP-1 is normal after stop.

Booth Note: **Recommend to Chief Evaluator that Trigger 1** (RM0201) be initiated at the start of 10OP-EH-001. This will cause RM-160 to fail low but there will not be an alarm for 5 minutes.

Role play as other individuals as needed.

EVENT 2 **Particulate and gas RM fail low, No Auto Actions.**

When cued by examiner, implement **Trigger #1**.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the failure of the automatic actions on RM-160 Alert/Failure alarm.
- **If contacted,** will take responsibility for writing the WR and CR.

Unit 2 Operator:

- **When** radiation alarms sound on the radiation alarm panel, silence the alarms and report the alarm to the Unit 1 SRO.
- **If directed to perform the ARP,** inform the Unit 1 SRO that you can't because you are busy with a surveillance procedure.

Field Operators:

- **If directed,** field operators will perform local manipulations as required.

Role play as other individuals as needed.

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EVENT 3 **1-RC-PT-1445 Fails High, 1-AP-31.00/0-AP-53.00**

When cued by examiner, implement **Trigger #3**.

Booth Note: **Critical Task CT-1:**
PORV 1-RC-PCV-1456 must be closed prior to Reactor trip (OTΔT). This will occur in approximately 30 seconds.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the failure of 1-RC-PT-1445. The individual(s) contacted will also acknowledge any TS LCOs and entry into AP-53.00/AP-31.00.
- **If contacted,** will take responsibility for writing the CR.

STA:

- **If contacted**, will acknowledge the failure of 1-RC-PT-1445. The individual(s) contacted will also acknowledge (but not confirm/deny) any TS LCOs.
- **If asked,** the STA will review VPAP-2802 and TRM Section 3.3 and report completion of the review and this failure does not impact these documents.
- **If contacted,** will take responsibility for writing the CR.
- **If the team has a transient brief:** The STA will have no input for the brief; will acknowledge SRO direction to monitor RCS pressure, if given.

Field Operators:

No feedback required for this failure.

Maintenance/Work Week Coordinator:

- **If contacted**, will acknowledge instrumentation failure and commence investigations.

Unit 2 Operator:

If Contacted, acknowledge the failure of 1-RC-PT-1445.

Role play as other individuals as needed.

EVENT 4 **A SG NR Level Channel III fails HIGH.**

When cued by examiner, implement **Trigger #5**.

Booth Note: **Critical Task CT-2:**
Should the BOP fail to take action to control A SG NR level, an automatic reactor trip will occur. This would be considered failure criteria.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the failure of 1-FW-LT-1476. The individual(s) contacted will also acknowledge any TS LCOs and entry into AP-53.00.
- **If contacted,** will take responsibility for writing the CR.
- **If contacted,** will recommend waiting for I&C to be ready to perform 0-OP-RP-001

STA:

- **If contacted**, will acknowledge the failure of 1-FW-LT-1476. The individual(s) contacted will also acknowledge (but not confirm/deny) any TS LCOs.
- **If asked,** the STA will report that 1-FW-LT-1476 is a Reg. Guide 1.97 component. The STA will also report that upon review of CEP 99-0029 that only one channel of SG level indication is required per SG, so no actions for Reg. Guide 1.97 are required.
- **If asked,** the STA will review VPAP-2802 and TRM Section 3.3 and report that he has completed his review and this failure does not impact these documents.
- **If contacted,** will take responsibility for writing the CR.
- **If the team has a transient brief:** The STA will have no input.

SIMULATOR OPERATOR'S GUIDE

Maintenance:

- **If contacted**, will acknowledge instrumentation failure and commence investigations and/or repair efforts.

Field Operators:

- **If contacted**, field operators will report no issues at the MFRVs.

Unit 2:

- If team directs performance of 1-OPT-RX-007, Shift Average Power Calculation, state that you will have the 4th RO perform the procedure.

Role play as other individuals as needed.

EVENT 5 Trip of running 1-SW-P-10A with failure of 1-SW-P-10B auto start.

When cued by examiner, implement **Trigger #7**.

Operations Supervisor/Management:

- **If contacted**, acknowledge trip of 1-SW-P-10A and the failure of 1-SW-P-10B to auto start.
- **If asked,** will notify the OMOC and Maintenance.
- **When notified,** acknowledge Tech Spec requirements for the 1-SW-P-10A tripping, but do not imply concurrence with SRO Tech Spec determination.
- **If asked,** will recommend ramping unit off line.

STA:

- **If contacted**, acknowledge the trip of 1-SW-P-10A, acknowledge the Tech Spec requirements for the pump trip, but do not imply concurrence with the Tech Spec determination by the SRO.
- **If the team has a transient brief:** The STA will have no input.

Field Operators: (Wait three minutes between direction to perform local action/status check and report.)

- **If contacted**, 1-SW-P-10A will have no local indications for cause of the trip.
- **When contacted,** as Service Building Operator, MCC 1H1-1 1D (1-SW-P-10A) thermal overload will be found tripped.
- **When contacted:** 1-SW-P-10B post start checks are normal.
- **If contacted,** as Service Building Operator, MER 3 and 4 parameters are normal per AP-12.00, pages 3 and 4.
- **If contacted,** as Service Building Operator, MER 3 Chiller parameters are normal per AP-12.00 page 5
- **If contacted,** as Service Building Operator, MER 5 chiller parameters are normal per AP-12.00, page 6.
- **If contacted,** as Service Building Operator, SW chemical injection system operation is normal.

Maintenance/ Work Week Coordinator:

- **If contacted**, will notify Electricians to troubleshoot the cause of 1-SW-10A (MCC 1H1-1 1D breaker) overload trip.

Role play as other individuals as needed.

EVENT 6 Ramp Unit to HSD.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the ramp to HSD.
- **If contacted,** will take responsibility for writing the CR.
- **If asked** for a recommended ramp rate, ask what the Unit Supervisor recommends. When authorized by the NRC, the Shift Manager will direct a 1%/minute ramp rate.

Unit 2 Operator:

- **If notified**, acknowledge the failure and impending ramp of Unit 1.
- **If notified**, acknowledge direction to initiate 0-OP-EP-004, Load Shed.

STA:

- **If contacted**, will acknowledge the Reactivity Plan reported by the RO.
- **If contacted,** will take responsibility for writing the WR and CR.
- **If the team has a transient brief:** The STA will, "nothing to add".
- If contacted, STA review of VPAP-2802 complete, notification requirements reviewed with Shift Manager.
- **If directed**, setup SG NR level trend on PCS for BOP use.

Maintenance/ Work Week Coordinator:

- **If contacted**, will acknowledge the requirements to reduce reactor power.

Chemistry

- **If contacted,** acknowledge the ramp.

Unit 2

- **If directed**, Unit 2 to initiate 0-OP-EP-004, Load Shed, to determine required position of LOAD SHED SYS Switch, acknowledge direction.

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Field Operators:

- **If contacted**, as the Turbine Building Operator to walkdown the Turbine during the ramp, acknowledge the direction.
- **If contacted,** as the polishing building operator, acknowledge the direction to monitor polisher DP.

Role play as other individuals as needed.

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EVENT 7/8 LOCA Outside Containment, ECA-1.2

When cued by examiner, implement **Trigger #11**.

This will cause a LOCA to occur upstream of 1-SI-MOV-1890C. The break size will result in loss of power to 1-SI-MOV-1890C in approximately 30 minutes. **Monitor VD5** (Safeguards Pit) until 1-SI-MOV-1890C is isolated.

Five minutes after the LOCA starts the Boron Xfer pump 1-CH-P-2A will thermal overload. The HHSI pumps will be taking a suction on the VCT due to failures to 1-CH-MOV-1115B-E. **Monitor VCT level, and Seal Injection flow** because the HHSI pumps will be drawing down VCT at approximately 4%/minute. **Notify the Chief Examiner if Seal injection flow lowers to 0. This will be used as indication that the HHSI pump are air-bound. (Use SimView** Variables chli112/chli115 to monitor VCT level, U0981/u0982/u0983 to monitor RCP A/B/C seal injection flow).

CT-3: Restore HHSI flow from the RWST to the core prior to air-binding of the HHSI pumps.

CT-4: Isolate LOCA outside of Containment before power is lost to 1-SI-MOV-1890C.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the reactor trip failure, completion of FR-S.1, completion of E-0 Immediate Actions, and transition to ES-0.1.
- **If contacted**, will acknowledge the subsequent fault on the previously identified ruptured SG. Will also acknowledge any TS information (time permitting) and information related to radiation monitors alarming.
- **If contacted,** will take responsibility for writing the WR and CR.
- **When directed,** acknowledge direction to brief an operator, have tags removed, and breakers closed for 1-SI-MOV-1890A / B / C.

Booth:

- **When directed**, acknowledge direction to brief an operator, clear tags and close breakers for 1-SI-MOV-1890 A / B / C. Use **Trigger 15** to energize 1-SI-MOV-1890A / B / C. Report to MCR as the Service Building Operator Inside that tags have been cleared and breakers closed for 1-SI-MOV-1890A / B / C when 1-SI-MOV-1890A energized.

STA:

- **If directed**, setup PCS trends for th RO/BOP, but do not interpret or provide direction to the RO/BOP pertaining to the trends.

Unit 2 Operator:

- **If directed** to respond to radiation alarms on the radiation alarm panel, silence the alarms when and report the alarm to the Unit 1 SRO.
- **If directed** perform the associated RM ARP without leaving the confines of the Unit 2 control area. If actions or verifications are required on the Unit 1 side, inform the Unit 1 SRO of the need for an operator to complete the ARP.
- **If asked,** check of Unit 1 Air ejector and Blowdown Radiation monitors – normal.
- **When contacted by BOP,** Chilled Water has been throttled IAW the Caution prior to Step 10 of Attachment 3. MCR boundary D/P indicates the same value as Unit 2 ventilation panel D/P gauges. Unit 2 will assume responsibility for Attachment 3 when last page is reached (SFP monitoring).

Field Operators:

- **If directed,** field operators will remove tags and close breakers for 1-SI-MOV-1890A / B / C. **Insert Trigger 15.** This will result in power restored to the breakers for 1-SI-MOV-1890 A, B, and C in 3 minutes.
- **If asked** after 1SI-MOV-1890C is closed, report that the room with the break no longer has steam coming out the door vent, but considerable flow noise is still present. (this report was added during exam administration.)

Role play as other individuals as needed.

The scenario will end upon entering 1-ECA-3.1 or at the lead examiners discretion.

Appendix D **Scenario Outline** **Form ES-D-1**

NRC EXAM – SCENARIO #4

Facility: Surry Power Station Scenario No.: 4 Op-Test No.: 2016-004

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: Unit 1 at ~5%, BOL, 1415 ppm Boron. Unit 2 at 100% power

- Unit startup in progress, 1-GOP-1.8 and 1-OP-TM-001.

Turnover: The Team will pre-brief placing the generator on-line and ramping up in power prior to entering the Simulator.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R –RO/SRO N - BOP	Place Unit on-line and begin ramp up in power
2	RM0209, +.5 CC07	I– BOP/SRO TS-SRO	CC RM Fail upscale with failure auto close HCV-CC-100
3	PG0101 PG0202	C-RO/SRO	1-PG-P-1A trips on overcurrent, 1-PG-P-1B fails to auto start
4	RC1503, +1	C-RO/SRO TS-SRO	PRZR Spray fails open (AP-53.00) **(CT-1)**
5	EL0801	C-BOP/SRO	Loss of 1G Screenwell Transformer (AP-12.01)
6	EL01 ED0201 ED0602F FW47	M - ALL	Loss of Offsite Power with Failure of EDG #1 and EDG #2 (ECA-0.0) and TDAFW pump auto start failure. **(CT-2, CT-3)**

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

Event 1: **Place Unit On-Line and Ramp Up in Power**. (R – RO/SRO, N- BOP)

The Team will pre-brief 1-GOP-1.8, Unit Startup, HSD to Max Allowable Power (step 5.6.13), and 1-OP-TM-001 (step 5.7), Turbine-Generator Startup to 20% - 25% Turbine Power prior to Simulator entry. A reactivity plan will be provided for the Team use during the pre-brief and in the Simulator for the Ramp up in power. The Team will place the Unit on-line and commence a ramp up in power. A surrogate operator will be available to the Team until the FRVs are in AUTO and the Bypass valves are closed; the BOP will then assume SG level control.

Verifiable Action(s):

1) RO – Manipulate rod control and CVCS Blender to control Tave and ΔFlux during the power escalation.
2) BOP – manipulate Generator output breakers.
3) BOP – Manually control SG NR level, following relief of surrogate.

Technical Specifications/ TRM Actions/ Reg. Guide 1.97/ VPAP-2802, Reportability/ Equipment Important to Emergency Response (EP-AA-303).

Event 2: **1-CC-RI-105, CC RM, Fail high without associated auto action**. (I – BOP/SRO, TS – SRO).
After the Team has raised power, stable control of SG NR level with FRVs in auto has been achieved, and the Evaluation Team is ready, the malfunction is initiated. This failure causes 1-CC-RI-105 Alert and High alarms to actuate with the failure of HCV-CC-100, CC Surge TK VNT Isol VV, to auto close. The BOP will respond to the RM alarm and take action IAW with RM Annunciator Response Procedure.

Verifiable Actions(s):

1) BOP – Close HCV-CC-100, CC Surge Tank vent valve.

Technical Specifications:

1) Tech Spec table 3.7-5, Item 1, Component Cooling water radiation monitors close HCV-CC-100, See Specification 3.13.
2) Tech Spec 3.13.C, Whenever the component cooling water radiation monitor is inoperable, the surge tank vent valve shall remain closed.

TRM Actions/ Reg. Guide 1.97/ VPAP-2802, Reportability/ Equipment Important to Emergency Response (EP-AA-303).

None.

Event 3: **Running PG pump trips, backup PG pump fails to start.** (C – RO/SRO)
When the Evaluating Team is ready, the malfunction is implemented. This failure causes the running PG pump to trip with the backup pump failing to auto trip. The RO will diagnose the failure based on alarms and indications received, and start 1-PG-P-1B.

Verifiable Action(s):

1) RO – Start 1-PG-P-1B.

Technical Specifications/ Technical Requirements Manual/ Reg. Guide 1.97/ VPAP-2802, Reportability/ Equipment Important to Emergency Response (EP-AA-303).

None.

Event #4: **1-RC-PCV-1455B, "B" Spray valve fails Open** (C – RO/SRO, TS - SRO)
When the Evaluating Team is ready, the malfunction is initiated. The controller for the "B" Spray Valve, 1-RC-PCV-1455B, fails causing the spray valve to open fully. The RO will diagnose he failure based on alarms and indications received, place the controller in manual and reduce output to close the spray valve to allow pressure to recover. The Team will implement 0-AP-53.00, Loss of Vital Instrumentation/Controls for this failure.

Verifiable Actions:
1) RO – Place the failed controller in manual and reduce output.

Critical Task 1: If the RO fails to take timely action in response to the Spray Valve opening, an automatic reactor trip on RCS Low Pressure will occur; an unanticipated reactor trip should be considered as failure criteria. An Operations representative will be available for consultation as necessary.

Technical Specifications:
1) Tech Spec 3.12.F.2, DNB Parameters, RCS pressure < 2205 psig, Return RCS to >2205 psig within 2 hours or reduce Thermal Power to less than 5% of Rated Power within the next 6 hours.

Technical Requirements Manual/ Reg. Guide 1.97/ VPAP-2802, Reportability/ Equipment Important to Emergency Response (EP-AA-303).
None.

Event 5: **Loss of the 1G Screenwell Bus. (**C – BOP/SRO)
When the Evaluating Team is ready the malfunction is initiated. This failure causes the loss of the 1G screenwell bus which causes the loss of the running Unit 1 CW pumps. The Team will respond to the alarms received and implement 0-AP-12.01, Loss of Intake Canal Level.
Verifiable Action(s):
1) RO – Throttle the Waterbox outlet MOVs to control canal level.
2) BOP – Use PCS interface to restart Unit 1 CW pumps using Attachment 3 of 0-AP-12.01.

Technical Specifications/ Technical Requirements Manual/ Reg. Guide 1.97/ VPAP-2802, Reportability/ Equipment Important to Emergency Response (EP-AA-303).
None.

Event #6: **Loss of Offsite Power, #1/#2 EDGs fail, ECA-0.0.** (M – ALL)
When the Evaluation Team is ready, the malfunction is initiated. These failure cause a Loss of Off-site power, failure of the Air Start System for EDG #1, #2 EDG trip on overspeed on startup, and lead the Team to implement ECA-0.0. The TDAFW pump will also fail to auto start leading to a condition where no AFW is available to the SGs following the reactor trip. The Team is expected to start the TDAFW pump to control SGs level, initiate 0-AP-17.06, AAC Diesel Generator - Emergency Operations, to strip the 1J Emergency Bus and load the AAC on the 1J bus. When the AAC DG is loaded on the 1J bus, ECA-0.0 will send the Team to Step 33, where operating equipment is checked. The Team is expected to transition to ECA-0.1, Loss of All AC Power Recovery Without SI Required.
Verifiable Actions:
1) RO – Close MSTVs on Step 2 of ECA-0.0.
2) BOP – Start TDAFW pump.
3) BOP – Place components supplied by the 1J bus in PTL.
4) BOP – Load the AAC diesel on the 1J bus.

Critical Task:
1) **CT-2:** Establish AFW Flow during SBO; Establish greater than 350 gpm AFW flow before wide range level in any 2 steam generators is less than 7%.
Job Aid 17, Critical Task Development, CT-23, based on Pressurized Water Reactor Owners Group Westinghouse Emergency Response Guideline -Based

Critical Tasks (PWROG-14043-NP) Appendix B Critical Task CT-23. Old CT - ECA-0.0 – B.

2) **CT-3:** Time Critical Operator Actions, E-11, Align AAC Diesel to respective emergency prior to declaration of an ELAP.

Job Aid 17, Critical Task Development, SPS-CT-1 Re-energize an Emergency Bus on the AAC DG within 10 minutes.

Critical Task start time **begins** when crew enters ECA-0.0, and Critical Task stop time **ends** when AAC DG is loaded on the 1J bus.

The Scenario is terminated on Evaluation Team cue after power is restored to the 1J bus.

Initial Conditions:

Unit 1 at ~5% power with a startup in progress; BOL. Unit 2 is operating at 100% power with all system and cross-ties operable.

Pre-load malfunctions: (Trigger 30's)

- FW47, Disable FW-P-2 Auto Start
- CC07, Disable CC-HCV-100 Auto closure

Equipment Status/ Procedures/ Alignments/ Data Sheets/ etc.:

- 1-GOP-1.8, Unit Startup, 2% Reactor Power to Max Allowable Power.
- 1-OP-TM-001, Turbine-Generator Startup to 20% - 25% Turbine Power.
- Ramp Plan for Power Ascension.

Turnover:

Unit 1 at ~5% reactor Power, with a startup in progress.

The Team will pre-brief 1-GOP-1.8, Unit Startup, 2% Reactor Power to Max Allowable Power, and 1-OP-TM-001, Turbine-Generator Startup to 20% - 25% Turbine Power. Once in the Simulator, the Team will place Unit 1 on-line and begin ramping the Unit to 100% power. The performance of this procedure has been analyzed based on the current plant configurations and the PSA indicates green

Event	Malf. #'s	Severity	Instructor Notes and Required Feedback
1	N/A	N/A	Place unit on line and begin ramp up in power. (1-GOP-1.8, 1-OP-TM-001)
2	RM0209	+0.5	CC RM Fail upscale with failure of HCV-CC-100 to auto close.
3	PG0101 PG0202	TRUE	1-PG-P-1A trips on overcurrent, 1-PG-P-1B fails to auto start.
4	RC1503	+1	Przr spray valve fails open (0-AP-53.00) **(CT-1)**
5	EL0801	TRUE	Loss of Screenwell Transformer (0-AP-12.01)
6	EL01 ED0201 ED0602 FW47	TRUE	Loss of Offsite power with failure of EDG #1, and EDG #2. TDAFW pump failure. (ECA-0.0) **(CT-2, CT-3)**

OPERATING PLAN:

Unit 1 is stable at ~5% reactor power with RCS boron concentration of 1415 ppm.

Unit startup is progress in accordance with 1-GOP-1.8, Unit Startup, 2% Reactor Power to Max Allowable Power, and 1-OP-TM-001, Turbine-Generator Startup to 20% - 25% Turbine Power.

All systems and crossties are operable.

Unit #2 is at 100% power.

Shift orders are to place the Unit on-line and commence ramp to 100% power in accordance with 1-GOP-1.8, Unit Startup, 2% Reactor Power to Max Allowable Power, starting at Step 5.6.13; and 1-OP-TM-001, Turbine-Generator Startup to 20% - 25% Turbine Power, Section 5.7. Performance of this evolution has been authorized and has been PSA analyzed for current plant conditions.

A surrogate operator will be used for feed control until the Main Feed Reg Valves are placed in Automatic and the Feed Reg bypass valves are closed. This operator's role is limited to SG NR level control and will not be available to communicate with field operators or provide peer checks of control board operations.

PWR Scenario :

Scenario Objectives:

A. Given the Unit at ~5% reactor power, place the Unit on-line and commence a ramp up in power in accordance with 1-GOP-1.8, Unit Startup, 2% Reactor Power to Max Allowable Power, and 1-OP-TM-001, Turbine-Generator Startup to 20% - 25% Turbine Power.
B. Given a failure of RI-CC-105, respond in accordance with the ARP 0-RM-M5, and perform actions to isolate the CC Surge Tank.
C. Given a failure of the running PG pump, respond in accordance with ARP 1B-D4 and restore PG flow.
D. Given a failure of the Pressurizer spray valve, respond in accordance with 0-AP-53.00, and restore pressure to normal.
E. Given a failure of the 1G Screenwell Transformer, respond in accordance with 0-AP-12.01 and restore Canal level to normal.
F. Given a Station blackout with loss of AFW, respond in accordance with 1-ECA-0.0, and 0-AP-17.06 to restore power to 1J bus.

Scenario Sequence

Event One: Place Unit On-Line and Ramp Up in Power.

The Team will pre-brief 1-GOP-1.8, Unit Startup, HSD to Max Allowable Power, and 1-OP-TM-001, Turbine-Generator Startup to 20% - 25% Turbine Power prior to Simulator entry. A reactivity plan will be provided for the Team use during the pre-brief and in the Simulator for the Ramp up in power. The Team will place the Unit on-line and commence a ramp up in power. A surrogate operator will be available to the Team until the FRVs are in AUTO and the Bypass valves are closed; the BOP will then assume SG level control.

Malfunctions required: None

Objectives: (RO) Control reactor power per 1-GOP-1.8.

(BOP) Place the Unit on-line IAW 1-OP-TM-001

(BOP) Commence ramp up in power using Turbine controls.

Success Path: (RO) control RCS Tave using control rods and dilution. (BOP) Place Unit on-line and begin ramp up in power using turbine controls. (Team) When conditions established, place FRVs in automatic.

Event Two: 1-CC-RI-105, CC RM, Fail high without associated auto action.

After the Team has raised power, stable control of SG NR level with FRVs in auto has been achieved, and the Evaluation Team is ready, the malfunction is initiated. This failure causes 1-CC-RI-105 Alert and High alarms to actuate with the failure of HCV-CC-100, CC Surge TK VNT Isol VV, to auto close. The BOP will respond to the RM alarm and take action IAW with RM Annunciator Response Procedure

Malfunctions required: One, RM0209

Objectives: (BOP) Close HCV-CC-100, CC Surge Tank vent valve.

(SRO) Identifies Tech Spec 3.13.C is not met until the surge tank vent valve HCV-CC-100 is closed.

Success Path: HCV-CC-100, CC Surge Tank vent valve is closed.

Event Three: Running PG pump trips, backup PG pump fails to start.

When the Evaluating Team is ready, the malfunction is implemented. This failure causes the running PG pump to trip with the backup pump failing to auto start. The RO will diagnose the failure based on alarms and indications received, and start 1-PG-P-1B.

Malfunctions required: Two PG0101, PG0202

Objectives: (RO) Identifies loss of running PG pump and failure of the standby pump to auto start. RO manually starts 1-PG-P-1B.

Success Path: Standby PG pump is started.

Event Four 1-RC-PCV-1455B, "B" Spray valve fails Open (C – RO/SRO, TS - SRO)

When the Evaluating Team is ready, the malfunction is initiated. The controller for the "B" Spray Valve, 1-RC-PCV-1455B, fails causing the spray valve to open fully. The RO will diagnose the failure based on alarms and indications received, place the controller in manual and reduce output to close the spray valve to allow pressure to recover. The Team will implement 0-AP-53.00, Loss of Vital Instrumentation/Controls for this failure.

Malfunctions required: One, RC1503

Objectives: (RO) Identify failure of Spray controller, takes spray controller to MAN and restores pressure to normal band.

(SRO) Direct actions of 0-AP-53.00. Identify Tech Spec 3.12.F.2, DNB Parameters, RCS pressure < 2205 psig, Return RCS to >2205 psig within 2 hours or reduce Thermal Power to less than 5% of Rated Power within the next 6 hours.

Critical Task 1: If the RO fails to take timely action in response to the Spray Valve opening, an automatic reactor trip on RCS Low Pressure will occur; an unanticipated reactor trip should be considered as failure criteria. An Operations representative will be available for consultation as necessary

Success Path: Stop lowering RCS pressure by closing spray valve, and restore Pressurizer pressure to normal.

Event Five: Loss of the 1G Screenwell Bus. (C – BOP/SRO)

When the Evaluating Team is ready the malfunction is initiated. This failure causes the loss of the 1G screenwell bus which causes the loss of the running Unit 1 CW pumps. The Team will respond to the alarms received and implement 0-AP-12.01, Loss of Intake Canal Level.

Malfunctions required: One, EL0801

Objectives: (BOP) Identify loss of Screenwell transformer. Start Unit 1 CW pumps per 0-AP-12.01.

(RO) Throttle Waterbox outlet MOVs to control canal level.

(SRO) Direct actions per 0-AP-12.01.

Success Path: Restart Unit 1 CW pumps IAW 0-AP-12.01.

Event Six: Loss of Offsite Power, #1/#2 EDGs fail, ECA-0.0.

When the Evaluation Team is ready, the malfunction is initiated. These failure cause a Loss of Off-site power, failure of the Air Start System for EDG #1, #2 EDG trip on overspeed on startup, and lead the Team to implement ECA-0.0. The TDAFW pump will also trip on startup leading to a condition where no AFW is available to the SGs following the reactor trip. The Team is expected to start the TDAFW pump to control SGs level, initiate 0-AP-17.06, AAC Diesel Generator - Emergency Operations, to strip the 1J Emergency Bus and load the AAC on the 1J bus. When the AAC DG is loaded on the 1J bus, ECA-0.0 will send the Team to Step 33, where operating equipment is checked. The Team is expected to transition to ECA-0.1, Loss of All AC Power Recovery Without SI Required

Malfunctions required: Four; EL01, ED0201, ED0602, and FW47

Objectives: (RO) Perform immediate actions of ECA-0.0. Close MSTVs.

(BOP) Start TDAFW pump. Strip the 1J bus. Load the AAC diesel on the 1J bus per AP-17.06.

(SRO) Direct actions per ECA-0.0 to restore power to 1J bus.

Success Path: AFW is restored to the SGs. Power is restored to the 1J bus.

The Scenario is terminated once power is restored to 1J bus as determined by NRC Lead evaluator.

Scenario Recapitulation

Total Malfunctions: 10
Abnormal Events: 5, (ARP RM-M5, ARP 1D-B4, 0-AP-53.00, 0-AP-12.01, 0-AP-17.06)
Major Transients: 1
EOPs Entered: 0
EOP Contingencies: 1 (ECA-0.0)

Event Description: .Place Unit on line and ramp up in power.

Cue: When team ready.

Time	Position	Applicant's Action or Behavior
		1-GOP-1.8
	Team	Team will pre-brief Initial Conditions, Precautions and Limitations, and procedure prior to entering simulator.
		1-GOP-1.8
		1-OP-CH-021 (*Alternate Dilution Using Blender*) procedure steps are contained in this guide starting at page 20.
	RO	5.6.13 IF the Steam Dumps are in Auto in Steam Pressure Mode, THEN do the following. Otherwise, enter N/A.
		a. **Increase Reactor power to approximately 6% -10% by withdrawing the Control Rods and/or using chemical shim.**
	BOP	b. Check that the Steam Dumps come open to maintain Steam Header pressure at approximately 1005 psig.
	BOP	5.6.14 Check that condenser pressure will be equal to or less than 3.5 inches of Hg pressure (or greater than 26.5 inches of Hg vacuum) before synchronization.
	BOP	5.6.15 Notify the System Operator and Energy Supply (MOC) that the unit is coming on line.
		5.6.16 Check that at least five Polishing beds are in service. *CP operator will report 6 polishers in service.*
		1-GOP-1.8
	SRO	Note prior to Step 5.6.17: • Hotwell temperature should be greater than 70°F before synchronization. This recommended temperature is based on a North Anna Reactor trip caused by low feedwater temperature.
		1-GOP-1.8
	SRO	5.6.17 Synchronize the Generator with the bus in accordance with 1-OP-TM-001, Subsection 5.7, Synchronizing and Loading the Turbine to 5 percent Rated Load in the OPER AUTO Mode. The team will now go to 1-OP-TM-001 (Subsection 5.7). All previous subsections will be completed. 1-OP-TM-001 actions start on page 15 of this guide.

Event Description: .Place Unit on line and ramp up in power.

Cue: When team ready.

		1-GOP-1.8
	RO	5.6.18 AFTER the generator breakers are closed, THEN verify annunciator 1K-B1, GEN BKR AUX REL FAIL TURB TRIP CKT, is NOT LIT.
	SRO	5.6.19 Notify the System Operator and Energy Supply (MOC) that the unit is on the line and log the on-line time in the Unit 1 Narrative Log.
	SRO	5.6.20 Check that the VOLTAGE REGULATOR is in automatic control. IF the VOLTAGE REGULATOR is NOT in automatic control, THEN notify Supervisor - System Operations at 8-730-3345 (Innsbrook).
		1-GOP-1.8
	SRO	**CAUTION** prior to Step 5.6.21: • To provide for a positive channel check indication, steam flow must be verified on all six channels of SG STEAM FLOW PROTECT before 23 percent reactor power is exceeded.
	SRO	**NOTES** prior to Step 5.6.21: • Power level increases should be monitored closely and rods adjusted to maintain Tave close to Tref. Ramp rate will be a function of Steam Generator Level Control. • Chemistry should be notified when power level changes are equal to or greater than 15 percent/hr. • The Turbine should be operated in IMP IN while ramping is in progress. If desired, the turbine may be placed in IMP OUT at approximately 90 to 91 percent power. If the power increase is stopped during the ramp to 100%, IMP OUT may be used to assist in stabilizing the Turbine.
	SRO	5.6.21 Continue in 1-OP-TM-001, Subsection 5.8, Power Escalation to 20% - 25% Turbine Power, while continuing to perform this procedure.

Event Description: .Place Unit on line and ramp up in power.

Cue: When team ready.

		1-GOP-1.8
	SRO	**CAUTION** prior to Step 5.6.22: • To prevent a Reactor Trip, Step 5.3.24 must be repeated if Reactor Power has decreased below 10 percent and PERM STATUS LIGHTs B1 and C1 are NOT LIT.
		1-GOP-1.8
	RO	5.6.22 WHEN reactor power increases above 10 percent power, THEN perform the following.
	RO	a. Check that the following Trip Status Lights are LIT. _____ 1. Trip Status Light E1, NIS PWR RGE P-10 CH-1 _____ 2. Trip Status Light F1, NIS PWR RGE P-10 CH-2 _____ 3. Trip Status Light G1, NIS PWR RGE P-10 CH-3 _____ 4. Trip Status Light H1, NIS PWR RGE P-10 CH-4
	RO	b. Check that the Perm Status Light A3, P-10 NIS PWR RGE > 10%, is LIT.
	RO	c. Check that the Perm Status Light B2, P-7 NIS PWR RGE AND TURB PWR < 10%, is NOT LIT.
		d. Block the Intermediate Range Trip by performing the following.
	RO	**1. Depress 1/N 38A TRA, INT RNG TRIP - BLOCK, pushbutton.** **2. Depress 1/N 38B TRB, INT RNG TRIP - BLOCK, pushbutton.** 3. Check Perm Status Light B1, NIS INT RNG RX TRIP AND ROD STOP BLOCKED, is LIT.
	RO	e. Block the Power Range Low Trip by performing the following.
		1. Depress 1/N 47A TRA, PWR RNG (LO SETPT) TRIP - BLOCK, pushbutton. **2. Depress 1/N 47B TRB, PWR RNG (LO SETPT) TRIP - BLOCK, pushbutton.** 3. Check Perm Status Light C1, NIS PWR RNG LO SP TRIP - BLOCKED, is LIT
	BOP	5.6.23 Perform the following substeps at the described Turbine Power.
		a. WHEN turbine power increases through 10 percent, THEN check that the following Trip Status Lights are LIT. _____ 1. Trip Status Light E3, TURB PWR > 10% CH-3 _____ 2. Trip Status Light F3, TURB PWR > 10% CH-4
		b. WHEN turbine power increases through 15 percent, THEN check Perm Status Light K1, P-2 AUTO ROD CONTROL BLOCKED TURB PWR < 15%, is NOT LIT.

Event Description: .Place Unit on line and ramp up in power.

Cue: When team ready.

		1-GOP-1.8
	SRO	**NOTE** prior to Step 5.6.24: • When Steam Dumps close, a decrease in RCS temperature should be anticipated and compensatory actions taken.
	RO/BOP	5.6.24 IF Steam Dumps in Auto, THEN verify the Steam Dumps modulate closed as Turbine Power is increased.
		5.6.25 IF the Steam Header Pressure controller in Manual, THEN as Turbine power level continues to increase, reduce the STM DUMP VVS DEMAND signal to zero while maintaining Reactor power constant. Enter N/A if controller in Auto.
	BOP	5.6.26 Maintain Turbine Valve Position Limiter approximately 5% above Governor Valve demand.
		NOTE: Steam Flow / Feed Flow indications do not have to be matched to be considered stable. All three MFRVs should be placed in Auto at the same time to ease the transition to Auto feed control.
	TEAM SURROGATE	5.6.27 WHEN Feedwater temperature is greater than 260°F (PCS points T0418A, T0438A, T0458A) with stable Steam Flow / Feed Flow, THEN perform the following: a. Check that the MFRVs are closed. b. Place the MFRVs in Auto. c. WHEN MFRV demand exceeds approximately 9%, THEN slowly close the MFRV Bypass HCVs as the MFRVs come open.
		NOTE: When the Steam Dumps are fully closed, Tave will decrease as Turbine power is increased.
	RO/BOP	5.6.28 IF the Steam Header Pressure controller is in Auto, THEN as Turbine power level is increased, perform the following. Enter N/A if controller in Manual. a. Check that the Steam Dumps modulate closed. b. WHEN the Steam Dumps are closed, THEN place the Steam Header Pressure controller in Manual.
	SRO	5.6.29 IF the Steam Header Pressure controller is in Manual, THEN as Turbine power level continues to increase, reduce the STM DUMP VVS DEMAND signal to zero while maintaining Reactor power constant. Enter N/A if controller was operated in Auto.

Event Description: .Place Unit on line and ramp up in power.

Cue: When team ready.

		1-GOP-1.8
	RO/BOP	5.6.30 Place the STM DUMP MODE SEL switch in the TAVG position as follows. a. Check STM HDR pressure controller demand at zero. b. Place STM DUMP CNTRL switch to OFF/RESET. c. Place STM DUMP MODE SEL switch to RESET and spring return to TAVG. d. Check annunciator 1H-D7, STM DUMP PERM, is NOT LIT. e. Place STM DUMP CNTRL switch to ON.
		END OF GOP ACTIONS – 1-OP-TM-001 ACTIONS BEGIN NEXT PAGE.

Event Description: .Place Unit on line and ramp up in power.

Cue: When team ready.

		1-OP-TM-001 **5.7 Synchronizing and Loading the Turbine to 5% Rated Load in the OPER AUTO Mode**
	BOP	**NOTES** prior to Step 5.7.1: • Shift Supervision may authorize entry or exit from this subsection at any step or substep based upon existing plant conditions. N/A must be entered for the specific steps or substeps in the subsection that were not performed as a result of the authorized exit or entry. • Hotwell temperature should be greater than 70°F before synchronization. This recommended temperature is based on a North Anna Reactor trip caused by low feedwater temperature.
	BOP	5.7.1 Check that the Hotwell temperature is greater than 70°F. IF Hotwell temperature is NOT greater than 70°F, THEN evaluate the effects of synchronization with temperature less than 70°F
		1-OP-TM-001
	SRO	**CAUTION** prior to Step 5.7.2: • During Turbine startup and operation at less than 10% electrical load, Condenser vacuum, as read on MCR Condenser Vacuum Recorders CN-PR-101A and CN-PR-101B, should be maintained as high as possible and greater than 26.5 in. Hg to prevent Turbine blade flutter. During shutdown, Condenser vacuum should be maintained as high as possible, and greater than 26.5 in. Hg until the Turbine rotor is on the Turning Gear.
	BOP	5.7.2 Check that the Turbine vacuum indicated on MCR Condenser Vacuum Recorders CN-PR-101A and CN-PR-101B is greater than 26.5 inches of Hg Vacuum.
	BOP	5.7.3 Check that the pumps and fans for the three Main Transformers are in operation. *Field operator will report pumps and fans in service*
		1-OP-TM-001
	BOP	5.7.4 Check that UNIT NO. 1 LOAD MEGAWATTS chart recorder is ON.
	BOP	5.7.5 Check or depress the VV POSTN LIMITER raise button until the VV POSTN LIMIT indicator registers 10% VALVE POSITION.
	SRO	5.7.6 Check that the applicable GOP has been completed up to synchronization, and that the Startup Team is ready to synchronize the generator with the bus.

Event Description: .Place Unit on line and ramp up in power.

Cue: When team ready.

		1-OP-TM-001
	BOP	**NOTE** prior to Step 5.7.7: Shift Supervision may adjust the ramp rate to aid in unit stabilization.
	BOP	5.7.7 Verify or place the LOAD RATE % PER MIN thumbwheel to position 1. (1%/MIN)
	SRO	**CAUTIONS** prior to step 5.7.8: • The Sync Switch should not be turned to the AUTO position as the AUTO SYNC function is inoperative. • To prevent breaker disagreement, the Generator output breaker control switch should be held in CLOSE until the red light is LIT or the breaker indicates tripped.
	BOP	5.7.8 Synchronize the Generator with the bus using OCB-G102, GEN OUTPUT BKR, by performing the following substeps. IF the Generator will be synchronized using OCB-G1T240, THEN enter N/A AND GO TO Step 5.7.9. a. **Insert the Sync Key into CS-G102, GEN OUTPUT BKR SYNC SWITCH**. b. **Turn CS-G102 to MAN.** c. **Raise the SETTER to 1805 rpm and press the GO button.** d. Check that voltage is indicated on the INCOMING and RUNNING voltmeters. **NOTE**: Slow in the fast direction is one clockwise rotation in 20 or more seconds. e. **Check a slow rotation of the synchroscope in the fast direction. (clockwise) IF NOT, THEN raise or lower the SETTER as required and press the GO Button.**

Event Description: .Place Unit on line and ramp up in power.

Cue: When team ready.

		1-OP-TM-001 *5.7.8 (Continued)* **NOTE**: INCOMING and RUNNING voltages should be within 2 volts. f. **Equalize the INCOMING voltage with the RUNNING voltage using the EXCITATION LEVEL control switch.** **CAUTION**: If Generator output is not indicated at the time of synchronization and no operator action is taken, an anti-motoring trip will occur **NOTE**: With the Synchroscope running as close to a 20-second cycle as possible, very little load will be placed on the generator. **NOTE**: Reflexes should be mentally checked with respect to the Synchroscope needle speed so that the Generator Breaker is closed at 12:00 o'clock. g. **WHEN the Synchroscope is at (approximately) 2 minutes to 12:00 o'clock, THEN close OCB-G102, Generator Output Breaker.** **NOTE**: Approximately 15 to 20 seconds may elapse before the Setter indication increases above zero. h. Check that the following indications are NOT LIT. • Permissive Status Light E-3 GEN NO. 1 MOTORING INITIATED • Annunciator 1J-D7, GEN MOTORING TURB LO ΔP i. IF the Generator is motoring, THEN immediately raise the setter to 5% and depress the GO pushbutton. Otherwise, enter N/A. (The ramp rate may be raised as necessary to clear the motoring alarms. When the alarms are clear, the Turbine ramp rate may be lowered or halted as desired.) j. **Turn CS-G102, GEN OUTPUT BKR SYNC SWITCH, to OFF.** k. **Insert the Sync Key into CS-G1T240, GEN OUTPUT BKR SYNC SWITCH.** l. **Turn CS-G1T240 to MAN.** m. **Check that the synchroscope needle stopped at approximately the 12:00 o'clock position.** n. Check that the INCOMING and RUNNING voltages are within 2 volts. o. **Close OCB-G1T240.** p. **Turn CS-G1T240 to OFF and remove the Sync Key.**
	BOP	

Event Description: .Place Unit on line and ramp up in power.

Cue: When team ready.

		1-OP-TM-001
	SRO/BOP	5.7.9 Synchronize the Generator with the bus using OCB-G1T240, GEN OUTPUT BKR, by performing the following substeps. IF the Generator was synchronized using OCB-G102, THEN enter N/A AND GO TO Step 5.7.10
	SRO/BOP	Notes prior to Step 5.7.10: • The VV POSTN LIMIT setpoint should be raised proportionally as the Turbine load is raised. The Turbine Governor Valves should not be run up against the Limiter. • The Turbine should not be continuously operated on the VV POSTN LIMIT. • During Power Escalation, the VV POSTN LIMIT should be maintained as close as reasonably possible just above the actual governor valve position for the desired power level. This method of operation will prevent a Turbine Governor Valve(s) from failing to an open position due to an electronic or hydraulic failure thereby causing an excessive load on the Unit or causing the Unit to exceed licensed power limits.
	BOP/SRO	5.7.10 IF the VALVE POS LIMIT light is LIT, THEN slowly raise the VV POS LIMIT setpoint until the light is NOT LIT, OR lower Unit load until the VALVE POS LIMIT light is NOT LIT AND adjust the VV POS LIMIT setpoint as required.
	BOP	5.7.11 Verify that the SPEED light is NOT LIT and the LOAD light is LIT.
	BOP	5.7.12 RETURN TO appropriate startup GOP to continue the Unit Startup. **THE team will return to GOP-1.8 (momentarily).**
	SRO	**CAUTIONS** prior to Step 5.8.1: • Constant communication between the Reactor Operators on the S/G Level Controls, the Control Rods, Steam Dumps, and the Turbine must be maintained to prevent temperature or level transients. • Rapid Loading of the Turbine - Generator may cause a Steam Generator High Level Trip. **(Reference 2.4.1)**

Event Description: .Place Unit on line and ramp up in power.

Cue: When team ready.

	SRO/BOP	**1-OP-TM-001** **NOTES** prior to Step 5.8: • Shift Supervision may authorize entry or exit from this subsection at any step or substep based upon existing plant conditions. N/A must be entered for the specific steps or substeps in the subsection that were not performed as a result of the authorized exit or entry. • Ramping the Turbine at 1%/min until the Steam Dumps are closed will aid in the transition to auto feed control. Once the Steam Dumps are closed the normal ramp rate is Position 6. • In the OPER AUTO mode, Turbine loading may be stopped by depressing the HOLD pushbutton and may be restarted by depressing the GO pushbutton. 5.8.1 With the OPER AUTO mode selected, set the desired load in the SETTER and depress the GO pushbutton. 5.8.2 Maintain the System Voltage on the 230 KV BUS VOLT meter as requested by the System Operator. 5.8.3 WHEN Turbine power increases above 10%, THEN check PCS alarm Y2060D, Exh Hood Sprays OFF, is received. 5.8.4 WHEN IMPULSE CHAMBER PRESSURE (Turbine Power) passes through 30 percent OR when the startup has stabilized, THEN check or depress the IMP IN pushbutton AND check that the IMP IN light is LIT and the IMP OUT light is NOT LIT. Enter N/A if Turbine control will remain in IMP OUT. *Evaluator's Note: No further actions are expected for this event.*
	BOP	**END EVENT 1**

Event Description: .Place Unit on line and ramp up in power.

Cue: When team ready.

Time	Position	Applicant's Action or Behavior
	RO	1-OP-CH-021, Alternate Dilution Using Blender 3.0 Initial Conditions 3.1 Check Primary Grade water is available to the Blender. 4.0 Precautions and Limitations 4.1 Control rod position, Tavg, and/or power level should be observed when making up to the RCS. 4.2 Operation of pressurizer heaters and spray valves should be used to equalize Boron concentration (CB) when changing CB. 4.3 The blender must be frequently monitored for proper operation during the entire duration of the makeup. **(Reference 2.4.1)** 4.4 The Reactor Operator shall notify Shift Supervision before performing any Blender evolution. **(Reference 2.4.1)** 4.5 Rapidly changing VCT level and pressure may affect RCP Seal leakoff, which should be monitored for normal response. 4.6 Operation of the Blender must be Peer checked. 4.7 Due to system configuration, PG flow will continue after reaching the integrator endpoint. Depending on the total flow rate, 0-5 gallons of additional flow should be anticipated. At 100 gpm, four gallons of additional flow is expected. At 60 gpm, two gallons of additional flow is expected. 4.8 The Blender may lock up if the RATE function is in use at the end of make up. (Integrator lock up does NOT affect the Blender AUTO function). **(Ref. 2.4.2)**
	RO	1-OP-CH-021, Alternate Dilution Using Blender 4.0 Precautions and Limitations (Continued) 4.9 If the ENT button on the BA or PG integrator is pressed twice in succession, the integrator will flash the Grand Total on the digital display. The ENT button should be pressed an additional time to exit the Grand Total display. The integrator setpoint will NOT be affected. 4.10 Dilutions of greater than 2000 gallons can result in RCS H2 concentration going low out of band. Dilutions of this amount should be made to the top of the VCT using 1-OP-CH-007, Blender Operations.

Event Description: .Place Unit on line and ramp up in power.

Cue: When team ready.

		1-OP-CH-021, Alternate Dilution Using Blender
	RO	5.1 Alternate Dilution **NOTE:** This subsection will be used for the first alternate dilution of the shift. Attachment 3 will be used as a guide for further alternate dilutions for the remainder of the shift, unless Excess Letdown is in service. 5.1.1 Notify Shift Supervision of impending Alternate Dilution. **(Reference 2.4.1)** 5.1.2 Notify STA of impending Alternate Dilution. 5.1.3 Place the MAKE-UP MODE CNTRL switch in the STOP position. 5.1.4 Adjust both of the following controllers for the flow rate and total gallons of Primary Grade water for the dilution. IF the **PG FLOW CNTRL** controller setpoint has previously been set, THEN enter N/A for that substep. a. 1-CH-FC-1114A, PG FLOW CNTRL _____ GPM (IAW Attachment 10) b. Determine the required integrator setpoint by performing the following: _____ gal (-) _____= _____ Integrator setpoint (Desired Dilution) (anticipated additional flow, dependent on flowrate)

Event Description: .Place Unit on line and ramp up in power.

Cue: When team ready.

		1-OP-CH-021, Alternate Dilution Using Blender
	RO	5.1.4 (Continued) c. Record number of gallons of PG to be added from Step 5.4.4.b and enter into 1-CH-YIC-1114A, PRI WATER SUP BATCH INTEGRATOR (GAL) as follows: _____ GAL 1. Depress PRESET A Button (Controller will read the last value entered into the controller; reads in gallons.) 2. To clear PRESET A, depress the CLR Button. Enter N/A if not required. 3. Enter desired PRESET A value. Enter N/A if not required. 4. Depress ENT Button. 5.1.5 Place the MAKE-UP MODE SEL switch in the ALT DIL position. 5.1.6 IF it is desired to direct the dilution water to the charging pump suction only, THEN place 1-CH-FCV-1114B, BLENDER TO VCT, in the CLOSE position. Otherwise, enter N/A. 5.1.7 Place the MAKE-UP MODE CNTRL switch in the START position. 5.1.8 Check all of the following conditions. a. 1-CH-FCV-1113A, BORIC ACID TO BLENDER, is closed. b. 1-CH-FCV-1113B, BLENDER TO CHG PUMP, is open. c. 1-CH-FCV-1114A, PGW TO BLENDER, is controlling in AUTO. d. 1-CH-1114B, BLENDER TO VCT, is OPEN – **N/A** 5.1.9 IF it is desired to stop the Dilution before the selected amount, THEN place the MAKE-UP MODE CNTRL switch in the STOP position. IF the PRI WATER SUP BATCH INTEGRATOR (GAL) is used to stop the flow, THEN enter N/A for this step. 5.1.10 WHEN the desired amount of makeup has been reached, THEN check both of the following. • 1-CH-FCV-1113B closes. • IF Step 5.4.6 was NOT performed, THEN check that 1-CH-FCV-1114B is closed. Otherwise, enter N/A.

Event Description: .Place Unit on line and ramp up in power.

Cue: When team ready.

	RO	1-OP-CH-021, Alternate Dilution Using Blender 5.1.11 IF Step 5.4.6 was performed, THEN place 1-CH-FCV-1114B in AUTO. Otherwise, enter N/A. 5.1.12 IF a manual makeup is desired, THEN enter N/A for Steps 5.4.14 through 5.4.16 AND GO TO Subsection 5.5. 5.1.12 Place the MAKE-UP MODE SEL switch in the AUTO position. 5.1.13 Place the MAKE-UP MODE CNTRL switch in the START position. 5.1.14 Notify Shift Supervision of Blender status. **(Reference 2.4.1)** ***Additional Alternate Dilutions will be performed using 1-OP-CH-021, Attachment 1 (Next Page).***

Event Description: .Place Unit on line and ramp up in power.

Cue: When team ready.

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Attachment 1
REPEATED ALTERNATE DILUTIONS

NOTE: This attachment will be used for repeated Dilutions after the initial Subsection 5.1 has been filled out for the shift.

Procedure Steps:	Initial (1)		Initial (2)		Initial (3)	
	Perf.	IV	Perf.	IV	Perf.	IV
1.1 Notify Shift Supervision of impending Alternate Dilution. **(Reference 2.4.1)**						
1.2 Notify STA of impending Alternate Dilution.						
1.3 Place the MAKE-UP MODE CNTRL switch in the STOP position.						
1.4 Check set or set controller and integrator for the flow rate and total gallons of Primary Grade water for the dilution.						
1.5 Place the MAKE-UP MODE SEL switch in the ALT DIL position.						
1.6 IF it is desired to direct the dilution water to the charging pump suction only, THEN place 1-CH-FCV-1114B, BLENDER TO VCT, in the CLOSE position. Otherwise, enter N/A.						
1.7 Place the MAKE-UP MODE CNTRL switch in the START position.						
1.8 Check proper valve positions.						
1.9 WHEN the desired amount of makeup has been reached, THEN check proper valve positions.						
1.10 Check or place 1-CH-FCV-1114B in AUTO.						
1.11 Place the MAKE-UP MODE SEL switch in the AUTO position.						
1.12 Place the MAKE-UP MODE CNTRL switch in the START position.						
1.13 Notify Shift Supervision of Blender status. **(Reference 2.4.1)**						

Event Description: CC RM Fail upscale with failure of HCV-CC-100 to auto close.

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
	BOP	Diagnoses failure of 1-RM-CC-105 with the following indications/alarms: Alarms: • 0-RM-L5 CC HX A/B OUT ALERT/FAILURE • 0-RM-M5 1-CC-RI-105 HIGH Indications: 1-CC-RI-105 indicates all "EEEEEEs." 1-CC-RI-105, HIGH, WARN and RANGE lights LIT. **NOTE**: RM-M5 Guidance located at end of this section.
	BOP SRO	0-RM-L5 Notes Prior to Step 1: • If a monitor fails, the automatic functions associated with that monitor must be verified or performed. • When HP has surveyed the area and declared radiation levels normal, the components that were realigned due to monitor failure may be returned to normal and activities in the affected area may continue. • Tech Spec 3.13.C requires that HCV-CC-100 remain closed if either CC radiation monitor is inoperable.
	BOP	0-RM-L5 1. CHECK ALARM - READING ON MONITOR GREATER THAN OR EQUAL TO ALERT SETPOINT OR RADIATION LEVEL HAS TRENDED UP • 1-CC-RI-105, HDR A • 1-RM-RR-150C, Pen 1 BOP will identify that the meter indicates "EEEEEEEs" and a steeply rising trend.
	BOP	0-RM-L5, Step 1 RNO a) IF all EEEEEs indicated on display, THEN GO TO 0-OPT-RM-001, Radiation Monitoring Equipment Check.

Event Description: CC RM Fail upscale with failure of HCV-CC-100 to auto close.

Cue: By Examiner.

		0-OPT-RM-001 Precautions and Limitations 4.1 Each process radiation monitor paper advance uses about 5 hours worth of paper. Unnecessary paper advances will cause the roll to run out prematurely. 4.2 Check Sources for the Victoreen digital radiation monitors operate as follows. • For digital PROCESS monitors - The Check Source is exposed to the detector by depressing and holding the CHECK SOURCE pushbutton. • For digital AREA monitors - A Check Source signal is inserted into the detector circuit by depressing and releasing the CHECK SOURCE pushbutton. The Check Source signal is removed when the CHECK SOURCE pushbutton is depressed and released a second time or after approximately three minutes. The digital AREA monitors do not have a radioactive Check Source.
	BOP	0-OPT-RM-001 6.1 Work Preparation 6.1.1 IF a radiation monitor is out of service, THEN enter OOS in applicable spaces of Attachments. NOTE: • A failed Digital Rate Meter is indicated by "EEEEEs" in the digital display window, and the FAIL Alarm light LIT. • If the Radiation Monitor has associated automatic actions, those actions will occur when the monitor fails. 6.1.2 IF this procedure is being performed due to failure of a Digital Radiation Monitor with all EEEEEs displayed, THEN perform the following. Otherwise, enter N/A. a. IF Radiation Monitor has associated automatic actions, THEN check or perform actions as necessary. Otherwise, enter N/A. *BOP may use RM-L5or RM-M5 guidance for completion of the verification of Auto Actions*. **Places 1-HCV-CC-100 in OFF**. *Directs Unit 2 to place SOV-CC-200 in close*.

Event Description: CC RM Fail upscale with failure of HCV-CC-100 to auto close.

Cue: By Examiner.

	BOP	0-OPT-RM-001 b. On the front panel of rate meter, depress the ON/OFF push button, and check the meter is OFF. **BOP places On/Off switch in Off**. c. WHEN 30 seconds have elapsed, THEN perform Step 6.1.2.d. d. On the front panel of rate meter, depress the ON/OFF push button, and check the meter is ON. BOP Places RM in On, Meter immediately goes to all "EEEEE's" with the HIGH, WARN and RANGE lights Lit. BOP Notifies SRO RM has failed and I&C assistance is required.
	SRO	SRO will review Technical Specifications 3.13.C and identify that whenever the component cooling water radiation monitor is inoperable, the surge tank vent valve shall remain closed. The SRO may review Technical Specification Table 3.7-5, which will refer the SRO to Technical Specification 3.13.
	SRO	The team will hold a transient brief. During the brief the failure of the CC RM and Vent Valve will be discussed. The RO/BOP will report Annunciators received related to the event, and Critical Parameters affected. STA will have no input for the brief.
	SRO	SRO will notify the Shift Manager of the failure and request I&C assistance.

Event Description: CC RM Fail upscale with failure of HCV-CC-100 to auto close.

Cue: By Examiner.

	BOP	RM-M5 **Note**: Candidate may refer to this ARP initially in response to the High Alarm. **NOTE**: • If a monitor fails, the automatic functions associated with that monitor should be verified or performed. • When HP has surveyed the area and declared radiation levels normal, the components that were realigned due to monitor failure may be returned to normal and activities in the affected area may continue. • Tech Spec 3.13.C requires that HCV-CC-100 remain closed if either CC radiation monitor is inoperable. 1 VERIFY ALARM - READING ON MONITOR GREATER THAN OR EQUAL TO HIGH SETPOINT • 1-CC-RI-105, HDR A • 1-RM-RI-150C, Pen 1 *Identifies Monitor reading is greater than High Alarm*.
	BOP	RM-M5 2 VERIFY CC HEAD TANK VENT VALVE - CLOSED a) Place HCV-CC-100 in OFF (Unit 1) **Places HCV-CC-100 in Off.** b) Place SOV-CC-200 in CLOSE (Unit 2) *Directs Unit 2 operator to place SOV-CC-200 in close*.

Event Description: CC RM Fail upscale with failure of HCV-CC-100 to auto close.

Cue: By Examiner.

		RM-M5 **NOTE**: The following components are the most likely sources of inleakage to the CC System: • RCP Thermal Barrier • NRHX • Primary Sample coolers • Excess Letdown HX • HRSS coolers • RHR HX • SFP coolers • RHR Pump Seal coolers
	BOP	3 MONITOR CC HEAD TANK LEVEL AND CC TEMP FOR INCREASING LEAKAGE TO CC SYSTEM
		RM-M5
	BOP	4 NOTIFY HP TO DO THE FOLLOWING: • Verify area evacuated as necessary • Control access as necessary • Investigate cause • Determine need for setpoint change
	BOP	*Notifies HP*.
		RM-M5
	BOP	5 PERFORM ( )-OPT-RC-10.0, REACTOR COOLANT LEAKAGE OR ( )-AP-16.00, EXCESSIVE RCS LEAKAGE, AS NECESSARY *Notifies RO/SRO to perform 1-OPT-RC-10.0, ass necessary.*
		RM-M5
	BOP	6 DETERMINE LEAKAGE SOURCE BY SAMPLING AS NECESSARY *Notifies SRO concerning Step.*
		RM-M5
	BOP	7 ISOLATE LEAKAGE *Notifies SRO of need to isolate leakage if discovered by sampling*.

Event Description: CC RM Fail upscale with failure of HCV-CC-100 to auto close.

Cue: By Examiner.

	BOP	RM-M5 8 PROVIDE NOTIFICATIONS AS NECESSARY: • Shift Supervision • OMOC • STA • Health Physics • Instrumentation Department *Informs SRO of required notifications.*
		END EVENT 2

Event Description: 1-PG-P-1A trips on overcurrent, 1-PG-P-1B fails to auto start

Cue: When initiated by Team

Time	Position	Applicant's Action or Behavior
	Team	Diagnose the failure using the following: Alarms: BR-D10, PRI GRADE WTR LO HDR PRESS 1D-B4, PRI WTR TO BLEND LO PRESS Indications: 1-PG-P-1A RED indication light OFF. 1-PG-P-1B does not Auto Start as expected. **NOTE**: Actions for 1D-B4, at the end of this section.
	SRO	Directs the BOP to implement the ARP for BR-D10 Annunciator SRO notifies Unit 2 that PG water flow has been lost.
	BOP	NOTE: The standby PG Pump should automatically start when system pressure decreases to less than or equal to 50 psig. 1 VERIFY PG SYSTEM PRESSURE LESS THAN OR EQUAL TO 75 PSIG • PI-BR-121, Pri Wtr Sup Press *BOP checks 1-BR-PI-121, PRI WTR SUP PRESS meter on BR Panel and notes pressure has decreased to 0 psig.*
	BOP	2 VERIFY PG PUMPS - RUNNING AS NECESSARY • One in Hand • One in Auto Do the following a) Align switches as necessary b) IF PG Pumps off for planned evolution, THEN return to procedure in effect
	BOP	**Starts 1-PG-P-1B by placing control switch in HAND**.
	BOP	*Verifies PG pressure returns to Normal pressure*. (1D-B4 annunciator clears).
	SRO	*Informs Unit 2 of PG system status*. *Directs RO to dispatch operator to check status of 1-PG-P-1A breaker*.

Event Description: 1-PG-P-1A trips on overcurrent, 1-PG-P-1B fails to auto start

Cue: When initiated by Team

	BOP	3 CHECK EXCESSIVE USE OF PG WATER AS INDICATED ON FI-BR-126, PRI WTR SUP PPS FLOW Identifies 0 indicated flow on FR-BR-126, PRI WTR SUP PPS FLOW. Step 3 RNO Do the following: a) Locally check PG Pump for proper operation. *BOP directs Service Building North Yard to check status of 1-PG –P-1A and 1B.* b) Locally check for system integrity *Directs Auxiliary Building operator/SB North Yard to check system integrity*. c) IF system leakage or rupture exists, THEN isolate as necessary AND GO TO Step 6. d) GO TO **Step 5**.
	BOP	5 VERIFY PROPER OPERATION OF PUMP RECIRCULATION VALVE • 1-BR-PCV-114, PRI SUP WATER PUMPS 1A/B RECIRC HDR *Identifies PG header pressure normal*.
	BOP	6 SUBMIT CONDITION REPORT AS NECESSARY
	BOP	7 PROVIDE NOTIFICATION AS NECESSARY • Shift Supervision Notifies SRO that ARP actions complete.
	BOP	Reviews ARP for 1D-B4, PRI WTR TO BLEND LO PRESS.
	BOP	1D-B4 1 CHECK PG HDR PRESS - LESS THAN OR EQUAL TO 65 PSIG ON 1-BR- PI-121 AT THE BORON RECOVERY PANEL Identifies 0 psig indicated.

Event Description: 1-PG-P-1A trips on overcurrent, 1-PG-P-1B fails to auto start

Cue: When initiated by Team

		1D-B4
	BOP	2 CHECK PRIMARY GRADE WATER PUMPs - ONE RUNNING • 1-PG-P-1A • 1-PG-P-1B
	RO	*Identifies no PG pump running*.
		Step 2 RNO: Start a pump.
	RO	**Starts 1-PG-P-1B**
		1D-B4
	BOP	3 CHECK 1-BR-PCV-114 - THROTTLING TO RAISE HDR PRESS
	BOP	*Identifies PG Pressure returns to normal*.
		1D-B4
	BOP	4 CHECK VALVE LINEUP – CORRECT *Identifies PG pump alignment correct*. *BOP may direct Auxiliary Building Operator to walk down PG system for abnormalities.*
		1D-B4
	BOP	5 CHECK PG HDR PRESS – GREATER THAN 65 PSIG *Identifies PG pressure normal and stable*.
		1D-B4
	BOP	6 NOTIFY SHIFT SUPERVISION *Notifies SRO that ARP review complete*.

Event Description: 1-PG-P-1A trips on overcurrent, 1-PG-P-1B fails to auto start

Cue: When initiated by Team

	SRO	Update Shift Manager on status of PG system and request electrical maintenance to determine cause of 1-PG-P-1A trip and 1-PG-P-1B failure to AUTO Start.
		END EVENT #3

Event Description: Pressurizer Spray valve fails open.

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
	RO	Diagnoses Failure based on the following indications: 1-RC-PCV-1455B, Spray from Loop C, fails to 100%. 1-RC-PCV-1444J, Master Cntrl, starts lowering in response to press. Annunciator 1C-B8, PRZR LO PRESS. Pressurizer Heater Banks A / B/ E energize.
	RO	Performs the Immediate Actions of AP-53.00 [1] **Checks redundant indications of pressurizer pressure – NORMAL** [2] **Places the PRZR SPRAY LOOP C Controller in MANUAL closes spray valve.** **Critical Task 1: Close the Spray valve before Reactor trip on low pressure.** If the RO fails to take timely action in response to the Spray Valve opening, an automatic reactor trip on RCS Low Pressure will occur; an unanticipated reactor trip should be considered as failure criteria. Announces completion of Immediate Actions of AP-53.00.
	SRO RO	Step 1, 0-AP-53.00 CHECK REDUNDANT INSTRUMENT CHANNEL(S) INDICATION – NORMAL. Reports Redundant indications of Pressurizer pressure normal.
	SRO RO	Step 2, 0-AP-53.00 PLACE AFFECTED CONTROL(S)/ COMPONENT(S) IN MANUAL CONTROL AND STABILIZE PARAMETER USING REDUNDANT INDICATION Reports 1-RC-PCV-1455B, Spray from Loop C in manual and closed.
	SRO	The SRO will lead a transient brief. During the brief, the failure of 1-RC-PCV-1455B, Spray from Loop C will be discussed. The RO/BOP will report Annunciators received related to the event, and Critical Parameters affected. STA will have no input for the brief; monitor RCS pressure using PCS if SRO directs.
	SRO RO	Step 3, 0-AP-53.00 * VERIFY REACTOR POWER – LESS THAN OR EQUAL TO 100% Reports reactor power approximately 100% using PCS indication.

Event Description: Pressurizer Spray valve fails open.

Cue: By Examiner.

		Step 4, 0-AP-53.00
	SRO	NOTE: • Step 4 failures are listed in order of performance priority. Only the failed instrument/control and associated step number should be read aloud. • When the affected instrument/controller malfunction(s) has been addressed by this procedure, recovery actions should continue at Step 13.
		Step 4, 0-AP-53.00, Continued
	SRO	* DETERMINE THE FAILED INSTRUMENT / CONTROL AND GO TO APPROPRIATE STEP OR PROCEDURE:
	RO	• PRZR Pressure Control, Step 5
		Step 5, 0-AP-53.00
	SRO	**NOTE**: RCS pressure decrease will cause a slight decrease in RCS Tave due to negative reactivity from the moderator pressure coefficient.
	SRO	CHECK PRZR SPRAY VALVE CONTROLLERS – NORMAL
	RO	Reports No, PRZR Spray Vale Controller is NOT Normal.
		Step 5 RNO, 0-AP-53.00
	SRO	a. Place failed controller in Manual. b. Restore pressure to normal and stabilize. c. Check or stabilize Turbine load. d. If manual control is ineffective or unavailable, THEN GO TO 1-AP-31.00. e. If RCS pressure returns to normal THEN do the following: 1) Maintain stable Turbine load until pressure control system is returned to normal. 2) If no other instrumentation failure exists, THEN GO TO Step 13. Otherwise, GO TO Step 7.
	RO	Reports that Spray valve controller is in Manual. Pressure is stable or returning to normal. GO TO step 13.
		Step 13, AP-53.00
	SRO	13. Check Calorimetric – Functional IAW 1-OPT-RX-001, Attachment 4.
	RO	*Determines that Calorimetric is functional.* Note: 1-OPT-RX-001, Attachment 4 is included after step 17.

Event Description: Pressurizer Spray valve fails open.

Cue: By Examiner.

	SRO STA	0-AP-53.00 14. REVIEW THE FOLLOWING • Tech Spec 3.7 *Determines Tech Spec 3.7 is met.* *NOTE: If pressure lowered to 2205 psig, then SRO declares Tech Spec 3.12.F.2 is applicable. This requires pressure be raised above 2205 psig in 2 hours.* • VPAP-2802, NOTIFICATIONS - None • TRM SECTION 3.3, INSTRUMENTATION – None. • Reg. Guide 1.97: None • EP-AA-303, EQ. IMPORTANT TO EMERGENCY RESPONSE - None *The STA reports completion of review and has discussed the results with the Shift Manager.*
	SRO BOP SRO	0-AP-53.00 15 CHECK ADDITIONAL INSTRUMENT / CONTROLLER MALFUNCTION – EXISTS Reports no additional failure exists GOES TO Step 17
	SRO	0-AP-53.00 17. PROVIDE NOTIFICATIONS AS NECESSARY: • Shift Supervision • OMOC • STA (PRA determination) • I&C

Event Description: Pressurizer Spray valve fails open.

Cue: By Examiner.

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Attachment 4
CALORIMETRIC PROGRAM OPERABILITY

NOTE: TRM 3.3.5 shall be reviewed for required actions for non-functionality of the UFM Calorimetric, Normalized Feedwater Venturi, or PCS Calorimetric. Power reduction to less than 98.4% may be required.

1. To check the Primary Plant Performance Program (PP) operability perform the following:

_____ a. Open Programs - Operator Display / Engineering Display

_____ b. Open PP Output Summary - (Operator Display - Primary Plant Poke)

_____ c. Check short timed values for selected basis, Steam Flow (1-OPT-RX-002 box) or Feedflow (1-OPT-RX-003 box), are updating and either good or fair quality.

_____ d. IF selected basis NOT updating and either good or fair quality, THEN contact Reactor Engineering (if available), and then select another calorimetric basis IAW Step 6.3.1. Otherwise, enter N/A.

2. To check the Flow Corrections Program (FL) operability perform the following:

_____ a. Open Programs - Operator Display / Engineering Display

_____ b. Open FL Output Summary (Operator Display - Flow Corr Poke)

_____ c. Check FL Program Status is OK. IF NOT OK, THEN perform the following to check status of different bases.

_____ 1. Open FL0101 - Output Summary (FL Summary Poke)

_____ 2. Compare displayed values to the FL0101 Table below and check selected calorimetric values are updating and either good or fair quality.

_____ 3. IF selected basis NOT operable, THEN contact Reactor Engineering (if available), and then select another calorimetric basis IAW Step 6.3.1.

Event Description: Pressurizer Spray valve fails open.

Cue: By Examiner.

DOMINION
Surry Power Station

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Attachment 4
CALORIMETRIC PROGRAM OPERABILITY

FL0101 Table				
Flow Correction List	Normalized Feedwater	UFM Feedwater	Venturi Feedwater	Steam Flow
Charging Line Flow Corr	X	X	X	X
Letdown Line Flow Corr	X	X	X	X
SG A-1 FF CORR		X	X	
SG A-2 FF CORR		X	X	
SG B-1 FF CORR		X	X	
SG B-2 FF CORR		X	X	
SG C-1 FF CORR		X	X	
SG C-2 FF CORR		X	X	
SG A-1 SF CORR				X
SG A-2 SF CORR				X
SG B-1 SF CORR				X
SG B-2 SF CORR				X
SG C-1 SF CORR				X
SG C-2 SF CORR				X
SG A-1 FF CORR NORM	X			
SG A-2 FF CORR NORM	X			
SG B-1 FF CORR NORM	X			
SG B-2 FF CORR NORM	X			
SG C-1 FF CORR NORM	X			
SG C-2 FF CORR NORM	X			

		END EVENT #4

Event Description: Loss of 1G Screenwell Transformer.

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior

	BOP	Diagnoses failure using the following indications/alarms:
		• VSP-J6 – 230 KV HSE TRBL
		• VSP L7 - LLIS TROUBLE
		  • PCS Alarms:
		  • IS-C8 – S/W NO.1 OR NO. 2 XFMR TRBL
		  • IS-D9 - XFMR NO. 1 DIFF OPER
		  • PCS screens indicating a loss of Unit 1 CW pumps
		ARP VSP L-7 directs use of PCS, IS-C8 dispatches personnel to inspect transformer at low levels, and IS-D9 verifies proper crosstie of the 1G & 2G busses then initiates 0-AP-12.01.

	SRO RO	Enters 0-AP-12.01, LOSS OF INTAKE CANAL LEVEL **NOTE:** EPIPs may be applicable. 1. CHECK ENTRY INTO THIS PROCEDURE-FROM AN EOP OR AN AP TO RESTORE SW FLOW TO THE CCHXs Step 1 RNO actions: GO TO Step 3. Determines entry is not from an EOP or an AP to restore SW flow to the CCHXs and goes to step 3
	SRO RO BOP	Caution and Note prior to step 3 **CAUTION:** • To prevent turbine damage from turbine stall flutter, Main Condenser vacuum must be maintained greater than 26.5 in-Hg when turbine power is less than or equal to 10%. • Abnormal Procedure ( )-AP-14.00, LOSS OF CONDENSER VACUUM, should be reviewed if turbine vacuum can NOT be maintained. **NOTE:** If both units are at power, it may be necessary to trip one unit to reduce the rate of Intake Canal inventory loss. *3. TRY TO MAINTAIN INTAKE CANAL LEVEL: • **Throttle Waterboxes** • Reduce Unit load as necessary to maintain Condenser vacuum

Event Description: Loss of 1G Screenwell Transformer.

Cue: By Examiner.

	SRO RO/BOP	AP-12.01 4. CHECK INTAKE CANAL LEVEL – LOWERING DUE TO SUSPECTED BREACH. *RO/BOP reports canal level trending* down *but not due to suspected breach.* Goes to step 8.
	BOP SRO BOP	AP-12.01 8. START CIRC WATER PUMPS AS REQUIRED FROM THE MCR IAW ATTACHMENT 3 Directs BOP to perform attachment 3. 1. <u>STARTING CIRCULATING WATER PUMPS FROM THE MCR OR LLIS</u> **NOTE:** If starting circ water pumps that have just tripped, 5 minutes must be allowed for coastdown before starting. a. Check 4160 VAC G bus energized by Normal Supply or X-Tie. b. Check the LOCAL CONTROL indication for the pump to be started is NOT LIT. IF remote start is inoperable, THEN verify CW pumps to be started are in LOCAL. c. **Select Soft Control for the pump to be started. N/A if local start to occur.** d. **Enable Soft Control and verify red border**. N/A if local start to occur. e. **Start the selected Circulating Water Pump by pushing the START button**. IF local start to occur due to inoperable PCS, THEN start CW pumps locally. f. Check amps indicated for pump started. g. Direct Outside Operator to perform local operational checks IAW OP-48.1.1. BOP will wait 5 minutes before REMOTELY starting all CW pumps that had previously tripped.

Event Description: Loss of 1G Screenwell Transformer.

Cue: By Examiner.

	SRO BOP	AP-12.01 Note prior to step 9 **NOTE:** • A PIN Number and a Key are required for entry into the ESW Pump house. • A Key is required for entry into the ESW Pump house and the Low Level Switchgear Room. • There are no restrictions on the number of CW pumps which may be started with the 1G and 2G buses crosstied. 9. SEND OPERATOR TO LOW LEVEL INTAKE TO PERFORM THE FOLLOWING PROCEDURES: • Attachment 2, LOW LEVEL INTAKE RESPONSES • 0-OP-SW-002, EMERGENCY SERVICE WATER PUMP OPERATION • OP-48.1.1, STARTING ANY CW PUMP
	SRO/RO	AP-12.01 10. CHECK INTAKE CANAL LEVEL – GREATER THAN TRIP SETPOINT • Annunciator ( )F-G1, INTK CANAL LO LVL TRIP - NOT LIT • Intake Canal level – GREATER THAN 23.5 FEET
	SRO/RO	AP-12.01 11. CHECK CW LOSS - SUSTAINED WITH NO EXPECTATION OF RECOVERY Step 11 RNO actions: GO TO Step 13.
	SRO	AP-12.01 13. CONTINUE TO REDUCE UNIT LOAD AS NECESSARY TO MAINTAIN VACUUM Team will determine not necessary to reduce turbine load. 14. CHECK GRAVEL NECK MAKEUP FROM INTAKE CANAL – IN SERVICE. GO TO STEP 16 16. CHECK INTAKE CANAL LEVEL – STABLE OR INCREASING 17. GO TO STEP 32

Event Description: Loss of 1G Screenwell Transformer.

Cue: By Examiner.

		AP-12.01
	SRO	32. NOTIFY THE FOLLOWING: • OM on call • Manager Nuclear Operations • STA
		AP-12.01, Note prior to step 33
	SRO	**NOTE:** Intake canal level must be maintained above 17.2 FT for adequate RS HX inventory. 33. CHECK INTAKE CANAL LEVEL - RISING
	RO	34. CHECK INTAKE CANAL LEVEL - GREATER THAN 17.2 FT
		AP-12.01, Note prior to step 35
	SRO	**NOTE:** If SW flow to the CC HXs is increased, intake canal level should be monitored. The valves must be returned to their original position if canal level decreases. 35. THROTTLE OPEN CC HX SW OUTLET VALVES AS NECESSARY TO LOWER CC TEMPERATURE
	RO	Team will determine that this is not necessary. 36. VERIFY CAUSE OF LEVEL DECREASE - CORRECTED 37. RESTORE CW AND SW COMPONENTS (INCLUDING CW CHEMICAL INJECTION BY OPENING 1-SA-285 AND 2-SA-274) TO SUPPORT PLANT CONDITIONS - END AP-12.01 actions
		End Event #5

Event Description: Loss of Offsite Power, ECA-0.0

Cue: By Examiner.

	Team	Diagnoses loss of power to both Unit 1 Emergency AC busses. Crew will probably direct enter 1-ECA-0.0. Crew may perform1-E-0 and enter 1-ECA-0.0 at step 3 of E-0. Either way is acceptable.
		ECA-0.0, Loss of All AC Power Performs ECA-0.0 Immediate Actions, OR SRO Prompts ECA-0.0 IAs. **NOTE Prior to Step 1**: CSF Status Trees should be monitored for information only. FRs should NOT be implemented. RO [1] CHECK REACTOR TRIP: a) Manually trip reactor b) Check the following: Reactor trip and bypass breakers - OPEN Neutron Flux – LOWER Reports "Reactor Tripped" SRO Acknowledges "Reactor Tripped"
		ECA-0.0, Loss of All AC Power RO [2] CHECK TURBINE TRIP: a) Manually trip the turbine b) Close MSTVs **Closes MSTVs** Reports "Turbine Tripped", Immediate Actions of ECA-0.0 complete. SRO Acknowledges "Turbine Tripped" and completion of ECA-0.0 Immediate Actions. **Note**: MSTVs may have been closed on E-0, Step 2.

Event Description: Loss of Offsite Power, ECA-0.0

Cue: By Examiner.

		ECA-0.0
	SRO RO	3. CHECK RCS ISOLATION: a) Letdown isolation valves - CLOSED 1-CH-LCV-1460A – **Manually Closes Valve** 1-CH-LCV-1460B – **Manually Closes Valve** 1-RH-HCV-1142 – Checks Valve Closed
	SRO	b) PRZR PORVs – CLOSED
	RO	Reports Yes, PRZR PORVs Closed.
	SRO	c) Loop drain valves - CLOSED 1-RC-HCV-1557A 1-RC-HCV-1557B 1-RC-HCV-1557C
	RO	Reports Yes, Loop drain valves closed.
	SRO	d) RX Head vent valves - CLOSED 1-RC-SOV-100A-1 1-RC-SOV-100A-2 1-RC-SOV-100B-1 1-RC-SOV-100B-2
	RO	Reports Yes, RX Head vent valves closed.
	SRO	e) PRZR vent valves - CLOSED 1-RC-SOV-101A-1 1-RC-SOV-101A-2 1-RC-SOV-101B-1 1-RC-SOV-101B-2
	RO	Reports Yes, PRZR vent valves closed

Event Description: Loss of Offsite Power, ECA-0.0

Cue: By Examiner.

		ECA-0.0 NOTES Prior to Step 4: Local actions performed in the field may require use of the following: Sound Powered Headphones to communicate and coordinate with Control Room or other locations. Appropriate Vital Area Key to access locked areas.
	SRO	4. CHECK AFW FLOW – GREATER THAN 350 GPM [450 GPM]
	BOP	Reports No, 0 gpm AFW flow indicated.
		Step 4 RNO
	SRO	Do the following: Check TD AFW pump running. IF NOT, THEN manually open steam supply valves.
	BOP	Reports No, TDAFW pump not running, opening steam supply valves. Monitors TDAFW start, and reports AFW Indicated at (actual AFW indicated).
		CT-2: **Establish AFW Flow during SBO**. Establish greater than 350 gpm AFW flow before wide range level in any 2 steam generators is less than 7%.
		TS 3.7, Table 3.7-2, Item 3b, RCP undervoltage starts turbine driven pump, Operator Action 20, With current plant conditions, RCS Temperature and pressure must be reduced to less than 350 °F/450 psig in the next 12 hours. (**Recommend consideration of TS determination concerning TDAFW as a follow-up question, post scenario, at the Evaluator's discretion**).

Event Description: Loss of Offsite Power, ECA-0.0

Cue: By Examiner.

		ECA-0.0
	SRO	CAUTIONS prior to Step 5: If EDG 3 is loaded on 2J emergency bus, an evaluation should be made prior to taking any actions affecting EDG 3. Instrument Air must be restored in a timely manner using 1-IA-C-1, 2-IA-C-1, or the Temporary Diesel Driven Air Compressor. Emergency Bus restoration must consider operation of an emergency bus supplied air compressor. Breaker 15J3 will not close automatically with an Undervoltage or Degraded Voltage Signal on Unit 2 J Bus, except with a valid Unit 1 SI signal.
	RO/BOP	Acknowledge CAUTIONS.
	SRO	5. TRY TO RESTORE POWER TO ANY AC EMERGENCY BUS
		a) Check EDG – RUNNING May query Unit 2 concerning status of #2 and #3 EDG. Unit 2 will respond that #3 EDG is supplying 2J Emergency Bus; #2 EDG started but tripped on overspeed. Report No #1 EDG not running; there appears to be a problem with the air start motors.
	SRO	Step 5. RNO: Do the following: 1) Put EDG in EXERCISE.
	BOP	**Places #1 EDG in EXERCISE**.
	SRO	2) Start EDG.
	BOP	**Presses Engine Start pushbutton, monitors #1 EDG speed rising and stabilizing at 900 RPM**. Reports #1 EDG is NOT running.
	SRO	3) Check established or establish generator voltage by depressing Field Flash pushbutton.
	SRO	5) GO TO Step 5c.

Event Description: Loss of Offsite Power, ECA-0.0

Cue: By Examiner.

		ECA-0.0, Step 5 (Continued)
	SRO	c) Check AC emergency buses - AT LEAST ONE ENERGIZED
	RO/BOP	Reports No, 1H and 1J emergency busses are NOT energized.
	SRO	1) IF both EDGs NOT running THEN initiate 0-AP-17.06, AAC DIESEL GENERATOR – EMERGENCY OPERATIONS AND GO TO Step 6.
		ECA-0.0, Step 6
	SRO	6. CHECK LOSS OF EMERGENCY BUSES - DUE TO APPENDIX R FIRE
	RO	Reports No, Loss due to a loss of off-site power.
	SRO	Goes to Step 8.

Event Description: Loss of Offsite Power, ECA-0.0

Cue: By Examiner.

		ECA-0.0, Step 8
	SRO	**Caution Prior to Step 8**: If an SI signal exists or an SI signal is actuated during this procedure, it should be reset to permit manual loading of equipment on an AC emergency bus.
	RO	Acknowledges Caution.
	SRO	8. DEFEAT AUTO START OF EQUIPMENT: a) Put the following switches in Pull to Lock: **Air recirc fans** ("A" & "C" CTMT Recirc Fans) **LHSI pumps** **OSRS pumps** **ISRS pumps** **CS pumps** **BC pumps** **PRZR heaters** ("A" PRZR heater) **CHG pumps** **MD AFW pumps** **CN pumps** **Filter exhaust fans** (1-VS-F-58A) **CC pumps**
	RO	Places component switches in PTL/Lockout.
	SRO	b) Check breakers open by checking breaker position indicating lights - RED LIGHTS NOT LIT CS pumps ISRS pumps
	RO	Reports Yes, Red lights not lit.
	SRO	c) Check breakers open by checking breaker position indicating lights - RED LIGHTS NOT LIT. MD AFW pumps
	RO	Reports Yes, Red Light not lit.

Event Description: Loss of Offsite Power, ECA-0.0

Cue: By Examiner.

	SRO RO	ECA-0.0, Step 9 9. LOCALLY ISOLATE RECP SEALS. • RCP Seal Return, 1-CH-MOV-1381 • RCP Seal injection, 1-CH-MOV-1370 • Seal Injection needle valves, 1-CH-294, 1-CH-297, 1-CH-300. • Thermal barrier CC, 1-CC-96. *RO closes 1-CH-MOV-1381, and 1-CH-MOV-1370.* *RO directs Field operator to close Seal Injection valves 1-CH-294, 1-CH-297, and 1-CH-300; and 1-CC-96.*
	SRO RO	ECA-0.0 Step 10 10. CHECK COMMUNICATIONS CAPABILITY. • Gaitronics or • **Station Radios**
	SRO RO	ECA-0.0 Step 11 11. TAKE ACTION TO CONSERVE INTAKE CANAL INVENTORY. a. Check Unit 2J bus – ENERGIZED. *RO reports 2J IS ENERGIZED.* *b. Check closed or close condenser circ water isolation valves:* • ***1-CW-MOV-100A*** • ***1-CW-MOV-106B*** • ***1-CW-MOV-100C*** • ***1-CW-MOV-106D*** c. Initiate SW isolation IAW Attachment 4. *RO closes Circ Water isolation valves.* *RO directs field operator to initiate SW isolation IAW Attachment 4*
	SRO	ECA-0.0 Step 12 Caution before Step 12 • When power is restored to either AC emergency bus from an offsite source or the associated EDG recovery actions should continue, starting with Step 33. • If the AAC Diesel Generator is supplying only Bus 1J and is not required by Unit 2, recovery actions should continue, starting with Step 33. 12. TRY TO LOCALLY RESTORE AC POWER. a. Initiate AP-17 series procedures to restore EDGs. b. Initiate 0-AP-10.08, STATION POWER RESTORATION, to restore power to transfer buses. c. Initiate backfeed alignment. Note: At this time power should be restored to 1J bus from the AAC Diesel Generator

Op-Test No.: Surry 2016-1 Scenario No.: 4 Event No.: 6

Event Description: Loss of Offsite Power, ECA-0.0

Cue: By Examiner.

	SRO RO/BOP	ECA-0.0 Step 33. 33. CHECK IF 4160V AC EMERGENCY POWER IS RESTORED. a. AC emergency buses – AT LEAST ONE ENERGIZED FROM THE FOLLOWING. • Off Site Source • Associated EDG • **AAC Diesel Generator** b. Check FSGs – Any implemented. *No, go to Step 33.d* c. Perform 1-FSG-13. *Not needed goes to next step.* d. Check Bus 1H or 1J ENERGIZED FROM ANY OF THE FOLLOWING. • Off Site Source • Associated EDG • **AAC Diesel Generator** Goes to Step 34.
	SRO RO	ECA-0.0 Step 34 34. MANUALLY OR LOCALLY CONTROL SG PORVS TO STABILIZE SG PRESSURES. *RO checks SG PORVs and adjusts if necessary. (Should not be necessary at this time)*
	SRO RO	ECA-0.0 Step 35 35.CHECK FOLLOWING EQUIPMENT LOADED ON AC EMERGENCY BUS • CHG pump SW pump • CHG pump CC pump • 480 VAC MCCs • Vital bus UPS • Gaitronics • One control room chiller(Two Control Room Chillers if any MCR or ESGR temperature indicator greater than 84°F, monitor approximately every hour) • One Unit 1 Control Room AHU and one Unit 2 Control Room AHU. • One Unit 1 ESGR AHU and one Unit 2 ESGR AHU • Aux Vent filtered exhaust fan • Turning Gear oil pump • Turbine Turning Gear • Common Radiation monitoring cabinets • Semi Vital Bus • IA Compressor. *RO checks all equipment available or directs field operator to start equipment as necessary.*

Event Description: Loss of Offsite Power, ECA-0.0

Cue: By Examiner.

		ECA-0.0 Step 36 Note before Step 36. NOTE: If RCP seal cooling was previously isolated, further cooling of the RCP seals will be established by natural circulation cooldown as directed in subsequent guidelines. 36. IDENTIFY RECOVERY PROCEDURE. a. Check RCS subcooling based on CETCs – GREATER THAN 30ºF [85 ºF]. b. Check PRZR level – GREATER THAN 22% [50%]. c. Check SI equipment satus: • SI equipment HAS REMAINED SECURED UPON AC POWER RESTORATION. • SI flow – isolated. d. GO TO 1-ECA-1.1, LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED. The Scenario may be terminated when Lead Evaluator determines.

Event Description: Loss of Offsite Power, ECA-0.0

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
	BOP	0-AP-17.06, AAC DG Generator – Emergency Operations NOTES Prior to Step 1: A one-line diagram showing the AAC Electrical distribution is provided in Attachment 1. The AAC Diesel Generator should automatically start when Transfer Buses D and F OR E and F are deenergized. 1. CHECK EMERGENCY BUSES 1J AND 2H - EITHER OR BOTH DEENERGIZED Yes, both de-energized. **CT-3:** Align AAC Diesel to respective emergency bus 1J prior to declaration of an ELAP. Critical Task start time **begins** when crew enters ECA-0.0, and Critical Task stop time **ends** when AAC DG is loaded on the 1J bus.
	BOP	0-AP-17.06 CAUTION Prior to Step 2: Loading of the AAC Diesel should consider availability of Instrument Air from 1-IA-C-1 or the Temporary Diesel Air Compressor. 2. GO TO THE APPROPRIATE STEP BASED ON DESIRED USE OF THE AAC DIESEL GENERATOR Step 3, Only Bus 1J to be energized Goes to Step 3.
	BOP	0-AP-17.06 3. CHECK AAC DIESEL GENERATOR - AVAILABLE AND RUNNING Annunciator 0-WD-C2, AAC SYSTEM AVAILABLE BUS 1D - LIT AND Annunciator 0-WD-D1, AAC GENERATOR TRIP - NOT LIT Locates to the Waste Disposal Board and verifies annunciator status as above.

Event Description: Loss of Offsite Power, ECA-0.0

Cue: By Examiner.

		0-AP-17.06
	BOP	**CAUTION Prior to Step 4**: An overcurrent fault on 15D1 will prevent 0-AAC-BKR-05L3 from closing. NOTE Prior to Step 4: Annunciator 0-WD-C2, AAC SYSTEM AVAILABLE BUS 1D, should go out when 0-AAC-BKR-05L3 closes. Acknowledge CAUTION and NOTE. 4. ENERGIZE TRANSFER BUS D BY CLOSING 0-AAC-BKR-05L3 a) At Unit 1 EDG 3 Control Panel, place Transfer Switch NORMAL/AAC, 0-AAC-43-15J8, in AAC position **Locates to the #3 EDG Panel and places Switch in AAC Position**. b) Check Annunciator 1K-D3, BUS 1D UNDERVOLT - NOT LIT Verifies annunciator 1K-D3 – Not LIT. :
		0-AP-17.06
	BOP	5. CHECK OR PLACE THE FOLLOWING LOADS IN PTL a) Put the following switches in PTL / LOCKOUT: **1-VS-F-1B (14J7)** **1-SI-P-1B (14J3)** **1-RS-P-2B (14J8)** **1-RS-P-1B (14J4)** **1-CS-P-1B (14J5)** **PRZR Heater Group A (14J9)** **1-CH-P-1B (15J5)** **1-CH-P-1C (15J2, ALT)** **1-FW-P-3B (15J4)** **1-CC-P-1B (15J10)** 1-VS-F-58B, if powered from Alternate source, 14J13 Places control switches in PTL / Lockout (bolded above). b) Check breakers open by checking breaker position indicating lights - RED LIGHTS NOT LIT 1-CS-P-1B (14J-5) 1-RS-P-1B (14J-4) Verifies indicating lights OUT.

Event Description: Loss of Offsite Power, ECA-0.0

Cue: By Examiner.

	BOP	0-AP-17.06, Step 5 c) c) Check breaker open by checking breaker position indicating lights - RED LIGHTS NOT LIT 1-FW-P-3B (15J4) Identifies Red Light NOT LIT; Goes to Step 5.
	BOP	0-AP-17.06 Step 6 6. ENERGIZE EMERGENCY BUS 1J a) **Place the Sync switch for 15J8 in ON** b) Check breaker 15J3 is OPEN **Note**: May reset amber light by taking 15J8 control switch to Trip and return to Auto-After-Trip position. Notifies the Team that 1J Emergency Bus will be energized. c) **Close breaker 15J8 by holding control switch in the Closed position for at least five seconds** d) **Place the Sync switch for 15J8 in OFF** Performs actions bolded above. Reports that 1J Bus has been Energized.
		End EVENT #6 **End SCENARIO**

FOLDOUT PAGES FOR REFERENCED PROCEDURES

CONTINUOUS ACTIONS PAGE FOR 1-ECA-0.0

1. ALTERNATE LOW PRESSURE FEEDWATER
   Perform Attachment 10 if TD AFW flow is lost and is NOT immediately recoverable, after Step 5 has been performed.

2. LOSS OF VITAL INSTRUMENTATION OR CONTROL POWER
   Perform 1-FSG-7, LOSS OF VITAL INSTRUMENTATION OR CONTROL POWER, if ELAP is in progress and EITHER condition listed below occurs:
   - ALL DC bus voltages – LESS THAN 105 VDC

     OR
   - Required vital instruments – CAN NOT BE MAINTAINED ENERGIZED

3. LOW DECAY HEAT TEMPERATURE CONTROL
   Perform 1-FSG-9, LOW DECAY HEAT TEMPERATURE CONTROL, if SG pressure can NOT be maintained at or above the target pressure and EITHER condition below:
   - SG pressure 300 psig psig with accumulators NOT isolated/vented

     OR
   - SG pressure 175 psig with accumulators isolated/vented

4. ALTERNATE ECST MAKEUP
   Perform 1-FSG-6, ALTERNATE ECST MAKEUP, if ECST level – LESS THAN 20% and ALL conditions listed below occurs:
   - ELAP is in progress

     AND
   - ECST is available

     AND
   - Step 4 has been performed

5. LONG TERM RCS INVENTORY CONTROL
   Perform 1-FSG-1, LONG TERM RCS INVENTORY CONTROL, if ELAP is in progress and ANY condition listed below occur:
   - PRZR level - LESS THAN 35% [63%]

     AND
   - Time and personnel - AVAILABLE

     OR
   - RVLIS - LESS THAN 78%

     AND
   - RCS pressure - LESS THAN 400 psig

     OR
   - Prior to 16 hours since Loss Of All AC

SIMULATOR OPERATOR'S GUIDE

Simulator Setup

Initial Conditions:

Recall IC -376 **and implement TRIGGER #30 to activate all passive malfunctions and verify Trigger #30 implemented.**

Open the SimView window and add the following point to it:

- asp_ao_off

Enter the following MALFUNCTIONS:

Malfunction	Delay	Ramp	Trigger	Value	Final	Trigger Type (Auto or Manual)
FW47 DISABLE FW-P-2 AUTO START	0	0	30	FALSE	TRUE	ACTIVE
CC07 DISABLE CC-HCV-100 AUTO CLOSURE	0	0	30	FALSE	TRUE	ACTIVE
RM0209 PROCESS RAD MONITOR RI-CC-105 FAILURE	10	0	1	0	0.5	MAN
PG0202 DISABLE PG-P-1B AUTO START	0	0	3	FALSE	TRUE	MAN
PG0101 THERMAL OVERLOAD PG-P-1A	10	0	3	FALSE	TRUE	MAN
RC1503 PRZR PRESS CONTROLLER FAILURE (1-RC-PC-1444H)	10	0	5	0	1	MAN
EL0801 LOSS OF SCREENWELL TRANSFORMER 1	10	0	7	FALSE	TRUE	MAN
EL01 LOSS OF OFFSITE POWER	10	0	9	FALSE	TRUE	MAN
ED0201 EDG 1 AIR START SYSTEM FAILURE	0	0	9	FALSE	TRUE	MAN
ED0602 EMERG DIESEL 2 OVERSPEED	0	0	9	FALSE	TRUE	MAN

SIMULATOR OPERATOR'S GUIDE

Enter the following Remote Functions

Description	Delay	Ramp	Trigger	Value	Final	Trigger Type (Auto or Manual)
SA_223 SERVICE AIR COMPRESSOR SA-C-2C DISCHARGE ISO VALVE	2:00	1:00	11	0	100	MAN
CH_294 RC PMP A SEAL ISOL VLV	2:00	0	13	31	0	MAN
CH_297 RC PMP B SEAL ISOL VLV	2:00	0	13	31	0	MAN
CH_300 RC PMP C SEAL ISOL VLV	2:00	0	13	31	0	MAN
SW_39 OUTLET SW ISOLATION VALVE FM 1-CC-E-1A	2:00	0	15	100	0	MAN
SW_35 OUTLET SW ISOLATION VALVE FM 1-CC-E-1B	2:00	0	15	100	0	MAN
SW_52 OUTLET SW ISOLATION VALVE FM 1-BC-E-1A	2:00	0	15	100	0	MAN
SW_48 OUTLET SW ISOLATION VALVE FM 1-BC-E-1B	2:00	0	15	100	0	MAN
SW_43 OUTLET SW ISOLATION VALVE FM 1-BC-E-1C	2:00	0	15	100	0	MAN
FW_141 AUX FW PUMP FW-P-2 discharge flow to hdr A isol vlv	2:00	0	17	100	0	MAN
FW_156 AUX FW PUMP FW-P-3A discharge flow to hdr A isol vlv	2:00	0	17	100	0	MAN
FW_171 AUX FW PUMP FW-P-3B discharge flow to hdr A isol vlv	2:00	0	17	100	0	MAN

SIMULATOR OPERATOR'S GUIDE

Enter the following EVENT TRIGGERS:

TRIGGER	TYPE	DESCRIPTION
1	MAN	PROCESS RAD MON FAILURE, RI-CC-105
3	MAN	THERMAL OL PG-P-1B, WITH AUTO START FLR
5	MAN	PRZR PRESS CONTROLLER, 1-RC-PC-1444H, FAILURE
7	MAN	LOSS OF SCREENWELL XFMR 1
9	MAN	LOSS OF OFFSITE, WITH EDG 1AND EDG 2 FAILURE
11	MAN	STARTS TEMP DIESEL AIR COMPRESSOR
13	MAN	RCP SEAL INJECTION ISOLATION
15	MAN	SW ISOLATION
17	MAN	AUX FW ISOLATION OF H HEADER
30	MAN	DISABLE FW-P-2 AUTO START
30	MAN	DISABLE CC-HCV-100 AUTO CLOSURE

SIMULATOR OPERATOR'S GUIDE

Verify the following control room setup:

- ❑ Place the simulator in RUN and verify normal 5% power operation indications.
- ❑ Reset the ROD CONTROL SYSTEM
- ❑ Verify SF/FF temp recorder is installed.
- ❑ Verify Red Magnets on the following components: NONE
- ❑ Verify 1-RM-RI-112 aligned to A/B SG and 1-RM-RI-113 aligned to C SG (magnets).
- ❑ Verify Ovation System operating.
- ❑ Reset ICCMs.
- ❑ Verify Component Switch Flags.
- ❑ Verify Brass Caps properly placed.
- ❑ Verify SG PORVs set for 1035 psig.
- ❑ Verify Rod Control Group Step Counters indicate properly.
- ❑ Verify Ovation CRT display.
- ❑ Advance Charts
- ❑ Verify Turbine Thumb Wheel Settings @120 rpm/min and Position 6
- ❑ Verify Containment Instrument Air Compressors are on Inside Suction (all RMs reset)
- ❑ Verify all ARPs have been cleaned

❑ 1C-B8	❑ 1D-B4	❑ VSP-J6	❑ VSP-L7
❑ 0-RM-L5	❑ 0-RM-M5	❑ 0-BR-10	❑

- ❑ Verify CLEAN copies of the following procedures are in place:

❑ 1-GOP-1.8	❑ 1-OP-TM-001	❑ 1-OP-CH-021	❑ 0-OPT-RM-001
❑ 1-AP-31.0	❑ 0-AP-12.01	❑ 0-AP-17.06	❑ 1-ECA-0.0
❑ 0-AP-53.00	❑	❑	❑

- ❑ **Verify Reactivity Placard is current.**
- ❑ Verify ALL PINK MAGNETS are accounted for.

SIMULATOR OPERATOR'S GUIDE

- ❑ Reset Blender Integrators for Boric Acid to 100 and PG 1000.

Brief

This simulator performance scenario is performed in the EVALUATION MODE. You should not direct questions to the evaluators. Otherwise, you should perform as if you were in the MCR.

Your ability to maintain a log is not being graded, but maintaining a rough log is recommended to help during briefs.

If you need to communicate with the Unit 2 operator, verbally state, "Unit 2" and an instructor will locate to the Unit 2 area and respond to you as quickly as possible.

In the unlikely event that the simulator fails such that illogical indications result, the session will be terminated. In other words, respond to what you see. If there is a problem with the simulation, the session will be terminated or adjusted as appropriate based on the specific problem.

Assign operating positions.

Ask for and answer questions.

Conduct shift turnover:

The initial conditions.

Unit 1 currently operating at ~5% reactor Power.

Unit #2 is at 100% power.

Shift orders are to place the Unit on-line and commence a ramp to 30% in accordance with 1-GOP-1.8, Unit Startup, HSD to Max Allowable Power, Step 5.6.13; and 1-OP-TM-001, Turbine – Generator Startup to 20% - 25% Turbine Power, Section 5.7. Station Management has given permission to continue the startup.

Current Boron concentration is 1415 ppm. 8.0 weight percent in the "A" BAST.

A surrogate operator will be used for feed control until the Main Feed Reg Valves are placed in Automatic and the Feed Reg bypass valves are closed. This operator's role is limited to SG NR level control and will not be available to communicate with field operators or provide peer checks of control board operations.

Session Conduct:

- Ensure conditions in Simulator Set-up are established.
- **Ensure Trigger 30 is active prior to team entering the simulator.**
- Verify Exam Security has been established and ASP_AO_OFF = True.

EVENT 1: Place Unit on line, commence ramp up

Operations Supervisor/Management:

- **If contacted,** acknowledge placing Unit on-line.

System Operator (SOC)/MOC:

- **When contacted**, acknowledge Unit 1 on-line.

Field Operators:

- **If contacted**, Turbine Building Operator is monitoring Lube Oil temperatures and will adjust cooling flow as necessary.
- **If contacted:** Operator reports main transformer pumps and fans operating.

Polishing Building:

- **If contacted**: 6 polishing beds are in service.

STA:

Will monitor ramp.

SIMULATOR OPERATOR'S GUIDE

EVENT 2 **1-CC-RI-105 Fails high with no Auto Action**

When cued by examiner, implement **Trigger #1**.
Have copy of OPT-RM-001 ready for Unit 2 to provide to BOP.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the failure 1-CC-RI-105.
- **If contacted,** will acknowledge TS 3.13 requirement to maintain the CC Surge Tank Vent Valve closed.
- **If contacted,** will contact I&C.
- **If contacted,** will take responsibility for writing the CR.

Unit 2 Operator:

- **If asked**, Unable to respond to CC RM alarm.
- **When asked**, Will provide copy of 0-OPT-RM-001.
- **When asked,** SOV-CC-200 has been placed in close**.**

STA:

- **If contacted**, will acknowledge the failure of 1-CC-RI-105. The individual(s) contacted will also acknowledge (but not confirm/deny) any TS LCOs.
- **If contacted,** will take responsibility for writing the CR.
- **If the team has a transient brief:** The STA will have no input.

Field Operators:

- **If contacted**, field operators will report no issues at the RM detector.

Maintenance/Work Week Coordinator:

- **If contacted**, will acknowledge instrumentation failure and Notify I&C.

Rad Protection/HP

- **If contacted**, acknowledge failure of CC Rad Monitor.

Role play as other individuals as needed.

EVENT 3 **1-PG-P-1A trips, no Auto Start 1-PG-P-1B.**

When cued by examiner, implement **Trigger #3**.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the trip of 1-PG-P-1A, and failure of 1-PG-P-1B to auto start.
- **If contacted,** will take responsibility for writing the CR.
- **If requested**. Will notify Electrical Maintenance to investigate.

STA:

- **If contacted**, will acknowledge the trip of 1-PG-P-1A, and failure of 1-PG-P-1B to auto start.
- **If contacted,** will take responsibility for writing the CR.
- **If the team has a transient brief:** The STA will have no input.

Field Operators: (three minutes elapse from dispatch to report).

- **If contacted**, will check local status of 1-PG-P-1A, no abnormalities noted.
- **If contacted**, 1-PG-P-1B is operating normally following start.
- **If contacted**, will check status of 1-PG-P-1A breaker, MCC 1B1-1A 1C. Will report that breaker has thermalled.

Work Week Coordinator:

- **If contacted**, will acknowledge thermal trip of 1-PG-P-1A and take responsibility for contact of Electrical Maintenance.

Unit 2:

- **If contacted**, will acknowledge the loss of PG flow and restoration of PG when 1-PG-P-1B started.

Role-play as other individuals as needed.

EVENT 4 **PRZR Spray valve fails open.**

When cued by examiner, implement **Trigger #5**.

Critical Task 1: Close the Spray valve before Reactor trip on low pressure. If the RO fails to take timely action in response to the Spray Valve opening, an automatic reactor trip on RCS Low Pressure will occur; an unanticipated reactor trip should be considered as failure criteria.

Operations Supervisor/Management:

- **If contacted**, acknowledge failure of PRZR Spray valve controller.
- **If asked,** will notify I&C of the failure.
- **If asked,** will notify the OMOC.
- **When notified,** acknowledge any Tech Spec requirements (DNB) due to the failure, but do not imply concurrence with SRO Tech Spec determination.

STA:

- **If contacted**, acknowledge the failure, acknowledge the Tech Spec requirements for the failed channel, but do not imply concurrence with the Tech Spec determination by the SRO.
- **When notified,** VPAP-2802, Reg Guide 1.97, TRM Section 3.3, and EP-AA-303 have been reviewed and results discussed with the Shift Manager.
- **If the team has a transient brief:** The STA will have no input.
- **If directed,** will monitor RCS pressure recovery using PCS.

I&C:

- **If notified**, acknowledge the failure and the need to place the channel in trip.

Maintenance/Work Week Coordinator:

- **If contacted**, will notify I&C of the failed channel, have I&C prepare to place the channel in trip, and prepare to troubleshoot the cause of the failure.

Role play as other individuals as needed.

EVENT 5 Loss of 1G Screenwell Transformer-.

When cued by examiner, implement **Trigger #7**.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the loss of 1G transformer and entry into AP-12.01.
- **If contacted,** will take responsibility for writing the CR.

Unit 2 Operator:

- **If directed**, acknowledge that they need to implement AP-12.01.
- **If directed**, acknowledge they need to throttle waterboxes.

STA:

- **If contacted**, will acknowledge the loss of 1G transformer.
- **If contacted,** will take responsibility for writing the CR.
- **If the team has a transient brief:** The STA will state have no input.
- **If directed,** will assist the Team in screenwell distribution status.

Field Operators:

- **If contacted,** will report to the low levels and/or switchyard as directed. The outside operator will report a large bird, dead on top of 1G transformer.
- **If directed,** to perform OP-48.1.1, wait 5 minutes and report all local checks for CW pumps are sat.

Maintenance/Work Week Coordinator:

- **If contacted**, will acknowledge the loss of 1G transformer and will commence investigations and/or efforts to repair.

EVENTS 6 Loss of Offsite power, ECA-0.0.

When cued by examiner, implement **Trigger #9**.

Critical Tasks

CT-2: Establish AFW Flow during SBO; Establish greater than 350 gpm AFW flow before wide range level in any 2 steam generators is less than 7%.

CT-3: Align AAC Diesel to respective emergency bus 1J prior to declaration of an ELAP.

Operations Supervisor/Management:

- **If contacted**, acknowledge LOOP, and Reactor Trip of Both Units.

Unit Two:

- **If contacted**, Event initiated, acknowledge WD, BR, and RMA alarms.
- **If asked**, will report that #2 EDG is NOT running (started but tripped immediately), and #3 EDG is loaded on 2J Emergency Bus.

Field Operators:

- **If asked**, to start and align temporary diesel air compressor, **Insert Trigger 11**. After 3 minutes inform MCR that Temporary Diesel air compressor is running.
- **If asked,** to close seal injection valves, **Insert Trigger 13**, and inform operator after 2 minutes that Seal injection valves are isolated.
- **If asked,** to close thermal barrier isolation, 1-CC-96, **Insert Trigger 13**, and inform operator after 2 minutes that 1-CC-96 IS isolated.
- **If asked,** to isolate SW IAW Attachment 4, **Insert Trigger 15,** and inform operator after 2 minutes that Attachment 4 is complete.
- **If asked,** to isolate AFW H Train, 1-FW-141/156/171, **Insert Trigger 17,** wait 2 minutes then inform operator that H Train of AFW is isolated.

Maintenance/Work Week Coordinator:

- **If contacted**, will acknowledge the failures and commence investigations.

STA:

- **If contacted**, acknowledge LOOP and go to floor 10 minutes following call.
- **If the team has a transient brief:** The STA will have no input for the brief.

Role play as other individuals as needed.

U.S. Nuclear Regulatory Commission
Surry Power Station

SR16301
Simulator Job Performance Measure 001AA2.05
[Alternate Path]

Applicant_____ Start Time_____

Examiner_____

Date _____ Stop Time_____

Title

Adjust the PRNIs in accordance with 1-OPT-RX-001

K/A: 001AA2.05 Ability to determine and interpret the following as they apply to the Continuous Rod Withdrawal: Uncontrolled rod withdrawal, from available indications. (4.4 / 4.7)

Applicability	**Estimated Time**	**Actual Time**
RO/SRO	10 Minutes	____ Minutes

Conditions

- **This JPM to be Pre-briefed with marked up copy of procedure.**
- This JPM is performed in the Simulator.
- Unit 1 operating at 89.5% power. 1-OPT-RX-001 has been completed up to Section 6.2.

Standards

- Place rods in Manual, adjust N44 IAW 1-OPT-RX-001, Section 6.2 and Attachment 1 then return rods to Auto.
- Upon detecting continuous rod motion, place rods in Manual again.
- When rods do not stop in Manual, trip the reactor IAW 0-AP-1.00, Rod Control System Malfunction and 1-E-0, Reactor Trip or Safety Injection.

Initiating Cues

- Unit 1 operating at 89.5% power.
- The Unit 1 RO has completed 1-OPT-RX-001, Section 6.1.
- You are to perform 1-OPT-RX-001, Section 6.2.

Terminating Cues

- Reactor tripped IAW 0-AP-1.00, Rod Control System Malfunction and 1-E-0, Reactor Trip or Safety Injection.

Procedures

- 1-OPT-RX-001, Reactor Power Calorimetric Using PCS Computer Program, Rev. 51
- 0-AP-1.00, Rod Control System Malfunction, Rev. 27
- 1-E-0, Reactor Trip or Safety Injection, Rev. 71

Tools and Equipment

- None

Safety Considerations

- None

Simulator Setup

- Recall **IC-377**.

  -OR-

- Call up 90% power IC and initialize.
- Place simulator in RUN.
- Adjust N41, N42, and N43 to 90% indication using drawer gain control.
- Adjust N44 to an indication of 88% power using the drawer gain control.
- Enter malfunction RD0102, Continuous Rod Withdrawal All Modes; set to **Trigger 1.**
- Place Simulator in Freeze until JPM performance.

Notes

- The Applicant is given the marked-up copy of 1-OPT-RX-001. This evolution may be pre-briefed.
- When possible place Simulator in RUN prior to the candidate entering the Simulator.

PERFORMANCE CHECKLIST

Notes to the Evaluator

- Task critical elements are **bolded**.
- *An additional instructor may be needed to silence alarms for the examinee.*
- **START TIME:**

STEP 1: Reviews Purpose, Initial Conditions, and Precautions and Limitations of 1-OPT-RX-001. **STANDARD:** a) Reviews Purpose 1.1, 1.2, and 1.3. b) Reviews Initial Conditions 3.1 and 3.2. c) Reviews Precautions and Limitations 4.1 through 4.24; noting 4.3, and 4.6. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 2: Compare each NI channel percent power indication with the Calcalc Total Thermal Pwr (UFM, Venturi or Normalized Feedwater) or Calcalc 10-Min Avg Pwr (Steam Flow), whichever is the standard. (Each NI should be within + 2% and - 0% of the Calorimetric value if Reactor power is greater than or equal to 90%, OR within + 4% and - 0% of the Calorimetric value if Reactor power is less than 90%.). *(Step 6.2.1)* **STANDARD:** a) Reads and Initials Step 6.2.1. b) Refers to Step 6.1.12 to determine Calcalc Total Thermal Power: 89.5%. c) Locates to PRNI drawers and observes N41 indicating 90%, N42 indicating 90%, N43 indicating 90%, and N44 indicating 88%. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 3: **NOTE**: Gain potentiometer adjustment can cause average flux deviation alarms as well as high flux rod stop alarms. This should be anticipated when adjusting gain potentiometers. (Reference 2.4.6). **STANDARD:** Reviews NOTE prior to Step 6.2.2. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 4: IF the NI Channel is within tolerance but adjustment will better align it with the calorimetric, THEN obtain Shift Supervision concurrence AND adjust NI Channel IAW Attachment 1 to the value recorded in Step 6.1.12 or Step 6.1.13. Record initials on Attachment 1. IF no NI adjustment is made, OR NI is NOT within tolerance, THEN enter N/A. *(Step 6.2.2)* **STANDARD:** Enters N/A and Initials Step 6.2.2. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 5: IF NI channel is NOT within tolerance, THEN obtain Shift Supervision concurrence AND adjust the gain potentiometer on the front panel of each NI Channel IAW Attachment 1 to the value recorded in Step 6.1.12 or Step 6.1.13. Record initials on Attachment 1. IF all NI channels are within tolerance, THEN enter N/A. *(Step 6.2.3)* **STANDARD:** a) Initials Step 6.2.3. b) Reports to Shift Manager (Evaluator) that N44 requires adjustment, and requests authorization to make these adjustments. c) Initiates Attachment 1. **EVALUATOR'S NOTE:** **If asked:** Shift Supervision has concurred with adjustment of PRNIs. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 6: Attachment 1, 1-OPT-RX-001, NI Calibration. **CAUTION**: To prevent introducing non-conservative High Flux Trip and High Flux Rod Stop setpoints, setpoint changes required by the following step must be completed before any associated Gain Potentiometer adjustments are performed. **STANDARD:** Reviews CAUTION Prior to Step 1 of Attachment 1. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 7: IF Reactor power is less than 90% AND the Gain Potentiometer on any NI will be decreased, THEN before adjusting NIs, have I & C lower the High Flux Trip and High Flux Rod Stop setpoints on all NIs based on current Reactor power level. Otherwise, enter N/A. (Reference 2.4.5). *(Attachment 1, Step 1)* **STANDARD:** Enters N/A and Initials Step 1 of Attachment 1. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 8: N41. (*Attachment 1 Table*) **STANDARD:** a) Enters N/A in Item 3) block, N41 column of the Table. b) Enters N/A in item 4) block, N41 column of the Table. c) Enters N/A in Item 5) block, N41 column of the Table. **EVALUATOR'S NOTE:** A **KEY** is provided on Page 9 of 11, depicting the completed Table on Page 26 of 1-OPT-RX-001. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 9: N42. (*Attachment 1 Table*) **STANDARD:** a) Enters N/A in Item 3) block, N42 column of the Table. b) Enters N/A in item 4) block, N42 column of the Table. c) Enters N/A in Item 5) block, N42 column of the Table. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 10: N43. (*Attachment 1 Table*) **STANDARD:** a) Enters N/A in Item 3) block, N43 column of the Table. b) Enters N/A in item 4) block, N43 Column of the Table. c) Enters N/A in Item 5) block, N43 column of the Table. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 11: N44. (*Attachment 1 Table*) **STANDARD:** **a) Places Rod control in manual, and initials item 2) block, N44 column of the Table.** a) Enters 88% in Item 3) block, N44 column of the Table. b) Checks alternate indications of reactor Power (i.e., N41, N42, N43, Turbine Impulse Pressure, and Calorimetric power) prior to adjustment of N44 IAW P&L 4.6. **c) Adjusts gain control on N44 Drawer to 89.5% indication. (Band: 89.5 – 93.5%)** d) Enters Initials in item 4) block, N44 Column of the Table. e) Records 89.5% in Item 5) block, N44 column of the Table. f) Allows at least one (1) minute to pass before placing rod control in automatic following gain control manipulation. **g) Places Rod control in Automatic.** h) Identifies outward rod motion with no Tave/Tref deviation. **i) Returns rod control to manual.** j) Notes Rod Motion NOT stopped. **EVALUATOR'S NOTE:** **Booth Operator:** When rod control placed in Automatic for item g) above, actuate **Trigger 1**. NOTE: When N44 gain control is adjusted, it will be adjusted in the *clockwise* direction. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 12: Performs Immediate Action Steps of AP-1.00, Rod Control System Malfunction. a) Check for continuous rod withdrawal – YES. b) Stop rod motion. • Put ROD CONT MODE SEL switch in MANUAL • Check rod motion stopped – NO **c) Trip Reactor and GO TO 1-E-0, Reactor Trip or Safety Injection.** d) Performs 1-E-0 Immediate Actions. **EVALUATOR'S NOTE:** **Evaluator:** JPM may be stopped any time after the reactor is tripped. **Evaluator:** Evaluator should acknowledge Immediate Action Steps as they are announced by the Candidate. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 13: NOTIFY NUCLEAR SHIFT MANAGER (EVALUATOR) WITH STATUS OF TASK. When report of completion of AP-1.00 Immediate Actions made, Candidate should report completion of task. **COMMENTS:** **** JPM COMPLETE ****	**_____ SAT** **_____ UNSAT**

STOP TIME:

_____

_____

_____

_____

KEY
(for Examiner)

	NI-41	NI-42	NI-43	NI-44
2) Place rod control to MANUAL. Enter N/A if NI-44 will NOT be adjusted.				Candidate Initials
3) Record As Found NI power level for each channel to be adjusted. Enter N/A for channel(s) not being adjusted.	N/A	N/A	N/A	88%
4) Adjust the Gain Potentiometer on the front panel of each NI channel to the new Reactor Power value and initial appropriate block(s). Enter N/A for channel(s) not being adjusted.	N/A	N/A	N/A	Candidate Initials
5) Record As Left NI power level for each channel adjusted. Enter N/A for channel(s) not adjusted.	N/A	N/A	N/A	89.5%
6) Allow at least one minute to pass before placing the rod control back to AUTO. Enter N/A if NI-44 was NOT adjusted.				---------

Operator Directions Handout
(TO BE READ TO APPLICANT BY EXAMINER)

Initial Conditions

- Unit 1 is operating at 89.5%.
- The Unit 1 RO has completed 1-OPT-RX-001, Section 6.1, Calculating Reactor Power Using Primary Performance Program, and recorded CALCALC Total Thermal Power on Step 6.1.12.

Initiating Cues

- You are to perform 1-OPT-RX-001, Section 6.2, Adjusting NI Channels.

Operator Directions Handout
(TO BE GIVEN TO APPLICANT)

Initial Conditions

- Unit 1 is operating at 89.5%.
- The Unit 1 RO has completed 1-OPT-RX-001, Section 6.1, Calculating Reactor Power Using Primary Performance Program, and recorded CALCALC Total Thermal Power on Step 6.1.12.

Initiating Cues

- You are to perform 1-OPT-RX-001, Section 6.2, Adjusting NI Channels.

U.S. Nuclear Regulatory Commission
Surry Power Station

SR16301
Simulator Job Performance Measure 011EA1.11

Applicant_____ Start Time_____

Examiner_____

Date _____ Stop Time_____

Title

Isolate Leaking RSHX ("D")

K/A: 011EA1.11 Ability to operate and monitor the following as they apply to a Large Break LOCA: Long-term cooling of core. (4.2 / 4.2)

Applicability	**Estimated Time**	**Actual Time**
RO/SRO	8 Minutes	____ Minutes

Conditions

- Task is to be PERFORMED in the simulator.
- A LBLOCA has occurred on Unit 1. Following completion of 1-E-0, Attachment 1, Step 9d (Check OSRS pumps – NOT CAVITATING), Annunciator RM-C8, RS/SW HX D ALERT/FAILURE was received followed by Annunciator RM-D8, 1-SW-RI-117 High.

Standards

- 1-RS-P-2B , B OSRS pump, stopped.
- 1-RS-E-1D isolated (1-SW-MOV-104D and 1-SW-MOV-105D shut).
- 1-SW-P-5D, D RSHX RM SW pump, stopped.

Initiating Cues

- You are to perform Annunciator Response Procedure 1-RM-D8, 1-SW-RI-117 HIGH.

Terminating Cues

- Report of completion of Annunciator Response Procedure 1-RM-D8, 1-SW-RI-117 HIGH, Step 12.

Procedures

- 1-RM-D8, 1-SW-RI-117 HIGH (Rev 4)

Tools and Equipment

- None

Safety Considerations

- None

Simulator Setup

- Recall **IC-378**.

  -OR-

- Call up 100% power IC and initialize.
- Place simulator in RUN.
- Enter Malfunctions:
  - RC0101, RCS Cold Leg A Pipe Rupture; 50% severity
  - RS0504, Malf Leak Flow from RS-E-1D to SW System; 100% severity
- Place Simulator in Run. Perform Actions of E-0 until ORS Pumps start.
- Ensure RM-D8, 1-SW-RI-117 HI goes into alarm.
- Reset CLS signal when Containment pressure lowers to < 14.2 psia.
- Place Simulator in Freeze until JPM performance.

Notes

- When possible place Simulator in RUN prior to the candidate entering the Simulator.

PERFORMANCE CHECKLIST

Notes to the Evaluator

- Task critical elements are **bolded**.
- *An additional instructor may be needed to silence alarms for the examinee.*
- **START TIME:**

STEP 1: VERIFY ALARM - READINGS ON MONITOR OR CHART RECORDER GREATER THAN OR EQUAL TO HIGH SETPOINT. *(Step 1)* **STANDARD:** a) Reviews CAUTION prior to Step 1: Operation of the RSHX SW radiation monitors is not required to directly support RS functional requirements. b) Verifies 1-SW-RI-117 greater than the High alarm setpoint by pressing the drawer High pushbutton and observing indication less than current reading. c) May also verify that the red HIGH light is lit and bar graph LEDs are red. d) Verifies 1-RM-RR-150A, Pen 4 is trending with drawer indication. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 2: CHECK UNIT 2 - OPERATIONS NORMAL. *(Step 2)* **STANDARD:** Asks Unit 2 if Unit 2 Operation Normal or remembers Unit 2 status from initial briefing. **EVALUATOR'S NOTE:** **If asked**: Unit 2 is stable at 100% power. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 3: CHECK AFFECTED HX IN SERVICE. *(Step 3)* **STANDARD:** a) Checks SW Flow to 1-RS-E-1D by observing 1-SW-MOV-103A or 103B OPEN, GREEN lights Out, RED Lights Lit. b) Check SW flow to 1-RS-E-1D by observing 1-SW-MOV-104D and 1-SW-MOV-105D OPEN, GREEN Lights Out, RED Lights Lit. c) Check SW flow by observing SW flow through 1-SW-FI-106D, RS HX D SW OUTLET FLOW. d) Checks 1-RS-P-2B running by observing breaker closed indications, RED Light Lit and GREEN Light Out. e) Check amps indicated for 1-RS-P-2B and discharge pressure indication on 1-RS-PI-156B, DISCH PRESS PUMP B. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 4: PLACE ADDITIONAL RS HX(s) IN SERVICE AS REQUIRED. *(Step 4)* **STANDARD:** a) Identifies 1-RS-E-1A, 1-RS-E-1B, and 1-RS-E-1C in service by observing SW valves Open, SW Flow through the HXs, and 1-RS-P-1A/1B/2A running. b) Determines sufficient HXs in service to maintain heat sink for Reactor Core following shift to RMT. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 5: CONSULT WITH SHIFT SUPERVISION AND OMOC TO DETERMINE IF THE AFFECTED RSHX SHOULD BE REMOVED FROM SERVICE. *(Step 5)* **STANDARD:** a) Reviews CAUTION prior to Step 5: CAUTION: An operating RS train should NOT be secured unless sufficient redundant trains are available for containment heat removal. b) Consults with Shift Manager (Evaluator) to determine if affected RSHX should be removed from service. **EVALUATOR'S NOTE:** **If asked:** State that the OMOC has been consulted and recommends that 1-RS-E-1D be isolated. From Surry UFSAR Chapter 6: With a maximum service water temperature of 100°F, the recirculation spray subsystem design is conservative. There is a minimum 100% reserve capacity in recirculation spray at the onset of an accident. Within one day after the LOCA, the reserve capacity exceeds 400%. This would mean that removing one RSHX from service would be acceptable and the three remaining RSHXs are sufficient. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 6: CHECK AFFECTED RSHX TO BE REMOVED FROM SERVICE. *(Step 6)* **STANDARD:** Identifies 1-RS-E-1D to be removed from service. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 7: STOP ASSOCIATED RS PUMP AND PLACE IN PTL: *(Step 7)* **STANDARD:** **a) Stops 1-RS-P-2B.** b) Checks 1-RS-P-2B secured by observing zero (0) amps indicated, GREEN Light Lit and RED Light Out on breaker control switch, and pump discharge pressure on 1-RS-PI-156B, DISCH PRESS PUMP B. c) Acknowledges Annunciator 1A-H8, RS PP 2B LOCKOUT OR OL TRIP. **EVALUATOR'S NOTE:** Per 1-RM-D8, Step 7, the pump control switch should be placed in PTL. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 8: STOP ASSOCIATED RSHX SW PUMP: *(Step 8)* **STANDARD:** a) Reviews NOTE prior to Step 8: NOTE: CLS must be reset to allow securing RSHX SW pump from MCR. b) Verifies CLS is reset by verifying the following annunciators are NOT LIT: • 1B-A4 – CLS SYS COIL FAILURE • 1B-B4 – CLS HI TR A • 1B-B5 – CLS HI TR B • 1B-C4 – CLS HI-HI TR A • 1B-C5 – CLS HI-HI-TR B **c) Places 1-SW-P-5D control switch to Stop.** b) Verifies 1-SW-P-5D stopped by observing GREEN Light On, RED Light Off. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 9: ISOLATE SW TO 1-RS-E-1D BY CLOSING THE ASSOCIATED MOVS: *(Step 9)* **STANDARD:** a) Reviews NOTE prior to Step 9: NOTE : If an undervoltage condition occurs before CLS reset, the SW MOVs will reopen when voltage is returned to normal. b**) Closes 1-SW-MOV-104D by placing control switch in close position.** c) Verifies 1-SW-MOV-104D closed by observing GREEN Light Lit, and RED Light Off. d) **Closes 1-SW-MOV-105D by placing control switch in close position.** e) Verifies 1-SW-MOV-105D closed by observing GREEN Light Lit, and RED Light Off. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 10: NOTIFY NUCLEAR SHIFT MANAGER (EVALUATOR) STATUS OF TASK. Candidate should report completion of task. **COMMENTS:** **** JPM COMPLETE ****	**_____ SAT** **_____ UNSAT**

STOP TIME:

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Operator Directions Handout
(TO BE READ TO APPLICANT BY EXAMINER)

Initial Conditions

- A LBLOCA has occurred on Unit 1. Unit 2 is operating at stable power level of 100%.
- The Operating Team is currently performing 1-E-1, Loss of Reactor or Secondary Coolant.
- Annunciator 1-RM-C8, RS/SW HX D ALERT/FAILURE, and 1-RM-D8, 1-SW-RI-117 HIGH have just been received.

Initiating Cues

- You are to perform Annunciator Response Procedure 1-RM-D8, 1-SW-RI-117 HIGH.

Operator Directions Handout
(TO BE GIVEN TO APPLICANT)

Initial Conditions

- A LBLOCA has occurred on Unit 1. Unit 2 is operating at stable power level of 100%.
- The Operating Team is currently performing 1-E-1, Loss of Reactor or Secondary Coolant.
- Annunciator 1-RM-C8, RS/SW HX D ALERT/FAILURE, and 1-RM-D8, 1-SW-RI-117 HIGH have just been received.

Initiating Cues

- You are to perform Annunciator Response Procedure 1-RM-D8, 1-SW-RI-117 HIGH.

U.S. Nuclear Regulatory Commission
Surry Power Station

SR16301
Simulator Job Performance Measure WE14EA1.3

Applicant_____ Start Time_____

Examiner_____

Date _____ Stop Time_____

Title

Perform 1-E-0, Attachment 4

K/A: WE14EA1.3 Ability to operate and/ or monitor the following as they apply to the (High Containment Pressure): Desired operating results during abnormal and emergency situations. (3.3 / 3.8)

Applicability	**Estimated Time**	**Actual Time**
RO/SRO	10 Minutes	____ Minutes

Conditions

- Task is to be PERFORMED in the simulator.
- A LBLOCA has occurred on Unit 1 coincident with a Loss of Offsite Power.

Standards

- All components listed on 1-E-0, Attachment 4 – CLS Component Verification are in their required positions.

Initiating Cues

- A LBLOCA has occurred on Unit 1.
- You are to perform 1-E-0, Attachment 4 – CLS Component Verification.

Terminating Cues

- Report of completion of 1-E-0, Attachment 4 – CLS Component Verification.

Procedures

- 1-E-0, Attachment 4 – CLS Component Verification (Rev 71)

Tools and Equipment

- None

Safety Considerations

- None

Simulator Setup

- Recall **IC-379**.

  -OR-

- Call up 100% power IC and initialize.
- Enter Malfunctions:
  - EL01, Loss of Offsite Power, **Trigger 1**
  - RC0101, RCS Cold Leg A Pipe Rupture; final value = 50, **Trigger 1**
  - CA03, Disable IA-TV-101A Auto Closure; Active
  - CC15, Disable CC-TV-105C Auto Closure; Active
  - CW23, Disable CW-MOV-106C Auto Closed; Active
  - RM1002, Disable RM-TV-100B Auto Close; Active
  - SW1304, Disable SW-P-5D Auto Start; Active
- Place Simulator in Run. Insert **Trigger 1**.
- Perform 1-E-0 actions up to Attachment 1, Step 8e.
- Place Simulator in Freeze until JPM performance.

Notes

- When possible place Simulator in RUN prior to the candidate entering the Simulator.

PERFORMANCE CHECKLIST

Notes to the Evaluator

- Task critical elements are **bolded**.
- *An additional instructor may be needed to silence alarms for the examinee.*
- **START TIME:**

STEP 1: Check Phase II and Phase III Containment Isolation Valves are closed. **STANDARD:** a) Locates to the Vertical Board. b) Checks Phase II and Phase III Containment Isolation Valves Closed / Green lights lit. **c) For valves out of position, closes the valves:** • **1-RM-TV-100B** • **1-CC-TV-105C** • **1-IA-TV-101A** d) Applicant annotates Attachment. Applicant may also place "pink magnets" on valves out of position. **EVALUATOR'S NOTE:** **If asked**: Acknowledge valves out of position. Tell Applicant to continue performing attachment. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 2: Checks Containment Air Recirculation Fans tripped. **STANDARD:** a) Locates to the Unit 1 Ventilation Panel. b) Checks Containment Air Recirculation Fans OFF (green & amber lights lit): • 1-VS-F-1A • 1-VS-F-1B **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 3: Checks Recirculation Spray Service Water in operation. **STANDARD:** a) Locates to the Bench Board. b) Checks SW MOVs for all RSHXs Open / Red Lights lit: • 1-SW-MOV-105A through -105D • 1-SW-MOV-104A through -104D • 1-SW-MOV-103A through -103D c) Checks SW flow by observing SW flow through 1-SW-FI-106A through-106D between 6,000and 12,500 gpm. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 4: Checks RSHX SW RM Sample Pumps running. **STANDARD:** a) Locates to Radiation Monitoring Panel. b) Checks RSHX SW RM Sample Pumps running (*time delayed – 1 minute*). Red lights lit. **c) For non-running pump (1-SW-P-5D), starts pump.** d) Applicant annotates pump start on Attachment. Applicant may also place "pink magnet" on 1-SW-P-5D control switch**.** **EVALUATOR'S NOTE:** **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 5: Checks RSHX RM Pump No-Flow annunciators clear. **STANDARD:** a) Locates to Vertical Board. b) Verifies all RSHX SW RM Pump alarms clear. c) Acknowledges NOTE that CLS must be reset to allow RM pumps to be secured from MCR. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 6: Checks Containment Spray and Recirc Spray Systems valve positions. **STANDARD:** a) Locates to Bench Board. b) Checks CS and RS System Valves Open / Red lights lit. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 7: Checks Circulating and Service Water Systems isolation due to Hi-Hi CLS with LOOP. **STANDARD:** a) Recalls from Initial Conditions that a Loss of Offsite Power has also occurred. b) Checks CW isolation valves for Main Condenser Closed / Green lights lit. **c) For valve out of position, closes the valve:** • **1-CW-MOV-106C** d) Applicant annotates Attachment. Applicant may also place "pink magnet" on valve out of position. e) Checks SW isolation valves for BC and CC Heat Exchangers Closed / Green lights lit. **EVALUATOR'S NOTE:** **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 8: Notify Nuclear Shift Manager (Evaluator) Status of Task. Applicant should report completion of task. Applicant should also notify the SM (Evaluator) of components found out of position and actions taken. **COMMENTS:** ** **JPM COMPLETE** **	_____ **SAT** _____ **UNSAT**

STOP TIME:

Operator Directions Handout
(TO BE READ TO APPLICANT BY EXAMINER)

Initial Conditions

- A LBLOCA has occurred on Unit 1.
- The Operating Team is currently performing 1-E-1, Loss of Reactor or Secondary Coolant.

Initiating Cues

- You are to perform 1-E-0, Attachment 4 – CLS Component Verification.

Operator Directions Handout
(TO BE GIVEN TO APPLICANT)

Initial Conditions

- A LBLOCA has occurred on Unit 1.
- The Operating Team is currently performing 1-E-1, Loss of Reactor or Secondary Coolant.

Initiating Cues

- You are to perform 1-E-0, Attachment 4 – CLS Component Verification.

U.S. Nuclear Regulatory Commission
Surry Power Station

SR16301
Simulator Job Performance Measure 013A4.01
[Alternate Path]

Applicant_____ Start Time_____

Examiner_____

Date _____ Stop Time_____

Title

Transfer the SI System to the Cold Leg Recirculation Mode

K/A: 013A4.01 Ability to manually operate and/or monitor in the control room: ESFAS-initiated equipment which fails to actuate. (4.5/4.8)

Applicability	**Estimated Time**	**Actual Time**
RO/SRO(I)	10 Minutes	_____ minutes

Conditions

- Task is to be PERFORMED in the simulator.
- A LBLOCA has occurred on Unit 1. The RWST is near the RMT swapover point.

Standards

- RCS recirculation flow established with 1-SI-P-1B and 1-CH-P-1C running IAW 1-ES-1.3, Transfer to Cold Leg Recirculation, Steps 1-5.

Initiating Cues

- 1-E-1, Loss of Reactor or Secondary Coolant, Step 21.
- Nuclear Shift Manager direction.

Terminating Cues

- Completion of 1-ES-1.3, Transfer to Cold Leg Recirculation, Steps 1-5.

Procedures

- 1-ES-1.3, Transfer to Cold Leg Recirculation. (Rev. 20)

Tools and Equipment

- None

Safety Considerations

- None

Simulator Setup

- Recall **IC-380**.

  -OR-

- Call up 100% power IC and initialize. Place simulator in RUN.
- Initiate the following annunciator overrides:
  V1AE2 (RMT in test mode) to OFF.
- Initiate the following switch overrides:
  CSRMTA_REFUEL to REFUEL,
  CSRMTB_REFUEL to REFUEL.
- Initiate malfunction for "A" loop cold leg rupture (RC0101).
- Perform E-0 & transition to 1-E-1. Perform 1-E-1 through Step 21, which checks for transition to ES-1.3.
- Two (2) LHSI pumps, two (2) HHSI pumps & all ISRS pumps, OSRS pumps and CS pumps should be running. HHSI pumps should be on redundant flowpath alignment and charging pump mini-flow recirc valves should be closed.
- When RWST level is 21% insert malfunction EL1201 – Loss of 480v Emergency Switchgear 1H. This will result in loss of power to 1-RS-P-1A (ISRS), 1-RS-P-2A (OSRS), and 1-SI-P-1A (LHSI). The red lights should remain lit, but there will be no amps indicated for these pumps.
- When RWST level is 20% (RWST LOW LEVEL alarm is LIT), freeze simulator for performance.

Notes

- When possible place Simulator in RUN prior to the candidate entering the Simulator.

PERFORMANCE CHECKLIST

Notes to the Evaluator

- Task critical elements are **bolded**.
- *An additional instructor may be needed to silence and acknowledge alarms for the examinee.*
- **START TIME:**

STEP 1: CAUTIONS and NOTES Prior to Step 1. **STANDARD:** a) Reads caution that SI recirc flow to RCS must be maintained at all times. b) Reads caution that transfer to recirculation may cause high radiation in the Auxiliary Building. c) Notes that Steps 1 through 5 should be performed without delay and FRs should not be implemented before completion of these steps. d) Notes that if sump blockage or a complete loss of sump suction capability occurs, FRs should NOT be implemented until directed in Attachment 1, or in 1-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 2: CHECK OR PLACE BOTH RMT MODE TRANSFER SWITCHES IN RMT. *(Step 1)* **STANDARD:** Verifies BOTH RMT Transfer Switches in RMT position. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 3: RESET SI. *(Step 2)* **STANDARD:** Depresses both SI Reset Pushbuttons on Benchboard 1-1. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 4: CHECK SI RECIRC PHASE HEAT SINK. *(Step 3)* Check SW flow established to at least two RSHXs. *(Step 3a)* **STANDARD:** Checks the following flow indications for SW flow to at least two RS HXs: a) 1-SW-FI-106A (SW flow to "A" RSHX). b) 1-SW-FI-106B (SW flow to "B" RSHX). c) 1-SW-FI-106C (SW flow to "C" RSHX). d) 1-SW-FI-106D (SW flow to "D" RSHX). **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 5: Check AC emergency buses - ENERGIZED BY OFF-SITE POWER. *(Step 3b)* **STANDARD:** a) Checks "H" Bus voltage indicated (between 4000 and 4400 volts). b) Checks "H" Bus normal supply breaker, 15H8, closed (red light on & green off). c) Checks "J" Bus voltage indicated (between 4000 and 4400 volts). d) Checks "J" Bus normal supply breaker, 15J8, closed (red light on & green off). **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 6: Check RS pumps associated with RSHXs supplied by SW - AT LEAST TWO RUNNING. *(Step 3c)* **STANDARD:** Checks if the following pumps to determine if at least two are running: a) 1-RS-P-1A (associated w/ A RSHX) – breaker closed BUT NO AMPS INDICATED. b) 1-RS-P-1B (associated w/ B RSHX). c) 1-RS-P-2A (associated w/ C RSHX) – breaker closed BUT NO AMPS INDICATED. d) 1-RS-P-2B (associated w/ D RSHX). **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 7: CHECK LHSI PUMPS. *(Step 4)* LHSI pumps – BOTH RUNNING. *(Step 4a)* **STANDARD:** a) Checks 1-SI-P-1A breaker indication red light on BUT NO amps indicated. b) Checks 1-SI-P-1B breaker indication red light on and amps indicated. c) **Determines only one LHSI pump in service and secures 1-CH-P-1B and places in PTL. Verifies 1-CH-P-1A in PTL.** **EVALUATOR'S NOTE:** **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 8: ALIGNS SI SYSTEM FOR RECIRC. *(Step 5a & b)* **STANDARD:** a) Notes CAUTION that if suction source is lost to any SI or CS pump, the pump should be stopped. b) Checks 1-CH-MOV-1275A closed by observing green light on and red light off. c) Checks 1-CH-MOV-1275B closed by observing green light on and red light off. d) Checks 1-CH-MOV-1275C closed by observing green light on and red light off. e) Checks RWST level less than 13% on the following indicators: • 1-CS-LI-100A • 1-CS-LI-100B • 1-CS-LI-100C • 1-CS-LI-100D f) If RWST level not less than 13%, waits for level to reach 13%. **EVALUATOR'S NOTE:** If annunciators 1A-A2, 1A-B2, 1A-C2, and 1A-D2 are lit, the operator should identify auto RMT failure and proceed to Step 5c. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 9: Check Phase 1 - INITIATED. *(Step 5c(1) and RNO)* **STANDARD:** a) Checks Phase 1 White Status light NOT lit. (Goes to RNO) b) Pushes both RMT actuation pushbuttons for Train A. c) Pushes both RMT actuation pushbuttons for Train B. d) Verifies RMT not actuated and that valves must be manually aligned. **EVALUATOR'S NOTE:** • Phase 1 White Status light is not lit. • RMT actuation pushbuttons will not function when pushed. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 10: LHSI discharge to HHSI - OPEN. *(Step 5c(2))* **STANDARD:** a) Opens 1-SI-MOV-1863A by placing control switch to OPEN. b) Checks valve open by observing red light on & green off. **c) Opens 1-SI-MOV-1863B by placing control switch to OPEN.** d) Checks valve open by observing red light on & green off. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 11: LHSI Recirc valves - CLOSED. *(Step 5c(3))* **STANDARD:** a) Closes 1-SI-MOV-1885A by placing control switch to CLOSE. b) Checks 1-SI-MOV-1885A closed by observing green light on & red off. **c) Closes 1-SI-MOV-1885B by placing control switch to CLOSE.** d) Checks 1-SI-MOV-1885B closed by observing green light on & red off. **e) Closes 1-SI-MOV-1885C by placing control switch to CLOSE.** f) Checks 1-SI-MOV-1885C closed by observing green light on & red off. g) Closes 1-SI-MOV-1885D by placing control switch to CLOSE. h) Checks 1-SI-MOV-1885D closed by observing green light on & red off. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 12: Check Phase 2 - INITIATED. *(Step 5d(1) and RNO)* **STANDARD:** a) Checks Phase 2 Amber Status light NOT LIT. (Goes to RNO). b) Ensures 1 minute elapsed since RMT *should have actuated* prior to continuing. **EVALUATOR'S NOTE:** **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 13: LHSI suction from sump - OPEN. *(Step 5d(2))* **STANDARD:** a) Opens 1-SI-MOV-1860A by placing control switch to OPEN. b) Checks 1-SI-MOV-1860A open by observing red light on & green off. **c) Opens 1-SI-MOV-1860B by placing control switch to OPEN.** d) Checks 1-SI-MOV-1860B open by observing red light on & green off. **EVALUATOR'S NOTE:** These valves take approximately 1 minute to open. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 14: LHSI suction from RWST - CLOSED. *(Step 5d(3))* **STANDARD:** a) Closes 1-SI-MOV-1862A by placing control switch to CLOSE. b) Checks 1-SI-MOV-1862A closed by observing green light on & red off. **c) Closes 1-SI-MOV-1862B by placing control switch to CLOSE.** d) Checks 1-SI-MOV-1862B closed by observing green light on & red off. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 15: CHG pump suction from RWST valves - CLOSED. *(Step 5d(4))* **STANDARD:** **a) Closes 1-CH-MOV-1115B by placing control switch to CLOSE.** b) Checks 1-CH-MOV-1115B closed by observing green light on & red off. **c) Closes 1-CH-MOV-1115D by placing control switch to CLOSE.** d) Checks 1-CH-MOV-1115D closed by observing green light on & red off. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 16: Check recirculation flow - ESTABLISHED. *(Step 5e)* **STANDARD:** Verifies SI flow to the Rx core via cold leg flowpath by checking the following flow instrumentation: • 1-SI-FI-1945 (A LHSI FT) – 0 gpm, • 1-SI-FI-1946 (B LHSI FT) - ~3400 gpm, • 1-SI-FI-1961 (A Loop FT) - ~ 150 gpm, • 1-SI-FI-1962 (B Loop FT) - ~ 150 gpm, • 1-SI-FI-1963 (C Loop FT) - ~ 150 gpm, • 1-SI-FI-1943 (Total flow normal hdr) - ~440 gpm, • 1-SI-FI-1943A (Total flow normal hdr) - ~ 440 gpm, • 1-SI-FI-1940 (Total flow alt hdr) – 0 gpm, • 1-SI-FI-1940A (Total flow alt hdr) – 0 gpm. **EVALUATOR'S NOTE:** No flow should be noted on the "A" LHSI and Alternate Header flow indicators since 1-SI-P-1A has no power and only the Charging Pump aligned to the Normal Header is running. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 17: REPORTS TO NUCLEAR SHIFT MANAGER (EVALUATOR). **STANDARD:** Verbal status report made that cold leg recirculation established. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STOP TIME:

Operator Directions Handout
(TO BE READ TO APPLICANT BY EXAMINER)

Initial Conditions

- A Large-Break LOCA has occurred on Unit 1.
- RWST level is approximately 20%.
- The team has just transitioned to 1-ES-1.3.

Initiating Cue

- Perform steps 1-5 of 1-ES-1.3, Transfer to Cold Leg Recirculation.

Operator Directions Handout
(TO BE GIVEN TO APPLICANT)

Initial Conditions

- A Large-Break LOCA has occurred on Unit 1.
- RWST level is approximately 20%.
- The team has just transitioned to 1-ES-1.3.

Initiating Cue

- Perform steps 1-5 of 1-ES-1.3, Transfer to Cold Leg Recirculation.

U.S. Nuclear Regulatory Commission
Surry Power Station

SR16301
Simulator Job Performance Measure 005A2.03

Applicant_____ Start Time_____

Examiner_____

Date _____ Stop Time_____

Title

RESPOND TO A LOSS OF DECAY HEAT REMOVAL

K/A: 005A2.03 Ability to (a) predict the impacts of the following malfunctions or operations on the RHRS, and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: RHR pump / motor malfunction. (2.9 / 3.1)

Applicability	**Estimated Time**	**Actual Time**
RO/SRO(I)	15 minutes	_____minutes

Conditions

- Task is to be PERFORMED in the simulator.
- 1-RH-P-1A was in service on "A" RHR HX. We just received annunciator 1B-G6, RHR HX LO FLOW, and 1-RH-P-1A has tripped.

Standards

- 1-RH-P-1B started, RHR flow restored, and heat sink restored to the in service RHR HX in accordance with 1-AP-27.00, Loss of Decay Heat Removal Capability. RCS temperature is under the control of the operator.

Initiating Cues

- 1-RH-P-1A was in service on "A" RHR HX. We just received annunciator 1B-G6, RHR HX LO FLOW, and 1-RH-P-1A has tripped.

Terminating Cues

- 1-AP-27.00, Loss of Decay Heat Removal Capability, step 14 completed.

Procedures

- 1-AP-27.00, Loss of Decay Heat Removal Capability (Rev. 26).

Tools and Equipment
- None

Safety Considerations
- None

Simulator Setup

- Recall **IC-381**.

  -OR-

- Call up RHR IC and initialize. Place simulator in RUN.
- Verify "A" RHR pump running and "B" in AUTO.
- Verify 1-RH-FCV-1605 in auto with flow rate set at 3400 gpm.
- Verify 1-RH-HCV-1758 set at approximately 90% demand (9.0 on pot).
- Implement malfunction for over-current trip of 1-RH-P-1A (RH0501) and allow annunciators 1B-G6 & 1B-G7 to alarm.
- Close 1-CC-TV-109A.
- Place simulator in FREEZE until ready to perform JPM.

- **Simulator Operator Note**: Place RED magnets on 1-RH-MOV-1700, 1701 and 1720A red bulbs. Place green magnets on SI accumulator green bulbs and verify magnets are correct for SI system for CSD. Place a white magnet and green arrow on the Pressurizer level cold cal channel 1-RC-LI-1460 and make sure the trend recorder is set for this channel.

Notes

- When possible place Simulator in RUN prior to candidate entering the Simulator.

PERFORMANCE CHECKLIST

Notes to the Evaluator

- Task critical elements are **bolded**.
- *An additional instructor may be needed to silence and acknowledge alarms for the examinee.*
- **START TIME:**

STEP 1: ***CAUTIONS and NOTE PRIOR TO STEP 1*** **CAUTION:** • Loss of RHR due to a total loss of IA is addressed by 0-AP-40.00, NON-RECOVERABLE LOSS OF IA. • Loss of RHR due to a total loss of AC Power is addressed by 1-AP-10.27, LOSS OF ALL AC POWER WHILE ON RHR. • Loss of RHR may cause CTMT radiological and heat stress conditions to degrade. Local actions in CTMT should be coordinated with HP. • During solid plant operation, inadvertent actuation of the OPMS may occur if letdown is isolated. • If RCS boiling occurs, non-essential personnel should be evacuated from CTMT. **NOTE:** EPIPs may be applicable. **STANDARD:** • Acknowledges note and acknowledges cautions and recognizes that a total loss of IA or AC Power is not occurring. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 2: CHECK RCS INVENTORY - LOWERING. (*Step 1)* • PRZR level - LOWERING • Standpipe level - LOWERING • Reactor cavity level - LOWERING • RCS Narrow Range level - LOWERING • CTMT sump level - RISING • Makeup rate - RISING • PRT level, pressure, or temperature - RISING • PDTT level - RISING • RWST level - RISING **STANDARD:** • Notes that there are no draindown evolutions in progress and inventory is stable based on the directions given. • Checks Containment Sump level (1-DA-LI-100) is stable and not rising. • Checks PRT conditions (level, LI-1-470; pressure, PI-1-472; and temperature, TI-1-471) are stable and not rising. • Checks PDTT level (1-DG-LI-107) is stable and not rising. • Checks RWST level stable. • Determines that RCS inventory is NOT lowering and performs RNO to transition to procedure STEP 4. **EVALUATOR'S NOTE:** • **If asked**: All indications are as you see them. • **If asked**: No personnel are in Containment. • **If asked**: Cavity is not flooded up. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 3: CHECK RHR PUMP - ONE RUNNING. *(Step 4)* **STANDARD:** • Checks that no RHR pumps are running by observing zero amps indicated and 1-RH-P-1A has red and amber lights lit, 1-RH-P-1B has green light lit. Goes to RNO. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 4:

IF Emergency Bus power is available, THEN do the following: *(Step 4 RNO)*

a) Manually close RH control valves:
- **1-RH-FCV-1605**
- **1-RH-HCV-1758**
- **1-RH-HCV-1142**

b) Start one RHR pump.

c) Adjust RH control valves to return flow to pre-event rate:
- 1-RH-FCV-1605
- 1-RH-HCV-1758
- 1-RH-HCV-1142

d) IF an RHR pump can NOT be started, THEN GO TO Step 16. ***(NO, proceeds down)***

IF RHR pump NOT running due to loss of Emergency Bus power, THEN do the following: ***(NO, proceeds to Step 5)***

a) Check initiated or initiate 1-AP-10.07, LOSS OF UNIT 1 POWER.
b) IF ELAP in progress, THEN GO TO 1-AP-10.27, Loss of All AC Power While on RHR.
c) GO TO Step 16.

STANDARD:

- **Places 1-RH-FCV-1605 in manual and closes valve.**
- Notes setpoint on ten turn pot for 1-RH-HCV-1758 (9.8) and then **closes 1-RH-HCV-1758 using ten turn pot**.
- **Closes 1-RH-HCV-1142 using ten turn pot.**
- **Starts 1-RH-P-1B by taking control switch to the start position and verifying amps are indicated.**
- **Manually opens 1-RH-FCV-1605 using controller pushbuttons until flow is established.**
- Places ten turn pot for 1-RH-FCV-1758 at pre-event setpoint of 9.8.
- **Fully opens 1-RH-HCV-1142.**
- Proceeds to Step 5 since an RHR pump was started and the cause of trip was NOT due to a loss of Emergency Bus power.

COMMENTS:

_____ SAT

_____ UNSAT

STEP 5: CHECK RHR FLOW - INDICATED ON RHR SYS FLOW. *(Step 5)* • 1-RH-FI-1605 **STANDARD:** • Checks RHR flow at 3400 gpm (3300-3500) on 1-RH-FI-1605. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 6: CHECK RHR PUMP – VORTEXING *(Step 6)* • Flow indication on 1-RH-FI-1605 - OSCILLATING • Amperage indication - OSCILLATING **STANDARD:** • Checks flow steady on 1-RH-FI-1605 and amps steady for 1-RH-P-1B. • Goes to step 6 RNO and transitions to Step 12. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 7: CHECK RHR HEAT SINK: *(Step 12)* a) Flow on 1-RH-FI-1605 - NORMAL b) CC to RHR HX 1) In-Service RHR HX CC Outlet HDR Flow - NORMAL • 1-CC-FI-110A OR • 1-CC-FI-110B **STANDARD:** • Checks flow on 1-RH-FI-1605 indicating normal about 3400 gpm. • Checks CC to RHR HX on 1-CC-FI-110A NOT normal at zero gpm. Goes to RNO. **EVALUATOR'S NOTE:** **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 8: 1) Check opened or **open 1-CC-TV-109A** or 1-CC-TV-109B. *(Step 12b.1 RNO)* IF TV can NOT be opened due to a localized loss of IA, THEN locally open IAW 0-FCA-16.00, LOCAL OPERATION OF AIR OPERATED VALVES. IF the in-service RHR HX TV can NOT be opened, THEN place the other RHR HX in service IAW Attachment 11. IF CC flow can NOT be established to either RHR HX, THEN do the following: a. Evaluate initiating 1-AP-15.00, LOSS OF COMPONENT COOLING. b. GO TO Step 16. 2) RHR HX CC Outlet HDR TEMP - NORMAL • 1-CC-TI-109A OR • 1-CC-TI-109B **STANDARD:** • **Opens 1-CC-TV-109A to restore CC flow thru "A" RHR HX.** • Monitors "A" RHR HX CC outlet temperature to verify temperatures are normal. **EVALUATOR'S NOTE:** **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 9: CHECK RCS TEMPERATURE - STABLE OR LOWERING. *(Step 13)* **STANDARD:** • **Checks RCS temperature and/or RHR temperature stable or lowering.** • **If RCS temperature is rising then cooling flow is adjusted.** **EVALUATOR'S NOTE:** Candidate may adjust 1-RH-HCV-1758 to reduce temperature. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 10: RETURN TO PROCEDURE IN EFFECT. *(Step 14)* **STANDARD:** • Operator Exits 1-AP-27.00. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 11: REPORT TO NUCLEAR SHIFT MANAGER (EVALUATOR). **STANDARD:** Verbal status report that 1-AP-27.00, Loss of Decay Heat Removal Capability is complete and Decay Heat Removal has been restored. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STOP TIME:

_____

_____

_____

_____

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_____

Operator Directions Handout
(TO BE READ TO APPLICANT BY EXAMINER)

Initial Conditions

- The Unit has been operating on RHR with 1-RH-P-1A in service on "A" RHR HX at 3400 gpm.
- RCS temperature: 278 ^{o}F and slowly lowering.
- We just received annunciator 1B-G6, RHR HX LO FLOW, and 1-RH-P-1A has tripped.
- No RCS draindown evolutions are in progress and inventory is stable.

Initiating Cues

- Perform 1-AP-27.00, Loss of Decay Heat Removal Capability.

Operator Directions Handout
(TO BE GIVEN TO APPLICANT)

Initial Conditions

- The Unit has been operating on RHR with 1-RH-P-1A in service on "A" RHR HX at 3400 gpm.
- RCS temperature: 278 ^{o}F and slowly lowering.
- We just received annunciator 1B-G6, RHR HX LO FLOW, and 1-RH-P-1A has tripped.
- No RCS draindown evolutions are in progress and inventory is stable.

Initiating Cues

- Perform 1-AP-27.00, Loss of Decay Heat Removal Capability.

U.S. Nuclear Regulatory Commission
Surry Power Station

SR16301
Simulator Job Performance Measure 086A4.02

Applicant_____ Start Time_____

Examiner _____

Date _____ Stop Time_____

Task

Disable Containment Detection on 0-FP-MON-IMS-1.

K/A: 086A4.02 Ability to manually operate and / or monitor in the control room: Fire detection panels. (3.5 / 3.5)

Applicability	**Est. Completion Time**	**Actual Time**
RO/SRO(I)	5 Minutes	_____ Minutes

Conditions

- Task is to be performed in the simulator.
- Fire Detection System testing is occurring on Unit 1 Containment.

Standards

- The operator will disable and acknowledge the Unit 1 Containment Fire Detection alarms on fire protection panel 0-FP-MON-IMS-1 IAW 0-OP-ZZ-007, General Operating Practices.

Initiating Cues

- Fire Detection System testing is occurring on Unit 1 Containment.
- Shift Manager direction to disable the fire panel alarms for Unit 1 Containment.

Terminating Cues

- Fire panel alarms in containment disabled for 10 minutes.

Procedures

- None

Tools and Equipment

- None

Safety Considerations

- None

Simulator Setup

- Recall **IC-382**.

  -OR-

- Recall IC-1 (100% power).
- Place simulator in RUN.
- Insert the following Fire Protection overrides:
  - A300, Heat Sensor 01-FP-DT-102B Reactor Cont U1 EL 47', set to 300, Insert.
  - A306, Heat Sensor 01-FP-DT-102P, Reactor Cont U1 EL 34'6", set to 300, Insert
  - Acknowledge alarms on Fire Protection Panel.
- Place simulator in freeze.

Notes

- When possible place Simulator in RUN prior to the candidate entering the Simulator.

PERFORMANCE CHECKLIST

Notes to the Evaluator

- Task critical elements are **bolded**.
- *An additional instructor may be needed to silence alarms for the examinee.*
- **START TIME: _____**

Step 1. Proceeds to Fire Protection touch screen panel 0-FP-MON-IMS-1. **STANDARD:** (a) Verifies the only fire detectors in alarm are in the Unit 1 containment building. (b) Returns to main screen. **(c) Touches CONTAINMENT DETECTION button on lower right portion of screen.** **(d) Selects UNIT 1 CONTAINMENT DETECTION ENABLED button.** **(e) Selects DISABLE button.** (f) Acknowledges TROUBLE alarms received due to disabling the Unit 1 Containment fire detectors. **(g) Press the TROUBLE TOTAL Icon.** **(h) Select applicable Trouble Alarm from the TROUBLE ACTIVE LIST.** **(i)** When the ACKNOWLEDGE BOX pops up, THEN **Press the ACKNOWLEDGE ICON.** (j) Returns the panel to the home screen. **EVALUATOR'S NOTE:** A placard is posted above 0-FP-MON-IMS-1 giving instructions on how to disable the Containment Fire Detection alarms. The Applicant may also use this as reference. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
Step 2. Reports to Shift Manager (Evaluator) that alarms in Containment have been disabled for 10 minutes. **STOP TIME: _____** **EVALUATOR'S NOTE** **COMMENTS:**	**_____ SAT** **_____ UNSAT**

Operator Directions Handout
(TO BE READ TO APPLICANT BY EXAMINER)

Initial Conditions

- I&C is performing testing on heat detectors in Unit 1 Containment and requests the fire alarms be disabled on the MCR Fire Protection Panel.

Initiating Cues

- You are to disable the Unit 1 Containment Fire Detection alarms, and acknowledge any associated trouble alarms on Fire Protection Panel 0-FP-MON-IMS-1 in accordance with 0-OP-ZZ-007, Attachment 13, Step 1.

Operator Directions Handout
(TO BE GIVEN TO APPLICANT)

Initial Conditions

- I&C is performing testing on heat detectors in Unit 1 Containment and requests the fire alarms be disabled on the MCR Fire Protection Panel.

Initiating Cues

- You are to disable the Unit 1 Containment Fire Detection alarms, and acknowledge any associated trouble alarms on Fire Protection Panel 0-FP-MON-IMS-1 in accordance with 0-OP-ZZ-007, Attachment 13, Step 1.

(Page 1 of 2)

Attachment 13
DISABLING OR RE-ENABLING CONTAINMENT FIRE DETECTION

INFORMATION USE

NOTE: The Containment Detection Buttons can display the status of the Disabled / Enabled alarms.

1. To disable Containment detection at 0-FP-MON-IMS-1, perform the following. Otherwise, enter N/A.

_____ a. Press the CONTAINMENT DETECTION button.

_____ b. Select Unit 1 Containment Detection or Unit 2 Containment Detection by touching the applicable button.

NOTE: • U1(U2) Cont EL. -27 and U1(U2) Cont Pen Area buttons on the main graphic page will turn yellow and Trouble Alarms associated with all the heat and smoke detectors for the affected Containment will need to be acknowledged.

• The disabled alarms will automatically re-enable after 10 minutes.

_____ c. Press the DISABLE button to silence the applicable unit Penetration Area and Ductwork alarms for 10 minutes, OR press CANCEL.

2. To re-enable alarms at 0-FP-MON-IMS-1 prior to the 10 minute time delay, perform the following. Otherwise, enter N/A.

_____ a. Press the CONTAINMENT DETECTION button.

_____ b. Select Unit 1 Containment Detection or Unit 2 Containment Detection by touching the applicable button.

_____ c. Press ENABLE IMMEDIATE button to re-enable alarms for the applicable unit Penetration Area and Ductwork, OR press CANCEL.

(Page 2 of 2)

Attachment 13

DISABLING OR RE-ENABLING CONTAINMENT FIRE DETECTION

NOTE: If 0-FP-MON-IMS-1 is not available to disable or re-enable Containment alarms, 0-FP-FACP-7 for Unit 1, or 0-FP-FACP-8 for Unit 2, may be used.

_____ 3. To disable Unit 1 Containment alarms at 0-FP-FACP-7, press U1 CONT DISABLE 10 MIN TIMER button. Otherwise, enter N/A.

_____ 4. To enable Unit 1 Containment alarms at 0-FP-FACP-7, press U1 CONT DISABLE 10 MIN TIMER button. Otherwise, enter N/A.

_____ 5. To disable Unit 2 Containment alarms at 0-FP-FACP-8, press U2 CONT DISABLE 10 MIN TIMER button. Otherwise, enter N/A.

_____ 6. To enable Unit 2 Containment alarms at 0-FP-FACP-8, press U2 CONT DISABLE 10 MIN TIMER button. Otherwise, enter N/A.

(Page 2 of 2)

Attachment 12

ACKNOWLEDGING ALARM / TROUBLE CONDITIONS ON 0-FP-MON-IMS-1

2. ACKNOWLEDGING A TROUBLE ALARM

NOTE: The TROUBLE TOTAL icon will be flashing yellow and an audible alarm will be sounding.

_____ 2.1 Press the TROUBLE TOTAL Icon.

_____ 2.2 Select Applicable Trouble Alarm from the TROUBLE ACTIVE LIST.

2.3 WHEN the ACKNOWLEDGE BOX automatically pops up, THEN perform the following:

_____ a. Press the ACKNOWLEDGE Icon.

_____ b. Press the CLOSE WINDOW Icon.

_____ c. Read the TROUBLE ACTIVE LIST for alarm(s).

U.S. Nuclear Regulatory Commission
Surry Power Station

SR16301
Simulator Job Performance Measure 016A2.01
[Alternate Path]

Applicant_____ Start Time_____

Examiner_____

Date _____ Stop Time_____

Title

RESPOND TO A SECONDARY SYSTEM TRANSIENT.

K/A: 016A2.01, Ability to (a) predict the impacts of the following malfunctions or operations on the NNIS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Detector Failure. (3.0/3.1)

Applicability	**Estimated Time**	**Actual Time**
RO/SRO(I)	10 Minutes	____ Minutes

Conditions

- Task is to be PERFORMED in the simulator.
- Unit is operating at 90% power with all systems normal and in automatic.

Standards

- "C" SG level manually controlled and level stabilized to 44% ± 5% using 1-FW-MOV-154C IAW 0-AP-53.00, Loss of Vital Instrumentation / Controls, Revision 21.

Initiating Cues

- Nuclear Shift Manager direction.

Terminating Cues

- Report received that unit is stabilized and 0-AP-53.00 is completed.

Procedures

- 0-AP-53.00, Loss of Vital Instrumentation / Controls, Revision 21.

Tools and Equipment

- None

Safety Considerations

- None

Simulator Setup

- Recall **IC-383**.

  -OR-

- Recall 90% power IC and initialize. Place simulator in RUN.
- Enter Malfunction, MS1308 – SG Pressure Transmitter MS-PT-1495 Failure ("C" S/G Ch. 3 PT), Final Value = 1, 10 Sec Ramp, **Trigger 1**.
- Enter Controller Override, FW, FWFC498F_MANUAL, OFF, Active.
- Enter Controller Override, FW, FWFC498F_AUTO, ON, Active.
- Freeze Simulator until ready.

Notes

- When possible place Simulator in RUN prior to the candidate entering the Simulator.
- This failure will cause "C" SG Channel III Main Steam Pressure Transmitter to fail high, causing the selected steam flow channel to go high. The resulting Feed Flow / Steam Flow mismatch will cause "C" FRV to open, causing "C" SG NR level to rise. The "C" FRV will fail to shift to manual control, requiring the operator to throttle flow with the Feedwater isolation MOV to prevent a turbine trip/reactor trip on SG NR high-high level.

PERFORMANCE CHECKLIST

Notes to the Evaluator

- Task critical elements are **bolded**.
- *An additional instructor may be needed to silence alarms for the examinee.*
- **START TIME_____**

STEP 1 CHECK REDUNDANT INSTRUMENT CHANNEL(S) INDICATION – NORMAL. *(0-AP-53.00, Step 1)* **STANDARD:** a) Identifies the affected SG using Steam Flow/Feed Flow mismatch annunciators, "C" SG Level trend, and/or "C" FRV demand. b) Identifies Channel II and IV "C" SG Pressure Normal; Channel III failed high. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 2 PLACE AFFECTED CONTROL(S)/COMPONENT(S) IN MANUAL CONTROL AND STABILIZE PARAMETER USING REDUNDANT INDICATION. *(0-AP-53.00, Step 2)* **STANDARD:** a) Attempts to place "C" FRV in manual. Controller will not shift to manual. **b) Places 1-FW-MOV-154C, SG C FW ISOL, in Close.** c) Continues to hold control switch in close until "C" SG Feed flow is less than Steam flow, and "C" SG Level begins to trend towards 44%. **d) Applicant controls "C" SG NR level at 44% ±5% using 1-FW-MOV-154C.** **EVALUATOR'S NOTE:** **JPM Failure Criteria**. An automatic Turbine/Reactor trip due to untimely Applicant response to the event is considered a JPM Failure. **Cue:** Direct operator to restore and stabilize "C" SG level to program band and stabilize. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 3 Reports completion of Immediate Action Steps of 0-AP-53.00 to Shift manager (Evaluator). **STANDARD:** Reports "C" SG NR level stable in the program band (44% ±5%). **COMMENTS:** ****END OF JPM****	**_____ SAT** **_____ UNSAT**

STOP TIME:

Operator Directions Handout
(TO BE READ TO APPLICANT BY EXAMINER)

Initial Conditions

- You are the Unit 1 RO and I am the Nuclear Shift Manager. The unit is operating at 90% power with all systems in automatic.

Initiating Cues

- You are to respond to a plant transient.

Operator Directions Handout
(TO BE GIVEN TO APPLICANT)

Initial Conditions

- You are the Unit 1 RO and I am the Nuclear Shift Manager. The unit is operating at 90% power with all systems in automatic.

Initiating Cues

- You are to respond to a plant transient.

U.S. Nuclear Regulatory Commission
Surry Power Station

SR16301
Simulator Job Performance Measure 062.A4.01

Applicant_____ Start Time_____

Examiner _____

Date _____ Stop Time_____

Task

SYNCHRONIZE AND TRANSFER ELECTRICAL POWER SYSTEMS.

K/A: 062A4.01 Ability to manually operate and/or monitor in the control room: All breakers (including available switchyard). (3.3 / 3.1)

Applicability	**Est. Completion Time**	**Actual Time**
RO	10 Minutes	_____ Minutes

Conditions

- This JPM to be **pre-briefed.**
- Task is to be PERFORMED in the Simulator.
- Unit 1 is stable at 25% - 30% power with feed control in automatic.

Standards

- Station Service buses “A”, “B”, and “C” shifted to normal alignment IAW 1-GOP-1.5, Unit Startup, 2% Reactor Power to Max Allowable Power, Step 5.3.43 and Attachment 5.

Initiating Cues

- 1-GOP-1.5, Unit Startup, 2% Reactor Power to Max Allowable Power, Step 5.3.43.
- Shift Manager direction.

Terminating Cues

- Completion of 1-GOP-1.5, Attachment 5.

Procedures

- 1-GOP-1.5, Unit Startup, 2% Reactor Power to Max Allowable Power, Attachment 5.

Tools and Equipment

- None

Safety Considerations

- None

Simulator Setup

- Recall **IC-384**.

  -OR-

- Call up 25% power IC and initialize. Place simulator in RUN.
- If necessary, sync and close breakers ACB-15A1, ACB-15B1 & ACB-15C1. Then open breakers ACB-15A2, ACB-15B2 & ACB-15C2.
- Verify Main Generator and Grid voltages are within 5 volts (Incoming vs. Running meters next to Synchroscope). If necessary, adjust RSST voltages using XtremeView screen EL10 – RSST Electrical Controls. The tap changers must be placed in Manual, the tap changers adjusted as necessary, then placed back in Auto. The generator should be as close to 0 MVARS as possible prior to synchronization.
- Freeze simulator until JPM performance.

Notes

- When possible the simulator should be placed in RUN prior to the candidate entering the Simulator.

PERFORMANCE CHECKLIST

Notes to the Evaluator

- Task critical elements are **bolded**.
- Critical step sequencing requirements: Buses (A, B & C) may be done in any order; steps should be sequenced 1-2-4-5 (bus A), 6-7-9-10 (bus B), 11-12-15-16 (bus C).
- The Evaluator may elect to stop the JPM after the First bus is transferred.
- **START TIME:_____**

STEP 1. Transfer Bus 1A to Station Service. *(Att. 5, Step 1)* **STANDARD** (a) Acknowledges NOTE that sync-volts incoming and running should be within ± 5 volts and how both can be adjusted. **(b) Inserts sync key into sync switch, CS-25-15A2**.(*Step 1a*) **(c) Turns sync switch to the ON position**.(*Step 1b*) (d) Checks sync meter response indicates incoming and running voltages are within ±5 volts.(*Step 1c*) **EVALUATOR'S NOTE:** Candidate may make a plant announcement at this point. ***This step is sequence critical.*** **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 2. Transfer Bus 1A to Station Service. *(Att. 5, Step 1; continued)* **STANDARDS** **(a) Places control switch for ACB-15A2 to the CLOSE position**.(*Step 1e*) (b) Verifies closed indication (red light on - green light off) received. **EVALUATOR'S NOTE:** ***This step is sequence critical.*** **COMMENTS:**	**_____ SAT** **_____ UNSAT**

Step 3. Transfer Bus 1A to Station Service. *(Att. 5, Step 1; continued)* **STANDARD** Verifies amps indicated on Bus 1A amperage meter.(*Step 1f*) **COMMENTS:**	**_____ SAT** **_____ UNSAT**
Step 4. Transfer Bus 1A to Station Service. *(Att. 5, Step 1; continued)* **STANDARD** **(a) Places control switch for ACB-15A1 to the OPEN position**.(*Step 1h*) (b) Verifies open indication (green light on - red light off) received. **EVALUATOR'S NOTE:** ***This step is sequence critical.*** **COMMENTS:**	**_____ SAT** **_____ UNSAT**
Step 5. Transfer Bus 1A to Station Service. *(Att. 5, Step 1; continued)* **STANDARD** **(a) Turns off the sync switch (CS-25-15A2)** (*Step 1i)* **(b) Removes sync key.(*Step 1j*)** **EVALUATOR'S NOTE:** ***This step is sequence critical.*** **COMMENTS:**	**_____ SAT** **_____ UNSAT**

Step 6. Transfer Bus 1B to Station Service. *(Att. 5, Step 2)* **STANDARD** (a) Acknowledges NOTE that sync-volts incoming and running should be within ± 5 volts and how both can be adjusted. **(b) Inserts sync key into sync switch, CS-25-15B2.**(*Step 2a*) **(c) Turns sync switch to the ON position**.(*Step 2b*) (d) Verifies sync meter response indicates incoming and running voltages are within ± 5 volts.(*Step 2c*) **EVALUATOR'S NOTE:** ***This step is sequence critical.*** **COMMENTS:**	**_____ SAT** **_____ UNSAT**
Step 7. Transfer Bus 1B to Station Service. *(Att. 5, Step 2; continued)* **STANDARD** **(a) Places control switch for ACB-15B2 to the CLOSE position**.(*Step 2e*) (b) Verifies closed indication (red light on - green light off) received. **EVALUATOR'S NOTE:** ***This step is sequence critical.*** **COMMENTS:**	**_____ SAT** **_____ UNSAT**
Step 8. Transfer Bus 1B to Station Service. *(Att. 5, Step 2; continued)* **STANDARD** Verifies amps indicated on Bus 1B amperage meter.(*Step 2f*) **COMMENTS:**	**_____ SAT** **_____ UNSAT**

Step 9. Transfer Bus 1B to Station Service. *(Att. 5, Step 2; continued)* **STANDARD** **(a) Places control switch for ACB-15B1 to the OPEN position**.(*Step 2h*) (b) Verifies open indication (green light on - red light off) received. **EVALUATOR'S NOTE:** ***This step is sequence critical.*** **COMMENTS:**	**_____ SAT** **_____ UNSAT**
Step 10. Transfer Bus 1B to Station Service. *(Att. 5, Step 2; continued)* **STANDARD** **(a) Turns off the sync switch (CS-25-15B2)** (*Step 2i)* **(b) Removes sync key**.(*Step 2j*) **EVALUATOR'S NOTE:** ***This step is sequence critical.*** **COMMENT:**	**_____ SAT** **_____ UNSAT**
Step 11. Transfer Bus 1C to Station Service. *(Att. 5, Step 3)* **STANDARD** (a) Acknowledges NOTE that sync-volts incoming and running should be within ± 5 volts and how both can be adjusted. **(b) Places sync key into sync switch, CS-25-15C2.**(*Step 3a*) **(c) Turns sync switch to the ON position**.(*Step 3b*) (d) Verifies sync meter response indicates incoming and running voltages are within ± 5 volts.(*Step 3c*) **EVALUATOR'S NOTE:** ***This step is sequence critical.*** **COMMENT:**	**_____ SAT** **_____ UNSAT**

Step 12. Transfer Bus 1C to Station Service. *(Att. 5, Step 3; continued)* **STANDARD** **(a) Places control switch for ACB-15C2 to the CLOSE position**.(*Step 3e*) (b) Verifies closed indication (red light on - green light off) received. **EVALUATOR'S NOTE:** ***This step is sequence critical.*** **COMMENT:**	**_____ SAT** **_____ UNSAT**
Step 13. Transfer Bus 1C to Station Service. *(Att. 5, Step 3; continued)* **STANDARD** Verifies annunciator 1K-F6 has cleared (not lit).(*Step 3f*) **COMMENT:**	**_____ SAT** **_____ UNSAT**
Step 14. Transfer Bus 1C to Station Service. *(Att. 5, Step 3; continued)* **STANDARD** Verifies amps indicated on Bus 1C amperage meter.(*Step 3g*) **COMMENTS:**	**_____ SAT** **_____ UNSAT**

Step 15. Transfer Bus 1C to Station Service. *(Att. 5, Step 3; continued)* **STANDARD** **(a) Places control switch for ACB-15C1 to the OPEN position**.(*Step 3i*) (b) Verifies open indication (green light on - red light off) received. **EVALUATOR'S NOTE:** ***This step is sequence critical.*** **COMMENTS:**	**_____ SAT** **_____ UNSAT**
Step 16. Transfer Bus 1C to Station Service. *(Att. 5, Step 3; continued)* **STANDARD** (a) Turns off the sync switch (CS-25-15A2) (*Step 3j)* (b) Removes sync key.(*Step 3k*) **EVALUATOR'S NOTE:** ***This step is sequence critical.*** **COMMENTS:**	**_____ SAT** **_____ UNSAT**

Step 17. IF 0-OP-EP-004 is open for configuration control of Alternate Load Shed alignment, THEN using the open 0-OP-EP-004, restore Load Shed to normal alignment, while continuing in this procedure. Otherwise, enter N/A. *(Att. 5, Step 4)* **STANDARD** (a) Acknowledges NOTE before Step 4 that if an Alternate Load Shed alignment is in effect, 0-OP-EP-004, Load Shed, will be in the possession of Shift Supervision for the purpose of configuration control. (b) Determines that an Alternate Load Shed alignment is NOT in effect and enters "N/A" for Step 4. **EVALUATOR'S NOTE:** **If asked**: An Alternate Load Shed alignment is not in effect. **COMMENTS:**	_____ **SAT** _____ **UNSAT**
Step 18. REPORTS TO SHIFT MANAGER (EVALUATOR). **STANDARD** Verbal status report made that action completed. **COMMENTS:**	_____ **SAT** _____ **UNSAT**

STOP TIME: _____

_____

_____

_____

Operator Directions Handout
(TO BE READ TO APPLICANT BY EXAMINER)

Initial Conditions

- Start up in progress on Unit 1, and startup is on standby for the 30% power chemistry hold.
- Feed control is in automatic.
- An Alternate Load Shed alignment is NOT in effect.

Initiating Cues

- You are to Transfer Station Electrical Service from Reserve to Normal in accordance with 1-GOP-1.5, Attachment 5.

Operator Directions Handout
(TO BE GIVEN TO APPLICANT)

Initial Conditions

- Start up in progress on Unit 1, and startup is on standby for the 30% power chemistry hold.
- Feed control is in automatic.
- An Alternate Load Shed alignment is NOT in effect.

Initiating Cues

- You are to Transfer Station Electrical Service from Reserve to Normal in accordance with 1-GOP-1.5, Attachment 5.

U.S. Nuclear Regulatory Commission
Surry Power Station

SR16301
In Plant Job Performance Measure 076A2.01
[ALTERNATE PATH]

Applicant_____ Start Time_____

Examiner_____

Date _____ Stop Time_____

Title

LOCALLY ISOLATE SERVICE WATER TO #3 MER DURING FLOODING.

K/A: 076A2.01 Ability to (a) predict the impacts of the following malfunctions or operations on the SWS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of SWS. (3.5/3.7)

Applicability	**Estimated Time**	**Actual Time**
RO/SRO	10 Minutes	_____

Conditions

- Task is to be SIMULATED in the plant.
- Any plant mode/condition where a large SW leak in #3 MER has occurred.

Standards

- Flooding isolated to #3 MER as indicated by lowering water level in accordance with 0-AP-13.00 steps 38 and 39.

Initiating Cues

- 0-AP-13.00, Turbine Building or #3 MER Flooding, Step 38.
- Shift Manager direction.

Terminating Cues

- 0-AP-13.00, Turbine Building or #3 MER Flooding, Step 39 completed.

Procedures

- 0-AP-13.00, Turbine Building or #3 MER Flooding, Revision 29.

Tools and Equipment

- None

Safety Considerations

- Standard Personal Safety Equipment

Initial Conditions

- This task is to be SIMULATED. Do NOT turn switches, manipulate controls or reposition valves.
- There is a major Service Water leak in #3 MER.
- Charging Pump Service Water Pumps 1-SW-P-10B and 2-SW-P-10B have been secured.
- Main Control Room Chillers 1-VS-E-4A, 4B, and 4C have been secured.
- MER 3 Watertight Door has been checked closed.
- Service Water Headers 1D and 2A are in service.

Initiating Cues

- I need you to isolate Service Water to #3 MER in accordance with Steps 38 and 39 of 0-AP-13.00, Turbine Building or #3 MER Flooding.

Notes to the Evaluator.

- **Task briefing should occur in the pre-determined location.**
- This task is to be SIMULATED. Do NOT allow the Applicant to manipulate controls, operate switches or reposition valves.
- A KEY is attached to this JPM showing the evaluator the leak location and critical valves.

PERFORMANCE CHECKLIST

Notes to the Evaluator

- Task critical elements are **bolded**.
- A KEY is attached to this JPM showing the evaluator the leak location and critical valves.
- **START TIME:**

STEP 1 ISOLATE SW TO MER 3: *(Step 38.a)* a) Fail 1-SW-263 closed by opening Circuit 8 on Lighting Panel 2T3 (located north of 2-FW-E-2A) **STANDARD:** a) Locates lighting panel 2T3 (located north of 2-FW-E-2A). **b) Opens circuit 8 on lighting panel 2-EP-LP-2T3.** **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 2 Check open or open 1-SW-500, SW Header Crosstie (MER 4) *(Step 38.b)* **STANDARD:** a) Proceeds to #4 MER. b) Locates manual valve 1-SW-500 (halfway across room under smoke detector). c) Pulls pin from handwheel actuator. d) Opens 1-SW-500 by rotating valve handwheel in the counter-clockwise direction. **EVALUATOR'S NOTE:** **Cue:** Initially, 1-SW-500 position indicator points to CLOSED. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 3 Close 2-SW-476, Water Box 2C Isol (MER 4). *(Step 38c)* **STANDARD:** a) Locates 2-SW-476 (in #4 MER 2/3 of the way across the room on the right hand side). b) Pulls pin from handwheel actuator. c) Checks closed 2-SW-476 by rotating the handwheel clockwise and verifying no motion. **EVALUATOR'S NOTE:** **Cue:** Initially, 2-SW-476 position indicator points to CLOSED. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 4 Close 2-SW-478, SW Header Crosstie. (MER 4) *(Step 38.d)* **STANDARD:** a) Locates 2-SW-478 (in #4 MER 2/3 of the way across the room on the right hand side). b) Pulls pin from handwheel actuator. c) Closes 2-SW-478 by rotating valve handwheel in the clockwise direction. **EVALUATOR'S NOTE:** **Cue:** Initially, 2-SW-478 position indicator points to OPEN. **Cue:** As the handwheel is rotated in the clockwise direction, the position indication pointer rotates from the OPEN to the CLOSED position. **Safety concern: Trainee does not have to crawl across pipes to check the valve labels at the east end of the #4 MER. He can identify which valve label he is looking at, and the evaluator can state the label reads "2-SW-478" if the correct label is identified. The trainee can then describe the required actions to complete valve manipulation from the west end of #4 MER.** . **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 5 Secure Chemical Injection to MER 3 SW Supply Header IAW 0-OP-SW-006, MER 3 and MER 4 Service Water Chemical Injection Operation. *(Step 38.e)* **STANDARD:** Notifies Shift Manager (Evaluator) that Chemical Injection to MER 3 SW Supply Header needs to be secured IAW 0-OP-SW-006. **EVALUATOR'S NOTE:** **Cue:** Unit 1 Turbine Building Operator will secure chemical injection. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 6 CHECK WATER LEVEL IN MER 3 ON MER 4 GAUGE 2-PL-LI-201 – LOWERING *(Step 39)* **STANDARD:** a) Locates MER 3 level gauge 2-PL-LI-201 in MER 4. **b) Checks to see if water level in MER 3 is lowering.** **EVALUATOR'S NOTE:** **Cue:** After the Applicant locates MER 3 level gauge, tell him the **level is 50" H_2O and slowly rising**. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 7 Secure CHG Pump SW Pumps: *(Step 39.a RNO)* • 1-SW-P-10A • 2-SW-P-10A **STANDARD:** a) Calls Unit 1 RO and directs securing of 1-SW-P-10A. b) Calls Unit 2 RO and directs securing of 2-SW-P-10A. **EVALUATOR'S NOTE:** **Cue:** When the Applicant has given the directions to secure 1/2-SW-P-10A, inform the Applicant that the pumps are secured. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 8 Close 1-SW-499, Water Box 1D Isolation. *(Step 39.b RNO)* **STANDARD:** a) Locates manual valve 1-SW-499 in MER 4. **b) Pulls pin from handwheel actuator.** c) **Closes 1-SW-499 by rotating valve handwheel in the clockwise direction until the needle points to CLOSED.** **EVALUATOR'S NOTE:** **Cue:** Initially, 1-SW-499 position indicator points to OPEN. **Cue:** As the handwheel is rotated in the clockwise direction, the position indication pointer rotates from the OPEN to the CLOSED position **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 9 Close 1-SW-500, Water Box 1D Isol. *(Step 39.c RNO)* **STANDARD:** a) Locates manual valve 1-SW-500 (halfway across room under smoke detector). **b) Pulls pin from handwheel actuator.** **c) Closes 1-SW-500 by rotating valve handwheel in the clockwise direction.** **EVALUATOR'S NOTE:** **Cue:** As the handwheel is rotated in the clockwise direction, the position indication pointer rotates from the OPEN to the CLOSED position. ***NOTE*:** *1-SW-500 was previously opened (simulated) in a previous step.* **Cue:** Water level on 2-PL-LI-201, MER 3 Level gauge is 52" and slowly lowering. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 10 REPORT TO SHIFT SUPERVISOR (EVALUATOR). **STANDARD:** Verbal status report that steps 38 and 39 of 1-AP-13.00 are complete. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STOP TIME: _____

_____

_____

_____

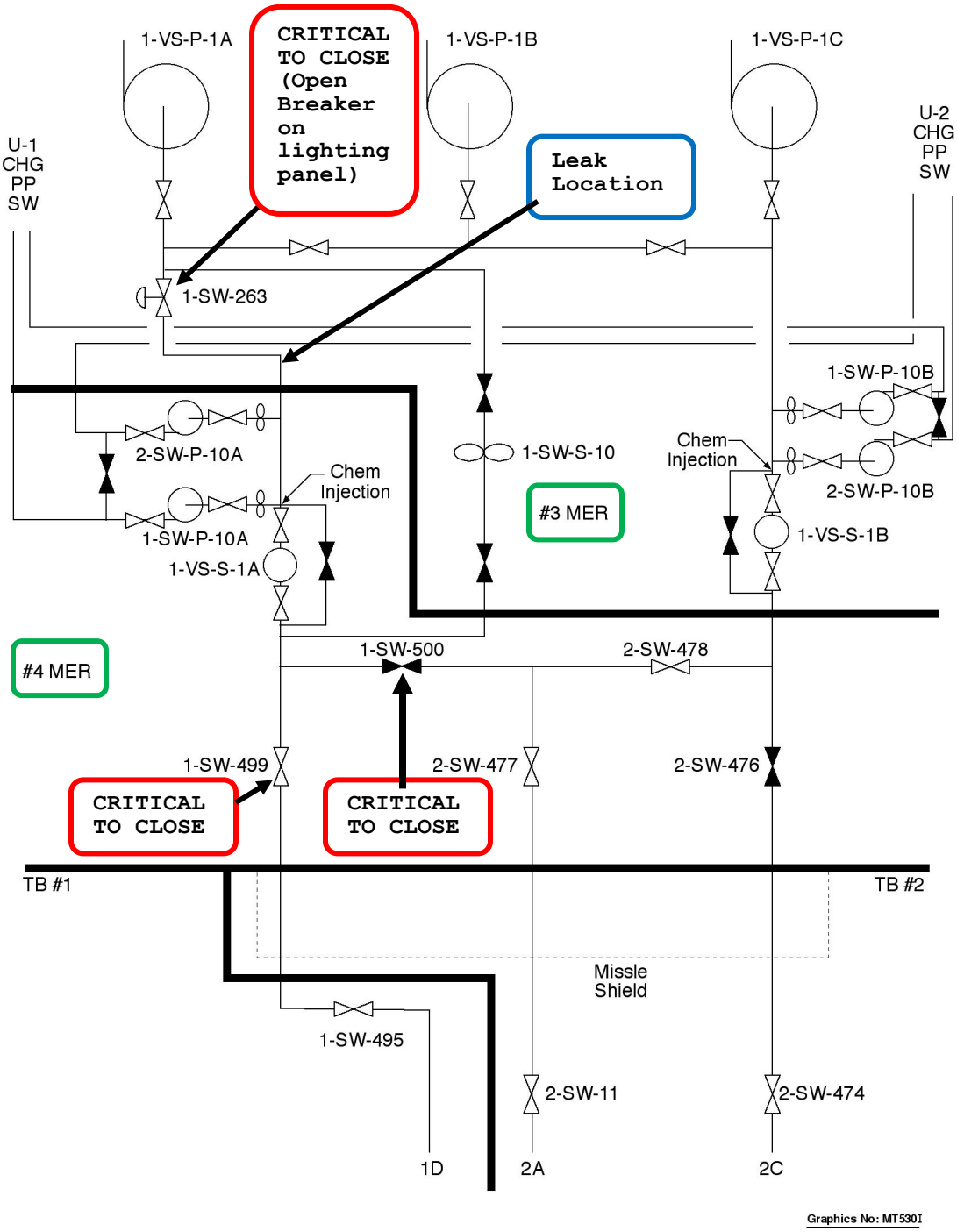
_____

_____

_____

KEY

(FOR EVALUATOR)



SERVICE BUILDING SERVICE WATER SUBSYSTEM

Operator Directions Handout
(TO BE READ TO APPLICANT BY EXAMINER)

Initial Conditions

- This task is to be SIMULATED. Do NOT turn switches, manipulate controls or reposition valves.
- There is a major Service Water leak in #3 MER.
- Charging Pump Service Water Pumps 1-SW-P-10B and 2-SW-P-10B have been secured.
- Main Control Room Chillers 1-VS-E-4A, 4B, and 4C have been secured.
- MER 3 Watertight Door has been checked closed.
- Service Water Headers 1D and 2A are in service.

Initiating Cues

- I need you to isolate Service Water to #3 MER in accordance with Steps 38 and 39 of 0-AP-13.00, Turbine Building or #3 MER Flooding.

Notes to the Evaluator.

- **Task briefing should occur in the pre-determined location.**
- This task is to be SIMULATED. Do NOT allow the Applicant to manipulate controls, operate switches or reposition valves.
- Critical step sequencing requirements: None.

Operator Directions Handout
(TO BE GIVEN TO APPLICANT)

Initial Conditions

- This task is to be SIMULATED. Do NOT turn switches, manipulate controls or reposition valves.
- There is a major Service Water leak in #3 MER.
- Charging Pump Service Water Pumps 1-SW-P-10B and 2-SW-P-10B have been secured.
- Main Control Room Chillers 1-VS-E-4A, 4B, and 4C have been secured.
- MER 3 Watertight Door has been checked closed.
- Service Water Headers 1D and 2A are in service.

Initiating Cues

- I need you to isolate Service Water to #3 MER in accordance with Steps 38 and 39 of 0-AP-13.00, Turbine Building or #3 MER Flooding.

TO BE GIVEN TO APPLICANT

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
38. ___	ISOLATE SW TO MER 3:	
	☐ a) Fail 1-SW-263 closed by opening Circuit 8 on Lighting Panel 2T3 (located north of 2-FW-E-2A)	
	☐ b) Check open or open 1-SW-500, SW Header Crosstie (MER 4)	
	☐ c) Close 2-SW-476, Water Box 2C Isol (MER 4)	c) Do the following: ☐ 1) Check open or open 2-SW-533, located in MER 5. ☐ 2) Close 2-SW-474, located in Unit 2 BC HX SW MOV pit.
	☐ d) Close 2-SW-478, SW Header Crosstie. (MER 4)	
	☐ e) Secure Chemical Injection to MER 3 SW Supply Header IAW 0-OP-SW-006, MER 3 and MER 4 Service Water Chemical Injection Operation	
39. ___	CHECK WATER LEVEL IN MER 3 ON MER 4 GAUGE 2-PL-LI-201 - LOWERING	Do the following: a) Secure CHG Pump SW Pumps: ☐ • 1-SW-P-10A ☐ • 2-SW-P-10A ☐ b) Close 1-SW-499, Water Box 1D Isol. ☐ c) Close 1-SW-500, SW Header Crosstie.

U.S. Nuclear Regulatory Commission
Surry Power Station

SR16301
In Plant Job Performance Measure 068AA1.12

Applicant_____ Start Time_____

Examiner_____

Date _____ Stop Time_____

Title

LOCALLY ESTABLISH UNIT 2 RCS & S/G HIGH/LOW INTERFACE INTEGRITY.

K/A: 068AA1.12, Ability to operate and / or monitor the following as they apply to the Control Room Evacuation: Auxiliary shutdown panel controls and indicators. (4.4/4.4)

Applicability	**Estimated Time**	**Actual Time**
RO/SRO(I)	4 Minutes	____ Minutes

Conditions

- Task is to be SIMULATED in the Plant.
- A limiting MCR fire has occurred and forced MCR evacuation. 0-FCA-1.00 Attachment 1 is in progress at step 6.

Standards

- MSTVs disabled by (simulated) placing the MSTV Fire Emergency Closure switch to EMERG CLOSE.
- Switches for Rx Head and PZR vent valves (Train A & B), both PZR PORVs, Letdown, and Excess Letdown have been (simulated) placed in the DISABLED position IAW FCA-1.00, Limiting MCR Fire (Rev. 49), Attachment 1, ESGR/Cable Vault Operations, step 6-9.

Initiating Cues

- FCA-1.00, Limiting MCR Fire, Attachment 1, ESGR/Cable Vault Operations
- Shift Manager direction.

Terminating Cues

- Report received that Unit 2 High/Low Interface Integrity established (steps 6-9 completed).

Procedures

- 0-FCA-1.00, Limiting MCR Fire (Rev. 49), Attachment 1, ESGR Cable Vault Operations.

Tools and Equipment

- None

Safety Considerations

- Standard Personal Safety Equipment

Initial Conditions

- This task is to be SIMULATED. Do NOT turn switches, manipulate controls or reposition valves.
- A fire has forced evacuation of the control room.
- You ONLY have a key to the Appendix R panel with you.

Initiating Cues

- I need you perform Steps 6 through 9 of 0-FCA-1.00, Attachment 1.

Notes to the Evaluator

- This task is to be SIMULATED. Do NOT allow the operator to manipulate controls, operate switches or reposition valves.
- Critical step sequencing requirements: None.

PERFORMANCE CHECKLIST

Notes to the Evaluator

- Task critical elements are **bolded**.
- **START TIME:**

STEP 1 Open Unit 2 Appendix R Isolation Panel door (Key required). *(Step 6)* **STANDARD:** a) Proceeds the Unit 2 Appendix R panel. b) Simulates unlocking and opening panel. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 2 On Unit 2 Appendix R Isolation Panel, place MSTVs in EMERG CLOSE position using FIRE EMERG CLOSE switch. *(Step 7)* **STANDARD:** **Disables the MSTVs by placing the MSTV Fire Emergency Closure switch to EMERG CLOSE.** **EVALUATOR'S NOTE:** **Cue:** Point to EMERG CLOSE position on FIRE EMERG CLOSE switch. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 3 Open Unit 2 Auxiliary Shutdown Panel door (Key required). *(Step 8)* **STANDARD:** a) Proceeds the Unit 2 Auxiliary Shutdown Panel. **b) Obtains key for ASD panel by breaking the glass key enclosure on the panel door.** c) Simulates unlocking and opening panel. **EVALUATOR'S NOTE:** **Cue:** If candidate attempts to use the Appendix R panel key, it does not work. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 4 Establish RCS and SG High/Low Interface integrity on Unit 2: *(Step 9)* a) On Auxiliary Shutdown Panel, place the following switches in DISABLE: • RX HEAD/PRZR VENT VVS TRAIN A • 2-RC-SOV-200A-1 - 2-RC-SOV-201A-1 • PRZR PORV, 2-RC-PCV-2455C • LETDOWN LINE ISOL, 2-CH-LCV-2460A • RX HEAD/PRZR VENT VVS TRAIN B • 2-RC-SOV-200B-1 - 2-RC-SOV-201B-1 • PRZR PORV, 2-RC-PCV-2456 • EXCESS LETDOWN FLOW, 2-CH-HCV-2137 **STANDARD:** a) Locates each switch on Unit 2 ASDP. **b) Simulates placing each switch in the DISABLE position.** **EVALUATOR'S NOTE:** **Cue:** Point to DISABLE position on each switch as Applicant simulates correct manipulation. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 5 Reports to Shift Manager (Evaluator) that task is complete. **STANDARD:** Informs Evaluator task has been completed. **COMMENTS:** ****END OF JPM****	**_____ SAT** **_____ UNSAT**

STOP TIME:

Operator Directions Handout
(TO BE READ TO APPLICANT BY EXAMINER)

Initial Conditions

- This task is to be SIMULATED. Do NOT turn switches, manipulate controls or reposition valves.
- A fire has forced evacuation of the control room.
- You ONLY have a key to the Appendix R panel with you.

Initiating Cues

- I need you perform Steps 6 through 9 of 0-FCA-1.00, Attachment 1.

Notes to the Evaluator

- This task is to be SIMULATED. Do NOT allow the operator to manipulate controls, operate switches or reposition valves.
- Critical step sequencing requirements: None.

Operator Directions Handout
(TO BE GIVEN TO APPLICANT)

Initial Conditions

- This task is to be SIMULATED. Do NOT turn switches, manipulate controls or reposition valves.
- A fire has forced evacuation of the control room.
- You ONLY have a key to the Appendix R panel with you.

Initiating Cues

- I need you perform Steps 6 through 9 of 0-FCA-1.00, Attachment 1.

1. ☑ Isolate MCR Ventilation from ESGR at 0-FP-FACP-14, MAIN HALON PANEL:
   - ☑ a) Place UNIT 1 DAMPER CLOSURE switch in CLOSE.
   - ☑ b) Place UNIT 2 DAMPER CLOSURE switch in CLOSE.

2. ☑ Open Unit 1 Appendix R Isolation Panel door (Key required).

3. ☑ On Unit 1 Appendix R Isolation Panel, place MSTVs in EMERG CLOSE position using FIRE EMERG CLOSE switch.

4. ☑ Open Unit 1 Auxiliary Shutdown Panel door (Key required).

NOTE:
- RCS and Secondary High/Low pressure boundary valves may be operated under Shift Supervision direction after evaluation of system integrity.
- When ( )-CH-LCV-( )460A is disabled, the valve will be unavailable until CTMT entry or MCR access is possible.

5. ☑ Establish RCS and SG High/Low Interface integrity on Unit 1:

   a) On Auxiliary Shutdown Panel, place the following switches in DISABLE:

   - RX HEAD/PRZR VENT VVS TRAIN A
   - ☑ 1-RC-SOV-100A-1 - 1-RC-SOV-101A-1
   - ☑ PRZR PORV, 1-RC-PCV-1455C
   - ☑ LETDOWN LINE ISOLATION, 1-CH-LCV-1460A
   - RX HEAD/PRZR VENT VVS TRAIN B
   - ☑ 1-RC-SOV-100B-1 - 1-RC-SOV-101B-1
   - ☑ PRZR PORV, 1-RC-PCV-1456
   - ☑ EXCESS LETDOWN FLOW, 1-CH-HCV-1137

6. ___ Open Unit 2 Appendix R Isolation Panel door (Key required).

7. ___ On Unit 2 Appendix R Isolation Panel, place MSTVs in EMERG CLOSE position using FIRE EMERG CLOSE switch.

8. ___ Open Unit 2 Auxiliary Shutdown Panel door (Key required).

9. ___ Establish RCS and SG High/Low Interface integrity on Unit 2:

a) On Auxiliary Shutdown Panel, place the following switches in DISABLE:

- RX HEAD/PRZR VENT VVS TRAIN A

☐ • 2-RC-SOV-200A-1 - 2-RC-SOV-201A-1

☐ • PRZR PORV, 2-RC-PCV-2455C

☐ • LETDOWN LINE ISOL, 2-CH-LCV-2460A

- RX HEAD/PRZR VENT VVS TRAIN B

☐ • 2-RC-SOV-200B-1 - 2-RC-SOV-201B-1

☐ • PRZR PORV, 2-RC-PCV-2456

☐ • EXCESS LETDOWN FLOW, 2-CH-HCV-2137

U.S. Nuclear Regulatory Commission
Surry Power Station

SR16301
In Plant Job Performance Measure 061K4.01

Applicant_____ Start Time_____

Examiner_____

Date _____ Stop Time_____

Title

LOCALLY SWAP THE AFW PUMP, 2-FW-P-2 SUPPLY TO FIRE WATER

K/A: 061K4.01 Knowledge of AFW design feature(s) and/or interlock(s) which provide for the following: Water sources and priority of use. (4.1/4.2)

Applicability	**Estimated Time**	**Actual Time**
RO/SRO(I)/SRO(U)	15 Minutes	____ Minutes

Conditions

- Task is to be SIMULATED in the plant.
- A simulated loss of secondary heat sink is in progress. Both the ECST and underground tank levels are below 20% and it is desired to swap AFW pump suction to the Fire Main.

Standards

- 2-FW-P-2 AFW suction aligned to Fire water.

Initiating Cues

- 2-FR-H.1, Response to Loss Of Secondary Heat Sink; Attachment 1, Alternate Suction to AFW Pumps.
- Shift Manager direction.

Terminating Cues

- Report received that 2-FW-P-2 AFW suction aligned to Fire water.

Procedures

- 2-FR-H.1, Attachment 1, step 4, Rev 37

Tools and Equipment
- None

Safety Considerations
- Standard PPE Required.

Initial Conditions

- Unit 2 is currently experiencing a loss of secondary heat sink and the team is currently at step 3 of 2-FR-H.1, Response to Loss of Secondary Heat Sink.
- AFW cross-tie from Unit 1 is unavailable and the basement of Unit 2 safeguards is not accessible due to high radiation levels.

Initiating Cues

- I need you to align Fire Water to 2-FW-P-2, per step 4 of 2-FR-H.1, Attachment 1.

Notes to the Evaluator

- This task is to be SIMULATED. Do NOT allow the operator to manipulate controls, operate switches or reposition valves.
- Critical step sequencing requirements: None.

PERFORMANCE CHECKLIST

Notes to the Evaluator

- Task critical elements are **bolded**.
- This task is to be SIMULATED. Do NOT allow the operator to manipulate controls, operate switches or reposition valves
- **START TIME_____:**

STEP 1: Fire Water Alignment to AFW Pumps. Locally close the telltale drain valve, 2-FW-119. *(2-FR-H.1, Attachment 1 Step 4a)* **Standards** (a) Proceeds to Unit 2 safeguards steam side. **(b) Closes 2-FW-119 by turning handwheel in the clockwise direction.** **Evaluator's Cues** **Cue:** When the valve is operated properly, the valve stem inserts until the handwheel will not turn. **Evaluator's Notes** • 2-FW-119 is located between the fire main isolation valves near the stairway to the upper levels and is normally open. **Evaluator's Comments**	**_____ SAT** **_____ UNSAT**

STEP 2: Locally open fire main isolation valves: *(2-FR-H.1, Attachment 1 Step 4b*) o 2-FW-120 o 2-FW-185 **Standards** **(a) Opens 2-FW-120 by turning handwheel in the counter-clockwise direction.** **(b) Opens 2-FW-185 by turning handwheel in the counter-clockwise direction.** **Evaluator Cues** • **Cue:** valve stems rise as FW-120 & FW-185 are properly operated. • **Cue:** After both FW-120 & FW-185 opened, flow noise is momentarily heard through the valves. • **Cue:** If FW-119 NOT closed before opening FW-120 & FW-185, water is spraying out from 2-FW-119. **Evaluator's Notes** • 2-FW-120 & -185 are located on ground level near stairway. **Evaluator's Comments**	**_____ SAT** **_____ UNSAT**
STEP 3: Locally start diesel driven fire pump. (*2-FR-H.1, Attachment 1 step 4c*) **STANDARD:** a) Asks Shift Manager/Evaluator status of diesel driven fire pump. **EVALUATOR'S NOTE:** **When asked**: Another operator has started the diesel driven fire pump. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 4: Locally open fire water suction valves to available AFW pump(s): *(2-FR-H.1, Attachment 1 step 4d)* 2-FW-P-2 • 2-FW-154 **STANDARD:** a) Acknowledges **NOTE** prior to Step d: The following steps should be used as needed to align water to each AFW pump one at a time and the MCR informed after each pump alignment is complete. **b) Opens 2-FW-154, (for 2-FW-P-2) by turning handwheel in the counter-clockwise direction.** **Evaluator's Cues** **Cue:** valve stem rises if valve is properly operated. **EVALUATOR'S NOTE:** Candidate may inform MCR (Evaluator) following manipulation of suction valve. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 5: Locally check AFW pump suction pressure. *(2-FR-H.1, Attachment 1 step 4e*) **Standards** Checks 2-FW-P-2 AFW pump suction pressure gauge to verify pressure available: 2-FW-PI-256A (for 2-FW-P-2), **Evaluator's Cues** **Cue:** gauge indicates full range (> 30 psig). **Evaluator's Comments**	**_____ SAT** **_____ UNSAT**

STEP 6: Locally close normal AFW pump suction valves: (*2-FR-H.1, Attachment 1 step 4f)* 2-FW-P-2 • 2-FW-153 • 2-FW-283 **Standards** **(a) Closes 2-FW-153 (ECST to 2-FW-P-2) by turning handwheel in the clockwise direction** (b) Verifies 2-FW-283 closed (booster pps to 2-FW-P-2). **Evaluator's Cues** • **Cue:** valve stem goes in if 2-FW-153 is properly operated. • **Cue:** valve stem for 2-FW-283 is as indicated (~½ inch showing). **Evaluator's Comments**	**_____ SAT** **_____ UNSAT**
STEP 7: REPORTS TO SHIFT MANAGER (EVALUATOR) **Standards** Verbal status report made that 2-FW-P-2 is aligned on fire water. **STOP TIME: _____** **Evaluator's Comments**	**_____ SAT** **_____ UNSAT**

STOP TIME:

_____

_____

_____

_____

Operator Directions Handout
(TO BE READ TO APPLICANT BY EXAMINER)

Initial Conditions

- Unit 2 is currently experiencing a loss of secondary heat sink and the team is currently at step 3 of 2-FR-H.1, Response to Loss of Secondary Heat Sink.

- AFW cross-tie from Unit 1 is unavailable and the basement of Unit 2 safeguards is not accessible due to high radiation levels.

Initiating Cues

- I need you to align Fire Water to 2-FW-P-2, per step 4 of 2-FR-H.1, Attachment 1.

Notes to the Evaluator

- This task is to be SIMULATED. Do NOT allow the operator to manipulate controls, operate switches or reposition valves.
- Critical step sequencing requirements: None.

Operator Directions Handout
(TO BE GIVEN TO APPLICANT)

Initial Conditions

- Unit 2 is currently experiencing a loss of secondary heat sink and the team is currently at step 3 of 2-FR-H.1, Response to Loss of Secondary Heat Sink.
- AFW cross-tie from Unit 1 is unavailable and the basement of Unit 2 safeguards is not accessible due to high radiation levels.

Initiating Cues

- I need you to align Fire Water to 2-FW-P-2, per step 4 of 2-FR-H.1, Attachment 1.

4. Fire Water Alignment to AFW pumps

___ a. Locally close telltale drain valve, 2-FW-119.

___ b. Locally open fire main isolation valves:

☐ • 2-FW-120
☐ • 2-FW-185

___ c. Locally start diesel driven fire pump.

NOTE: The following steps should be used as needed to align fire water to each available AFW pump one at a time and the MCR informed after each pump alignment is complete.

___ d. Locally open fire water suction valves to available AFW pump(s):

2-FW-P-2	2-FW-P-3A	2-FW-P-3B
☐ 2-FW-154	☐ 2-FW-169	☐ 2-FW-184

___ e. Locally check AFW pump suction pressure.

___ f. Locally close normal AFW pump suction valves:

2-FW-P-2	2-FW-P-3A	2-FW-P-3B
☐ 2-FW-153	☐ 2-FW-168	☐ 2-FW-183
☐ 2-FW-283	☐ 2-FW-284	☐ 2-FW-285

U.S. Nuclear Regulatory Commission
Surry Power Station

SR16301
In Plant Job Performance Measure 076A2.01
[Alternate Path]

Applicant_____ Start Time_____

Examiner_____

Date _____ Stop Time_____

Title

Isolate Service Water to #5 MER During Flooding

K/A: 076A2.01 Ability to (a) predict the impacts of the following malfunctions or operations on the SWS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of SWS. (3.5 / 3.7)

Applicability	Estimated Time	Actual Time
RO	12 Minutes	____ Minutes

Conditions

- Task is to be SIMULATED in the Plant.
- Major Service Water Leak in #5 MER.

Standards

- Flooding isolated to MER #5 as indicated by lowering water level IAW 0-AP-13.00, Step 23.

Initiating Cues

- Shift Manager Direction.
- 0-AP-13.00, Turbine Building or MER 3 Flooding, Step 23.

Terminating Cues

- 0-AP-13.00, Turbine Building or MER 3 Flooding, Step 23, complete.

Procedures

- 0-AP-13.00, Turbine Building or MER 3 Flooding, Rev 29
- Probabilistic Risk Assessment, SPS Units 1&2 IPE, FDS-1ME2
- SA-AA-104, Confined Space Entry

Tools and Equipment

- None

Safety Considerations

- Standard Personal Safety Equipment

Initial Conditions

- This task is to be SIMULATED. Do NOT turn switches, manipulate controls or reposition valves.
- A major Service Water leak has been reported in #5 MER.
- The #5 MER chillers have been secured.
- The SW header from Unit 1D Waterbox is in service.

Initiating Cues

- I need you to isolate Service Water to #5 MER in accordance with Step 23 of 0-AP-13.00, Turbine Building or #3 MER Flooding.

Notes

- Task briefing should occur in the pre-determined location.
- This task is to be SIMULATED. Do NOT allow the Candidate to manipulate controls, operate switches or reposition valves.

PERFORMANCE CHECKLIST

Notes to the Evaluator

- Task critical elements are bolded.
- **START TIME:**

STEP 1: CLOSE OR CHECK CLOSED 2-SW-530 TO ISOLATE SW TO MER 5 ***(Step 23a)*** **STANDARD:** a) Proceeds to #5 MER. b) Locates 2-SW-530 in northwest corner of MER 5. c) Closes 2-SW-530 by rotating the handwheel clockwise until valve stem is fully inserted. **EVALUATOR'S NOTE:** **If asked:** Approximately 3" of water on floor. **Cue:** 2-SW-530 is "as you see it" (*OPEN*). **Cue:** Valve handwheel turns clockwise and valve stem retracts if valve is operated properly. **Cue:** Flooding is from dike area next to electrical room, overflowing into chiller area. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 2: CLOSE OR CHECK CLOSED 2-SW-532 TO ISOLATE SW TO MER 5 *(Step 23a)* **STANDARD:** (a) Locates 2-SW-532 in northwest corner of MER 5. **(b) Closes 2-SW-532 by rotating the handwheel clockwise until valve stem is fully inserted.** **EVALUATOR'S NOTE:** **Cue:** 2-SW-532 is "as you see it" (*OPEN*). **Cue:** Valve handwheel turns clockwise and valve stem retracts if valve is operated properly. **Cue:** Flooding continues from dike area next to electrical room, overflowing into chiller area. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 3: CLOSE OR CHECK CLOSED 2-SW-535 TO ISOLATE SW TO MER 5. *(Step 23a)* **STANDARD:** a) Locates 2-SW-535 in MER 5 on back wall 10 feet from the west wall, waist high. **b)** Closes 2-SW-535 by rotating the valve handle clockwise until the valve stem is fully inserted**.** **EVALUATOR'S NOTE:** **If asked:** Observes no flow indicated on 1-SW-FI-132D. **Cue:** 2-SW-535 is "as you see it" (*THROTTLED*). **Cue:** Valve handwheel turns clockwise and valve stem retracts if valve is operated properly. **Cue:** Flooding continues from dike area next to electrical room, overflowing into chiller area. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 4: CLOSE OR CHECK CLOSED 2-SW-536 TO ISOLATE SW TO MER. *(Step 23a)* **STANDARD:** a) Locates 2-SW-536 in MER 5 on back wall 10 feet from the east wall, waist high. b) Closes 2-SW-536 by rotating the valve handle clockwise until the valve stem is fully inserted. **EVALUATOR'S NOTE:** **If asked:** Observes no flow indicated on 1-SW-FI-132E **Cue:** 2-SW-536 is "as you see it" (*THROTTLED*). **Cue:** Valve handwheel turns clockwise and valve stem retracts if valve is operated properly. **Cue:** Flooding continues from dike area next to electrical room, overflowing into chiller area. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 5: Check flooding - STOPPED. *(Step 23b)* **STANDARD:** a) Identifies flooding continues. b) Goes to 23b RNO. **EVALUATOR'S NOTE:** **Cue:** Water still pouring over top of dike. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 6: [ALTERNATE PATH STARTS HERE] Check or place in service SW Header 1D IAW 0-OP-SW-49.3, SWAPPING CONTROL ROOM CHILLER AND CHARGING PUMP SW SUPPLY HEADERS. (*Step 23 b, RNO 1)* **STANDARD:** a) Recalls from initial briefing that the 1D SW header is in service. (OR) b) Simulates Gai-Tronics use to contact SRO for the status of the 1D SW header. (OR) c) Checks 1-SW-495, in the Unit 1 CC HX SW MOV Pit, open and supplying the 1D SW header. **EVALUATOR'S NOTE:** • **If asked:** Evaluated Space is as you see it. • **Cue:** If Applicant should go to Unit 1 CC HX SW MOV Pit to determine 1-SW-495 position, after Candidate points out valve location, use flashlight to indicate 1-SW-495 position arrow is pointing towards the OPEN position. ***Safety Concern*:** Candidate does not have to travel down into the valve pits. They can identify which valve label they are looking at, and the evaluator can state the label reads "1-SW-495" if the correct label is identified. The Trainee can describe actions to complete valve manipulation from above. ***Safety Concern*:** The valve pits have been classified as Evaluated Spaces. Do not allow the Candidate to enter the valve pits. The Candidate should mention that the valve pits are Evaluated Spaces. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

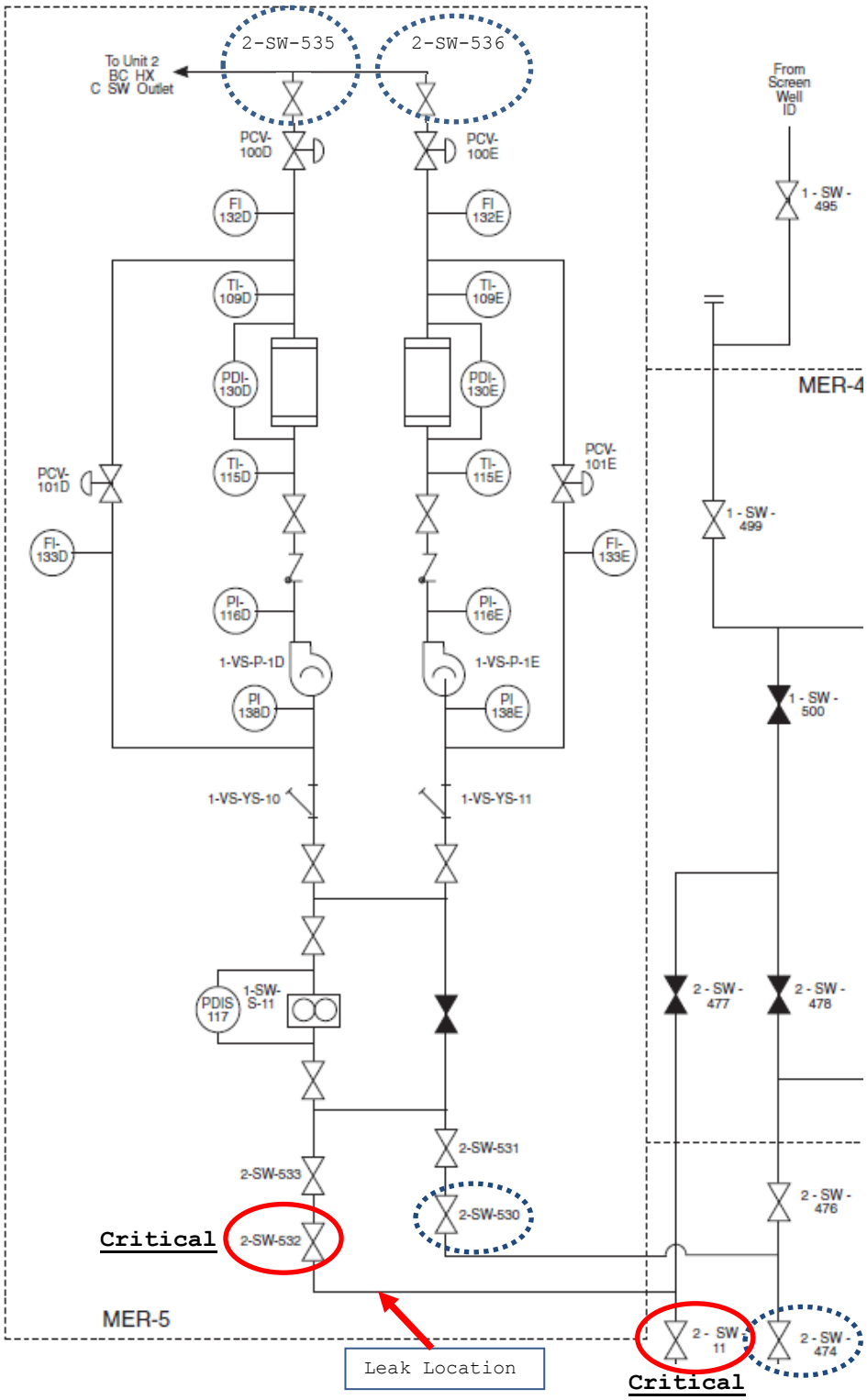
STEP 7: Close 2-SW-474, located in Unit 2 BC HX SW MOV pit. ***(Step 23b, RNO 2)*** **STANDARD:** a) Locates 2-SW-474 in Unit 2 BC HX SW MOV Pit and pulls pin from 2-SW-474 valve operator. b) Closes 2-SW-474 by rotating the handwheel in the clockwise direction. c) Candidate returns to #5 MER to determine status of #5 MER flooding. **EVALUATOR'S CUE**: **If asked**: After 2-SW-474 closed; Water is still flowing over the dike in #5 MER. **Cue**: When Candidate locates 2-SW-474 in Unit 2 BC HX MOV pit and describes action in b) above, use flashlight to indicate 2-SW-474 position indicator moving from OPEN to CLOSE position; valve motion stops when CLOSED position reached. **EVALUATOR'S NOTE:** **Cue:** Evaluated Space is as you see it. ***Safety Concern*:** Candidate does not have to travel down into the valve pits. They can identify which valve label they are looking at, and the evaluator can state the label reads "2-SW-474" if the correct label is identified. The Trainee can describe actions to complete valve manipulation from above. ***Safety Concern*:** The valve pits have been classified as Evaluated Spaces. Do not allow the Candidate to enter the valve pits. The Candidate should mention that the valve pits are Evaluated Spaces. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 8: CHECK THAT FLOODING HAS STOPPED. *(Step 23b, RNO 3)* **STANDARD:** a) Locates 2-SW-11 in Unit 2 RS HX SW MOV (SW-MOV-203C/D) Pit. b) Pull pin from 2-SW-11 valve positioner. **c) Closes 2-SW-11 by rotating the handwheel in the clockwise direction.** d) Returns to MER #5 and verifies flooding stopped. **EVALUATOR'S CUE:** **Cue**: When Candidate locates 2-SW-11 in Unit 2 RS HX MOV pit and describes action in b) above, use flashlight to indicate 2-SW-11 position indicator moving from OPEN to CLOSE position; valve motion stops when CLOSED position reached. **Cue:** When Candidate returns to #5 MER to determine status of flooding, inform Candidate that water has stopped flowing over the dike, and water level on the floor is 2" and lowering. **EVALUATOR'S NOTE:** ***Safety Concern*:** Candidate does not have to travel down into the valve pits. They can identify which valve label they are looking at, and the evaluator can state the label reads "2-SW-11" if the correct label is identified. The Trainee can describe actions to complete valve manipulation from above. ***Safety Concern*:** The valve pits have been classified as Evaluated Spaces. Do not allow the Candidate to enter the valve pits. The Candidate should mention that the valve pits are Evaluated Spaces. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 9: REPORTS TO SHIFT MANAGER (EVALUATOR). **STANDARD:** Verbal report that 0-AP-13.00, Step 23 is complete. **COMMENTS:** ** **JPM COMPLETE** **	**_____ SAT** **_____ UNSAT**

STOP TIME:

KEY


2-SW-535
2-SW-536
To Unit 2 BC HX C SW Outlet
From Screen Well ID
PCV-100D
PCV-100E
1 - SW - 495
FI 132D
FI 132E
TI-109D
TI-109E
PDI-130D
PDI-130E
MER-4
PCV-101D
TI-115D
TI-115E
PCV-101E
1 - SW - 499
FI-133D
FI-133E
PI-116D
PI-116E
1-VS-P-1D
1-VS-P-1E
PI 138D
PI 138E
1 - SW - 500
1-VS-YS-10
1-VS-YS-11
PDIS 117
1-SW-S-11
2 - SW - 477
2 - SW - 478
2-SW-531
2-SW-533
2-SW-530
2 - SW - 476
Critical
2-SW-532
MER-5
2 - SW - 11
2 - SW - 474
Leak Location
Critical

Operator Directions Handout
(TO BE READ TO APPLICANT BY EXAMINER)

Initial Conditions

- This task is to be SIMULATED. Do NOT turn switches, manipulate controls or reposition valves.
- A major Service Water leak has been reported in #5 MER.
- The #5 MER chillers have been secured.
- The SW header from Unit 1D Waterbox is in service.

Initiating Cues

- I need you to isolate Service Water to #5 MER in accordance with Step 23 of 0-AP-13.00, Turbine Building or #3 MER Flooding.

Notes

- Task briefing should occur in the pre-determined location.
- This task is to be SIMULATED. Do NOT allow the Candidate to manipulate controls, operate switches or reposition valves.

Operator Directions Handout
(TO BE GIVEN TO APPLICANT)

Initial Conditions

- This task is to be SIMULATED. Do NOT turn switches, manipulate controls or reposition valves.
- A major Service Water leak has been reported in #5 MER.
- The #5 MER chillers have been secured.
- The SW header from Unit 1D Waterbox is in service.

Initiating Cues

- I need you to isolate Service Water to #5 MER in accordance with Step 23 of 0-AP-13.00, Turbine Building or #3 MER Flooding.

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STEP	ACTION/ EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23. ___	ISOLATE SW TO MER 5: a) Close or check closed the following isolation valves: ☐ • 2-SW-530 (NW corner of MER 5) ☐ • 2-SW-532 (NW corner of MER 5) ☐ • 2-SW-535 (South wall, West side of MER 5) ☐ • 2-SW-536 (South wall, East side of MER 5) ☐ b) Check flooding - STOPPED	b) Do the following: ☐ 1) Check or place in service SW Header 1D IAW 0-OP-SW-49.3, SWAPPING CONTROL ROOM CHILLER AND CHARGING PUMP SW SUPPLY HEADERS. ☐ 2) Close 2-SW-474, located in Unit 2 BC HX SW MOV pit. ☐ 3) IF flooding NOT stopped, THEN close 2-SW-11, located in Unit 2 RX HX SW MOV pit.
24. ___	CHECK CONTROL ROOM CHILLERS - ONE RUNNING	☐ Start Control Room Chiller IAW Shift Supervision direction using 0-OP-VS-006, CONTROL ROOM RELAY ROOM VENTILATION SYSTEM.
25. ___	GO TO STEP 50	
	NOTE: Attachment 1 lists the sources of Service Water from each water box.	
26. ___	LOCALLY ATTEMPT TO ISOLATE SW LINE	

U.S. Nuclear Regulatory Commission
Surry Power Station

SR16301
In Plant Job Performance Measure KA Number 078A2.01

Applicant_____ Start Time_____

Examiner_____

Date _____ Stop Time_____

Title

MANUALLY BYPASS UNIT 2 INSTRUMENT AIR DRYER 2-IA-D-1.

K/A: 078A2.01, Ability to (a) predict the impacts of the following malfunctions or operations on the IAS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Air dryer and filter malfunctions. (2.4/2.9)

Applicability	**Estimated Time**	**Actual Time**
RO	4 Minutes	____ Minutes

Conditions

- Task is to be SIMULATED in the Plant.
- Unit 2 IA dryer has experienced a loss of power and has failed to automatically bypass.

Standards

- ARP 2B-G5, Step 2 RNO performed to locally bypass air dryer and restore Unit 2 IA pressure.

Initiating Cues

- ARP 2B-G5, Inst. Air Dryer Trouble.
- Shift Manager direction.

Terminating Cues

- Report received that Unit 2 IA dryer has been manually bypassed (step 2 RNO).

Procedures

- ARP 2B-G5, Inst. Air Dryer Trouble.

Tools and Equipment

- None

Safety Considerations

- Standard Personal Safety Equipment

Initial Conditions

- This task is to be SIMULATED. Do NOT turn switches, manipulate controls or reposition valves.
- 2-IA-D-1, Unit 2 Instrument Air Dryer, has lost power.
- Unit 2 Instrument Air pressure is 78 psig and lowering very slowly.

Initiating Cues

- I need you perform ARP 2B-G5, INST AIR DRYER TRBL to respond to the IA dryer trouble alarm.

Notes to the Evaluator

- This task is to be SIMULATED. Do NOT allow the operator to manipulate controls, operate switches or reposition valves.
- Critical step sequencing requirements: None.

PERFORMANCE CHECKLIST

Notes to the Evaluator

- Task critical elements are **bolded**.
- **START TIME:**

STEP 1 LOCALLY CHECK IA DRYER - ONE OR MORE OF THE FOLLOWING CONDITIONS EXIST: *(Step 1)* ☐• Loss of power ☐• Dryer bed too wet ☐• Probe cable disconnected ☐• Inlet valve malfunction ☐• Exhaust valve malfunction ☐• Dryer discharge pressure less than or equal to 80 PSIG **STANDARD:** a) Proceeds the Unit 2 Turbine Building Basement, southwest corner. b) Acknowledges NOTE to check the IA Dryer Display Panel Status. c) Checks Display Panel. d) Checks dryer discharge pressure above panel. **EVALUATOR'S NOTE:** **NOTE:** Applicant may recall from the instructions that the dryer has lost power, check that substep, and continue to the next step. **Cue:** Local panel display is blank. **If asked:** Local dryer discharge pressure is ~77 psig (indicate with pen or other suitable device). **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 2 CHECK IA DRYER 2-IA-D-1 - BYPASSED: *(Step 2)* ☐• 2-IA-TV-225 - CLOSED ☐• 2-IA-TV-226 - OPEN **STANDARD:** Checks the position of the automatic bypass and isolation valves**.** **EVALUATOR'S NOTE:** **Cue:** 2-IA-TV-225 is "as you see it" *(OPEN – see note below).* **Cue**: 2-IA-TV-226 is "as you see it" *(CLOSED – see note below).* NOTE: The position indicators on 2-IA-TV-225 and 2-IA-TV-226 are located on the coupling between valve operator and valve body. It is an arrow-shape that indicates direction of flow ( ). The arrow on 2-IA-TV-225 should be in-line with the pipe and the arrow on 2-IA-TV-226 should be perpendicular to the pipe. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 3

Do the following to bypass dryer: *(Step 2 RNO)*

☐**a) Locally open 2-IA-1476, IA DRYER TV-226 BYPASS.**

☐**b) Locally close 2-IA-1477, IA DRYER INLET TV-225 ISOL.**

☐**c) Locally close 2-IA-11, IA Dryer Outlet Valve.**

☐ d) Remove dryer from service in accordance with 2-MOP-IA-002, REMOVAL FROM SERVICE AND RETURN TO SERVICE OF INSTRUMENT AIR COMPRESSOR 2-IA-C-1, INSTRUMENT AIR DRYER 2-IA-D-1, OR SERVICE AIR RECEIVER 2-SA-TK-1.

☐ e) Submit a Condition Report.

☐ f) GO TO Step 7.

STANDARD:

a) **Simulates cutting yellow tie wrap and opening 2-IA-1476.**
b) **Simulates cutting yellow tie wrap and closing 2-IA-1477.**
c) **Simulates cutting yellow tie wrap and closing 2-IA-11.**
d) Informs SM (Evaluator) of the need to perform 2-MOP-IA-002.
e) Informs SM (Evaluator) of the need to submit a CR.
f) Continues to Step 7.

EVALUATOR'S NOTE:

Cue: The isolation valves manipulated are quick-throw 90° valves. As the Applicant simulates changing valve position, the valve handle should be parallel to the pipe for OPEN and perpendicular to the pipe for CLOSED.

Cue: Flow noise is heard when opening 2-IA-1476.

Cue: If trainee calls (simulated) the Main Control Room for status of IA pressure, inform them that IA pressure is 85 psig and rising.

NOTE: A set of cutters is staged locally to remove the tie wraps.

NOTE: At least one of the isolation valves must be closed (2-IA-1477 or 2-IA-11) to satisfy the critical step.

NOTE: The local dryer discharge pressure gauge is isolated from the IA header by the valve manipulations that the trainee has just performed. If asked, the local discharge pressure gauge should indicate ~75 psig and stable.

Cue: Another operator will perform 2-MOP-IA-002 to remove the dryer from service.

Cue: Another operator will submit the Condition Report.

COMMENTS:

_____ SAT

_____ UNSAT

STEP 4 PROVIDE NOTIFICATIONS AS NECESSARY: *(Step 7)* ☐ • OMOC ☐ • STA ☐ • Shift Supervision **STANDARD:** Informs SM (Evaluator) that the Unit 2 IA dryer is manually bypassed. **COMMENTS:** ****END OF JPM****	**_____ SAT** **_____ UNSAT**

STOP TIME:

Operator Directions Handout
(TO BE READ TO APPLICANT BY EXAMINER)

Initial Conditions

- This task is to be SIMULATED. Do NOT turn switches, manipulate controls or reposition valves.
- 2-IA-D-1, Unit 2 Instrument Air Dryer, has lost power.
- Unit 2 Instrument Air pressure is 78 psig and lowering very slowly.

Initiating Cues

- I need you perform ARP 2B-G5, INST AIR DRYER TRBL to respond to the IA dryer trouble alarm.

Notes to the Evaluator

- This task is to be SIMULATED. Do NOT allow the operator to manipulate controls, operate switches or reposition valves.
- Critical step sequencing requirements: None.

Operator Directions Handout
(TO BE GIVEN TO APPLICANT)

Initial Conditions

- This task is to be SIMULATED. Do NOT turn switches, manipulate controls or reposition valves.
- 2-IA-D-1, Unit 2 Instrument Air Dryer, has lost power.
- Unit 2 Instrument Air pressure is 78 psig and lowering very slowly.

Initiating Cues

- I need you perform ARP 2B-G5, INST AIR DRYER TRBL to respond to the IA dryer trouble alarm.

SURRY POWER STATION

ANNUNCIATOR RESPONSE PROCEDURE

NUMBER	PROCEDURE TITLE	REVISION
2B-G5	INST AIR DRYER TRBL	4
		PAGE 1 of 4

REFERENCES 2B-53

1) UFSAR 9.8
2) 11448-FM-075A
3) 11548-FE-18AW
4) 11448-ESK-10B, 10AX
5) DCP 86-03A-3
6) DCP 86-03C-3
7) DR S-98-1572

PROBABLE CAUSE

1) Alarm actuates when one or more of the following conditions exist:
   a. Instrument Air dryer discharge pressure less than or equal to 80 PSIG.
   b. Loss of power to dryer.
   c. Dryer bed too wet.
   d. Dryer bed too dry.
   e. Moisture probe cable disconnected.
   f. Inlet valve malfunction.
   g. Exhasut valve malfunction.
   h. Isolation valve closed.
   i. Bypass valve open.
2) Instrumentation failure has occurred.

CONTINUOUS USE

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: The local IA Dryer Display Panel Status Screen should be checked to determine alarm or warning condition.

1. ___ LOCALLY CHECK IA DRYER - ONE OR MORE OF THE FOLLOWING CONDITIONS EXIST:

- ☐ • Loss of power
- ☐ • Dryer bed too wet
- ☐ • Probe cable disconnected
- ☐ • Inlet valve malfunction
- ☐ • Exhaust valve malfunction
- ☐ • Dryer discharge pressure less than or equal to 80 PSIG

☐ Initiate a Condition Report AND GO TO Step 7.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2.	CHECK IA DRYER 2-IA-D-1 - BYPASSED: ☐ • 2-IA-TV-225 - CLOSED ☐ • 2-IA-TV-226 - OPEN	Do the following to bypass dryer: ☐ a) Locally open 2-IA-1476, IA DRYER TV-226 BYPASS. ☐ b) Locally close 2-IA-1477, IA DRYER INLET TV-225 ISOL. ☐ c) Locally close 2-IA-11, IA Dryer Outlet Valve. ☐ d) Remove dryer from service in accordance with 2-MOP-IA-002, REMOVAL FROM SERVICE AND RETURN TO SERVICE OF INSTRUMENT AIR COMPRESSOR 2-IA-C-1, INSTRUMENT AIR DRYER 2-IA-D-1, OR SERVICE AIR RECEIVER 2-SA-TK-1. ☐ e) Submit a Condition Report. ☐ f) GO TO Step 7.
3.	CHECK POWER AVAILABLE TO DRYER ☐ • 2-EP-BKR-2J1-1-4A1, TURB BLDG IA DRYER	WHEN power restored to dryer, THEN do the following: ☐ a) Push Reset Button to reset dryer control circuit. ☐ • Located on outside of control panel 2-IA-CP-225. b) Verify valves have returned to normal alignment: ☐ • 2-IA-TV-225 - OPEN ☐ • 2-IA-TV-226 - CLOSED ☐ c) GO TO Step 7.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. ___	CHECK ALARM CONDITION - CLEAR	☐ WHEN alarm condition clears, THEN GO TO Step 5.
5. ___	LOCALLY PUSH RESET BUTTON TO RESET DRYER CONTROL CIRCUIT ☐ • Located on outside of control panel 2-IA-CP-225	Do the following: ☐ a) Submit a Condition Report. ☐ b) GO TO Step 7.
6. ___	INITIATE A CONDITION REPORT	
7. ___	PROVIDE NOTIFICATIONS AS NECESSARY: ☐ • OMOC ☐ • STA ☐ • Shift Supervision	

- END -

U.S. Nuclear Regulatory Commission
Surry Power Station

SR16301
In Plant Job Performance Measure EPE055EA202

Applicant_____ Start Time_____

Examiner_____

Date _____ Stop Time_____

Title

Locally Operate U2 S/G PORVs

K/A: EPE 055 EA2.02, Ability to determine or interpret the following as they apply to Station Blackout: RCS Core Cooling through natural circulation cooling to S/G cooling. (4.4/4.7)

Applicability	**Estimated Time**	**Actual Time**
RO/SRO	15 Minutes	

Conditions

- Task is to be SIMULATED in the Plant.
- A loss of all AC power has occurred and the crew is in the process of depressurizing intact SGs to 175 psig for long term cooling.

Standards

- Air bottles and regulator aligned to U2 SG PORVs to restore SG depressurization.

Initiating Cues

- Shift Manager direction.

Terminating Cues

- 2-ECA-0.0 Attachment 8, steps 1-5, and Part 1 completed.

Procedures

- 2-ECA-0.0, LOSS OF ALL AC POWER, Rev. 39

Tools and Equipment

- None

Safety Considerations

- Standard Personal Safety Equipment

Initial Conditions

- A loss of all AC power has occurred and the operating team is ready to commence depressurization of all intact steam generators to 175 psig in accordance with 2-ECA-0.0.

- The SG PORV controllers in the MCR are inoperable.

Initiating Cues

- I need you to perform 2-ECA-0.0, Attachment 8 for all three S/G PORVs and call me when ready to commence depressurization.

Notes

- A copy of 2-ECA-0.0, LOSS OF ALL AC POWER, Attachment 8 is attached to this JPM.
- This task is to be SIMULATED. Do NOT allow the operator to manipulate controls, operate switches or reposition valves. DO NOT allow the operator to enter a contaminated area or break the vertical plane of a contaminated area for the simulation of this JPM.
- Critical step sequencing requirements: None.

PERFORMANCE CHECKLIST

Notes to the Evaluator

- Task critical elements are bolded.
- **START TIME:**

STEP 1: Close the isolation valve between the PORV Positioner and the actuator for the SG PORV(s) to be operated. (*Attachment 8, step 3)* **STANDARD:** a) Operator reports to Unit two Safeguards. **b) Closes 2-IA-1625A, 2-MS-RV-201A Positioner Isolation Valve.** **c) Closes 2-IA-1625B, 2-MS-RV-201B Positioner Isolation Valve.** **d) Closes 2-IA-1625C, 2-MS-RV-201C Positioner Isolation Valve.** **EVALUATOR'S NOTE:** • **Cue:** Handle turns 90° and stops. • Valves are "green-handled" valves located on underside of actuator. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 2: Open the bottled air supply valve for the SG PORV(s) to be operated. *(Attachment 8, step 4)* **STANDARD:** **a) Opens 2-IA-1627A, Bottled Air Supply for 2-MS-RV-201A.** **b) Opens 2-IA-1627B, Bottled Air Supply for 2-MS-RV-201B.** **c) Opens 2-IA-1627A, Bottled Air Supply for 2-MS-RV-201A.** **EVALUATOR'S NOTE:** **Cue**: Valve handle turns counter-clockwise several turns and stops. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 3: **NOTE**: Certain postulated BDB FLEX scenarios result in damage to the Containment Spray Pump House which will render the SG PORV control station inoperable. This will necessitate use of backup bottled air system located in Main Steam Valve House. Perform one of the following: *(Attachment 8, step 5)* • IF operation of SG PORV positioners is available in Containment Spray Pump House (Preferred), THEN perform Part 1, Operation of SG PORV Positioners from Containment Spray Pump House. • IF operation of SG PORV positioners is NOT available in Containment Spray Pump House, THEN perform Part 2, Operation of SG PORV Positioners from Main Steam Valve House. **STANDARD:** a) Operator acknowledges NOTE. b) Operator determines that Part 1 is applicable and proceeds to step 6. **EVALUATOR'S NOTE:** **If asked**: Conditions in the Containment Spray Pump House are as you see them. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 4: Check 2-IA-PCV-211 is backed off. (no spring pressure) *(Attachment 8, step 6)* **STANDARD:** a) Operator explains that the adjustment know would be backed off (counter-clockwise) until no spring pressure is felt. **EVALUATOR'S NOTE:** **Cue:** When knob is turned counter-clockwise, no spring pressure is felt. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 5: Align air bottle to supply the SG PORV(s) by opening one of the following. *(Attachment 8, step 7)* **STANDARD:** **a) Operator opens 2-IA-1628, Air Bottle Manifold Isolation Valve.** Or **b) Operator opens 2-IA-1629, Air Bottle Manifold Isolation Valve.** NOTE: Only one of these valves need to be open, but if operator opens both valves then the critical task is met with comment. **EVALUATOR'S NOTE:** **Cue**: Valve handle turns counter-clockwise several turns and stops. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 6: **NOTE:** • The SG PORV(s) will start to open when regulator output pressure is approximately six psig and will be fully open at approximately 30 psig. • Close communication must be maintained between the MCR and Safeguards to control RCS cooldown rate. • Vent valve 2-IA-1632, SG PORV Rapid Closure Vent Valve, may be opened as necessary for rapid closure of the SG PORVs. **STANDARD:** **a)** Operator acknowledges NOTE. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 7: Open the bottle isolation valve. *(Attachment 8, step 8)* **STANDARD:** **a) Operator opens bottle isolation valve**. **EVALUATOR'S NOTE:** **Cue**: Valve handle turns counter-clockwise several turns and stops. **Cue:** Regulator supply pressure shows approximately 2000 psig. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 8: Operator reports to Shift Manager (Evaluator). **STANDARD:** Operator reports that SG PORVs are set up for Local operation. **EVALUATOR'S NOTE:** **Cue**: Acknowledge report and instruct operator to open the PORVS by applying 18 psig regulator pressure in accordance with step 9. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 9: Adjusts 2-IA-PCV-211, SG PORV Bottled Air System Regulator to open SG PORV(s) for desired cooldown. (*Attachment 8, step 9)* **STANDARD:** **a) Operator adjusts regulator pressure up to approx. 18 psig.** b) Operator reports adjustment to Shift Manager. **EVALUATOR'S NOTE:** **Cue**: Regulator pressure does not initially move unless trainee has opened bottle isolation valve. **Cue:** Steam flow noise heard as regulator approaches 8 psig. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 10: Informs Shift Manager that regulator is set at 18 psig. **EVALUATOR'S NOTE:** WHEN informed that regulator is set at 18 psig, inform operator that valves are at desired position and task is complete. **COMMENTS:** **** JPM COMPLETE ****	**_____ SAT** **_____ UNSAT**

STOP TIME: _____

Comments: _____

_____

_____

_____

_____

_____

_____

Operator Directions Handout
(TO BE READ TO APPLICANT BY EXAMINER)

Initial Conditions

- A loss of all AC power has occurred and the operating team is ready to commence depressurization of all intact steam generators to 175 psig in accordance with 2-ECA-0.0.
- The SG PORV controllers in the MCR are inoperable.

Initiating Cues

- I need you to perform 2-ECA-0.0, Attachment 8 for all three S/G PORVs and call me when ready to commence depressurization.

Notes

- A copy of 2-ECA-0.0, LOSS OF ALL AC POWER, Attachment 8 is attached to this JPM.
- This task is to be SIMULATED. Do NOT allow the operator to manipulate controls, operate switches or reposition valves. DO NOT allow the operator to enter a contaminated area or break the vertical plane of a contaminated area for the simulation of this JPM.
- Critical step sequencing requirements: None.

Operator Directions Handout
(TO BE GIVEN TO APPLICANT)

Initial Conditions

- A loss of all AC power has occurred and the operating team is ready to commence depressurization of all intact steam generators to 175 psig in accordance with 2-ECA-0.0.

- The SG PORV controllers in the MCR are inoperable.

Initiating Cues

- I need you to perform 2-ECA-0.0, Attachment 8 for all three S/G PORVs and call me when ready to commence depressurization.

1. ___ Consult with Unit SRO to determine which SG PORV(s) will be operated.

2. ___ Send Operator to Safeguards.

3. Close the isolation valve between the PORV positioner and actuator for the SG PORV(s) to be operated.

   ___ • 2-IA-1625A, 2-MS-RV-201A Positioner Isolation Valve

   ___ • 2-IA-1625B, 2-MS-RV-201B Positioner Isolation Valve

   ___ • 2-IA-1625C, 2-MS-RV-201C Positioner Isolation Valve

4. Open the bottled air supply valve for the SG PORV(s) to be operated.

   ___ • 2-IA-1627A, Bottled Air Supply for 2-MS-RV-201A

   ___ • 2-IA-1627B, Bottled Air Supply for 2-MS-RV-201B

   ___ • 2-IA-1627C, Bottled Air Supply for 2-MS-RV-201C

   NOTE: Certain postulated BDB FLEX scenarios result in damage to the Containment Spray Pump House which will render the SG PORV control station inoperable. This will necessitate use of backup bottled air system located in Main Steam Valve House.

5. Perform one of the following:

   ___ • IF operation of SG PORV positioners is available in Containment Spray Pump House (Preferred), THEN perform Part 1, Operation Of SG PORV Positioners From Containment Spray Pump House.

   ___ • IF operation of SG PORV positioners is NOT available in Containment Spray Pump House, THEN perform Part 2, Operation of SG PORV Positioners From Main Steam Valve House.

PART 1: OPERATION OF SG PORV POSITIONERS FROM CONTAINMENT SPRAY PUMP HOUSE

6. ___ Check 2-IA-PCV-211 is backed off. (no spring pressure)

7. Align air bottle to supply the SG PORV(s) by opening one of the following.

   ___ • 2-IA-1628, Air Bottle Manifold Isolation Valve

   ___ • 2-IA-1629, Air Bottle Manifold Isolation Valve

NOTE:
- The SG PORV(s) will start to open when regulator output pressure is approximately six psig and will be fully open at approximately 30 psig.
- Close communication must be maintained between the MCR and Safeguards to control RCS cooldown rate.
- Vent valve 2-IA-1632, SG PORV Rapid Closure Vent Valve, may be opened as necessary for rapid closure of the SG PORVs.

8. ___ Open the bottle isolation valve.

9. ___ Adjust 2-IA-PCV-211, SG PORV Bottled Air System Pressure Regulator, to open SG PORV(s) for desired cooldown rate.

PART 2: OPERATION OF SG PORV POSITIONERS FROM MAIN STEAM VALVE HOUSE

1. ___ Check 2-IA-PCV-212 is backed off. (no spring pressure)

2. Align Main Steam Valve House air bottles by performing the following:

   ___ a. Close 2-IA-2806, Bottled Air Supply to PORVs - BDB

   ___ b. Open 2-IA-2805, Bottled Air Supply to PORVs - BDB

   ___ c. Check open or open 2-IA-2802, Bottled Air Supply to PORV's - BDB

3. Align air bottle to supply the SG PORV(s) by opening one of the following.

   ___ • 2-IA-2800, Air Bottle Manifold Isolation Valve - BDB

   ___ • 2-IA-2801, Air Bottle Manifold Isolation Valve - BDB

NOTE:
- The SG PORV(s) will start to open when regulator output pressure is approximately six psig and will be fully open at approximately 30 psig.
- Close communication must be maintained between the MCR and Safeguards to control RCS cooldown rate.
- Vent valve 2-IA-2804, SG PORV Rapid Closure Vent Valve - BDB, may be opened as necessary for rapid closure of the SG PORVs

4. ___ Open the bottle isolation valve.

5. ___ Adjust 2-IA-PCV-212, SG PORV Bottled Air System Pressure Regulator - BDB, to open SG PORV(s) for desired cooldown rate.

6. ___ Monitor Air Bottle pressure. IF bottle pressure reaches 100 psig, THEN replace bottle OR use BDB Portable Air Compressor to supply pressure.

U.S. Nuclear Regulatory Commission
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SR16301
Administrative Job Performance Measure G2.1.5

Applicant_____ Start Time_____

Examiner_____

Date _____ Stop Time_____

Title

Evaluate Overtime Eligibility

K/A: G.2.1.5 Ability to use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc. (2.9/3.9)

Applicability	**Estimated Time**	**Actual Time**
SRO(I)/SRO(U)	20 Minutes	

Conditions

- Task is to be PERFORMED in the classroom.

Standards

- Correctly determines which operator(s) is/are able to stay over for two hours without prior overtime approval IAW LI-AA-700 – Fatigue Management and Work Hour Limits for Covered Workers (Rev. 12).

Initiating Cues

- Evaluate the work history for all six (6) operators.
- Determine which operator(s), if any, can be held over for two hours without prior overtime approval, and determine which operators CANNOT be held over for two hours without prior overtime approval.

Terminating Cues

- Applicant has evaluated all operators and determined their overtime eligibility.

Tools and Equipment

- Calculator
- Overtime History
- Laptop with Doc Top.

Safety Considerations

- None

Notes

- The evaluations of the individual operators may be performed in any order.
- The candidates should use Doc Top to search for the procedure (LI-AA-700)

Work History

Day	1	2	3	4	5	6	7	8 (Today)
Operator #1	12	0	12	12	12	12	8	14
Operator #2	0	12	12	12	12	12	0	12
Operator #3	0	12	12	12	0	0	12	12
Operator #4	12	0	12	12	12	12	0	13
Operator #5	12	12	12	12	0	0	0	15
Operator #6	0	12	12	12	12	8	8	8

PERFORMANCE CHECKLIST

Notes to the Evaluator

- Task critical elements are **bolded**.
- **START TIME:**

STEP 1 OBTAINS A CURRENT COPY OF LI-AA-700 – FATIGUE MANAGEMENT AND WORK HOUR LIMITS FOR COVERED WORKERS. **STANDARD:** Obtains a copy of LI-AA-700 by using Laptop and DocTop procedure search program. This can be accomplished by either requesting a copy of the procedure from the evaluator or by logging on to a network computer and obtaining an electronic version of the procedure. **EVALUATOR NOTES:** **Provide to Applicant**: A copy of LI-AA-700, section 3.3.1 through 3.3.4 is attached to this JPM. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 2 DETERMINES THE ELIGIBILITY OF OPERATOR #1. **STANDARD:** **Identifies that Operator #1 would not exceed any overtime limits.** **EVALUATOR NOTES:** *Days 2-8 will reach 72 hours, but not exceed it. Day 8 will reach 16 hours, but not exceed it.* *Reference: LI-AA-700, Section 3.3.1.* **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 3 DETERMINES THE ELIGIBILITY OF OPERATOR #2. **STANDARD:** **Identifies that Operator #2 would exceed hours limitations.** **EVALUATOR NOTES:** *Days 2 - 8 already have 72 hours in a 7-day period. The additional two hours would yield 74 hours in a 7-day period, which would require management approval.* *Reference: LI-AA-700, Section 3.3.1.* **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 4 DETERMINES THE ELIGIBILITY OF OPERATOR #3. **STANDARD:** **Identifies that Operator #3 would not exceed hours limitations.** **EVALUATOR NOTES:** *Day 7 and 8 have 24 hours in a 48 hour period. The additional two hours would yield 26 hours in a 48 hour period, which is the maximum.* *Reference: LI-AA-700, Section 3.3.1.* **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 5 DETERMINES THE ELIGIBILITY OF OPERATOR #4. **STANDARD:** **Identifies that Operator #4 would not exceed any overtime limits.** **EVALUATOR NOTES:** *No limits are exceeded.* *Reference: LI-AA-700, Section 3.3.1.* **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 6 DETERMINES THE ELIGIBILITY OF OPERATOR #5. **STANDARD:** **Identifies that Operator #5 would exceed hours limitations.** **EVALUATOR NOTES:** *Day 8 already has 15 hours in a 24 hour period. The additional two hours would yield 17 hours consecutively and in a 24 hour period, which would require management approval.* *NOTE: <u>Either</u> criteria is acceptable for a reason.* *Reference: LI-AA-700, Section 3.3.1.* **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 7 DETERMINES THE ELIGIBILITY OF OPERATOR #6. **STANDARD:** **Identifies that Operator #6 would exceed hours limitations.** **EVALUATOR NOTES:** *Days 2 - 8 already have 72 hours in a 7-day period. The additional two hours would yield 74 hours in a 7-day period, which would require management approval.* *Reference: LI-AA-700, Section 3.3.1.* **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 8 REPORTS ELIGIBILITY OF ALL OPERATORS. **STANDARD:** Applicant reports that Operators 1, 3, and 4 are eligible to receive the overtime without prior management approval and the others are not. Table correctly filled out. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STOP TIME:

_____

_____

_____

_____

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_____

ANSWER KEY

Work History

Day	1	2	3	4	5	6	7	8 (Today)
Operator #1	12	0	12	12	12	12	8	14
Operator #2	0	12	12	12	12	12	0	12
Operator #3	0	12	12	12	0	0	12	12
Operator #4	12	0	12	12	12	12	0	13
Operator #5	12	12	12	12	0	0	0	15
Operator #6	0	12	12	12	12	8	8	8

***ALL BLOCKS OF THIS TABLE ARE CRITICAL STEPS**

	Eligible for 2 hours of additional overtime without management approval?	Reason, if any, for **NOT** being eligible for overtime without prior management approval.
Operator #1	**Yes**	
Operator #2	**No**	**Exceeds 72 hours in 7 day period**
Operator #3	**Yes**	
Operator #4	**Yes**	
Operator #5	**No**	**Exceeds 16 consecutive hours** **OR** **Exceeds 16 hours in 24 hour period (Either criteria is acceptable)**
Operator #6	**No**	**Exceeds 72 hours in 7 day period**

3.3 Work Hours, Breaks, and Days Off

Cognizant Supervisor

3.3.1 **APPLY** the following limits to individuals regardless of unit status:

- No more than 16 consecutive hours
- No more than 16 work hours in any rolling 24-hour period
- No more than 26 work hours in any rolling 48-hour period
- No more than 72 work hours in any rolling 168-hour (7-day) period
- At least a 10-hour break between successive work periods or an 8-hour break when a break of less than 10 hours is necessary to accommodate a crew's or individual's scheduled transition between work schedules or shifts
- A 34-hour uninterrupted, continuous break in any 216-hour (9-day) period

3.3.2 **REFER** to Section 3.2, Calculating Work Hours, and **CALCULATE** the weekly average work hours over the averaging period (not to exceed six weeks) by dividing the total hours worked by the number of full weeks (Sunday through Saturday) in the rolling averaging period.

NOTE: During the first 60 days of an unplanned security system outage or increased threat condition, security personnel need **NOT** meet the minimum days off requirements specified in Table 2 or the maximum average work hour requirements specified in step 3.3.3.

NOTE: The non-outage maximum average work hour limit could allow individuals to work every day and remain less than the limit. It remains Dominion's responsibility to schedule hours consistent with the objective of preventing impairment from fatigue consistent with the requirements of 10CFR26.205(c) and Section 3.7 of this procedure.

3.3.3 During online operations and without issuance of a waiver, **ENSURE** an individual does **NOT** work more than a weekly average of 54 hours, calculated using an averaging period of up to six weeks, which advances by seven consecutive calendar days at the finish of every averaging period.

3.3.4 For the purposes of compliance with maximum average work hours requirements, **EXCLUDE** hours worked over the weekly 54-hour limit by Security personnel during the actual conduct of force-on-force exercises evaluated by the NRC.

Operator Directions Handout
(TO BE READ TO APPLICANT BY EXAMINER)

Initial Conditions:

- A start-up, following a mid-cycle reactor trip, is planned for the following shift. One Reactor Operator must be held over two hours for the start-up, and the computer program for calculating overtime eligibility – Emp Center is not available.
- Attached is the work history (excluding shift turnover time) of the available Reactor Operators on shift.
- All operators began their shift at the same time each day. (Day Shift)
- All six operators have tomorrow (Day 9) off.

Initiating Cues

You have been directed to:

- Evaluate the work history for all six (6) operators.
- Determine which operator(s), if any, can / cannot be held over for an additional two hours without obtaining management overtime approval. State the reason if any operator(s) cannot be held over for the additional two hours.

Operator Directions Handout
(TO BE GIVEN TO APPLICANT)

Initial Conditions:

- A start-up, following a mid-cycle reactor trip, is planned for the following shift. One Reactor Operator must be held over two hours for the start-up, and the computer program for calculating overtime eligibility – Emp Center is not available.
- Attached is the work history (excluding shift turnover time) of the available Reactor Operators on shift.
- All operators began their shift at the same time each day. (Day Shift)
- All six operators have tomorrow (Day 9) off.

Initiating Cues

You have been directed to:

- Evaluate the work history for all six (6) operators.
- Determine which operator(s), if any, can / cannot be held over for an additional two hours without obtaining management overtime approval. State the reason if any operator(s) cannot be held over for the additional two hours.

(TO BE GIVEN TO APPLICANT)

Work History

Day	1	2	3	4	5	6	7	8 (Today)
Operator #1	12	0	12	12	12	12	8	14
Operator #2	0	12	12	12	12	12	0	12
Operator #3	0	12	12	12	0	0	12	12
Operator #4	12	0	12	12	12	12	0	13
Operator #5	12	12	12	12	0	0	0	15
Operator #6	0	12	12	12	12	8	8	8

	Eligible for 2 hours of additional overtime without management approval?	Reason, if any, for **NOT** being eligible for overtime without prior management approval.
Operator #1		
Operator #2		
Operator #3		
Operator #4		
Operator #5		
Operator #6		

U.S. Nuclear Regulatory Commission
Surry Power Station

SR16301
Administrative Job Performance Measure G2.1.19

Applicant_____ Start Time_____

Examiner_____

Date _____ Stop Time_____

Title

Perform calculation of reactor power using 1-OPT-RX-003, Reactor Power Calorimetric using Feed Flow and PCS Computer Points (Manual).

K/A: G2.1.19, Ability to use plant computers to evaluate system or component status. (3.9 / 3.8)

Applicability	**Estimated Time**	**Actual Time**
RO/SRO(I)/SRO(U)	45 Minutes	

Conditions

- Task is to be PERFORMED in the classroom.
- Unit 1 is at 90% power.
- Feedwater Ultrasonic Flow Measurement (UFM) is non-functional.

Standards

- 1-OPT-RX-003, Sections 6.1 and 6.2 completed satisfactorily.

Initiating Cues

- Nuclear Shift Manager direction.

Terminating Cues

- 1-OPT-RX-003, Sections 6.1 and 6.2 completed.

Procedures

- 1-OPT-RX-003， Reactor Power Calorimetric using Feed Flow and PCS Computer Points (Manual), Rev. 26
- 1-DRP-003, Curve Book (Unit 1), Rev. 125
- Surry Technical Requirements Manual (SRO-only), Rev 36.
- Surry Technical Specifications, Rev. 48.

Tools and Equipment

- Calculator
- Technical Specifications
- Technical Requirements Manual

Safety Considerations

- None

Notes

- A marked-up copy of 1-OPT-RX-003 should be given to the Applicant.
- A copy of 1-DRP-003, Unit 1 Curve Book, shall be made available.
- A copy of the Surry TRM shall be available to SRO candidates.
- A copy of the Surry Technical Specifications shall be available to the SRO candidates.

PERFORMANCE CHECKLIST

Notes to the Evaluator

- Task critical elements are **bolded**.
- **START TIME:**

STEP 1 Applicant reviews sections of procedure that are already signed. **STANDARD:** a) Reviews Section 1.0, Purpose. b) Reviews Section 2.0, References. c) Reviews Section 3.0, Initial Conditions. d) Reviews Section 4.0, Precautions and Limitations. e) Reviews Section 5.0, Special Tools and Equipment. **EVALUATOR'S NOTE:** **If asked**: The Manual Calorimetric Spreadsheet will not be used. **If asked**: Data points from the UFM cabinet will not be used. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 2 Applicant commences Section 6.1. **NOTE**: This calorimetric uses the corrected Steam Generator Feedwater flow as calculated by the Flow Corrections program to calculate reactor power according to the following equation. Reactor Power = (h_{steam} h_{feed}) x $Flow_{feed}$ - Added Pump Heat – Added Pressurizer Heat – Blowdown Heat Loss + Insulation Losses + Letdown, Charging, and Seal Injection Heat Contributions Where: • Pump Heat equals 40.96 x 106 BTU/hr. • Blowdown Flow is recorded from PCS points (F2551A) FPP0001K , (F2552A) FPP0002K, (F2553A) FPP0003K, (preferred) or from Control Room indications. • Insulation losses equal 1.5 MWth = 5.12 x 106 BTU/hr. • Charging, letdown, and seal water injection heat contributions equals 5.0 MWth = 17.06 x 106 BTU/hr **STANDARD:** Acknowledges NOTE regarding data collection. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 3 IF this procedure is being performed because the Primary Plant Performance Program is not operational, THEN initiate 1-OPT-RX-007 to determine the shift average power. Otherwise, enter N/A. *(Step 6.1.1)* **STANDARD:** a) Applicant notes that Shift Average Power indications listed on provided sheet indicate "BAD". b) Informs SM (Evaluator) that 1-OPT-RX-007 should be initiated. **EVALUATOR'S NOTE:** **If asked**: Another Operator will perform 1-OPT-RX-007 as necessary. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 4 IF the Manual Calorimetric Spreadsheet will be used, THEN line through Attachment 3 and mark with "See Attached." Otherwise, enter N/A. *(Step 6.1.2)* **STANDARD:** a) Recalls from Initial Conditions that the Manual Calorimetric Spreadsheet will not be used. b) Enters N/A for the step. **EVALUATOR'S NOTE:** **If asked:** The Manual Calorimetric Spreadsheet will not be used. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 5 **NOTE:** Venturi Feed flow transmitter data will be invalid if feed flow transmitters are bypassed. *(NOTE before Step 6.1.3)* **STANDARD:** Acknowledges NOTE. **EVALUATOR'S NOTE:** **If asked**: The feed flow venturi transmitters are in service. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 6 IF Primary Plant Performance is based on Venturi feedwater flow AND the Feed Reg Bypass HCVs are NOT closed AND feedwater flow is NOT aligned through the feed flow transmitters, THEN close the Feed Reg Bypass HCVs OR align bypass flow to the feed flow transmitters to obtain Flow Corrections data. Otherwise, enter N/A for this step. *(Step 6.1.3)* **STANDARD:** a) Recalls from Initial Conditions that the Feed Regulating Valve bypasses are closed. b) Enters N/A for step. **EVALUATOR'S NOTE:** **If asked**: Feed Regulating Valve bypasses are closed. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 7 IF Step 6.1.3 was performed, THEN wait approximately 5 minutes AND GO TO Subsection 6.2. *(Step 6.1.4)* **STANDARD:** Enters N/A for step since the previous step was not performed. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 8 Applicant commences Section 6.2. **NOTE**: When using feedwater flow as the basis for the calorimetric the Filtered Average Feed Flow should be used. **STANDARD:** Acknowledges NOTE. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 9

Obtain the values for SG Pressure, FW Temperature, and Main Feedwater Flow for each loop from the PCS computer. Record the computer point values in the appropriate boxes below and on Attachment 3, Page 1. *(Step 6.2.1)*

_____ SAT

_____ UNSAT

- U9171 SG A Corrected Stm Press __*829.98*__ psia
- U9172 SG B Corrected Stm Press __*828.62*__ psia
- U9173 SG C Corrected Stm Press __*827.66*__ psia

- T0418A SG A FW Temp (RTD-111A) __*431.16*__ °F
- T0438A SG B FW Temp (RTD-111B) __*431.16*__ °F
- T0458A SG C FW Temp (RTD-111C) __*431.16*__ °F

U9174 SG A Filtered Average Feed Flow ___*3391.24*___ x 10^3 lbm/hr

U9175 SG B Filtered Average Feed Flow ___*3392.67*___ x 10^3 lbm/hr

U9176 SG C Filtered Average Feed Flow ___*3392.99*___ x 10^3 lbm/hr

STANDARD:

Using JPM Attachment 1 (PP Output Summary), Applicant fills in numbers for this step and on procedure Attachment 3.

EVALUATOR'S NOTE:

A completed table is attached at the end of this JPM showing all data.

COMMENTS:

STEP 10

IF Feedwater temperature for any loop is greater than 443°F, THEN notify Reactor Engineering. Otherwise, enter N/A. *(Step 6.2.2)*

_____ SAT

_____ UNSAT

STANDARD:

a) Applicant notes that Feedwater temperature is 431.16°F.
b) Applicant places N/A in initial block.

EVALUATOR'S NOTE:

A completed table is attached at the end of this JPM showing all data.

COMMENTS:

STEP 11 IF Step 6.1.3 was performed, THEN return the Feed Reg Bypass HCVs to desired position. Otherwise, enter N/A. *(Step 6.2.3)* **STANDARD:** a) Applicant recalls that the Feed Reg Bypass HCVs were not manipulated. b) Enters N/A in initial block. **EVALUATOR'S NOTE:** **If asked**: Feed Reg Valve bypasses were not manipulated. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 12 Obtain pressurizer heater input by using the computer point listed below. Record this value in the appropriate box on Attachment 3, Page 2. (Enter 0 KW if computer point inoperable) *(Step6.2.4)* • Q0400A Pressurizer Heater Power __*850.7*__ KW **STANDARD:** a) Applicant references attached PP Output Summary from PCS. b) Notes that PZR Heater Power is 850.7 KW. c) Records 850.7 KW in the step block and on page 2 of Attachment 3. **EVALUATOR'S NOTE:** A completed table is attached at the end of this JPM showing all data. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 13 **NOTE:** • Blowdown flow must be maintained as constant as possible. The most accurate data will be obtained by isolating blowdown, but isolation is not required. • PCS points for automatic Blowdown flow are the preferred inputs for the following step. *(NOTE prior to Step 6.2.5)* **STANDARD:** Applicant acknowledges NOTE. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 14 Obtain loop blowdown flow by using the PCS points or indicators listed below. Circle PCS point (preferred) or indicator used. Record these values in the appropriate boxes on Attachment 3, Page 1. *(Step 6.2.5)* • (F2551A) FPP0001K, FI-BD-103A or FI-BD-104A SG A BD Flow ___*57.540*__ gpm • (F2552A) FPP0002K, FI-BD-103B or FI-BD-104B SG B BD Flow ___*62.593*__ gpm • (F2553A) FPP0003K, FI-BD-103C or FI-BD-104C SG C BD Flow ___*58.400*__ gpm **STANDARD:** a) Applicant refers to attached PP Output Summary from PCS for blowdown flows. b) Circles the PCS point (F2551A, etc.) and records value in step and on Attachment 3. **EVALUATOR'S NOTE:** **If asked**: Blowdown is in AUTO mode for PCS. A completed table is attached at the end of this JPM showing all data. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 15 Find the enthalpy of steam, h_s, for each loop using Corrected Steam Pressure from Attachment 3 and the Enthalpy Steam Table (100% Quality) in 1-DRP-003. Record values in the appropriate boxes on Attachment 3, Page 1. *(Step 6.2.6)* **STANDARD:** a) Applicant locates Enthalpy Steam Table (100% Quality) in 1-DRP-003 (Attachment 72). b) Determines h_s for each loop. Applicant may interpolate exact values or round to the nearest psia. • Loop A – 1198.54 BTU/lbm *(band 1198.57 – 1198.51 BTU/lbm)* • Loop B – 1198.57 BTU/lbm *(band 1198.60 – 1198.54 BTU/lbm)* • Loop C – 1198.60 BTU/lbm *(band 1198.63 – 1198.57 BTU/lbm)* c) Records values on Attachment 3. **EVALUATOR'S NOTE:** The listed band was developed by rounding steam pressure to the nearest psia, then taking the enthalpy value for ±1 psia. A completed table is attached at the end of this JPM showing all data. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 16 **NOTE:** Using a FW pressure of 800 psia in the next step will be conservative for all Reactor Power levels. Find the enthalpy of feedwater, h_f, for each loop, using Feedwater Temperature from Attachment 3 and the Enthalpy Compressed Liquid Table (800 psia) in 1-DRP-003. Record values in the appropriate boxes on Attachment 3, Page 1. *(Step 6.2.7)* **STANDARD:** a) Acknowledges NOTE prior to step that using FW pressure of 800 psia is conservative. b) Applicant locates Enthalpy Compressed Liquid Table (800 psia) in 1-DRP-003 (Attachment 74). c) Determines h_f for each loop. Applicant may interpolate exact values or round to the nearest tenth of a degree. • Loop A – 409.61 BTU/lbm *(band 409.50 – 409.72 BTU/lbm)* • Loop B – 409.61 BTU/lbm *(band 409.50 – 409.72 BTU/lbm)* • Loop C – 409.61 BTU/lbm *(band 409.50 – 409.72 BTU/lbm)* d) Records values on Attachment 3. **EVALUATOR'S NOTE:** The listed band was developed by rounding feedwater temperature to the nearest tenth of a degree, then taking the enthalpy value for ±1/10th of a degree. A completed table is attached at the end of this JPM showing all data. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 17 Calculate $\Delta h_1 = h_s - h_f$ for each loop and record results in appropriate boxes on Attachment 3, Page 1. *(Step 6.2.8)* **STANDARD:** Applicant calculates Δh_1 and records values. • Loop A – 788.93 BTU/lbm *(band 789.07 – 788.79 BTU/lbm)* • Loop B – 788.96 BTU/lbm *(band 789.10 – 788.82 BTU/lbm)* • Loop C – 788.99 BTU/lbm *(band 789.13 – 788.85 BTU/lbm)* **EVALUATOR'S NOTE:** A completed table is attached at the end of this JPM showing all data. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 18 Calculate Blowdown Flow M_{bd} (lbm/hr) = BD (gpm) x 496.6563 $\frac{\text{lbm/hr}}{\text{gpm}}$. Record values in the appropriate boxes on Attachment 3, Page 1. *(Step 6.2.9)* **STANDARD:** Applicant calculates M_{bd} and records values. • Loop A – 28577.60350 lbm/hr *(band 28577 – 28578 lbm/hr)* • Loop B – 31087.20779 lbm/hr *(band 31087 – 31088 lbm/hr)* • Loop C – 29004.72792 lbm/hr *(band 29004 – 29005 lbm/hr)* **EVALUATOR'S NOTE:** The listed band was developed by rounding up or down to the nearest whole number. A completed table is attached at the end of this JPM showing all data. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 19 Find the enthalpy of the blowdown, h_{bd}, for each loop, using the Corrected Steam Pressure from Attachment 3 and the Enthalpy Saturated Liquid Table in 1-DRP-003. Record values in the appropriate boxes on Attachment 3, Page 1. *(Step 6.2.10)* **STANDARD:** a) Applicant locates Enthalpy Saturated Liquid Table in 1-DRP-003 (Attachment 73). b) Determines h_{bd} for each loop. Applicant may interpolate exact values or round to the nearest psia. • Loop A – 515.00 BTU/lbm *(band 514.83 – 515.17 BTU/lbm)* • Loop B – 514.83 BTU/lbm *(band 514.66 – 515.00 BTU/lbm)* • Loop C – 514.66 BTU/lbm *(band 514.49 – 514.83 BTU/lbm)* c) Records values on Attachment 3. **EVALUATOR'S NOTE:** The listed band was developed by rounding steam pressure to the nearest psia, then taking the enthalpy value for ±1 psia. A completed table is attached at the end of this JPM showing all data. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 20 Calculate $\Delta h_2 = h_s - h_{bd}$ for each loop and record results in appropriate boxes on Attachment 3, Page 1. *(Step 6.2.11)* **STANDARD:** Applicant calculates Δh_2 and records values. • Loop A – 683.54 BTU/lbm *(band 683.74 – 683.34 BTU/lbm)* • Loop B – 683.74 BTU/lbm *(band 683.94 – 683.54 BTU/lbm)* • Loop C – 683.94 BTU/lbm *(band 684.14 – 683.74 BTU/lbm)* **EVALUATOR'S NOTE:** A completed table is attached at the end of this JPM showing all data. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 21

Perform the following for each loop: *(Step 6.2.12)*

a. Calculate (M_f x Δh_1) and (M_{bd} x Δh_2) for each loop and record results in appropriate boxes on Attachment 3, Page 1

b. Calculate Q_{loop} = (M_f x Δh_1) - (M_{bd} x Δh_2) for each loop and record results in appropriate boxes on Attachment 3, Page 1.

STANDARD:

a) Applicant calculates (M_f x Δh_1) and (M_{bd} x Δh_2) for each loop and record results in appropriate boxes on Attachment 3.

(M_{bd} x Δh_2)
- Loop A – 19,533,935.10 BTU/hr *(band 19,539,237.98 – 19,528,490.52 BTU/hr)*
- Loop B – 21,255,567.45 BTU/hr *(band 21,261,642.78 – 21,249,891.52 BTU/hr)*
- Loop C – 19,837,493.61 BTU/hr *(band 19,842,796.56 – 19,831,878.70 BTU/hr)*

(M_f x Δh_1)
- Loop A – 2,675,450,973 BTU/hr *(band 2,675,925,747 – 2,674,976,200 BTU/hr)*
- Loop B – 2,676,680,923 BTU/hr *(band 2,677,155,897 – 2,676,205,949 BTU/hr)*
- Loop C – 2,677,035,180 BTU/hr *(band 2,677,510,199 – 2,676,560,162 BTU/hr)*

b) Applicant calculates Q_{loop} = (M_f x Δh_1) - (M_{bd} x Δh_2) for each loop and record results in appropriate boxes on Attachment 3.

- Loop A – 2,655,917,038 BTU/hr *(band 2,656,386,509 – 2,655,447,709 BTU/hr)*
- Loop B – 2,655,425,356 BTU/hr *(band 2,655,894,254 – 2,654,956,057 BTU/hr)*
- Loop C – 2,657,197,686 BTU/hr *(band 2,657,667,402 – 2,656,728,283 BTU/hr)*

EVALUATOR'S NOTE:

A completed table is attached at the end of this JPM showing all data.

COMMENTS:

_____ **SAT**

_____ **UNSAT**

STEP 22

Convert Pressurizer Heat Input from KW to BTU/hr by multiplying by 3413.0 BTU/hr/KW, and record results in appropriate boxes on Attachment 3, Page 2. *(Step 6.2.13)*

STANDARD:

a) Applicant multiplies PZR Heat Input (*850.7* KW) by 3413.0 BTU/hr/KW.
b) Records 2,903,439.1 BTU/hr in appropriate block.

EVALUATOR'S NOTE:

A completed table is attached at the end of this JPM showing all data.

COMMENTS:

_____ **SAT**

_____ **UNSAT**

STEP 23 Calculate total heat from Reactor by using Q_{Total} = $Q_{loop\ A}$ + $Q_{loop\ B}$ + $Q_{loop\ C}$ (BTU/hr) - PRZR HTR Input (BTU/hr) - RCP Heat Input (BTU/hr) + Letdown, Seal Injection, and Charging Heat Loss (BTU/hr) + Insulation Loss (BTU/hr). Record results in appropriate box on Attachment 3, Page 2 *(Step 6.2.14)* **STANDARD:** Applicant calculates Q_{Total}. • $Q_{loop\ A}$ + $Q_{loop\ B}$ + $Q_{loop\ C}$ = 7,968,540,080 BTU/hr *(band 7,969,948,165 – 7,958,132,049 BTU/hr)* • -RCP Heat Input + Letdown, Seal Injection, and Charging Heat Loss + Insulation Loss = – 18.78E6 BTU/hr • -PZR Heat Input = 2,903,439.1 BTU/hr • Q_T = 7,946,856,641 BTU/hr *(band 7,948,264,726 – 7,936,448,610 BTU/hr)* **EVALUATOR'S NOTE:** A completed table is attached at the end of this JPM showing all data. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 24 Divide Q_T by 3.413 x 10^6 to find Reactor output in MW_{th}. Record results in appropriate box on Attachment 3, Page 2. *(Step 6.2.15)* **STANDARD:** Applicant calculates Reactor output in MW_{th}. • MW_{th} = 7,946,856,641 BTU/hr ÷ 3413000 = 2,328.0804 *(band 2328.8206 – 2325.3585)* **EVALUATOR'S NOTE:** A completed table is attached at the end of this JPM showing all data. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 25 Find the percent power level by using % Power = (MW_{th}/2587) x 100. Record results in appropriate box on Attachment 3, Page 2. *(Step 6.2.16)* **STANDARD:** Applicant calculates % Reactor Power. • **% Power = (2,328.0804 ÷ 2587) MWth x 100** **= 90.00 %** ***(band 90.10% - 89.85%)*** **EVALUATOR'S NOTE:** A completed table is attached at the end of this JPM showing all data. Band is based on rounding errors. The Applicant may sign and date the Attachment at this time and report the JPM completed. It is at the Evaluator's discretion to continue the procedure. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 26 IF the Manual Calorimetric Spreadsheet was used, THEN sign and date the computer generated printouts (performer and independent reviewer) and attach the printouts to this procedure. *(Step 6.2.17)* **STANDARD:** Applicant recalls that the Manual Calorimetric Spreadsheet was not used and enters N/A for the step. **EVALUATOR'S NOTE:** **If asked**: The Manual Calorimetric Spreadsheet was not used. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 27 IF Attachment 3 was used, THEN sign and date Attachment 3 (performer and independent reviewer). *(Step 6.2.18)* **STANDARD:** a) Applicant signs and dates Attachment 3. b) Requests an Independent Verifier to check work. **EVALUATOR'S NOTE:** The Applicant may report the JPM complete at this time. It is at the Evaluator's discretion to continue the procedure **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 28 **CAUTION** To prevent exceeding maximum rated Reactor thermal power, Reactor power must not be increased based on the result of this calorimetric. NOTE: Due to differences in the uncertainty calculations for Primary Plant Performance and the manual calorimetric, indicated power between the two may vary by 0.4%. IF Reactor Power as calculated is greater than 98.4%, THEN perform the following: *(Step 6.2.19)* a. Immediately reduce Reactor Power to less than 98.4% power IAW Attachment 4. b. Terminate this procedure and reperform calorimetric. **STANDARD:** Applicant notes that Reactor Power is 90%. Enters N/A in both blocks. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 29 Report to Shift Manager (Evaluator) completion of Task. **COMMENTS:** ** **JPM COMPLETE** **	**_____ SAT** **_____ UNSAT**

STOP TIME: _____

Comments: _____

_____

_____

_____

_____

_____

_____

	LOOP A	LOOP B	LOOP C
Corrected Steam Pressure (psia)	U9171 *829.98*	U9172 *828.62*	U9173 *827.66*
Enthalpy Steam h_s (BTU/lbm)	***1198.54***	***1198.57***	***1198.60***
Feedwater Temp (°F)	T0418A *431.16*	T0438A *431.16*	T0458A *431.16*
Enthalpy FW h_f (BTU/lbm)	***409.61***	***409.61***	***109.61***
$\Delta h_1 = (h_s - h_f)$ BTU/lbm	***788.93***	***788.96***	***788.99***
Blowdown Flow (gpm)	(SG A) *57.540*	(SG B) *62.593*	(SG C) *58.400*
x Conversion gpm to lbm/hr	x 496.6563	x 496.6563	x 496.6563
Blowdown Flow M_{bd} (lbm/hr)	***= 28577.6035***	***= 31087.20779***	***= 29004.72792***
Enthalpy h_{bd} (BTU/lbm)	***515.00***	***514.83***	***514.66***
$\Delta h_2 = (h_s - h_{bd})$ BTU/lbm	683.54	683.74	683.94
M_{bd} x Δh_2 (BTU/hr)	***= 19533935.1***	***= 21255567.45***	***= 19837493.61***
Feedwater Flow M_{fw} (lbm/hr)	SG A Feed Flow *3391.24E3*	SG B Feed Flow *3392.67E3*	SG C Feed Flow *3392.99E3*
M_{fw} x Δh_1 (BTU/hr)	***2,675,450,973***	***2,676,680,923***	***2,677,035,180***
$Q_{loop} = (M_{fw} \times \Delta h_1) - (M_{bd} \times \Delta h_2)$ BTU/hr	$Q_{loop\ A}$ = ***2,655,917,038***	$Q_{loop\ B}$ = ***2,655,425,356***	$Q_{loop\ C}$ = ***2,657,197,686***

Pressurizer Heater Input (KW)	*850.7* (Q0400A)
x Conversion KW to BTU/hr	x 3413
Pressurizer Heater Input	= ***2,903,439.1*** *(2.9E6)*

$Q_{loop\ A} + Q_{loop\ B} + Q_{loop}$ C (BTU/hr)	= ***7,968,540,080***
- RCP Input + Letdown, Charging, and Seal Injection Losses + Insulation Losses	- 18.78 x 106 BTU/hr
- Pressurizer Heater Input (BTU/hr)	*- 2903439.1*
QT (BTU/hr)	= ***7946856641***
MW_{th} = QT / 3413000	***= 2,328.40804 MWth***
% POWER = (MW/th / 2587) x 100	***= 90.00417627% POWER***

- Instructor-calculated values are in ***BOLD Italics***.

Operator Directions Handout
(TO BE READ TO APPLICANT BY EXAMINER)

SRO Only Question

- The Feedwater Ultrasonic Flow Measurement System (UFM) has been determined to be NON-FUNCTIONAL.
- The PCS Calorimetric program is otherwise functional.

What are the Required Actions? List Reference(s).

STANDARD:

- Applicant evaluates TRM-3.3.5, Feedwater Ultrasonic Flow Meter Calorimetric:

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Feedwater UFM System not FUNCTIONAL.	A.1 Change the calorimetric program from the Feedwater UFM System to the Normalized Feedwater Venturi System. AND A.2 Restore Feedwater UFM System to FUNCTIONAL status.	1 hour 48 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Reduce THERMAL POWER to ≤ 2546 MWt (98.4% rated power). AND B.2 Change the calorimetric program from the Normalized Feedwater Venturi System to the Feed or Steam Venturi System.	1 hour 1 hour

EVALUATOR'S NOTE:

- **Provide Candidate with a copy of Surry Technical Requirements Manual, and Technical Specifications.**
- **Candidate may include 1-OPT-RX-007 as one of the Required Actions, however this is not critical.**

Operator Directions Handout
(TO BE GIVEN TO APPLICANT)

SRO Only Question

- The Feedwater Ultrasonic Flow Measurement System (UFM) has been determined to be NON-FUNCTIONAL.
- The PCS Calorimetric program is otherwise functional.

- What are the Required Actions? List Reference(s).

Operator Directions Handout
(TO BE READ TO APPLICANT BY EXAMINER)

Initial Conditions

- Unit 1 is at a stable power and has been stable for 2 hours. No periodic tests or calibration evolutions are in progress.
- Feed Water Ultrasonic Flow Measurement (UFM) is non-functional.
- The PCS Calorimetric program is otherwise functional.
- The following unit conditions exist:
  - The Manual Calorimetric Spreadsheet will NOT be used.
  - Feed Water Regulating Valve bypass valves are closed.

Initiating Cues

- Using the attached PP Output Summary sheet, perform Sections 6.1 and 6.2 of 1-OPT-RX-003, Reactor Power Calorimetric using Feed Flow and PCS Computer Points (Manual).

Operator Directions Handout
(TO BE GIVEN TO APPLICANT)

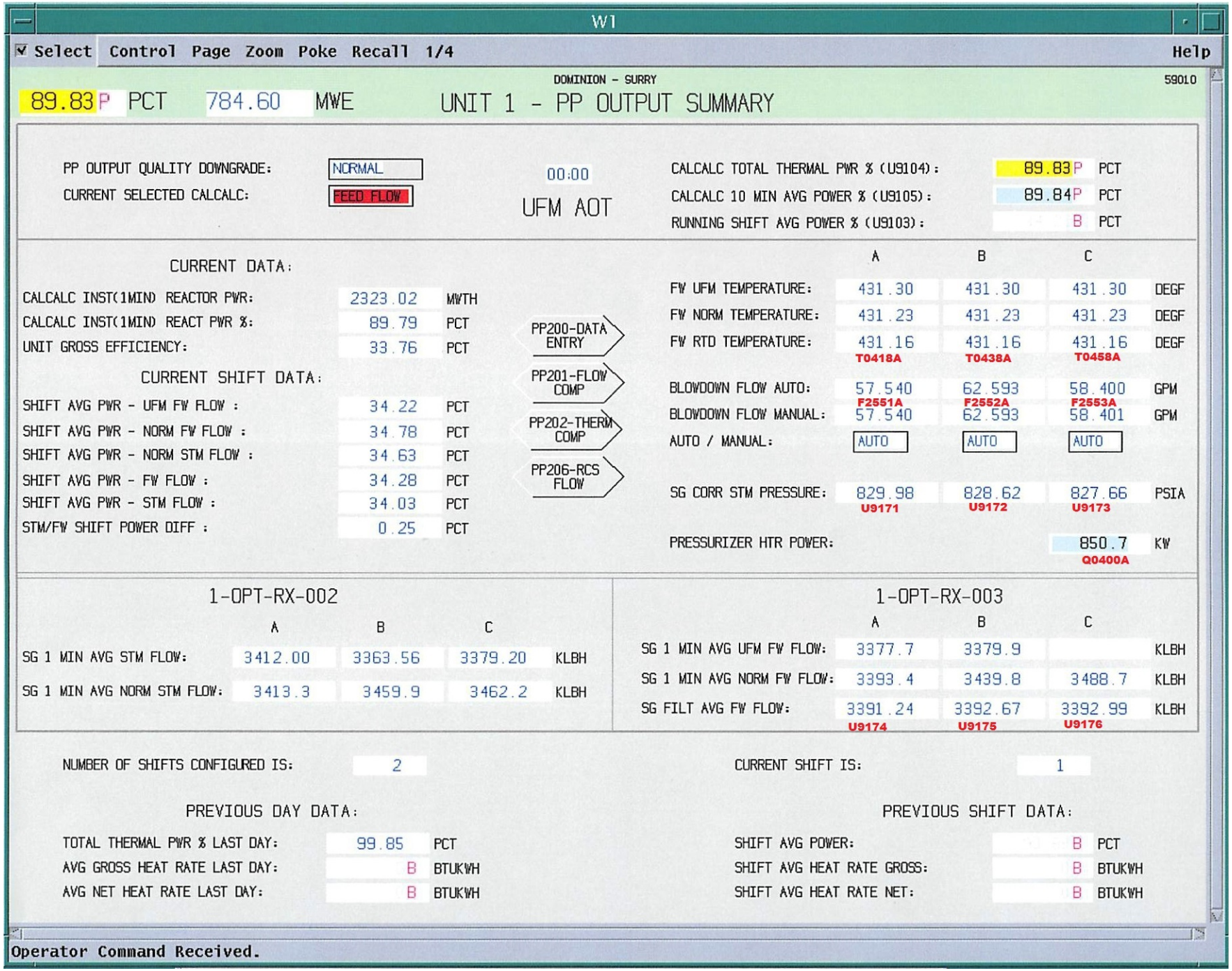
Initial Conditions

- Unit 1 is at a stable power and has been stable for 2 hours. No periodic tests or calibration evolutions are in progress.
- Feed Water Ultrasonic Flow Measurement (UFM) is non-functional.
- The PCS Calorimetric program is otherwise functional.
- The following unit conditions exist:
  - The Manual Calorimetric Spreadsheet will NOT be used.
  - Feed Water Regulating Valve bypass valves are closed.

Initiating Cues

- Using the attached PP Output Summary sheet, perform Sections 6.1 and 6.2 of 1-OPT-RX-003, Reactor Power Calorimetric using Feed Flow and PCS Computer Points (Manual).

Attachment 1



JPM n

U.S. Nuclear Regulatory Commission
Surry Power Station

SR16301
Administrative Job Performance Measure G2.3.2

Applicant_____ Start Time_____

Examiner_____

Date _____ Stop Time_____

Title

Calculate the radiation exposure when locally operating 2-SI-MOV-2865B.

K/A: G2.3.4 Knowledge of radiation exposure limits under normal and emergency conditions. (3.2/3.7)

Applicability	**Estimated Time**	**Actual Time**
RO/SRO	15 Minutes	

Conditions

- Task is to be PERFORMED in the classroom.

Standards

- Determines which method will result in the lowest total dose (put check mark to indicate Lowest dose).
- Determines the total dose received for Low dose method.
- Determines the total dose received for High dose method.

Initiating Cues

- You are to answer the radiation control question, placing your response on the paper containing the question.

Terminating Cues

- Applicant informs the examiner that the answer to the question has been completed.

Tools and Equipment

- Calculator
- Survey Data

Safety Considerations

- None

Times to perform the task:

Two way travel time to 2-SI-MOV-2865B without SCBA	12 minutes
Two way travel time to 2-SI-MOV-2865B with SCBA	16 minutes
Time for two people without SCBAs to close 2-SI-MOV-2865B	5 minutes
Time for one person with a SCBA to close 2-SI-MOV-2865B	16 minutes

Dose rates for the Areas

Average Dose Rate while traveling to and from 2-SI-MOV-2865B	20 mRem/hr
Average External Dose Rate while closing 2-SI-MOV-2865B	70 mRem/hr
Average Internal Dose Rate while closing 2-SI-MOV-2865B (if not wearing SCBA)	60 mRem/hr

PERFORMANCE CHECKLIST

Notes to the Evaluator

- Task critical elements are **bolded**.
- **START TIME:**

Steps can be performed in any order **STEP 1** APPLICANT CALCULATES THE TOTAL EXPOSURE FROM TRAVELING TO AND FROM 2-SI-MOV-2865B. **STANDARD:** a) One operator, with SCBA Total travel time is 16 minutes. Average Dose Rate during travel is 20 mRem/hr. (20 mRem/hr) x (1 hr / 60 minutes) x (16 minutes) = 5.33 mRem *(Band 5-6 mRem)* Total Travel Time Dose: 5.33 mRem b) Two operators, **NO** SCBAs Total travel time is 12 minutes. Average Dose Rate during travel is 20 mRem/hr. (20 mRem/hr) x (1 hr / 60 minutes) x (12 minutes) = 4 mRem (2 operators) x (4 mRem) = 8 mRem Total Travel Time Dose: 8 mRem **COMMENTS:**	**_____ SAT** **_____ UNSAT**

Steps can be performed in any order **STEP 2** APPLICANT CALCULATES THE TOTAL EXPOSURE FROM CLOSING 2-SI-MOV-2865B. **STANDARD:** a) One operator, <u>with</u> SCBA Time to close the valve is 16 minutes. Average External Dose Rate 70 mRem/hr. (70 mRem/hr) x (1 hr / 60 minutes) x (16 minutes) = 18.67 mRem external. Total dose to close the valve: <u>18.67 mRem</u> *(Band 18-19 mRem)* b) Two operators, **NO** SCBAs Time to close the valve is 5 minutes. Average External Dose Rate 70 mRem/hr. Average Internal Dose Rate 60 mRem/hr. (70 mRem/hr) x (1 hr / 60 minutes) x (5 minutes) = 5.83 mRem external. (60 mRem/hr) x (1 hr / 60 minutes) x (5 minutes) = 5 mRem internal. (2 operators) x (5.83 mRem + 5 mRem) = 21.66 mRem Total dose to close the valve: <u>21.66 mRem</u> *(Band 21-22 mRem)* **COMMENTS:**	**_____ SAT** **_____ UNSAT**

Steps can be performed in any order **STEP 3** APPLICANT DETERMINES TOTAL JOB DOSE. **STANDARD:** a) One operator, <u>with</u> SCBA Total dose to close the valve: 18.67 mRem Total Travel Time Dose: 5.33 mRem **Total Job Dose: <u>24 mRem</u>** ***(Band 23-25 mRem)*** b) Two operators, **NO** SCBAs Total dose to close the valve: 21.66 mRem Total Travel Time Dose: 8 mRem **Total Job Dose: <u>29.66 mRem</u>** ***(Band 29-30 mRem)*** **COMMENTS:**	**_____ SAT** **_____ UNSAT**
Steps can be performed in any order **STEP 4** TASK TEAM DETERMINATION. **STANDARD:** **Applicant reports that one operator with a respirator is the team that will perform the task with the minimum total dose**. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STOP TIME:

_____

_____

_____

_____

_____

Operator Directions Handout
(TO BE READ TO APPLICANT BY EXAMINER)

Initial Conditions:

- Unit 2 is in a refueling outage and leakage out of the 'B' SI Accumulator has been noted.
- The operating team has attempted to close 2-SI-MOV-2865B – 'B' SI Accumulator Discharge MOV; the valve cannot be closed from the MCR and needs to be locally closed.
- You have been tasked with entering containment and locally closing 2-SI-MOV-2865B and then exiting containment.
- HP has reported that there is airborne contamination in the area of 2-SI-MOV-2865B and have asked that the use of SCBAs be evaluated.
- HP has stated that if respirators are **NOT** worn, the **internal dose rate is 60 mRem/hr** while manipulating 2-SI-MOV-2865B; this dose rate is in addition to the radiation field (**external dose rate = 70 mRem/hr**) where the valve is located.
- HP has also stated that the **average dose rate is 20 mRem/hr** while traveling from the containment entry point to the valve and there is no airborne contamination while traveling to and from 2-SI-MOV-2865B.
- A second operator is available to aid you in performance of this task, if you deem it necessary.
- HP personnel are currently unavailable to provide assistance for dose determination.

Initiating Cues

Given the travel times, times to perform the task and dose rates on the attached table, determine which one of the following will result in the lowest total dose for the task, and calculate the total dose received (travel to and from the valve and close the valve) for each choice below.

a. One operator wearing an SCBA

b. Two operators not wearing an SCBA

Notes

Operator Directions Handout
(TO BE GIVEN TO APPLICANT)

Initial Conditions:

- Unit 2 is in a refueling outage and leakage out of the 'B' SI Accumulator has been noted.
- The operating team has attempted to close 2-SI-MOV-2865B – 'B' SI Accumulator Discharge MOV; the valve cannot be closed from the MCR and needs to be locally closed.
- You have been tasked with entering containment and locally closing 2-SI-MOV-2865B and then exiting containment.
- HP has reported that there is airborne contamination in the area of 2-SI-MOV-2865B and have asked that the use of SCBAs be evaluated.
- HP has stated that if respirators are **NOT** worn, the **internal dose rate is 60 mRem/hr** while manipulating 2-SI-MOV-2865B; this dose rate is in addition to the radiation field (**external dose rate = 70 mRem/hr**) where the valve is located.
- HP has also stated that the **average dose rate is 20 mRem/hr** while traveling from the containment entry point to the valve and there is no airborne contamination while traveling to and from 2-SI-MOV-2865B.
- A second operator is available to aid you in performance of this task, if you deem it necessary.
- HP personnel are currently unavailable to provide assistance for dose determination.

Initiating Cues

Given the travel times, times to perform the task and dose rates on the attached table, determine which one of the following will result in the lowest total dose for the task, and calculate the total dose received (travel to and from the valve and close the valve) for each choice below.

a. One operator wearing an SCBA

b. Two operators not wearing an SCBA

Operator Directions Handout
(TO BE GIVEN TO APPLICANT)
(Page 2 of 2)

Times to perform the task:

Two way travel time to 2-SI-MOV-2865B without a SCBA	12 minutes
Two way travel time to 2-SI-MOV-2865B with a SCBA	16 minutes
Time for two people without SCBAs to close 2-SI-MOV-2865B	5 minutes
Time for one person with a SCBA to close 2-SI-MOV-2865B	16 minutes

Dose rates for the Areas

Average Dose Rate from while traveling to and from 2-SI-MOV-2865B	20 mRem/hr
Average External Dose Rate while closing 2-SI-MOV-2865B	70 mRem/hr
Average Internal Dose Rate while closing 2-SI-MOV-2865B (if not wearing SCBA)	60 mRem/hr

1) Lowest Total Dose (put check mark to indicate Lowest dose)

   _____ One operator wearing an SCBA.

   _____ Two operators NOT wearing an SCBA.

2) Total dose received for Low dose method is ___ mrem.

3) Total dose received for High dose method is ___ mrem.

JPM o

U.S. Nuclear Regulatory Commission
Surry Power Station

SR16301
Administrative Job Performance Measure G2.4.39
TIME CRITICAL

Applicant_____ Start Time_____

Examiner_____

Date _____ Stop Time_____

Title

Complete Report of Emergency to State and Local Governments Form for SEM approval.

K/A: G2.4.39 – Knowledge of RO responsibilities in emergency plan implementation. (3.8/3.7)

Applicability	**Estimated Time**	**Actual Time**
RO	15 Minutes **(Time Critical)**	

Conditions

- Task may be PERFORMED in classroom or Simulator.
- A simulated ALERT is in progress.

Standards

- Completes EPIP-2.01, Notification of State and Local Governments steps 1-5 and Report of Emergency to State and Local Governments Form for SEM approval.

Initiating Cues

- Nuclear Shift Manager direction.

Terminating Cues

- EPIP-2.01 steps 1-5 and Report of Emergency to State and Local Governments Form complete.

Procedures

- EPIP-2.01, Revision 44
- Report of Emergency to State and Local Governments Form (730860)

Tools and Equipment

- None

Safety Considerations

- None

PERFORMANCE CHECKLIST

Notes

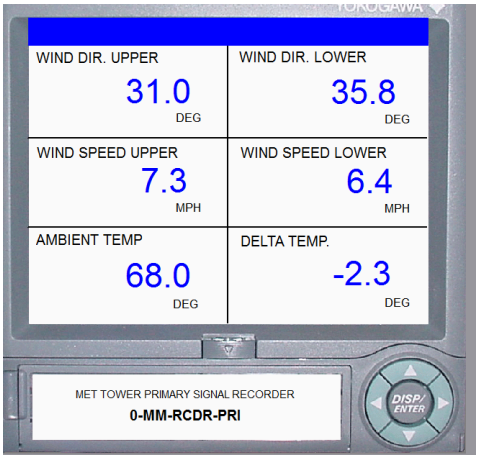
- Provide a copy of State & Local Communicator binder to each RO candidate.

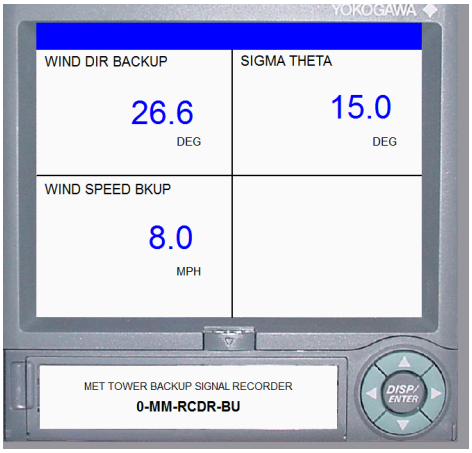
Simulator Set-up

- Enter the following Meter Overrides for MET PANEL

Recorder Name	Variable Name	Initial Value	Final Value	Recorder Reading
Wind Dir Upper	MET_WIND_DIR_UPR	0.5185185	.0574	31.0°
Wind Dir Lower	MET_WIND_DIR_LWR	0.5185185	.0663	35.8°
Wind Speed Upper	MET_WIND_SPD_UPR	0.1	0.073	7.3 mph
Wind Speed Lower	MET_WIND_SPD_LWR	0.1	0.064	6.4 mph
Ambient Temp.	MET_TEMP	0.651852	0.6	68°F
Delta Temp	MET_DELTAT	0.2222222	0.185	-2.3°F
Wind Dir Backup	MET_WIND_DIR_BKP	0.5185185	0.0492	26.6°
Wind Spd Backup	MET_WIND_SPD_BKP	0.1	0.08	8 mph
Sigma Theta	MET_WIND– MET_SIGMA_THETA	0.46	0.3	15.0°

When complete the Recorders should look as shown below.





Notes to the Evaluator.

- Task critical elements are **bolded**.
- **START TIME: _____.**

STEP 1 Initiates Procedure. (*EPIP-2.01*, *Step 1*) **STANDARD:** Applicant obtains EPIP-2.01 from the State & Local Communicator Notebook, and fills out Name, Date, Time, and Location. **EVALUATOR'S NOTE:** **If asked**: Have Applicant use current date and time. Location should be Surry Power Station (or similar). JPM Start time is EAL declaration time. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 2 CHECK FIRST REPORT OF EMERGENCY FOR EVENT – REQUIRED (*EPIP-2.01, Step 2*) **STANDARD:** Determines that this is the initial report of the event. **EVALUATOR'S NOTE:** **If asked**: Inform Applicant that this is the first report for the event. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 3 Reviews NOTES before *Step 3*. **STANDARD:** a) Identifies that the state and local EOCs must be notified within 15 minutes of declaration. b) Identifies that Attachment 1 may be referenced as necessary to help fill out the report. c) Identifies that steps 7 through 11 are optional for the initial report, any changes in the emergency class, or PAR changes. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 4 CHECK EMERGENCY – REMAINS IN EFFECT. (*EPIP 2.01, Step 3*) **STANDARD:** Applicant determines that the emergency is still in effect. **EVALUATOR'S NOTE:** **If asked**: The emergency is still on-going. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 5 RECORD INFORMATION ON REPORT OF EMERGENCY TO STATE AND LOCAL GOVERNMENTS (*EPIP-2.01, Step 4*) **STANDARD:** a) Obtains Report of Emergency to State and Local Governments Form. b) Applicant may use EPIP-2.01, Attachment 1 to assist in filling out report. **EVALUATOR'S NOTE:** Report of Emergency to State and Local Governments Form is provided. **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 6

Fill out Report of Emergency to State and Local Governments Form.

STANDARD:

The applicant will:

a) Place a "1" in the ROE Message blank.
b) Check "Drill Message" block or "Emergency Message block".
c) For Item 1 (classification):
- **Check "Alert" block.**
- **Record FA1.1 in EAL.**
- **Record JPM start time/date as "Declared" time/date.**
- **Record Name.**

d) For Item 2 (meteorological data):
- **Check the "on-site measurements" block.**
- Records time data was obtained
- **Records AVE wind speed and direction from available MET instruments.**
- **AVE Wind Speed (Lower) = 6.4 mph**
- **AVE Wind Direction (Lower) = 35.8°**

e) For Item 3 (releases), check the "A" block for no radiological releases.
f) For Item 4 (site access), check the "Available" block.
g) For Item 5 (PAR), check the "is NOT required" block.
h) For Item 6 (updates), check the "60 minute" block.
i) Reviews and acknowledges NOTE that Items 7 through 11 may be excluded from message.
j) Checks "Excluded from message" blocks on Items 7 through 11.
k) Hands form to SEM (Evaluator) for approval.

EVALUATOR'S NOTE:

- If asked: This is a Drill Message. Applicant may check "Emergency Message" block if the evaluator is not asked. This is not a critical task.
- Item 6 may be checked "60 minutes" as this is the default value.
- From EPIP-2.01, Attachment 1:

COMMENTS:

_____ SAT

_____ UNSAT

STEP 7 HAVE SEM/RM APPROVE REPORT. *(EPIP-2.01, Step 5)* **STANDARD:** Applicant will hand Report form to SEM (Evaluator) for approval. **COMMENTS:** **STOP CRITICAL TASK TIME:_____** **** JPM COMPLETE ****	**_____ SAT** **_____ UNSAT**

STOP TIME: _____

Comments: _____

_____

_____

_____

_____

_____

_____

KEY
(FOR EVALUATOR)

REPORT OF EMERGENCY TO STATE AND LOCAL GOVERNMENTS

ROE MESSAGE # 1 APPROVAL: _____
(Station Emergency Manager or Recovery Manager)

ATTENTION ALL STATIONS. This is Surry Power Station.
Standby for a(n) ☑ Drill Message ☐ Emergency Message ☐ Drill Termination Message ☐ Emergency Termination Message.
Use the Report of Emergency form to copy message. **(READ SLOWLY)**

Item 1. EMERGENCY CLASSIFICATION: ☐ NOUE ☑ Alert ☐ Site Area Emergency ☐ General Emergency

In accordance with EAL F A 1 . 1 Declared at Start (24-hr time) on Date (date).

This is (name) Applicant Name / Emergency Communicator.

Please acknowledge receipt of this message: **(Conduct roll-call and check boxes as each party answers.)**
☐ VA EOC ☐ Surry County ☐ Isle of Wight County ☐ James City County ☐ Williamsburg ☐ Newport News ☐ York County

Notification completed at _____ (24-hr time) on _____ (date).

Item 2. METEOROLOGICAL DATA: Based on: ☑ On-site Measurements ☐ Off-site Measurements ☐ Not Available

Time: Time (24-hr time) AVE Wind Speed 6.4 mph ; AVE Wind Direction from 35.8° degrees (0° to 360°)

Item 3. RELEASE OF RADIOACTIVE MATERIAL:
Routine releases ongoing due to plant operations. Additional radiological releases associated with the event:
☑ A. No radiological release. Will NOT transmit Report of Radiological Conditions to Virginia EOC.
☐ B. Radiological release in progress. Will transmit Report of Radiological Conditions to Virginia EOC.
☐ C. Radiological release now terminated. Will transmit Report of Radiological Conditions to Virginia EOC.
☐ D. Radiological release projected to occur. Will transmit Report of Radiological Conditions to Virginia EOC.

Item 4. SITE ACCESS: ☑ Available ☐ Not Available

Item 5. PROTECTIVE ACTION RECOMMENDATION: ☑ is NOT required ☐ will be transmitted to VEOC ☐ has been transmitted to VEOC.

Item 6. UPDATE SCHEDULE: ☑ 60 minutes (recommended); ☐ Other _____; EOC Watch Officer: _____

NOTE: Items 7 – 11 optional for message reporting initial Emergency Plan entry, emergency classification change or PAR changes and "Excluded from message" may be checked. **"Items 7 – 11 are excluded from message"** may be read in lieu of reading each item.

Item 7. EMERGENCY RESPONSE ACTIONS UNDERWAY: ☑ Excluded from message
☐ None ☐ Station emergency personnel called in
☐ Station monitoring teams dispatched off-site ☐ Other _____

Item 8. EVACUATION OR COMPANY DISMISSAL OF SITE PERSONNEL: ☑ Excluded from message
☐ No
☐ Evacuation to **Primary** Remote Assembly Area: ☐ Planned ☐ In progress ☐ Completed ☐ Released from RAA
☐ Evacuation to **Secondary** Remote Assembly Area: ☐ Planned ☐ In progress ☐ Completed ☐ Released from RAA
☐ Company Dismissal: ☐ Planned ☐ In progress ☐ Completed
☐ Other _____

Item 9. PROGNOSIS OF SITUATION SINCE LAST REPORT: ☑ Excluded from message
☐ Stable ☐ Worsening
☐ Improving ☐ Other _____

Item 10. ASSISTANCE REQUESTED OR BEING PROVIDED: ☑ Excluded from message
☐ None
_____ (#) Fire Units from _____ _____ (#) Police Units from _____
_____ (#) Rescue Units from _____ _____ (#) Other _____

Item 11. ADDITIONAL INFORMATION (Do not use abbreviations, mark numbers or acronyms.): ☑ Excluded from message
_____
_____

This is Surry Power Station out at _____ (24-hr time) on _____ (date).

Item 12. TERMINATION INFORMATION (Complete ONLY for termination message):
Event Terminated at: _____ (24-hr time) on _____ (date).
Please acknowledge receipt of this message: **(Conduct roll-call and check boxes as each party answers.)**
☐ VA EOC ☐ Surry County ☐ Isle of Wight County ☐ James City County ☐ Williamsburg ☐ Newport News ☐ York County
This is Surry Power Station out at _____ (24-hr time) on _____ (date).

Operator Directions Handout
(TO BE READ TO APPLICANT BY EXAMINER)

Initial Conditions

- An Alert was just declared due to a SBLOCA on Unit 1. (*Use current time & date*)
- The EAL identifier is FA1.1.
- PCS is inoperable.
- There are no radiological releases and plant access is available.

Initiating Cues

- **This JPM is Time Critical.**

- You are the State and Local Emergency Communicator. You are to fill out the Report of Emergency to State and Local Governments.

Operator Directions Handout
(TO BE GIVEN TO APPLICANT)

Initial Conditions

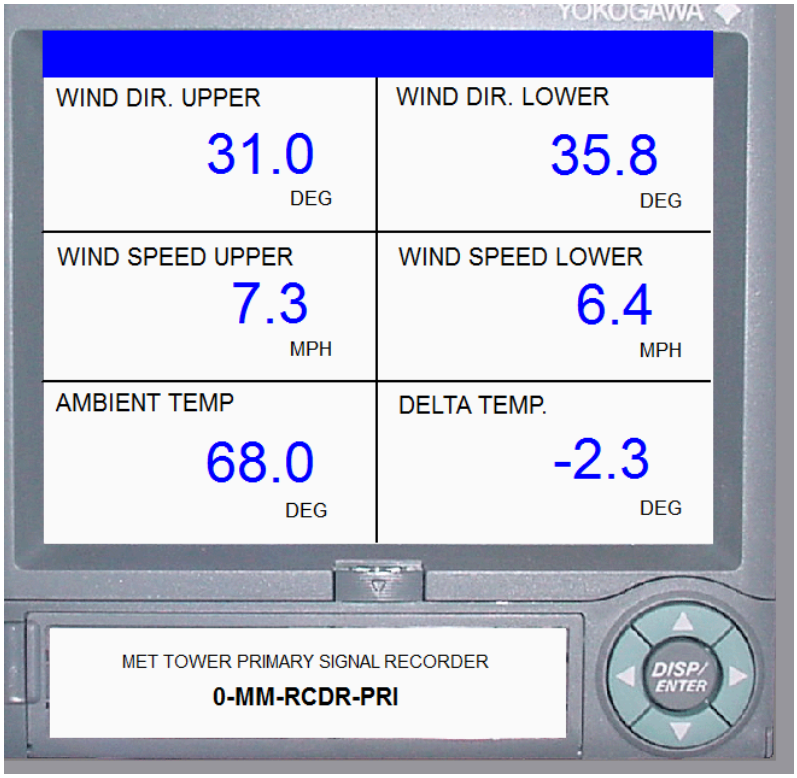
- An Alert was just declared due to a SBLOCA on Unit 1. (*Use current time & date*)
- The EAL identifier is FA1.1.
- PCS is inoperable.
- There are no radiological releases and plant access is available.

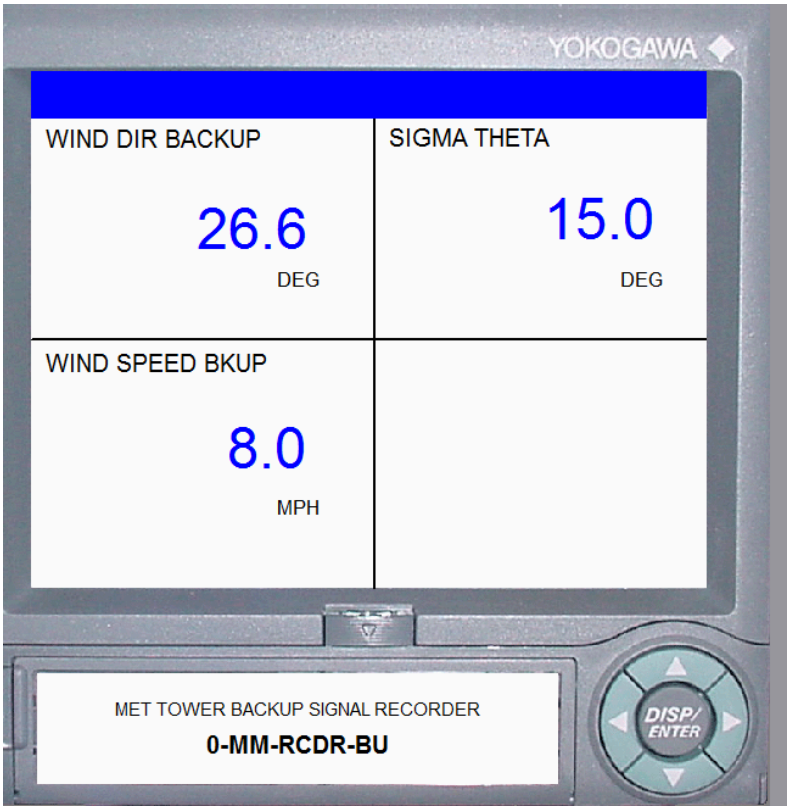
Initiating Cues

- **This JPM is Time Critical.**

- You are the State and Local Emergency Communicator. You are to fill out the Report of Emergency to State and Local Governments.

****PROVIDE THIS SHEET TO THE APPLICANT*****





U.S. Nuclear Regulatory Commission
Surry Power Station

SR16301
Administrative Job Performance Measure G2.4.44
TIME CRITICAL

Applicant_____ Start Time_____

Examiner_____

Date _____ Stop Time_____

Title

DETERMINE REQUIRED PAR ACTIONS

K/A: G2.4.44 – Knowledge of emergency plan protective action recommendations. (2.4/4.4)

Applicability	**Est Completion Time**	**Actual Time**
SRO ONLY	15 Minutes **(Time Critical)**	_____

Conditions

- Task is to be PERFORMED in the CLASSROOM.
- A GENERAL EMERGENCY is in progress.

Standards

- Protective Action Recommendation completed IAW EPIP-1.06, Protective Action Recommendations.

Initiating Cues

- A General Emergency based on EAL SG1.1 (Loss of offsite and onsite power to Unit 1) has just been declared. You are to determine the Protective Action Recommendations and complete any forms required for communicating PARS.

Terminating Cues

- EPIP-1.06, Step 4 Completed.

Procedures

- EPIP-1.06, Protective Action Recommendations, Revision 11.

Tools and Equipment

- None

Safety Considerations

- None

Performance Checklist

Notes to the Evaluator.

- Task critical elements are **bolded**.
- **TIME CRITICAL REQUIREMENT:**
  This PAR must be identified and relayed to Emergency Communicators within 15 minutes.
- **START TIME: _____**(Also used for GE declaration time)

STEP 1 Obtains and Initiates EPIP-1.06. (*Step 1*) **STANDARD:** a) Obtains EPIP-1.06 from Station Emergency Manager binder. b) Acknowledges NOTE before Step 1 that Attachments 4 and 5 may be used for reference. c) Initiates procedure by filling out name, date, and time. **EVALUATOR'S NOTE:** **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 2 USE ATTACHMENT 1, PROTECTIVE ACTION RECOMMENDATION FLOWCHART SPS, TO DETERMINE INITIAL PAR. (*Step 2*) **STANDARD:** a) Applicant uses Attachment 1 (flowchart) to determine the initial PAR. b) *Severe Accident* = NO c) *Hostile Action* = NO d) *Dose Assessment Available* = NO e) PAR = Evacuate: 2 mile radius and 5 miles downwind. **EVALUATOR'S NOTE:** **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 3 IMPLEMENT ATTACHMENT 2, AFFECTED SECTOR(S) MAP. (*Step 3*) **STANDARD:** a) Acknowledges NOTE before Step 3 that Attachment 2 is used for EPIP-1.06 PARs only, not EPIP-4.07 PARs. b) Applicant implements Attachment 2 to determine affected sector(s): - Acknowledges NOTE regarding rounding of wind direction up or down. - Records time data acquired**.** - Records wind direction from 180°. - Records wind speed of 17 mph. - Uses table to determine that the affected sectors are R, A, B and records on attachment. - Marks the affected sectors on map using pen, pencil, highlighter, etc. **EVALUATOR'S NOTE:** **COMMENTS**	**_____ SAT** **_____ UNSAT**

STEP 4 COMPLETE ATACHMENT 3, REPORT OF PROTECTIVE ACTION RECOMMENDATION. (*Step 4 and Attachment 3*) **STANDARD:** **Applicant completes Attachment 3:** - **Records #1 in PAR MESSAGE space.** - Acknowledges NOTES to transmit PAR to Virginia EOC only using ARD, autodial, or direct dial. Only use Insta-Phone if all other methods of contacting VEOC are non-functional. - **Places check mark in "Drill Message" box, or "Emergency Message for Protective Actions" box.** - **Places check mark in "EVACUATE" box. Fills in 2 Mile radius 360° and 5 miles downwind in the following sectors: R, A, B.** - Acknowledges NOTE in REMARKS block regarding Shelter-in-Place recommendations. - Record Notes (Optional). - **Signs for approval to transmit. Records current date and time.** **EVALUATOR'S NOTE:** **This step must be complete within 15 minutes of start of task.** **Record Time: _____** **COMMENTS**	**_____ SAT** **_____ UNSAT**

Stop Time:_____

_____

_____

_____

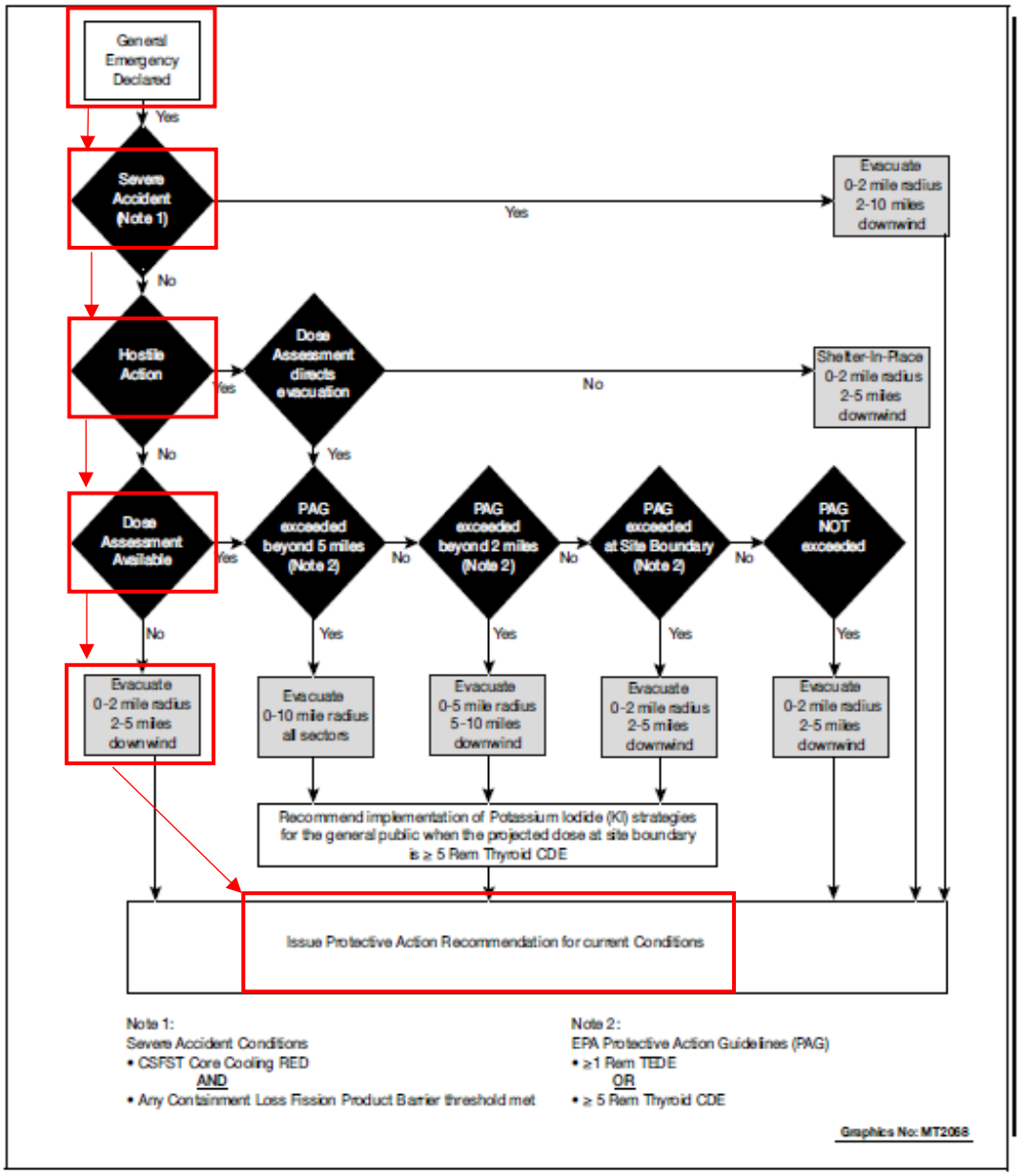
_____

_____

_____

KEY
(FOR EVALUATOR)

NUMBER EPIP-1.06	ATTACHMENT TITLE PROTECTIVE ACTION RECOMMENDATION FLOWCHART SPS	ATTACHMENT 1
REVISION 11		PAGE 1 of 1



KEY
(FOR EVALUATOR)

NUMBER EPIP-1.06	ATTACHMENT TITLE AFFECTED SECTOR(S) MAP	ATTACHMENT 2
REVISION 11		PAGE 1 of 1

NOTE: Rounding shall be used when determining affected sectors using wind direction.
For example: Wind Direction (degrees from) 11.5 to 11.9 would be rounded up to 12.0.
Wind Direction (degrees from) 11.1 to 11.4 would be rounded down to 11.0.

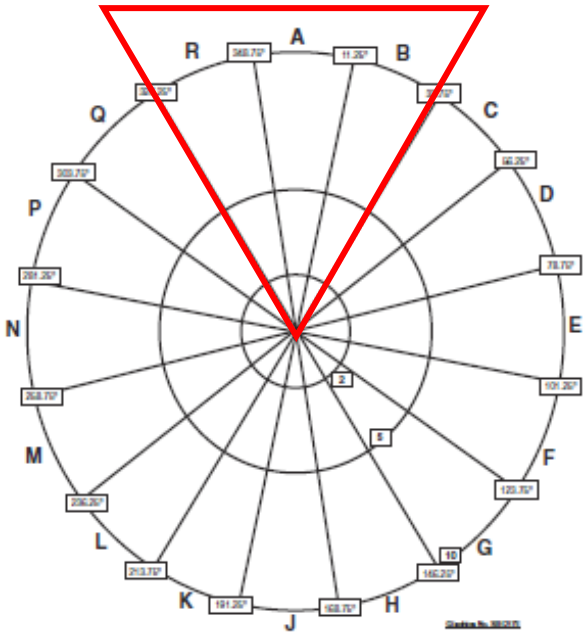
Average Wind Direction and Average Wind Speed Data:

At Time (24-hr time), Wind Direction From 180° (degrees), Wind Speed 17 (in mph), Sectors R, A, B

At _____ (24-hr time), Wind Direction From _____ (degrees), Wind Speed _____ (in mph), Sectors _____

At _____ (24-hr time), Wind Direction From _____ (degrees), Wind Speed _____ (in mph), Sectors _____

At _____ (24-hr time), Wind Direction From _____ (degrees), Wind Speed _____ (in mph), Sectors _____



AVERAGE WIND DIRECTION (Degrees) From	AFFECTED SECTORS
349 - 11	H, J, K
12 - 33	J, K, L
34 - 56	K, L, M
57 - 78	L, M, N
79 - 101	M, N, P
102 - 123	N, P, Q
124 - 146	P, Q, R
147 - 168	Q, R, A
169 - 191	R, A, B
192 - 213	A, B, C
214 - 236	B, C, D
237 - 258	C, D, E
259 - 281	D, E, F
282 - 303	E, F, G
304 - 326	F, G, H
327 - 348	G, H, J

KEY
(FOR EVALUATOR)

NUMBER EPIP-1.06	ATTACHMENT TITLE REPORT OF PROTECTIVE ACTION RECOMMENDATION	ATTACHMENT 3
REVISION 11		PAGE 1 of 1

PAR MESSAGE # 1

NOTE:
- Transmit to Virginia EOC only using the VEOC ARD.
- IF VEOC ARD nonfunctional, THEN use VEOC autodial or direct dial (804) 674-2400 or (804) 310-8868.
- IF all means of communications with VEOC nonfunctional, THEN use Insta-Phone.

This is Surry Power Station with a(n) ☑ Drill Message ☐ Emergency Message for Protective Action Recommendation. **Use the Report of Protective Action Recommendation form to copy this message.**

(READ SLOWLY)

PROTECTIVE ACTION RECOMMENDATION:

☐ SHELTER-IN-PLACE: ____ Mile radius 360° and ____ Miles downwind in the following sectors:

_____.

☑ EVACUATE: 2 Mile radius 360° and 5 Miles downwind in the following sectors:

R, A, B.

☐ BEYOND 10 MILE EPZ:

☐ Evacuate Area: _____ Centerline in degrees; _____Distance in Miles; _____ Width in feet

☐ Shelter-in-place: ____ Centerline in degrees; _____Distance in Miles; _____ Width in feet

☐ POTASSIUM IODIDE:

Recommend implementation of Potassium Iodide (KI) strategies for the general public.
The projected dose at the site boundary is ≥ 5 Rem Thyroid CDE.

The time is _____ (24-hr time).

This is _____ / Emergency Communicator.

Message received by: Virginia EOC Watch Officer (name) _____.

This is Surry Power Station out at _____ (24-hr time) on _____ (date).

REMARKS (OPTIONAL) / APPROVAL INFORMATION [DO NOT READ]

NOTE: Shelter-in-Place may be recommended as a result of evacuation impediments (e.g., Hostile Action events) or other known conditions which make evacuation dangerous.

REMARKS: _____

_____

APPROVED BY: Applicant Signature / Date / Time
Station Emergency Manager or Recovery Manager / **Date** / **Time**

Operator Directions Handout
(TO BE READ TO APPLICANT BY EXAMINER)

Initial Conditions

- A General Emergency based on EAL SG1.1 (Loss of all offsite and onsite power to Unit 1 Emergency Busses H and J) has just been declared (*use current date/time*).
- The TDAFW pump is Unavailable.
- CETC temperature is 580 ºF.
- All radiation monitors indicate pre-event radiation levels.
- The State and Local Communicator has determined wind direction to be from 180° and wind speed to be 17 mph.
- Dose Assessment teams have just been dispatched. No reports yet.

.

Initiating Cues

- **This JPM is TIME CRITICAL.**
- You are to determine the Protective Action Recommendations and complete all lines required for communicating the PAR.

Operator Directions Handout
(TO BE GIVEN TO APPLICANT)

Initial Conditions

- A General Emergency based on EAL SG1.1 (Loss of all offsite and onsite power to Unit 1 Emergency Busses H and J) has just been declared (*use current date/time*).
- The TDAFW pump is Unavailable.
- CETC temperature is 580 ºF.
- All radiation monitors indicate pre-event radiation levels.
- The State and Local Communicator has determined wind direction to be from 180° and wind speed to be 17 mph.
- Dose Assessment teams have just been dispatched. No reports yet.

.

Initiating Cues

- **This JPM is TIME CRITICAL.**
- You are to determine the Protective Action Recommendations and complete all lines required for communicating the PAR.

JPM q

U.S. Nuclear Regulatory Commission
Surry Power Station

SR16301
Administrative Job Performance Measure G2.4.47

Applicant_____ Start Time_____

Examiner_____

Date _____ Stop Time_____

Title

DETERMINE RCS LEAK RATE.

K/A: G2.4.47 – Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material. (4.2/4.2)

Applicability	**Est Completion Time**	**Actual Time**
RO/SRO	15 (RO) / 25 (SRO) Minutes	_____

Conditions

- Task is to be PERFORMED in the CLASSROOM.

Standards

- Determine RCS leak rate.
- Evaluate Technical Specifications

Initiating Cues

- Shift Manager direction.

Terminating Cues

- The Applicant states that the calculation of RCS leak rate is complete.

Procedures

- 1-OPT-RC-10.01, Reactor Coolant Leakage – Manually Calculated, Revision 19. Attachments 3 and 4.
- Surry Technical Specifications

Tools and Equipment

- Calculator

Safety Considerations

- None

Performance Checklist

Notes to the Evaluator.

- Task critical elements are **bolded**.
- **START TIME: _____**

STEP 1: DETERMINES CHANGE IN VCT LEVEL. **STANDARD:** • Records final and initial values for VCT level on Attachment 3. **COMMENTS:**	**_____ SAT** **_____ UNSAT**
STEP 2: CONVERTS % CHANGE IN LEVEL OVER TIME TO LBM/MINUTE. **STANDARD:** • Multiplies the percent change in VCT level by the conversion factor listed on Attachment 4. – -7.0% x 116.6 lbm/% = -816.2 lbm. (allow for rounding) • Divides the calculated value by the elapsed time for the change. – -816.2 lbm / 5.0 minutes = -163.24 lbm/min (allow for rounding) **COMMENTS:**	**_____ SAT** **_____ UNSAT**

STEP 3. CONVERTS THE LEAK RATE TO GPM BY MULTIPLYING THE CONVERSION FACTOR LISTED IN TABLE 5 OF ATTACHMENT 4. **STANDARD:** • Multiplies the lbm/min value obtained in previous step by the conversion factor listed in Table 5. – (7.48052 gal/ft^3 ÷ 61.856 lbm/ft^3) x -163.24 lbm/min = -19.7 gpm (allow for rounding) **COMMENTS**	**_____ SAT** **_____ UNSAT**
STEP 4. INFORMS SHIFT MANAGER OF THE CALCULATED LEAK RATE. **STANDARD:** • **Informs Shift Manager that the calculated RCS leak rate based on the change in VCT level is 19.7 gpm**. **EVALUATOR'S NOTE:** **An answer in the band of 19.0 to 20.0 gpm is acceptable based on rounding tolerances**. **COMMENTS** ****END OF JPM****	**_____ SAT** **_____ UNSAT**

Stop Time:_____

Comments

_____

_____

_____

_____

_____

_____

_____

KEY
(FOR EVALUATOR)

(Page 1 of 1)

Attachment 3

DATA REQUIRED FOR CALCULATION OF THE RCS LEAK RATE

Required Data for Calculating RCS Leak Rate			
Parameter being analyzed	Final Value of Parameter at End Time	Initial Value of Parameter at Start Time	** Change in Parameter (+ or -) (final value - initial value)
Elapsed Time			(Minutes)
Tave (T0400A)	(°F)	(°F)	
Tave (T0420A)	(°F)	(°F)	
Tave (T0440A)	(°F)	(°F)	
Average of Tave's	(°F)	(°F)	(±°F)
RCS PRESS 1-RC-PI-1444 or 1-RC-PI-1402-1 or P0483	(psig)	(psig)	
PRZR Level LO480A	(%)	(%)	
PRZR Level LO481A	(%)	(%)	
PRZR Level LO482A	(%)	(%)	
Average PRZR Level	(%)	(%)	(±%)
VCT Level	34.1 (%)	27.1 (%)	-7.0 (±%)
PDTT Level	(%)	(%)	(±%)
PRT Level Elapsed Time			(Hours or Minutes)
PRT Level (L0485A)	(%)	(%)	
PRT Mass (lbm) use 1-DRP-003	(lbm)	(lbm)	(±lbm)
Total Other Identified Leakage			(from Attachment 2, ± gpm)
RCS Density	(lbm / FT^3)	(lbm / FT^3)	
RCS Mass (RCS Density x 8208.8 ft^3)	(lbm)	(lbm)	(±lbm)
Performed by: Initial / Date	_____/_____ Initial / Date	_____/_____ Initial / Date	

**A ± value in the change in parameter column indicates an increase or decrease in the respective parameter.

KEY
(FOR EVALUATOR)

(Page 1 of 2)

Attachment 4
CALCULATION OF THE RCS LEAK RATES

Table 1, Calculation of the Leak Rates Determined from Attachment 3			
Change in Parameter (±) (final value - initial value)	multiply by Conversion Factors	divide by Elapsed Time (minutes)	Leak Rate (lbm / minute)
(PRZR Level Change) (±%)	366.96 lbm / %		
(VCT Level Change) -7.0 (±%)	116.6 lbm / %	-816.2 / 5.0	-163.24
(PDTT Level Change) (±%)	71.16 lbm / %		
(PRT Level Change) (±lbm)	1.0		
(Other Identified Leakage) (± gpm)	8.337 lbm / gallon		
(RCS Total Mass) (±lbm)	1.0		

Table 2, Calculation of the **Total** RCS Leakage			
RCS Total Mass Leak Rate (lbm / minute)	plus PRZR Leak Rate (lbm / minute)	plus VCT Leak Rate (lbm / minute)	equals RCS Total Leak Rate (lbm / minute) [To be multiplied by (-1.0)]
0	0	-163.24	-163.24

Table 3, Calculation of the Total **Identified** Leakage			
PDTT Leak Rate (lbm / minute)	plus PRT Leak Rate (lbm / minute)	plus Other Identified Leak Rate (lbm / minute)	equals Total Identified Leak Rate (lbm / minute)
0	0	0	0

Performed by: _____ _____ _____ _____
Signature Initial Print Date

KEY
(FOR EVALUATOR)

(Page 2 of 2)

Attachment 4
CALCULATION OF THE RCS LEAK RATES

Table 4, Calculation of the Total Unidentified Leakage		
RCS Total Leak Rate (lbm / minute)	minus Total Identified Leak Rate (lbm / minute)	equals RCS Total Unidentified Leak Rate (lbm / minute)
-163.24	0	-163.24

Table 5, Summary of RCS Leakage in GPM		
Leak Rate (lbm / minute)	Conversion Factor ** (gallons / lb_m)	Leakage (gpm)
RCS Total Leak Rate -163.24	7.48052 gallons / ft^3 Divided by 61.856 lb_m / ft^3 (VCT Conditions)	-19.7
Total Identified Leak Rate 0	7.48052 gallons / ft^3 Divided by 61.856 lb_m / ft^3 (VCT Conditions)	0
RCS Total Unidentified Leak Rate -163.24	7.48052 gallons / ft^3 Divided by 61.856 lb_m / ft^3 (VCT Conditions)	-19.7

**VCT conditions for Make-up Water to RCS: Density = 61.856 lbm / ft^3 at 110°F and 15 psia

NOTE: For RCS walkdown, record estimated leakage based on walkdown. N/A gpm

Calculations Performed by: _____ _____ _____ _____
Signature Initial Print Date

Attachment 1

Operator Directions Handout
(TO BE READ TO APPLICANT BY EXAMINER)

SRO Only Question

- The leakage is coming from 1-RC-PCV-1455B, “C” Loop Spray Valve packing.
- You are to evaluate Technical Specifications.

STANDARD:

- Applicant evaluates TS-3.1.C, RCS Operational LEAKAGE:
  - **Applicant notes that the calculated 19.7 gpm exceeds the allowable 10 gpm Identified leakage criteria per TS-3.1.C.1.c.**
  - **Since it has been determined to NOT be pressure boundary leakage, TS-3.1.C.2a is applicable -** If RCS operational LEAKAGE is not within the limits of 3.1.C.1 for reasons other than pressure boundary LEAKAGE or primary to secondary LEAKAGE, reduce LEAKAGE to within the specified limits within 4 hours.
  - **Applicant determines that TS-3.1.C.2b is applicable -** If the LEAKAGE is not reduced to within the specified limits within 4 hours, the unit shall be brought to HOT SHUTDOWN within the next 6 hours and COLD SHUTDOWN within the following 30 hours.

EVALUATOR’S NOTE:

- **Provide Candidate with a copy of Surry Technical Specifications.**

Attachment 1

Operator Directions Handout
(TO BE GIVEN TO APPLICANT)

SRO Only Question

- The leakage is coming from 1-RC-PCV-1455B, “C” Loop Spray Valve packing.
- You are to evaluate Technical Specifications.

Attachment 1

Operator Directions Handout
(TO BE READ TO APPLICANT BY EXAMINER)

Initial Conditions

- Unit 1 is at 100% power.
- A few minutes ago, the Unit 1 RO noted a change in VCT level and charging flow.
- Plant parameters are as follows:
  - At 0515, VCT Level was 34.1%
  - At 0520, VCT Level was 27.1%
  - Charging flow is elevated.
  - PZR Level, PZR Pressure, and T_{AVE} are stable and unchanged.
- All other Unit parameters are stable and normal for 100% power operation.

Initiating Cues

- Shift Manager direction.

Directions to the Operator

- You are to calculate the RCS leak rate using 1-OPT-RC-10.01, Reactor Coolant Leakage – Manually Calculated, Attachments 3 and 4.

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