

Facility: <u>_Surry_</u>	Scenario No.: <u>_1_</u>	Op-Test No.: <u>17-301_</u>
Examiners: _____ Operators: _____ _____ _____		
Initial Conditions: Unit 1 and 2 at 100% power; MOL. <ul style="list-style-type: none"> <li>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. The Extra Reactor Operator will perform these checks.</li> <li>1-SI-P-1A is tagged out for breaker work (8 hours ago). 72 hour TS clock in effect. Return to service expected later this shift.</li> </ul>		
Turnover: The Team will pre-brief conduct of PT-18.6I, PZR Block Valve Stroke Test		

Event No.	Malf. No.	Event Type*	Event Description
1	RCMOV_5 35_BKR, Open	N BOP/SRO C RO TS SRO	Test Cycle Pressurizer PORV, Block Valve breaker will trip when re-opened
2	RC4903, - 2 DEG	I RO/SRO TS SRO	PRZR Level Transmitter Fails to 34%, requiring IAs of AP-53.00 to control CH flow.
3	SD0201	C BOP/SRO	Loss of High Pressure Drain Pump, 1-SD-P-1A. (AP-18.00) <b>(CT-1)</b>
4		R RO/SRO N BOP	Ramp to 75% power IAW AP-23.00.
5	FW1902, -1 DEG	I BOP/SRO	'B' FRV Controller fails low requiring manual FRV control. ( AP-53.00). <b>(CT-2)</b>
6	RC2402, 40%, 60 sec ramp  GM0701, GM0702  RC5601 RC5602 RC5603  CH6401, CH6402 CH0503	M All	Steam Generator Tube Rupture "B" SG at approximately 360 gpm. AP-16.00, (E-0, E-3).  Generator Output breakers don't automatically open.  Reactor Coolant Pumps trip on electrical power swap to Reserve Station Service Transformers (30 seconds after reactor trip).  Failure of HHSI ('C' trip, A and B fail to auto start) and LHSI (B fails to auto start).  <b>(CT-3, CT-4)</b>
7	PCV455C_ OPEN, OFF	M All	SGTR with Loss of Pressure Control. (ECA-3.3)

8	SI409 SI2505 CH54 CH55	C BOP	BOP Failures in E-0 Attachments: <ul style="list-style-type: none"><li>• 1-CH-P-1A/B fail to auto start; 1-CH-P-1C trips on Overcurrent.</li><li>• 1-SI-P-1B, LHSI pump does not auto start.</li><li>• 1-CH-HCV-1200, Letdown Orifice Isol. A/B does not auto close.</li><li>• 1-VS-MOD-103A, Control Room Sup MOD does not auto close.</li><li>• 1-MS-TV-109, SFGD Steam Traps Outlet Trip Valve does not auto close.</li><li>• 1-DA-TV-100A/B, CTMT Sump PPS Disch I/S TV does not auto close.</li></ul>
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

## LIST OF CRITICAL TASKS

CT #	EVENT	DESCRIPTION	MET (✓)
CT-1	3, Loss of HP Drain Pump	Start a third Condensate pump and reduce power prior to S/G low level trip (2/3 channels on one S/G $\leq$ 17% NR).	
CT-2	5, 'B' FRV CNTRL FL	Restore Feedwater to normal and restore S/G level to normal prior to S/G Low level trip (2/3 channels on one S/G $\leq$ 17% NR), or S/G High level trip (2/3 channels on one S/G $\geq$ 75% NR).	
CT-3	6, SGTR	Restore High Head SI to the core prior to exiting E-0.	
CT-4	6, SGTR	Isolate Feedwater flow into the ruptured S/G before S/G 'B' NR reaches 100%	

**Event 1: PT-18.6 I, PZR Block Valve Stroke Test.** (N- BOP/SRO)

The Team will pre-brief this evolution prior to entering the Simulator. Upon entry of the Team to the Simulator, the Scenario brief will be given, questions answered, and the Team allowed ~ 5 minutes to become acclimated to the Simulator Environment.

When the BOP closes 1-RC-MOV-1535, 1-RC-PCV-1456 block valve, and attempts to re-open 1-RC-MOV-1535, a series of triggers actuate to trip the power supply breaker to 1-RC-MOV 1535.

**Verifiable Action(s):**

- 1) BOP will close 1-RC-MOV-1535 and time the stroke.
- 2) RO/BOP will place the 1-RC-MOV-1456 PORV control switch in the “close” position following Tech Spec review.

**Technical Specifications:** The SRO will Review Tech Specs and determine which TS LCOs are not met. The following LCOs are not met:

- **Tech Specs 3.1.A.6.d:** A one (1) hour clock exists to place 1-RC-PCV-1456 in manual (switch to close); and a 72 hour clock to return the block valve to an OPERABLE status, or be in HSD in 6 hours and RCS temperature <350°F within the next 6 hours.

This Event sets up entry into ECA-3.3, SGTR without Pressure Control; Major Event later in the Scenario.

**Event 2: PRZR level Upper Channel Fails Low PRZR level on selected Upper Channel fails to ~34%. (I – RO/SRO, TS – SRO).**

The RO will diagnose the failure based on CH to Regen HX Hi/Low flow alarm (Annunciator 1D-E5) or identification of CH flow increasing and PZR level Channel III lowering.

**Verifiable Actions(s):**

- 1) The RO will place CH flow in Manual and control PRZR level at setpoint IAW AP-53.00, Loss of Vital Instrumentation/Controls.
- 2) RO will select an operable channel on the pressurizer level recorder.
- 3) The RO will defeat the failed channel IAW AP-53.00, and return CH flow to automatic when normal PRZR level restored.

**Technical Specifications:** The SRO will Review Tech Specs and determine which TS LCOs are not met. The following LCOs are not met:

- **TS 3.7, Table 3.7-1, item 9.** Operator Actions: 72 hour clock to place the Failed Channel in trip. With the number of OPERABLE Channels less than the Total number of channels; place the failed channel in trip in 72 hours, allowable to bypass the channel for up to 12 hours for surveillance, if requirements not met reduce power to less than P-7 (10%) within the next 6 hours.

Other Tech Spec LCOs mentioned in AP-53.00 which are met include:

- TS-Table 3.7-6, item 14, Pressurizer Level, 2 Channels required, condition met.
- Tech Spec 3.1.A.5 (Pressurizer heaters) is met.



**Event 3: Loss of the HP Heater Drain Pump (1-SD-P-1A) (C – BOP/SRO)**

The BOP will diagnose the failure based upon alarms and indication received. The Team will initiate AP-18.00, Loss of HP Heater Drain Pump/ Network 90 failure.

**Verifiable Actions:**

- 1) The BOP will place the tripped High Pressure Drain pump control switch in PTL.
- 2) The BOP will start a third condensate pump.
- 3) Reduce Turbine Load as necessary to maintain reactor power less than 100% using the valve position limiter or using Turbine Manual (approximately 50 MW reduction required).

**Technical Specifications – None**

**Critical Task (CT-1): Start a third condensate pump, and reduce power prior to S/G low level trip (2/3 channels on one S/G  $\leq$  17% NR).** (approx. 14 minutes w/no operator action).

**Event 4: Power Reduction to less than 75% power using AP-23.00, Rapid Load Reduction. (R – RO/SRO, N-BOP)**

The SRO will lead a Team Brief where the reactivity plan will be discussed to reduce reactor power to less than 75% power in order to restore the Polishing Building to service. The RO and SRO will be credited with a Reactivity Manipulation and the BOP with a Normal Evolution.

**Verifiable Action(s):**

- 1) RO will manipulate control rods to control delta flux and/or Tave.
- 2) RO will manipulate CVCS controls to Emergency Borate.
- 3) RO will manipulate CVCS control to establish a normal boration to assist in Tave control.
- 4) BOP will manipulate Turbine Controls to establish power reduction.
- 5) BOP will maintain 'B' Feed flow in MANUAL during the ramp.

**Event #5: "B" FRV Controller fails low. (I – BOP/SRO)**

BOP will diagnose the failure based upon alarms and indications received and take the Immediate Actions of AP-53.00. The Team will implement AP-53.00, Loss of Vital Instrumentation/Controls and shift "B" FRV controller to manual. The BOP will restore "B" SG NR level to program.

**Verifiable Action(s):**

- 1) BOP will place the "B" FRV in manual and regain control of "B" SG NR level.
- 2) BOP will restore 'B' S/G to normal band and maintain control throughout remainder of scenario.

**Technical Specifications - None**

**Critical Task (CT-2): Restore Feedwater to normal and restore S/G level to normal prior to S/G Low level trip (2/3 channels on one S/G  $\leq$  17% NR), or S/G High level trip (2/3 channels on one S/G  $\geq$  75% NR).**

**Event #6: SGTR “B” SG, 360 gpm. (M – ALL)**

When the evaluation Team is ready, a SGTR in the “B” SG will be implemented. The RO will assess RCS leakage in response to alarms and indications received. The RO will perform AP-16.00, and determine that RCS leakage exceeds 50 gpm. The Team will perform E-0 and manually initiate SI. During the performance of E-0 the main generator output breakers will fail to trip requiring the RO to manually trip them. During the manual SI the HHSI pumps will fail; 1-CH-P-1A trips shortly after auto starting, and 1-CH-P-1B, and 1C fail to auto start. 1-SI-P-1B will fail to auto start, and with the ‘A’ LHSI pump tagged out there will be no LHSI pump running.

The SRO will perform a commensurate brief and continue with E-0. While the RO and SRO continue with E-0, the BOP will be directed to perform E-0 Attachments 1 through 3. The RO may be directed to perform Attachment 2 due to the SI failures.

**Verifiable Actions:**

- 1) RO will increase CH flow in manual per Immediate Action Steps of 1-AP-16.00, Excessive RCS Leakage to determine if RCS leakage is greater than the capacity of a single CH pump.
- 2) RO re-perform High Level Steps of E-0, and manually Safety Inject on Step 4 of 1-E-0.
- 3) BOP will perform Attachments 1-3 of E-0. Failures included in Event 8. Note: The RO may be directed to perform Attachment 2.

**Critical Tasks:**

**CT-3:** Total loss of HHSI: 1-CH-P-1C trips on overcurrent immediately after reactor trip. 1-CH-P-1A, and 1B fail to auto start on the SI. 1-SI-P-1B will fail to auto start, and with the ‘A’ LHSI pump tagged out there will be no LHSI pump running. **The operator must restore HHSI to the core prior to exiting E-0** to provide adequate core cooling.

**CT-4: Isolate feedwater flow into the ruptured S/G before S/G ‘B’ NR reaches 100%.** With no operator action to isolate FW, this would take approximately 24 minutes. Failing to isolate Feedwater into the ruptured S/G will cause the S/G to fill faster. Once NR level reaches 100% there is no accurate method for determining S/G level due to the inaccuracy of the WR S/G levels. Once a S/G is fully flooded the hydrodynamic loading on the S/G, MS lines, and other components may exceed their allowable stress rating, possibly causing the S/G to fail catastrophically.

**Event #7: SGTR with Loss of Pressure control. (M – All)**

The Team continues through the EOP progression E-0 to E-3.

After the Team has completed the rapid cooldown of E-3 and moves to the Depressurization steps, the Team will be presented with the inability to depressurize the RCS (No RCPs – No Spray available), 1 PZR PORV inoperable, and the last PZR PORV not responding to placing the control switch in Open. This will require the Team to Transition to ECA-3.3, SGTR without Pressure Control.

When ECA-3.3 is entered, it is expected that the ruptured SG level will be > 73% NR leading to Team moving to Step 6, Check If SI Can Be Terminated.

**Verifiable Actions:**

- 1) BOP will isolate AFW flow to the Ruptured SG.
- 2) BOP will reset SI and secure “A” CH pump and one of the running LHSI pumps.  
(Discretionary CT – within 30 minutes).
- 3) BOP will manipulate steam dump controls for rapid cooldown.
- 4) RO/BOP will block SI signals when conditions established.
- 5) RO will manipulate SI/CVCS control to terminate SI, establish CH flow, and restore letdown flow (ECA-3.3).

***Event #8: BOP Failures in E-0 Attachments***

During performance of E-0 the BOP will identify and correct the following component failures:

- 1-CH-P-1A/B fail to auto start; 1-CH-P-1C trips on Overcurrent.
- 1-SI-P-1B, LHSI pump does not auto start.
- 1-CH-HCV-1200, Letdown Orifice Isol. A/B does not auto close.
- 1-VS-MOD-103A, Control Room Sup MOD does not auto close.
- 1-MS-TV-109, SFGD Steam Traps Outlet Trip Valve does not auto close.
- 1-DA-TV-100A/B, CTMT Sump PPS Disch I/S TV does not auto close.

The Scenario is terminated at Lead Evaluator discretion or at Step 10 of ECA-3.3, “Check SI FLOW NOT REQUIRED”.

Initial Conditions: Unit 1 and 2 Operating at 100%.

Turnover: The Team will pre-brief conduct of PT-18.6I, PZR Block Valve Stroke Test

Pre-load malfunctions: (Trigger 30's)

- CH6401 DISABLE CHP1A AUTO START
- CH6402 DISABLE CHP1B AUTO START
- GM0701 MAIN GEN BKR OCB-G102 AUTO TRIP DISABLE
- GM0702 MAIN GEN BKR OCB-G1T240 AUTO TRIP DISABLE
- SI2409 SI RELAY CI1A FAILS TO ACTUATE
- SI2505 SI RELAY SI5B FAILS TO ACTUATE
- CH54 DISABLE CH-HCV-1200A AUTO CLOSURE
- CH55 DISABLE CH-HCV-1200B AUTO CLOSURE
- FP0301 FPS FACP07 ALARM HORN FAILURE
- FP0302 FPS PC SPEAKER FAILURE
- SIP1A\_BKRPOS SIP1A BK 14H3 CUBICLE POSITION

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

- 1-SI-P-1A is tagged out for breaker work (8 hours ago). 72 hour TS clock in effect. Return to service expected later this shift.

Turnover:

Unit 1 and 2 at 100% power; MOL.

"A" BAST at 8.0 W/%; Last Shift performed two (2) 35 gallon alt dilutes followed by a manual makeup for training.

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-1A is tagged out for breaker work (2 hours ago). 72 hour TS clock in effect. Return to service expected later this shift.

Turnover: Team will perform 1-PT-18.6I, PZR Block Valve Stroke Test. 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	RCMOV_535_BKR,	Open	Test Cycle Pressurizer PORV, Block Valve breaker will trip when re-opened.
2	RC4903,	-.2 DEG	PRZR Level Transmitter Fails Low, requiring IAs of AP-53.00 to control CH flow. 0-AP-53.00.
3	SD0201	True	Loss of High Pressure Drain, AP-18.00
4	N/A	N/A	Ramp to 75% power IAW AP-23.00
5	FW1902,	-1 DEG	'B' FRV Controller fails low requiring manual FRV control. IAs of AP-53.00.

6	RC2402 GM0701 GM0702	40%  TRUE	<p>Steam Generator Tube Rupture “B” SG at approximately 360 gpm. AP-16.00, (E-0, E-3).</p> <p>Generator Output breakers fail to trip open.</p> <p>Reactor Coolant Pumps trip on electrical power swap to Reserve Station Service Transformers (30 seconds after reactor trip).</p> <p>Failure of HHSI (‘A’ trip, B and C fail to auto start). Failure of LHSI (‘B’ fails to auto start).</p>
	RC5601 RC5602 RC5603	TRUE	
	CH6402 CH6403 CH0503	TRUE	
7	PCV455C _OPEN,	OFF	PZR PORV 1-RC-1455C will not open when switch placed in “open” – Go to ECA-3.3
8	SI409  SI2505  CH54 CH55	TRUE	<p>BOP Failures in E-0 Attachments:</p> <ul style="list-style-type: none"> <li>• 1-CH-P-1A/B fail to auto start; 1-CH-P-1C trips on Overcurrent.</li> <li>• 1-SI-P-1B, LHSI pump does not auto start.</li> <li>• 1-CH-HCV-1200, Letdown Orifice Isol. A/B does not auto close.</li> <li>• 1-VS-MOD-103A, Control Room Sup MOD does not auto close.</li> <li>• 1-MS-TV-109, SFGD Steam Traps Outlet Trip Valve does not auto close.</li> <li>• 1-DA-TV-100A/B, CTMT Sump PPS Disch I/S TV does not auto close.</li> </ul>

## Scenario Objectives:

- A. Given a failure of 1-RC-MOV-1535 to re-open during performance of 1-PT-18.6I, PZR Block Valve Stroke Test, Implement the Applicable Tech Spec LCO.
- B. Given a pressurizer level channel deviation, respond IAW 0-AP-53.00 to the failure.
- C. Given a trip of the running High Pressure Drain pump, ramp the Unit 1 <75% IAW 1-AP-18.00 and 0-AP-23.
- D. Given a failure of ‘B’ FRV controller - low, take action IAW 0-AP-53.00 to control SG level.
- E. Given a Design Basis SG Tube Rupture, respond IAW 1-E-0, and 1-E-3, Steam Generator Tube Rupture.
- F. Given the Failure of 1-RC-PCV-1445C to open to depressurize the RCS, transition to 1-ECA-3.3, Steam Generator Tube Rupture without Pressurizer Pressure Control.
- G. Given SI relay failures, manually align components IAW E-0, Attachment 1, 2, and 3

**Scenario Sequence****Event One:** PRZR PORV Block Valve Stroke Test

Following turnover, the Crew will begin performing 1-PT-18.6I, Przr PORV Block Valve Stroke Test. The RO will stroke and time 1-RC-MOV-1535 closure time. The RO will then attempt to time the stroke-open time of 1-RC-MOV-1535. As soon as the operator places the control switch in the OPEN position, the breaker for 1-RC-MOV-1535 will trip open, preventing 1-RC-MOV-1535 from opening.

Malfunctions required: One, Breaker remote function RCMOV535\_BKR PRZR PORV BLOCK.

Objectives: (RO) Place 1-RC-MOV-1535 to OPEN and determine that supply breaker for 1-RC-MOV-1535 tripped.

(SRO). Refer to Tech Specs, determine if any LCOs are not met, and determine required actions.

Success Path. Determine that 1-RC-MOV-1535 is inoperable and place PORV 1-RC-MOV-1456 to CLOSE.

**Event Two:** Pressurizer Level Upper Channel fails low..

When the Evaluating Team is ready, the malfunction is implemented to cause the Pressurizer Level channel 3 (1-RC-LT-461) to fail low. This malfunction will cause the channel to fail to approximately 34% which will cause Charging flow to rise above the program amount.

Malfunctions required: One, RC4903.

Objectives: (RO): Place Charging flow controller 1-CH-FC-1122C to MAN and lower Charging flow to restore Pressurizer level to program value.

(SRO): Direct actions of 0-AP-53.00. Consult Tech Specs for the failure.

Success Path: Respond IAW 0-AP-53.00 to stabilize pressurizer level by taking manual control of 1-CH-FCV-1122 and lowering charging flow. Swap to an operable pressurizer level.

**Event Three:** Loss of High Pressure Drain Pump, 1-SD-P-1A.

When the Evaluating Team is ready, the malfunction is implemented to cause the loss of High Pressure Drain Pump, 1-SD-P-1A. This failure will result in a lower Feed flow due to the loss of the HP drain flow, thereby lowering all S/G NR levels below their program level. The BOP is expected to identify the failure, and when directed, start an additional condensate pump per 1-AP-18.00. The team will start making preparations to ramp the Unit to < 75%.

Malfunctions required: One, SD0201.

Objectives: (BOP) Diagnose the loss of the High Pressure Drain pump. When directed start an additional Condensate pump, and restore S/G level to normal.

(SRO) Direct starting of an additional Condensate pump and lower power level to be within Feeding capacity.

Success Path: Enter 1-AP-18.00. Start an additional Condensate pump and lower power as necessary to stabilize S/G level. Determine that a ramp to < 75% will be required.

Critical Task (CT-1) **Start a third condensate pump, and reduce power prior to S/G low level trip (2/3 channels on one S/G  $\leq$  17% NR).**

**Event Four:** Ramp to < 75%.

The crew will implement a ramp plan to lower power to < 75%. Note: The Feed Controller failure (Event 5) can be implemented during the ramp.

Malfunctions required: None.

Objectives: (BOP) Control "B" SG NR level using "B" FEED Controller in MAN.

(RO) Operate Boric Acid controls to maintain Tave in the band with Tref.

(SRO) Direct actions for ramp to < 75%.

Success Path: Ramp the unit to < 75% per 0-AP-23.00, Rapid Load Reduction.

**Event Five:** SG "B" Feed Controller fails low.

When the Evaluating Team is ready, the failure of the 'B' Feed Controller will take place. SG 'B' Feed controller will fail low causing feed flow to the 'B' SG to lower. 'B' S/G level will lower and the operator must take action prior to SG level reaching 17% to avoid a Reactor Trip. Actions are taken in accordance with 0-AP-53.00. SG 'B' level is stabilized.

Malfunctions required: One, FW 1801.

Objectives: (BOP) Place the 'B' FF controller to MAN and raise Feed flow slowly.

(SRO) Direct actions per 0-AP-53. Consult with Tech Specs to determine if any LCOs are not met, and required actions.

Success Path: Perform 0-AP-53.00, and consult Tech Specs to determine if there are any Required Actions.

Critical Task (CT-2): **Restore Feedwater to normal and restore S/G level to normal prior to S/G Low level trip (2/3 channels on one S/G  $\leq$  17% NR), or S/G High level trip (2/3 channels on one S/G  $\geq$  75% NR)**

**Event Six:** SGTR 'B' SG of 360 gpm.

When the Evaluating team is ready the malfunction is entered which will cause a SGTR of 360 gpm to be ramped in. The team will identify the leak and will perform AP-16.00, Excessive RCS Leakage. The rupture will rise and will require the crew to Trip and initiate SI per 1-E-0, Reactor Trip or SI. During the performance of E-0 the main generator output breakers will fail to trip

requiring the RO to manually trip them. During the manual SI the HHSI pumps will fail; 1-CH-P-1A trips shortly after auto starting, and 1-CH-P-1B, and 1C fail to auto start. 1-SI-P-1B will fail to auto start, and with the 'A' LHSI pump tagged out there will be no LHSI pump running.

The SRO will perform a commensurate brief and continue with E-0. While the RO and SRO continue with E-0, the BOP will be directed to perform E-0 Attachments 1 through 3. The RO may be directed to perform Attachment 2 due to the SI failures

Malfunctions required: Nine; RC2402, GM0701, GM0702, RC5601, RC5602, RC5603, CH6402, CH6403, CH0503.

Objectives: (RO): Perform immediate actions of 1-AP-16.00. Trip the Reactor and perform the Immediate Action Steps of 1-E-0, Reactor Trip or Safety Injection, from memory.

(BOP): Perform E-0 Attachments 1-3.

(SRO): Direct actions of E-0, and E-3

Success Path: Trip the Reactor and perform actions of 1-E-0, Reactor Trip or SI, and 1-E-3, SGTR to restore HHSI flow to the core. Isolate Feedwater to the ruptured SG and restore HHSI to the core.

#### Critical Tasks:

CT-3: Total loss of HHSI: 1-CH-P-1C trips on overcurrent after the reactor trip. 1-CH-P-1A, and 1B fail to auto start on the SI. 1-SI-P-1B will fail to auto start, and with the 'A' LHSI pump tagged out there will be no LHSI pump running. **The operator must restore HHSI to the core prior to exiting E-0** to provide adequate core cooling.

CT-4: **Isolate feedwater flow into the ruptured S/G before S/G 'B' NR reaches 100%.** With no operator action to isolate FW, this would take approximately 24 minutes. Failing to isolate Feedwater into the ruptured S/G will cause the S/G to fill faster. Once NR level reaches 100% there is no accurate method for determining S/G level due to the inaccuracy of the WR S/G levels. Once a S/G is fully flooded the hydrodynamic loading on the S/G, MS lines, and other components may exceed their allowable stress rating, possibly causing the S/G to fail catastrophically.

#### Event Seven: SGTR with Loss of Pressure Control.

After the Team has completed the rapid cooldown of E-3 and moves to the Depressurization steps. The RCPs tripped during swapover, and during event 1 1-RC-MOV-1535 failed such that one PORV was rendered inoperable. During E-3 when the team opens the other remaining PORV a failure will keep that PORV closed also. The Team will discover that they are unable to depressurize the RCS (No RCPs/No Spray available, No PORV available, Letdown isolated). This will require the Team to Transition to ECA-3.3, SGTR without Pressure Control.

When ECA-3.3 is entered, it is expected that the ruptured SG level will be > 73% NR leading to Team moving to Step 6, Check If SI Can Be Terminated.

Malfunctions required: One, PCV 455C\_OPEN OFF.



**Objectives:**

(RO) manipulate SI/CVCS control to terminate SI, establish CH flow, and restore letdown flow.

(BOP) Reset SI and secure 'A' CH pump. Isolate AFW flow to the Ruptured SG. Manipulate steam dump controls for rapid cooldown.

Success Path: Transition to ECA-3.3 when it is determined there is no success path to depressurize the RCS..

**Event Eight:** BOP Failures in E-0 Attachments.

During performance of E-0 the BOP will identify and correct the following component failures:

- 1-CH-P-1A/B fail to auto start; 1-CH-P-1C trips on Overcurrent.
- 1-SI-P-1B, LHSI pump does not auto start.
- 1-CH-HCV-1200, Letdown Orifice Isol. A/B does not auto close.
- 1-VS-MOD-103A, Control Room Sup MOD does not auto close.
- 1-MS-TV-109, SFGD Steam Traps Outlet Trip Valve does not auto close.
- 1-DA-TV-100A/B, CTMT Sump PPS Disch I/S TV does not auto close.

Malfunctions required: Four: SI409, SI2505, CH54, CH55.

Objectives: (BOP) Identify components that fail to reposition on the SI Signal, and place them in their required condition.

Success Path: Identify and position components using 1-E-0, Attachment 1, 2, and 3.

The Scenario is terminated at Lead Evaluator discretion or at Step 10 of ECA-3.3, "Check SI FLOW NOT REQUIRED"

**Scenario Recapitulation**

Total Malfunctions: 17

Abnormal Events: 3, AP-53.00 (twice), AP-18.00.

Major Transients: 1

EOPs Entered: 2 (E-0, E-3)

EOP Contingencies: 1 (ECA-3.3)

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## SHIFT TURNOVER INFORMATION

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### **OPERATING PLAN:**

Unit 1 is at 100% power with RCS boron concentration of 795 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. The Extra RO will perform these checks.
- 1-SI-P-1A is tagged out for breaker work (8 hours ago). 72 hour TS clock in effect. Return to service expected later this shift.

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 PT-18.6I, PZR Block Valve Stroke Test. Performance of this procedure has been authorized and has been PSA analyzed for current plant conditions.

The last shift performed two 35 gallon dilutions followed by a manual makeup for training.

Op-Test No.: Surry 2017-1

Scenario No.: 1

Event No.: 1

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Event Description: Test Cycle Pressurizer Block Valves, Block valve trips on re-open, PT-18.6I.

Cue: By team performance of 1-PT-18.6I.

Time	Position	Applicant's Action or Behavior
		1-PT-18.6I
	SRO/BOP	<b>NOTE</b> – Team will pre-brief this evolution prior to entering the simulator. Initial Conditions and Precautions and Limitations will be completed before entering the simulator.
	BOP	Verify closed or close PRZR PORV 1-RC-PCV-1456. (step 6.1.1)
	BOP	Verify key switch for PRZR PORV 1-RC-PCV-1456 OVPRESS Mitigating System is in DISABLE. (6.1.2)
	BOP	Verify PRZR PORV Block Valve 1-RC-MOV-1535 is open. (6.1.3)
		<b>Stroke PRZR PORV Block Valve 1-RC-MOV-1535 through one complete cycle, timing valve movement in each direction.</b> Time from signal initiation to complete valve travel. (6.1.4)
	BOP	Valve closes and fails to reopen.
	SRO	Refer to Technical Specification 3.1.A.6 for required action
	SRO	<b>Refer to Technical Specification 3.1.A.6 for required actions.</b>
		With one block valve inoperable, within 1 hour either restore the block valve to operable status or place the associated PORV in manual. In addition, restore the block valve to operable status in the next 72 hours or, be in at least HSD within the next 6 hours and reduce RCS temperature to < 350°F within the following 6 hours. (TS 3.1.A.6.d)
	BOP	<b><i>Places 1-RC-PCV-1456 in "CLOSE".</i></b>
	SRO	<b><i>Start 72 Hour Clock to repair Block Valve.</i></b>
	SRO	Direct RO/BOP to notify Service Building Operator to check status of 1H1-2S 6A breaker for 1-RC-MOV-1535.
	RO/BOP	<b><i>Contact Service Building Operator to check status of 1-RC-MOV-1535 Breaker.</i></b>

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Event Description: Test Cycle Pressurizer Block Valves, Block valve trips on re-open, PT-18.6I.

Cue: By team performance of 1-PT-18.6I.

	RO/BOP	When notified by field operator that 1H1-2S 6A. Breaker is tripped, report information to the Team using a Focus Brief.
	SRO	Notify Shift Manager of Block Valve failure and suspension of PT performance. Request Electrical Maintenance support to investigate breaker trip.
	SRO	Exit 1 hour clock to place 1-RC-PCV-1456 in manual.
	SRO	Perform brief to update Team on Technical Specification requirements. Brief driven by brief card and placards.
		---END OF EVENT 1---

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Scenario No.: 1

Event No.: 2

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Event Description: PRZR Level Transmitter Fails to 34%, 0-AP-53.00

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
	RO	<p>Diagnoses failure of 1-RC-LI-1461 with the following indications/alarms:</p> <p>Alarms:</p> <ul style="list-style-type: none"> <li>1C-D8 PRZR LO LEVEL (ARP at end of this section)</li> </ul> <p>Indications:</p> <ul style="list-style-type: none"> <li>CH Flow rises on 1-CH-FI-1122A to ~109 gpm</li> <li>PRZR Level on 1-RC-LI-1461 lowers to 34%</li> </ul> <p>In accordance with the immediate actions of AP-53.00 the RO will take manual control of pressurizer level control by placing 1-CH-FCV-1122 in manual and lowering charging flow to maintain program level (per AP-53.00).</p>
	SRO	Enters 0-AP-53.00, Loss of Vital Instrumentation / Controls.
	RO	<p>[1] CHECK REDUNDANT INSTRUMENT CHANNEL(S) INDICATION - NORMAL</p> <p>Checks 1-RC-LI-1459, Pressurizer Level Channel 1, and 1-RC-LI-1460, Pressurizer Level Channel 2 are NORMAL.</p>
	RO	<p>[2] PLACE AFFECTED CONTROL(S)/COMPONENT(S) IN MANUAL CONTROL AND STABILIZE PARAMETER USING REDUNDANT INDICATION</p> <p><b>Places 1-CH-FCV-1122 in manual and lowers charging flow.</b></p>
	SRO	<p>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 PRZR level with CH flow in MANUAL.</p> <p>STA will have no input for the brief.</p>
	RO	<p>Step 3, AP-53.00</p> <p>VERIFY REACTOR POWER – LESS THAN OR EQUAL TO 100%</p> <p><i>RO will identify that reactor power is less than 100% using PCS Display of Core Thermal Power.</i></p>

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Event No.: 2

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Event Description: PRZR Level Transmitter Fails to 34%, 0-AP-53.00

Cue: By Examiner.

	SRO	<p>Caution prior to step 4: If Reactor power has been affected by a secondary transient, Turbine adjustment may be needed to control Tave.</p> <p>Notes Prior to Step 4:</p> <ul style="list-style-type: none"> <li>Step 4 failures are listed in order of performance priority. Only the failed instrument/control and associated step number should be read aloud.</li> <li>When the affected instrument/controller malfunction(s) has been addressed by this procedure, recovery actions should continue at Step 11.</li> </ul>
	SRO	*4 DETERMINE THE FAILED INSTRUMENT / CONTROL AND GO TO APPROPRIATE STEP OR PROCEDURE:
	RO	<ul style="list-style-type: none"> <li>PRZR Level Control, Step 9.</li> </ul> <p><i>The RO will identify that 1-RC-LI-1461 (Channel 3) has failed.</i></p>
	SRO	Step 9, AP-53.00
	RO	9. CHECK PRZR LEVEL CONTROL CHANNELS – NORMAL
	SRO	<i>Responds “NO, 1-RC-LI-1461 Abnormal.”</i>
	RO	9 a) RNO 1) Place either of the following in MANUAL:
	SRO	<ul style="list-style-type: none"> <li>1-CH-FC-1122C, CHG FLOW CNTRL, OR</li> <li>1-CH-LC-1459G, PRZR LEVEL CNTRL</li> </ul>
	RO	<i>Responds “1-CH-FC-1122C in MANUAL”</i>
	SRO	9 a) RNO 2) Control PRZR Level at Program Level.
	RO	<i>Responds “Maintain PRZR Level at program <math>\pm</math> band set by SRO”</i>
	SRO	9 a) RNO 3) Move PRZR Level – CH SEL switch to Defeat the failed channel.
	RO/BOP	<b>Transfers PZR CH SEL switch to 1 / 2 Position.</b>
	SRO	9 a) RNO 4) Check or place recorder 1-RC-LR-1459 on an operable channel.
	BOP	<b><i>Checks or adjusts PRZR Level Recorder to 1-RC-LI-1459 or 1-RC-LI-1460.</i></b>
	SRO	<p>9a) RNO 5) Refer to Tech Specs 3.1.A.5, Table 3.7-1 Item 9, and Table 3.7-6, Item 13.</p> <ul style="list-style-type: none"> <li>3.1.A.5 (If Pzr heaters deenergized): This LCO is met.</li> <li><b>Table 3.7-1, item 9; Operator Action 7. Number of Operable channels one less than Total number of channels: Place Inoperable channel in trip within 72 hours, allowed to bypass channel for 12 hours for surveillance, If conditions not met within allowed time, reduce power to less than P-7 in the next 6 hours.</b></li> <li>TS Table 3.7-6, Item 13: Required Number of channels to meet function = 2. This LCO is met.</li> </ul>

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Event Description: PRZR Level Transmitter Fails to 34%, 0-AP-53.00

Cue: By Examiner.

	SRO	<p>9 a) RNO 6) Refer to Attachment 3.</p> <p><i>SRO hands Attachment 3, Pressurizer Level Control diagram to RO/BOP for review.</i></p> <p>Note: Attachment 3 is at the end of this section.</p>
	<p>SRO</p> <p>RO</p> <p>SRO</p> <p>RO</p> <p>SRO</p> <p>RO</p> <p>SRO</p> <p>RO</p>	<p>Step 9, AP-53.00, Continued:</p> <p>Step 9 b) Check Pressurizer Heaters - Energized.</p> <p><i>Checks Required Pressurizer Heaters energized, and reports that Pressurizer heaters are energized.</i></p> <p>Step 9 c) Check Letdown – IN SERVICE.</p> <p><i>“Reports Letdown in service”.</i></p> <p><b>Evaluator Note:</b> If crew isolates letdown (not anticipated), then crew will return Letdown to service per 0-AP-53.00, Attachment 8. (Attachment 8 included at end of this section)</p> <p>Step 9 d) Check PRZR level control – IN AUTOMATIC.</p> <p><i>Reports pressurizer level control in MANUAL.</i></p> <p>Step 9 d) RNO When pressurizer level restored to program level, un-saturate 1-CH-LC-1459G, PRZR LEVEL CNTRL. Place 1-CH-FC-1122C in automatic.</p> <p>Acknowledges direction and notifies SRO when pressurizer level returned to AUTOMATIC.</p>
	<p>SRO</p> <p>SRO</p> <p>RO/BOP</p>	<p>Step 11, AP-53.00</p> <p>SRO recalls NOTE 2 Prior to Step 4 and goes to Step 11 of AP-53.00.</p> <p>Step 11 Check Calorimetric – Functional IAW 1-OPT-RX-001, Attachment 4.</p> <p><i>Checks Calorimetric unaffected by this failure, and reports to the SRO.</i></p>

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Event Description: PRZR Level Transmitter Fails to 34%, 0-AP-53.00

Cue: By Examiner.

	SRO	<p>Step 12, AP-53.00</p> <p>Step 12 REVIEW THE FOLLOWING:</p> <ul style="list-style-type: none"><li>• Tech Spec 3.7</li><li>• VPAP 2802 Notifications and Reports</li><li>• TRM</li><li>• Reg Guide 1.97</li><li>• EP-AA-303, Equipment Important to Emergency Response.</li></ul> <p><i>SRO directs STA to review all documents listed.</i></p> <p><i>STA reports that "all documents have been reviewed and discussed with the Shift Manager."</i></p>
	SRO	<p>Step 13, AP-53.00</p> <p>CHECK ADDITIONAL INSTRUMENT / CONTROLLER MALFUNCTION - EXISTS</p> <p>The team will identify that no new additional failures exist (i.e., all failures have already been addressed), proceed to the RNO section, and this will direct the team to Step 15.</p>
	SRO	<p>Step 15, AP-53.00</p> <p>PROVIDE NOTIFICATIONS AS NECESSARY:</p> <ul style="list-style-type: none"><li>• Shift Supervision</li><li>• OMO</li><li>• STA (PRA determination)</li><li>• I&amp;C</li></ul>
		<b>END EVENT 2</b>



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Event Description: PRZR Level Transmitter Fails to 34%, 0-AP-53.00

Cue: By Examiner.



## SURRY POWER STATION

## ANNUNCIATOR RESPONSE PROCEDURE

NUMBER	PROCEDURE TITLE	REVISION
1C-D8	PRZR LO LVL	2
		PAGE 1 of 3

## REFERENCES

1C-32

- 1) UFSAR 4.0, 7.0, 9.1
- 2) 11448-ESK-10C
- 3) 11448-FM-86, 88
- 4) 1-DRP-005, Instrument Setpoints
- 5) 1-AP-16.00, Excessive RCS Leakage
- 6) Tech Spec 3.7
- 7) Tech Spec Amendment 228
- 8) DCP 01-008, Instrument and Controls Upgrade Project, Unit 1 P-250 & ERF Replacement

## PROBABLE CAUSE

- 1) Alarm actuates when LC-RC-459E senses Pressurizer level 5% below programmed level.  
  
Low level may be caused by one or more of the following:
  - Secondary load increase
  - Pressurizer Level Control System malfunction
  - Charging Flow Control System malfunction
  - RCS System leakage
- 2) Instrumentation failure has occurred.

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Event Description: PRZR Level Transmitter Fails to 34%, 0-AP-53.00

Cue: By Examiner.

NUMBER	PROCEDURE TITLE	REVISION
1C-D8	PRZR LO LVL	2
		PAGE 2 of 3

STEP	ACTION/ EXPECTED RESPONSE	RESPONSE NOT OBTAINED												
1. ____	VERIFY PRESSURIZER LEVEL - GREATER THAN OR EQUAL TO 5% BELOW PROGRAMMED LEVEL ON 2/3 CHANNELS <table><tr><td>CHANNEL</td><td>CH-1</td><td>CH-2</td><td>CH-3</td></tr><tr><td>INDICATOR</td><td>(1459)</td><td>(1460)</td><td>(1461)</td></tr><tr><td>PCS</td><td>L0480A</td><td>L0481A</td><td>L0482A</td></tr></table>	CHANNEL	CH-1	CH-2	CH-3	INDICATOR	(1459)	(1460)	(1461)	PCS	L0480A	L0481A	L0482A	<p><u>IF</u> any PRZR channel failed low, <u>THEN</u> do the following:</p> <ul style="list-style-type: none"><li>a) Move PRZR LVL CH SEL Switch to a different channel as necessary.</li><li>b) Adjust Charging and Letdown as necessary.</li><li>c) Refer to appropriate Tech Spec required actions.</li><li>d) Check that 1-CH-FCV-1122 controls PRZR level at setpoint.</li><li>e) <u>IF</u> 2/3 channels are inoperable, <u>THEN</u> place the Reactor in Hot Shutdown within 6 hours.</li></ul> <p><u>IF</u> no PRZR channel failed low, <u>THEN</u> initiate a Work Request <u>AND</u> GO TO Step 6.</p>
CHANNEL	CH-1	CH-2	CH-3											
INDICATOR	(1459)	(1460)	(1461)											
PCS	L0480A	L0481A	L0482A											
2. ____	VERIFY UNIT STATUS - SECONDARY LOAD INCREASE HAS OCCURRED	GO TO Step 4.												
3. ____	VERIFY PRZR LEVEL - STABLE OR INCREASING	<p>Use any of the following to return parameters to normal:</p> <ul style="list-style-type: none"><li>• Control Rods</li><li>• Turbine</li><li>• Blender</li></ul>												
4. ____	VERIFY CHG FLOW CONTROL SYSTEM - RETURNING PRZR LVL TO PROGRAM <ul style="list-style-type: none"><li>• 1-CH-FCV-1122</li></ul>	<p>Do the following:</p> <ul style="list-style-type: none"><li>• Manually adjust as necessary to return level to program.</li></ul> <p><u>OR</u></p> <ul style="list-style-type: none"><li>• Initiate 1-AP-16.00, EXCESSIVE RCS LEAKAGE.</li></ul>												

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Event Description: PRZR Level Transmitter Fails to 34%, 0-AP-53.00

Cue: By Examiner.

NUMBER	PROCEDURE TITLE	REVISION
1C-D8	PRZR LO LVL	2
		PAGE 3 of 3

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5. ____	VERIFY PRZR PRESSURE - NORMAL	Do the following:  a) IF Reactor trip is imminent, THEN GO TO 1-E-0, REACTOR TRIP OR SAFETY INJECTION.  b) Initiate 1-AP-31.00, INCREASING OR DECREASING RCS PRESSURE, as necessary.  c) Continue efforts to return level to program.  d) Initiate a Work Request.
6. ____	PROVIDE NOTIFICATIONS AS NECESSARY: <ul style="list-style-type: none"><li>• OMO</li><li>• STA</li><li>• Shift Supervisor</li></ul>	
	- END -	

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Scenario No.: 1

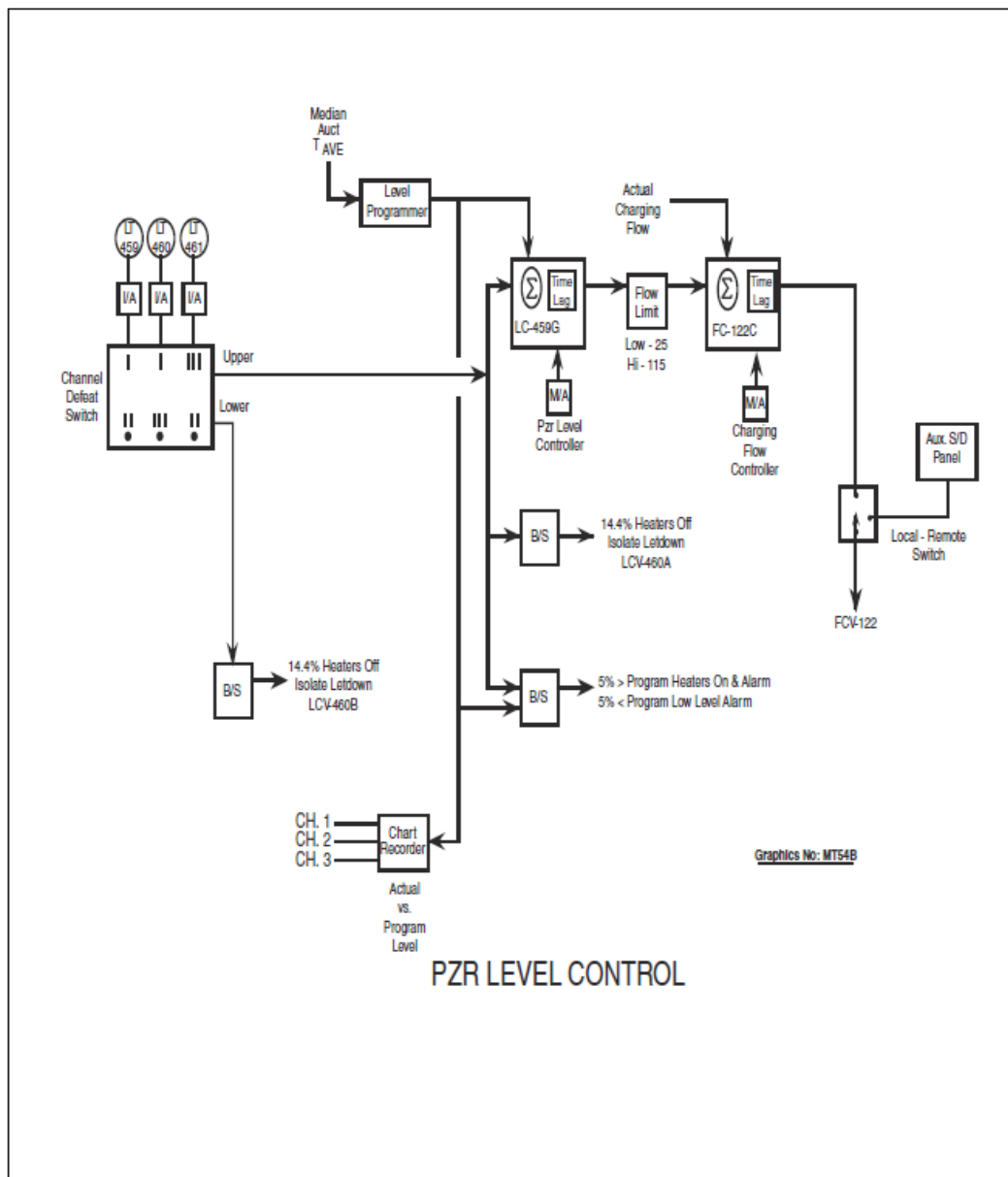
Event No.: 2

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Event Description: PRZR Level Transmitter Fails to 34%, 0-AP-53.00

Cue: By Examiner.

NUMBER 0-AP-53.00	ATTACHMENT TITLE  PRESSURIZER LEVEL CONTROL	ATTACHMENT 3
REVISION 22		PAGE 1 of 1



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Scenario No.: 1

Event No.: 2

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Event Description: PRZR Level Transmitter Fails to 34%, 0-AP-53.00

Cue: By Examiner.

NUMBER 0-AP-53.00	ATTACHMENT TITLE  PLACING NORMAL LETDOWN IN SERVICE	ATTACHMENT 8
REVISION 22		PAGE 1 of 2

1. \_\_\_\_ Check PRZR level is greater than 14.4% on selected channels.
2. \_\_\_\_ Check Annunciator ( )C-E8, PRZR LO LVL HTRS OFF & LETDOWN ISOL, is NOT LIT.
3. \_\_\_\_ Check or place at least one CC pump in service.
4. \_\_\_\_ Check closed or close all of the following valves:
  - ☐ • ( )-CH-LCV-( )460A, LETDOWN LINE ISOL
  - ☐ • ( )-CH-LCV-( )460B, LETDOWN LINE ISOL
  - ☐ • ( )-CH-HCV-( )200A, LETDOWN ORIFICE ISOL
  - ☐ • ( )-CH-HCV-( )200B, LETDOWN ORIFICE ISOL
  - ☐ • ( )-CH-HCV-( )200C, LETDOWN ORIFICE ISOL
5. \_\_\_\_ Check opened or open both of the Letdown Line Trip Valves:
  - ☐ • ( )-CH-TV-( )204A, LETDOWN LINE I/S TV
  - ☐ • ( )-CH-TV-( )204B, LETDOWN LINE O/S TV
6. \_\_\_\_ Check or place ( )-CH-PCV-( )145, LETDOWN LINE PRESS CNTRL, in MAN and OPEN (0% demand).
7. \_\_\_\_ Open ( )-CH-FCV-( )122, CHG FLOW CNTRL, and establish a charging flow of greater than or equal to 45 gpm as indicated on ( )-CH-FI-( )122A, CHG LINE FLOW.
8. \_\_\_\_ Open both of the following Letdown Line Isolation Valves:
  - ☐ • ( )-CH-LCV-( )460A, LETDOWN LINE ISOL
  - ☐ • ( )-CH-LCV-( )460B, LETDOWN LINE ISOL
9. \_\_\_\_ Open the 45 gpm Letdown Orifice Isolation by opening and placing the control switch in AUTO for ( )-CH-HCV-( )200A, LETDOWN ORIFICE ISOL.
10. \_\_\_\_ Check ( )-CH-FI-( )150, LETDOWN LINE FLOW, indicates approximately 45 gpm.

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Event No.: 2

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Event Description: PRZR Level Transmitter Fails to 34%, 0-AP-53.00

Cue: By Examiner.

NUMBER 0-AP-53.00	ATTACHMENT TITLE  PLACING NORMAL LETDOWN IN SERVICE	ATTACHMENT 8
REVISION 22		PAGE 2 of 2

11. \_\_\_\_ Check ( )-CC-TCV-( )03, NRHX OUTLET TEMP CNTRL, is controlling in AUTO as indicated by output demand and approximately 100°F on ( )-CH-TI-( )144, NON-REGEN HX OUTLET TEMP.
12. \_\_\_\_ IF desired, THEN open one of the following 60 gpm orifice valves and place the control switch in AUTO. (✓)
- ☐ • ( )-CH-HCV-( )200B, LETDOWN ORIFICE ISOL
  - ☐ • ( )-CH-HCV-( )200C, LETDOWN ORIFICE ISOL
13. \_\_\_\_ Check ( )-CH-FI-( )150, LETDOWN LINE FLOW, indicates correct flow for orifices in service.
14. \_\_\_\_ Slowly close ( )-CH-PCV-( )145 to obtain letdown line pressure between 300 - 350 psig as indicated on ( )-CH-PI-( )145, and then place in AUTO.
15. \_\_\_\_ Check Letdown parameters are normal for existing plant conditions and that there are no signs of flashing in the Letdown system. Adjust charging flow as required.

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Scenario No.: 1

Event No.: 3

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

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
	BOP	<p>Diagnose the trip of the High Pressure Drain Pump, 1-SD-P-1A based on the following indications/alarms:</p> <p>Alarms:</p> <ul style="list-style-type: none"> <li>• 1K-D4: 4 KV BKR AUTO TRIP</li> <li>• 1H-F3: CN POLISHING SYS TRBL</li> <li>• 1H-D3: CN POLISHING BYPASS AOV OPEN</li> <li>• 1H-E5/6/7: SG 1A/1B/1C FF &gt; &lt; SF</li> <li>• 1H-G5/6/7: SG 1A/1B/1C LVL ERROR</li> <li>• 1J-B4: HP HTR DR RCVR TK HI LVL</li> <li>• 1J-E1:FW HTR 4A HI LVL</li> <li>• 1J-F1: FW HTR 4B HI LVL</li> </ul> <p>Indications:</p> <ul style="list-style-type: none"> <li>• Lowering S/G level indications.</li> <li>• FRV controllers open all FRVs in an attempt to maintain level.</li> </ul>
	SRO	Step 1, AP-18.00
		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	<i>Reports that 1-SD-P-1, HP Heater Drain pumps tripped.</i>
	SRO	b) Place pump control Switch in PTL
	BOP	<b>Places 1-SD-P-1A control switch in PTL</b>
		Evaluator Note: It is possible that crew may enter 1-AP-21.00 first, due to lowering feed flow. This is not anticipated, but AP-21.00 is included at the end of this section.
	SRO	Step 2, 1-AP-18.00
	RO/BOP	CHECK REACTOR POWER – GREATER THAN OR EQUAL TO 75%
		<i>Reports reactor power at 100%. Note: Over time power will rise to approx. 101%.</i>
	SRO	Step 3, AP-18.00
	BOP	START THIRD CONDENSATE PUMP AS REQUIRED BY PLANT CONDITIONS
		<b>Starts 1-CN-P-1A and verifies Proper Operation.</b>
		<b>Critical Task (CT-1): Start a third condensate pump, and reduce power prior to S/G low level trip (2/3 channels on one S/G <math>\leq</math> 17% NR).</b>

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Scenario No.: 1

Event No.: 3

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

Cue: By Examiner.

	SRO	Step 4, AP-18.00  NOTE: With unit at 100% power, Turbine load should be decreased approximately 50 MW.  REDUCE TURBINE LOAD AS NECESSARY TO MAINTAIN LOOP $\Delta T$ s - LESS THAN 100%  • <i>Use Valve Position Limiter</i> OR • <i>Reduce Turbine load using Turbine Manual. (Expected)</i>
	BOP	<b>Using Guidance of NOTE preceding the Step, Turbine load will be reduced.</b>
	SRO	Step 5, 1-AP-18.00  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
	SRO	Step 6, 1-AP-18.00  * USE CONTROL RODS AND CHEMICAL SHIM TO MAINTAIN $\Delta$ FLUX IN BAND
	SRO	Step 7, 1-AP-18.00  MONITOR MAIN FEED REG VALVE RESPONSE - MAINTAINING SG LEVEL IN BAND
	BOP	Acknowledges Step direction.
	SRO	Initiate AP-23.00, Rapid Load Reduction. (Event 5)
		<b>END EVENT #3</b>



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Scenario No.: 1

Event No.: 3

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

Cue: By Examiner.

NUMBER	PROCEDURE TITLE	REVISION
1-AP-21.00	LOSS OF MAIN FEEDWATER FLOW	9
		PAGE 2 of 4

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
[ 1 ]	CHECK MAIN FEED PUMP STATUS:  <input type="checkbox"/> a) Check Reactor Power - GREATER THAN 80%  <input type="checkbox"/> b) Check Main Feed Pumps - TWO RUNNING	<input type="checkbox"/> a) <u>IF</u> at least one Main Feed Pump running, <u>THEN</u> GO TO Step 2.  <input type="checkbox"/> b) GO TO 1-E-0, REACTOR TRIP OR SAFETY INJECTION.
[ 2 ]	START AN ADDITIONAL CONDENSATE PUMP	
[ 3 ]	REDUCE TURBINE LOAD TO MATCH STEAM FLOW WITH FEED FLOW  <input type="checkbox"/> • Use Valve Position Limiter  <u>OR</u>  <input type="checkbox"/> • Reduce Turbine load using Turbine Manual	
4.	CHECK CONDENSATE POLISHING BLDG BYPASS - REQUIRED  <input type="checkbox"/> • Main Feed Pump Suction Pressure - LESS THAN 400 PSIG	<input type="checkbox"/> GO TO Step 6.
5.	OPEN 1-CP-MOV-100	
6.	ENERGIZE ALL PRZR HEATERS	
7.	CHECK STEAM DUMP OPERATION - REDUCING TAVE/TREF MISMATCH BASED ON DEMAND SIGNAL	<input type="checkbox"/> Manually operate Steam Dumps in the Steam Pressure Mode.  <input type="checkbox"/> <u>IF</u> Steam Dumps inoperable, <u>THEN</u> dump steam using SG PORVs.

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Event No.: 3

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

Cue: By Examiner.

NUMBER	PROCEDURE TITLE	REVISION
1-AP-21.00	LOSS OF MAIN FEEDWATER FLOW	9
		PAGE 3 of 4

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p><b>NOTE:</b> Depending on initial plant conditions, rod insertion or boration may be used to stabilize RCS temperature and maintain <math>\Delta</math>Flux in band.</p>		
8. ____	CHECK CONTROL RODS - INSERTING IF NECESSARY	<input type="checkbox"/> Manually insert control rods.
9. ____	CHECK ANNUNCIATOR 1E-E3, $\Delta$ FLUX DEVIATION - NOT LIT	<input type="checkbox"/> Perform Annunciator Response Procedure.
10. ____	CHECK ALL SG FLOWS - STEAM FLOW IS LESS THAN OR EQUAL TO FEED FLOW	Do the following: <input type="checkbox"/> a) Continue to reduce Turbine load. <input type="checkbox"/> b) RETURN TO Step 7.
11. ____	CHECK ALL SG LEVELS - AT OR TRENDING TO PROGRAMMED LEVEL	<input type="checkbox"/> Manually control Main Feed Water Regulating Valves.
12. ____	CHECK TAVE - MATCHED WITH TREF	Do the following: <input type="checkbox"/> a) Adjust control rods. <input type="checkbox"/> b) Dilute or borate the RCS as necessary.
13. ____	CHECK FEED HEADER TO STEAM HEADER $\Delta$ P - AT LEAST 50 PSID	<input type="checkbox"/> Reduce turbine load.
14. ____	CHECK AMPs ON EACH MOTOR OF THE RUNNING MAIN FEED PUMP(s) - LESS THAN 420 AMPS	<input type="checkbox"/> Reduce turbine load.

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Event No.: 3

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

Cue: By Examiner.

NUMBER	PROCEDURE TITLE	REVISION
1-AP-21.00	LOSS OF MAIN FEEDWATER FLOW	9
		PAGE 4 of 4

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p><b>NOTE:</b> The polishing building should be returned to service as soon as reasonably achievable to minimize iron transport and prevent entry into Action Level.</p>		
15. ____	CHECK OPERATION OF MAIN FEED PUMP(s) <ul style="list-style-type: none"><li><input type="checkbox"/> • Recirc valve position</li><li><input type="checkbox"/> • Discharge MOV position</li><li><input type="checkbox"/> • Pump amps</li></ul>	
16. ____	CHECK REACTOR POWER CHANGE - LESS THAN 15% IN ONE HOUR	<input type="checkbox"/> Notify Chemistry.
17. ____	NOTIFY THE FOLLOWING: <ul style="list-style-type: none"><li><input type="checkbox"/> • OMOC</li><li><input type="checkbox"/> • Maintenance Foreman</li></ul>	
- END -		

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Event No.: 4

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Event Description: Ramp to 75% power. (0-AP-23.00)

Cue: When initiated by Team.

Time	Position	Applicant's Action or Behavior
		AP-23.00, Rapid Load Reduction
	SRO	<p>The team will hold a transient brief. During the brief the upcoming ramp will be discussed.</p> <p>The RO and BOP will report critical parameters, as per placard on Main Control Room Bench Board. It is expected that the RO will discuss reactivity parameters associated with the ramp from the pre-planned ramp plan.</p> <p><i>The STA will have nothing new to add.</i></p> <p>The following reactivity plan will be discussed <i>for a ramp to 75%</i>:</p> <ul style="list-style-type: none"> <li>• The Team will discuss duration of Emergency Borate at start of Ramp, and remaining boron to be added via normal boration flowpath.</li> <li>• Gallons of boric acid required as per plan – 147 gallons.</li> <li>• Will probably recommend 25 sec Emerg Boration (50 gallons). Depending on Tave/Tref mismatch.</li> <li>• If 25 sec. EB then 97 gallons Normal Boration.</li> <li>• “D” control bank end at 197 steps.</li> <li>• 1900 gallons of PG to stabilize power at 75%.</li> </ul>
	SRO	<p>Step 1, 0-AP-23.00</p> <p>Caution Prior to Step 1:</p> <ul style="list-style-type: none"> <li>• Conservative decision-making must be maintained during rapid load reductions. Refer to Attachment 1 for trip criteria.</li> </ul> <p>Notes Prior to Step 1:</p> <ul style="list-style-type: none"> <li>• Actions that can be completed independently of preceding steps may be performed out of sequence as directed by the SRO</li> <li>• When the Turbine is not being actively ramped, the REFERENCE and SETTER values must remain matched to prevent inadvertent ramp.</li> <li>• Pre-planned reactivity plans located in the Main Control Room will be used as guidance for ramping down to the desired power level.</li> <li>• 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.</li> <li>• For ramp rates greater than or equal to 1%/minute, Rod Control should remain in Automatic if available.</li> </ul>
	RO	<p>Step 1, 0-AP-23.00</p> <p><b>TURN ON ALL PRZR HEATERS.</b></p>

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Event No.: 4

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Event Description: Ramp to 75% power. (0-AP-23.00)

Cue: When initiated by Team.

	SRO	Step 2 0-AP-23.00
		INITIATE PLANT LOAD REDUCTION AT 2%/MINUTE OR LESS:
	BOP	a) Check turbine valve position - NOT ON LIMITER <i>The turbine is NOT on the limiter.</i>
	RO	b) Insert control rods in AUTO or MANUAL as necessary to maintain Tave and Tref within 5°F.
	BOP	c) <b>Check or place turbine in IMP IN or IMP OUT as determined by Shift Supervision</b> <i>The SRO chooses <b>IMP IN</b>.</i>
	BOP	d) <b>Adjust SETTER to desired power level. (Will adjust to approx.. 70%)</b>
	BOP	e) <b>Adjust LOAD RATE %/MIN thumbwheel to desired ramp rate (1%/minute)</b>
	BOP	f) <b>Initiate Turbine load reduction using OPERATOR AUTO (pushes the GO button)</b>
	BOP	g) <b>Reduce Turbine Valve Position Limiter as load decreases</b> <i>Periodically reduce the limiter setpoint during the ramp.</i>
	SRO	Step 3, 0-AP-23.00
	RO	CHECK EMERGENCY BORATION – REQUIRED Reports Emergency Boration required.
	SRO	Step 4, 0-AP-23.00
	RO	NOTE: Step 4 or Step 5 may be performed repeatedly to maintain Tref and Tave matched, ΔFlux in band, and control rod position above the LO-LO insertion limit. Acknowledges NOTE.

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Event Description: Ramp to 75% power. (0-AP-23.00)

Cue: When initiated by Team.

	SRO	Step 4, 0-AP-23.00
	RO	PERFORM AN EMERGENCY BORATION IAW THE FOLLOWING:
	RO	a) <i>Check or raise CHG flow to greater than 75 gpm</i>
	RO	b) <b>Transfer the in-service BATP to FAST</b>
	RO	c) <b>Open 1-CH-MOV-1350 for required time</b>
	RO	d) <i>Monitor EMRG BORATE FLOW</i> <ul style="list-style-type: none"> <li>1-CH-FI-1110</li> </ul>
	RO	e) After required emergency boration, perform the following:
	RO	1) <b>Close 1-CH-MOV-1350</b>
	RO	2) <b>Transfer the in-service BATP to AUTO</b>
		3) Restore Charging flow control to normal.
	RO	Step 5, 0-AP-23.00
		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	Step 6, 0-AP-23.00, NOTES
		NOTES: <ul style="list-style-type: none"> <li>If at any time plant conditions no longer require rapid load reduction, actions should continue at Step 37.</li> <li>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.</li> <li>I &amp; C should be contacted to provide assistance with adjusting IRPIs.</li> </ul>
	RO/BOP	Step 6, 0-AP-23.00
		CONTROL RAMP RATE TO MAINTAIN RCS PRESSURE GREATER THAN 2205 PSIG
	RO	Step 7, 0-AP-23.00
		* CHECK LETDOWN ORIFICES – TWO IN SERVICE
		<i>Evaluator note: two orifices will already be in service.</i>

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Event Description: Ramp to 75% power. (0-AP-23.00)

Cue: When initiated by Team.

	BOP	<p>Step 8, 0-AP-23.00</p> <p>MONITOR STEAM DUMPS FOR PROPER OPERATION</p>
	SRO	<p>Step 9, 0-AP-23.00</p> <p>NOTIFY THE FOLLOWING:</p> <ul style="list-style-type: none"> <li>• Energy Supply (MOC)</li> <li>• Polishing Building</li> <li>• Chemistry</li> <li>• OMO</li> </ul>
	SRO	<p>Step 10, 0-AP-23.00</p> <p>EVALUATE THE FOLLOWING:</p> <ul style="list-style-type: none"> <li>• EPIP applicability</li> </ul> <p><i>The Shift Manager will review EPIPs for applicability. They are not applicable.</i></p> <ul style="list-style-type: none"> <li>• VPAP-2802, NOTIFICATIONS AND REPORTS, applicability</li> </ul> <p><i>SRO directs STA to review VPAP-2802. The STA reports that he has completed his review of VPAP-2802, and EPIPs and has discussed these with the Shift Manager.</i></p>
	SRO	<p>Step 11, 0-AP-23.00</p> <p>CHECK RAMP WILL BE TO LESS THAN APPROXIMATELY 35% REACTOR POWER.</p> <p><i>SRO determines that ramp will NOT be to &lt; 35% and goes to Step 13.</i></p>
	SRO	<p>Step 13, 0-AP-23.00</p> <p>CHECK REACTOR POWER – HAS DECREASED MORE THAN 15% IN ONE HOUR.</p> <p>When reactor power has decreased &gt;15%, then chemistry will be notified.</p>
	SRO	<p>Step 14, 0-AP-23.00</p> <p>NOTIFY CHEMISTRY OF POWER CHANGE . 15% IN ONE HOUR.</p> <p><i>RO/BOP notifies Chemistry</i></p>
		<b><u>END EVENT #4</u></b>

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Event No.: 4

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Event Description: Ramp to 75% power. (0-AP-23.00)

Cue: When initiated by Team.

AP-23.00 ATTACHMENT 4, 5.

Time	Position	Applicant's Action or Behavior
		<b>0-AP-23.00 Attachment 4 (NORMAL BORATION) Actions</b>
	RO	<b>1. Place the MAKE-UP MODE CNTRL switch in the STOP position.</b>
	RO	<b>2. Adjust 1-CH-YIC-1113 to desired total gallons.</b>
	RO	<b>3. Adjust 1-CH-FC-1113A to desired flow rate.</b>
	RO	<b>4. Place the MAKE-UP MOD SEL switch in the BORATE position.</b>
	RO	<b>5. Place the MAKE MODE CNTRL switch in the START position.</b>
	RO	6. Check proper valve positions.
	RO	7. Adjust boration rate using 1-CH-FC-1113A, as necessary.
	RO	<p>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.</p> <p>a) Manually blend approximately 20 gallons to flush the boration path IAW Attachment 5, Manual Makeups.</p> <p>b) Enter N/A for the remaining steps in this Attachment.</p> <p><i>Attachment 5 is on the next page</i></p>
	RO	9. Check controllers for Primary Grade water and Boric Acid are set correctly.
	RO	<b>10. Place the MAKE-UP MODE SEL switch in the AUTO position.</b>
	RO	<b>11. Place the MAKE-UP MODE CNTRL switch in the START position.</b>
	RO	12. Notify Shift Supervision of blender status.



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Event No.: 4

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Event Description: Ramp to 75% power. (0-AP-23.00)

Cue: When initiated by Team.

AP-23.00 ATTACHMENT 4, 5.

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

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Scenario No.: 1

Event No.: 5

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Event Description: 'B' FRV Controller Fails Low (0-AP-53.00)

Cue: Examiner (Following ramp/ Blender returned to AUTO).

Time	Position	Applicant's Action or Behavior
	BOP	<p>Diagnoses failure 'B' FRV Controller with the following indications/alarms:</p> <p>Alarms:</p> <ul style="list-style-type: none"> <li>1H-G6 STM GEN 1B LVL ERROR.</li> </ul> <p>Indications:</p> <ul style="list-style-type: none"> <li>Step decrease in 1B SG Feed Flow indication.</li> <li>Step decrease in 1B SG Feed Flow Controller indication.</li> <li>Lowering level on 'B' SG.</li> </ul>
	SRO	Enters 0-AP-53.00 LOSS OF VITAL INSTRUMENTATION / CONTROLS
	BOP	<p>Step 1, AP-53.00</p> <p>[1] CHECK REDUNDANT INSTRUMENT CHANNEL(S) INDICATION - NORMAL</p> <p>BOP identifies that all Feed flow indication is lowering due to FRV controller failure.</p>
	BOP	<p>Step 2, AP-53.00</p> <p>[2] PLACE AFFECTED CONTROL(S)/COMPONENT(S) IN MANUAL CONTROL AND STABILIZE PARAMETER USING REDUNDANT INDICATION</p> <p><b>BOP takes manual control of 'B' SG feed reg valve and raises demand (FF &gt; SF) to restore level to program.</b></p> <div style="border: 1px solid black; padding: 5px;"> <p><b>Critical Task (CT-2): Restore Feedwater to normal and restore S/G level to normal prior to S/G Low level trip (2/3 channels on one S/G <math>\leq</math> 17% NR), or S/G High level trip (2/3 channels on one S/G <math>\geq</math> 75% NR)</b></p> </div>
	SRO	<p>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.</p> <p>STA will have no input for the brief.</p>
	SRO	<p>Step 3, AP-53.00</p> <p>VERIFY REACTOR POWER – LESS THAN OR EQUAL TO 100%</p>
	RO	<p><i>RO will identify that reactor power is less than 100% using PCS Display of Core Thermal Power.</i></p>

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Event No.: 5

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Event Description: 'B' FRV Controller Fails Low (0-AP-53.00)

Cue: Examiner (Following ramp/ Blender returned to AUTO).

	SRO	<p>Caution prior to step 4: If Reactor power has been affected by a secondary transient, Turbine adjustment may be needed to control Tave.</p> <p>Notes Prior to Step 4:</p> <ul style="list-style-type: none"> <li>Step 4 failures are listed in order of performance priority. Only the failed instrument/control and associated step number should be read aloud.</li> <li>When the affected instrument/controller malfunction(s) has been addressed by this procedure, recovery actions should continue at Step 13.</li> </ul>
	SRO  RO/BOP  SRO	<p>Step 4, AP-53.00</p> <p>DETERMINE THE FAILED INSTRUMENT / CONTROL AND GO TO APPROPRIATE STEP OR PROCEDURE:</p> <p><i>Identifies 1B SG Feed Flow affected by a failure of the 'B' FRV Controller 1-FW-FCV-1488.</i></p> <p>Goes to Step 7.</p>
	SRO  SRO  BOP  BOP  BOP  BOP  BOP	<p>Step 7, AP-53.00</p> <p>CAUTION: When CALCALC is based on Feedwater, changes in feed flow will affect calorimetric power. Reactor power must be monitored when adjusting feed flow.</p> <p>CHECK STEAM GENERATOR LEVEL CONTROL INSTRUMENTS – NORMAL</p> <ul style="list-style-type: none"> <li>Steam Pressure</li> <li>Steam Flow</li> <li><b>Feed Flow</b></li> <li>Steam Generator Level</li> </ul> <p>Determines CH III and IV Feed flow instrumentation for 'B' SG is NOT normal.</p> <p>Step 7. RNO, AP-53.00</p> <p>IF the selected steam flow, steam pressure, or feed flow input to the SG Water Level Control system has failed, THEN do the following:</p> <p><b>a) Place the associated Feed Reg Valve in MANUAL.</b></p> <p><i>Verifies 'B' SG MFRV controller, 1-FW-FCV-1488, in manual</i></p> <p>b) Control SG level at program level (44%, a band will be given).</p> <p><i>Verifies 'B' SG NR level is returning to program level.</i></p> <p>d) WHEN SG level returned to normal, THEN place the Feed Reg Valve in AUTOMATIC.</p>

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Event Description: 'B' FRV Controller Fails Low (0-AP-53.00)

Cue: Examiner (Following ramp/ Blender returned to AUTO).

	BOP	<b>Maintains control of 1-FW-FCV-1488 in MANUAL</b>
	SRO	Step 7, RNO, AP-53.00 (Continued)
	SRO	Perform follow-up actions: <ul style="list-style-type: none"> <li>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.</li> </ul> <i>If asked the Shift Manager will recommend not performing 1-OP-RP-001 at this time.</i>
	SRO	b) Refer to the following Tech Spec 3.7 items: <ul style="list-style-type: none"> <li>• Table 3.7-1, 12 and 17</li> <li>• Table 3.7-2, 1.c, 1.e, and 3.a</li> <li>• Table 3.7-3, 2.a, and 3.a</li> <li>• Table 3.7-6, 15 and 16</li> </ul>
	SRO	<b>Determines all LCOs are met.</b> <ul style="list-style-type: none"> <li>c) Refer to Attachment 1.</li> <li>d) IF no other instrumentation failure exists, THEN GO TO Step 11.</li> </ul>
	SRO	Step 11, AP-53.00
	SRO	SRO recalls NOTE 2 Prior to Step 4 and goes to Step 11 of AP-53.00.
	SRO	Step 11 Check Calorimetric – Functional IAW 1-OPT-RX-001, Attachment 4.
	RO/BOP	<i>Checks Calorimetric unaffected by this failure, and reports to the SRO.</i>
	SRO	Step 12, AP-53.00
	SRO	Step 12 REVIEW THE FOLLOWING: <ul style="list-style-type: none"> <li>• Tech Spec 3.7</li> <li>• VPAP 2802 Notifications and Reports</li> <li>• TRM</li> <li>• Reg Guide 1.97</li> <li>• EP-AA-303, Equipment Important to Emergency Response.</li> </ul> <i>SRO directs STA to review all documents listed.</i> <i>STA reports that “all documents have been reviewed and discussed with the Shift Manager.”</i>

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Event Description: 'B' FRV Controller Fails Low (0-AP-53.00)

Cue: Examiner (Following ramp/ Blender returned to AUTO).

	SRO	<p>Step 13, AP-53.00</p> <p>CHECK ADDITIONAL INSTRUMENT / CONTROLLER MALFUNCTION - EXISTS</p> <p>The team will identify that no new additional failures exist (i.e., all failures have already been addressed), proceed to the RNO section, and this will direct the team to Step 15.</p>
	SRO	<p>Step 15, AP-53.00</p> <p>PROVIDE NOTIFICATIONS AS NECESSARY:</p> <ul style="list-style-type: none"><li>• Shift Supervision</li><li>• OMOC</li><li>• STA (PRA determination)</li><li>• I&amp;C</li></ul>
		<b>END EVENT #5</b>

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Event No.: 6

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Event Description: SGTR 'B' SG of 360 gpm (AP-16.00, E-0, E-3)

Cue: Examiner.

	Team	<p>Diagnose SGTR B SG based on the following:</p> <p>Alarms:</p> <ul style="list-style-type: none"> <li>• 1A-B3 N-16 ALERT</li> <li>• 1A-A3 N-16 HIGH</li> <li>• RM-G8 CNDSR AIR EJECTOR ALERT/FAILURE</li> <li>• RM-H8 1-SV-RI-111 HIGH</li> </ul> <p>Indications:</p> <ul style="list-style-type: none"> <li>• Increasing trend on 1-MS-RR-193, Control Room N16 Trend Recorder, from Normal to 200 GPD.</li> <li>• STM LINE B Trend will Lead STM LINE A and STM LINE B.</li> </ul> <p>Direct Unit to Perform Annunciator Response Procedure for A/E Alert and High Alarms.</p> <p><i>Note: Unit 2 Operator will perform ARP for A/E RM Alarms. Unit 2 will hand Page 3 and 4 of RM-H8 ARP to BOP to check Auto Actions complete; following E-0 Team Brief.</i></p>
	SRO	<p>1-AP-16.00</p> <p>Direct the RO to perform the Immediate Action Steps of 1-AP-16.00.</p>
	SRO	<p>Step 1, 1-AP-16.00</p> <p>NOTE:</p> <ul style="list-style-type: none"> <li>• If SI Accumulators are isolated, 1-AP-16.01, SHUTDOWN LOCA, should be used for guidance.</li> <li>• RCS average temperature has a direct impact on pressurizer level.</li> </ul> <p>MAINTAIN PRZR LEVEL</p> <ul style="list-style-type: none"> <li>• Isolate Letdown.</li> <li>• Control Charging flow.</li> </ul>
	RO	<p><b><i>RO isolates letdown by closing 1-LCV-1460A, and B.</i></b></p> <p><b><i>RO takes manual control of charging to stabilize pressurizer level.</i></b></p>
	SRO	<p>Step 2, 1-AP-16.00</p> <p>CHECK THE FOLLOWING PARAMETERS - STABLE OR INCREASING</p> <ul style="list-style-type: none"> <li>• PRZR level</li> <li>• PRZR pressure</li> <li>• RCS subcooling</li> </ul>
	RO	<p>Report that PRZR Level, Pressure, and Subcooling are not stable.</p> <p><i>RO continues actions to quantify leakrate</i></p>

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Event Description: SGTR 'B' SG of 360 gpm (AP-16.00, E-0, E-3)

Cue: Examiner.

	SRO  RO	<p>Step 3, 1-AP-16.00</p> <p>PLACE THE FOLLOWING COMPONENTS IN OFF:</p> <ul style="list-style-type: none"> <li>• CTMT sump pumps <b>Places 1-DA-P-4B control switch on OFF</b></li> <li>• CTMT vacuum pumps <b>Places 1-CV-P-1A control switch in OFF</b></li> </ul>
	SRO  SRO  RO	<p>Step 4, 1-AP-16.00</p> <p>NOTE: Shift Supervision and STA must remain informed of RCS leak rate for EPIP applicability.</p> <p>CHECK REACTOR TRIP – REQUIRED</p> <ul style="list-style-type: none"> <li>• Leak rate - GREATER THAN 50 GPM OR</li> <li>• Adequate makeup not being provided by blender</li> </ul> <p><b>Reports RCS leak rate greater than 50 gpm.</b></p> <p><i>NOTE: Due to transient on RCS caused by Ramp for previous event, exact quantification of leak rate may be difficult.</i></p>
	SRO  RO	<p>Step 5, 1-AP-16.00</p> <p>ALIGN CHG PUMP SUCTION TO RWST</p> <p>a) Open 1-CH-MOV-1115B and 1-CH-MOV-1115D <b>Opens CH pump Suction MOVs from RWST, 1-CH-MOV-1115B/D</b></p> <p>b) Close 1-CH-MOV-1115C and 1-CH-MOV-1115E <b>Closes CH pump Suction from VCT MOVs, 1-CH-MOV-1115C/E</b></p>
	SRO	<p>Step 6, 1-AP-16.00</p> <p>GO TO 1-E-0, REACTOR TRIP OR SAFETY INJECTION</p>

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Event Description: SGTR 'B' SG of 360 gpm (AP-16.00, E-0, E-3)

Cue: Examiner.

	RO	<p><b><u>1-E-0 – Reactor Trip or Safety Injection</u></b></p> <p>[1] CHECK REACTOR TRIP:</p> <p>a) Manually trip reactor</p> <p><b>Pushes the reactor trip push buttons.</b></p> <p>b) Check the following:</p> <ul style="list-style-type: none"> <li>• All Rods On Bottom light – LIT</li> <li>• Reactor trip and bypass breakers – OPEN</li> <li>• Neutron flux – DECREASING</li> </ul> <p><i>RO Reports "Reactor Tripped" at completion of Step 1. SRO Acknowledges.</i></p>
	RO RO	<p>[2] CHECK TURBINE TRIP:</p> <p>a) Manually trip the turbine</p> <p><b>Pushes the turbine trip push buttons.</b></p> <p>b) Check all turbine stop valves - CLOSED</p> <p>c) Isolate reheaters by closing MSR steam supply SOV</p> <ul style="list-style-type: none"> <li>• <b>1-MS-SOV-104</b></li> </ul> <p>d) Verify generator output breakers – OPEN (Time Delayed). <i>RO determines generator output breakers did not auto open.</i></p> <p>d) <b>RNO RO manually opens output breakers and places Excitation control switch in OFF.</b></p> <p><i>RO Reports "Turbine Tripped" at completion of Step 2. SRO Acknowledges.</i></p>
	RO	<p>[3] VERIFY BOTH AC EMERGENCY BUSES – ENERGIZED</p> <p><i>RO Reports "Both AC Emergency Buses Energized" at completion of Step 3. SRO acknowledges.</i></p>



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Event Description: SGTR 'B' SG of 360 gpm (AP-16.00, E-0, E-3)

Cue: Examiner.

	RO	<p>[4] CHECK IF SI INITIATED:</p> <p>a) Check if SI is actuated:</p> <ul style="list-style-type: none"> <li>LHSI pumps – RUNNING</li> <li>SI annunciators – LIT <ul style="list-style-type: none"> <li>A-F-3 SI INITIATED – TRAIN A</li> <li>A-F-4 SI INITIATED – TRAIN B</li> </ul> </li> </ul> <p>RO will determine that SI has not occurred and perform step 4a RNO actions:</p> <p>RO 4a RNO Check if SI is required or imminent as indicated by any of the following:</p> <ul style="list-style-type: none"> <li>Low PRZR pressure</li> <li>High CTMT pressure</li> <li>High steamline differential pressure</li> <li>High steam flow with low Tave or low line pressure</li> </ul> <p>IF SI is required, THEN GO TO Step 4b.</p> <div style="border: 1px solid black; padding: 5px;"> <p>Evaluator Note: It is possible that crew may opt to go to ES-0.1, Reactor Trip Response due to the current size of the leak. If this is the case the crew will then shortly return to E-0 once SI auto initiates or the crew recognizes that SI is required.</p> </div> <p><b>Report to SRO that Safety Injection is required.</b>  <b>Manually Initiate Safety Injection.</b>  <i>Check Annunciator 1A-F3, SI Initiated Train A - LIT</i>  <i>Check Annunciator 1A-F4, SI Initiates Train B – LIT</i>  <i>Check LHSI, HHSI Pumps Running and flowing to the core.</i></p> <p><i>Report to SRO “Immediate Actions of E-0 with SI Complete. There is <u>no SI flow</u> to the core.”</i></p> <p>SRO Acknowledges.</p> <p>RO 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.</p> <p>SRO The SRO will set priorities: (Most likely listed below)  RO – Perform Attachment 2, 9, continue with SRO in performance of E-0 to E-3.  BOP – Perform Attachment 1 and 3 of E-0.</p> <div style="border: 1px solid black; padding: 5px;"> <p>The SRO will hand out copies of the E-0 Continuous Action Page, and Continuous Action Steps (Located at Event 9).  <b>Note: Attachments 2, 9 are at end of this section. Attachments 1, 3 are in Event 8.</b></p> </div>
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Event Description: SGTR 'B' SG of 360 gpm (AP-16.00, E-0, E-3)

Cue: Examiner.

	SRO/BOP	<p>Step 5, E-0</p> <p>Initiate Attachment 1 (<i>Attachment 1, contained in Event 8</i>).</p>
	SRO/RO	<p>SRO may direct the RO to perform Attachment 9 of 1-E-0 for Ruptured SG Isolation and AFW Control. This may or may not be initiated at any time during the performance of E-0. <i>Attachment 9 actions are contained at the end of this section.</i></p>
	RO	<p>Step 6, E-0</p> <p>* CHECK RCS AVERAGE TEMPERATURE</p> <ul style="list-style-type: none"> <li>• STABLE AT 547°F</li> </ul> <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> <li>• TRENDING TO 547°F</li> </ul> <p>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. Stop dumping steam</p> <p><b>Reduce AFW flow to the SG</b></p> <p>Close MSTVs if cooldown continues</p> <p>Evaluator Note: The team is performing equivalent actions per Attachment 9 of E-0.</p>
	RO	<p>Step 7, E-0</p> <p>7. CHECK PRZR PORVs AND SPRAY VALVES:</p> <ul style="list-style-type: none"> <li>a) PRZR PORVs – CLOSED</li> <li>b) PRZR spray controls <ul style="list-style-type: none"> <li>• Demand at Zero (or)</li> <li>• Controlling Pressure</li> </ul> </li> <li>c) PORV block valves - AT LEAST ONE OPEN</li> </ul>

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Event Description: SGTR 'B' SG of 360 gpm (AP-16.00, E-0, E-3)

Cue: Examiner.

	<p>SRO</p> <p>RO</p>	<p>Step 8, E-0</p> <p><b>NOTE:</b> Seal injection flow should be maintained to all RCPs.</p> <p><b>* CHECK RCP TRIP AND MINIFLOW RECIRC CRITERIA:</b></p> <p>a) Charging Pumps – AT LEAST ONE RUNNING AND FLOWING TO RCS</p> <p>Two or three Charging pumps <i>may or may not</i> be running and flowing to the RCS. NOTE: The Charging pumps are initially off (due to malfunction), they will be restored by Checklist 1, or 2.</p> <p>b) RCS subcooling - LESS THAN 30°F [85°F]</p> <p>RCS subcooling will NOT be less than 30 °F</p> <p><b>RNO for the step is to go to step 9.</b></p>
	RO	<p>Step 9, E-0</p> <p>CHECK IF SGs ARE NOT FAULTED:</p> <ul style="list-style-type: none"> <li>• Check pressures in all SGs</li> </ul> <p>a) STABLE OR INCREASING AND b) GREATER THAN 100 PSIG</p> <p>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.</p>
	<p>RO</p> <p>SRO</p>	<p>Step 10, E-0</p> <p>CHECK IF SG TUBES ARE NOT RUPTURED:</p> <ul style="list-style-type: none"> <li>• Condenser air ejector radiation – NOT NORMAL</li> <li>• SG blowdown radiation – NOT NORMAL</li> <li>• SG MS radiation – NORMAL</li> <li>• TD AFW pump exhaust radiation – NORMAL</li> <li>• SG NR Level - NOT INCREASING IN AN UNCONTROLLED MANNER</li> </ul> <p>RO should observe 'B' SG NR level going up uncontrollably.</p> <p><b>RNO: GO TO 1-E-3, STEAM GENERATOR TUBE RUPTURE.</b></p>

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Event Description: SGTR 'B' SG of 360 gpm (AP-16.00, E-0, E-3)

Cue: Examiner.

	SRO	<p><b>E-3</b></p> <p>The team will hold a transition brief. During the brief it will be identified that 'B' SG is ruptured, current isolation status of the ruptured SG and that the team is transitioning to 1-E-3.</p> <p><i>The STA will state that he has nothing to add to the brief.</i></p>
	<p>SRO</p> <p>RO</p>	<p><b>BEGIN Step 1, 1-E-3:</b></p> <p><b>NOTE:</b> Seal injection flow should be maintained to all RCPs.</p> <p><b>*CHECK RCP TRIP AND MINIFLOW RECIRC CRITERIA:</b></p> <p>a) Charging Pumps – AT LEAST ONE RUNNING AND FLOWING TO RCS</p> <p><i>RO will identify that two charging pumps are running.</i></p> <p>b) RCS subcooling - LESS THAN 30°F [85°F]</p> <p><i>RO will identify that RCS subcooling is greater than 30°F</i></p> <p>RNO is to go to step 2</p>
	SRO	<p>Step 2, E-3</p> <p>IDENTIFY RUPTURED SG(s):</p> <ul style="list-style-type: none"> <li>• Unexpected rise in any SG narrow range level</li> <li>OR</li> <li>• High radiation from any SG MS line monitor</li> <li>OR</li> <li>• High radiation from any SG blowdown line</li> <li>OR</li> <li>• High radiation from any SG sample</li> </ul> <p>Team identifies 'B' SG NR level rising unexpectedly.</p>

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Event Description: SGTR 'B' SG of 360 gpm (AP-16.00, E-0, E-3)

Cue: Examiner.

	SRO	<p>Step 3, E-3</p> <p>CAUTION:</p> <ul style="list-style-type: none"><li>• If the TD AFW pump is the only available source of feed flow, steam supply to the TD AFW pump must be maintained from at least one SG.</li><li>• At least one SG must be maintained available for RCS cooldown.</li></ul>
	RO	<p>3. ISOLATE RUPTURED SG(s):</p> <ul style="list-style-type: none"><li>a) Adjust ruptured SG PORV controller setpoint to 1035 psig</li><li>b) Check ruptured SG(s) PORV – CLOSED</li><li>c) Verify blowdown TVs from ruptured SG(s) – CLOSED</li><li>d) Locally close steam supply valve(s) to TD AFW pump:<ul style="list-style-type: none"><li>• 1-MS-120 for 'B' SG</li></ul></li></ul> <p><i>If 1-MS-120 not closed iaw attachment 9 of 1-E-0, then a field operator will be dispatched to close it at this time.</i></p> <ul style="list-style-type: none"><li>e) <b>Close ruptured SG(s) MSTV (B)</b></li></ul>

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Event Description: SGTR 'B' SG of 360 gpm (AP-16.00, E-0, E-3)

Cue: Examiner.

	SRO	Step 4, E-3
		CAUTION: If any ruptured SG is faulted, feed flow to that SG should remain isolated during subsequent recovery actions unless needed for RCS cooldown.
		* CHECK RUPTURED SG LEVEL:
		a) Narrow range level – GREATER THAN 12% [18%]
	RO	b) Stop feed flow to ruptured SG(s) Identifies 'B' SG level >12%, closes 1-FW-MOV-151C/D to isolate AFW Flow
		<b>CT-4: Isolate feedwater flow into the ruptured S/G before S/G 'B' NR reaches 100%. Note: Isolation of FW occurs at this step or may have been completed while performing Attachment 9 of E-0.</b>
	RO	c) Check ruptured SG AFW MOVs auto-open signal – DEFEATED <i>Identifies auto-open signal not defeated, SRO goes to Step 4 c) RNO</i> <b>NOTE: BOP may have performed the following LAW Attachment 9.</b>
		1) Select the ruptured SG AFW MOVs using the following switches: • <b>H TRAIN DISABLE SELECTOR SWITCH</b> • <b>J TRAIN DISABLE SELECTOR SWITCH</b>
		2) Defeat the auto-open signal for the selected MOVs by placing the following key switches in the DISABLE SELECTED position:  • <b>H TRAIN AUTO OPEN ENABLE SWITCH</b> • <b>J TRAIN AUTO OPEN ENABLE SWITCH</b>
	SRO	Step 5, E-3
		CAUTION: Major steam flow paths from the ruptured SG(s) should be isolated before initiating RCS cooldown.
		CHECK RUPTURED SG(S) PRESSURE - GREATER THAN 350 PSIG
	RO	<i>Identifies 'B' SG pressure ~ 1000 psig.</i>

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Event Description: SGTR 'B' SG of 360 gpm (AP-16.00, E-0, E-3)

Cue: Examiner.

	SRO RO SRO	<p>Step 6, E-3</p> <p>* CHECK LOW PRZR PRESS SI SIGNAL – BLOCKED</p> <ul style="list-style-type: none"> <li>• Permissive Status light C-2 - LIT</li> </ul> <p><i>Identifies PSL C2 NOT LIT. (May or may not be LIT)</i></p> <p><u>WHEN</u> PRZR pressure less than 2000 psig, <u>THEN</u> do the following:</p> <ol style="list-style-type: none"> <li>Turn both LO PRZR PRESS &amp; STM HDR/LINE ΔP switches to block.</li> <li>Check Permissive Status light C-2 - LIT.</li> </ol> <p><b>NOTE:</b> BOP may have completed this action in E-0, Attachment 1.</p>
	SRO RO SRO	<p>Step 7, E-3</p> <p>CHECK LOW TAVE SI SIGNAL – BLOCKED</p> <ul style="list-style-type: none"> <li>• Permissive Status light F-1 - LIT</li> </ul> <p><i>Identifies PSL F1 NOT LIT. (May or may not be LIT)</i></p> <p><u>WHEN</u> Tave less than 543°F, <u>THEN</u> do the following:</p> <ol style="list-style-type: none"> <li>Turn both HI STM FLOW &amp; LO TAVG OR LP switches to block.</li> <li>Check Permissive Status light F-1 - LIT.</li> </ol> <p><b>NOTE:</b> BOP may have completed this action in E-0, Attachment 1.</p>
	SRO	<p>Step 8, E-3</p> <p><b>CAUTION:</b> • Flow on each Main Steamline should be kept less than <math>1.0 \times 10^6</math> PPH to prevent Main Steamline isolation during RCS cooldown with the Steam Dumps.</p> <ul style="list-style-type: none"> <li>• If no RCPs are running, RCS cooldown and depressurization may cause a false Integrity Status Tree indication on the ruptured loop. The Cold Leg indication on the ruptured loop should be disregarded until after the performance of Step 36.</li> </ul> <p><b>NOTE:</b> RCP trip criteria does NOT apply after initiation of an operator controlled cooldown.</p>

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Event Description: SGTR 'B' SG of 360 gpm (AP-16.00, E-0, E-3)

Cue: Examiner.

	SRO/BOP																																					
		Step 8, E-3, Continued																																				
	RO	INITIATE RCS COOLDOWN:																																				
		a) Determine required core exit temperature (ONE TIME):																																				
	RO	<table><tr><th colspan="3">LOWEST RUPTURED SG PRESSURE (PSIG)</th><th>CORE EXIT TEMPERATURE (°F)</th></tr><tr><td>BETWEEN</td><td>1001 AND</td><td>1085</td><td>495 [440]</td></tr><tr><td>BETWEEN</td><td>901 AND</td><td>1000</td><td>485 [430]</td></tr><tr><td>BETWEEN</td><td>801 AND</td><td>900</td><td>470 [415]</td></tr><tr><td>BETWEEN</td><td>701 AND</td><td>800</td><td>455 [400]</td></tr><tr><td>BETWEEN</td><td>601 AND</td><td>700</td><td>440 [385]</td></tr><tr><td>BETWEEN</td><td>501 AND</td><td>600</td><td>420 [365]</td></tr><tr><td>BETWEEN</td><td>401 AND</td><td>500</td><td>400 [345]</td></tr><tr><td>BETWEEN</td><td>350 AND</td><td>400</td><td>385 [335]</td></tr></table>	LOWEST RUPTURED SG PRESSURE (PSIG)			CORE EXIT TEMPERATURE (°F)	BETWEEN	1001 AND	1085	495 [440]	BETWEEN	901 AND	1000	485 [430]	BETWEEN	801 AND	900	470 [415]	BETWEEN	701 AND	800	455 [400]	BETWEEN	601 AND	700	440 [385]	BETWEEN	501 AND	600	420 [365]	BETWEEN	401 AND	500	400 [345]	BETWEEN	350 AND	400	385 [335]
LOWEST RUPTURED SG PRESSURE (PSIG)			CORE EXIT TEMPERATURE (°F)																																			
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BETWEEN	401 AND	500	400 [345]																																			
BETWEEN	350 AND	400	385 [335]																																			
	RO																																					
	RO																																					
	SRO	<p><b>Concur Target CETC temperature 485 °F if SG pressure between 901 and 1000 psig, or 495° if SG pressure between 1001 and 1085 psig.</b></p>																																				
		<b>b) Place Steam Dump Mode Select switch in Steam Pressure mode</b>																																				
	RO	c) Check RCS Tave - LESS THAN 543°F																																				
		<b>d) Place the STM DUMP CNTRL switch in BYP INTLTK and then return to ON.</b>																																				
	RO	e) Check Bypass Status light D-2 – LIT																																				
	SRO	<p><b>f) Dump steam to condenser from intact SG(s) at maximum rate</b></p> <p>g) Check CETCs - LESS THAN REQUIRED TEMPERATURE</p> <p><i>When RCS Temperature &lt; 543°F, SRO will direct the block of HSF SI and check of PSL F1 LIT.</i></p> <p><i>When RCS pressure &lt; 2000 psig, SRO will direct the block of Low Pressure/Header-to-Line SI Signal, and check the PSL C2 LIT.</i></p> <p><b>Performs the Block of SI Signals and check of PSLs when directed.</b></p>																																				
		h) Stop RCS cooldown																																				
		<b>When target CETC Temperature reached, RO throttles back on steam dumps.</b>																																				
		i) Maintain CETCs - LESS THAN REQUIRED TEMPERATURE																																				
		<i>SRO will direct a band for control of CETC temperature.</i>																																				



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	SRO	<p>Step 9, E-3</p> <p>CHECK INTACT SG LEVELS:</p> <ul style="list-style-type: none"> <li>a) Any narrow range level – GREATER THAN 12% [18%]</li> <li>b) Check emergency buses – BOTH ENERGIZED</li> <li>c) Control feed flow to maintain narrow range level between 22% and 50%</li> </ul>
	RO/BOP	<p><b>Adjust AFW to restore “A” and “C” SG NR Level to 22-50%.</b></p>
	SRO	<p>Step 10, E-3</p> <p>CAUTION: If any PRZR PORV opens because of high PRZR pressure, the PORV must be verified closed or isolated after pressure decreases to less than 2335 psig.</p> <p>*CHECK PRZR PORVs AND BLOCK VALVES:</p> <ul style="list-style-type: none"> <li>a) Power to PRZR PORV block valves – AVAILABLE</li> <li>b) PRZR PORVs – CLOSED</li> <li>c) PRZR PORV block valves - AT LEAST ONE OPEN</li> </ul> <div style="border: 1px solid black; padding: 5px;"> <p>Evaluator Note: The Block Valve 1-RC-MOV-1535 failed at step 1 therefore the only PORV/Block valve available would be PORV 1-RC-PCV-1455C and Block Valve 1-RC-MOV-1536.</p> </div>
	SRO	<p>Step 11. E-3</p> <p>RESET BOTH TRAINS OF SI</p>
	RO	<p><i>Push SI Reset Pushbuttons. SI previously reset.</i></p>
	SRO	<p>Step 12, E-3</p> <p>RESET CLS:</p> <ul style="list-style-type: none"> <li>a) Check CTMT pressure – HAS EXCEEDED 17.7 psia</li> </ul>
	RO	<p><i>Report No, CTMT has not exceeded 17.7 psia.</i></p> <p>RNO a) GO TO Step 13.</p>

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Event Description: SGTR 'B' SG of 360 gpm (AP-16.00, E-0, E-3)

Cue: Examiner.

	SRO	Step 13, E-3
		CHECK INSTRUMENT AIR AVAILABLE:
		a) Check annunciator B-E-6 - NOT LIT
	RO	<i>Report Yes, B-E-6 Not Lit.</i>
		b) Check at least one CTMT IA compressor – RUNNING
		• 1-IA-C-4A or 1-IA-C-4B
	RO	<i>Report Yes, 1-IA-C-4A running</i>
		c) Check 1-IA-TV-100 – OPEN
	RO	<i>Report Yes, 1-IA-TV-100 open.</i>
	SRO	Step 14, E-3
		ALIGN CONDENSER AIR EJECTOR TO CTMT:
		a) Check the following:
		• 1-SV-TV-102 – OPEN
		• 1-SV-TV-103 – CLOSED
		b) Open the following valve:
		• 1-SV-TV-102A
	RO/BOP	<b>Opens 1-SV-TV-102A.</b>

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Event Description: SGTR 'B' SG of 360 gpm (AP-16.00, E-0, E-3)

Cue: Examiner.

	SRO	Step 15, E-3  CAUTION: RCS pressure should be monitored. If RCS pressure decreases in an uncontrolled manner to less than 250 psig [400 psig], one LHSI pump must be manually restarted to supply water to the RCS.  *CHECK IF LHSI PUMPS SHOULD BE STOPPED:  a) Check LHSI pumps - ANY RUNNING WITH SUCTION ALIGNED TO RWST  RO <i>Reports 1 LHSI pump running with suction aligned to RWST.</i>  b) RCS pressure – GREATER THAN 250 PSIG [400 PSIG]  RO <i>Reports RCS pressure greater than 250 psig.</i>  c) Stop LHSI pumps and put in AUTO  RO <b>Stops running LHSI pump and places in AUTO.</b>
	SRO RO/BOP  RO/BOP  RO/BOP	Step 16, E-3  CHECK IF RCS COOLDOWN SHOULD BE STOPPED: a) Check CETCs - LESS THAN REQUIRED TEMPERATURE <i>Reports CETCs &lt; required temperature</i>  b) Stop RCS cooldown <i>Reports RCS Coodown stopped.</i>  c) Maintain CETCs - LESS THAN REQUIRED TEMPERATURE <i>Reports that RCS temperature being maintained in required band.</i>
	SRO  BOP	Step 17, E-3  CHECK RUPTURED SG(s) PRESSURE - STABLE OR INCREASING  Reports "B" SG pressure stable.
	SRO  BOP	Step 18. E-3  CHECK RCS SUBCOOLING BASED ON CETCs - GREATER THAN 50°F [105°F]  Reports indicated subcooling value.

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Event Description: SGTR 'B' SG of 360 gpm (AP-16.00, E-0, E-3)

Cue: Examiner.

	SRO	<p>Step 19, E-3</p> <p>DEPRESSURIZE RCS TO MINIMIZE BREAK FLOW AND REFILL PRZR:</p> <p>a) Check normal spray – AVAILABLE</p> <ul style="list-style-type: none"> <li>• RCP C AND 1-RC-PCV-1455B - BOTH AVAILABLE</li> <li>OR</li> <li>• RCPs A and B, AND 1-RC-PCV-1455A – BOTH AVAILABLE</li> </ul>
	RO	<p><i>Identifies No pressurizer spray available, SRO Goes To Step 20.</i></p> <p><i>Note: RCPS tripped when reactor tripped and generator output breakers opened.</i></p>
	SRO	<p>Step 20, E-3</p> <p>CAUTION: • The PRT may rupture if a PRZR PORV is used for RCS depressurization. Rupturing the PRT may result in abnormal containment conditions.</p> <ul style="list-style-type: none"> <li>• Cycling of the PRZR PORV should be minimized.</li> </ul> <p>NOTE: The upper head region may void during RCS depressurization if RCPs are not running. This will result in a rapidly increasing PRZR level.</p> <p>DEPRESSURIZE RCS USING PRZR PORV TO MINIMIZE BREAK FLOW AND REFILL PRZR:</p> <p>a) PRZR PORV - AT LEAST ONE AVAILABLE</p> <p>b) Open one PRZR PORV until ANY of the following conditions satisfied: (Attachment 3 lists conditions)</p> <ul style="list-style-type: none"> <li>• PRZR level - GREATER THAN 69%</li> <li>OR</li> <li>• RCS subcooling based on CETCs - LESS THAN 30°F [85°F]</li> <li>OR</li> <li>• BOTH of the following exist: <ul style="list-style-type: none"> <li>1) RCS pressure - LESS THAN RUPTURE SG(s) PRESSURE</li> <li>2) PRZR level - GREATER THAN 22% [50%]</li> </ul> </li> </ul>
	RO	<p><b>When Attempt Made to open 1-RC-PCV-1455C, PCV will Not Open.</b></p>
	SRO	<p><b>Transition to ECA-3.3</b></p>
		<p><b>End EVENT #6</b></p>

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Event Description: SGTR SG of 360 gpm. E-0 ATTACHMENT 2

Cue: Examiner.

Time	Position	Applicant's Action or Behavior
	BOP	<b>ATTACHMENT 2 of 1-E-0</b>  <b>NOTE:</b> Components previously aligned by SI termination steps, must not be realigned by this Attachment.
	BOP	<b>ATTACHMENT 2 of 1-E-0</b>  1. Check opened or open CHG pump suction from RWST MOVs. <ul style="list-style-type: none"> <li>1-CH-MOV-1115B</li> <li>1-CH-MOV-1115D</li> </ul>
	BOP	<b>ATTACHMENT 2 of 1-E-0</b>  2. Check closed or close CHG pump suction from VCT MOVs. <ul style="list-style-type: none"> <li>1-CH-MOV-1115C</li> <li>1-CH-MOV-1115E</li> </ul>
	BOP	<b>ATTACHMENT 2 of 1-E-0</b>  3. Check running or start at least two CHG pumps. (listed in preferred order) <ul style="list-style-type: none"> <li>1-CH-P-1C</li> <li>1-CH-P-1B</li> <li>1-CH-P-1A</li> </ul> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <b>CT-3: Restore HHSI flow to the core prior to exiting E-0.</b> Total loss of HHSI: 1-CH-P-1C trips on overcurrent immediately after reactor trip. 1-CH-P-1A, and 1B fail to auto start.         </div>
	BOP	<b>ATTACHMENT 2 of 1-E-0</b>  4. Check opened or open HHSI to cold legs MOVs. <ul style="list-style-type: none"> <li>1-SI-MOV-1867C</li> <li>1-SI-MOV-1867D</li> </ul>
	BOP	<b>ATTACHMENT 2 of 1-E-0</b>  5. Check closed or close CHG line isolation MOVs. <ul style="list-style-type: none"> <li>1-CH-MOV-1289A</li> <li>1-CH-MOV-1289B</li> </ul>

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Event Description: SGTR SG of 360 gpm. E-0 ATTACHMENT 2

Cue: Examiner.

	BOP	<b>ATTACHMENT 2 of 1-E-0</b>  6. Check closed or close Letdown orifice isolation valves.  <ul style="list-style-type: none"><li>• 1-CH-HCV-1200A</li><li>• 1-CH-HCV-1200B</li><li>• 1-CH-HCV-1200C</li></ul> <b>RO/BOP will CLOSE 1-CH-HCV-1200A and 1-CH-HCV-1200B</b>
	BOP	ATTACHMENT 2 of 1-E-0  7. Check opened or open LHSI suction from RWST MOVs.  <ul style="list-style-type: none"><li>• 1-SI-MOV-1862A</li><li>• 1-SI-MOV-1862B</li></ul>
	BOP	ATTACHMENT 2 of 1-E-0  8. Check opened or open LHSI to cold legs MOVs.  <ul style="list-style-type: none"><li>• 1-SI-MOV-1864A</li><li>• 1-SI-MOV-1864B</li></ul>
	BOP	ATTACHMENT 2 of 1-E-0  10. check High Head SI flow to cold legs indicated.  <ul style="list-style-type: none"><li>• 1-SI-FI-1961</li><li>• 1-SI-FI-1962</li><li>• 1-SI-FI-1963</li><li>• 1-SI-FI-1943 or 1-SI-FI-1943A</li></ul>
	BOP	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.  <ul style="list-style-type: none"><li>• Alternate SI to Cold legs</li><li>• Hot leg injection</li></ul>

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Event No.: 6

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Event Description: SGTR SG of 360 gpm. E-0 ATTACHMENT 9

Cue: Examiner.

	RO/BOP	<p>ATTACHMENT 9 of 1-E-0</p> <p>1. Check SI is in progress. If SI is not in progress, then return to procedure step in effect.</p> <p>RO/BOP identifies that SI is in progress.</p>
	RO/BOP	<p>ATTACHMENT 9 of 1-E-0</p> <p>2. Identify Ruptured SG by one of the following conditions:</p> <ul style="list-style-type: none"> <li>• Unexpected rise in any SG Narrow Range level</li> <li>• High radiation from any SG MS line monitor</li> <li>• High radiation from any SG Blowdown line</li> </ul> <p>With SRO concurrence identifies 'B' SG as the ruptured SG</p>
	RO/BOP	<p>ATTACHMENT 9 of 1-E-0</p> <p>3. Check running or start AFW Pumps, as necessary</p> <ul style="list-style-type: none"> <li>• 1-FW-P-3A</li> <li>• 1-FW-P3B</li> <li>• 1-FW-P-2</li> </ul>
	RO/BOP	<p>ATTACHMENT 9 of 1-E-0</p> <p>4. Maintain feed flow to ruptured SG until level greater than 12% [18%]. GO TO Step 2. <u>WHEN</u> ruptured SG(s) Narrow Range level greater than 12% [18%], <u>THEN</u> then isolate feed flow by closing ruptured SG(s) AFW Isolation MOVs:</p> <ul style="list-style-type: none"> <li>• SG B, 1-FW-MOV-151C and 1-FW-MOV-151D</li> </ul> <p><b>RO/BOP closes 1-FW-MOV-151C/D when SG level is greater than 12% Narrow Range.</b></p> <div style="border: 1px solid black; padding: 5px;"> <p><b>CT-4: Isolate feedwater flow into the ruptured S/G before S/G 'B' NR reaches 100%. Note: Isolation of FW occurs at this step or may have been completed while performing E-3, step 4.</b></p> </div>
	RO/BOP	<p>ATTACHMENT 9 of 1-E-0</p> <p>5. Select the ruptured SG AFW MOVs using the following switches:</p> <ul style="list-style-type: none"> <li>• H TRAIN DISABLE SELECTOR SWITCH</li> <li>• J TRAIN DISABLE SELECTOR SWITCH</li> </ul>

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Event No.: 6

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Event Description: SGTR SG of 360 gpm. E-0 ATTACHMENT 9

Cue: Examiner.

	RO/BOP	<p>ATTACHMENT 9 of 1-E-0</p> <p>6. Disable the auto-open signal for the selected MOVs by placing the following keyswitches in the DISABLE SELETED position:</p> <ul style="list-style-type: none"><li>• H TRAIN AUTO OPEN ENABLE SWITCH</li><li>• J TRAIN AUTO OPEN ENABLE SWITCH</li></ul>
	RO/BOP	<p>ATTACHMENT 9 of 1-E-0</p> <p>CAUTION: At least one SG must be maintained available for RCS heat sink.</p> <p>7. Locally close steam supply valve to the TD AFW pump:</p> <ul style="list-style-type: none"><li>• 1-MS-120</li></ul> <p>RO/BOP directs field operator to close 1-MS-120.</p> <p><i>The field operator will acknowledge the requirement to close 1-MS-120. The field operator will later report that 1-MS-120 is closed.</i></p> <p>Note: This step is also accomplished by E-3, step 3.</p>
	RO/BOP	<p>ATTACHMENT 9 of 1-E-0</p> <p>8. Control Feed Flow to the SG IAW the following requirements:</p> <ul style="list-style-type: none"><li>• Minimum AFW flow is 350 gpm with SI initiated, until one SG Narrow Range level is greater than 12%</li><li>• When minimum heat sink has been verified, AFW MOVs should be controlled to maintain intact SG Narrow Range levels between 22% and 50%.<ul style="list-style-type: none"><li>• SG A, 1-FW-MOV-151E and 1-FW-MOV-151F</li><li>• SG C, 1-FW-MOV-151A and 1-FW-MOV-151B</li></ul></li></ul>
		<b>End EVENT #6</b>



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Scenario No.: 1

Event No.: 7

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Event Description: 1-RC-PCV-1455C fails to open. (1-ECA-3.3)

Cue: Pre-Event Failures.

Time	Position	Applicant's Action or Behavior
	SRO	<b>1-ECA-3.3 Actions</b>  The team will hold a transition brief. During the brief it will be identified that 'B' SG is ruptured, isolated, and unable to depressurize RCS normally. ECA-3.3 will provide actions to mitigate SGTR w/o Pressurizer pressure control.  The SRO will hand out ECA-3.3 Continuous Action Page (located at Event 9).  <i>The STA will state that he has nothing to add to the brief.</i>
	SRO  RO	Step 1, ECA-3.3 CAUTION: If no RCPs were running during the cooldown performed in 1-E-3, SI flow may cause a false Integrity Status Tree indication on the ruptured loop. The Cold Leg indication on the ruptured loop should be disregarded until after the performance of Step 21.  1. CHECK RUPTURED SG(S) NARROW RANGE LEVEL - LESS THAN 75% [73%]  <i>Reports that 'B' SG Level is greater than 75%.</i>  1. RNO - GO TO Step 6

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Scenario No.: 1

Event No.: 7

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Event Description: 1-RC-PCV-1455C fails to open. (1-ECA-3.3)

Cue: Pre-Event Failures.

	<p>SRO</p> <p>RO/BOP</p> <p>RO/BOP</p> <p>RO/BOP</p> <p>RO/BOP</p> <p>BOP</p>	<p>Step 6, ECA-3.3</p> <p>6. CHECK IF SI CAN BE TERMINATED:</p> <p>a) Check RCS subcooling based on CETCs - GREATER THAN 30°F [85°F]</p> <p><i>Identifies that RCS subcooling is greater than 30°F.</i></p> <p>b) Check secondary heat sink:</p> <ul style="list-style-type: none"> <li>Total feed flow to SGs – GREATER THAN 350 GPM [450 GPM] AVAILABLE</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>Narrow range level in at least one intact SG - GREATER THAN 12% [18%]</li> </ul> <p><i>Identifies That &gt;350 gpm AFW Available, and “A” and “C” SG NR level &gt;12%.</i></p> <p>c) Check RVLIS indication - GREATER THAN VALUE FROM TABLE</p> <table border="1"> <thead> <tr> <th rowspan="2">RCPs Running</th><th colspan="2">RVLIS INDICATION</th></tr> <tr> <th>Full Range</th><th>Dynamic Range</th></tr> </thead> <tbody> <tr> <td>0</td><td>GREATER THAN 63%</td><td></td></tr> <tr> <td>1</td><td></td><td>GREATER THAN 36%</td></tr> <tr> <td>2</td><td></td><td>GREATER THAN 51%</td></tr> <tr> <td>3</td><td></td><td>GREATER THAN 82%</td></tr> </tbody> </table> <p><i>Identify that RVLIS Full Range is Greater than 63%.</i></p> <p>d) Check any ruptured SG narrow range level - INCREASING IN AN UNCONTROLLED MANNER OR OFFSCALE HIGH</p> <p><i>BOP will identify that ‘B’ SG Level is Off-Scale High, or rising uncontrollably.</i></p>	RCPs Running	RVLIS INDICATION		Full Range	Dynamic Range	0	GREATER THAN 63%		1		GREATER THAN 36%	2		GREATER THAN 51%	3		GREATER THAN 82%
RCPs Running	RVLIS INDICATION																		
	Full Range	Dynamic Range																	
0	GREATER THAN 63%																		
1		GREATER THAN 36%																	
2		GREATER THAN 51%																	
3		GREATER THAN 82%																	
	<p>SRO</p> <p>RO</p>	<p>Step 7, ECA-3.3</p> <p>7. STOP ALL BUT ONE CHG PUMP AND PUT IN AUTO</p> <p><b>Secure one of the running charging pumps.</b></p>																	

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Event No.: 7

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Event Description: 1-RC-PCV-1455C fails to open. (1-ECA-3.3)

Cue: Pre-Event Failures.

	SRO	Step 8, ECA-3.3
	RO	8. ISOLATE HHSI TO COLD LEGS:
		a) Verify the following:
		1) CHG pump suctions from RWST - OPEN
		<ul style="list-style-type: none"> <li>• 1-CH-MOV-1115B</li> <li>• 1-CH-MOV-1115D</li> </ul>
		2) Check CHG pump miniflow recirc valves - OPEN
		<ul style="list-style-type: none"> <li>• 1-CH-MOV-1275A</li> <li>• 1-CH-MOV-1275B</li> <li>• 1-CH-MOV-1275C</li> <li>• 1-CH-MOV-1373</li> </ul>
	RO	b) Close HHSI to Cold Leg:
		<ul style="list-style-type: none"> <li>• <b>1-SI-MOV-1867C</b></li> <li>• <b>1-SI-MOV-1867D</b></li> <li>• 1-SI-MOV-1842</li> </ul>
	SRO	Step 9, ECA-3.3
	RO	9. ESTABLISH CHARGING FLOW:
		a) Close CHG flow control:
		• <b>1-CH-FCV-1122</b>
		a)
		b) Check CHG line isolation - OPEN
		• <i>1-CH-HCV-1310A</i>
	RO	c) Open CHG line isolation MOVs
		• <b>1-CH-MOV-1289A</b>
		• <b>1-CH-MOV-1289B</b>
	RO	d) Establish at least 40 gpm charging flow using CHG flow control

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**Cue: Pre-Event Failures.**

	SRO	<p>Step 10, ECA-3.3</p> <p>10. CHECK SI FLOW NOT REQUIRED:</p> <ul style="list-style-type: none"> <li>• RCS subcooling based on CETCs - GREATER THAN 30°F [85°F]</li> <li>• Check RVLIS indication – GREATER THAN VALUE FROM TABLE</li> </ul>																
	RO	<table border="1"> <thead> <tr> <th rowspan="2">RCPs Running</th> <th colspan="2">RVLIS INDICATION</th> </tr> <tr> <th>Full Range</th> <th>Dynamic Range</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>GREATER THAN 63%</td> <td></td> </tr> <tr> <td>1</td> <td></td> <td>GREATER THAN 36%</td> </tr> <tr> <td>2</td> <td></td> <td>GREATER THAN 51%</td> </tr> <tr> <td>3</td> <td></td> <td>GREATER THAN 82%</td> </tr> </tbody> </table> <p><i>Reports Full Range RVLIS &gt;63%.</i></p>	RCPs Running	RVLIS INDICATION		Full Range	Dynamic Range	0	GREATER THAN 63%		1		GREATER THAN 36%	2		GREATER THAN 51%	3	
RCPs Running	RVLIS INDICATION																	
	Full Range	Dynamic Range																
0	GREATER THAN 63%																	
1		GREATER THAN 36%																
2		GREATER THAN 51%																
3		GREATER THAN 82%																
		<p><b>END Event 7</b></p> <p><b>End Scenario</b></p>																

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Event No.: 8

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Event Description: BOP Failures. 1-CH-P-1A,B fail to auto start, 1-CH-P-1C trips on overcurrent; 1-SI-P-1B not auto start, 1-CH-HCV-1200 A/B not close, 1-VS-MOV-103A not close, 1-MS-TV-109 and 1-DA-TV-100 A/B not close.

**E-0 ATTACHMENT 1****Cue: Pre-load Malfunctions**

Time	Position	Applicant's Action or Behavior
	BOP	<b>ATTACHMENT 1 OF E-0</b>  1. CHECK FW ISOLATION: <ul style="list-style-type: none"> <li>• Feed pump discharge MOVs – CLOSED</li> <li>• 1-FW-MOV-150A</li> <li>• 1-FW-MOV-150B</li> <li>• MFW pumps – TRIPPED</li> <li>• Feed REG valves – CLOSED</li> <li>• SG FW bypass flow valves – DEMAND AT ZERO</li> <li>• SG blowdown TVs – CLOSED</li> </ul>
	BOP	2. CHECK CTMT ISOLATION PHASE I: <ul style="list-style-type: none"> <li>• Phase I TVs – CLOSED</li> <li>• 1-CH-MOV-1381 – CLOSED</li> <li>• 1-SV-TV-102A – CLOSED</li> <li>• PAM isolation valves – CLOSED               <ul style="list-style-type: none"> <li>• 1-DA-TV-103A</li> <li>• 1-DA-TV-103B</li> </ul> </li> </ul> <b>Will identify 1-DA-TV-100A/B, and 1-MS-TV-109 OPEN and CLOSE them.</b>
	BOP	3. CHECK AFW PUMPS RUNNING: <ul style="list-style-type: none"> <li>a) MD AFW pumps – RUNNING (Time Delayed)</li> <li>b) TD AFW pump - RUNNING IF NECESSARY</li> </ul>

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Event Description: BOP Failures. 1-CH-P-1A,B fail to auto start, 1-CH-P-1C trips on overcurrent; 1-SI-P-1B not auto start, 1-CH-HCV-1200 A/B not close, 1-VS-MOV-103A not close, 1-MS-TV-109 and 1-DA-TV-100 A/B not close.

**E-0 ATTACHMENT 1****Cue: Pre-load Malfunctions**

	BOP	<p><b>Attachment 1 of E-0</b></p> <p>4. CHECK SI PUMPS RUNNING:</p> <ul style="list-style-type: none"> <li>• CHG pumps – RUNNING</li> <li>• LHSI pumps – RUNNING</li> </ul> <p><b>Starts HHSI pumps 1-CH-P-1A, and B. Starts LHSI pump 1-SI-P-1B.</b></p> <div style="border: 1px solid black; padding: 5px;"> <p><b>CT-3: Restore HHSI flow to the core prior to exiting E-0. Total loss of HHSI: 1-CH-P-1C trips on overcurrent immediately after reactor trip. 1-CH-P-1A, and 1B fail to auto start.</b></p> </div>
	BOP	<p>5. CHECK CHG PUMP AUXILIARIES:</p> <ul style="list-style-type: none"> <li>• CHG pump CC pump – RUNNING</li> <li>• CHG pump SW pump - RUNNING</li> </ul>
	BOP	<p>6. CHECK INTAKE CANAL:</p> <ul style="list-style-type: none"> <li>• Level - GREATER THAN 24 FT</li> <li>• Level - BEING MAINTAINED BY CIRC WATER PUMPS</li> </ul>
	BOP	<p>7. CHECK IF MAIN STEAMLINES SHOULD BE ISOLATED:</p> <p>a) Check if ANY of the following annunciators - HAVE BEEN LIT</p> <ul style="list-style-type: none"> <li>• E-F-10 (High Steam Flow SI)</li> <li>• B-C-4 (Hi Hi CLS Train A)</li> <li>• B-C-5 (Hi Hi CLS Train B)</li> </ul> <p>Identifies annunciators not lit and goes to step 8.</p>

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Event Description: BOP Failures. 1-CH-P-1A,B fail to auto start, 1-CH-P-1C trips on overcurrent; 1-SI-P-1B not auto start, 1-CH-HCV-1200 A/B not close, 1-VS-MOV-103A not close, 1-MS-TV-109 and 1-DA-TV-100 A/B not close.

**E-0 ATTACHMENT 1****Cue: Pre-load Malfunctions**

	BOP	<b>Attachment 1 of E-0</b>  *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.
	BOP	*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  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

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Event Description: BOP Failures. 1-CH-P-1A,B fail to auto start, 1-CH-P-1C trips on overcurrent; 1-SI-P-1B not auto start, 1-CH-HCV-1200 A/B not close, 1-VS-MOV-103A not close, 1-MS-TV-109 and 1-DA-TV-100 A/B not close.

**E-0 ATTACHMENT 1****Cue: Pre-load Malfunctions**

	BOP	<p><b>Attachment 1 of E-0</b></p> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• CHG pumps should be run in the following order of priority: C, B, A.</li> <li>• Subsequent SI signals may be reset by re-performing Step 12.</li> </ul> <p>12. CHECK SI FLOW:</p> <p>a) HHSI to cold legs - FLOW INDICATED</p> <ul style="list-style-type: none"> <li>• 1-SI-FI-1961 (NQ)</li> <li>• 1-SI-FI-1962 (NQ)</li> <li>• 1-SI-FI-1963 (NQ)</li> <li>• 1-SI-FI-1943 or 1-SI-FI-1943A</li> </ul> <p>b) Check CHG pumps - THREE RUNNING <i>No go to step 12e. (1-CH-P-1C tripped on overcurrent)</i></p> <p>12e) RCS pressure - LESS THAN 185 PSIG</p> <p>RNO: e) IF one LHSI pump running, <u>THEN</u> GO TO Step 13:</p>
	BOP	13. CHECK TOTAL AFW FLOW - GREATER THAN 350 GPM [450 GPM]
	BOP	<p>14. CHECK AFW MOVs - OPEN</p> <p>Will identify that all AFW MOVs are not open and will read the RNO portion of this step and manually align valves as necessary.</p>
	BOP	<p>15. INITIATE SI VALVE ALIGNMENT IAW ATTACHMENT 2</p> <p>See attached copy of Attachment 2. (Next page of this guide)</p> <p>Depending on timing, this attachment may have already been completed.</p>



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Event Description: BOP Failures. 1-CH-P-1A,B fail to auto start, 1-CH-P-1C trips on overcurrent; 1-SI-P-1B not auto start, 1-CH-HCV-1200 A/B not close, 1-VS-MOV-103A not close, 1-MS-TV-109 and 1-DA-TV-100 A/B not close.

**E-0 ATTACHMENT 1****Cue: Pre-load Malfunctions**

	BOP	<p><b>Attachment 1 of E-0</b></p> <p>16. INITIATE VENTILATION, AC POWER, AND SFP STATUS CHECKS IAW ATTACHMENT 3</p> <p><i>Attachment 3 follows Attachment 2.</i></p> <p><b>Identify failure of 1-VS-MOD-103A CLOSES the MOD.</b></p> <p><i>Unit 2 Operator will state that Unit 2 is at 100% power (if asked)</i></p> <p><i>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.</i></p>
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Event Description: BOP Failures. 1-CH-P-1A,B fail to auto start, 1-CH-P-1C trips on overcurrent; 1-SI-P-1B not auto start, 1-CH-HCV-1200 A/B not close, 1-VS-MOV-103A not close, 1-MS-TV-109 and 1-DA-TV-100 A/B not close.

**E-0 ATTACHMENT 3****Cue: Pre-load Malfunctions**

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**

<u>MARK NUMBER</u>	<u>EQUIPMENT STATUS</u>
<input type="checkbox"/> 1-VS-F-4A & B	OFF
<input type="checkbox"/> 1-VS-HV-1A & B	OFF
<input type="checkbox"/> 1-VS-F-8A & B	OFF
<input type="checkbox"/> 1-VS-F-9A & B	GREEN
<input type="checkbox"/> 1-VS-F-59	GREEN
<input type="checkbox"/> 1-VS-F-6	OFF
<input type="checkbox"/> 1-VS-F-39	GREEN
<input type="checkbox"/> 1-VS-F-7A & B	GREEN
<input type="checkbox"/> 1-VS-HV-5	GREEN
<input type="checkbox"/> 1-VS-F-56A & B	GREEN
<input type="checkbox"/> 1-VS-F-40A & B	GREEN
<input type="checkbox"/> 1-VS-HV-4	OFF
<input type="checkbox"/> 2-VS-F-40A or B	RED
<input type="checkbox"/> 2-VS-HV-4	OFF

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Event Description: BOP Failures. 1-CH-P-1A,B fail to auto start, 1-CH-P-1C trips on overcurrent; 1-SI-P-1B not auto start, 1-CH-HCV-1200 A/B not close, 1-VS-MOV-103A not close, 1-MS-TV-109 and 1-DA-TV-100 A/B not close.

**E-0 ATTACHMENT 3****Cue: Pre-load Malfunctions**

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

<u>MARK NUMBER</u>	<u>EXPECTED EQUIPMENT STATUS</u>	<u>RESPONSE NOT OBTAINED</u>
<input type="checkbox"/> a. AOD-VS-107A & B AOD-VS-108	RED GREEN	<input type="checkbox"/> a.Place AUX BLDG CENTRAL AREA MODE switch to FILTER.
<input type="checkbox"/> b. MOD-VS-100A & B AOD-VS-106	RED GREEN	<input type="checkbox"/> b. • Place MOD-VS-100A to FILTER. • Place MOD-VS-100B to FILTER.
<input type="checkbox"/> c. MOD-VS-200A & B AOD-VS-206	GREEN RED	<input type="checkbox"/> c. • Place MOD-VS-200A to UNFILTER. • Place MOD-VS-200B to UNFILTER.
<input type="checkbox"/> d. AOD-VS-103A & B AOD-VS-104	GREEN GREEN	<input type="checkbox"/> d. • Place AOD-VS-103A in UNFILTER. • Place AOD-VS-103B in UNFILTER. • Place AOD-VS-104 in FILTER.
<input type="checkbox"/> e. AOD-VS-101A & B AOD-VS-102	GREEN GREEN	<input type="checkbox"/> e.Place AOD-VS-101A and 101B in UNFILTER.
<input type="checkbox"/> f. AOD-VS-111A & B	GREEN	<input type="checkbox"/> f.Place COMBINE CONTAINMENT EXHAUST in ISOLATE.
<input type="checkbox"/> g. AOD-VS-110	GREEN	<input type="checkbox"/> g.Place AOD-VS-109A and 109B in FILTER.
<input type="checkbox"/> h. AOD-VS-112A & B	GREEN	<input type="checkbox"/> h. • Place AOD-VS-112A in CLOSE. • Place AOD-VS-112B in CLOSE.
<input type="checkbox"/> i. MOD-VS-58A & B 1-VS-F-58A & B	RED RED	<input type="checkbox"/> 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)		
<input type="checkbox"/> • Total flow - GREATER THAN 32400 cfm		
<u>AND</u>		
<input type="checkbox"/> • Flow through each filter bank - LESS THAN 39600 cfm		

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Event Description: BOP Failures. 1-CH-P-1A,B fail to auto start, 1-CH-P-1C trips on overcurrent; 1-SI-P-1B not auto start, 1-CH-HCV-1200 A/B not close, 1-VS-MOV-103A not close, 1-MS-TV-109 and 1-DA-TV-100 A/B not close.

**E-0 ATTACHMENT 3****Cue: Pre-load Malfunctions**

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

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Event Description: BOP Failures. 1-CH-P-1A,B fail to auto start, 1-CH-P-1C trips on overcurrent; 1-SI-P-1B not auto start, 1-CH-HCV-1200 A/B not close, 1-VS-MOV-103A not close, 1-MS-TV-109 and 1-DA-TV-100 A/B not close.

**E-0 ATTACHMENT 3****Cue: Pre-load Malfunctions**

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.

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Event Description: BOP Failures. 1-CH-P-1A,B fail to auto start, 1-CH-P-1C trips on overcurrent; 1-SI-P-1B not auto start, 1-CH-HCV-1200 A/B not close, 1-VS-MOV-103A not close, 1-MS-TV-109 and 1-DA-TV-100 A/B not close.

**E-0 ATTACHMENT 3****Cue: Pre-load Malfunctions**

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

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.

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.

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Event Description: BOP Failures. 1-CH-P-1A,B fail to auto start, 1-CH-P-1C trips on overcurrent; 1-SI-P-1B not auto start, 1-CH-HCV-1200 A/B not close, 1-VS-MOV-103A not close, 1-MS-TV-109 and 1-DA-TV-100 A/B not close.

**E-0 ATTACHMENT 3****Cue: Pre-load Malfunctions**

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.

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.

Note: Unit 2 may be asked to perform tasks on page 6 of Attachment 3

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FOLDOUT PAGES: E-0, E-3, ECA-3.3

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



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FOLDOUT PAGES: E-0, E-3, ECA-3.3

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: E-0, E-3, ECA-3.3

CONTINUOUS ACTIONS PAGE FOR 1-E-31. SI REINITIATION CRITERIA

Manually operate 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%]

IF SI reinitiation occurs after Step 23, THEN GO TO 1-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY.

2. 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

3. SECONDARY INTEGRITY CRITERIA

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, unless needed for RCS cooldown.

4. AFW SUPPLY SWITCHOVER CRITERIA (Refer to Attachment 8)

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.

5. MULTIPLE TUBE RUPTURE CRITERIA

STABILIZE the plant and RETURN TO 1-E-3, STEAM GENERATOR TUBE RUPTURE, Step 1, if any intact SG level rises in an uncontrolled manner or any intact SG has abnormal radiation.

6. 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, annunciator H-D-1 should clear and affected components may be realigned as needed.

7. TD AFW PUMP SHUTDOWN CRITERIA

The TD AFW pump may be secured when SG NR level is greater than 22%, 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.

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FOLDOUT PAGES: E-0, E-3, ECA-3.3

CONTINUOUS ACTIONS PAGE FOR 1-ECA-3.3**1. SI REINITIATION CRITERIA**

Following SI termination or SI flow reduction, manually start SI pumps as necessary and GO TO 1-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, if EITHER condition listed below occurs:

- RCS subcooling based on CETCs - LESS THAN 30°F [85°F]
- RVLIS indication - LESS THAN VALUE FROM TABLE

RCPs Running	RVLIS INDICATION	
	Full Range	Dynamic Range
0	LESS THAN 63%	_____
1	_____	LESS THAN 36%
2	_____	LESS THAN 51%
3	_____	LESS THAN 82%

**2. 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

**3. SECONDARY INTEGRITY CRITERIA**

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 unless needed for RCS cooldown.

**4. AFW SUPPLY SWITCHOVER CRITERIA (Refer to Attachment 7)**

Transfer to one of the following alternate AFW water supplies if ECST level lowers to less than 20%.

- 1-CN-TK-2, using 1-CN-150.
- 1-CN-TK-3, using AFW Booster Pumps.
- AFW Crosstie.
- Firemain.

**5. 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.

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## SIMULATOR OPERATOR'S GUIDE

**Simulator Scenario Checklist**

- ☐ Perform Simulator Turnover Pre-session, and Post-session Checklist prior to the first Scenario of the day.
- ☐ Perform Simulator Turnover Post-session Checklist after the last Scenario of the day.

**Perform/Verify Simulator Setup:**

- ☐ ☐ ☐ Recall IC -391 (100%) **and verify Trigger #30 implemented.**  
**OR**  
Recall Base IC (IC001), Open Schedule, and Event Files for Scenario 1. Run Schedule file, and **implement Trigger 30.**
- ☐ ☐ ☐ Option: Recall Base IC (001), and open Schedule and Event File for 2017 NRC Scenario1. Run Schedule and Event File
- ☐ ☐ ☐ Verify 1-SI-P-1A in Pull-To-Lock, with red (tagged) magnet
- ☐ ☐ ☐ Verify 1-RC-LR-1459 selected to L-461 (ch 3).
- ☐ ☐ ☐ Verify PRZR LVL-CH SEL positioned to CH3/CH2 (Position 3).
- ☐ ☐ ☐ **Enter/Verify the following MALFUNCTIONS:**

Malfunction	Delay	Ramp	Trigger	Value	Final	Trigger Type (Auto or Manual)
RC4903 PRZR LEVEL XMTR CH 3 FAILURE (461)	10	20	1	0.0	-0.2	MANUAL
SD0201 HP HTR DRN PP SD-P-1A TRIPS: OVR CURRENT	10	0	3	FALSE	TRUE	MANUAL
FW1902 B S/G MN FD FLOW CNTRLR FC-488 FAILS	10	300	5	0.0	-1	MANUAL
RC2402 STEAM GENERATOR B TUBE RUPTURE	10	360	7	0.0	40	MANUAL
CH0503 OVER-CURRENT TRIP CHG PUMP CH-P-1C (NRM)	0	0	9	FALSE	TRUE	MANUAL
RC5601 SPURIOUS TRIP RCP 1A	0	0	17	FALSE	TRUE	AUTO
RC5602 SPURIOUS TRIP RCP 1B	0	0	17	FALSE	TRUE	AUTO
RC5603 SPURIOUS TRIP RCP 1C	0	0	17	FALSE	TRUE	AUTO
CH6401 DISABLE CHP1A AUTO START	0	0	30	FALSE	TRUE	MANUAL
CH6402 DISABLE CHP1B AUTO START	0	0	30	FALSE	TRUE	MANUAL
GM0701 MAIN GEN BKR OCB-G102 Auto trip disables.	0	0	30	FALSE	TRUE	MANUAL
GM0702 MAIN GEN BKR OCB-G1T240 Auto trip disables.	0	0	30	FALSE	TRUE	MANUAL

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SI2409 SI RELAY C11A FAILS TO ACTUATE	0	0	30	FALSE	TRUE	MANUAL
SI2505 SI RELAY S15B FAILS TO ACTUATE	0	0	30	FALSE	TRUE	MANUAL
CH54 DISABLE CH-HCV-1200A AUTO CLOSURE	0	0	30	FALSE	TRUE	MANUAL
CH55 DISABLE CH-HCV-1200B AUTO CLOSURE	0	0	30	FALSE	TRUE	MANUAL
FP0301 FPS FACP07 ALARM HORN FAILURE	0	0	30	FALSE	TRUE	MANUAL
FP0302 FPS PC SPEAKER FAILURE	0	0	30	FALSE	TRUE	MANUAL

☐ ☐ ☐ Enter/Verify the following REMOTE FUNCTIONS:

Description	Delay	Ramp	Trigger	Value	Final	Trigger Type (Auto or Manual)
SIP1A_BKRPOS SIP-1A BKR 14H3 CUBICLE POSITION	0	0	30		RACK OPEN	MANUAL
RCMOV535_BKR PZR PORV BLOCK	0	0	16	CLOSED	OPEN	AUTO
MS_120 SG B STM SUPPLY TO FW-P2	0	60	21	100	0	MANUAL

☐ ☐ ☐ Enter/Verify the following EVENT TRIGGERS:

Trigger#	EVENT	Command
Trigger setup to trip 1-RC-MOV1535 breaker when control switch in open to stroke test open time, Event 1. Trigger 16 sets when 1-RC-MOC-1535 closed, and 1-RC-MOV-1535 control switch taken to open		
9	Reactor power < 10%	Sets Trigger 9
16	RCMOV535 < .3 & MOV535_OPEN==1	Sets Trigger 16
Trigger setup to trip A, B, C, RCPs when Generator Output breakers open. (EL2 Auto Trigger). Actuates Trigger which implements Malfunction RC5601/5602/5603.		
17	!(elg102_bkr(2) & elg1T240_bkr)	Sets Trigger 17

## SIMULATOR OPERATOR'S GUIDE

TRIGGER	TYPE	DESCRIPTION
1	MAN	Fails PZR Level CH III to ~34%.
3	MAN	Trip running High Pressure Drain Pump.
5	MAN	B SG MN Feed Flow Flow Cntrl fails low
7	MAN	Actuates Steam Generator Tube Rupture, 360 gpm Sets OR so 1-RC-PCV-1455C will NOT OPEN.
9	AUTO	Actuates CH0503 to trip 1-CH-P-1C on reactor trip.
16	AUTO	Open Breaker to 1-RC-MOV-1535
17	AUTO	Spurious Trip A/B/C RCPs when Gen. Output Bkrs open
21	MAN	Opens 1-MS-120, SG 'B' Supply to FW-P2
30	MAN ACTIVE	CH6401 DISABLE CHP-1A AUTO START CH 6402 DISABLE CHP-1B AUTO START GM0701 DISABLE MN GEN BKR G102 AUTO TRIP GM0702 DISABLE MN GEN BKR G1T240 AUTO TRIP CH54 DISABLE CH-HCV-1200A AUTO CLOSURE CH55 DISABLE CH-HCV-1200B AUTO CLOSURE FP0301 FPS FACP07 ALARM HORN FAILURE FP0302 FPS PC SPEAKER FAILURE SI2409 SI RELAY CI1A FAILS TO ACTUATE SI2505 SI RELAY SI5B FAILS TO ACTUATE

☐ ☐ ☐ Enter/Verify the following Switch Overrides:

Override	Set Condition	Trigger
PCV455C_OPEN	OFF	7
PCV455C_CLOSE	ON	7
PCV455C_ENABLE	OFF	7

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## SIMULATOR OPERATOR'S GUIDE

**Verify the following control room setup:**

- ☐ ☐ ☐ Place the simulator in RUN and verify normal 100% power operation indications.
- ☐ ☐ ☐ Verify Red Magnets on the following components: **1-SI-P-1A**
- ☐ ☐ ☐ Verify All pink magnets collected from previous scenarios.
- ☐ ☐ ☐ Verify vertical board PCS monitor on ALARM SCREEN.
- ☐ ☐ ☐ Reset ICCMs.
- ☐ ☐ ☐ Verify all calcalc points are displayed on PCS: U9103, U9104, U9105V.
- ☐ ☐ ☐ Verify Component Switch Flags; 1-VS-F-58A and 1-VS-F-58B switches (AUTO AFTER STOP).
- ☐ ☐ ☐ Verify Brass Caps properly placed (Hi-Hi CLS, MSTVs, CH-MOV-1350, CW and SW MOVs, CTMT Hogger suction, CNDSR Vacuum breaker).
- ☐ ☐ ☐ Radiation Monitors all clear.
- ☐ ☐ ☐ Verify SG PORVs set for 1035 psig.
- ☐ ☐ ☐ Verify "D" bank rod height at 227 steps and Bank Overlap Counter at 611.
- ☐ ☐ ☐ Advance Charts.
- ☐ ☐ ☐ Verify Containment Instrument Air Compressors are on Inside Suction (all RMs reset).
- ☐ ☐ ☐ Verify SYNC keys in proper place.
- ☐ ☐ ☐ Verify MOL reactivity plans and benchboard Reactivity Placard is current.
- ☐ ☐ ☐ Reset Blender Integrators for Boric Acid to 100 and PG to 1000.
- ☐ ☐ ☐ Verify Stop Watches are available for RO and BOP.
- ☐ ☐ ☐ Verify Simulator "Session In Progress" light is turned ON.
- ☐ ☐ ☐ Verify no persons are logged onto network computer to ensure no procedures displayed.
- ☐ ☐ ☐ Verify PCS time matches Sim time.

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## SIMULATOR OPERATOR'S GUIDE

- ☐ ☐ ☐ Spot check all ARPs are clean, **verify** the following ARPs are clean.

1A-A3	1A-B3	1A-G4	1C-D8
1E-E3	1H-D3	1H-D4	1H-E5
1H-E6	1H-E7	1H-F3	1H-G5
1H-G6	1H-G7	1J-B4	1K-D4
1RM-G8	1RM-H8	1J-E1	1J-F1

- ☐ ☐ ☐ Verify CLEAN copies of the following procedures are in place.

1-PT-18.6.I	0-AP-53.00 (2)	0-AP-23.00	1-AP-18.00
1-AP-16.00	1-E-0	1-E-3	1-ECA-3.3
1-OP-ZZ-002	1-OPT-RX-001	1-OP-CH-007	



**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.**

	<b>TEAM 1</b>	<b>TEAM 2</b>	<b>TEAM 3</b>
<b>SRO</b>			
<b>RO</b>			
<b>BOP</b>			

**Ask for and answer questions.**

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## SIMULATOR OPERATOR'S GUIDE

Conduct shift turnover:

Unit 1 at 100% power with RCS boron concentration of 795 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. The Extra RO will perform these checks.
- 1-SI-P-1A is tagged out for breaker work (8 hours ago). 72 hour TS clock in effect. Return to service expected later this shift.

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 PT-18.6I, PZR Block Valve Stroke Test**. Performance of this procedure has been authorized and has been PSA analyzed for current plant conditions.

The last shift performed two 35 gallon dilutions followed by a manual makeup for training.

When the team has accepted the shift, proceed to the Session Conduct Section.

## SIMULATOR TURNOVER CHECKLIST

Pre Session Checks:			
Safety Injection Section (Magnets)	CW/SW Section	RCS Section	CVCS
SI-MOV-1865A <input type="checkbox"/> R <input type="checkbox"/> G SI-MOV-1865B <input type="checkbox"/> R <input type="checkbox"/> G SI-MOV-1865C <input type="checkbox"/> R <input type="checkbox"/> G SI-MOV-1869A <input type="checkbox"/> R <input type="checkbox"/> G SI-MOV-1869B <input type="checkbox"/> R <input type="checkbox"/> G SI-MOV-1890A <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> T/O SI-MOV-1890B <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> T/O SI-MOV-1890C <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> T/O Brass Cap <input type="checkbox"/> CLS TR A <input type="checkbox"/> CLS TR B	Brass Caps SW MOVs <input type="checkbox"/> 103A <input type="checkbox"/> 103B <input type="checkbox"/> 103C <input type="checkbox"/> 103D CW MOVs <input type="checkbox"/> 106A <input type="checkbox"/> 106B <input type="checkbox"/> 106C <input type="checkbox"/> 106D CW Inlet Throttle Plaques (10%) <input type="checkbox"/> 100A <input type="checkbox"/> 100B <input type="checkbox"/> 100C <input type="checkbox"/> 100D CTMT Hogger Suction Cap <input type="checkbox"/>	Tcold Loop Stop Pos (R – O) <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C Loop Bypass Valves (G – C) <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C Thot Loop Stop Pos (R - O) <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C SFP PPs Pwr <input type="checkbox"/> Norm <input type="checkbox"/> Alt PZR Level Recorder <input type="checkbox"/>	Core Life Plaque <input type="checkbox"/> Ramp Plan Book <input type="checkbox"/> OP-RX-010 Book <input type="checkbox"/> PG Int Set 1000 <input type="checkbox"/> BA Int Set 100 <input type="checkbox"/> Tavg/Tref Rec. <input type="checkbox"/> NI-NR-B <input type="checkbox"/> Group Step Ctrs <input type="checkbox"/> CERPIs <input type="checkbox"/> CH-MOV-1350 <input type="checkbox"/>
Main Steam/Feedwater	Electrical/VSP	PCS	RM/WD/BR
SG PORVs Set <input type="checkbox"/> MSTV Caps <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C SF/FF Rec Scale <input type="checkbox"/> Cond Vac Bkr Cap <input type="checkbox"/>	Synch Key <input type="checkbox"/> SVB Power <input type="checkbox"/> H <input type="checkbox"/> J LO System Switches <input type="checkbox"/> VS-F-58A Pwr <input type="checkbox"/> H <input type="checkbox"/> J <input type="checkbox"/> Grn Flag VS-F-58B Pwr <input type="checkbox"/> H <input type="checkbox"/> J <input type="checkbox"/> Grn Flag	PCS Main Screen U9103 <input type="checkbox"/> U9104 <input type="checkbox"/> U9105V <input type="checkbox"/> Alarm Screen (List) <input type="checkbox"/>	RM-112 <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C RM-113 <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C Comm RM Pwr <input type="checkbox"/> 1J <input type="checkbox"/> 2J Synch Key <input type="checkbox"/>
Post Session Checks:			
PCS Screens (Cleared/Display) <input type="checkbox"/> RO <input type="checkbox"/> BOP <input type="checkbox"/> SM <input type="checkbox"/> STA <input type="checkbox"/> PCs Logged OFF (including Booth) <input type="checkbox"/> Phone cleared <input type="checkbox"/> Recall IC-1 <input type="checkbox"/> Advance Charts <input type="checkbox"/> Procedures Changed <input type="checkbox"/> Red Light <input type="checkbox"/> Binders Stored <input type="checkbox"/> Trash Picked Up/Emptied <input type="checkbox"/> Vacuum Req'd? <input type="checkbox"/> Pink Magnets in Drawer <input type="checkbox"/> BB and VB Scenario Magnets removed <input type="checkbox"/> E-Mail to SSG Required <input type="checkbox"/> DVD Finalized <input type="checkbox"/> EAL Charts <input type="checkbox"/> Note Pads <input type="checkbox"/> Manning Sheets <input type="checkbox"/> Sticky Tabs (SRO/SM/ARPs) <input type="checkbox"/> Markers (ARPs) <input type="checkbox"/> Personnel/Comms Tracking Sheets (Booth) <input type="checkbox"/> Floor timers reset/In place <input type="checkbox"/> Booth timers reset/In place <input type="checkbox"/> Printers ready/have paper			

## SIMULATOR OPERATOR'S GUIDE

**Session Conduct:**

- Ensure conditions in Simulator Set-up are established.

**EVENT 1      Test Cycle PORV Block Valves, 1-PT-18.6I****BOOTH:**

30 minutes prior to the beginning of the scenario, provide the team with a copy of 1-PT-18.6I, Pressurizer Block Valve Stroke Test. The team will pre-brief the PT prior to entering the simulator.

**Trigger 16 implements Remote Function to trip 1-RC-MOV-1535 breaker.**

Trigger 16 (becomes Active) when 1-RC-MOC-1535 closed, and 1-RC-MOV-1535 control switch taken to open.

Operations Supervisor/Management/Work Week Coordinator:

**If contacted**, will acknowledge 1-RC-MOV-1535 breaker tripped when the valve was re-opened, suspension of the PT, and Tech Spec Clock identified (1 hour/72 hour).

Field Operator: *(3 minute delay from request to answer)*

**If Contacted**, as Service Building Operator, to check the status of 1-RC-MOV-1535 breaker, 1H1-2S 6A; report that the breaker has tripped (in the “trip free” position)

Shift Technical Advisor:

**If asked** to review Technical Specifications; report that you have reviewed Tech Specs and discussed this with the Shift Manager.

Role play as other individuals as needed.

**SIMULATOR OPERATOR'S GUIDE****EVENT 2      PRZR Level Transmitter 1-RC-LI-1461 Fail to 34%, 0-AP-53.00**

When cued by examiner, implement **Trigger #1**.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the failure of 1-RC-LI-1461. The individual(s) contacted will also acknowledge any TS LCOs and 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).
- **If contacted**, will take responsibility for writing the CR.

STA:

- **If contacted**, will acknowledge the failure of 1-RC-LI-1461. The individual(s) contacted will also acknowledge (but not confirm/deny) any TS LCOs.
- **If asked**, the STA will report that all documents have been reviewed 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 state that he has nothing to add.

Maintenance/Work Week Coordinator:

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

Unit 2 Operator:

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.

Role play as other individuals as needed.

## SIMULATOR OPERATOR'S GUIDE

**EVENT 3      Loss of HPD, 1-SD-P-1A. (1-AP-18.00).**

When the Evaluator indicates Ready, Activate Trigger #3.

**Critical Task (CT-1): Start a third condensate pump, and reduce power prior to S/G low level trip (2/3 channels on one S/G  $\leq$  17% NR).**

Operations Supervisor/Management:

- **If contacted**, will acknowledge the trip of 1-SD-P-1A, 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-1A 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 has discussed this with the Shift Manager.
- **If contacted**, will take responsibility for writing the CR.
- **If the team has a transient brief:** The STA will state that he has nothing to add.
- **When contacted:** EIPs have been reviewed with the Shift Manager.

Field Operators: *(Wait three (3) minutes from direction of a local action to the report of local condition found.)*

- **If contacted**, the condensate polishing building operator will acknowledge the need to ramp the unit.
- **If asked**, the condensate polishing building operator acknowledge bypass of the polisher.
- **When contacted**, as the Service Building Operator concerning the status of 1-SD-P-1A power supply breaker, 1-EP-BKR-15B6, report that the breaker is open with a timed overcurrent drop on "A" phase.

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- **When contacted**, as the Turbine Building Operator to check the status of 1-SD-P-1A, report that there are no apparent abnormalities with the “A” High Pressure Drain Pump.

Unit 2:

- **If contacted**, will acknowledge the trip of 1-SD-P-1A and the need to ramp at 1%/minute to 75% power.

Role-play as other individuals as needed.

**SIMULATOR OPERATOR'S GUIDE****EVENT 4      Ramp to 75%, 0-AP-23.00.**

Operations Supervisor/Management:

- **If contacted**, will acknowledge Ramp to 75% required due to the loss of 1-SD-P-1A.
- **If contacted**, will take responsibility for writing the CR.
- **When contacted:** The Shift Manager will review EIPs for applicability. They are not applicable.

Unit 2 Operator:

- **If notified of Ramp:** Acknowledge ramp of Unit 1.

STA:

- **If contacted**, will acknowledge the impending ramp to 75% power.
- **If contacted**, will take responsibility for writing the WR and CR.
- **When contacted:** The STA reports that he has completed his review of VPAP-2802 and EIPs and has discussed these with the Shift Manager.
- **If the team has a transient brief:** The STA will state that he has nothing new to add.

Chemistry:

- **If contacted**, will acknowledge ramp to 75%, and power has lowered by 15%.

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.



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**EVENT 5      'B' FRV Controller Fails Low.**

BOOTH NOTE: Recommend the next event starts following ramp, or when Blender placed in AUTO.

When cued by examiner, implement Trigger #5.

**Critical Task (CT-2): Restore Feedwater to normal and restore S/G level to normal prior to S/G Low level trip (2/3 channels on one S/G  $\leq 17\%$  NR), or S/G High level trip (2/3 channels on one S/G  $\geq 75\%$  NR)**

Operations Supervisor/Management:

- **If contacted**, will acknowledge failure, and entry into 0-AP-53.00.

STA:

- **If contacted**, will conduct review of documents and report, "all documents have been reviewed with the Shift Manager.
- **If the team has a transient brief:** The STA will state that he has nothing to add.

Maintenance/ Work Week Coordinator:

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

Field Operators

- If dispatched to check on 'B' FRV, acknowledge direction and report (after 3 minutes), "there are no abnormalities noted."

Role-play as other individuals as needed.

## SIMULATOR OPERATOR'S GUIDE

**EVENTS 6****SGTR (360) gpm). 0-AP-16.00, E-0, E-3.**

When cued by examiner, implement Trigger #9.

**Booth Notes. Verify the following:**

- 1-CH-P-1C trips immediately after reactor trip.
- RCPs trip via Trigger 17 when generator output breakers open following reactor trip.
- 1-RC-PCV-1455C is overridden to CLOSE (Trigger 9).

## Operations Supervisor/Management:

- **If contacted**, will acknowledge RCS leakage into the 'B' 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.
- **If contacted**, will acknowledge entry into AP-16.00, E-0, and E-3.

## STA:

- **If contacted**, will acknowledge the RCS leakage into the 'B' SG.
- **If asked** to calculate the RCS leak rate, state that it is difficult to ascertain at this time, but you will continue to monitor as time permits.
- **If contacted**, will take responsibility for writing the WR and CR.
- **If the team has a transient brief:** The STA will state that he has nothing to add.
- **If asked** to confirm EALs, report that "you have discussed the EAL with the Shift Manager."

## 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.

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- **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**, blowdown and air ejector RM readings are [*as indicated at the time*].
- **If asked:** Unit 2 RWST cross-ties are open.
- **If contacted**, Unit Two has implemented AP-50.00, and all conditions on U2 are normal.
- **If asked** to sound the Emergency Alarm, perform actions as directed.

## Field Operators:

- **If contacted**, to report abnormalities on RCPs, report no 86 devices drops apparent on RCP breakers, but the Speed Sensing Panel appears to be malfunctioning; lights blinking on and off 1-FW-88 – set fw\_88 to zero upon request.
- **If contacted**, to close 1-MS-120, SG 'G' Supply to 1-FW-P2. Insert Trigger 21, wait 3 minutes, then report that 1-MS-120 is CLOSED

## Maintenance/Work Week Coordinator:

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

## HP:

- **If contacted**, will acknowledge "B" SGTR.

Role play as other individuals as needed.

## SIMULATOR OPERATOR'S GUIDE

**EVENT 7**    **SGTR with Loss of Pressure Control**Booth Instructions:

Pre-event triggers 7 will disable PORV PCV 1455C. Verify that after Trigger 7 is implemented, PCV 1455C is overridden to the CLOSE position.

## Operations Supervisor/Management:

- **If contacted**, will take responsibility for writing the WR and CR.
- **If contacted**, will acknowledge entry into 1-ECA-3.3.
- **If contacted**, will acknowledge the SGTR on “B” SG.
- **If contacted**, will acknowledge the isolation of ‘B’ SG (if informed).

## Unit Two:

- **If asked**, blowdown and air ejector RM readings are [*as indicated at the time*].
- **If requested**, acknowledge RM alarms, and perform ARP actions.
- **If contacted**, Unit Two has implemented AP-50.00, and all conditions on U2 are normal.

## STA:

**If the team has a transient brief:** The STA will state that he has nothing to add.

## Field Operators:

**If contacted**, field operators will perform valve manipulations as required

Role play as other individuals as needed.

The scenario will end upon entering at step 10 of 1-ECA-3.1 or at the lead examiners discretion.

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**EVENT 8     BOP Failures: 1-CH-P-1A/B no auto start, 1-CH-P-1C trip, 1-SI-P-1B no auto start, 1-CH-HCV-1200 A/B not close, 1-VS-MOD-103A not close, 1-MS-TV-109 and 1-DA-TV-100A/B not close**

Operations Supervisor/Management:

- **If contacted**, will take responsibility for writing the WR and CR.

Unit Two:

- **If contacted**, Unit Two has implemented AP-50.00, and all conditions on U2 are normal.
- **If asked**, MRC differential pressure is a found. Unit 2 will assume responsibility for throttling SW flow IAW E-0, Attachment 3 guidance (page 6).

Field Operators:

**If contacted**, field operators will perform valve manipulations as required.

Facility: <u>_Surry_____</u> Scenario No.: <u>_2_____</u> Op-Test No.: <u>17-301__</u>			
Examiners: _____		Operators: _____	
<p>Initial Conditions: Unit 1 at 65%, and Unit 2 at 100% power; MOL. Unit 1 has just completed 1-FW-P-1B1 pump bearing replacement.</p> <ul style="list-style-type: none"> <li>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. The Extra Reactor Operator will perform these checks.</li> <li>1-SI-P-1A is tagged out for breaker work (8 hours ago). 72 hour TS clock in effect. Return to service expected later this shift.</li> </ul> <p>Turnover: The Team will pre-brief ramp to 75% power in accordance with 1-OP-TM-005 prior to Simulator entry, and commence the ramp following turnover.</p>			
Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N BOP R RO/SRO	Ramp to 75% (1-OP-TM-005)
2	CH28, +2	C RO/SRO	Charging FC 1122 Fails High. (AP-53.00)
3	FW1801, -1 (5:00 ramp)	I BOP/SRO TS SRO	'A' SG FF Fails Low . (AP-53.00) <b>CT-1</b>
4	FW2703	C BOP/SRO	MFP 'B' trips < 80%. (AP-21.00) <b>CT-2</b>
5	RC1501, +1 (5:00 ramp)	C RO/SRO TS SRO	PZR Press MPC FH. (AP-53.00, AP-31.00) <b>CT-3</b>
6	RC0101 (10%, 20 min ramp) SI34,35 CS12, CS13, CS0802	M All	LBLOCA w/ HHSI failure, and Cont spray failure. (AP-16.00, FR-Z.1, E-1) <b>CT-4, CT-5.</b>  SI 1867C, and 1867D fail to open. 1-CS-P-1B trips after 10 min. 1-CS-MOV101A, and 101B fail to auto open.
7	SI0902	M All	Loss of LHSL. (ECA-1.1) 1-SI-P-1B when started will trip in 5 min.
8	FW48 FW5502 BD03 SW03 SW1303	C BOP	BOP Failures in E-0 Attachments: <ul style="list-style-type: none"> <li>1-FW-P-3A, AFW pump 'A' fails to auto start.</li> <li>1-FW-MOV-150B, Feed Pump Discharge MOV fails to auto close.</li> <li>1-BD-TV-100C SG 'B' I/S TV does not auto close.</li> <li>1-SW-MOV-104A, RSHX A SW Inlet, does not auto open.</li> <li>1-SW-P-5C, RSHX C rad sample pump fails to auto start.</li> </ul>
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

## LIST OF CRITICAL TASKS

CT #	EVENT	DESCRIPTION	MET (✓)
CT-1	3, 'A' SG FF fails low	Restore Feedwater to normal and restore S/G level to normal prior to S/G low level trip (2/3 channels on one S/G $\leq$ 17% NR).	
CT-2	4, Loss of FW pump B	Start an additional Condensate pump, and lower power prior to S/G Low level trip (2/3 channels on one S/G $\leq$ 17% NR).	
CT-3	5, Pzr Press MPC fails high	Restore pressure to normal band prior to low pressure reactor trip at 1885 psig.	
CT-4	6, LB LOCA	Restore HHSI flow to the core by manually opening 1-SI-MOV-1867C or 1-SI-MOV-1867D prior to the RCS fully depressurizing or prior to exiting E-0.	
CT-5	6, LB LOCA	Manually open CS 1A discharge MOV; 1-CS-MOV-101A or B prior to Recirc Spray pump start (60% in RWST) in order to provide adequate NPSH.	

**Event 1: Ramp to 75% IAW 1-OP-TM-005 (N- BOP, R-RO,SRO)**

The Team will pre-brief this evolution prior to entering the Simulator. Upon entry of the Team to the Simulator, the Scenario brief will be given, questions answered, and the Team allowed ~ 5 minutes to become acclimated to the Simulator Environment. The team will then commence ramp per 1-OP-TM-005 and hold at 75% power.

**Verifiable Action(s):**

- 1) RO will manipulate control rods to control delta flux and/or Tave.
- 2) RO will manipulate CVCS control to establish a normal dilution to assist in Tave control.
- 3) BOP will manipulate Turbine Controls to establish power increase.

**Technical Specifications:** None.

**Event #2: Charging Line Flow controller fails high (C – RO/SRO)**

This failure will cause FCV-1122 to stroke close causing Letdown perturbations based on loss of cooling to Regen HX. The RO will diagnose the failure based upon alarms and indication received. The Team will initiate AP-53.00

**Verifiable Actions:**

- 1) The RO will place Charging line controller to manual and restore charging line flow to normal.

**Technical Specifications:** None

**Event 3: 'A' Feed Flow Channel FAILS Low. (I – BOP/SRO, TS – SRO)**

BOP will diagnose the failure based upon alarms and indications received and take the Immediate Actions of AP-53.00. The Team will implement AP-53.00, Loss of Vital Instrumentation/Controls and shift SGWLC input to Channel IV for "A" SG. The BOP will restore "A" SG NR level to program. If the operator does not take prompt action the turbine and reactor will trip on Hi S/G level (75%) in approximately 3 minutes.

**Verifiable Action(s):**

- 1) BOP will place the "A" FRV in manual and regain control of "A" SG NR level.
- 2) RO will defeat the failed channel.
- 3) BOP will return the "A" FRV to automatic.

**Technical Specifications:** The SRO will Review Tech Specs and determine which TS LCOs are not met. The following LCOs are not met:

- 1) Tech Spec 3.7, Table 3.7-1 Item 17, Low steam generator water level with steam flow/feedwater flow mismatch, Operator Action 6. With the number of OPERABLE Channels less than the TOTAL number of channels, operation may continue if the failed channel is placed in trip in 72 hours, the channel may be bypassed for 12 hours for surveillance, if conditions not satisfied in the time permitted be in Hot Shutdown within 6 hours.

**Critical Task: (CT-1): Restore Feedwater to normal and restore S/G level to normal prior to S/G High level trip at 75% NR. (2/3 channels on one S/G  $\geq$  75%)**



**Event 4: Loss of Feed pump 1B with power < 80%. (C – BOP/SRO)**

The BOP will diagnose the failure and start an additional Condensate pump per AP-21.00. If the operator does nothing the S/G low level trip will occur in approx. 3 min. The crew will perform 1-AP-21.00, If the operator starts an additional condensate pump but does not lower power, the reactor will trip on S/G Low level trip within 7 minutes

**Verifiable Action(s):**

- 1) BOP start an additional Condensate pump.
- 2) Team lower power to support one feed pump (approx.5-10%)

**Critical Tasks:**

**CT-2: Start an additional Condensate pump, and lower power prior to S/G low level reactor trip at 17% NR.** (2/3 channels on one S/G  $\leq 17\%$ )

**Event 5: PRZR Pressure MPC fails high (I – RO/SRO, TS – SRO).**

The RO will diagnose the failure based on lowering pressure on all pressure channels. The RO will perform actions per AP-53.00, and AP-31.00 to stop the pressure transient and restore pressure to normal. If the RO does not take prompt actions the reactor will trip on low pressure in just under 3 minutes.

**Verifiable Actions(s):**

- 1) The RO will place Przr Press MPC to Manual.
- 2) RO will close the spray valves.
- 3) The RO will raise pressure to normal operating band

**Technical Specifications:** The SRO will Review Tech Specs and determine which TS LCOs are not met. The following LCOs are not met:

- 2) TS 3.1.A.6.a: With one or both PORVs inoperable but capable of being manually cycled, within 1 hour either restore the PORV to operable status or close the block valve and maintain power to the block valve. Otherwise be in HSD within the next 6 hours...

Note: Pressure may lower below DNB and then recover. While pressure is below the DNB limit of 2205 psig there is a 2-hour clock to restore pressure to within its limit in 2 hours (TS3.12.F.2). It is not expected for this event for pressure to remain below the DNB limit for an appreciable amount of time.

**Critical Tasks (CT-3): Restore pressure to normal band prior to low pressure reactor trip at 1885 psig.** (2/3 Pzr Press  $\leq 1885$  psig)

**Event #6: Large Break LOCA. (M-All)**

A large break LOCA will occur causing a rapid lowering of pressurizer level and pressure. The RO will diagnose and perform AP-16.00 actions. The RO will report that leak size is > 50 gpm, and perform E-0 with SI at step 4. The team will diagnose failures of 1-SI-1867C and D to auto open. This will result in a loss of HHSI. 1-SI-P-1B, LHSI pump will auto start but because the break size is intermediate, there will be no LHSI flow to the core. There will be no SI flow to the core with this failure. Once containment pressure reaches HI-HI CLS setpoint team will diagnose failures of containment spray. The team will transition from E-0 to E-1

**Verifiable Actions:**

- 1) RO will perform AP-16.00 and will quantify leakrate.
- 2) RO will perform E-0 and identify no SI flow to the core.
- 3) RO or BOP will open 1-SI-1867C or D.
- 4) RO and BOP will perform Attachments 1-4 of E-0.
- 5) RO/BOP will open 1-CS-MOV-A or B.

**Critical Tasks:**

**CT-4:** The HHSI pumps will auto start but the HHSI cold leg MOVs; 1-SI-MOV-1867C and 1-SI-MOV-1867D will fail to auto open. The crew must restore HHSI flow to the core by manually **opening 1-SI-MOV-1867C OR 1-SI-MOV-1867D prior to the RCS fully depressurizing or prior to exiting E-0**. Failure to do this would represent a demonstrated inability of the crew to:

- Recognize a failure/incorrect auto actuation of an ESF system or component.
- Effectively direct/manipulate ESF controls.

**CT-5:** Both Containment Spray pumps will auto start on HI-HI CLS. Failures in 1-CS-MOV-101A, B prevent any containment spray from the 'A' train. Additionally 1-CS-P-1B will trip on overcurrent 10 minutes after starting. Once 1-CS-P-1B trips there will be no containment spray. Therefore the crew should **manually open CS 1A discharge MOV; 1-CS-MOV 101A OR B prior to Recirc Spray pump start (60% in RWST) in order to provide adequate NPSH**.

**Event #7: Loss of LHSI. (M – ALL)**

Shortly after starting SI automatically starts 1-SI-P-1B, the pump will trip on overcurrent. With total loss of LHSI the team will transition from E-1 to ECA-1.1 at step 18

**Verifiable Actions:**

- 1) RO/BOP will verify subcooling above the limit (30/85).
- 2) RO/BOP will stop all but one CHG pump.
- 3) RO/BOP will isolate HHSI to cold legs.

***Event #8: BOP Failures in E-0 Attachments***

During performance of E-0 the BOP will identify and correct the following component failures:

- 1-FW-P-3A, AFW pump 'A' fails to auto start.
- 1-FW-MOV-150B, Feed Pump Discharge MOV fails to close.
- 1-BD-TV-100C SG 'B' I/S TV does not auto close.
- 1-SW-MOV-104A, RSHX A SW Inlet, does not auto open.
- 1-SW-P-5C, RSHX C rad sample pump fails to auto start.

The Scenario is terminated at Lead Evaluator discretion or at Step 10 of ECA-1.1.

**Scenario Recapitulation**

Total Malfunctions: 11

Abnormal Events: 5, AP-53.00 (twice), AP-16.00, AP-21.00, AP-31.00.

Major Transients: 1

EOPs Entered: 2 (E-0, E-1)

EOP Contingencies: 1 (ECA-1.1)

Initial Conditions:

Turnover: The Team will raise power to 75% and hold for Feed Pump 24 hour run.

Pre-load malfunctions: (Trigger 30's)

- SI34 DISABLE SI-MOV-867C AUTO OPEN
- SI35 DISABLE SI-MOV-867D AUTO OPEN
- CS12 DISABLE CS-MOV-101A AUTO OPEN
- CS13 DISABLE CS-MOV-101B AUTO OPEN
- FW48 DISABLE AFW P-3A AUTO START
- FW5502 FW-MOV-150B AUTO CLOSE DISABLE
- BD03 DISABLE BD-TV-100C AUTO CLOSURE
- SW03 DOSAB;E SW-MOV-104A AUTO OPEN
- SW1303 DISABLE SW-P-5C AUTO START
- FP0301 FPS FACP07 ALARM HORN FAILURE
- FP0302 FPS PC SPEAKER FAILURE
- SIP1A\_BKRPOS SIP1A BK 14H3 CUBICLE POSITION

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

- 1-SI-P-1A is tagged out for breaker work (8 hours ago). 72 hour TS clock in effect. Return to service expected later this shift.

Turnover:

Unit 1 is at 65%, and Unit 2 is at 100% power, MOL. Unit 1 has just completed 1-FW-P-1B1 pump bearing replacement, and 1-FW-P-1B was recently started. More data is needed at 75% power before 1-FW-P-1B1 can be returned to service.

All systems and cross ties 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-1A is tagged out for breaker work (8 hours ago). 72 hour TS clock in effect. Return to service expected later this shift.

Turnover: The team will pre-brief a ramp to 75% power per 1-OP-TM-005. The team is to raise power to 75% and hold for Feed pump 24 hour run.

Event	Malf. #'s	Severity	Instructor Notes and Required Feedback
1	N/A		Ramp to 75% (1-OP-TM-005)
2	CH28	+2	Charging FC 1122 Fails High. (AP-53.00)
3	FW1801, -1 (5:00 ramp)	(-1) 5:00 ramp	'A' SG FF Fails Low. (AP-53.00) <b>CT-1</b>
4	FW2703	TRUE	MFP 'B' trips < 80%. (AP-21.00) <b>CT-2</b>

5	RC1501	(+1) 5:00 ramp	PZR Press MPC FH. (AP-53.00, AP-31.00) <b>CT-3</b>
6	RC0101 (10%, 20 min ramp) SI34, SI35, CS12, CS13, CS0802	(10%) 20:00 ramp	LBLOCA w/ HHSL failure, and Cont spray failure. (AP-16.00, FR-Z.1, E-1) <ul style="list-style-type: none"> <li>1-SI-1867C, and D fail to auto open. <b>(CT-4)</b></li> <li>1-CS-P-1B trips after 10 min. 1-CS-MOV101A, and 101B fail to auto open. <b>(CT-5)</b></li> </ul>
7.	SI0902	TRUE	Loss of LHSL. (ECA-1.1) 1-SI-P-1B when started will trip in 5min.
8	FW48 FW5502 BD03 SW03 SW1303	TRUE	BOP Failures in E-0 Attachments: <ul style="list-style-type: none"> <li>1-FW-P-3A, AFW pump 'A' fails to auto start.</li> <li>1-FW-MOV-150B, Feed Pump Discharge MOV fails to auto close.</li> <li>1-BD-TV-100C SG 'B' I/S TV does not auto close.</li> <li>1-SW-MOV-104A, RSHX A SW Inlet, does not auto open.</li> <li>1-SW-P-5C, RSHX C rad sample pump fails to auto start.</li> </ul>

### Scenario Objectives

- A. Demonstrate the ability to ramp the Unit in accordance with 1-OP-TM-005, Unit Ramping Operations while maintaining critical parameters within their program levels.
- B. Given a failure of the Pressurizer Pressure Master Controller, respond in accordance with 0-AP-53.00 to control Pressurizer pressure.
- C. Given a failure of the 'A' controlling Feed Flow channel, respond in accordance with 0-AP-53.00 to control 'A' SG level.
- D. Given a failure of the Charging flow controller, respond in accordance with 0-AP-53.00 to control Charging flow and Pressurizer Level.
- E. Given a trip of the 'B' Main Feed Pump, respond in accordance with 1-AP-21.00 to control Feed flow to all SGs.
- F. Given a Large Break LOCA respond in accordance with E-0, Reactor Trip or Safety Injection and E-1, Loss of Reactor or Secondary Coolant to maintain adequate core cooling.
- G. Given a loss of Low Head Safety Injection, respond in accordance with ECA-1.1, Loss of Emergency Coolant Recirculation to maintain adequate core cooling.

**Scenario Sequence****Event One:** Ramp to 75% power.

The Team will pre-brief a Ramp up in power IAW 1-OP-TM-005 and a provided Ramp Plan. Upon assuming the watch, the Team will commence a power escalation using 1-OP-TM-005, Unit Ramping Operations. The RO will use rods and dilution to maintain Tave/Tref within 5 °F, IAW the Ramp Plan. The BOP will manipulate turbine controls and monitor secondary parameters. The RO/BOP will peer check manipulations affecting reactivity, as time permits.

Malfunctions required: None.

Objectives: Initiate a controlled power escalation..

Success Path. Maintain Tave/Tref mismatch within 5 °F and Delta flux dear target value.

**Event Two:** Charging Flow Controller fails high.

When the Evaluating Team is ready, the failure of the Charging Flow Controller, 1-FC-1122 (HIGH) will take place. This failure will cause FCV-1122 to stroke close causing Letdown perturbations based on loss of cooling to Regen HX. The RO will diagnose the failure based upon alarms and indication received. The Team will initiate AP-53.00.

Malfunctions required: One, CH28.

Objectives: (RO) Place the Charging controller, 1-FC-1122 to MAN and raise Charging flow to restore Pressurizer level to normal.

(SRO) Direct actions per 0-AP-53. Consult with Tech Specs to determine if any LCOs are not met, and required actions.

Success Path: Perform 0-AP-53.00, and consult Tech Specs to determine if there are any Required Actions.

**Event Three:** 'A' SG Feed Flow fails low.

When the Evaluating Team is ready, the malfunction is implemented to cause the 'A' SG feed flow transmitter to fail low. This will cause the Feed Reg Valve for the 'A' SG to stroke open in an attempt to restore Feed flow. Actual Feed flow will rise, and with no operator action will reach the Hi SG level trip setpoint of 75%. The BOP will initiate action per 0-AP-53.00 and take manual control of the 'B' FRV and lower feed flow and SG level to program values. An alternate channel of Feed flow will be selected and the FRV returned to automatic.

Malfunctions required: One, FW1801.

Objectives: (BOP) Diagnose the failure of the FF channel, place the 'A' Feed Reg valve in MANUAL and regain control of the 'A' SG NR level. Return 'A' Feed Reg valve to AUTO after an alternate channel is selected.

(RO) Defeat the failed channel.

(SRO) Direct actions per 0-AP-53.00. Refer to Tech Specs and determine which LCOs are not met.

Success Path: Enter 0-AP-53.00, take manual control of 'A' FRV, restore 'A' S/G level to program and swap to alternate FF channel.

Critical Task: (CT-1): Restore Feedwater to normal and **restore S/G level to normal prior to S/G High level trip at 75% NR.** (2/3 channels on one S/G  $\geq$  75%)

**Event Four:** Loss of Feed Pump 1B with power < 80%

When the Evaluation Team is ready, the tripping of Main Feed Pump 1B will take place. The BOP will perform immediate actions of 1-AP-21.00, Loss of Main Feedwater flow. The operator will start an additional Condensate pump and lower power as necessary for one Feed Pump operation

Malfunctions required: One, FW2703

Objectives: (BOP) Control all SG NR levels using FEED Controller(s) in MAN.

(RO) Operate Boric Acid controls to maintain Tave in the band with Tref.

(SRO) Direct actions for matching steam flow with feed flow.

Success Path: Reduce power as necessary to match turbine steam flow with feed flow.

Critical Tasks: (CT-2): **Start an additional Condensate pump, and lower power prior to S/G low level reactor trip at 17% NR.** (2/3 channels on one S/G  $\leq$  17%)

**Event Five:** Pressurizer Pressure MPC fails high.

When the Evaluating Team is ready, the malfunction is implemented to cause the Pressurizer Pressure Master Pressure Controller, 1-RC-PC-1444J to fail high over a 5 minute ramp. As the MPC fails, Pressurizer spray valves will open causing Pressurizer pressure to lower. Backup heaters will energize. The RO will take action per 0-AP-53.00, Loss of Vital Instrumentation and Control; and 1-AP-31.00, Increasing or Decreasing RCS pressure to stop the pressure transient and restore pressure to normal prior to the reactor tripping in Low Pressurizer pressure.

Malfunctions required: One, RC1501.

Objectives: (RO): Place 1-RC-PC-144J to MAN and lower MPC manual control to restore Pressurizer pressure to program value.

(SRO): Direct actions of 0-AP-53.00. Consult Tech Specs for the failure.

Success Path: Respond IAW 0-AP-53.00, and AP-31.00 to stop pressurizer pressure from lowering and restore pressurizer pressure to normal operating pressure (2235 psig).

Critical Task (CT-3): **Restore pressure to normal band prior to low pressure reactor trip at 1885 psig.** (2/3 Pzr Press  $\leq$  1885 psig)

**Event Six:** Large Break LOCA.

When the Evaluating team is ready the malfunction is entered which will cause a Large Break LOCA causing a rapid lowering of pressurizer level and pressure. The RO will diagnose and perform AP-16.00 actions. The RO will report that leak size is  $> 50$  gpm, and perform E-0 with SI at step 4. The team will diagnose failures of 1-SI-1867C and D to auto open. This will result in a loss of HHSL. 1-SI-P-1B, LHSI pump will auto start but because the break size is intermediate, there will be no LHSI flow to the core. There will be no SI flow to the core with this failure. Once containment pressure reaches HI-HI CLS setpoint team will diagnose failures of containment spray. The team will transition from E-0 to E-1.

The SRO will perform a commensurate brief and continue with E-0. While the RO and SRO continue with E-0, the BOP will be directed to perform E-0 Attachments 1 through 4. The RO may be directed to perform Attachment 2 due to the SI failures

Malfunctions required: Six: RC0101, SI34, SI35, CS12, CS13, CS0802.

Objectives: (RO): Perform immediate actions of 1-AP-16.00. Trip the Reactor and perform the Immediate Action Steps of 1-E-0, Reactor Trip or Safety Injection, from memory. Identify no SI to the core. RO may be directed to perform Attachment 2.

(BOP): Perform E-0 Attachments 1-4.

(SRO): Direct actions of E-0, and E-1

Success Path: Trip the Reactor and perform actions of 1-E-0, Reactor Trip or SI, restore HHSL to the core and once CLS HI HI is reached, identify failures in Containment Spray.

**Critical Tasks:**

CT-4: The HHSL pumps will auto start but the HHSL cold leg MOVs; 1-SI-MOV-1867C and 1-SI-MOV-1867D will fail to auto open. The crew must restore HHSL flow to the core by manually **opening 1-SI-MOV-1867C OR 1-SI-MOV-1867D prior to the RCS fully depressurizing or prior to exiting E-0**. Failure to do this would represent a demonstrated inability of the crew to:

- Recognize a failure/incorrect auto actuation of an ESF system or component.
- Effectively direct/manipulate ESF controls.

CT-5: Both Containment Spray pumps will auto start on HI-HI CLS. Failures in 1-CS-MOV-101A, B prevent any containment spray from the 'A' train. Additionally 1-CS-P-1B will trip on overcurrent 10 minutes after starting. Once 1-CS-P-1B trips there will be no containment spray. Therefore the crew should **manually open CS 1A discharge MOV; 1-CS-MOV 101A OR B prior to Recirc Spray pump start (60% in RWST) in order to provide adequate NPSH**.

**Event Seven:** Loss of LHSI (ECA-1.1).



Shortly after the SI automatically starts 1-SI-P-1B, the pump will trip on overcurrent. The 'A' LHSI pump is already tagged out so now there is a total loss of LHSI. With total loss of LHSI the team will transition from E-1 to ECA-1.1 at step 18.

Malfunctions required: One, SI0902

Objectives:

(RO) will verify subcooling above the limit (30/85). .

(BOP) will stop all but one CHG pump. Will isolate HHSI to the cold legs.

Success Path: Transition to ECA-1.1 when it is determined there is no success path to depressurize the RCS.

**Event Eight:** BOP Failures in E-0 Attachments..

During performance of E-0 the BOP will identify and correct the following component failures:

- 1-FW-P-3A, AFW pump 'A' fails to auto start.
- 1-FW-MOV-150B, Feed Pump Discharge MOV fails to close.
- 1-BD-TV-100C SG 'B' I/S TV does not auto close.
- 1-SW-MOV-104A, RSHX A SW Inlet, does not auto open.
- 1-SW-P-5C, RSHX C rad sample pump fails to auto start.

Malfunctions required: Five: FW48, FW5502, BD03, SW03, SW1303.

Objectives: (BOP) Identify components that fail to reposition on the SI Signal, and place them in their required condition.

Success Path: Identify and position components using 1-E-0, Attachment 1, 2, 3.and 4.

The Scenario is terminated at Lead Evaluator discretion or at Step 10 of ECA-1.1.

**Scenario Recapitulation**

Total Malfunctions: 11

Abnormal Events: 5, AP-53.00 (twice), AP-16.00, AP-21.00, AP-31.00.

Major Transients: 1

EOPs Entered: 2 (E-0, E-1)

EOP Contingencies: 1 (ECA-1.1)

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## SHIFT TURNOVER INFORMATION

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### **OPERATING PLAN:**

The initial conditions have Unit 1 is at 65% power with RCS boron concentration of 897 ppm.

Unit 1 conditions have been stable at approximately 65% power for the last four hours. Unit 1 has just completed 1-FW-P-1B1 pump bearing replacement and started the 'B' Main Feed pump.

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. The Extra RO will perform these checks.
- 1-SI-P-1A is tagged out for breaker work (8 hours ago). 72 hour TS clock in effect. Return to service expected later this shift.

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

Shift orders are to raise power to 75% and hold for Feed Pump 24-hour run.

The last shift performed one 30 gallon dilution. Previous to this, shifts had been performing two 30 gallon dilutions.

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Event Description: Unit Ramp to 75% per 1-OP-TM-005, Ramping Operations.

Cue: When team and Examiners are ready.

Time	Position	Applicant's Action or Behavior
	Team	<p>1-OP-TM-005</p> <p>Team will pre-brief Initial Conditions, Precautions and Limitations, and procedure prior to entering simulator.</p> <p>The team will be provided with a copy of 1-OP-TM-005, Unit Ramping (Marked up to Section 5.3); 1-OP-CH-021, Alternate Dilution Using Blender; and a Reactivity plan.</p>
	SRO	<p>1-OP-TM-005, Unit Ramping Operations</p> <p>Section 5.3 will be completed (signed off), but will be reviewed by the team prior to entering the simulator.</p>
	SRO	<p>1-OP-TM-005, Unit Ramping Operations</p> <p><b>5.3 Preparations for Turbine Ramp Up</b></p> <p>5.3.1 Review all lighted annunciator windows for adverse conditions that could impact the performance of this procedure.</p> <p><b>Will be initialed as complete. – No annunciators Lit.</b></p> <p>5.3.2 Review the Tagout File for tagouts that could impact this procedure.</p> <p><b>Will be initialed as complete. – MCR FP Panel Tagged out, OC-18 performed by Unit 2 BOP.</b></p> <p>5.3.3 Review the Plant Status Log for conditions that could impact this procedure.</p> <p><b>Will be initialed as complete. – No items in the plant status log.</b></p>

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Event Description: Unit Ramp to 75% per 1-OP-TM-005, Ramping Operations.

**Cue: When team and Examiners are ready.**

	SRO	<p>1-OP-TM-005, Unit Ramping Operations</p> <p>NOTE: Rod height adjustments should be used to maintain Delta Flux as recommended by Reactor Engineering. Boration or dilution should be used to account for power defect and Xenon changes to maintain reference temperature.</p> <p>5.3.4 For scheduled power level changes greater than 10%, verify that a reactivity plan has been provided by Reactor Engineering. Otherwise, direct the STA to notify Reactor Engineering and request recommendations for control of core parameters.</p> <ul style="list-style-type: none"> <li>• Delta Flux control</li> <li>• Recommendations for Rod height and/or RCS Boron adjustments</li> <li>• Expected Xenon transient</li> </ul> <p><b>Will be initialed as complete. The team will be given a reactivity plan.</b></p> <p>5.3.5 Record the Target Power Level, the Current Power Level, and the Percent Power Change below.</p> <p>Target Power Level <u>75%</u></p> <p>Minus Current Power Level - <u>65%</u></p> <p>Equals Percent Power Change = <u>10%</u></p> <p><b>Will be initialed as complete</b></p> <p>5.3.6 Obtain a current copy of 1-DRP-003, Curve Book, Reactor Power and Rod Movement Limitations, and attach to this procedure. (Reference 2.3.9)</p> <p><b>Will be initialed as complete.</b></p> <p>5.3.7 Review 1-DRP-003, Curve Book, Reactor Power and Rod Movement Limitations.</p> <p><b>Will be initialed as complete.</b></p> <p>5.3.8 Document the power level(s) and hold time(s) that will be used to satisfy 1-DRP-003, Curve Book, Reactor Power and Rod Movement Limitations. This information should be obtained from the Reactivity Plan and/or the Reactor Engineer. Enter N/A if the fuel has been conditioned.</p> <p><b>Will be marked as N/A. Fuel Conditioning complete.</b></p>
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Event Description: Unit Ramp to 75% per 1-OP-TM-005, Ramping Operations.

**Cue: When team and Examiners are ready.**

	SRO	<p>1-OP-TM-005, Unit Ramping Operation</p> <p>Note prior to Step 5.3.9: If a shift turnover is required while Subsection 5.4 is in progress, Steps 5.3.9, 5.3.10, and 5.3.11 must be performed for the relieving shift. Multiple signoffs are provided for this purpose.</p> <p>5.3.9 Check that the Shift Manager (who is the designated Test Coordinator) or his designee has reviewed the Detailed Pre-Job Briefing Checklist and Responsibilities in Attachment 1 (page 3 of 5) and conducted a Detailed Pre-Job Briefing with all the personnel performing the unit ramp.</p> <p><b>Will be initialed as complete. Team will re-perform these steps prior to entering simulator.</b></p> <p>5.3.10 Check that the Senior Operations Manager or Operations Manager on Call has reviewed the Management Expectations Briefing Checklist in Attachment 1 (page 2 of 5) and briefed the Operations Department and support personnel on management expectations.</p> <p><b>Will be initialed as complete. Team will re-perform these steps prior to entering simulator.</b></p> <p>5.3.11 The pre-job brief shall include the items in Attachment 2, Pre-job Brief Expectations for Reactivity Control.</p> <p><b>Will be initialed as complete. Team will re-perform these steps prior to entering simulator.</b></p> <p>5.3.12 Determine the specific rate of Reactor power change and the methods which will be used to achieve this rate of change.  Rate of Power Change <u>0.33%/min</u>  Reactor Power Change Methods <u>Turbine, rod control, and chemical shim.</u></p> <p><b>Will be initialed as complete.</b></p> <p>5.3.13 Notify Energy Supply (MOC), Chemistry, and the Polishing Building that the power change is imminent</p> <p><b>Will be initialed as complete.</b></p> <p>The Team will commence with Section 5.4. Several steps may be completed prior to entering the simulator (i.e., marked N/A).</p>
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Event Description: Unit Ramp to 75% per 1-OP-TM-005, Ramping Operations.

Cue: When team and Examiners are ready.

	SRO/RO	<p>1-OP-TM-005, Unit Ramping Operation</p> <p>5.4 Power Increase Between 50% and 100% Reactor Power</p> <p>Caution prior to Step 5.4.1:</p> <ul style="list-style-type: none"> <li>Energizing additional PRZR heaters may cause a change in RCS average temperature due to a difference in boron concentration between the PRZR and the RCS.</li> </ul> <p>5.4.1 Check or place PRZR Backup Heaters in the MANUAL ON position IAW 1-OP-RC-019, Pressurizer Heater Operation.</p>
	SRO/RO	<p>1-OP-TM-005, Unit Ramping Operation</p> <p>Notes prior to Step 5.4.2:</p> <ul style="list-style-type: none"> <li>The second MFP should be started at approximately <math>6.0 \times 10^6</math> lbm/hr (5.6 - <math>6.4 \times 10^6</math> lbm/hr) total Feedwater flow.</li> <li>When a Main Feed Pump Recirc Valve opens, a decrease in FW temperature will occur that can add positive reactivity to the core. The magnitude of the reactivity change is dependent on the time in core life and the value of the Moderator Temperature Coefficient.</li> </ul> <p>5.4.2 WHEN reactor power level reaches the point where additional Feedwater flow is desired, THEN perform the following substeps. Enter N/A if a Main Feed Pump will not be started.</p> <ol style="list-style-type: none"> <li>Notify Chemistry and the Polishing Building of the imminent start of the idle Main Feedwater Pump.</li> <li>Place the idle Main Feedwater pump in service in accordance with 1-OP-FW-004, Main Feedwater System Operation.</li> </ol> <p><b>Sub-steps 5.4.1 and 5.4.2 will be marked "N/A"</b></p> <p>Note prior to Step 5.4.3: The turbine control valves should not run up against the Turbine Load Limiter</p> <p>5.4.3 Increase the Turbine Load Limiter and maintain the limiter <u>as close as reasonably possible</u> above the actual turbine load during power escalation (Reference 2.4.2).</p>

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Event Description: Unit Ramp to 75% per 1-OP-TM-005, Ramping Operations.

Cue: When team and Examiners are ready.

	SRO/RO	<p>1-OP-TM-005, Unit Ramping Operation</p> <p>Cautions prior to Step 5.4.4:</p> <ul style="list-style-type: none"> <li>To maintain positive control of reactivity, control rods shall be moved in a deliberate, carefully controlled manner while closely monitoring the Reactor's response.</li> <li>The Turbine will momentarily (1.5 seconds) shift to MANUAL when placed in IMP IN. To minimize Governor valve oscillations, the GV Tracking Meter should read as close to 0 as possible before transferring to IMP IN.</li> </ul> <p>5.4.4 Check initiated or initiate Attachment 4, Reactivity Control and Monitoring During Ramp. (Reference 2.4.6). <b>Attachment 4, 1-OP-TM-005, on Pages 27-29.</b></p> <p>Notes prior to Step 5.4.5:</p> <ul style="list-style-type: none"> <li>The Turbine should be operated in IMP IN while ramping is in progress. If the power increase is stopped during the ramp up, IMP OUT may be used to assist in stabilizing the Turbine.</li> <li>This procedure is normally entered at greater than 50% power. If power is less than 50%, procedure 1-GOP-1.5, Unit Startup, 2% Reactor Power to Max Allowable Power, must be used.</li> </ul> <p>5.4.5 <b>Commence the power increase at the ramp rate specified by Shift Supervision, using the LOAD RATE % PER MIN thumbwheel.</b></p> <p>Note prior to Step 5.4.6: Alternate indications of Reactor Power, such as Core <math>\Delta T</math>, 1<sup>st</sup> Stage Pressure, Condensate and Feedwater performance parameters, and Electrical output, should be reviewed and compared during power escalation. (Reference 2.4.3)</p> <p>5.4.6 <b>Borate, dilute, or use control rods as required to maintain <math>\Delta</math> flux in band.</b> Observe the expected response on FR-1-113, BA-PRI WTR FLOW and Y1C-114A, PRI WTR SUP BATCH INTEGRATOR.</p> <p><b><i>1-OP-CH-021 – Alternate Dilution Using Blender actions are outlined starting on page 24.</i></b></p>
	BOP	
	RO	

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Event Description: Unit Ramp to 75% per 1-OP-TM-005, Ramping Operations.

Cue: When team and Examiners are ready.

	SRO	<p>5.4.7 IF either annunciator 1G-C4, UPPER ION CHAMBER DEVIATION OR AUTO DEFEAT &lt;50%, or 1G-D4, LOWER ION CHAMBER DEVIATION OR AUTO DEFEAT &lt;50%, are LIT, THEN perform the following substeps. Otherwise, enter N/A.</p> <ul style="list-style-type: none"><li>a. Notify the OMOC.</li><li>b. Initiate an excore quadrant power tilt calculation and perform a calculation at 8 hour intervals until both annunciators are NOT LIT.</li><li>c. Review Tech Spec 3.12.B.5 and 3.12.B.6.</li><li>d. Notify Reactor Engineering or STA to determine new High Flux trip and rod stop setpoints.</li><li>e. Have I &amp; C adjust High Flux trip and rod stop setpoints as necessary based on tilt calculation.</li><li>f. Review Tech Spec 3.12.B.7 for additional actions required if tilt is not reduced to less than 2 percent after a period of 24 hours.</li><li>g. Stop ramp at least 5 percent less than High Flux Trip setpoint.</li></ul> <p><b>This step will be marked “N/A”</b></p> <p>5.4.8 WHEN both annunciators 1G-C4 and 1G-D4 are NOT LIT, THEN verify or adjust High Flux Trip and Rod Stop setpoints to the full power values</p>
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Event Description: Unit Ramp to 75% per 1-OP-TM-005, Ramping Operations.

**Cue: When team and Examiners are ready.**

	SRO	<p>1-OP-TM-005, Unit Ramping Operation</p> <p>Caution prior to Step 5.4.9: The following parameters must be closely monitored prior to exceeding 60% power: CP Bldg <math>\Delta P</math>, MFP suction pressure, MFP recirc status, and HP Heater Drain status. Adequate margin must be maintained on MFP suction pressure and CP Bldg <math>\Delta P</math> to prevent bypassing the CP Bldg and subsequent secondary transient. Reactor power should be held at approximately 60% while an HP Heater Drain Pump is started if adequate margin does not exist.</p> <p>Notes prior to Step 5.4.9:</p> <ul style="list-style-type: none"> <li>• Steps 5.4.9 through 5.4.16 may be marked with N/A depending on the power level at which the procedure was entered.</li> <li>• Ramping should be stopped at least 5 percent less than High Flux trip setpoint.</li> <li>• The following PCS points may be used to monitor duct temperature trend: <ul style="list-style-type: none"> <li>○ T2545A, Isolated Phase Bus Duct A Phase Air Temperature</li> <li>○ T2546A, Isolated Phase Bus Duct B Phase Air Temperature</li> <li>○ T2547A, Isolated Phase Bus Duct C Phase Air Temperature</li> </ul> </li> </ul> <p>5.4.9 Notify Chemistry and the Polishing Building of the imminent start of 1-SD-P-1A or 1-SD-P-1B. HP FW HTR DRN PP. Enter N/A for Steps 5.4.9 and 5.4.10 if pump is already running.</p> <p><b><i>Pump is already in service</i></b></p> <p>5.4.10 WHEN there is sufficient flow to the HP Heater Drain Tank, THEN start 1-SD-P-1A or 1-SD-P-1B IAW 1-OP-SD-002, HP Heater Drain Pump Operation.</p> <p>NOTE: If calorimetric basis has not been changed during the ramp, and no adjustments have been made to the NIs during the ramp, then a calorimetric is not required. (Reference 4.15)</p> <p>5.4.11 Continue the power escalation and evaluate the calorimetric. IF a calorimetric is required, THEN notify Energy Supply (MOC) that there will be a 70 percent (approximate) power hold to perform a calorimetric. Otherwise, enter N/A. (Reference 4.15)</p> <p>5.4.12 WHEN power level is stable at approximately 70 percent, THEN stop the power escalation AND initiate a calorimetric. Enter N/A if calorimetric is not required. (Reference 4.15)</p> <p>5.4.13 IF a flux map is needed, as desired by Reactor Engineering, THEN direct Reactor Engineering to perform flux map at this time. Otherwise, enter N/A.</p> <p><b>All steps will be marked "N/A"</b></p>
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Event Description: Unit Ramp to 75% per 1-OP-TM-005, Ramping Operations.

Cue: When team and Examiners are ready.

		<p>1-OP-TM-005, Unit Ramping Operations</p> <p>5.4.14 WHEN the calorimetric (if needed), initiated in Step 5.4.11, and the flux map (if needed), initiated in Step 5.4.12, have been satisfactorily completed, THEN notify Energy Supply (MOC), Chemistry, and the Polishing Building that the power escalation will continue, as required.</p> <p><b>Step will be marked “N/A”</b></p> <p>5.4.15 Continue the power escalation to 75 percent (approximate) power. <b><i>Team will begin at this Step.</i></b> <i>Evaluator’s Note: No further actions are expected for this event.</i></p>
		<p><b>-- END EVENT 1 --</b></p>

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Event Description: Unit Ramp to 75% per 1-OP-TM-005, Ramping Operations.

Cue: When team and Examiners are ready.

	RO	<p><b>1-OP-CH-021, Alternate Dilution Using Blender</b></p> <p>5.1 Alternate Dilution</p> <p><b>NOTE:</b> This subsection will be used for the first alternate dilution of the shift. Attachment 1 will be used as a guide for further alternate dilutions for the remainder of the shift.</p> <p><b>NOTE:</b> If unit on Excess Letdown, 1-OP-CH-007 should be used.</p> <p>5.1.1 Determine the required integrator setpoint by performing the following:</p> $\frac{\text{_____ gal (-)}}{(\text{Desired Dilution})} = \frac{\text{_____}}{(\text{anticipated additional flow, dependent on flowrate})} = \text{_____ Integrator setpoint}$ <p>5.1.2 Notify Shift Supervision of impending Alternate Dilution. (<b>Reference 2.4.1</b>)</p> <p>5.1.3 Notify STA of impending Alternate Dilution.</p> <p>5.1.4 Place the MAKE-UP MODE CNTRL switch in the STOP position.</p> <p>5.1.5 Adjust both of the following controllers for the flow rate and total gallons of Primary Grade water for the dilution. IF the <b>PG FLOW CNTRL</b> controller setpoint has previously been set, THEN enter N/A for that substep.</p> <p>a. 1-CH-FC-1114A, PG FLOW CNTRL _____ GPM (IAW Attachment 2)</p> <p>b. Record number of gallons of PG to be added from Step 5.1.1 and enter into 1-CH-YIC-1114A, PRI WATER SUP BATCH INTEGRATOR (GAL) as follows:          _____ GAL</p> <ol style="list-style-type: none"> <li>1. Depress PRESET A Button (Controller will read the last value entered into the controller; reads in gallons.)</li> <li>2. To clear PRESET A, depress the CLR Button. Enter N/A if not required.</li> <li>3. Enter desired PRESET A value. Enter N/A if not required.</li> <li>4. Depress ENT Button</li> </ol>
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Event Description: Unit Ramp to 75% per 1-OP-TM-005, Ramping Operations.

Cue: When team and Examiners are ready.

	RO	<p>1-OP-CH-021, Alternate Dilution Using Blender</p> <p>5.1.6 Place the MAKE-UP MODE SEL switch in the ALT DIL position.</p> <p>5.1.7 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.</p> <p>5.1.8 Place the MAKE-UP MODE CNTRL switch in the START position.</p> <p>5.1.9 Check all of the following conditions.</p> <ul style="list-style-type: none"> <li>a. 1-CH-FCV-1113A, BORIC ACID TO BLENDER, is closed.</li> <li>b. 1-CH-FCV-1113B, BLENDER TO CHG PUMP, is open.</li> <li>c. 1-CH-FCV-1114A, PGW TO BLENDER, is controlling in AUTO.</li> <li>d. 1-CH-1114B, BLENDER TO VCT, is OPEN – N/A</li> </ul> <p>5.1.10 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.</p> <p>5.1.11 WHEN the desired amount of makeup has been reached, THEN check both of the following valves closed.</p> <ul style="list-style-type: none"> <li>• 1-CH-FCV-1113B</li> <li>• 1-CH-FCV-1114B</li> </ul>
	RO	<p>5.1.12 Check or place 1-CH-FCV-1114B in AUTO.</p> <p>5.1.13 Check or place the following controllers in AUTO.</p> <ul style="list-style-type: none"> <li>• 1-CH-FC-1113A, BA FLOW CNTRL</li> <li>• 1-CH-FC-1114A, PG FLOW CNTRL</li> </ul> <p>5.1.14 Place the MAKE-UP MODE SEL switch in the AUTO position.</p> <p>5.1.15 Place the MAKE-UP MODE CNTRL switch in the START position.</p> <p>5.1.14 Notify Shift Supervision of Blender status. <b>(Reference 2.4.1)</b></p> <p><i>Additional Alternate Dilutions will be performed using 1-OP-CH-021, Attachment 1 (Next Page).</i></p>

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Event Description: Unit Ramp to 75% per 1-OP-TM-005, Ramping Operations.

Cue: When team and Examiners are 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.	Perf.	Perf.
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 Check or place flow controllers in Automatic.			
1.12 Place the MAKE-UP MODE SEL switch in the AUTO position.			
1.13 Place the MAKE-UP MODE CNTRL switch in the START position.			
1.14 Notify Shift Supervision of Blender status. (Reference 2.4.1)			

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Event Description: Unit Ramp to 75% per 1-OP-TM-005, Ramping Operations.

Cue: When team and Examiners are ready.

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## Attachment 4

## REACTIVITY CONTROL AND MONITORING DURING RAMP

- \_\_\_\_\_ 1. WHEN greater than 50% Reactor Power, THEN begin logging data on Attachment 4 (page 2 of 3) at a maximum interval of 30 minutes. Use multiple sheets as required.
- \_\_\_\_\_ 2. Begin logging reactivity manipulations on Attachment 4 (page 3 of 3) as applicable. Use multiple sheets as required.
- \_\_\_\_\_ 3. Maintain Tave and Tref approximately matched and Delta Flux in band (use Control Rods, Boration and/or Dilution) as discussed during the pre-job brief. Use the Reactivity Plan as a guide. (**Reference 2.4.6**)
- \_\_\_\_\_ 4. If significant deviation from the Reactivity Plan is required to maintain core parameters, consult with the STA and Reactor Engineering. Otherwise, enter N/A.
- \_\_\_\_\_ 5. If the ramp deviates from the Reactivity Plan (e.g. a change in ramp rate or an unplanned hold becomes necessary), consult with the STA and Reactor Engineer on the need for a revised reactivity plan. Otherwise, enter N/A.
- \_\_\_\_\_ 6. If critical plant parameters can not be maintained within prescribed limits, the contingency actions discussed in the pre-job brief shall be implemented. Otherwise, enter N/A.
- \_\_\_\_\_ 7. Continue logging data on Attachment 4 (pages 2 and 3) until the ramp is complete and unit conditions are stable.
- \_\_\_\_\_ 8. Attach completed log sheets to original procedure.

Event Description: Unit Ramp to 75% per 1-OP-TM-005, Ramping Operations.

**Cue: When team and Examiners are ready.**

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### Attachment 4

## REACTIVITY CONTROL AND MONITORING DURING RAMP

Circle the channel to be monitored.

[illegible]

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**Event No.: 1**

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Event Description: Unit Ramp to 75% per 1-OP-TM-005, Ramping Operations.

**Cue: When team and Examiners are ready.**

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**Attachment 4**

## REACTIVITY CONTROL AND MONITORING DURING RAMP

Circle the channel to be monitored.

[illegible]



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Event No.: 2

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Event Description: Charging Line Flow Controller Fails High. (AP-53.00)

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
		<p>Charging Line Flow Controller 1-CH-FC-1122 Fails High.</p> <p>Diagnose the failure based on the following alarms and indications:</p> <ul style="list-style-type: none"> <li>• 1-CH-FC-1122C indicates maximum demand.</li> <li>• Charging Line Flow, 1-CH-FI-1122A shows step drop to 0 gpm.</li> <li>• Annunciator 1D-E5, CHG PP TO REGEN HX HI-LO FLOW</li> <li>• Pressurizer Level lowers slowly on all Level channels.</li> <li>• Pressurizer Pressure lowers slowly on all channels.</li> <li>• VCT Level rising slowly.</li> </ul>
	SRO	Enters 0-AP-53.00, Loss of Vital Instrumentation / Controls.
	RO	<p>[1] CHECK REDUNDANT INSTRUMENT CHANNEL(S) INDICATION - NORMAL</p> <p>Checks Pressurizer Level channels; 1-RC-LI-1459, 1-RC-LI-1460, and 1-RC-LI-1461 are all normal.</p>
	RO	<p>[2] PLACE AFFECTED CONTROL(S)/COMPONENT(S) IN MANUAL CONTROL AND STABILIZE PARAMETER USING REDUNDANT INDICATION</p> <p><b>Places 1-CH-FCV-1122 in manual and raises charging flow.</b></p>
	SRO	<p>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 PRZR level with CH flow in MANUAL.</p> <p>STA will have no input for the brief.</p>
	RO	<p>Step 3, AP-53.00</p> <p>VERIFY REACTOR POWER – LESS THAN OR EQUAL TO 100%</p> <p><i>RO will identify that reactor power is less than 100% using PCS Display of Core Thermal Power.</i></p>

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Event Description: Charging Line Flow Controller Fails High. (AP-53.00)

Cue: By Examiner.

	SRO	<p>Step 4 CAUTION and Notes, AP-53.00</p> <p>Caution prior to step 4: If Reactor power has been affected by a secondary transient, Turbine adjustment may be needed to control Tave.</p> <p>Notes Prior to Step 4:</p> <ul style="list-style-type: none"> <li>Step 4 failures are listed in order of performance priority. Only the failed instrument/control and associated step number should be read aloud.</li> <li>When the affected instrument/controller malfunction(s) has been addressed by this procedure, recovery actions should continue at Step 11.</li> </ul>
	SRO	<p>*4 DETERMINE THE FAILED INSTRUMENT / CONTROL AND GO TO APPROPRIATE STEP OR PROCEDURE:</p> <ul style="list-style-type: none"> <li>PRZR Level Control, Step 9.</li> </ul>
	RO	<p><i>The RO will identify that 1-RC-FC-1122C has failed.</i></p>
	SRO	<p>Step 9, AP-53.00</p> <p>9. CHECK PRZR LEVEL CONTROL CHANNELS – NORMAL</p>
	RO	<p><i>Responds “NO, 1-RC-FC-1122C Abnormal.”</i></p>
	SRO	<p>9 a) RNO 1) Place either of the following in MANUAL:</p> <ul style="list-style-type: none"> <li>1-CH-FC-1122C, CHG FLOW CNTRL, OR</li> <li>1-CH-LC-1459G, PRZR LEVEL CNTRL</li> </ul>
	RO	<p><i>Responds “1-CH-FC-1122C in MANUAL”</i></p>
	SRO	<p>9 a) RNO 2) Control PRZR Level at Program Level.</p>
	RO	<p><i>Responds “Maintain PRZR Level at program <math>\pm</math> band set by SRO”</i></p>
	SRO	<p>9 a) RNO 3) Move PRZR Level – CH SEL switch to Defeat the failed channel.</p>
	RO/BOP	<p><i>Responds “There is no failed channel.”</i></p>
	SRO	<p>9 a) RNO 4) Check or place recorder 1-RC-LR-1459 on an operable channel.</p>
	BOP	<p><i>Responds 1-RC-LR-1459 is on an operable channel..</i></p>
	SRO	<p>9a) RNO 5) Refer to Tech Specs 3.1.A.5, Table 3.7-1 Item 9, and Table 3.7-6, Item 13.</p> <ul style="list-style-type: none"> <li>3.1.A.5 (If Pzr heaters deenergized): This LCO is met.</li> <li>Table 3.7-1, item 9: This LCO is met.</li> <li>TS Table 3.7-6, Item 13: This LCO is met.</li> </ul> <p>9 a) RNO 6) Refer to Attachment 3. (Continued on next page)</p>

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Event Description: Charging Line Flow Controller Fails High. (AP-53.00)

Cue: By Examiner.

	SRO	<p>Step 9a) RNO 6)</p> <p><i>SRO hands Attachment 3, Pressurizer Level Control diagram to RO/BOP for review.</i></p> <p>Note: Attachment 3 is at the end of this section.</p>
	SRO	Step 9b-9d, AP-53.00, Continued:
	RO	Step 9 b) Check Pressurizer Heaters - Energized.
	RO	<i>Checks Required Pressurizer Heaters energized, and reports that Pressurizer heaters are energized.</i>
	SRO	Step 9 c) Check Letdown – IN SERVICE.
	RO	<i>“Reports Letdown in service”.</i>
	SRO	Step 9 d) Check PRZR level control – IN AUTOMATIC.
	RO	<i>Reports pressurizer level control in MANUAL.</i>
	SRO	Step 9 d) RNO When pressurizer level restored to program level, un-saturate 1-CH-LC-1459G, PRZR LEVEL CNTRL. Place 1-CH-FC-1122C in automatic.
	RO	Acknowledges direction and notifies SRO when pressurizer level has returned to program value. RO maintains manual control of Charging flow.
	SRO	SRO recalls NOTE 2, prior to Step 4 and goes to Step 11 of AP-53.00.
	SRO	Step 11, AP-53.00
	RO/BOP	<p>Step 11 Check Calorimetric – Functional IAW 1-OPT-RX-001, Attachment 4.</p> <p><i>Checks Calorimetric unaffected by this failure, and reports to the SRO.</i></p> <p>1-OPT-RX-001, Attachment 4 at the end of this section.</p>

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Event Description: Charging Line Flow Controller Fails High. (AP-53.00)

Cue: By Examiner.

	SRO	<p>Step 12, AP-53.00</p> <p>Step 12 REVIEW THE FOLLOWING:</p> <ul style="list-style-type: none"><li>• Tech Spec 3.7</li><li>• VPAP 2802 Notifications and Reports</li><li>• TRM</li><li>• Reg Guide 1.97</li><li>• EP-AA-303, Equipment Important to Emergency Response.</li></ul> <p><i>SRO directs STA to review all documents listed.</i></p> <p><i>STA reports that “all documents have been reviewed and discussed with the Shift Manager.”</i></p>
	SRO	<p>Step 13, AP-53.00</p> <p>CHECK ADDITIONAL INSTRUMENT / CONTROLLER MALFUNCTION - EXISTS</p> <p>The team will identify that no new additional failures exist (i.e., all failures have already been addressed), proceed to the RNO section, and this will direct the team to Step 15.</p>
	SRO	<p>Step 15, AP-53.00</p> <p>PROVIDE NOTIFICATIONS AS NECESSARY:</p> <ul style="list-style-type: none"><li>• Shift Supervision</li><li>• OMO</li><li>• STA (PRA determination)</li><li>• I&amp;C</li></ul>
		<p><b><u>END EVENT #2</u></b></p>

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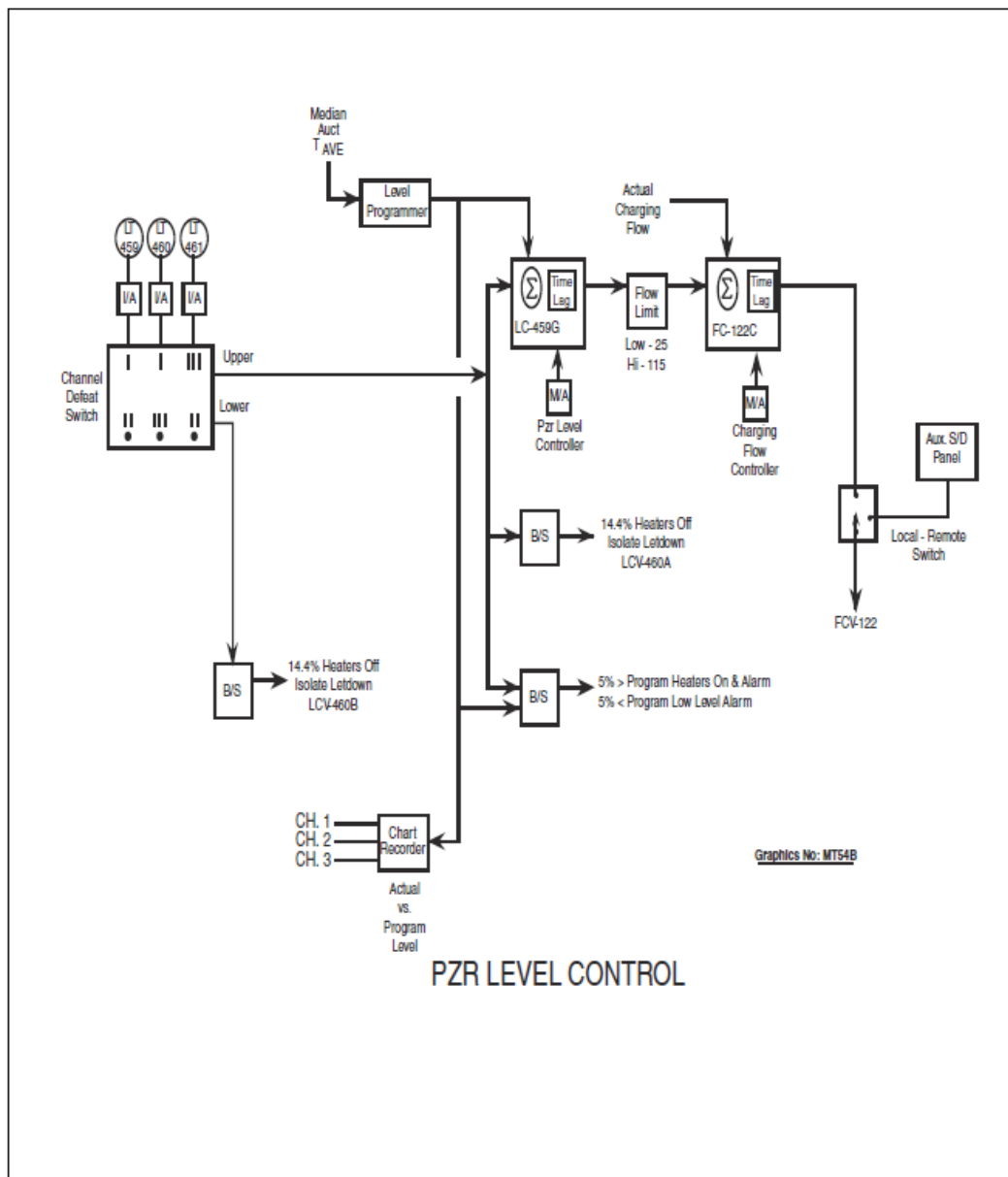
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Event Description: Charging Line Flow Controller Fails High. (AP-53.00)

Cue: By Examiner.

NUMBER 0-AP-53.00	ATTACHMENT TITLE  PRESSURIZER LEVEL CONTROL	ATTACHMENT 3
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Event Description: Charging Line Flow Controller Fails High. (AP-53.00)

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.

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Event Description: Charging Line Flow Controller Fails High. (AP-53.00)

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			

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Event No.: 3

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Event Description: 'A' SG Feed Flow XMTR (Ch 3), Fails low. (AP-53.00)

Cue: By Examiner

Time	Position	Applicant's Action or Behavior
	BOP	<p>Diagnoses failure FT-1477 with the following indications/alarms:</p> <p>Alarms:</p> <ul style="list-style-type: none"> <li>• 1H-E5 STM GEN 1A FW &gt;&lt; STM FLOW</li> <li>• 1F-C7 STM GEN 1A CH 3 FW &lt; STM FLOW</li> <li>• 1F-D7 STM GEN 1A CH 4 FW &lt; STM FLOW</li> <li>• 1H-G5 STM GEN 1A LVL ERROR.</li> </ul> <p>Indications:</p> <ul style="list-style-type: none"> <li>• Lowering 1A SG Feed Flow indication CH-3</li> <li>• Rising 1A SG Feed Flow indication CH-4</li> <li>• Rising demand indication on 1-FW-FC-1478 ('A' FRV)</li> <li>• Rising level indication on 'A' SG.</li> </ul>
	SRO	Enters 0-AP-53.00 LOSS OF VITAL INSTRUMENTATION / CONTROLS
	BOP	<p>Step 1, AP-53.00</p> <p>[1] CHECK REDUNDANT INSTRUMENT CHANNEL(S) INDICATION - NORMAL</p> <p>BOP identifies Channel IV indication for feed flow is NORMAL.</p>
	BOP	<p>Step 2, AP-53.00</p> <p>[2] PLACE AFFECTED CONTROL(S)/COMPONENT(S) IN MANUAL CONTROL AND STABILIZE PARAMETER USING REDUNDANT INDICATION</p> <p><b>BOP takes manual control of 'A' SG feed reg valve and lowers demand (FF &lt; SF) to restore level to program using Channel IV indication.</b></p> <div style="border: 1px solid black; padding: 5px;"> <p><b>Critical Task: (CT-1):</b> Restore Feedwater to normal and restore S/G level to normal prior to S/G High level trip at 75% NR.</p> </div>
	SRO	<p>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.</p> <p><i>The STA will state "nothing to add".</i></p>



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Event No.: 3

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Event Description: 'A' SG Feed Flow XMTR (Ch 3), Fails low. (AP-53.00)

Cue: By Examiner

	SRO  RO	<p>Step 3, AP-53.00</p> <p>* VERIFY REACTOR POWER – LESS THAN OR EQUAL TO 100%</p> <p><i>Checks Reactor Power &lt; 100% using PCS Calorimetric. Due to restoration of FF on 1A SG, power increase may be noted. As required, the SRO may direct the BOP to reduce turbine load to prevent exceeding 100% Calorimetric power.</i></p>
	SRO	<p>Step 4, AP-53.00, CAUTION, and Notes</p> <p>CAUTION: If Reactor power has been affected by a secondary transient, Turbine adjustment may be needed to control Tave.</p> <p>NOTES:</p> <ul style="list-style-type: none"> <li>• Step 4 failures are listed in order of performance priority. Only the failed instrument/control and associated step number should be read aloud.</li> <li>• When the affected instrument/controller malfunction has been addressed by this procedure, recovery actions may continue at Step 11.</li> </ul>
	SRO  RO/BOP  SRO	<p>Step 4, AP-53.00</p> <p>DETERMINE THE FAILED INSTRUMENT / CONTROL AND GO TO APPROPRIATE STEP OR PROCEDURE:</p> <p><i>Identifies 1A SG Feed Flow (CH 3) affected.</i></p> <p>Goes to Step 7.</p>

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Event No.: 3

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Event Description: 'A' SG Feed Flow XMTR (Ch 3), Fails low. (AP-53.00)

Cue: By Examiner

		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 <ul style="list-style-type: none"> <li>• Steam Pressure</li> <li>• Steam Flow</li> <li>• <b>Feed Flow</b></li> <li>• Steam Generator Level</li> </ul>
	BOP	<i>Determines CH III Feed flow instrumentation for 'A' SG is NOT normal.</i>
	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: <p><b>a) Place the associated Feed Reg Valve in MANUAL.</b></p>
	BOP	<i>Verifies 'A' SG MFRV controller, 1-FW-FCV-1478F, in manual</i>
	SRO	b) Control SG level at program level (44%, a band will be given).
	BOP	<i>Verifies 'A' SG NR level is returning to program level.</i>
	SRO	c) Select the redundant channel for affected SG(s)
	RO	<b>Selects Channel IV Feed Flow for 'A' SG using two-position selector switch on Vertical Board 1-2 (applicant may also place the associated Steam Flow channel in Channel IV)</b>
	SRO	d) WHEN SG level returned to normal, THEN place the Feed Reg Valve in AUTOMATIC.
	BOP	<b>Places 'A' SG FRV controller, 1-FW-FCV-1478F, in automatic control.</b>

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Event No.: 3

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Event Description: 'A' SG Feed Flow XMTR (Ch 3), Fails low. (AP-53.00)

Cue: By Examiner

		Step 7, RNO, AP-53.00 (Continued)
	SRO	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.  <i>If asked the Shift Manager will recommend not performing 1-OP-RP-001 at this time.</i>
	SRO	b) Refer to the following Tech Spec 3.7 items: <ul style="list-style-type: none"> <li>• Table 3.7-1, 12 and <b>17</b></li> <li>• Table 3.7-2, 1.c, 1.e, and 3.a</li> <li>• Table 3.7-3, 2.a, and 3.a</li> <li>• Table 3.7-6, 15 and 16</li> </ul>
	SRO	<b>Determines Table 3.7-1 item 17, is applicable.</b>  <b>1. Tech Specs Section 3.7, Table 3.7-1, Item 17,</b> 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 <b>placed in the trip condition in 72 hours</b> , 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.
		Step 11, AP-53.00
	SRO	11. Check Calorimetric – Functional IAW 1-OPT-RX-001, Attachment 4.
	RO	<i>Determines that Calorimetric is functional.</i>  Note: 1-OPT-RX-001, Attachment 4 is included on page 41.

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Event Description: 'A' SG Feed Flow XMTR (Ch 3), Fails low. (AP-53.00)

Cue: By Examiner

	SRO	Step 12, AP-53.00
	STA	<p>12. REVIEW THE FOLLOWING</p> <ul style="list-style-type: none"> <li>• Tech Spec 3.7</li> </ul> <p><i>Determines Table 3.7-1 item 17, Operator action 6, is applicable (place channel in trip w/in 72 hours).</i></p> <ul style="list-style-type: none"> <li>• VPAP-2802, NOTIFICATIONS</li> <li>• TRM SECTION 3.3, INSTRUMENTATION</li> <li>• Reg. Guide 1.97</li> <li>• EP-AA-303, EQ. IMPORTANT TO EMERGENCY RESPONSE</li> </ul> <p><i>The STA reports he has completed review and has discussed the results with the Shift Manager.</i></p>
	SRO	Step 13, AP-53.00
	BOP	13 CHECK ADDITIONAL INSTRUMENT / CONTROLLER MALFUNCTION – EXISTS
	SRO	Reports no additional failure exists
		GOES TO Step 15
	SRO	Step 15, AP-53.00
		<p>15. PROVIDE NOTIFICATIONS AS NECESSARY:</p> <ul style="list-style-type: none"> <li>• Shift Supervision</li> <li>• OMOC</li> <li>• STA (PRA determination)</li> <li>• I&amp;C</li> </ul>
		<b>END OF EVENT 3</b>

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Event Description: 'A' SG Feed Flow XMTR (Ch 3), Fails low. (AP-53.00)

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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.

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Event Description: 'A' SG Feed Flow XMTR (Ch 3), Fails low. (AP-53.00)

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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			

Op-Test No.: Surry 2017-301 Scenario No.: 2

Event No.: 4

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Event Description: Loss of Main Feed Pump 1-FW-P-1B with power &lt; 80%. (AP-21.00)

Cue: By Examiner, after verifying with Booth that Feed Flow is > 2.5 x 10<sup>6</sup> lbm/hr.

Time	Position	Applicant's Action or Behavior
	BOP	<p>Diagnoses 1-FW-P-1B trips.</p> <p>Indications:</p> <ul style="list-style-type: none"> <li>• 1H-H8, FW PP OVERCURRENT TRIP</li> <li>• 1H-E5/E6/E7, STM GEN 1A (1B, 1C) FW&gt;&lt;STM FLOW.</li> <li>• 1H-G5/G6/G7, STM GEN 1A (1B, 1C) LVL ERROR.</li> <li>• 1-FW-P-1B1, and 1-FW-P-1B2 ammeter indicates "0" amps.</li> <li>• Breaker trip lights; 1-FW-P-1B1, and 1-FW-P-1B2.</li> <li>• ALL SG levels lowering rapidly.</li> </ul> <p>Performs 1-AP-21.00 immediate actions.</p>
	SRO	Enters 1-AP-21.00, LOSS OF FEEDWATER FLOW
	BOP	<p>1-AP-21.00</p> <p>[1] CHECK MAIN FEED PUMP STATUS</p> <ul style="list-style-type: none"> <li>a) Check Reactor power GREATER than 80%</li> <li>b) Check Main Feed Pumps – TWO Running</li> </ul> <p><i>Determines that power is LESS than 80%, and goes to step 1a RNO.</i></p>
	BOP	<p>1-AP-21.00</p> <p>1a RNO If at least on Main Feed Pump running THEN GO TO Step 2.</p>
	BOP	<p>1-AP-21.00</p> <p>[2] START AN ADDITIONAL CONDENSATE PUMP</p> <p><i>Starts an additional Condensate Pump 1-CN-P-1A.</i></p>
	BOP	<p>1-AP-21.00</p> <p>[3] REDUCE TURBINE LOAD TO MATCH STEAM FLOW WITH FEED FLOW.</p> <ul style="list-style-type: none"> <li>• Use Valve Position Limiter OR</li> <li>• Reduce Turbine load using Turbine Manual</li> </ul> <p><i>BOP reduces Turbine load until Steam flow matches Feed flow.</i></p> <div style="border: 1px solid black; padding: 5px;"> <p><b>Critical Task CT-2: Start an additional Condensate pump, and lower power prior to S/G low level reactor trip at 17% NR.</b></p> </div> <p><i>Evaluator Note: Once Feed Flow is &gt; 2.5 x 10<sup>6</sup> lbm/hr then a Feed Pump trip will cause a Reactor trip on SG Low level unless the BOP starts an additional Condensate pump.</i></p>

Op-Test No.: Surry 2017-301 Scenario No.: 2

Event No.: 4

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Event Description: Loss of Main Feed Pump 1-FW-P-1B with power &lt; 80%. (AP-21.00)

Cue: By Examiner, after verifying with Booth that Feed Flow is > 2.5 x 10<sup>6</sup> lbm/hr.

	SRO	<p>1-AP-21.00</p> <p>Conducts a Brief summarizing the Event and Establish priorities.</p> <p>RO will provide Critical Parameters using Brief Placard.</p> <p>BOP will provide Critical Parameters using Brief Placard.</p> <p><i>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. He will also state that containment conditions and the electrical conditions are as you see them.</i></p> <p>Completes Brief and continues with 1-AP-21.00.</p>
	SRO BOP	<p>1-AP-21.00</p> <p>4. CHECK CONDENSATE POLISHING BYPASS REQUIRED.</p> <ul style="list-style-type: none"> <li>• Main Feed Pump Suction Pressure Less than 400 psig.</li> </ul> <p><i>BOP determines that Main Feed Pump Suction pressure is NOT &lt; 400 psig. Go to step 6.</i></p>
	SRO RO	<p>1-AP-21.00</p> <p>6. ENERGIZE ALL PRESSURIZER HEATERS.</p> <p><i>RO energizes all pressurizer heaters.</i></p>
	SRO BOP	<p>1-AP-21.00</p> <p>7. CHECK STEAM DUMP OPERATION – REDUCING TAVE/TREF MISMATCH BASED ON DEMAND SIGNAL.</p> <p><i>Determines that steam dump operation is effective. OR Determines that steam dump operation is not needed.</i></p>
	SRO RO/BOP	<p>1-AP-21.00</p> <p>NOTE: Depending on initial plan conditions, rod insertion or boration may be used to stabilize temperature and maintain delta flux in band.</p> <p><i>RO/BOP acknowledges the note.</i></p>
	SRO RO	<p>1-AP-21.00</p> <p>8. CHECK CONTROL RODS – INSERTING IF NECESSARY.</p> <p><i>RO reports that rods are inserting as necessary.</i></p> <p><i>IF RO answers “NO”, then SRO will direct the RO to manually insert rods as necessary.</i></p>



Op-Test No.: Surry 2017-301 Scenario No.: 2

Event No.: 4

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Event Description: Loss of Main Feed Pump 1-FW-P-1B with power &lt; 80%. (AP-21.00)

Cue: By Examiner, after verifying with Booth that Feed Flow is > 2.5 x 10<sup>6</sup> lbm/hr.

	SRO RO	<p>1-AP-21.00</p> <p>9. CHECK ANNUNCIATOR 1E-E3, DELTA FLUX DEVIATION IS NOT LIT.</p> <p><i>RO reports status of annunciator.</i></p> <p>Evaluator Note: This annunciator may come in depending on degree of turbine load reduction. If <b>annunciator 1E-E3 is lit</b> then crew will perform annunciator response.</p> <p>Note: 1E-E3 Annunciator actions included at end of this section..</p>
	SRO BOP	<p>1-AP-21.00</p> <p>10. CHECK ALL SG FLOWS – STEAM FLOW IS LESS THAN OR EQUAL TO FEED FLOW.</p> <p><i>BOP reports that all SG steam flows are less than Feed flow.</i></p>
	SRO BOP	<p>1-AP-21.00</p> <p>11. CHECK ALL SG LEVELS – AT OR TRENDING TO PROGRAMMED LEVEL.</p> <p><i>BOP reports that all SG levels are at programmed level.</i></p>
	SRO RO	<p>1-AP-21.00</p> <p>12. CHECK TAVE – MATCHED WITH TREF.</p> <p><i>RO reports that Tave is matched with Tref.</i></p> <p>Evaluator Note: If Tave is not matched with Tref then RO will be instructed to adjust control rods, dilute, or borate as necessary.</p>
	SRO BOP	<p>1-AP-21.00</p> <p>13. CHECK FEED HEADER TO STEAM HEADER DELTA P – AT LEAST 50 PSID.</p> <p><i>BOP reports on actual Feed Header to Steam Header Delta P which will be in excess of 50 psid.</i></p>
	SRO BOP	<p>1-AP-21.00</p> <p>14. CHECK AMPS ON EACH MOTOR OF THE RUNNING MAIN FEED PUMP LESS THAN 420 AMPS.</p> <p><i>BOP reports that yes “B” Main Feed pump amps are &lt; 420 amps and are approx. xx amps. Note: Amps is variable dependent on power level.</i></p>

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Event No.: 4

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Event Description: Loss of Main Feed Pump 1-FW-P-1B with power &lt; 80%. (AP-21.00)

Cue: By Examiner, after verifying with Booth that Feed Flow is >  $2.5 \times 10^6$  lbm/hr.

	SRO  BOP	1-AP-21.00  15. CHECK OPERATION OF MAIN FEED PUMPS <ul style="list-style-type: none"><li>Recirc valve position</li></ul> <i>Reports that Recirc valve position is closed.</i> <ul style="list-style-type: none"><li>Discharge MOV position.</li></ul> <i>Reports that Discharge MOV is OPEN.</i> <ul style="list-style-type: none"><li>Pump Amps.</li></ul> <i>Reports that Pump amps are approx.. 240 amps.</i>
	SRO  BOP	1-AP-21.00  16. Check Reactor Power change less than 15% in one hour.  <i>BOP makes report on amount of reactor power change in one hour.</i>  If yes, continue to step 17. If no, BOP will be instructed to notify chemistry.
	SRO  RO/BOP	1-AP-21.00  17. NOTIFY THE FOLLOWING <ul style="list-style-type: none"><li>OMOC</li><li>Maintenance Foreman.</li></ul> <i>Notifications made</i>
		<b><u>END EVENT #4</u></b>

Op-Test No.: Surry 2017-301 Scenario No.: 2

Event No.: 4

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Event Description: Loss of Main Feed Pump 1-FW-P-1B with power &lt; 80%. (AP-21.00)

Cue: By Examiner, after verifying with Booth that Feed Flow is >  $2.5 \times 10^6$  lbm/hr.**Dominion**

## SURRY POWER STATION

## ANNUNCIATOR RESPONSE PROCEDURE

NUMBER	PROCEDURE TITLE	REVISION
1E-E3	ΔFLUX DEVIATION (WITH 1 ATTACHMENT)	5
		PAGE 1 of 3

## REFERENCES

1E-67

- 1) UFSAR 14.2.4
- 2) Tech Spec 3.12
- 3) DR S-94-1354, Flux Penalty Time

## PROBABLE CAUSE

- 1) ΔFLUX outside of target band as calculated by PCS point YDF1108C. ΔFLUX out of band may be caused by one of the following:
  - Unit Start-up following a Unit Trip if dilution or boration has not been started in time to compensate for Xenon Reactivity changes.
  - Turbine run-back has occurred.
  - Proper rod position has not been maintained.
  - Instrumentation failure has occurred.
- 2) ΔFLUX accumulated penalty time greater than 60 minutes in the last 24 hours as calculated by PCS point YDF1109C.

***CONTINUOUS USE***

Op-Test No.: Surry 2017-301 Scenario No.: 2

Event No.: 4

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Event Description: Loss of Main Feed Pump 1-FW-P-1B with power &lt; 80%. (AP-21.00)

Cue: By Examiner, after verifying with Booth that Feed Flow is >  $2.5 \times 10^6$  lbm/hr.

NUMBER	PROCEDURE TITLE	REVISION
1E-E3	$\Delta$ FLUX DEVIATION	5
		PAGE 2 of 3

STEP	ACTION/ EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1.____	CHECK DELTA FLUX - OUTSIDE TARGET BAND ON 2 OUT OF 4 CHANNELS	<input type="checkbox"/> Initiate a condition report and GO TO Step 6.
2.____	CHECK REACTOR POWER LEVEL: <input type="checkbox"/> • GREATER THAN 90% - GO TO Step 3  <u>OR</u> <input type="checkbox"/> • BETWEEN 50% AND 90% - GO TO Step 4  <u>OR</u> <input type="checkbox"/> • BETWEEN 15% AND 50% - GO TO Step 5	
<p>*****</p> <p><b>CAUTION:</b> To comply with Tech Spec 3.12, Delta Flux must be within target band <u>OR</u> Reactor power must be less than 90% of Rated power, within 15 minutes of being outside of target band.</p> <p>*****</p>		
<p><b>NOTE:</b> A power increase to greater than 90% is contingent upon flux difference being within target band.</p>		
3.____	RETURN DELTA FLUX TO TARGET BAND WITHIN 15 MINUTES	<input type="checkbox"/> Reduce power to less than 90% within 15 minutes.
<p><b>NOTE:</b> • For power levels less than 90% the indicated Axial Flux Difference may deviate from target band for a maximum of one hour cumulative in any 24 hour period provided the flux difference is within the limits shown on Attachment 1.</p> <p>• One penalty minute is accumulated for each one minute of operation outside of target band at greater than 50% power.</p>		
4.____	CHECK PENALTY MINUTES ARE WITHIN ALLOWABLE LIMIT - 60 CUMULATIVE IN 24 HOURS	<input type="checkbox"/> Reduce power to less than 50% within 30 minutes.  <input type="checkbox"/> Reduce high neutron flux setpoint to less than or equal to 55% within 4 hours.

Op-Test No.: Surry 2017-301 Scenario No.: 2

Event No.: 4

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Event Description: Loss of Main Feed Pump 1-FW-P-1B with power &lt; 80%. (AP-21.00)

Cue: By Examiner, after verifying with Booth that Feed Flow is >  $2.5 \times 10^6$  lbm/hr.

NUMBER	PROCEDURE TITLE	REVISION
1E-E3	ΔFLUX DEVIATION	5
		PAGE
		3 of 3

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p><b>CAUTION:</b> If accumulated penalty time exceeds 60 minutes, this alarm will re-flash indicating that maximum of one hour (cumulative) in any 24 hour period has been exceeded. (TS Figure 3.12.3) This alarm will not clear until penalty time has expired 24 hours after ΔFlux has been returned to target band.</p> <p>*****</p> <p><b>NOTE:</b></p> <ul style="list-style-type: none"><li>• Flux difference may deviate from target band if reactor power is less than 50%.</li><li>• One half minute penalty is accumulated for each minute of operation outside of target band at power levels between 15% and 50%.</li><li>• A power increase to a level greater than 50% is contingent upon flux deviation difference not being outside target band for more than one hour accumulated penalty in the preceding 24 hours.</li></ul> <p>5. ____ ADJUST DELTA FLUX TO WITHIN TARGET BAND</p> <p>6. ____ NOTIFY SHIFT SUPERVISION</p> <p>- END -</p>		

Op-Test No.: Surry 2017-301 Scenario No.: 2

Event No.: 5

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Event Description: Pressurizer Pressure Master Pressure Controller Fails High (AP-53.00)

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
	RO	<p>Diagnoses Failure based on the following indications:</p> <ul style="list-style-type: none"> <li>• Master pressure controller output rising from approximately 35%.</li> <li>• PRZR Spray Valves, 1-RC-PCV-1455A, and 1-RC-PCV-1455B opening.</li> <li>• All Pressurizer Heater Banks energize.</li> <li>• Annunciator 1C-B8, PRZR LO PRESS</li> <li>• ~ 1 minute after event initiation, pressurizer pressure indicates 2133 psig.</li> </ul>
	RO	<p>Performs the Immediate Actions of AP-53.00</p> <p>[1] <b>Checks redundant indications of pressurizer pressure – NORMAL</b></p> <p>[2] <b>Places the Master Pressure Controller in MANUAL and lowers output to ~ 30%.</b></p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p><b>Critical Tasks (CT-3): Restore pressure to normal band prior to low pressure reactor trip at 1885 psig</b></p> </div> <p>Announces completion of Immediate Actions of AP-53.00.</p>
	SRO RO	<p>Step 1, 0-AP-53.00</p> <p>CHECK REDUNDANT INSTRUMENT CHANNEL(S) INDICATION – NORMAL.</p> <p>Reports Redundant indications of Pressurizer pressure normal.</p>
	SRO RO	<p>Step 2, 0-AP-53.00</p> <p>PLACE AFFECTED CONTROL(S)/ COMPONENT(S) IN MANUAL CONTROL AND STABILIZE PARAMETER USING REDUNDANT INDICATION</p> <p>Reports Master pressure Controller placed in manual and output set at 30%.</p>
	SRO	<p><i>Conducts brief using Brief Placard. RO Will report Critical parameters. BOP will report Critical Parameters. STA will state "Nothing to add".</i></p>
	SRO RO	<p>Step 3, 0-AP-53.00</p> <p>* VERIFY REACTOR POWER – LESS THAN OR EQUAL TO 100%</p> <p>Reports reactor power approximately 100% using PCS indication.</p>

Op-Test No.: Surry 2017-301 Scenario No.: 2

Event No.: 5

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Event Description: Pressurizer Pressure Master Pressure Controller Fails High (AP-53.00)

Cue: By Examiner.

	SRO	<p>Step 4, 0-AP-53.00</p> <p>CAUTION: If Reactor power has been affected by a secondary transient, Turbine adjustment may be needed to control Tave.</p> <p>NOTES before Step 4</p> <ul style="list-style-type: none"> <li>Step 4 failures are listed in order of performance priority. Only the failed instrument/control and associated step number should be read aloud.</li> <li>When the affected instrument/controller malfunction(s) has been addressed by this procedure, recovery actions should continue at Step 13.</li> </ul>
	<p>SRO</p> <p>RO</p>	<p>Step 4, 0-AP-53.00, Continued</p> <p>* DETERMINE THE FAILED INSTRUMENT / CONTROL AND GO TO APPROPRIATE STEP OR PROCEDURE:</p> <ul style="list-style-type: none"> <li>PRZR Pressure Control, Step 5</li> </ul>
	<p>SRO</p> <p>SRO</p> <p>RO</p>	<p>Step 5, 0-AP-53.00</p> <p><b>NOTE:</b> RCS pressure decrease will cause a slight decrease in RCS Tave due to negative reactivity from the moderator pressure coefficient.</p> <p>CHECK PRZR SPRAY VALVE CONTROLLERS – NORMAL</p> <p>Reports PRZR Spray Valve Controller Normal.</p>
	SRO	<p>Step 6, 0-AP-53.00</p> <p>GO TO ( )-AP-31.00, INCREASING OR DECREASING RCS PRESSURE</p> <p>Transitions to 1-AP-31.00.</p>
	<p>SRO</p> <p>RO</p>	<p>Step 1, 1-AP-31.00</p> <p>[1] CHECK PRZR PORVS – CLOSED</p> <p>Checks PRZR PORVs closed.</p>
	SRO	<p><i>SRO will hold a brief on entry to AP-31.00. SRO will direct RO to maintain RCS pressure at 2235 psig ± band, and pressure to be monitored by RO at a specific frequency.</i></p>

Op-Test No.: Surry 2017-301 Scenario No.: 2

Event No.: 5

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Event Description: Pressurizer Pressure Master Pressure Controller Fails High (AP-53.00)

Cue: By Examiner.

	SRO	Step 2, 1-AP-31.00  CAUTION: A Safety Injection may occur if the unit is not tripped prior to RCS pressure decreasing below 2100 psig.
	RO	CHECK RCS PRESSURE – DECREASING  <i>Reports Yes, RCS pressure initially lowering.</i>
	SRO	Step 3, 1-AP-31.00  CHECK MASTER CONTROLLER RESPONSE – NORMAL.
	RO	<i>Reports Master Pressure Controller Response NOT normal.</i>
	SRO	Step 3 RNO, 1-AP-31.00  a) Place 1-RC-PC-1444J, PRZR PRESS MASTER CNTRL, in MANUAL.
	RO	<i>Reports 1-RC-PC-1444J, PRZR PRESS MASTER CNTRL, is in MANUAL.</i>
	SRO	b) Lower demand on PRZR PRESS MASTER CNTRL to raise RCS pressure.
	RO	<i>Reports that demand has been lowered.</i>
	SRO	Step 4, 1-AP-31.00  CHECK PRZR SPRAY VALVES – CLOSED.
	RO	<i>Reports that PRZR SPRAY valves are closed.</i>
	SRO	Step 5, 1-AP-31.00  CHECK ALL PRZR HEATERS – ENERGIZED.
	RO	<i>Reports that all PRZR heaters are energized.</i>
	SRO	Step 6 Cautions & Notes, 1-AP-31.00  CAUTION: Lowering RCS pressure will cause the OT $\Delta T$ setpoint to lower.
	RO	NOTES: <ul style="list-style-type: none"> <li>Attachment 1 may be referred to for a diagram of the pressure control system.</li> <li>RCS pressure lowering will cause a slight reduction in RCS Tave due to negative reactivity from the moderator pressure coefficient.</li> </ul> <i>Acknowledges Cautions, and Notes.</i>



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Event No.: 5

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Event Description: Pressurizer Pressure Master Pressure Controller Fails High (AP-53.00)

Cue: By Examiner.

	SRO RO	Step 6, 1-AP-31.00  CHECK RCS PRESSURE – STILL LOWERING.  <i>Reports that No, RCS pressure is no longer lowering</i>  GOES TO STEP 10
	SRO RO	Step 10, 1-AP-31.00  CHECK RCS PRESSURE – STABILIZING AT OR TRENDING TO 2235 psig.  <i>Reports, Yes RCS pressure is stabilizing at (trending to) 2235 psig.</i>
	SRO	Step 11, 1-AP-31.00  GO TO STEP 17
	SRO RO	Step 17, 1-AP-31.00  CHECK MASTER CONTROLLER – IN MANUAL  <i>Reports, “Yes, MASTER PRESSURE CONTROLLER IS IN MANUAL.</i>
	SRO	Step 18, 1-AP-31.00  DECLARE 1-RC-PCV-1455C INOPERABLE.  <i>Declares 1-RC-PCV-1455C is INOPERABLE.</i>
	SRO RO	Step 19, 1-AP-31.00  CHECK PRZR PORVS – EITHER INOPERABLE. <ul style="list-style-type: none"> <li>• <b>1-RC-PCV-1455C</b></li> <li>• 1-RC-PCV-1456</li> </ul> <i>Reports, Yes, 1-RC-PCV-1455C is inoperable.</i>
	SRO RO	Step 20, 1-AP-31.00  CLOSE BLOCK VALVE FOR INOPERABLE PORV <ul style="list-style-type: none"> <li>• <b>1-RC-MOV-1536 if 1-RC-PCV-1455C INOPERABLE.</b></li> <li>• 1-RC-MOV-1535 if 1-RC-PCV-1456 INOPERABLE.</li> </ul>

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Event Description: Pressurizer Pressure Master Pressure Controller Fails High (AP-53.00)

Cue: By Examiner.

	SRO  RO	<p>Step 21, 1-AP-31.00</p> <p>CHECK PRZR PORVS – EITHER INCAPABLE OF BEING MANUALLY CYCLED.</p> <p><i>Reports NO, both PORVs are capable of being manually cycled.</i></p> <p>Goes to RNO, THEN goes to Step 23</p>
	SRO	<p>Step 23, 1-AP-31.00</p> <p>NOTIFY THE FOLLOWING:</p> <ul style="list-style-type: none"> <li>• OMOC</li> <li>• STA</li> <li>• I&amp;C</li> </ul> <p><i>Contacts the above named individuals</i></p>
	SRO	<p>Step 24, 1-AP-31.00</p> <p>REFER TO TECH SPECS:</p> <ul style="list-style-type: none"> <li>• 3.1.A.5 – Not applicable for this event.</li> <li>• <b>3.1.A.6. a, Relief Valves - With one or both PORVs inoperable but capable of being manually cycled, within 1 hour either restore the PORV(s) to OPERABLE status or close the associated block valve(s) and maintain power to the associated block valve(s). Otherwise, be in at least HOT SHUTDOWN within the next 6 hours and reduce Reactor Coolant System average temperature to &lt; 350°F within the following 6 hours</b></li> <li>• 3.1.C – Not applicable for this event.</li> <li>• <b>3.12.F – This LCO is met if pressure &gt; 2205 psig. During the lowering pressure transient, Pressurizer pressure more-than-likely lowered below the DNB limit of 2205 psig. Per TS 3.12.F.2, whenever any of the parameters in Tech Spec 3.12.F.1 has been exceeded (pressure &lt; 2205 psig) then either restore the parameter to within its limit within 2 hours or reduce Thermal Power to &lt; 5% within the next 6 hours.</b></li> </ul>
	SRO  STA	<p>Step 25, 1-AP-31.00</p> <p>REVIEW APPLICABILITY:</p> <ul style="list-style-type: none"> <li>• VPAP-2802</li> <li>• EAL MATRIX SU6.1</li> </ul> <p><i>The STA will report that he has reviewed these documents and discussed the results with the Shift Manager.</i></p>

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Event Description: Pressurizer Pressure Master Pressure Controller Fails High (AP-53.00)

Cue: By Examiner.

	SRO	Step 26, 1-AP-31.00  RESTORE PRESSURE CONTROL SYSTEM(S) TO NORMAL
		<b>END EVENT 5</b>

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Event No.: 6

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Event Description: Large Break LOCA (AP-16.00, E-0, E-0 Attachment 2 and 7, E-1)

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
	Team	<p>Diagnoses the failure with the following indications:</p> <p>Alarms:</p> <ul style="list-style-type: none"> <li>• RM-Q7 – CTMT PART ALERT/FAILURE</li> <li>• RM-Q8 – CTMT GAS ALERT/FAILURE</li> <li>• RM-R8 – CTMT GAS RM-RI-160 HIGH</li> </ul> <p><b>Indications:</b></p> <ul style="list-style-type: none"> <li>• CTMT Sump Level increasing</li> <li>• 1-DA-P-4A running continuously</li> </ul> <p><i>Unit 2 will perform RM ARPs, but will be unable to perform Auto Action verification.</i></p>
	SRO	<p>1-AP-16.00</p> <p>Direct initiation of 1-AP-16.00, EXCESSIVE RCS LEAKAGE</p>
	SRO	<p>1-AP-16.00</p> <p>Notes Prior to Step 1:</p> <ul style="list-style-type: none"> <li>• If SI Accumulators are isolated, 1-AP-16.01, Shutdown LOCA, should be used for guidance.</li> <li>• RCS average temperature has a direct impact on pressurizer level.</li> </ul>
	RO	<p>1-AP-16.00</p> <p>[1] MAINTAIN PRZR LEVEL:</p> <ul style="list-style-type: none"> <li>• <b>Isolate Letdown</b></li> <li>• <b>Control Charging flow</b></li> </ul> <p><b>RO isolates Letdown by closing; 1-CH-LCV-1460A or 1-CH-LCV-1460B (expected to close both), or by closing the orifice isolation valves, 1-CH-HCV 1200A, B, and C. The RO will take manual control of 1-CH-FCV-1122 to stabilize Pzr. level.</b></p>
	RO	<p>1-AP-16.00</p> <p>2. CHECK THE FOLLOWING PARAMETERS – STABLE OR INCREASING</p> <ul style="list-style-type: none"> <li>• PRZR Level</li> <li>• PRZR Pressure</li> <li>• RCS Subcooling</li> </ul> <p>Identifies that not all parameters are stable under the control of the operator. Team should identify RCS leak rate greater than 150 gpm.</p> <p><b>Team goes to 1-E-0.</b></p>

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Event No.: 6

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Event Description: Large Break LOCA (AP-16.00, E-0, E-0 Attachment 2 and 7, E-1)

Cue: By Examiner.

	SRO	GO TO 1-E-0, REACTOR TRIP OR SAFETY INJECTION
	SRO	<b>Directs RO to trip the reactor, perform E-0, and Manually Safety Inject on Step 4.</b>
	RO	<p><b><u>1-E-0 – Reactor Trip or Safety Injection</u></b></p> <p>[1] CHECK REACTOR TRIP:</p> <p>a) Manually trip reactor</p> <p><b>Pushes the reactor trip push buttons.</b></p> <p>b) Check the following:</p> <ul style="list-style-type: none"> <li>• All Rods On Bottom light – LIT</li> <li>• Reactor trip and bypass breakers – OPEN</li> <li>• Neutron flux - DECREASING</li> </ul>
	RO	1-E-0
	RO	<p>[2] CHECK TURBINE TRIP:</p> <p>a) Manually trip the turbine</p> <p><b>Pushes the turbine trip push buttons.</b></p> <p>b) Verify all turbine stop valves - CLOSED</p> <p>c) Isolate reheaters by closing MSR steam supply SOV</p> <ul style="list-style-type: none"> <li>• 1-MS-SOV-104</li> </ul> <p>d) Verify generator output breakers – OPEN (Time Delayed)</p>

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**Cue: By Examiner.**

	RO	<p>1-E-0 [3] CHECK BOTH AC EMERGENCY BUSES – ENERGIZED</p> <p>RO confirms that both AC emergency buses are energized.</p>
	<div style="text-align: center;">RO</div> <div style="text-align: center; margin-top: 100px;">RO</div>	<p>1-E-0 [4] CHECK IF SI INITIATED:</p> <ul style="list-style-type: none"> <li>a) Check if SI is actuated:             <ul style="list-style-type: none"> <li>LHSI pumps – RUNNING</li> <li>SI annunciators – LIT                 <ul style="list-style-type: none"> <li>A-F-3 SI INITIATED – TRAIN A</li> <li>A-F-4 SI INITIATED – TRAIN B</li> </ul> </li> </ul> </li> </ul> <p>4b) <b>Manually initiate SI</b></p> <p><b>The RO will manually initiate SI at step 4 by pushing both SI pushbuttons.</b></p> <p>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.</p> <p>RO should identify that there is NO SI flow to the core.</p> <p><i>The STA will have no input for the brief.</i></p>
	SRO/BOP	<p>1-E-0 5. Initiate Attachment 1.</p> <p><b>Note:</b> SRO will hand Attachment 2 to the RO, and Attachments 1 and 3 to the BOP.</p> <p>Evaluator Note: E-0 Attachments 2, and 7 are at the end of this section. Attachments 1, 3, and 4 are in Section 8 (BOP).</p> <div style="border: 2px solid black; padding: 5px; margin-top: 10px;"> <p><b>Critical Task CT-4:</b> The crew must restore HHSI flow to the core by manually opening 1-SI-MOV-1867C OR 1-SI-MOV-1867D prior to the RCS fully depressurizing or prior to exiting E-0.</p> </div>

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Event Description: Large Break LOCA (AP-16.00, E-0, E-0 Attachment 2 and 7, E-1)

Cue: By Examiner.

	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.
	<p>SRO</p> <p>RO</p>	<p>1-E-0</p> <p>*6. CHECK RCS AVERAGE TEMPERATURE</p> <ul style="list-style-type: none"> <li>• STABLE AT 547°F</li> </ul> <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> <li>• TRENDING TO 547°F</li> </ul> <p>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):</p> <p style="padding-left: 40px;">Stop dumping steam</p> <p style="padding-left: 40px;"><b>Reduce AFW flow to the SGs</b></p> <p style="padding-left: 40px;">Close MSTVs if cooldown continues</p>
	<p>SRO</p> <p>RO</p>	<p>1-E-0</p> <p>7. CHECK PRZR PORVs AND SPRAY VALVES:</p> <ul style="list-style-type: none"> <li>a) PRZR PORVs – CLOSED</li> <li>b) PRZR spray controls <ul style="list-style-type: none"> <li>• Demand at Zero (or)</li> <li>• Controlling Pressure</li> </ul> </li> <li>c) PORV block valves - AT LEAST ONE OPEN</li> </ul>

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Event Description: Large Break LOCA (AP-16.00, E-0, E-0 Attachment 2 and 7, E-1)

Cue: By Examiner.

	SRO  RO	<p>1-E-0</p> <p><b>NOTE:</b> Seal injection flow should be maintained to all RCPs.</p> <p>*8. CHECK RCP TRIP AND MINIFLOW RECIRC CRITERIA:</p> <p>a) Charging Pumps – AT LEAST ONE RUNNING AND FLOWING TO RCS</p> <p>Two or three Charging pumps will be running and flowing to the RCS.</p> <p>b) RCS subcooling - LESS THAN 30°F [85°F]</p> <p>RCS subcooling may or may not be less than 30 °F at this time.</p> <p>RNO for the step is to go to step 9.</p> <p><b>NOTE:</b> 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. CAP pages are at the end of this section</p>
	RO	<p>1-E-0</p> <p>9. CHECK IF SGs ARE NOT FAULTED:</p> <ul style="list-style-type: none"> <li>• Check pressures in all SGs</li> </ul> <p>a) STABLE OR INCREASING AND</p> <p>b) GREATER THAN 100 PSIG</p> <p>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.</p>
	SRO  Unit 2 Unit 2          RO	<p>1-E-0</p> <p>10. CHECK IF SG TUBES ARE NOT RUPTURED:</p> <ul style="list-style-type: none"> <li>• Condenser air ejector radiation – NORMAL</li> <li>• SG blowdown radiation – NORMAL</li> <li>• SG MS radiation – NORMAL</li> <li>• TD AFW pump exhaust radiation – NORMAL</li> <li>• SG NR Level - NOT INCREASING IN AN UNCONTROLLED MANNER</li> </ul> <p>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.</p>



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Event Description: Large Break LOCA (AP-16.00, E-0, E-0 Attachment 2 and 7, E-1)

Cue: By Examiner.

	SRO	1-E-0 11 CHECK RCS - INTACT INSIDE CTMT <ul style="list-style-type: none"> <li>• CTMT radiation - NORMAL</li> <li>• CTMT pressure - NORMAL</li> <li>• CTMT RS sump level – NORMAL</li> </ul>
	RO	Identify CTMT conditions as abnormal
	SRO	GO TO 1-E-1, LOSS OF REACTOR OR SECONDARY COOLANT.
	SRO	<b>1-E-1</b> Conducts a Brief summarizing the Event and Establish priorities.
	RO	RO/BOP will provide Critical Parameters  <i>The STA will have no input for the brief.</i>  The SRO will complete the Brief and continue with E-1.
	SRO	1-E-1  1. CHECK RCP TRIP AND MINIFLOW RECIRC CRITERIA. a) Charging pumps – At LEAST ONE RUNNING AND FLOWING TO RCS. b) RCS subcooling – LESS THAN 30°F [85°F] c) STOP ALL RCPs.
	RO	<i>Responds that all 3 charging pumps are running and flowing to the RCS. Subcooling is less than 30°F. Stops all RCPs. (Note: This may already have been completed by E-0 CAP)</i>
	SRO	d) RCS pressure – LESS THAN 1275 psig [1475 psig] e) CLOSE CHG pump miniflow recirc valves.
	RO	<i>Responds that RCS pressure is less than 1275 psig. Closes CHG pump mini flow valves 1-CH-MOV-1275A, 1275B, and 1275C. Note: This may have already been performed by E-0 CAP.</i>
	SRO	1-E-1  2. CHECK IF SGs ARE NOT FAULTED. CHECK pressures in all SGs: <ul style="list-style-type: none"> <li>• STABLE OR RISING</li> </ul>
	RO	<i>Responds “Yes, SGs are not faulted”</i>

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Event Description: Large Break LOCA (AP-16.00, E-0, E-0 Attachment 2 and 7, E-1)

Cue: By Examiner.

	SRO	1-E-1
	RO	<p>3. CHECK INTACT SG LEVELS.</p> <p>a) Narrow Range level – GREATER THAN 12% [18%].</p> <p>b) Check emergency busses – BOTH ENERGIZED.</p> <p>c) Control feed flow to maintain narrow range level between 22% and 50%.</p> <p><i>Responds All SGs are intact.</i></p>
	SRO	1-E-1
	RO/U2	<p>4. CHECK IF SG TUBES ARE NOT RUPTURED:</p> <ul style="list-style-type: none"> <li>• Condenser air ejector radiation – NORMAL. <i>U2 responds NORMAL.</i></li> <li>• SG blowdown radiation – NORMAL. <i>U2 responds NORMAL.</i></li> <li>• SG main steam radiation – NORMAL. <i>RO responds NORMAL.</i></li> <li>• TD AFW pump exhaust radiation – NORMAL. <i>RO responds NORMAL.</i></li> <li>• SG NR Level – NOT RISING IN AN UNCONTROLLED MANNER.</li> </ul> <p><i>RO responds SG TUBES ARE NOT RUPTURED.</i></p>
	SRO	1-E-1
	RO	<p>CAUTION: 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.</p> <p>5. CHECK PRZR PORVs AND BLOCK VALVES:</p> <p>a) Power to PRZR PORV block valves AVAILABLE</p> <p><i>Yes, Power is available to PRZR PORV block valves.</i></p>
	SRO	b) PRZR PORVs - CLOSED
	RO	<i>Yes, PRZR PORVs are CLOSED.</i>
	SRO	c) PRZR PORV block valves – AT LEAST ONE OPEN
	RO	<i>Yes, one PORV block valve is OPEN.</i>
	SRO	1-E-1
	RO	<p>*6. CHECK IF SI FLOW SHOULD BE REDUCED:</p> <p>a) RCS subcooling based on CETCs – GREATER THAN 30°F [85°F]</p> <p><i>Responds No subcooling is less than 30°F [85°F].</i></p> <p>Goes to Step 7</p>

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Event Description: Large Break LOCA (AP-16.00, E-0, E-0 Attachment 2 and 7, E-1)

Cue: By Examiner.

	SRO	1-E-1  *7. CHECK IF HI HI CLS INITIATED: <ul style="list-style-type: none"> <li>CS pump(s) – RUNNING</li> <li>OR</li> <li>Any Hi Hi CLS annunciator – LIT</li> </ul>
	RO	<i>Responds, Yes HI HI CLS is INITIATED.</i>
	SRO	1-E-1  8. CHECK SERVICE WATER AVAILABLE: a) Check Intake Canal level – BEING MAINTAINED BY CW PUMPS
	RO	<i>Responds, Yes Intake Canal is being maintained by CW pumps.</i>  Goes to step 12
	SRO	1-E-1  12. CHECK IF CS PUMPS CAN BE STOPPED a) Check the following: <ul style="list-style-type: none"> <li>RWST level – LESS THAN 3% AND</li> <li>CS Pump amps – FLUCTUATING</li> </ul>
	RO	<i>Responds No, RWST level is NOT less than 3%. Step 12 RNO; Perform steps 12b through 12f when these conditions are met.</i>  Goes to step 14.
	SRO	1-E-1  CAUTION: RCS pressure should be monitored. If RCS pressure lowers in an uncontrolled manner to less than 250 psig [400 psig], one LHSI pump must be manually restarted to supply water to the RCS  14. CHECK IF LHSI PUMPS SHOULD BE STOPPED: a) Check RCS pressure: 1) Pressure – GREATER THAN 250 PSIG [400 PSIG] 2) Pressure – STABLE OR RISING
	RO	<i>Responds No pressure is not greater than 400 psig</i>  Goes to step 16.

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Event Description: Large Break LOCA (AP-16.00, E-0, E-0 Attachment 2 and 7, E-1)

Cue: By Examiner.

	SRO  RO	1-E-1  16. CHECK IF EDGs CAN BE STOPPED: a) Check AC emergency buses – ENERGIZED BY OFFSITE POWER b) Reset both trains of SI if necessary.  <i>Responds, AC emergency buses are energized by OFFSITE Power. SI has been reset (resets SI if it hasn't been reset).</i>  c) Check CTMT pressure – LESS THAN 14 PSIA  <i>Responds, CTMT pressure is NOT less than 14 PSIA.</i>  Goes to step 17.
	SRO	1-E-1  17. CHECK INSTRUMENT AIR AVAILABLE a) Check annunciator B-E-6 – 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  <i>Responds, annunciator B-E-6 is NOT LIT. 1-IA-C-4A is running. 1-IA-TV-100 is CLOSED due to HI HI CLS.</i>

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Event Description: Large Break LOCA (AP-16.00, E-0, E-0 Attachment 2 and 7, E-1)

Cue: By Examiner.

	SRO	1-E-1
	RO	18. INITIATE EVALUATION OF PLANT STATUS: a) Check at least one train of cold leg recirculation capability: 1) Train A – AVAILABLE <ul style="list-style-type: none"><li>• 1-SI-P-1A</li><li>• 1-SI-MOV-1863A</li><li>• 1-SI-1885 A and D</li><li>• 1-SI-MOV-1860A</li><li>• 1-SI-MOV-1862A</li><li>• 1-CH-MOV-1115 B and D</li><li>• 1-CH-MOV-1115C or E</li></ul> <i>Responds, Train A is not available due to 1-SI-P-1A tagged out</i>
	SRO	2) Train B – AVAILABLE
	RO	<ul style="list-style-type: none"><li>• 1-SI-P-1B</li></ul> <i>Responds, Train B is not available due to 1-SI-P-1B overcurrent trip.</i>
	SRO	Goes to 1-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION
		<b>End EVENT #6</b>

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Event Description: Large Break LOCA. E-0 ATTACHMENT 2

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
		<b>ATTACHMENT 2 of 1-E-0</b>  <b>NOTE:</b> 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. <ul style="list-style-type: none"> <li>1-CH-MOV-1115B</li> <li>1-CH-MOV-1115D</li> </ul>
	RO	ATTACHMENT 2 of 1-E-0  2. Check closed or close CHG pump suction from VCT MOVs. <ul style="list-style-type: none"> <li>1-CH-MOV-1115C</li> <li>1-CH-MOV-1115E</li> </ul>
	RO	ATTACHMENT 2 of 1-E-0  3. Check running or start at least two CHG pumps. (listed in preferred order) <ul style="list-style-type: none"> <li>1-CH-P-1C</li> <li>1-CH-P-1B</li> </ul>
	RO	ATTACHMENT 2 of 1-E-0  4. Check opened or open HHSI to cold legs MOVs. <ul style="list-style-type: none"> <li>1-SI-MOV-1867C</li> <li>1-SI-MOV-1867D</li> </ul> <b>Opens 1-SI-1867C, and 1-SI-1867D.</b>  <div style="border: 1px solid black; padding: 5px;"> <b>Critical Task CT-4: Restore HHSI flow to the core by manually opening 1-SI-MOV-1867C OR 1-SI-MOV-1867D prior to the RCS fully depressurizing or prior to exiting E-0.</b> </div>
	RO	ATTACHMENT 2 of 1-E-0  5. Check closed or close CHG line isolation MOVs. <ul style="list-style-type: none"> <li>1-CH-MOV-1289A</li> <li>1-CH-MOV-1289B</li> </ul>

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Event Description: Large Break LOCA. E-0 ATTACHMENT 2

Cue: By Examiner.

	RO	<p>ATTACHMENT 2 of 1-E-0</p> <p>6. Check closed or close Letdown orifice isolation valves.</p> <ul style="list-style-type: none"> <li>• 1-CH-HCV-1200A</li> <li>• 1-CH-HCV-1200B</li> <li>• 1-CH-HCV-1200C</li> </ul>
	RO	<p>ATTACHMENT 2 of 1-E-0</p> <p>7. Check opened or open LHSI suction from RWST MOVs.</p> <ul style="list-style-type: none"> <li>• 1-SI-MOV-1862A</li> <li>• 1-SI-MOV-1862B</li> </ul>
	RO	<p>ATTACHMENT 2 of 1-E-0</p> <p>8. Check opened or open LHSI to cold legs MOVs.</p> <ul style="list-style-type: none"> <li>• 1-SI-MOV-1864A</li> <li>• 1-SI-MOV-1864B</li> </ul>
	RO	<p>ATTACHMENT 2 of 1-E-0</p> <p>9. Check running or <b>start at least one LHSI pump.</b></p> <ul style="list-style-type: none"> <li>• 1-SI-P-1A</li> <li>• 1-SI-P-1B</li> </ul> <p>Note: 1-SI-P-1B will trip 5 minutes after SI. 1-SI-P-1B may or may not be running. If it has tripped then annunciator 1A-H4, LHSI PP 1B LOCKOUT OR OL TRIP will be lit and the operator should not attempt to start 1-SI-P-1B.</p>
	RO	<p>ATTACHMENT 2 of 1-E-0</p> <p>10. Check High Head SI flow to cold legs indicated.</p> <ul style="list-style-type: none"> <li>• 1-SI-FI-1961</li> <li>• 1-SI-FI-1962</li> <li>• 1-SI-FI-1963</li> <li>• 1-SI-FI-1943 or 1-SI-FI-1943A</li> </ul>

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Event No.: 6

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Event Description: Large Break LOCA. E-0 ATTACHMENT 7

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
	RO	<p><b>ATTACHMENT 7 of 1-E-0</b></p> <p>1. Check SI is in progress. IF SI NOT in progress, THEN RETURN TO procedure step in effect.</p> <p>Identifies SI in progress, GOES TO STEP 2.</p>
	RO	<p><b>ATTACHMENT 7 of 1-E-0</b></p> <p>2. Check running or start AFW Pumps, as necessary.</p> <p>1-FW-P-3A 1-FW-P-3B 1-FW-P-2</p> <p>Identifies AFW PUMPs Running.</p>
	RO	<p><b>ATTACHMENT 7 of 1-E-0</b></p> <p>3. Maintain at least 350 gpm [450 gpm] AFW flow until one SG Narrow Range Level is greater than 12% [18%].</p> <p>Confers with SRO to determine AFW flow requirement.</p> <p><b>Throttles AFW Flow to achieve ~120 gpm per SG.</b></p>
	RO	<p><b>ATTACHMENT 7 of 1-E-0</b></p> <p>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.</p> <p>Acknowledges NOTE.</p> <p>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:</p> <p>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</p> <p>Checks SG NR level rising and continues to Step 5.</p>



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Event No.: 6

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Event Description: Large Break LOCA. E-0 ATTACHMENT 7

Cue: By Examiner.

	RO	<p>ATTACHMENT 7 of 1-E-0</p> <p>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</p> <p>Identifies Both Emergency Buses energized, returns Attachment 7 to SRO.</p>
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**Cue: Pre-Event Failures.**

Time	Position	Applicant's Action or Behavior
		1-ECA-1.1
	SRO	Conducts a Brief summarizing the Event and Establish priorities.
	RO	RO/BOP will provide Critical Parameters  <i>The STA will have no input for the brief.</i>  The SRO will complete the Brief and continue with ECA-1.1.
	SRO	1-ECA-1.1  CAUTION: <ul style="list-style-type: none"> <li>If emergency coolant recirculation capability is restored, return to the procedure and step in effect.</li> <li>If suction source is lost to any SI or spray pump, the pump should be stopped.</li> </ul> NOTES: <ul style="list-style-type: none"> <li>Attachment 1 provides a graph of the minimum amount of RCS makeup flow required to remove decay heat. (<i>Attachment 1 located at the end of this section</i>)</li> <li>If procedure has been entered due to CTMT sump blockage, FRs should NOT be implemented until directed.</li> <li>The minimum containment sump level for manual restart of LHSI is 6.0 ft.</li> </ul> <i>SRO refers to Attachment 1 to determine amount of SI flow required. Determines that &gt; 250 gpm needed to provide adequate heat removal.</i>
	RO	1. CHECK EMERGENCYT COOLANT RECIRCULATION EQUIPMENT – AVAILABLE a) Check the following pumps – AVAILABLE: <ul style="list-style-type: none"> <li>1-SI-P-1A AND</li> <li>1-CH-P-1A, B, or C</li> </ul> <i>Responds, No 1-SI-P-1A is NOT AVAILABLE.</i>  Goes to step 2.
	SRO	1-ECA-1.1  2. TRY TO RESTORE THE REDUNDANT FLOW PATH FROM THE CTMT SUMP TO THE RCS a. Check the following pumps – AVAILABLE <ul style="list-style-type: none"> <li>1-SI-P-1B AND</li> <li>1-CH-P-2A, B, or C</li> </ul>
	RO	<i>Responds, No 1-SI-P-1B is NOT AVAILABLE</i>  Goes to Step 3.
	SRO	1-ECA-1.1  3. RESET BOTH TRAINS OF SI

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Event No.: 7

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Event Description: LOSS OF LHSI (ECA-1.1, ATTACHMENT 1)

Cue: Pre-Event Failures.

	RO	<i>Resets both trains of SI or announces that all trains of SI have been reset.</i>
	SRO	1-ECA-1.1 4. PUT RMT MODE TRANSFER SWITCHES IN THE REFUEL MODE.
	RO	<i>Places both RMT MODE TRANSFER switches in the REFUEL MODE.</i>
	SRO	1-ECA-1.1 5. CHECK RWST LEVEL – GREATER THAN 6%.
	RO	<i>Responds, RWST level is greater than 6%.</i>
	SRO	1-ECA-1.1 6. ESTABLISH ONE TRAIN OF SI FLOW: a. Check CHG pumps – ONLY ONE RUNNING.
	RO	<i>Responds, two CHG pumps (B, C) are running.</i>
	SRO	6a RNO) IF CTMT Sump blockage has <u>NOT</u> occurred, <u>THEN</u> start or stop CHG pumps to establish only one pump running.
	RO	<i>Secures either B or C CHG pumps.</i>
	SRO	b) Place non-running CHG pumps in PTL
	RO	<i>Places CHG pump in PTL.</i>
	SRO	c) RCS pressure – LESS THAN 250 PSIG [400 PSIG]
	RO	d) Check LHSI pumps – ONLY ONE RUNNING.
	RO	<i>Responds No, there are no LHSI pumps running.</i>
	SRO	e) Implement FRs as necessary. f) GO TO Step 8

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Event No.: 7

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Event Description: LOSS OF LHSI (ECA-1.1, ATTACHMENT 1)

Cue: Pre-Event Failures.

	SRO	1-ECA-1.1															
	RO	CAUTION: Operation of an OSRS pump without the associated CS pump could cause cavitation as indicated by fluctuating amperage.															
	SRO	NOTE: If CLS can NOT be reset, local breaker operation will be required to stop CS and ISRS pumps.															
	RO	8. CHECK RECIRCULATION SPRAY SYSTEM.															
	SRO	a) Check for EITHER of the following:															
	RO	<ul style="list-style-type: none"> <li>Any CS pump – RUNNING OR REQUIRED OR</li> <li>RWST level - LESS THAN 20%</li> </ul> <i>Responds, Yes the 'A' CS pump is running.</i>															
	SRO	b) Check CTMT sump level – GREATER THAN 4.0 ft.															
	RO	c) Check SW aligned to at least two RS HXs.															
	SRO	d) Start RS pumps associated with aligned RS HXs															
	RO	<i>Starts two RS pumps as directed by SRO.</i>															
	SRO	1-ECA-1.1															
	RO	9. DETERMINE CS REQUIREMENTS.															
	SRO	a) Determine number of CS pumps required.															
	RO	<table border="1"> <thead> <tr> <th>CONTAINMENT PRESSURE</th><th>RS PUMPS RUNNING</th><th>CS PUMPS REQUIRED</th></tr> </thead> <tbody> <tr> <td>GREATER THAN 60 PSIA</td><td>-----</td><td>2</td></tr> <tr> <td>BETWEEN 14 PSIA AND 60 PSIA</td><td>FEWER THAN 2</td><td>2</td></tr> <tr> <td></td><td>2 OR MORE</td><td>1</td></tr> <tr> <td>LESS THAN 14 PSIA</td><td>-----</td><td>0</td></tr> </tbody> </table>	CONTAINMENT PRESSURE	RS PUMPS RUNNING	CS PUMPS REQUIRED	GREATER THAN 60 PSIA	-----	2	BETWEEN 14 PSIA AND 60 PSIA	FEWER THAN 2	2		2 OR MORE	1	LESS THAN 14 PSIA	-----	0
CONTAINMENT PRESSURE	RS PUMPS RUNNING	CS PUMPS REQUIRED															
GREATER THAN 60 PSIA	-----	2															
BETWEEN 14 PSIA AND 60 PSIA	FEWER THAN 2	2															
	2 OR MORE	1															
LESS THAN 14 PSIA	-----	0															
	SRO	b) CS pumps running – EQUAL TO NUMBER REQUIRED.															
	RO	<i>Closes 1-CS-MOV-101C and 1-CS-MOV-101D.</i>															
	SRO	Note: Will not be able to close MOVs until CLS is reset (CTMT press , 14 psia)															
	SRO	1-ECA-1.1															
	RO	10. MAKE UP TO RWST USING 1-OP-CS-004, REFUELING WATER STORAGE TANK MAKEUP, WHILE CONTINUING WITH THIS PROCEDURE.															
		<b>End of Event 7</b>															

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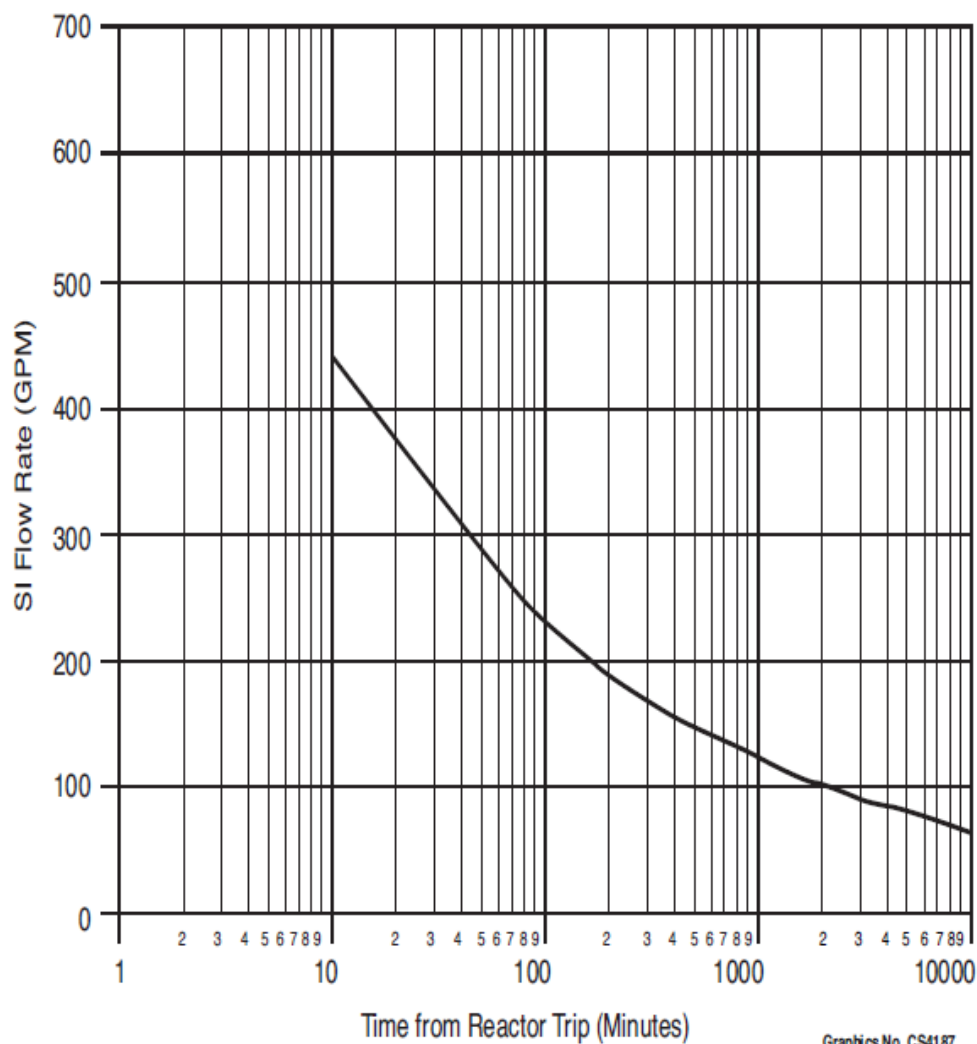
Event No.: 7

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Event Description: LOSS OF LHSI (ECA-1.1, ATTACHMENT 1)

Cue: Pre-Event Failures.

NUMBER 1-ECA-1.1	ATTACHMENT TITLE  MINIMUM SI FLOWRATE FOR DECAY HEAT REMOVAL VERSUS TIME FROM REACTOR TRIP	ATTACHMENT 1
REVISION 40		PAGE 1 of 1



Op-Test No.: Surry 2017-301 Scenario No.: 2

Event No.: 8

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Event Description: BOP FAILURES.

E-0 ATTACHMENTS 1

Cue: Pre Event failures.

Time	Position	Applicant's Action or Behavior
	BOP	<b>Attachment 1 of E-0</b>  1 CHECK FW ISOLATION: <ul style="list-style-type: none"> <li>• Feed pump discharge MOVs - CLOSED</li> <li>• 1-FW-MOV-150A</li> <li>• <b>1-FW-MOV-150B</b> <i>Closes 1-FW—MOV-150B</i></li> <li>• MFW pumps - TRIPPED</li> <li>• Feed REG valves - CLOSED</li> <li>• SG FW bypass flow valves - DEMAND AT ZERO</li> <li>• SG blowdown TVs – CLOSED</li> </ul>
	BOP	<b>Attachment 1 of E-0</b>  2 CHECK CTMT ISOLATION PHASE I: <ul style="list-style-type: none"> <li>• Phase I TVs – CLOSED (<i>Closes 1-BD-TV-100C</i>)</li> <li>• 1-CH-MOV-1381 – CLOSED</li> <li>• 1-SV-TV-102A - CLOSED</li> <li>• PAM isolation valves - CLOSED</li> <li>• 1-DA-TV-103A</li> <li>• 1-DA-TV-103B</li> </ul>
	BOP	<b>Attachment 1 of E-0</b>  3 CHECK AFW PUMPS RUNNING: <ul style="list-style-type: none"> <li>a) <b>MD AFW pumps - RUNNING (Time Delayed)</b> <i>Starts 1-FW-P-3A</i></li> <li>b) TD AFW pump - RUNNING IF NECESSARY</li> </ul>

Op-Test No.: Surry 2017-301 Scenario No.: 2

Event No.: 8

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Event Description: BOP FAILURES.

E-0 ATTACHMENTS 1

Cue: Pre Event failures.

	BOP	<b>Attachment 1 of E-0</b>  4. CHECK SI PUMPS RUNNING: <ul style="list-style-type: none"> <li>• CHG pumps –RUNNING</li> <li>• LHSI pumps – RUNNING</li> </ul>
	BOP	<b>Attachment 1 of E-0</b>  5. CHECK CHG PUMP AUXILIARIES: <ul style="list-style-type: none"> <li>• CHG pump CC pump – RUNNING</li> <li>• CHG pump SW pump - RUNNING</li> </ul>
	BOP	<b>Attachment 1 of E-0</b>  6. CHECK INTAKE CANAL: <ul style="list-style-type: none"> <li>• Level - GREATER THAN 24 FT</li> <li>• Level - BEING MAINTAINED BY CIRC WATER PUMPS</li> </ul>
	BOP	<b>Attachment 1 of E-0</b>  7. CHECK IF MAIN STEAMLINES SHOULD BE ISOLATED: <ul style="list-style-type: none"> <li>a) Check if ANY of the following annunciators - HAVE BEEN LIT               <ul style="list-style-type: none"> <li>• E-F-10 (High Steam Flow SI)</li> <li>• <b>B-C-4 (Hi Hi CLS Train A)</b></li> <li>• <b>B-C-5 (Hi Hi CLS Train B)</b></li> </ul> </li> <li>b) <b>Check MSTV - CLOSED</b></li> <li>c) Check either of the following – ACTUATED               <ul style="list-style-type: none"> <li>• Hi steam flow SI OR</li> <li>• Header to Line SI</li> </ul> </li> </ul> Identifies annunciators BC-4, BC-5 lit and goes to step 8.

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Event Description: BOP FAILURES.

E-0 ATTACHMENTS 1

Cue: Pre Event failures.

	BOP	<p><b>Attachment 1 of E-0</b></p> <p>*8. CHECK IF CS REQUIRED:</p> <ul style="list-style-type: none"><li>a) CTMT pressure – HAS EXCEEDED 23 PSIA</li><li><b>b) Manually initiate HI HI CLS</b></li><li><b>c) Trip all RCPs</b></li><li>d) <b>Check CS pumps – RUNNING</b></li><li>e) Initiate Attachment 4</li></ul> <p><b>Identifies pressure has exceeded 23 psia and goes to Attachment 4.</b></p>
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Event No.: 8

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Event Description: BOP FAILURES.

E-0 ATTACHMENTS 4

Cue: Pre Event failures.

NUMBER 1-E-0	ATTACHMENT TITLE  CLS COMPONENT VERIFICATION	ATTACHMENT 4
REVISION 71		PAGE 1 of 2

LOCATION: Vertical BoardVALVE 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-101BLOCATION: Unit 1 Vent PanelRECIRC FAN STATUS: OFF  
LIGHTS: AMBER☐ 1-VS-F-1A☐ 1-VS-F-1BLOCATION: Bench BoardVALVE 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 PanelPUMPS: RUNNING (Time delayed)☐ 1-SW-P-5A☐ 1-SW-P-5B☐ 1-SW-P-5C☐ 1-SW-P-5D

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Event Description: BOP FAILURES.

E-0 ATTACHMENTS 4

Cue: Pre Event failures.

NUMBER 1-E-0	ATTACHMENT TITLE  CLS COMPONENT VERIFICATION	ATTACHMENT 4
REVISION 71		PAGE 2 of 2

LOCATION: Annunciator Panel AALARMS: 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

**NOTE:** CLS must be reset to allow securing rad monitor pumps from the MCR.

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

LOCATION: Bench BoardVALVE POSITION: OPEN  
LIGHTS: RED

☐ 1-CS-MOV-102A    ☐ 1-CS-MOV-102B  
☐ 1-RS-MOV-156A    ☐ 1-RS-MOV-156B

**Critical Task CT-5: Open 1-CS-MOV-101A OR 1-CS-MOV-101B  
prior to Recirc Spray pump start (60% in RWST)**

☐ 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 BoardVALVE 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

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Event Description: BOP FAILURES.

E-0 ATTACHMENTS 3

Cue: Pre Event failures.

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

<u>MARK NUMBER</u>	<u>EQUIPMENT STATUS</u>
<input type="checkbox"/> 1-VS-F-4A & B	OFF
<input type="checkbox"/> 1-VS-HV-1A & B	OFF
<input type="checkbox"/> 1-VS-F-8A & B	OFF
<input type="checkbox"/> 1-VS-F-9A & B	GREEN
<input type="checkbox"/> 1-VS-F-59	GREEN
<input type="checkbox"/> 1-VS-F-6	OFF
<input type="checkbox"/> 1-VS-F-39	GREEN
<input type="checkbox"/> 1-VS-F-7A & B	GREEN
<input type="checkbox"/> 1-VS-HV-5	GREEN
<input type="checkbox"/> 1-VS-F-56A & B	GREEN
<input type="checkbox"/> 1-VS-F-40A & B	GREEN
<input type="checkbox"/> 1-VS-HV-4	OFF
<input type="checkbox"/> 2-VS-F-40A or B	RED
<input type="checkbox"/> 2-VS-HV-4	OFF

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Event Description: BOP FAILURES.

E-0 ATTACHMENTS 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

<u>MARK NUMBER</u>	<u>EXPECTED EQUIPMENT STATUS</u>	<u>RESPONSE NOT OBTAINED</u>
<input type="checkbox"/> a. AOD-VS-107A & B AOD-VS-108	RED GREEN	<input type="checkbox"/> a. Place AUX BLDG CENTRAL AREA MODE switch to FILTER.
<input type="checkbox"/> b. MOD-VS-100A & B AOD-VS-106	RED GREEN	<input type="checkbox"/> b. • Place MOD-VS-100A to FILTER. • Place MOD-VS-100B to FILTER.
<input type="checkbox"/> c. MOD-VS-200A & B AOD-VS-206	GREEN RED	<input type="checkbox"/> c. • Place MOD-VS-200A to UNFILTER. • Place MOD-VS-200B to UNFILTER.
<input type="checkbox"/> d. AOD-VS-103A & B AOD-VS-104	GREEN GREEN	<input type="checkbox"/> d. • Place AOD-VS-103A in UNFILTER. • Place AOD-VS-103B in UNFILTER. • Place AOD-VS-104 in FILTER.
<input type="checkbox"/> e. AOD-VS-101A & B AOD-VS-102	GREEN GREEN	<input type="checkbox"/> e. Place AOD-VS-101A and 101B in UNFILTER.
<input type="checkbox"/> f. AOD-VS-111A & B	GREEN	<input type="checkbox"/> f. Place COMBINE CONTAINMENT EXHAUST in ISOLATE.
<input type="checkbox"/> g. AOD-VS-110	GREEN	<input type="checkbox"/> g. Place AOD-VS-109A and 109B in FILTER.
<input type="checkbox"/> h. AOD-VS-112A & B	GREEN	<input type="checkbox"/> h. • Place AOD-VS-112A in CLOSE. • Place AOD-VS-112B in CLOSE.
<input type="checkbox"/> i. MOD-VS-58A & B 1-VS-F-58A & B	RED RED	<input type="checkbox"/> 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)		
<input type="checkbox"/> • Total flow - GREATER THAN 32400 cfm		
<u>AND</u>		
<input type="checkbox"/> • Flow through each filter bank - LESS THAN 39600 cfm		

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Event No.: 8

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Event Description: BOP FAILURES.

E-0 ATTACHMENTS 3

Cue: Pre Event failures.

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

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Event Description: BOP FAILURES.

E-0 ATTACHMENTS 3

Cue: Pre Event failures.

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

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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.

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Event Description: BOP FAILURES.

E-0 ATTACHMENTS 3

Cue: Pre Event failures.

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)
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.
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.

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Event Description: BOP FAILURES.

E-0 ATTACHMENTS 3

Cue: Pre Event failures.

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

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	CONTINUOUS ACTIONS PAGE	REVISION
1-E-0		71

1. RCP TRIP CRITERIA

Trip all RCPs if BOTH conditions listed below occur:

- Charging Pumps - AT LEAST ONE RUNNING AND FLOWING TO RCS
- RCS Subcooling - LESS THAN 30°F [85°F]

2. MINIFLOW RECIRC CRITERIA

- CLOSED - When RCS pressure is less than 1275 psig [1475 psig] AND RCP Trip Criteria are met (RCPs OFF).
- 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

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FOLDOUT PAGES FOR REFERENCED PROCEDURES

NUMBER 1-E-0	CONTINUOUS ACTION STEPS	REVISION 71
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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)

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FOLDOUT PAGES FOR REFERENCED PROCEDURES

CONTINUOUS ACTIONS PAGE FOR 1-E-11. RCP TRIP CRITERIATrip 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 CRITERIAFollowing 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 CRITERIAUse 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)

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## SIMULATOR OPERATOR'S GUIDE

## Simulator Scenario Checklist

- ☐ Perform Simulator Turnover Pre-session, and Post-session Checklist prior to the first Scenario of the day.
- ☐ Perform Simulator Turnover Post-session Checklist after the last Scenario of the day.

**Perform/Verify Simulator Setup:**

- ☐ ☐ ☐ Recall IC -392 (65%) and verify Trigger #30 implemented.  
OR  
Recall Base IC (IC10), Open Schedule, and Event Files for Scenario 2. Run Schedule file, and implement Trigger 30.
- ☐ ☐ ☐ Verify 1-SI-P-1A in Pull-To-Lock, with red (tagged) magnet
- ☐ ☐ ☐ Verify S/G A FW FLOW CH SEL to CH 477 (BLUE)
- ☐ ☐ ☐ Open the Monitor 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)
CH28 CHG LINE FLOW CONTROLLER FC-1122A FAILS	5	0	1	1	2	MANUAL
FW1801 A S/G MN FD FLOW SMTR FT-1477 FAILS	10	5:00	3	0	-1	MANUAL
FW2703 MAIN FW PUMP FW-P-1B OVERCURRENT TRIP	10	0	5	FALSE	TRUE	MANUAL
RC1501 PRZR PRESS CONTROLLER FAILURE (1-RC-PC-1444J)	10	5:00	7	0	1	MANUAL
RC0101 RCS COLD LEG A PIPE RUPTURE	10	20:00	9	0	10	MANUAL
CS0802 CS-P-1B BKR 14J5 OVERCURRENT TRIP	10:00	0	11	FALSE	TRUE	AUTO
SI0902 LHSI PUMP SI-P-1B OVERCURRENT TRIP	5:00	0	13	FALSE	TRUE	AUTO
SI34 DISABLE SI-MOV-8967C AUTO OPEN	0	0	30	FALSE	TRUE	MANUAL
SI35 DISABLE SI-MOV-8967D AUTO OPEN	0	0	30	FALSE	TRUE	MANUAL
CS12 DISABLE CSMOV101A AUTO OPEN	0	0	30	FALSE	TRUE	MANUAL
CS13 DISABLE CSMOV101B AUTO OPEN	0	0	30	FALSE	TRUE	MANUAL
FW48 DISABLE AFWP3A AUTO START	0	0	30	FALSE	TRUE	MANUAL
FW5502 FW-MOV-150B AUTO CLOSE DISABLE	0	0	30	FALSE	TRUE	MANUAL

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## SIMULATOR OPERATOR'S GUIDE

BD03 DISABLE BDTV100C AUTO CLOSURE	0	0	30	FALSE	TRUE	MANUAL
SW03 DISABLE SW-MOV-104A AUTO OPEN	0	0	30	FALSE	TRUE	MANUAL
SW1303 DISABLE SW-P-5C AUTO START	0	0	30	FALSE	TRUE	MANUAL
FP0301 FPS FACP07 ALARM HORN FAILURE	0	0	30	FALSE	TRUE	MANUAL
FP0302 FPS PC SPEAKER FAILURE	0	0	30	FALSE	TRUE	MANUAL

☐ ☐ ☐ Enter/Verify the following REMOTE FUNCTIONS:

Description	Delay	Ramp	Trigger	Value	Final	Trigger Type (Auto or Manual)
SIP1A_BKRPOS SIP-1A BKR 14H3 CUBICLE POSITION	0	0	30		RACK OPEN	MANUAL

☐ ☐ ☐ Enter/Verify the following EVENT TRIGGERS:

Trigger#	EVENT	Command
11	CSP1B_run	Sets Trigger 11
13	SIP1B_RUN	Sets Trigger 13

TRIGGER	TYPE	DESCRIPTION
1	MAN	Fails Pressurizer Pressure Master Pressure Controller High
3	MAN	Fails 'A' S/G Feed Flow Transmitter FT-1477 Low
5	MAN	Fails CHG Flow Controller FC-1122A High
7	MAN	Trips 1-FW-P-1B on overcurrent
9	MAN	Ruptures RCS Cold Leg A

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## SIMULATOR OPERATOR'S GUIDE

11	AUTO	Sets Trigger 11 after 1-CS-P-1B starts
13	AUTO	Sets Trigger 13 after SI initiates

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## SIMULATOR OPERATOR'S GUIDE

**Verify the following control room setup:**

- ☐ ☐ ☐ Place the simulator in RUN and verify normal 100% power operation indications.
- ☐ ☐ ☐ Verify Red Magnets on the following components: **1-SI-P-1A**
- ☐ ☐ ☐ Verify All pink magnets collected from previous scenarios.
- ☐ ☐ ☐ Verify vertical board PCS monitor on ALARM SCREEN.
- ☐ ☐ ☐ Reset ICCMs.
- ☐ ☐ ☐ Verify all calcalc points are displayed on PCS: U9103, U9104, U9105V.
- ☐ ☐ ☐ Verify Component Switch Flags; 1-VS-F-58A and 1-VS-F-58B switches (AUTO AFTER STOP).
- ☐ ☐ ☐ Verify Brass Caps properly placed (Hi-Hi CLS, MSTVs, CH-MOV-1350, CW and SW MOVs, CTMT Hogger suction, CNDSR Vacuum breaker).
- ☐ ☐ ☐ Radiation Monitors all clear.
- ☐ ☐ ☐ Verify SG PORVs set for 1035 psig.
- ☐ ☐ ☐ Verify "D" bank rod height at 190 steps and Bank Overlap Counter at 574.
- ☐ ☐ ☐ Advance Charts.
- ☐ ☐ ☐ Verify Containment Instrument Air Compressors are on Inside Suction (all RMs reset).
- ☐ ☐ ☐ Verify SYNC keys in proper place.
- ☐ ☐ ☐ Verify MOL reactivity plans and benchboard Reactivity Placard is current.
- ☐ ☐ ☐ Reset Blender Integrators for Boric Acid to 100 and PG to 1000.
- ☐ ☐ ☐ Verify stopwatches for RO and BOP.
- ☐ ☐ ☐ Verify Simulator "Session In Progress" light is turned ON.
- ☐ ☐ ☐ Verify no persons are logged onto network computer to ensure no procedures displayed.
- ☐ ☐ ☐ Verify PCS time matches Sim time.
- ☐ ☐ ☐ Spot check all ARPs are clean, **verify** the following ARPs are clean.

1B-A3	1C-B8	1C-D8	1D-E5
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## SIMULATOR OPERATOR'S GUIDE

1F-C7	1H-E5	1H-E6	1H-E7
1H-G5	1H-G6	1H-G7	1H-H8
1RM-Q7	1RM-Q8	1RM-R8	

☐ ☐ ☐ Verify CLEAN copies of the following procedures are in place.

1-OP-TM-005	0-AP-53.00 (3)	1-AP-16.00	1-AP-21.00
1-AP-31.00	1-E-0	1-E-1	1-ECA-1.1
1-OP-ZZ-002	1-OPT-RX-001	1-OP-CH-007	1-OP-CH-021
1-OP-TM-005 (marked up)			



**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.**

	<b>TEAM 1</b>	<b>TEAM 2</b>	<b>TEAM 3</b>
<b>SRO</b>			
<b>RO</b>			
<b>BOP</b>			

**Ask for and answer questions.**

**Op-Test No.: Surry 2017-301****Scenario No.: 2****Page 93 of 105****SIMULATOR OPERATOR'S GUIDE****Conduct shift turnover:**

The initial conditions have Unit 1 at 65% power with RCS boron concentration of 795 ppm.

Unit conditions have been stable at approximately 65% power. The 'B' Main Feed Pump 1-FW-P-1B was just started following pump bearing replacement.

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. The Extra RO will perform these checks.
- 1-SI-P-1A is tagged out for breaker work (8 hours ago). 72 hour TS clock in effect. Return to service expected later this shift.

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

Shift orders are to raise power on Unit #1 to 75% and hold at that power level for further Feed Pump testing.

The last shift performed one 30 gallon dilution followed by a manual makeup for training.

When the team has accepted the shift, proceed to the Session Conduct Section.

## SIMULATOR TURNOVER CHECKLIST

Pre Session Checks:			
Safety Injection Section (Magnets)	CW/SW Section	RCS Section	CVCS
SI-MOV-1865A <input type="checkbox"/> R <input type="checkbox"/> G SI-MOV-1865B <input type="checkbox"/> R <input type="checkbox"/> G SI-MOV-1865C <input type="checkbox"/> R <input type="checkbox"/> G SI-MOV-1869A <input type="checkbox"/> R <input type="checkbox"/> G SI-MOV-1869B <input type="checkbox"/> R <input type="checkbox"/> G SI-MOV-1890A <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> T/O SI-MOV-1890B <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> T/O SI-MOV-1890C <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> T/O Brass Cap <input type="checkbox"/> CLS TR A <input type="checkbox"/> CLS TR B	Brass Caps SW MOVs <input type="checkbox"/> 103A <input type="checkbox"/> 103B <input type="checkbox"/> 103C <input type="checkbox"/> 103D CW MOVs <input type="checkbox"/> 106A <input type="checkbox"/> 106B <input type="checkbox"/> 106C <input type="checkbox"/> 106D CW Inlet Throttle Plaques (10%) <input type="checkbox"/> 100A <input type="checkbox"/> 100B <input type="checkbox"/> 100C <input type="checkbox"/> 100D CTMT Hogger Suction Cap <input type="checkbox"/>	Tcold Loop Stop Pos (R – O) <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C Loop Bypass Valves (G – C) <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C Thot Loop Stop Pos (R - O) <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C SFP PPs Pwr <input type="checkbox"/> Norm <input type="checkbox"/> Alt PZR Level Recorder <input type="checkbox"/>	Core Life Plaque <input type="checkbox"/> Ramp Plan Book <input type="checkbox"/> OP-RX-010 Book <input type="checkbox"/> PG Int Set 1000 <input type="checkbox"/> BA Int Set 100 <input type="checkbox"/> Tavg/Tref Rec. <input type="checkbox"/> NI-NR-B <input type="checkbox"/> Group Step Ctrs <input type="checkbox"/> CERPIs <input type="checkbox"/> CH-MOV-1350 <input type="checkbox"/>
Main Steam/Feedwater	Electrical/VSP	PCS	RM/WD/BR
SG PORVs Set <input type="checkbox"/> MSTV Caps <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C SF/FF Rec Scale <input type="checkbox"/> Cond Vac Bkr Cap <input type="checkbox"/>	Synch Key <input type="checkbox"/> SVB Power <input type="checkbox"/> H <input type="checkbox"/> J LO System Switches <input type="checkbox"/> VS-F-58A Pwr <input type="checkbox"/> H <input type="checkbox"/> J <input type="checkbox"/> Grn Flag VS-F-58B Pwr <input type="checkbox"/> H <input type="checkbox"/> J <input type="checkbox"/> Grn Flag	PCS Main Screen U9103 <input type="checkbox"/> U9104 <input type="checkbox"/> U9105V <input type="checkbox"/> Alarm Screen (List) <input type="checkbox"/>	RM-112 <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C RM-113 <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C Comm RM Pwr <input type="checkbox"/> 1J <input type="checkbox"/> 2J Synch Key <input type="checkbox"/>
Post Session Checks:			
PCS Screens (Cleared/Display) <input type="checkbox"/> RO <input type="checkbox"/> BOP <input type="checkbox"/> SM <input type="checkbox"/> STA <input type="checkbox"/> PCs Logged OFF (including Booth) <input type="checkbox"/> Phone cleared <input type="checkbox"/> Recall IC-1 <input type="checkbox"/> Advance Charts <input type="checkbox"/> Procedures Changed <input type="checkbox"/> Red Light <input type="checkbox"/> Binders Stored <input type="checkbox"/> Trash Picked Up/Emptied <input type="checkbox"/> Vacuum Req'd? <input type="checkbox"/> Pink Magnets in Drawer <input type="checkbox"/> BB and VB Scenario Magnets removed <input type="checkbox"/> E-Mail to SSG Required <input type="checkbox"/> DVD Finalized <input type="checkbox"/> EAL Charts <input type="checkbox"/> Note Pads <input type="checkbox"/> Manning Sheets <input type="checkbox"/> Sticky Tabs (SRO/SM/ARPs) <input type="checkbox"/> Markers (ARPs) <input type="checkbox"/> Personnel/Comms Tracking Sheets (Booth) <input type="checkbox"/> Floor timers reset/In place <input type="checkbox"/> Booth timers reset/In place <input type="checkbox"/> Printers ready/have paper			

## SIMULATOR OPERATOR'S GUIDE

**Session Conduct:**

- Ensure conditions in Simulator Set-up are established.

**EVENT 1      Unit Ramp to 75% per 1-OP-TM-001**

## BOOTH:

30 minutes prior to the beginning of the scenario, provide the team with a marked up copy of 1-OP-TM-001, 1-OP-CH-021, and a Reactivity plan. The team will pre-brief the procedure for ramping the unit prior to entering the simulator

## Operations Supervisor/Management:

- **If contacted**, acknowledge start of Ramp to 75%.
- **If asked:** I&C is standing by to adjust IRPIs as necessary.

## I&amp;C:

- **If contacted:** Standing by to adjust IRPIs as necessary.

## System Operator/MOC

**If contacted:** acknowledge Surry Unit 1 starting ramp to 75% at normal rate

Field Operators: (*2 minute delay from request to answer*)

- **If contacted as Unit 1 Turbine Building:** monitoring Lube oil temperatures during ramp.
- **If contacted as Polishing Building Operator:** There are 6 Beds in service; D/P ~22 psig.

Role play as other individuals as needed.

## SIMULATOR OPERATOR'S GUIDE

**EVENT 2     Charging Line Flow Controller Fails High.**

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

Operations Supervisor/Management:

- **If contacted**, will acknowledge the malfunction of the Charging Line Flow Controller and entry into AP-53.00.
- **If contacted**, will take responsibility for writing the CR.
- **If contacted**, acknowledge that EPIPs and VPAP-2802 are required to be reviewed.

STA:

- **If contacted**, will acknowledge the malfunction of the Charging Line Flow Controller and entry into AP-53.00. 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**, reports to SRO that EPIPs, and VPAP-2802, have been reviewed and discussed with the Shift Manager.
- **If the team has a transient brief:** The STA will state that he has nothing to add.

Field Operators:

- **If dispatched to look at 1-FCV-1122**, report “no abnormalities noted.”

Maintenance/Work Week Coordinator:

- **If contacted**, will acknowledge the malfunction of the Charging Line Flow Controller and commence investigation of the failure.

Unit 2 Operator:

**If contacted**, will acknowledge the failure of the Charging Line Flow Controller.

## SIMULATOR OPERATOR'S GUIDE

**EVENT 3**    **'A' SG Feed Flow XMTR (Ch3) Fails low.**

When cued by examiner, (prior to step 11 of AP-53.00 from Event 2), implement **Trigger #3**.

BOOTH NOTE: **Critical Task: (CT-1):** Restore Feedwater to normal and restore S/G level to normal **prior to S/G High level trip at 75% NR.**

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.
- **If asked to walkdown LP Heater Drain pump**, report "no abnormalities noted."

Maintenance/ Work Week Coordinator:

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## SIMULATOR OPERATOR'S GUIDE

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

Maintenance/ Work Week Coordinator:

- **If contacted**, will the dropped rod and commence investigations into the reason the rod dropped into the core.
- **If contacted**, will acknowledge the impending ramp.

Unit 2:

- **If contacted**, will acknowledge the failure of the feed flow channel.
- **If contacted to perform 1-OP-RP-009**, respond “there is no one available at this time.

Role-play as other individuals as needed.

## SIMULATOR OPERATOR'S GUIDE

**EVENT 4**     **Loss of Main Feed Pump 1-FW-P-1B with power < 80%.**

When cued by examiner, implement **Trigger #7.**

**Critical Task CT-2: Start an additional Condensate pump, and lower power prior to S/G low level reactor trip at 17% NR.**

Booth Notes: Monitor Feed Flow during the ramp and inform the Chief Examiner when:

- SG 'A' Feed Flow is  $> 2.47 \times 10^6$  lbm/hr. Once Feed Flow is above this flow rate than a third Condensate pump needs to be started in order to restore SG level to program.
- SG 'A' Feed Flow is  $> 2.64 \times 10^6$  lbm/hr. Once Feed Flow is above this flow rate than a third Condensate pump will need to be started AND power will need to be lowered.

Operations Supervisor/Management:

- **If contacted**, acknowledge trip of the "A" Main Feed pump and actions taken per 1-AP-21.00.

Unit 2 Operator:

- **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.

STA:

- **If the team has a transient brief:** The STA will have no input for the brief.

Maintenance/Work Week Coordinator:

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

Role play as other individuals as needed.



## SIMULATOR OPERATOR'S GUIDE

**EVENT 5     Pressurizer Pressure Master Pressure Controller Fails High**

When cued by examiner, implement **Trigger #1**.

**Critical Task CT-3: Restore pressure to normal band prior to low pressure reactor trip at 1885 psig**

Operations Supervisor/Management:

- **If contacted**, will acknowledge the malfunction of the Master Pressure Controller and entry into AP-53.00/P-31.00.
- **If contacted**, will take responsibility for writing the CR.
- **If contacted**, will acknowledge, but not confirm, entry into 1 hour Tech Spec Clock to close the block valve for 1-RC-PCV-1455C.
- **If contacted**, acknowledge that EIPs and VPAP-2802 are required to be reviewed.

STA:

- **If contacted**, will acknowledge the malfunction of the Master Pressure Controller and entry into AP-53.00/P-31.00. 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**, reports to SRO that EIPs, and VPAP-2802, and SU6.1 have been reviewed and discussed with the Shift Manager.
- **If the team has a transient brief:** The STA will state that he has nothing to add.

Field Operators:

- **If contacted**, field operators will perform actions as directed.

Maintenance/Work Week Coordinator:

- **If contacted**, will acknowledge the malfunction of the Master Pressure Controller and commence investigation of the failure.

Unit 2 Operator:

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- **If contacted**, will acknowledge the Master Controller Malfunction.

## SIMULATOR OPERATOR'S GUIDE

**EVENT 6/7 Large Break LOCA/ Entry into ECA-1.1**

When cued by examiner, implement **Trigger #9**.

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

- RC0101, RCS Cold Leg A rupture will ramp in to 10% over 20 minutes.
- **Verify Trigger 13 goes active after SI is initiated.**
- **Verify Trigger 11 goes active after 1-CS-P-1B starts**

**Critical Task CT-4:** The crew must restore HHSI flow to the core by manually **opening 1-SI-MOV-1867C OR 1-SI-MOV-1867D** prior to the RCS fully depressurizing or prior to exiting E-0.

**Critical Task CT-5:** Manually open CS 1A discharge MOV; 1-CS-MOV 101A OR B prior to Recirc Spray pump start (60% in RWST) in order to provide adequate NPSH.

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.
- **If contacted**, will acknowledge equipment failures.
- **If contacted**, will acknowledge entry into 1-ECA-1.1, Loss of Emergency Coolant Recirculation.

STA:

- **If the team has a transient brief:** The STA will acknowledge monitoring of CSFSTs.
- **If directed**, monitor restoration of SI flow flow, and report PCS indicated flow when established.

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- **When conditions are met for FR-P.1**, Inform SRO that conditions are met for FR-P.1 (red path).
- **When notified**, acknowledge that EIPs 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.
- **If requested**, acknowledge RM alarms, and perform ARP actions.
- **If contacted**, Unit Two has implemented AP-50.00, and all conditions on U2 are normal.
- **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 1-SI-P-1B overcurrent trip. Acknowledge and call back after 2 minutes and report that 1-SI-P-1B breaker has an overcurrent trip flag on 'C' phase.
- **If contacted**, regarding 1-CS-P-1B overcurrent trip. Acknowledge and call back after 2 minutes and report that 1-SI-P-1B breaker has an overcurrent trip flag on 'A' 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 safety related equipment, and will commence troubleshooting as directed.

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Role play as other individuals as needed.

The Scenario will end after step 10 of 1-ECA-1.1 or as directed by Chief Examiner.

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Operations Supervisor/Management:

- **If contacted,**
- **If contacted,**

Unit 2 Operator:

- **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 of the need for an operator to complete the ARP.

Field Operators:

- **If directed,**

Role play as other individuals as needed.

The scenario will end upon entering 1-ECA-3.1 or at the lead examiners discretion.

Facility: <u>Surry Power Station</u>	Scenario No.: <u>3</u>	Op-Test No.: <u>2017-003</u>
Examiners: _____		Operators: _____
_____		_____
_____		_____
<p>Initial Conditions: Unit 1 90% power; MOL. Unit 2 at 100% power.</p> <ul style="list-style-type: none"> <li>1-SI-P-1A is tagged out for breaker work (8 hours ago). 72 hour TS clock in effect. Return to service expected later this shift.</li> <li>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. The Extra Reactor Operator will perform these checks.</li> </ul> <p>Turnover: The Crew will be provided a copy of 1-OP-TM-005 and a ramp plan to return Unit 1 to 100% power.</p>		

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N BOP R SRO/RO	Ramp Unit 1 to 100% power IAW 1-OP-TM-005
2	MS1401	I SRO/RO TS SRO	Channel III Turbine First Stage Impulse Pressure fails low, 120 second Ramp. 0-AP-53.00 <b>[CT-1]</b>
3	MS2102	I BOP/SRO	Steam Pressure channel input for "B" SG PORV will fail high causing "B" SG PORV to open. 0-AP-53.00, 1-AP-38.00.
4	CHLC112C Setpt, fail low	C RO/SRO	VCT level controller setpoint fails low causing CH-LCV-1115A to divert to the PDT. 0-AP-53.00.
5	FW1309, FWFCV498 C_Manual	I BOP/SRO TS SRO	Channel III "C" SG NR level input fails low causing "C" FRV to open complicated by failure of manual pushbutton. 0-AP-53.00, TS-3.7. <b>[CT-2]</b>
6	RC1403	C RO/SRO	#3 Seal, "C" RCP fails leading to manual reactor trip. 1-AP-9.00, E-0, ES-0.1.
7	FW1603 RS1001 RS1002  SW O/R CCTV105A/ B/C Close	M All	"C" SG Feed line break inside CTMT with failure of HI-HI CLS to actuate. FR-Z.1, E-0, E-2, ES-1.1. <b>[CT-3]</b>  <b>[CT-4]</b>
8	VS0102 VS1501 SI2509	C BOP	SI Components fail to reposition on SI signal. Identified and corrected using E-0 Attachments.

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

## LIST OF CRITICAL TASKS

CT #	EVENT	DESCRIPTION	MET (✓)
CT-1	2, Turbine Impulse Pressure Fail Low	Place rod control in manual prior to reactor trip and SI on High Steam Flow. Should the RO/BOP fail to take timely action to place rod control in manual, a reactor trip and SI will occur on High Steam Flow approximately 2 minutes following Event initiation. Actuation of the reactor protection system for this event would be considered failure of this CT. A Plant Representative will be available for consult during the Scenario.	
CT-2	5, C SG NR CH III, Fail Low	Control "C" SG NR level to prevent an automatic turbine trip/reactor trip on high SG NR level at 75%. Should the BOP fail to take timely action to control "C" SG NR level, an automatic turbine trip/reactor trip will occur approximately 80 seconds from Event initiation. Actuation of the reactor protection system for this event would be considered failure of this CT. A Plant Representative will be available for consult during the Scenario.	
CT-3	7, Feed Line Break in CTMT	Terminate CS and SI flow from the RWST prior to transition to 1-ES-1.3, Transfer to Cold Leg Recirculation, at RWST level of 20%. Critical Task start begins at initiation of CS and SI flow from RWST and ends when CS and SI flow is terminated. Time to reach RWST level of 20% is approximately 50 minutes. A Plant Representative will be available for consult during the Scenario.	
CT-4	7, Feed Line Break in CTMT	Secure A/B RCPs on loss of support conditions (Cooling Water flow) prior to receipt of RCP Frame Danger Annunciator (high vibrations). Approximately 22 minutes following CTMT pressure exceeding the Hi-Hi-CLS setpoint, Annunciator 1C-H4, RCP Frame Danger, will be received if the RCPs have not been secured. Failure to secure the RCPs when directed will adversely complicate Plant Recovery following blowdown of the faulted SG by preventing the use of the RCPs.	



**Event 1: Ramp 90% to 100% Power.** (N- BOP, R - RO/SRO)

The Crew will be pre-briefed prior to entering the Simulator concerning a ramp at the normal ramp rate from an initial power of 90%, in accordance with 1-OP-TM-005, Unit Ramping Operations. The Crew will be provided a copy 1-OP-TM-005 and the ramp plan for the power escalation.

**Verifiable Action(s):**

- 1) RO: Operate the control rods and blender systems as required by the ramp plan for the power escalation.
- 2) BOP: Operate the Turbine controls as necessary to begin the power escalation.

**Technical Specifications:** None.

**Event 2: First Stage Turbine Impulse Pressure Channel III Fail Low.** (I – RO/SRO, TS – SRO).

On Lead Evaluator Cue, the Malfunction for the failure of Channel III of Turbine Impulse Pressure will be actuated. This failure will cause control rods to drive in at 72 steps minute and cause the SGWLC setpoint for all three SGs to go to 33%. The RO is expected to place control rods in manual to stop rod motion IAW 0-AP-53.00. The BOP will monitor SG NR level as they trend to 33%. The SRO will consult Tech Specs and determine requirements as specified below. During recovery from the event, the RO is expected to return control rods to the pre-event rod height; the BOP will place all FRVs in manual control and restore SG NR levels to 44%, and then return the FRVs to Automatic Control. Actions taken IAW 0-AP-53.00, Loss of Vital Instrumentation/Controls. Approximately 6 minutes following the Channel Failure, AMSAC will be non-functional.

**Verifiable Actions(s):**

- 1) RO: Place rod control in manual to stop inward rod motion.
- 2) RO: Place Steam Dump Control in OFF, and Defeat Polishing Building Bypass prior to Shifting controlling channels of Turbine Impulse Pressure to Channel IV.
- 3) BOP: Place FRVs in Manual and restore SG NR level to program, and return FRVs to Automatic.

**Technical Specifications:**

- 1) TS 3.7, Item 20.e., Operator Action 13: within 1 hour determine by observation of the associated permissive annunciator window(s) that the interlock is in its required state for the existing plant condition, or be in at least HOT SHUTDOWN within the next 6 hours.
- 2) TS 3.7, Table 2, Item 1.e.1), "Steam Line Flow", Operator Action 20, With the number of OPERABLE channels less than the Total Number of Channels, REACTOR CRITICAL and/or POWER OPERATION may proceed provided the following conditions are satisfied:
  - a. The inoperable channel is placed in the tripped condition within 72 hours.
  - b. 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) TS 3.12.F.1, DNB Parameters, RCS Pressure <2205 psig, restore the RCS pressure to >2205psig within two (2) hours or reduce Thermal Power to less than 5% of Rated Power within the next 6 hours.
- 4) Per VPAP-2802, Notifications and Reports, Section 6.30.2, AMSAC is non-functional. A 30 day clock in effect to review 10CFR50.72/50.73 requirements for reportability.

**Critical Task: (CT-1)**, Place rod control in manual prior to reactor trip and SI on High Steam Flow. Should the RO/BOP fail to take timely action to place rod control in manual, a reactor trip and SI will occur on High Steam Flow. Actuation of the reactor protection system for this event would be considered failure of this CT. A Plant Representative will be available for consult during the Scenario.

**Event 3: “B” SG PORV Pressure Input Fails High. (I – BOP/SRO)**

Following completion of the required actions of event 2 and at the Lead Evaluator Cue, the malfunction will be actuated causing the failure of the Steam Pressure input for the “B” SG PORV to fail high leading to the “B” SG PORV to open in automatic. The BOP is expected to take Action IAW 0-AP-53.00, Loss of Vital Instrumentation/Controls, place the “B” SG PORV in Manual, and close the Valve. The Crew will perform 0-AP-53.00, and 1-AP-38.00, Main Stem System Control Malfunction, to address this failure.

**Verifiable Action(s):**

- 1) BOP: Place the “B” SG PORV in Manual and reduce demand to zero leading to the closure of the “B” SG PORV.

**Technical Specifications:**

None.

**Event #4: CVCS Letdown Controller Failure/CH-LCV-1115A fail to Divert Position (C – RO/SRO)**

Following the completion of Event 3 and at the Lead Evaluators Cue, the Malfunction is actuated to fail the setpoint of the CVCS Letdown controller, which causes 1-CH-LCV-1115A to fail to the Divert Position. The RO should respond IAW 0-AP-53.00, Loss of Vital Instrumentation/Controls, and place the control switch for 1-CH-LCV-1115A in the VCT position to stop the divert. Further action will be directed by the SRO using the guidance of 0-AP-53.00 to place the VCT level controller in Manual, reduce the setpoint to zero, and return the control switch for 1-CH-LCV-1115A to the Auto position.

**Verifiable Actions:**

- 1) RO: Place 1-CH-LCV-1115A control switch in VCT position.
- 2) RO: Place VCT level controller in manual and reduce the setpoint to zero.
- 3) RO: Return 1-CH-LCV-1115A control switch to Auto position.

**Technical Specifications:**

None.

**Event #5: “C” SG NR Level Channel III Fail Low/”C” FRV Manual-Down Button Disabled.**  
(I –BOP/SRO, TS – SRO)

When the actions of Event 4 are completed and Lead Evaluator Cue the malfunction will be initiated to cause Channel III “C” SG NR level to fail low. This failure results in the “C” FRV opening and the rise in “C” SG NR level. This failure is complicated by the failure of the “C” FRV controller Manual Down button to function, requiring the BOP to use the FRV MOV to throttle feed flow to the “C” SG before a turbine/reactor trip occurs on high SG level. The actions of the BOP are taken IAW 0-AP-53.00, Loss of Vital Instrumentation/Controls. The SRO will use the guidance of 0-AP-53.00 in response to the failure.

**Verifiable Action(s):**

- 1) BOP: Place “C” FRV in manual and attempt to reduce feed flow to the “C” SG.
- 2) BOP: Use 1-FW-MOV-154C to throttle feed flow to the “C” SG. “C” FRV Bypass valve may also be used for fine control.

**Technical Specifications:**

- 1) TS 3.7, 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:
  - a. 1. The inoperable channel is placed in the tripped condition within 72 hours.
  - b. 2. 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) TS 3.7, Table 3.7-2, Items 3a, 1) and 2), Operator Action 20. With the number of OPERABLE channels less than the Total Number of Channels, REACTOR CRITICAL and/or POWER OPERATION may proceed provided the following conditions are satisfied:
  - a. The inoperable channel is placed in the tripped condition within 72 hours.
  - b. 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) TS 3.7, Table 3.7-3, Item 3a), Operator Action 20. With the number of OPERABLE channels less than the Total Number of Channels, REACTOR CRITICAL and/or POWER OPERATION may proceed provided the following conditions are satisfied:
  - a. The inoperable channel is placed in the tripped condition within 72 hours.
  - b. 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) TS Table 3.7-6, Item 15, SG Water Level (Narrow Range), 2 per SG – Met.

**Critical Task: (CT-2)** Control “C” SG NR level to prevent an automatic turbine trip/reactor trip on high SG NR level at 75%. Should the BOP fail to take timely action to control “C” SG NR level an automatic turbine trip/reactor trip will occur. Actuation of the reactor protection system for this event would be considered failure of this CT. A Plant Representative will be available for consult during the Scenario.

**Event #6: #3 Seal failure “C” RCP. (C –RO/SRO)**

Following completion of actions for Event 5 and with the Lead Evaluator Cue, the next event will occur. This malfunction is the failure of the #3 Seal on the “C” RCP resulting in low seal leakoff from the “C” RCP, loss of D/P on Seal 2/3, and small leak into CTMT. The Crew will respond to alarms and indications available and enter 1-AP-9.00, RCP Abnormal Conditions. On Step 8 RNO of the Abnormal Procedure, the Crew will have indications that of 0 gpm seal leakoff flow, the Crew will initiate E-0 to trip the reactor. The SRO should direct the BOP to the “C” Loop Pressurizer Spray Valve and secure the “C” RCP approximately 5 minutes after the reactor has been tripped. The Crew will Transition to and perform ES-0.1 while continuing actions of 1-AP-9.00.

**Verifiable Actions:**

- 1) RO: Manual reactor trip and performance of E-0 Immediate Actions from memory.

**Technical Specifications:**

None.

**Event #7: “C” SG Feed Line Break in CTMT with Hi-Hi CLS Failure.** (M – All)

When the actions of Event 6 have been completed and on the Lead Evaluator Cue, the malfunction for a Feed Line Break in CTMT will be actuated. The Crew is expected to respond by initiating SI and returning to E-0. As CTMT pressure rises and exceeds the Hi-Hi CLS setpoint (23 psia), the majority of Hi-Hi-CLS actions will fail with the exception that the CC cooling TVs for the RCPs (valves close.) The Crew should identify entry conditions for FR-Z.1 and enter the procedure to restore CTMT cooling. Upon completion of FR-Z.1, the Crew should transition to E-0, E-2, and ES-1.1.

**Verifiable Actions:**

- 1) RO: Manually start/align components to restore CTMT Cooling.

**Critical Task: (CT-3):** Terminate CS and SI flow from the RWST prior to transition to 1-ES-1.3, Transfer to Cold Leg Recirculation, at RWST level of 20%. Critical Task start begins at initiation of CS and SI flow from RWST and ends when CS and SI flow is terminated. Time to reach RWST level of 20% is approximately 50 minutes. A Plant Representative will be available for consult during the Scenario.

**Critical Task: (CT-4)** Secure A/B RCPs on loss of support conditions (Cooling Water flow) prior to receipt of RCP Frame Danger Annunciator (high vibrations). Approximately 22 minutes following CTMT pressure exceeding the Hi-Hi-CLS setpoint, Annunciator 1C-H4, RCP Frame Danger, will be received if the RCPs have not been secured. Failure to secure the RCPs when directed will adversely complicate Plant Recovery following blowdown of the faulted SG by preventing the use of the RCPs.

**Event #8: SI Components that fail to reposition following SI actuation.** (C – BOP)

Following exit from FR-Z.1, and re-entry into E-0, the following components will be identified by the BOP and placed in their required positions IAW E-0 Attachments:

- 1) 1-CH-TV-1204B, Letdown Outside CTMT isolation TV, Open, must be manually closed.
- 2) 1-VS-F-9A, Aux Bldg Central Area Fan, running, must be manually secured.
- 3) 1-VS-F-58B, Filtered Exhaust Fan, secured, must be manually started.
- 4) 1-VS-MOD-103C, MCR Ventilation isolation MOD, Open, must be manually closed.

The Scenario ends on Lead Evaluator Cue when the Crew has completed Step 11 of 1-ES-1.1.

Initial Conditions: Unit 1 at 90% with a ramp up to 100% power IAW 1-OP-TM-005 planned. The Crew will pre-brief the procedure and ramp plan prior to Simulator entry.			
Pre-load malfunctions: (Trigger 30's) <ul style="list-style-type: none"> <li>○ SIP1A_BKRPOS, RACKOUT</li> <li>○ FP0301, FACP07 ALARM HORN FAILURE</li> <li>○ FP0302, FPS SPEAKER FAILURE</li> </ul>			
Equipment Status/ Procedures/ Alignments/ Data Sheets/ etc.: <ul style="list-style-type: none"> <li>○ 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. OC-18 for monitoring being performed by Unit 2 BOP.</li> <li>○ 1-SI-P-1A is tagged out for breaker work (8 hours ago). 72 hour TS clock in effect. Return to service expected later this shift.</li> </ul>			
Turnover: <ul style="list-style-type: none"> <li>• Ramp Unit 1 to 100% power in accordance with 1-OP-TM-005, Unit Ramping Operations and the provided Ramp Plan.</li> <li>• The performance of this procedure has been analyzed based on the current plant configurations, has been approved by Station Management, and the PSA indicates green.</li> </ul>			
Event	Malf. #'s	Severity	Instructor Notes and Required Feedback
1	N/A	N/A	Ramp Unit 1 to 100% power IAW 1-OP-TM--005
2	MS1401	-2 Deg	Channel III Turbine First Stage Impulse Pressure fails low, 120 second Ramp. 0-AP-53.00 <b>[CT-1]</b>
3	MS2102	+1 Deg	Steam Pressure channel input for "B" SG PORV will fail high causing "B" S PORV to open. 0-AP-53.00, 1-AP-38.00.
4	CHLC112C Setpt, fail low	0	VCT level controller setpoint fails low causing CH-LCV-1115A to divert to the PDT. 0-AP-53.00.
5	FW1309, FWFCV498 C_Manual	-1 Deg O/R OFF	Channel III "C" SG NR level input fail low causing "C" FRV to open complicated by failure of manual pushbutton. 0-AP-53.00, TS-3.7. <b>[CT-2]</b>
6	RC1403	100% Deg	#3 Seal, "C" RCP fails leading to manual reactor trip. 1-AP-9.00, E-0, ES-0.1.
7.	FW1603 RS1001 RS1002  SW O/R CCTV105A/ B/C Close	100% Dg  True  O/R, Close, ON	"C" SG Feed line break inside CTMT with failure of HI-HI CLS to actuate. FR-Z.1, E-0, E-2, ES-1.1. <b>[CT-3]</b>  <b>[CT-4]</b>
8	VS0102 VS1501 SI2509	True	SI Components fail to reposition on SI signal. Identified and corrected using E-0 Attachments.

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## SHIFT TURNOVER INFORMATION

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### **OPERATING PLAN:**

Unit 1 is at 90% power with RCS boron concentration of 825 ppm.

All systems and crossties are operable with the following exception:

- 1-SI-P-1A is tagged out for breaker work (8 hours ago). 72 hour TS clock in effect. Return to service expected later this shift.
- 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. The Extra Reactor Operator will perform these checks.

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

Shift orders are to ramp Unit 1 to 100% power IAW 1-OP-TM-005, Unit Ramping Operations and the reactivity plan provided by Reactor Engineering. Performance of 1-OP-TM-005 has been authorized and has been PSA analyzed for current plant conditions.

The last shift performed one 30 gallon dilution. Previous to this, shifts had been performing two 30 gallon dilutions.

### **Scenario 3:**

#### **Scenario Objectives:**

- A. Given conditions requiring ramp in power to 100%, perform the ramp in accordance with 1-OP-TM-005, Unit Ramping Operations, and the provided ramp plan.
- B. Given a failure of Channel III Turbine Impulse Pressure in the low direction, respond to the failure in accordance with 0-AP-53.00, Loss of Vital Instrumentation/Controls.
- C. Given the failure of the Steam Pressure input to the "B" SG PORV failing high, respond to the failure IAW 0-AP-53.00, Loss of Vital Instrumentation and Controls, and 1-AP-38.00, Main Steam System Control Malfunction.
- D. Given a failure of the VCT Level Controller setpoint in the low direction, respond in accordance with 0-AP-53.00, Loss of Vital Instrumentation/Controls.
- E. Given the failure of Channel III of "C" SG NR SG level in the low direction and subsequent failure of the "C" FRV to shift to manual control, respond in accordance with 0-AP-53.00, Loss of Vital Indications/Controls, to control "C" SG NR level using "C" FRV isolation MOV and/or "C" FRV Bypass HCV.
- F. Given a failure of "C" RCP #3 Seal, respond in accordance with 1-AP-9.00, RCP Abnormal Conditions to trip the reactor and secure the "C" RCP.
- G. Given a Feed Line Break inside CTMT with the failure of Hi-Hi CLS to actuate, respond in accordance with E-0, Reactor Trip or Safety Injection, and FR-Z.1, Response to High Containment Pressure.
- H. Given various SI components failing to reposition on SI actuation, respond in accordance with 1-E-0, Attachments to place the components in their required position.

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## SHIFT TURNOVER INFORMATION

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### Scenario Sequence

#### Event One: Ramp Increase in Reactor Power.

Following turnover, the Crew will begin raising reactor power from 90% to maximum rated thermal power in accordance with 1-OP-TM-005, Unit Ramping Operations.

Malfunctions required: None.

Objectives: (RO) Manipulate the Control Rods and the CVCS Blender system to control Tave and Delta Flux during the power escalation.

(BOP) Manipulate the Turbine Controls to begin the ramp up in power.

(SRO) Supervise and Direct the ramp up in power.

Success Path: Raise reactor power using Turbine Controls, Controls Rods, and the CVCVS Blender to while maintaining Tave/Tref within  $\pm 5^{\circ}\text{F}$  and Delta Flux within the target band.

#### Event Two: Channel III Turbine Impulse Pressure Fails Low.

When the Evaluating Team is ready, the malfunction is implemented to fail 1-MC-PT-1446 in the low direction. This will result in control rods inserting at 72 steps per minutes, SGWLC system setpoint to lower to 33%, and all SG NR level levels begin trending to 33%. The Crew will respond IAW 0-AP-53.00, Loss of Vital Instrumentation/Controls, to place rod control in manual to stop rod motion

Malfunctions required: One, MS1401.

Objectives: (RO): Place Rod Control in Manual to stop inward rod motion.

(BOP): Control FRV in Manual to restore SG NR level to 44%; return FRVs to Auto.

(SRO): Consult Tech Specs for the failure.

Success Path: Respond IAW 0-AP-53.00 to swap controlling channel of Turbine First Stage Pressure, restore SG NR level to 44%, and return control rods to pre-event height without exceeding maximum licensed power level.

**Critical Task: (CT-1)**, Place rod control in manual prior to reactor trip and SI on High Steam Flow. Should the RO/BOP fail to take timely action to place rod control in manual, a reactor trip and SI will occur on High Steam Flow. Actuation of the reactor protection system for this event would be considered failure of this CT. A Plant Representative will be available for consult during the Scenario.

#### Event Three: "B" SG PORV opens due to pressure input channel failing high.



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## SHIFT TURNOVER INFORMATION

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When the Evaluating Team is ready, the malfunction is implemented to cause the “B” SG PORV to fail full open. The BOP is expected to identify the failure, place the controller for the “B” SG PORV in Manual, and reduce demand to close the valve. Actions taken are in accordance with 0-AP-53.00 and 1-AP-38.00, Main Steam System Control Malfunction.

Malfunctions required: One, MS2102.

Objectives: (BOP) Operate the “B” SG PORV controller to close the open PORV.

Success Path: Close the open SG PORV by placing in Manual and reducing demand to 0.

### **Event Four:** VCT Level Controller setpoint fail low, Letdown Divert to the PDT.

When the Evaluating Team is ready, the failure of the VCT level controller is implemented which causes Letdown to divert to the PDT. The RO is expected to identify that letdown is diverting, and place 1-CH-LCV-1115A control switch in the “VCT” position. Actions taken in accordance with 0-AP-53.00.

Malfunctions required: One, Setpoint Override, CHLC112C\_SETPT, 0.

Objectives: (RO) Place the control switch for 1-CH-LCV-1115A in “VCT” position to stop diversion of Letdown flow to the PDT.

Success Path: Place VCT Level Controller in Manual and reduce demand to 0, then return 1-CH-LCV-1115A control switch to the “NORM” position.

### **Event Five:** Channel III “C” SG NR Level Fail Low with failure of “C” FRV controller to shift to Manual.

When the Evaluation Team is ready, the malfunction is implemented to cause Channel III NR level on “C” SG to fail low. This will result in “C” FRV opening to full demand. When the BOP attempts to take manual control of the “C” FRV, the controller will fail to shift to Manual, requiring the BOP to throttle feed flow using 1-FW-MOV-154C, “C” FRV Manual Isolation MOV, to prevent SG level from rising to the Turbine Trip setpoint of 75%. Operation of the MOV will provide gross control of SG level; once “C” SG level has been restored to normal, the BOP may use the “C” FRV bypass HCV for fine control of SG level. Actions taken are in accordance with 0-AP-53.00.

Malfunctions required: Two, FW1309, Switch O/R FWFC498F\_MANUAL OFF.

Objectives: (BOP) Control “C” SG NR level using “C” FRV isolation MOV and/or “C” FRV bypass HCV.

(SRO) Consult Tech Specs to determine requirements for the Channel Failure.

Success Path: Control “C” SG NR level to prevent a Turbine Trip/Reactor Trip on SG High level.

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## SHIFT TURNOVER INFORMATION

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**Critical Task: (CT-2)** Control “C” SG NR level to prevent an automatic turbine trip/reactor trip on high SG NR level at 75%. Should the BOP fail to take timely action to control “C” SG NR level an automatic turbine trip/reactor trip will occur. Actuation of the reactor protection system for this event would be considered failure of this CT. A Plant Representative will be available for consult during the Scenario.

**Event Six: #3 Seal Failure on “C” RCP.**

When the Evaluating Team is ready, the malfunction for the failure of #3 seal on “C” RCP is implemented. This failure causes a loss of seal D/P indication for #1 and #2 Seal, and “C” RCP seal return flow to go to 0 gpm indicated flow. The Crew will respond in accordance with 1-AP-9.00, RCP Abnormal Conditions. On Step 8 RNO, the procedure requires the reactor be tripped; the associated Spray Valve demand set to 0, and “C” RCP secure approximately five (5) minutes following the reactor trip. The Crew will transition to 1-ES-0.1, Reactor Trip Response, and continue actions associated with 1-AP-9.00.

Malfunctions required: One, RC1403

Objectives: (RO): Trip the Reactor and perform the Immediate Action Steps of 1-E-0, Reactor Trip or Safety Injection, from memory.

(BOP): Close “C” Loop Spray Valve and Secure “C” RCP.

Success Path: Trip the Reactor and secure the “C” RCP.

**Event Seven: “C” SG Feed Line Break Inside CTMT with Hi-Hi CLS Failure to Actuate.**

When the Evaluating Team is satisfied with the Crew actions associated with 1-ES-0.1 and 1-AP-9.00, the malfunction is actuated to cause a Feed Line Break inside CTMT. The Crew is expected to Transition back to 1-E-0 with SI in service, and check the first four (4) steps of E-0 accomplished. The Crew is expected to identify Hi-Hi CLS has failed to actuate and Transition to FR-Z.1, Response to Containment High Pressure, on an ORANGE Path. Component Cooling TVs that are closed by a Hi-Hi CLS signal will close when CTMT pressure exceeds 23 psia. The Crew will perform actions of FR-Z.1 to manually align CS/RS containment depressurizing equipment, then transition back to E-0, E-2 (Faulted Steam Generator Isolation), and transition to 1-E-1 (Loss of Reactor or secondary Coolant) where the Scenario is terminated at the discretion of the Lead Evaluator.

Malfunctions required: Six, FW1603, RS1001, RS1002, Switch Overrides TCCC105A\_CLOSE/TVCC105B\_CLOSE/TVCC105C\_CLOSE.

Objectives: (RO) Backup SI and re-verify E-0 Immediate Actions.

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## SHIFT TURNOVER INFORMATION

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(RO/BOP) Manually align CTMT depressurizing components due to failure of Hi-Hi CLS.

Success Path: Transition to FR-Z.1 when CTMT pressure exceeds 23 psia, manually align components to begin depressurizing CTMT.

**Critical Task: (CT-3):** Terminate CS and SI flow from the RWST prior to transition to 1-ES-1.3, Transfer to Cold Leg Recirculation, at RWST level of 20%. Critical Task start begins at initiation of CS and SI flow from RWST and ends when CS and SI flow is terminated. Time to reach RWST level of 20% is approximately 50 minutes. A Plant Representative will be available for consult during the Scenario.

**Critical Task: (CT-4)** Secure A/B RCPs on loss of support conditions (Cooling Water flow) prior to receipt of RCP Frame Danger Annunciator (high vibrations). Approximately 22 minutes following CTMT pressure exceeding the Hi-Hi-CLS setpoint, Annunciator 1C-H4, RCP Frame Danger, will be received if the RCPs have not been secured. Failure to secure the RCPs when directed will adversely complicate Plant Recovery following blowdown of the faulted SG by preventing the use of the RCPs.

**Event Eight:** Various SI Components Fail to Reposition on the Signal.

Following transition from FR-Z.1 to E-0, the BOP will be provided Attachments 1, 2, 3, and 4 of E-0 to check the position of components affected by and SI, Hi and Hi-Hi CLS signal. The BOP will identify and place the following components in their required condition:

- 1-CH-TV-1204B, Letdown Isolation Outside TV.
- 1-VS-F-9A, Auxiliary Building Central Fan.
- 1-VS-F-58B, Cat I Filter Fan.
- 1-VS-MOD-103C, MCR Ventilation Isolation Damper.

Malfunctions required: Three, VS0102, VS1501, SI2509.

Objectives: (BOP) Identify components that fail to reposition on the SI Signal, and place them in their required condition.

Success Path: Identify and position components using 1-E-0, Attachment 1, 2, 3, and 4.

### Scenario Recapitulation

Total Malfunctions: 16

Abnormal Events: 5, (0-AP-53.00 (4), 1-AP-38.00, 1-AP-9.00)

Major Transients: 1

EOPs Entered: 4 (ES-0.1, E-0 With SI, E-2, ES-1.1)

EOP Contingencies: 1 (FR-Z.1)

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Event No.: 1

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Event Description: Unit Ramp 90% to 100% IAW 1-OP-TM-005.

Cue: When team ready.

Time	Position	Applicant's Action or Behavior
	SRO	<p>1-OP-TM-005, Unit Ramping Operations</p> <p><b>5.3 Preparations for Turbine Ramp Up</b></p> <p>5.3.1 Review all lighted annunciator windows for adverse conditions that could impact the performance of this procedure.</p> <p><b>Will be initialed as complete. – No annunciators Lit.</b></p> <p>5.3.2 Review the Tagout File for tagouts that could impact this procedure.</p> <p><b>Will be initialed as complete. – MCR FP Panel Tagged out, checks performed by Extra Reactor Operator.</b></p> <p>5.3.3 Review the Plant Status Log for conditions that could impact this procedure.</p> <p><b>Will be initialed as complete. – No items in the plant status log.</b></p>
	SRO	<p><b>NOTE:</b> Rod height adjustments should be used to maintain Delta Flux as recommended by Reactor Engineering. Boration or dilution should be used to account for power defect and Xenon changes to maintain reference temperature</p> <p>5.3.4 For scheduled power level changes greater than 10%, verify that a reactivity plan has been provided by Reactor Engineering. Otherwise, direct the STA to notify Reactor Engineering and request recommendations for control of core parameters.</p> <ul style="list-style-type: none"> <li>• Delta Flux control</li> <li>• Recommendations for Rod height and/or RCS Boron adjustments</li> <li>• Expected Xenon transient</li> </ul> <p><b>Will be initialed as complete. The team will be given a reactivity plan.</b></p> <p>5.3.5 Record the Target Power Level, the Current Power Level, and the Percent Power Change below.</p> <p>Target Power Level <u>100%</u></p> <p>Minus Current Power Level - <u>90.0%</u></p> <p>Equals Percent Power Change = <u>10%</u></p> <p><b>Will be initialed as complete</b></p> <p>5.3.6 Obtain a current copy of 1-DRP-003, Curve Book, Reactor Power and Rod Movement Limitations, and attach to this procedure. (Reference 2.3.9)</p> <p><b>Will be initialed as complete.</b></p> <p>5.3.7 Review 1-DRP-003, Curve Book, Reactor Power and Rod Movement Limitations.</p>

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Event Description: Unit Ramp 90% to 100% IAW 1-OP-TM-005.

Cue: When team ready.

	SRO	<p>1-OP-TM-005, Unit Ramping Operations</p> <p><b>Will be initialed as complete.</b></p> <p>5.3.8 Document the power level(s) and hold time(s) that will be used to satisfy 1-DRP-003, Curve Book, Reactor Power and Rod Movement Limitations. This information should be obtained from the Reactivity Plan and/or the Reactor Engineer. Enter N/A if the fuel has been conditioned.</p> <p><b>Will be marked as N/A. Fuel Conditioning complete.</b></p> <p>Note prior to Step 5.3.9: If a shift turnover is required while Subsection 5.4 is in progress, Steps 5.3.9, 5.3.10, and 5.3.11 must be performed for the relieving shift. Multiple signoffs are provided for this purpose.</p> <p>5.3.9 Check that the Shift Manager (who is the designated Test Coordinator) or his designee has reviewed the Detailed Pre-Job Briefing Checklist and Responsibilities in Attachment 1 (page 3 of 5) and conducted a Detailed Pre-Job Briefing with all the personnel performing the unit ramp.</p> <p><b>Will be initialed as complete. Team will re-perform these steps prior to entering simulator.</b></p>
	SRO	<p>1-OP-TM-005, Unit Ramping Operation</p> <p>5.3.10 Check that the Senior Operations Manager or Operations Manager on Call has reviewed the Management Expectations Briefing Checklist in Attachment 1 (page 2 of 5) and briefed the Operations Department and support personnel on management expectations.</p> <p><b>Will be initialed as complete. Team will re-perform these steps prior to entering simulator.</b></p> <p>5.3.11 The pre-job brief shall include the items in Attachment 2, Pre-job Brief Expectations for Reactivity Control.</p> <p><b>Will be initialed as complete. Team will re-perform these steps prior to entering simulator.</b></p> <p>5.3.12 Determine the specific rate of Reactor power change and the methods which will be used to achieve this rate of change.  Rate of Power Change <u>0.33%/min</u>  Reactor Power Change Methods <u>Turbine, rod control, and chemical shim.</u></p> <p><b>Will be initialed as complete.</b></p> <p>5.3.13 Notify Energy Supply (MOC), Chemistry, and the Polishing Building that the power change is imminent</p> <p><b>Will be initialed as complete.</b></p> <p>The Team will commence with Section 5.4. Several steps may be completed prior to entering the simulator (i.e., marked N/A).</p>

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Event Description: Unit Ramp 90% to 100% IAW 1-OP-TM-005.

Cue: When team ready.

	SRO/RO	<p>1-OP-TM-005, Unit Ramping Operation</p> <p>5.4 Power Increase Between 50% and 100% Reactor Power</p> <p>Caution prior to Step 5.4.1:</p> <ul style="list-style-type: none"> <li>Energizing additional PRZR heaters may cause a change in RCS average temperature due to a difference in boron concentration between the PRZR and the RCS.</li> </ul> <p>5.4.1 Check or place PRZR Backup Heaters in the MANUAL ON position IAW 1-OP-RC-019, Pressurizer Heater Operation.</p>
	SRO/RO	<p>1-OP-TM-005, Unit Ramping Operation</p> <p>Notes prior to Step 5.4.2:</p> <ul style="list-style-type: none"> <li>The second MFP should be started at approximately <math>6.0 \times 10^6</math> lbm/hr (5.6 - <math>6.4 \times 10^6</math> lbm/hr) total Feedwater flow.</li> <li>When a Main Feed Pump Recirc Valve opens, a decrease in FW temperature will occur that can add positive reactivity to the core. The magnitude of the reactivity change is dependent on the time in core life and the value of the Moderator Temperature Coefficient.</li> </ul> <p>5.4.2 WHEN reactor power level reaches the point where additional Feedwater flow is desired, THEN perform the following substeps. Enter N/A if a Main Feed Pump will not be started.</p> <ol style="list-style-type: none"> <li>Notify Chemistry and the Polishing Building of the imminent start of the idle Main Feedwater Pump.</li> <li>Place the idle Main Feedwater pump in service in accordance with 1-OP-FW-004, Main Feedwater System Operation.</li> </ol> <p><b>Sub-steps 5.4.1 and 5.4.2 will be marked "N/A"</b></p> <p>Note prior to Step 5.4.3: The turbine control valves should not run up against the Turbine Load Limiter</p> <p>5.4.3 Raise the Turbine Load Limiter and maintain the limiter <u>as close as reasonably possible</u> above the actual turbine load during power escalation (Reference 2.4.2).</p> <p>Cautions prior to Step 5.4.4:</p> <ul style="list-style-type: none"> <li>To maintain positive control of reactivity, control rods shall be moved in a deliberate, carefully controlled manner while closely monitoring the Reactor's response.</li> <li>The Turbine will momentarily (1.5 seconds) shift to MANUAL when placed in IMP IN. To minimize Governor Valve oscillations, the GV Tracking Meter should read as close to zero as possible before transferring to IMP IN.</li> </ul>

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Event Description: Unit Ramp 90% to 100% IAW 1-OP-TM-005.

Cue: When team ready.

	BOP/RO	<p>1-OP-TM-005, Unit Ramping Operation</p> <p>5.4.4 Check initiated or initiate Attachment 4, Reactivity Control and Monitoring During Ramp. (Reference 2.4.6). <b><i>Attachment 4, 1-OP-TM-005, on Pages 25-27.</i></b></p> <p>Notes prior to Step 5.4.5:</p> <ul style="list-style-type: none"> <li>The Turbine should be operated in IMP IN while ramping is in progress. If the power increase is stopped during the ramp up, IMP OUT may be used to assist in stabilizing the Turbine.</li> <li>This procedure is normally entered at greater than 50% power. If power is less than 50%, procedure 1-GOP-1.5, Unit Startup, 2% Reactor Power to Max Allowable Power, must be used.</li> </ul>
	BOP	<p>5.4.5 <b>Commence the power increase at the ramp rate specified by Shift Supervision, using the LOAD RATE % PER MIN thumbwheel.</b></p>
	RO	<p>1-OP-TM-005, Unit Ramping Operation</p> <p>Note prior to Step 5.4.6:</p> <p>Alternate indications of Reactor Power, such as Core <math>\Delta T</math>, 1<sup>st</sup> Stage Pressure, Condensate and Feedwater performance parameters, and Electrical output, should be reviewed and compared during power escalation. (Reference 2.4.3)</p> <p>5.4.6 <b>Borate, dilute, or use control rods as required to maintain <math>\Delta</math> flux in band.</b> Observe the expected response on FR-1-113, BA-PRI WTR FLOW and Y1C-114A, PRI WTR SUP BATCH INTEGRATOR.</p> <p><b><i>1-OP-CH-021 – Alternate Dilution Using Blender actions are outlined starting on page 20.</i></b></p>
	SRO	<p>5.4.7 IF either annunciator 1G-C4, UPPER ION CHAMBER DEVIATION OR AUTO DEFEAT &lt;50%, or 1G-D4, LOWER ION CHAMBER DEVIATION OR AUTO DEFEAT &lt;50%, are LIT, THEN perform the following substeps. Otherwise, enter N/A.</p> <ol style="list-style-type: none"> <li>Notify the OMOC.</li> <li>Initiate an excore quadrant power tilt calculation and perform a calculation at 8 hour intervals until both annunciators are NOT LIT.</li> <li>Review Tech Spec 3.12.B.5 and 3.12.B.6.</li> <li>Notify Reactor Engineering or STA to determine new High Flux trip and rod stop setpoints.</li> <li>Have I &amp; C adjust High Flux trip and rod stop setpoints as necessary based on tilt calculation.</li> </ol>

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Event Description: Unit Ramp 90% to 100% IAW 1-OP-TM-005.

Cue: When team ready.

	SRO	<p>1-OP-TM-005, Unit Ramping Operation</p> <p>f. Review Tech Spec 3.12.B.7 for additional actions required if tilt is not reduced to less than 2 percent after a period of 24 hours.</p> <p>g. Stop ramp at least 5 percent less than High Flux Trip setpoint.</p> <p><b>This step will be marked “N/A”</b></p> <p>5.4.8 WHEN both annunciators 1G-C4 and 1G-D4 are NOT LIT, THEN verify or adjust High Flux Trip and Rod Stop setpoints to the full power values.</p>
	SRO	<p>1-OP-TM-005, Unit Ramping Operation</p> <p>Caution prior to Step 5.4.9: The following parameters must be closely monitored prior to exceeding 60% power: CP Bldg ΔP, MFP suction pressure, MFP recirc status, and HP Heater Drain status. Adequate margin must be maintained on MFP suction pressure and CP Bldg ΔP to prevent bypassing the CP Bldg and subsequent secondary transient. Reactor power should be held at approximately 60% while an HP Heater Drain Pump is started if adequate margin does not exist.</p> <p>Notes prior to Step 5.4.9:</p> <ul style="list-style-type: none"> <li>• Steps 5.4.9 through 5.4.16 may be marked with N/A depending on the power level at which the procedure was entered.</li> <li>• Ramping should be stopped at least 5 percent less than High Flux trip setpoint.</li> <li>• The following PCS points may be used to monitor duct temperature trend: <ul style="list-style-type: none"> <li>○ T2545A, Isolated Phase Bus Duct A Phase Air Temperature</li> <li>○ T2546A, Isolated Phase Bus Duct B Phase Air Temperature</li> <li>○ T2547A, Isolated Phase Bus Duct C Phase Air Temperature</li> </ul> </li> </ul> <p>5.4.9 Notify Chemistry and the Polishing Building of the imminent start of 1-SD-P-1A or 1-SD-P-1B. HP FW HTR DRN PP. Enter N/A for Steps 5.4.9 and 5.4.10 if pump is already running.</p> <p><b><i>Pump is already in service</i></b></p> <p>5.4.10 WHEN there is sufficient flow to the HP Heater Drain Tank, THEN start 1-SD-P-1A or 1-SD-P-1B IAW 1-OP-SD-002, HP Heater Drain Pump Operation.</p> <p>NOTE: If calorimetric basis has not been changed during the ramp, and no adjustments have been made to the NIs during the ramp, then a calorimetric is not required. (Reference 4.15)</p> <p>5.4.11 Continue the power escalation and evaluate the calorimetric. IF a calorimetric is required, THEN notify Energy Supply (MOC) that there will be a 70 percent (approximate) power hold to perform a calorimetric. Otherwise, enter N/A. (Reference 4.15)</p>



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Event Description: Unit Ramp 90% to 100% IAW 1-OP-TM-005.

Cue: When team ready.

	SRO	<p>1-OP-TM-005, Unit Ramping Operation</p> <p>5.4.12 WHEN power level is stable at approximately 70 percent, THEN stop the power escalation AND initiate a calorimetric. Enter N/A if calorimetric is not required. (Reference 4.15)</p> <p>5.4.13 IF a flux map is needed, as desired by Reactor Engineering, THEN direct Reactor Engineering to perform flux map at this time. Otherwise, enter N/A.</p> <p><b>All steps will be marked "N/A"</b></p>
	<p>SRO</p> <p>SRO</p> <p>SRO</p> <p>SRO</p>	<p>1-OP-TM-005, Unit Ramping Operations</p> <p>5.4.14 WHEN the calorimetric (if needed), initiated in Step 5.4.11, and the flux map (if needed), initiated in Step 5.4.12, have been satisfactorily completed, THEN notify Energy Supply (MOC), Chemistry, and the Polishing Building that the power escalation will continue, as required.</p> <p><b>Step will be marked "N/A"</b></p> <p>5.4.15 Continue the power escalation to 90 to 91 percent (approximate) power. <b><i>Team will begin at this Step.</i></b></p> <p>Caution prior to Step 5.4.16: The Turbine will momentarily (1.5 seconds) shift to MANUAL when placed in IMP OUT. To minimize Governor Valve oscillations, the GV Tracking Meter should read as close to 0 as possible before transferring to IMP OUT.</p> <p>5.4.16 WHEN power level is stable at approximately 90 to 91 percent, THEN place the Turbine in IMP OUT. Enter N/A if turbine operation above 90 to 91 percent will be in IMP IN.</p> <p>5.4.17 Check that Power Hold Limits from 1-DRP-003, Curve Book, Reactor Power and Rod Movement Limitations, have been satisfied or accounted for prior to exceeding 95%. Enter N/A if fuel has been conditioned.</p> <p><i>Evaluator's Note: No further actions are expected for this event.</i></p>
		<b>-- END EVENT 1 --</b>

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Event Description: Unit Ramp 90% to 100% IAW 1-OP-TM-005.

Cue: When team ready.

Time	Position	Applicant's Action or Behavior
	RO	<p>1-OP-CH-021, Alternate Dilution Using Blender</p> <p>3.0 Initial Conditions</p> <p>3.1 Check Primary Grade water is available to the Blender.</p> <p>4.0 Precautions and Limitations</p> <p>4.1 Control rod position, Tav<sub>g</sub>, and/or power level should be observed when making up to the RCS.</p> <p>4.2 Operation of pressurizer heaters and spray valves should be used to equalize Boron concentration (CB) when changing CB.</p> <p>4.3 The blender must be frequently monitored for proper operation during the entire duration of the makeup. <b>(Reference 2.4.1)</b></p> <p>4.4 The Reactor Operator shall notify Shift Supervision before performing any Blender evolution. <b>(Reference 2.4.1)</b></p> <p>4.5 Rapidly changing VCT level and pressure may affect RCP Seal leakoff, which should be monitored for normal response.</p> <p>4.6 Operation of the Blender must be Peer checked.</p> <p>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.</p> <p>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). <b>(Ref. 2.4.2)</b></p> <p>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.</p> <p>4.10 Dilutions of greater than 2000 gallons can result in RCS H<sub>2</sub> 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</p>

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Event Description: Unit Ramp 90% to 100% IAW 1-OP-TM-005.

Cue: When team ready.

	RO	<p>1-OP-CH-021, Alternate Dilution Using Blender</p> <p>5.1 Alternate Dilution</p> <p><b>NOTE:</b> 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. If unit on excess letdown, 1-OP-CH-007 should be used.</p> <p>5.1.1 Determine the required integrator setpoint by performing the following:  <math display="block">\frac{\text{_____ gal (-)}}{\text{(Desired Dilution)}} = \frac{\text{_____}}{\text{(anticipated additional flow, dependent on flowrate)}} = \text{_____ Integrator setpoint}</math></p> <p>5.1.2 Notify Shift Supervision of impending Alternate Dilution. <b>(Reference 2.4.1)</b></p> <p>5.1.3 Notify STA of impending Alternate Dilution.</p> <p>5.1.4 Place the MAKE-UP MODE CNTRL switch in the STOP position.</p> <p>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 <b>PG FLOW CNTRL</b> controller setpoint has previously been set, THEN enter N/A for that substep.</p> <p>a. 1-CH-FC-1114A, PG FLOW CNTRL _____ GPM (IAW Attachment 10)</p>
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Event Description: Unit Ramp 90% to 100% IAW 1-OP-TM-005.

Cue: When team ready.

	RO	<p>1-OP-CH-021, Alternate Dilution Using Blender</p> <p>5.1.5 (Continued)</p> <p>b. 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</p> <p>1. Depress PRESET A Button (Controller will read the last value entered into the controller; reads in gallons.)</p> <p>2. To clear PRESET A, depress the CLR Button. Enter N/A if not required.</p> <p>3. Enter desired PRESET A value. Enter N/A if not required.</p> <p>4. Depress ENT Button.</p> <p>5.1.6 Place the MAKE-UP MODE SEL switch in the ALT DIL position.</p> <p>5.1.7 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.</p> <p>5.1.8 Place the MAKE-UP MODE CNTRL switch in the START position.</p> <p>5.1.9 Check all of the following conditions.</p> <p>a. 1-CH-FCV-1113A, BORIC ACID TO BLENDER, is closed.</p> <p>b. 1-CH-FCV-1113B, BLENDER TO CHG PUMP, is open.</p> <p>c. 1-CH-FCV-1114A, PGW TO BLENDER, is controlling in AUTO.</p> <p>d. 1-CH-1114B, BLENDER TO VCT, is OPEN – N/A</p> <p>5.1.10 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.</p> <p>5.1.11 WHEN the desired amount of makeup has been reached, THEN check both of the following valves are closed.</p> <ul style="list-style-type: none"><li>• 1-CH-FCV-1113B</li><li>• 1-CH-FCV-1114B</li></ul>
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Op-Test No.: Surry 2017-301 Scenario No.: 3

Event No.: 1

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Event Description: Unit Ramp 90% to 100% IAW 1-OP-TM-005.

Cue: When team ready.

	RO	<p>1-OP-CH-021, Alternate Dilution Using Blender</p> <p>5.1.12 Check or place 1-CH-FCV-1114B in AUTO.</p> <p>5.1.13 Check or place the following controllers in Automatic.</p> <ul style="list-style-type: none"><li>• 1-CH-FC-1113A, BA FLOW CNTRL</li><li>• 1-CH-FC-1114A, PG FLOW CNTRL</li></ul> <p>5.1.14 Place the MAKE-UP MODE SEL switch in the AUTO position.</p> <p>5.1.15 Place the MAKE-UP MODE CNTRL switch in the START position.</p> <p>5.1.16 Notify Shift Supervision of Blender status. <b>(Reference 2.4.1)</b></p> <p><i>Additional Alternate Dilutions will be performed using 1-OP-CH-021, Attachment 1 (Next Page).</i></p>
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Op-Test No.: Surry 2017-301 Scenario No.: 3

Event No.: 1

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Event Description: Unit Ramp 90% to 100% IAW 1-OP-TM-005.

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.	Perf.	Perf.
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 <u>IF</u> it is desired to direct the dilution water to the charging pump suction only, <u>THEN</u> 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 <u>WHEN</u> the desired amount of makeup has been reached, <u>THEN</u> check proper valve positions.			
1.10 Check or place 1-CH-FCV-1114B in AUTO.			
1.11 Check or place flow controllers in Automatic.			
1.12 Place the MAKE-UP MODE SEL switch in the AUTO position.			
1.13 Place the MAKE-UP MODE CNTRL switch in the START position.			
1.14 Notify Shift Supervision of Blender status. (Reference 2.4.1)			

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Event No.: 1

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Event Description: Unit Ramp 90% to 100% IAW 1-OP-TM-005.

Cue: When team ready.

(Page 1 of 3)

**Attachment 4****REACTIVITY CONTROL AND MONITORING DURING RAMP**

- \_\_\_\_\_ 1. WHEN greater than 50% Reactor Power, THEN begin logging data on Attachment 4 (page 2 of 3) at a maximum interval of 30 minutes. Use multiple sheets as required.
- \_\_\_\_\_ 2. Begin logging reactivity manipulations on Attachment 4 (page 3 of 3) as applicable. Use multiple sheets as required.
- \_\_\_\_\_ 3. Maintain Tave and Tref approximately matched and Delta Flux in band (use Control Rods, Boration and/or Dilution) as discussed during the pre-job brief. Use the Reactivity Plan as a guide. (Reference 2.4.6)
- \_\_\_\_\_ 4. If significant deviation from the Reactivity Plan is required to maintain core parameters, consult with the STA and Reactor Engineering. Otherwise, enter N/A.
- \_\_\_\_\_ 5. If the ramp deviates from the Reactivity Plan (e.g. a change in ramp rate or an unplanned hold becomes necessary), consult with the STA and Reactor Engineer on the need for a revised reactivity plan. Otherwise, enter N/A.
- \_\_\_\_\_ 6. If critical plant parameters can not be maintained within prescribed limits, the contingency actions discussed in the pre-job brief shall be implemented. Otherwise, enter N/A.
- \_\_\_\_\_ 7. Continue logging data on Attachment 4 (pages 2 and 3) until the ramp is complete and unit conditions are stable.
- \_\_\_\_\_ 8. Attach completed log sheets to original procedure.

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## REACTIVITY CONTROL AND MONITORING DURING RAMP

Circle the channel to be monitored.

[illegible]



**Op-Test No.: Surry 2017-301      Scenario No.: 3**

**Event No.: 1**

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Event Description: Unit Ramp 90% to 100% IAW 1-OP-TM-005.

**Cue: When team ready.**

(Page 3 of 3)

## Attachment 4

## REACTIVITY CONTROL AND MONITORING DURING RAMP

Circle the channel to be monitored.

[illegible]

Op-Test No.: Surry 2017-301 Scenario No.: 3

Event No.: 2

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Event Description: Channel III Turbine Impulse Pressure Fails Low

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
	RO	Identify the failure based on: <ul style="list-style-type: none"> <li>• Annunciator 1H-A4, Tave/Tref DEV</li> <li>• Annunciator 1H-G5/G6/G7, SG LVL ERROR, A/B/C SG</li> <li>• Annunciator 1H-H7, STM DUMP V V TRIP OPEN</li> <li>• Annunciator 1F-F4/F5/F6, STM GEN 1A/1B/1C CH 3 HI STM LINE FLOW</li> <li>• Control rods stepping in 72 steps/minute</li> <li>• 1-MS-PI-1446, Failing Low</li> </ul>
	RO	0-AP-53.00  Perform the Immediate Action Steps of 0-AP-53.00 [1] CHECK REDUNDANT INSTRUMENT CHANNEL(S) INDICATION – NORMAL <i>Identifies 1-MS-PI-1446, Turbine Impulse Pressure failing low.</i>  [2] PLACE AFFECTED CONTROL(S)/ COMPONENT(S) IN MANUAL CONTROL AND STABILIZE PARAMETER USING REDUNDANT INDICATION <b>Places Rod Control in Manual</b> <i>Checks Rod Motion Stopped</i>  <div style="border: 1px solid black; padding: 5px;"> <b>Critical Task: (CT-1)</b>, Place rod control in manual prior to reactor trip and SI on High Steam Flow. Should the RO/BOP fail to take timely action to place rod control in manual, a reactor trip and SI will occur on High Steam Flow approximately 2 minutes following Event initiation. Actuation of the reactor protection system for this event would be considered failure of this CT. A Plant Representative will be available for consult during the Scenario.           </div>
	SRO  RO  SRO  RO	0-AP-53.00  Reads Immediate Action Steps of 0-AP-53.00 [1] CHECK REDUNDANT INSTRUMENT CHANNEL(S) INDICATION – NORMAL <i>Reports Yes, 1-MS-PI-1447, Channel IV First Stage Pressure, Normal.</i>  [2] PLACE AFFECTED CONTROL(S)/ COMPONENT(S) IN MANUAL CONTROL AND STABILIZE PARAMETER USING REDUNDANT INDICATION  <i>Reports, Yes, Rod Control in Manual and Rod Motion Stopped.</i>

Op-Test No.: Surry 2017-301 Scenario No.: 3

Event No.: 2

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Event Description: Channel III Turbine Impulse Pressure Fails Low

Cue: By Examiner.

	SRO	<p>0-AP-53.00</p> <p>Conducts a Transient Brief</p> <p>Summarizes Event and queries RO and BOP for Annunciators received and Critical Parameters.</p> <p>RO reports Annunciators received on VB 1-1, Critical Parameters: RCS Pressure, Tave, Rod Height, and Delta Flux.</p> <p>BOP reports Annunciators on VB 1-2, Critical Parameters: SG NR Level and trend</p> <p>STA will have no input for the Brief.</p> <p>SRO Concludes the Brief and continues 0-AP-53.00 at Step 3.</p>
	SRO	0-AP-53.00
	BOP	<p>*3 CHECK REACTOR POWER – LESS THAN OR EQUAL TO 100%</p> <p><i>Reports Actual Reactor Power and Trend using PCS 30 minute power indication.</i></p>
	SRO	<p>0-AP-53.00</p> <p><b>CAUTION</b> Prior to Step 4: If Reactor power has been affected by a secondary transient, Turbine adjustment may be needed to control Tave.</p> <p><b>NOTES</b> prior to Step 4:</p> <ul style="list-style-type: none"> <li>• Step 4 failures are listed in order of performance priority. Only the failed instrument/control and associated step number should be read aloud.</li> <li>• When the affected instrument/controller malfunction(s) has been addressed by this procedure, recovery actions should continue at Step 11.</li> </ul> <p>*4. DETERMINE THE FAILED INSTRUMENT / CONTROL AND GO TO APPROPRIATE STEP OR PROCEDURE:</p> <ul style="list-style-type: none"> <li>• Turbine First Stage Pressure, Attachment 2</li> </ul>
	RO/BOP	<i>Reports Yes, Turbine First Stage Pressure Failed.</i>
	SRO	Goes to Attachment 2
	SRO	0-AP-53.00, Attachment 2
	RO	<p><b>CAUTION</b> prior to Step 1: Delta flux must be monitored and maintained within band if rods have moved.</p> <p><i>Acknowledges caution, may report current indication of Delta Flux.</i></p>
	SRO	<p><b>NOTE</b> Prior to Step 1: Page 4 of this Attachment shows a one-line diagram of Turbine First Stage Pressure.</p>
	RO	<i>Acknowledges Note.</i>

Op-Test No.: Surry 2017-301 Scenario No.: 3

Event No.: 2

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Event Description: Channel III Turbine Impulse Pressure Fails Low

Cue: By Examiner.

		0-AP-50.00, Attachment 2
	SRO	1. <u>IF</u> the selected Turbine First Stage Pressure channel has failed, THEN do the following:
	RO	a. Check or place the ROD CONT MODE SEL switch in MANUAL. <i>Reports Rod Control in Manual.</i>
	SRO	b. Select redundant Turbine First Stage Pressure channel IAW the following:
	BOP	1. Check or place STM DUMP CNTRL switch in OFF-RESET. <b>Places STM DUMP CNTRL in OFF.</b>
	SRO	2. Check or place (1)-CP-43-(1)CP(1)01, SUDDEN LOSS LOAD DEFEAT switch in DEFEAT position. <b>Places 1-CP-43-1CP-101 in Defeat.</b>
	BOP	3. Check or place Main Feed Reg Valves in MANUAL: <ul style="list-style-type: none"> <li>• (1)-FW-FCV-(1)478, SG A FEED REG</li> <li>• (1)-FW-FCV-(1)488, SG B FEED REG</li> <li>• (1)-FW-FCV-(1)498, SG C FEED REG</li> </ul> <b>Places A/B/C FRV controllers in Manual.</b>
	SRO	4. Check or place TURB FIRST STAGE PRESS CH SEL switch to redundant channel.
	RO	<b>Shifts TURB FIRST STAGE PRESS CH SEL switch in CH IV.</b> <i>Reports Turbine Impulse Pressure channel in CH IV, verified by SG LVL DEV Annunciators 1H-G5/6/7 for A/B/C SGs alarming.</i>

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Event No.: 2

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Event Description: Channel III Turbine Impulse Pressure Fails Low

Cue: By Examiner.

		0-AP-53.00, Attachment 2
	SRO	<b>CAUTION</b> prior to Step 2: When CALCALC is based on Feedwater, changes in feed flow will affect calorimetric power. Reactor power must be monitored when adjusting feed flow.
	BOP	<i>Acknowledges Caution.</i>
	SRO	2. Return affected components to normal position IAW Shift Supervision direction: <ul style="list-style-type: none"> <li>a. WHEN SG level returned to normal, THEN place Main Feed Reg Valves in AUTO: <ul style="list-style-type: none"> <li>• (1)-FW-FCV-(1)478, SG A FEED REG</li> <li>• (1)-FW-FCV-(1)488, SG B FEED REG</li> <li>• (1)-FW-FCV-(1)498, SG C FEED REG</li> </ul> </li> </ul>
	BOP	<b>Slowly adjusts A/B/C FRV controllers to restore SG NR level to 44% while monitoring Reactor Power using PCS 30 minute display. When level restored, places FRVs in Auto.</b>
		0-AP-53.00, Attachment 2
	SRO	<b>NOTES</b> applicable prior to substep b.: <ul style="list-style-type: none"> <li>• Unless there is evidence that a Turbine runback is imminent, the preferred alignment of the Steam Dump control system is ON in the Tave Mode.</li> <li>• If (1)-MS-PT-(1)446 fails low, Steam Dump Demand will go to 100%, but steam dumps will not open, since an arming signal (load reject or trip) is not present. If the steam dumps are not in Steam Pressure Mode following (1)-MS-PT-(1)446 failing low and a load reject occurs, then all the steam dumps will open. AMSAC will not function six minutes after the failure.</li> </ul> <p><i>SRO will hold a Focus Brief with the Crew discuss Steam Dump Operation with the failure of 1-NS-PT-1446.</i></p>
		b. Return Steam Dumps to service IAW Shift Supervision direction. <ul style="list-style-type: none"> <li>1. Momentarily place STM DUMP MODE SEL switch in RESET.</li> </ul>
	BOP	<b>Places STM DUMP MODE SEL in RESET.</b>
	SRO	2. Place STM DUMP CNTRL switch in ON.
	BOP	<b>Places STM DUMP CNTRL in ON.</b>

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Event No.: 2

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Event Description: Channel III Turbine Impulse Pressure Fails Low

Cue: By Examiner.

		0-AP-53.00, Attachment 2, Substep b., Continued.
	SRO	3. Place (1)-CP-43-(1)CP(1)01, SUDDEN LOSS LOAD DEFEAT switch in NORMAL position.
	BOP	<b>Places 1-CP-43-1CP-101 in NORMAL.</b>
	SRO	4. IF (1)-MS-PT-(1)447 has failed, THEN restore the CP Bldg as required.
	BOP	<i>Reports No, 1-MS-PT-1447 not failed</i>
	SRO	5. IF ( )-MS-PT-( )446 has failed low, THEN consult with Shift Manager for the need to place the STM DUMP MODE SEL switch in STEAM PRESSURE mode.
	BOP	<i>Acknowledges SRO need to consult SM.</i>
	SRO	c. Return Rod Control to Auto IAW Shift Supervision direction.
		1. Review appropriate ARP(s) to check correct rod position. (for example, G-F-8)
	RO	<i>Reports No, 1G-F8 Not LIT.</i>
	SRO	2. Place the ROD CONT MODE SEL switch in AUTO.
		<i>RO/SRO should discuss restoring control rods to pre-event rod height and placing rod control in auto.</i>
	RO	<b>Restores control rods to pre-event height and places rod control in Auto.</b>
		0-AP-53.00, Attachment 2
	SRO	3. 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.
		<i>SRO consults with SM; notifying of failure, actions taken, Unit status, and follow-up actions required.</i>

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Event No.: 2

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Event Description: Channel III Turbine Impulse Pressure Fails Low

Cue: By Examiner.

	<p>0-AP-53.00, Attachment 2</p> <p>b. Refer to the following Tech Spec 3.7 items.</p> <ul style="list-style-type: none"> <li>Table 3.7-1, 20 (Refer to (1)-OPT-RP-001 - one hour clock) and Table 3.7-2, 1.e</li> </ul> <ol style="list-style-type: none"> <li><b><u>TS 3.7, Item 20.e., Operator Action 13:</u></b> within 1 hour determine by observation of the associated permissive annunciator window(s) that the interlock is in its required state for the existing plant condition, or be in at least HOT SHUTDOWN within the next 6 hours.</li> <li><b><u>TS 3.7, Table 2, Item 1.e.1), "Steam Line Flow", Operator Action 20,</u></b> With the number of OPERABLE channels less than the Total Number of Channels, REACTOR CRITICAL and/or POWER OPERATION may proceed provided the following conditions are satisfied: a. The inoperable channel is placed in the tripped condition within 72 hours. b. 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 &amp; pressure to less than 350°F/450 psig, respectively in the following 12 hours.</li> <li><b><u>TS 3.12.F.1, DNB Parameters, RCS Pressure &lt;2205 psig,</u></b> restore the RCS pressure to &gt;2205psig within two (2) hours or reduce Thermal Power to less than 5% of Rated Power within the next 6 hours.</li> </ol> <p><i>SRO updates Crew/SM concerning results of TS Review, and directs BOP to perform 1-OPT-RP-001 to be completed within 1 hour. Unit 2 will provide copy of OPT to BOP. OPT pages follow at end of this section.</i></p> <p>c. Refer to VPAP-2802 for AMSAC inoperability.</p> <p><i>SRO directs STA to review VPAP-2802 concerning AMSAC Operability. STA will report review complete and requirements discussed with the Shift Manager.</i></p> <p>d. IF no other instrumentation failure exists, THEN GO TO Step 11.</p> <p><i>SRO returns to AP-53.00, Step 11.</i></p>
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Event Description: Channel III Turbine Impulse Pressure Fails Low

Cue: By Examiner.

	SRO	0-AP-53.00 11. CHECK CALORIMETRIC – FUNCTIONAL IAW (1)-OPT-RX-001, ATTACHMENT 4  <i>Directs BOP to perform 1-OPT-RX-001, Attachment 4, upon completion of 1-OPT-RP-001.</i>
	BOP	<i>Reports Yes, Calorimetric is Functional IAW 1-OPT-RX-001, Attachment 4. 1-OPT-RX-001, Attachment 4 at end of this section.</i>
	SRO	0-AP-53.00 12. REVIEW THE FOLLOWING:  <ul style="list-style-type: none"> <li>• Tech Spec 3.7</li> <li>• VPAP-2802, NOTIFICATIONS AND REPORTS</li> <li>• TRM SECTION 3.3, INSTRUMENTATION</li> <li>• Reg Guide 1.97</li> <li>• EP-AA-303, Equipment Important to Emergency Response</li> </ul> <i>SRO Directs STA to perform reviews required for the failure. STA will report reviews have been completed and results discussed with the Shift Manager.</i>
	SRO  RO	0-AP-53.00 13. CHECK ADDITIONAL INSTRUMENT / CONTROLLER MALFUNCTION - EXISTS  <i>Reports No, no further malfunction exists.</i>  <i>SRO GOES TO Step 15.</i>
	SRO	0-AP-53.00 15. PROVIDE NOTIFICATIONS AS NECESSARY:  <ul style="list-style-type: none"> <li>• Shift Supervision</li> <li>• OMOC</li> <li>• STA (PRA determination)</li> <li>• I&amp;C</li> </ul> <i>SRO consults Shift Manager concerning notification of OMOC of the failure and request for I&amp;C assistance; Notifies STA to add failure to PRA program.</i>
		<b>END EVENT 2</b>



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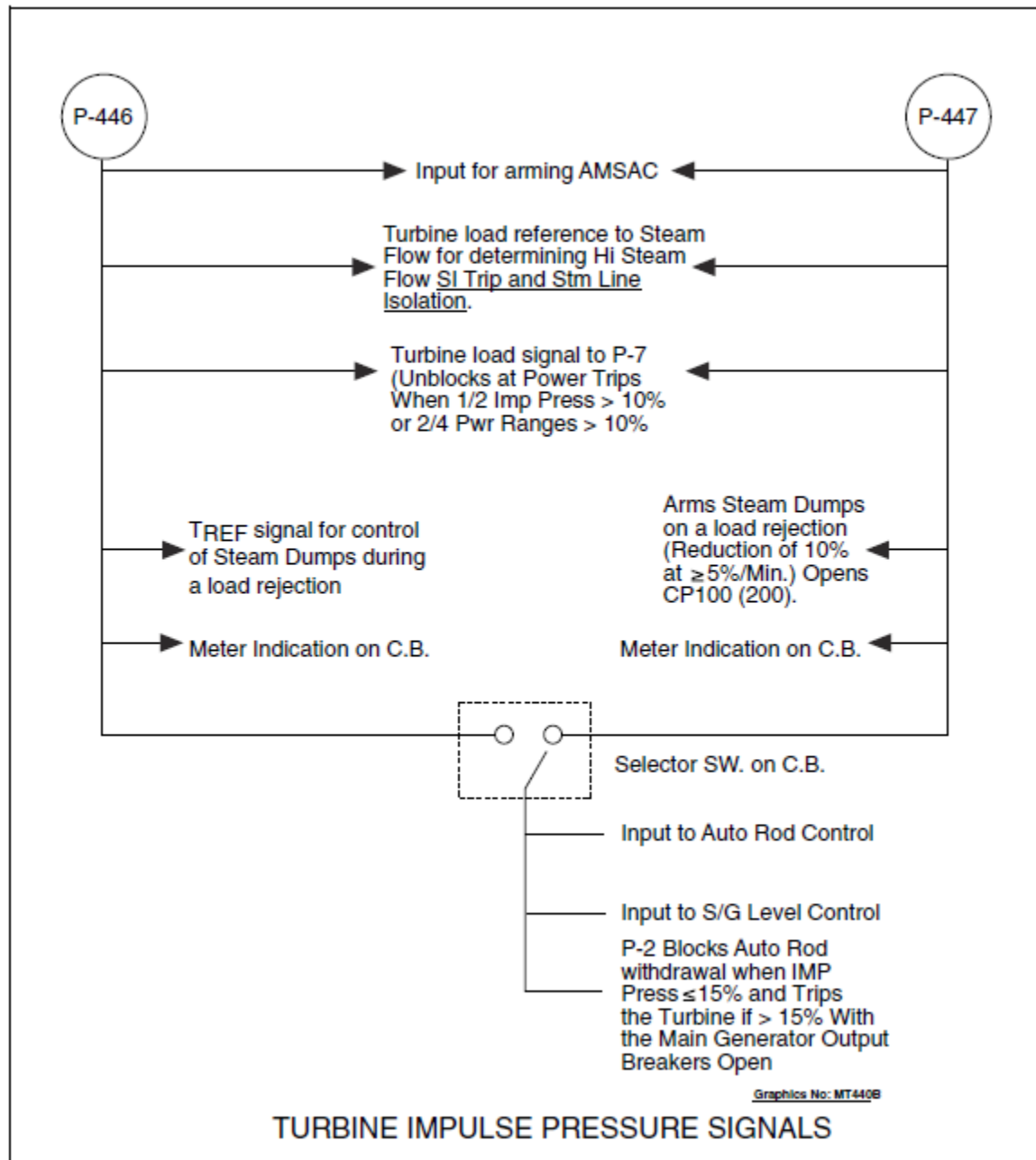
Event No.: 2

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Event Description: Channel III Turbine Impulse Pressure Fails Low

Cue: By Examiner.

0-AP-53.00, Attachment 2, Page 4 (SRO provides to RO/BOP)



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Event Description: Channel III Turbine Impulse Pressure Fails Low

Cue: By Examiner.

1-OPT-RX-001, Attachment 4, Calorimetric Program Operability

(Page 1 of 2)

**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.

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Event Description: Channel III Turbine Impulse Pressure Fails Low

Cue: By Examiner.

1-OPT-RX-001, Attachment 4, Calorimetric Program Operability

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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			

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Event Description: Channel III Turbine Impulse Pressure Fails Low

Cue: By Examiner.

1-OPT-RP-001, Check of Permissive Status Lights P-6, P-7, P-8 and P-10

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## Attachment 1

## PERMISSIVE STATUS LIGHTS

Permissive Signal	Actual Power Level	Upper and Lower Setpoints	Status Light Description	Status Light Condition	Initials
P-6	_____ N35	1/2 NIs > $1 \times 10^{-10}$ amps	P-6 NIS INT RGE > $1 \times 10^{-10}$ % AMPS	B-3 ILLUMINATED	
	_____ N36	2/2 NIs < $5 \times 10^{-11}$ amps	P-6 NIS INT RGE > $1 \times 10^{-10}$ % AMPS	B-3 EXTINGUISHED	
P-7	_____ 446	2/2 Turb Pwr < 8.8 % (53 psig) <u>and</u> 3/4 NIs < 6 %	P-7 NIS PWR RGE AND TURB PWR < 10%	B-2 ILLUMINATED	
	_____ 447				
	_____ N41	1/2 Turb Pwr > 10.0% (56 psig) <u>or</u> 2/4 NIs > 10 %	P-7 NIS PWR RGE AND TURB PWR < 10 %	B-2 EXTINGUISHED	
	_____ N42				
_____ N43					
_____ N44					
P-8	_____ N41	3/4 NIs < 31 %	P-8 NIS PWR RGE < 35 %	A-2 ILLUMINATED	
	_____ N42	2/4 NIs > 35 %	P-8 NIS PWR RGE < 35 %	A-2 EXTINGUISHED	
	_____ N43				
	_____ N44				
P-10	_____ N41	2/4 NIs > 10 %	P-10 NIS PWR RGE > 10 %	A-3 ILLUMINATED	
	_____ N42	3/4 NIs < 6 %	P-10 NIS PWR RGE > 10 %	A-3 EXTINGUISHED	
	_____ N43				
	_____ N44				
Completed by:				Date:	

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Event No.: 2

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Event Description: Channel III Turbine Impulse Pressure Fails Low

Cue: By Examiner.

1-OPT-RP-001, Check of Permissive Status Lights P-6, P-7, P-8 and P-10

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## Attachment 2

## PERMISSIVE COMPUTER POINTS

Permissive Signal	Actual Power Level	Upper and Lower Setpoints	Computer Point	Computer Point Description	Computer Pt Status	Initials
P-6	_____ N35 _____ N36	1/2 NIs > $1 \times 10^{-10}$ amps	N0034D	N31 HIGH FLUX TRIP-- MANUAL BLOCK	ON	
		2/2 NIs < $5 \times 10^{-11}$ amps	_____	N31 HIGH FLUX TRIP-- MANUAL BLOCK	_____	_____
		1/2 NIs > $1 \times 10^{-10}$ amps	N0035D	N32 HIGH FLUX TRIP-- MANUAL BLOCK	ON	
		2/2 NIs < $5 \times 10^{-11}$ amps	_____	N32 HIGH FLUX TRIP-- MANUAL BLOCK	_____	_____
P-7	_____ 446 _____ 447	2/2 Turb Pwr < 8.8% (53 psig) and 3/4 NIs < 6%	Y0003D	NUCLEAR & TB PWR RE TR P7 PERM	ON	
	_____ N41 _____ N42 _____ N43 _____ N44	1/2 Turb Pwr > 10.0% (56 psig) or 2/4 NIs > 10%	Y0003D	NUCLEAR & TB PWR RE TR P7 PERM	OFF	
P-8	_____ N41	3/4 NIs < 31%	F0499D	RCL LO F PERM P8	ON	
	_____ N42 _____ N43 _____ N44	2/4 NIs > 35%	F0499D	RCL LO F PERM P8	OFF	

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Event No.: 3

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Event Description: Steam Pressure Input to “B” SG PORV Fails, “B” SG PORV Opens Fully.

Cue: Evaluator Cue, when Team completes 1-OPT-RP-001.

Time		Position	Applicant's Action or Behavior
		Crew	Diagnoses failure based on the following indications: “B” SG PORV RED open light LIT “B” SG SG PORV Demand ramping to 100% “B” SG NR level “swell”
		BOP	0-AP-53.00  Perform Immediate Action Steps of 0-AP-53.00 [1] CHECK REDUNDANT INSTRUMENT CHANNEL(S) INDICATION – NORMAL <i>Identifies “B” SG pressure NORMAL.</i>  [2] PLACE AFFECTED CONTROL(S)/ COMPONENT(S) IN MANUAL CONTROL AND STABILIZE PARAMETER USING REDUNDANT INDICATION <b>Places “B” SG PORV in Manual, and reduces demand to close the “B” SG PORV.</b>  <i>Checks “B” SG PORV RED light out and GREEN light LIT. Reports Immediate Actions of AP-53.00 complete.</i>
		SRO  BOP  SRO  BOP	0-AP-53.00  Reads Immediate Action Steps of 0-AP-53.00 [1] CHECK REDUNDANT INSTRUMENT CHANNEL(S) INDICATION – NORMAL <i>Reports Yes, “B” SG Pressure, Normal.</i>  [2] PLACE AFFECTED CONTROL(S)/ COMPONENT(S) IN MANUAL CONTROL AND STABILIZE PARAMETER USING REDUNDANT INDICATION  <i>Reports, Yes, “B” SG PORV placed in Manual and PORV is closed.</i>
		SRO	0-AP-53.00  Conducts a Transient Brief Summarizes Event and queries RO and BOP for Annunciators received and Critical Parameters.  RO reports no Annunciators received on VB 1-1, Critical Parameters: unchanged.  BOP reports no Annunciators on VB 1-2, Critical Parameters: PORV closed.  STA will have no input for the Brief.  SRO Concludes the Brief and continues 0-AP-53.00 at Step 3.

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Event No.: 3

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Event Description: Steam Pressure Input to “B” SG PORV Fails, “B” SG PORV Opens Fully.

Cue: Evaluator Cue, when Team completes 1-OPT-RP-001.

		SRO BOP	0-AP-53.00  *3 CHECK REACTOR POWER – LESS THAN OR EQUAL TO 100%  <i>Reports Actual Reactor Power and Trend using PCS 30 minute power indication.</i>
		SRO BOP SRO	0-AP-53.00  <b>CAUTION</b> Prior to Step 4: If Reactor power has been affected by a secondary transient, Turbine adjustment may be needed to control Tave. <b>NOTES</b> prior to Step 4: <ul style="list-style-type: none"> <li>Step 4 failures are listed in order of performance priority. Only the failed instrument/control and associated step number should be read aloud.</li> <li>When the affected instrument/controller malfunction(s) has been addressed by this procedure, recovery actions should continue at Step 11.</li> </ul> *4. DETERMINE THE FAILED INSTRUMENT / CONTROL AND GO TO APPROPRIATE STEP OR PROCEDURE: <ul style="list-style-type: none"> <li>Steam Dumps / SG PORVs 1-AP-38.00.</li> </ul> <i>Reports Yes, SG “B” SG PORV.</i>  Goes to 1-AP-38.00  <b>Note:</b> SRO may have directly entered 1-AP-38.00, Main Steam System Malfunction.
		SRO BOP	1-AP-38.00  1. CHECK STEAM DUMP VALVES – CLOSED  <i>Reports Yes, Steam Dumps closed.</i>

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Event Description: Steam Pressure Input to "B" SG PORV Fails, "B" SG PORV Opens Fully.

Cue: Evaluator Cue, when Team completes 1-OPT-RP-001.

		1-AP-38.00
	SRO	2. CHECK SG PORVS – CLOSED
	BOP	Reports, Yes "B: SG PORV closed, but was open.
	SRO	2. RNO IF SG pressure greater than desired pressure, THEN check PORV(s) close when SG pressure lowers below desired pressure AND GO TO Step 3.
	BOP	<i>Reports No, "B" SG Pressure NORMAL.</i>
	SRO	IF SG pressure less than desired pressure, THEN do the following:
		a) Place affected PORV controller in Manual and close valve.
	BOP	<i>Reports Yes, "B" SG PORV in Manual and closed.</i>
	SRO	b) IF any SG PORV NOT closed, THEN do either of the following:
	BOP	<i>Reports No, PORV is closed.</i>
	SRO	c) Check associated MS line pressure transmitter (1-MS-PI-101A, B, C) for the affected PORV at the ASD Panel to determine if transmitter failure is cause of PORV failure.
		Directs BOP to dispatch Service Bldg Inside operator to check status of MS line pressure indicators on Aux Shutdown Panel.
		<b>Note:</b> Service Bldg Inside operator will report 1-MS-PI-101B failed high.
		SRO continues to Step 3, while awaiting local report.
		1-AP-38.00
	SRO	3. CHECK THE FOLLOWING CONDITIONS:
		• Reactor power - LESS THAN OR EQUAL TO 100%
		• Turbine load – NORMAL
	BOP	<i>Reports Yes, reactor power is less than 100% and Turbine load is normal.</i>



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Event Description: Steam Pressure Input to “B” SG PORV Fails, “B” SG PORV Opens Fully.

Cue: Evaluator Cue, when Team completes 1-OPT-RP-001.

	SRO	1-AP-38.00 <b>NOTE</b> prior to Step 4: The power reductions required by Step 4 are intended for failures causing full or partial closure of a control valve, or if valve closure is required for maintenance.
	BOP	4. CHECK MAIN TURBINE AND MSR STEAM CONTROL VALVES:  a) MSR Steam supply MOVs and FCVs – NORMAL  b) Turbine Governor Valves and Stop Valves – NORMAL  c) Reheat Stop and Intercept Valves – NORMAL  <i>Reports Yes, Turbine and MST Steam Control Valves normal.</i>
	SRO	1-AP-38.00
	BOP	5. CHECK TURBINE MONITORING LIGHTS – NORMAL  <i>Reports Yes, Turbine Monitoring Lights are normal.</i>
	SRO	1-AP-38.00
	RO/BOP	6. STABILIZE UNIT CONDITIONS:  a) Adjust Turbine load as necessary  b) Borate or dilute as necessary  <i>Report Yes, Unit Conditions Stable.</i>
	SRO	1-AP-38.00
	RO/BOP	7. SUBMIT CONDITION REPORT AS NECESSARY  <i>Acknowledge CR submission required.</i>
	SRO	1-AP-38.00
		8. PROVIDE NOTIFICATIONS:  • Shift Supervision • STA (PRA determination) • OMO • MOC  <i>SRO will contact Shift Manager; notify of failure, Unit Status, and procedure entered; request OMO and I&amp;C be notified.</i>

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Event No.: 3

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Event Description: Steam Pressure Input to “B” SG PORV Fails, “B” SG PORV Opens Fully.

**Cue: Evaluator Cue, when Team completes 1-OPT-RP-001.**

	SRO	<p>1-AP-38.00</p> <p>9. CHECK ABNORMAL CONDITION - CORRECTED</p> <p>Do the following:</p> <p>a) Consult with Shift Supervision. b) Submit Condition Report. c) IF problem of short term nature, THEN GO TO Step 10 when problem corrected.</p> <p>SRO will conduct a focus brief and discuss failure with the Crew; 1-AP-38.00 will be suspended until resolution by I&amp;C.</p>
		<b>END EVENT 3</b>

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Event No.: 4

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Event Description: VCT Level Controller Setpoint Fails Low

Cue: Evaluator Cue.

Time	Position	Applicant's Action or Behavior
	RO	<p>Diagnose the failure based on the flowing alarms/indications:  1-CH-LC-1112C, VCT Level CNTRL, Demand goes to 100%  1-CH-LCV-1115A, Opens, Amber light LIT  If level VCT level reaches 27%, Blender will start to recover level in the VCT.</p>
	RO	<p>0-AP-53.00</p> <p>Perform Immediate Action Steps of 0-AP-53.00</p> <p>[1] CHECK REDUNDANT INSTRUMENT CHANNEL(S) INDICATION – NORMAL</p> <p><i>Identifies Both VCT level Channels lowering.</i></p> <p>[2] PLACE AFFECTED CONTROL(S)/ COMPONENT(S) IN MANUAL CONTROL AND STABILIZE PARAMETER USING REDUNDANT INDICATION.</p> <p><b>Places 1-CH-LCV-1115 A control switch in NORM position, and checks Amber Light NOT LIT, and RED "VCT" Light LIT.</b>  <i>Reports 1-CH-LCV-1115A in NORM position, valves indicates closed, and Immediate Action steps of 0-AP-53.00 complete.</i></p>
	SRO	<p>0-AP-53.00</p> <p>Conducts a Transient Brief</p> <p>Summarizes Event and queries RO and BOP for Annunciators received and Critical Parameters.</p> <p>RO reports no Annunciators received on VB 1-1, Critical Parameters VCT is (reports actual level in VCT) and trend stable.</p> <p>BOP reports no Annunciators on VB 1-2, Critical Parameters: unchanged.</p> <p>STA will have no input for the Brief.</p> <p>SRO Concludes the Brief and continues 0-AP-53.00 at Step 3.</p> <p>SRO/RO Consult and determine the failure is limited to the 1-CH-LC-1112C, the Modulating Divert Function has been lost. Discussion concludes that 1-CH-LC-1112C can be placed in Manual, Demand reduced to 0, and 1-CH-LCV-1115 control switch returned to Auto.</p>
	RO	<p><b>Places 1-CH-LC-1112C in Manual, reduces Demand to 0, and returns 1-CH-LCV-1115A to Auto position.</b></p>

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Event No.: 4

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Event Description: VCT Level Controller Setpoint Fails Low

Cue: Evaluator Cue.

	SRO  RO	0-AP-53.00  *3 CHECK REACTOR POWER – LESS THAN OR EQUAL TO 100%  <i>Reports Actual Reactor Power and Trend using PCS 30 minute power indication.</i>
	SRO        RO	0-AP-53.00  <b>CAUTION</b> Prior to Step 4: If Reactor power has been affected by a secondary transient, Turbine adjustment may be needed to control Tave. <b>NOTES</b> prior to Step 4: <ul style="list-style-type: none"> <li>• Step 4 failures are listed in order of performance priority. Only the failed instrument/control and associated step number should be read aloud.</li> <li>• When the affected instrument/controller malfunction(s) has been addressed by this procedure, recovery actions should continue at Step 11.</li> </ul> *4. DETERMINE THE FAILED INSTRUMENT / CONTROL AND GO TO APPROPRIATE STEP OR PROCEDURE:  Based on 2 <sup>nd</sup> Note, SRO/RO determine controller malfunction has been addressed. SRO GOES TO Step 11  <i>Agrees that controller malfunction has been addressed and Procedure Action should continue at Step 11.</i>
	SRO        BOP	0-AP-53.00  11. CHECK CALORIMETRIC – FUNCTIONAL IAW (1)-OPT-RX-001, ATTACHMENT 4  <i>Directs BOP to check Calorimetric Functional IAW 1-OPT-RX-001, Attachment 4.</i>  <i>Checks Calorimetric Functional using 1-OP-RX-001, Attachment 4.</i>  <i>Reports Calorimetric Functional.</i>  <i>Note: Attachment 4 of 1-OPT-RX-001 follows this section.</i>

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Event No.: 4

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Event Description: VCT Level Controller Setpoint Fails Low

Cue: Evaluator Cue.

	SRO	0-AP-53.00
	STA	<p>12. REVIEW THE FOLLOWING:</p> <ul style="list-style-type: none"> <li>• Tech Spec 3.7</li> <li>• VPAP-2802, NOTIFICATIONS AND REPORTS</li> <li>• TRM SECTION 3.3, INSTRUMENTATION</li> <li>• Reg Guide 1.97</li> <li>• EP-AA-303, Equipment Important to Emergency Response</li> </ul> <p>SRO Directs STA to check items 2 through 5, above. SRO Consults Tech Specs and determine no Action Items are impacted.</p> <p><b>Will report references have been checked and requirements discussed with the Shift Manager.</b></p>
	SRO	0-AP-53.00
	RO	13. CHECK ADDITIONAL INSTRUMENT / CONTROLLER MALFUNCTION – EXISTS
	SRO	<p><i>Reports, No additional controller/instrument failure does not exist.</i></p> <p>GOES TO Step 15.</p>
	SRO	0-AP-53.00
	SRO	<p>15. PROVIDE NOTIFICATIONS AS NECESSARY:</p> <ul style="list-style-type: none"> <li>• Shift Supervision</li> <li>• OMOC</li> <li>• STA (PRA determination)</li> <li>• I&amp;C</li> </ul> <p><i>Contacts Shift manger and reports failure, Procedure entered, and status of the plant. Requests OMOC and I&amp;C be contacted concerning the failure.</i></p> <p><i>Directs the STA to add the failure to the PRA calculation.</i></p>
		<b><u>END EVENT #4</u></b>

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Event No.: 4

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Event Description: VCT Level Controller Setpoint Fails Low

Cue: Evaluator Cue.

1-OPT-RX-001, Attachment 4

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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.

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Event No.: 4

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Event Description: VCT Level Controller Setpoint Fails Low

Cue: Evaluator Cue.

1-OPT-RX-001, Attachment 4

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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			

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Event No.: 5

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Event Description: Channel III, "C" SG NR Level Fail Low; "C" FRV Manual Button Failed

Cue: Lead Evaluator Cue.

Time	Position	Applicant's Action or Behavior
	BOP	<p>Diagnoses the Failure based on the following Alarms/Indications:</p> <p>Annunciator 1H-G7, STM GEN 1C LVL ERROR  Annunciator 1H-C7, STM GEN 1C LO-LO LVL  Annunciator 1F-G9, STM GEN 1C LO- LO LVL CH 3  Lowering trend in Channel III, "C" SG NR Level, 1-FW-LI-1496  Rising trend on Channel I&amp;II "C" SG NR Level, 1-FW-LI-1494/1495  Rising Demand on 1-FW-FC-1498F, "C" FRV</p>
	BOP	<p>0-AP-53.00</p> <p>Perform Immediate Action Steps of 0-AP-53.00</p> <p>[1] CHECK REDUNDANT INSTRUMENT CHANNEL(S) INDICATION – NORMAL</p> <p><i>Identifies "C" SG Channels I&amp;II Rising.</i></p> <p>[2] PLACE AFFECTED CONTROL(S)/ COMPONENT(S) IN MANUAL CONTROL AND STABILIZE PARAMETER USING REDUNDANT INDICATION.</p> <p>[2] RNO Do the following:</p> <ul style="list-style-type: none"> <li>• IF no control function affected, THEN GO TO Step 4.</li> <li>• IF Feedwater-related failure, THEN control SG level with Feedwater Isolation MOVs.</li> </ul> <p>Attempts to place "C" FRV, 1-FW-FC-1498F in Manual; <b>Throttles 1-FW-MOV-154C, to reduce Feed Flow less than Steam Flow on "C" SG.</b> And Checks "C" SG level trending back to Normal level.</p> <p><i>Reports "C" SG Channel III NR Level has failed Low, "C" FRV controller would not shift to Manual, 1-FW-MOV-154C throttled to reduce Feed Flow to "C" SG, "C" SG level returning to Normal level, and Immediate Action steps of 0-AP-53.00 complete.</i></p> <div style="border: 1px solid black; padding: 5px;"> <p><b>Critical Task: (CT-2)</b> Control "C" SG NR level to prevent an automatic turbine trip/reactor trip on high SG NR level at 75%. Should the BOP fail to take timely action to control "C" SG NR level, an automatic turbine trip/reactor trip will occur approximately 80 seconds from Event initiation. Actuation of the reactor protection system for this event would be considered failure of this CT. A Plant Representative will be available for consult during the Scenario.</p> </div>



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Event No.: 5

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Event Description: Channel III, "C" SG NR Level Fail Low; "C" FRV Manual Button Failed

Cue: Lead Evaluator Cue.

	SRO	<p>0-AP-53.00</p> <p>Conducts a Transient Brief</p> <p>Summarizes Event and queries RO and BOP for Annunciators received and Critical Parameters.</p> <p>RO reports no Annunciators received on VB 1-1, Critical Parameters are stable. May report Reactor Power using PCS 30 minute variable.</p> <p>BOP reports no Annunciators on VB 1-2, Critical Parameters: "C" SG Level and trend.</p> <p>STA will have no input for the Brief.</p> <p>SRO Concludes the Brief, Establishes Band for "C" SG NR level with BOP of <math>44 \pm 5\%</math> when normal level restored, and discusses Contingency for "C" SG level control should a reactor trip occur with the abnormal "C" Feed Control.</p> <p>Continues with 0-AP-53.00 at Step 3.</p>
	<p>SRO</p> <p>RO</p> <p>SRO</p> <p>RO</p>	<p>0-AP-53.00</p> <p>*3 CHECK REACTOR POWER – LESS THAN OR EQUAL TO 100%</p> <p><i>Reports Actual Reactor Power and Trend using PCS 30 minute power indication.</i></p> <p>Direct RO to Review the Annunciator Response Procedures for alarms associated with the Event.</p> <p><i>Report results of ARP review to SRO.</i></p>
	<p>SRO</p> <p>BOP</p> <p>SRO</p>	<p>0-AP-53.00</p> <p><b>CAUTION</b> Prior to Step 4: If Reactor power has been affected by a secondary transient, Turbine adjustment may be needed to control Tave.</p> <p><b>NOTES</b> prior to Step 4:</p> <ul style="list-style-type: none"> <li>• Step 4 failures are listed in order of performance priority. Only the failed instrument/control and associated step number should be read aloud.</li> <li>• When the affected instrument/controller malfunction(s) has been addressed by this procedure, recovery actions should continue at Step 11.</li> </ul> <p>*4. DETERMINE THE FAILED INSTRUMENT / CONTROL AND GO TO APPROPRIATE STEP OR PROCEDURE:</p> <ul style="list-style-type: none"> <li>• SG NR Level, Step 7.</li> </ul> <p><i>Reports Yes, Channel III, "C" SG NR Level Failed Low.</i></p> <p>Goes to Step 7.</p> <p><b>NOTE:</b> SRO/BOP may discuss use of "C" FRV bypass valve HCV, 1-FW-HCV-155C, for fine control of "C" SG NR Level.</p>

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Event No.: 5

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Event Description: Channel III, "C" SG NR Level Fail Low; "C" FRV Manual Button Failed

Cue: Lead Evaluator Cue.

		0-AP-53.00
		<b>CAUTION</b> 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.
	SRO	7. CHECK STEAM GENERATOR LEVEL CONTROL INSTRUMENTS – NORMAL • Steam Generator Level
	BOP	<i>Reports No, "C" SG NR Level failed Low</i>
	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:
	BOP	<i>Reports No, steam flow, steam pressure and feed flow are normal.</i> IF SG Level Channel III has failed, THEN do the following:
	SRO	a) Place the associated Feed Reg Valve in MANUAL.
	BOP	<i>Reports No, "C" FRV cannot be placed in Manual.</i>
	SRO	b) IF manual control of Feedwater is inoperable, THEN do the following:
		1) Control SG level with Feedwater Isolation MOVs.
	BOP	<i>Reports Yes "C" SG NR level being controlled using "C" FRV isolation MOV.</i>
	SRO	2) Consult with the Shift Manager concerning the need to place the MFRV on the jack.
		<i>States that Shift Manager will be consulted.</i>
	SRO	c) Control SG level at program level.
	BOP	<i>Reports Yes "C" SG being controlled at (provides actual level ± set band).</i>
	SRO	d) Main Feed Reg Valve Bypass Valves may be used for fine control of SG level.
	BOP	<i>Acknowledges FRV bypass valve may be used for fine control</i>
		:

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Event Description: Channel III, "C" SG NR Level Fail Low; "C" FRV Manual Button Failed

Cue: Lead Evaluator Cue.

	SRO	<p>0-AP-53.00, Step 7 RNO, Continued</p> <p>Perform follow-up actions</p> <p>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.</p> <p>b) Refer to the following Tech Spec 3.7 items:</p> <ul style="list-style-type: none"><li>• Table 3.7-1, <b>12</b> and 17</li><li>• Table 3.7-2, 1.c, 1.e, and <b>3.a</b></li><li>• Table 3.7-3, 2.a, and <b>3.a</b></li><li>• Table 3.7-6, 15 and 16</li></ul> <p>c) Refer to Attachment 1.</p> <p>d) IF no other instrumentation failure exists, THEN GO TO Step 11.</p> <p>Notifies RO/BOP of Need to Consult Tech Specs and Shift Manager.</p>
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Event Description: Channel III, "C" SG NR Level Fail Low; "C" FRV Manual Button Failed

Cue: Lead Evaluator Cue.

	SRO	<p>0-AP-53.00</p> <p><i>Notify Shift Manager of the Failure, Actions taken, Procedures entered, and status of the Unit. Request OMOC be notified, and I&amp;C contacted. Address I-OP-RP-001, stating that this procedure should be prioritized until I&amp;C is ready to place the channel in trip.</i></p> <p>Consult Tech Specs and identify:</p> <ol style="list-style-type: none"> <li>1) TS 3.7, 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: <ol style="list-style-type: none"> <li>a. The inoperable channel is placed in the tripped condition within 72 hours.</li> <li>b. 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.</li> </ol> <p>If the conditions are not satisfied in the time permitted, be in at least HOT SHUTDOWN within 6 hours.</p> </li> <li>2) TS 3.7, Table 3.7-2, Items 3a, 1) and 2), Operator Action 20. With the number of OPERABLE channels less than the Total Number of Channels, REACTOR CRITICAL and/or POWER OPERATION may proceed provided the following conditions are satisfied: <ol style="list-style-type: none"> <li>a. The inoperable channel is placed in the tripped condition within 72 hours.</li> <li>b. 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.</li> </ol> <p>If the conditions are not satisfied in the time permitted, be in HOT SHUTDOWN within the next 6 hours and reduce RCS temperature &amp; pressure to less than 350°F/450 psig, respectively in the following 12 hours.</p> </li> <li>3) TS 3.7, Table 3.7-3, Item 3a), Operator Action 20. With the number of OPERABLE channels less than the Total Number of Channels, REACTOR CRITICAL and/or POWER OPERATION may proceed provided the following conditions are satisfied: <ol style="list-style-type: none"> <li>a. The inoperable channel is placed in the tripped condition within 72 hours.</li> <li>b. 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.</li> </ol> <p>If the conditions are not satisfied in the time permitted, be in HOT SHUTDOWN within the next 6 hours and reduce RCS temperature &amp; pressure to less than 350°F/450 psig, respectively in the following 12 hours.</p> </li> <li>4) TS Table 3.7-6, Item 15, SG Water Level (Narrow Range), 2 per SG – Met.</li> </ol> <p>Notify Crew and Shift Manager the results of Tech Spec consult.</p> <p><i>Note: Attachment 1 follows this Section.</i></p> <p>GO TO Step 11</p>
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Event No.: 5

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Event Description: Channel III, "C" SG NR Level Fail Low; "C" FRV Manual Button Failed

Cue: Lead Evaluator Cue.

	SRO	0-AP-53.00 11. CHECK CALORIMETRIC – FUNCTIONAL IAW (1)-OPT-RX-001, ATTACHMENT 4  <i>Directs RO to check Calorimetric Functional IAW 1-OPT-RX-001, Attachment 4.</i>
	RO	<i>Checks Calorimetric Functional using 1-OP-RX-001, Attachment 4.</i>  <i>Reports Calorimetric Functional.</i>
	SRO	0-AP-53.00 12. REVIEW THE FOLLOWING: <ul style="list-style-type: none"> <li>• Tech Spec 3.7</li> <li>• VPAP-2802, NOTIFICATIONS AND REPORTS</li> <li>• TRM SECTION 3.3, INSTRUMENTATION</li> <li>• Reg Guide 1.97</li> <li>• EP-AA-303, Equipment Important to Emergency Response</li> </ul> SRO Directs STA to check items 2 through 5, above. SRO Consults Tech Specs and determine no Action Items are impacted.  <b>Will report references have been checked and requirements discussed with the Shift Manager.</b>
	SRO	0-AP-53.00 13. CHECK ADDITIONAL INSTRUMENT / CONTROLLER MALFUNCTION – EXISTS
	RO	<i>Reports, No additional controller/instrument failure does not exist.</i>  GOES TO Step 15.
	SRO	0-AP-53.00 15. PROVIDE NOTIFICATIONS AS NECESSARY: <ul style="list-style-type: none"> <li>• Shift Supervision</li> <li>• OMO</li> <li>• STA (PRA determination)</li> <li>• I&amp;C</li> </ul> <i>Contacts Shift manger and reports failure, Procedure entered, and status of the plant. Requests OMO and I&amp;C be contacted concerning the failure.</i>  <i>Directs the STA to add the failure to the PRA calculation.</i>
		<b>END EVENT #5</b>

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Event No.: 5

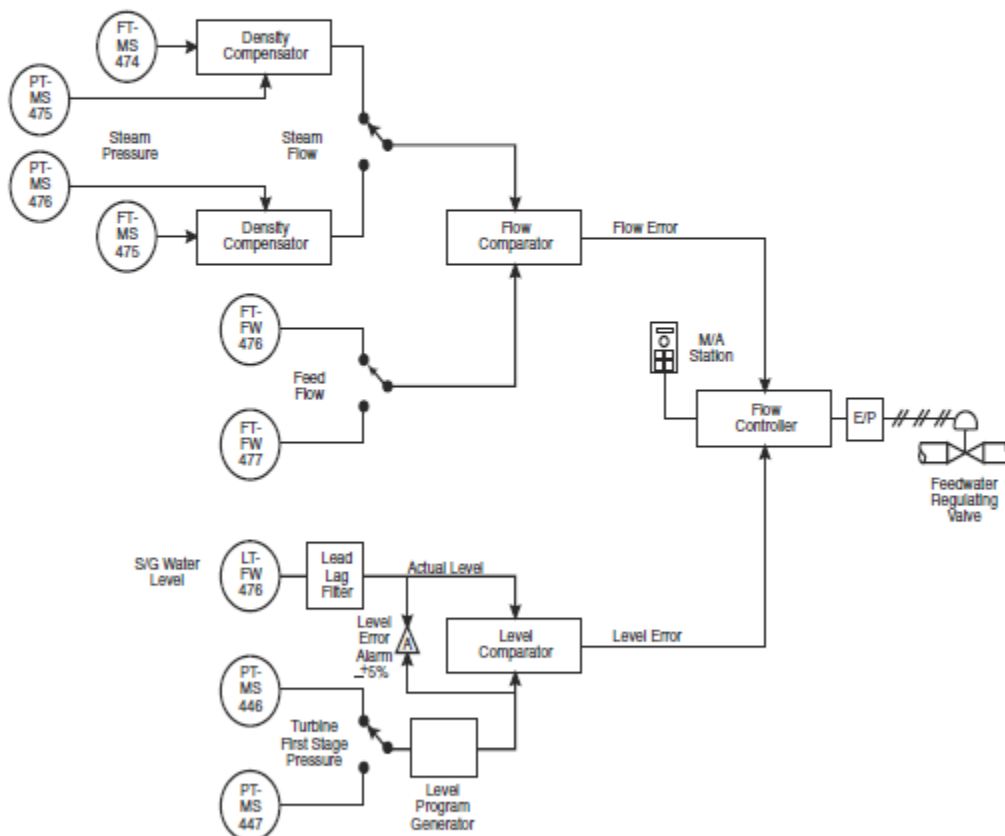
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Event Description: Channel III, "C" SG NR Level Fail Low; "C" FRV Manual Button Failed

Cue: Lead Evaluator Cue.

0-AP-53.00, Attachment 1:

NUMBER	ATTACHMENT TITLE	ATTACHMENT
0-AP-53.00	SG WATER LEVEL CONTROL SYSTEM	1
REVISION		PAGE
22		1 of 1

**NOTE:** This Attachment uses SG A as a reference for mark numbers.

Graphics No: 6208

SGWLC DIAGRAM

Op-Test No.: Surry 2017-301 Scenario No.: 3

Event No.: 6

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Event Description: "C" RCP #3 Seal Failed

Cue: Lead Evaluator Cue.

	Crew	<p>Diagnoses the Failure of #3 Seal on the "C" RCP based on the following alarms/indications:</p> <p>Annunciator 1C-C5, RCP 1C SEAL 2 LO INLET PRESS</p> <p>Annunciator 1C-F4, RCP 1C SEAL LEAKOFF LO FLOW</p> <p>Blue Pen, 1-CH-FR-1190, RCP Seal Leakoff Flow Recorder, 0 gpm</p> <p>PCS Indications, "C" RCP:</p> <p>#1 Seal D/P ~1118 psid</p> <p>#2 &amp; #3 Seal D/P – Grayed out with B (Bad) notation.</p>
	SRO	<p>1-AP-9.00, RCP Abnormal Conditions</p> <p>Note: SRO will direct the RO to check Seal Indications using the PCS, and review the Annunciator Response Procedure for alarms Lit on the "C" Annunciator Panel, (Step 3 of 1C-F4 directs response IAW 1-AP-9.00.)</p> <p><b>CAUTION</b> prior to Step 1: If RCP seal injection flow is lost, RCP seal or bearing temperatures can be expected to reach maximum operating limits within one to two hours, even with normal Thermal Barrier CC flow.</p> <p><b>NOTES</b> prior to Step 1:</p> <ul style="list-style-type: none"> <li>• If an RCP needs to be tripped with the Reactor critical, a Reactor trip must be performed before securing the RCP.</li> <li>• Attachment 1 and Attachment 6 list PCS points which may be used to monitor RCP performance. SRO provides Att. 1 &amp; 6 to RO.</li> </ul> <p>1. CHECK SEAL INJECTION – FLOW INDICATED</p>
	RO	<p><i>Reports Yes, Seal Injection flow is (provides actual flow) and Stable.</i></p>
	SRO	1-AP-9.00
	RO	2. CHECK RCS PRESSURE – LESS THAN 2100 PSIG
	SRO	<p><i>Reports No, RCS pressure is (provides actual pressure) and Stable.</i></p> <p>Goes TO STEP 4.</p>
	SRO	1-AP-9.00
	RO	<p>*4 CHECK RCP SEAL WATER OUTLET TEMPERATURE - LESS THAN 200°F</p> <ul style="list-style-type: none"> <li>• PCS Point T0183A - RCP C</li> </ul> <p><i>Reports Yes, C RPC Seal Outlet Temperature is (provides actual Temperature) and is Stable.</i></p>

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Event No.: 6

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Event Description: "C" RCP #3 Seal Failed

Cue: Lead Evaluator Cue.

		1-AP-9.00
	SRO	<p><b>NOTE</b> prior to Step 5: First, Second, and Third Stage Seal <math>\Delta P</math> is indicated on the PCS, or may be determined using Notes on Attachment 1, page 2.</p> <p>*5. CHECK RCP SEAL STAGES – NOT FAILED</p> <ul style="list-style-type: none"> <li>• <math>\Delta P</math> across each seal stage – LESS THAN 2000 PSID</li> </ul>
	RO	<p><i>Reports Yes, #1 Seal D/P ~ 1118 psid; #2 &amp; #3 – grayed out.</i></p>
		1-AP-9.00
	SRO	<p><b>NOTE</b> prior to Step 6: Differential pressure of greater than 1440 psid is an indication that one seal stage has failed and a second seal stage is degrading. Unit operation with only one failed seal stage is acceptable.</p> <p>*6. CHECK RCP SEAL STAGES – LESS THAN ONE SEAL STAGE FAILED</p> <ul style="list-style-type: none"> <li>• <math>\Delta P</math> across each seal stage – LESS THAN 1440 PSID</li> </ul>
	RO	<p><i>Reports Yes, Seal D/P less than 1440 psid.</i></p>
		1-AP-9.00
	SRO	<p><b>CAUTION</b> prior to Step 7: RCPs may be operated without seal water return flow for up to 30 minutes.</p> <p><b>NOTE</b> prior to Step 7: Attachment 3 may be used to check suspect Seal Leakoff flow instrumentation.</p> <p>*7. CHECK RCP SEAL LEAKOFF – LESS THAN 3.3 GPM</p>
	RO	<p><i>Reports Yes, C RCP Seal Leakoff is 0 gpm.</i></p>



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Event Description: "C" RCP #3 Seal Failed

Cue: Lead Evaluator Cue.

		1-AP-9.00
		<p><b>CAUTION</b> prior to Step 8: RCPs may be operated without seal water return flow for up to 30 minutes.</p> <p><b>NOTES</b> prior to Step 8:</p> <ul style="list-style-type: none"> <li>• Attachment 3 may be used to check suspect Seal Leakoff flow instrumentation.</li> <li>• If Seal Leakoff flow lowers to less than or equal to 0.2 gpm, the PCS points listed below will display zero and turn gray. An actual low flow condition can be diagnosed/confirmed by changes in other parameters, including CTMT Sump and PDTT level / influent rate, P2 pressure, and Seal Leakoff temperature. <ul style="list-style-type: none"> <li>• P1CH002C, Loop A #2 Seal ΔP • P1CH003C, Loop A #3 Seal ΔP</li> <li>• P1CH005C, Loop B #2 Seal ΔP • P1CH006C, Loop B #3 Seal ΔP</li> <li>• P1CH008C, Loop C #2 Seal ΔP • P1CH009C, Loop C #3 Seal ΔP</li> </ul> </li> <li>• If RCP Seal Leakoff flow lowers significantly, concurrent with a rise in PDTT inleakage, flow from the third stage leakoff to the PDTT may be included as part of total seal leakoff flow, as this means the third stage has elevated leakby and sufficient cooling remains.</li> </ul>
	SRO	8. CHECK RCP SEAL LEAKOFF – GREATER THAN OR EQUAL TO 1.2 GPM
	RO	<i>Reports No, C RCP Seal Leakoff is 0 gpm.</i>
	SRO	Do the following:
		a) Check open or open RCP SEAL LKOFF ISOL VV on affected RCP(s):
		<ul style="list-style-type: none"> <li>• 1-CH-HCV-1303A</li> <li>• 1-CH-HCV-1303B</li> <li>• 1-CH-HCV-1303C</li> </ul>
	RO	<i>Reports Yes, RCP Seal Leak off isolation valves open.</i>
	SRO	b) IF 1-CH-HCV-1303A/B/C closed and can NOT be opened within 30 minutes, <b>OR flow is less than 0.2 gpm (with RCP SEAL LKOFF ISOL VV open)</b> , THEN do the following:
		1) Trip the Reactor.
		2) Initiate 1-E-0, Reactor Trip or Safety Injection.
		3) WHEN approximately five minutes have elapsed since Reactor Trip, THEN do the following:
		a. IF RCP A affected, THEN close 1-RC-PCV-1455A, Pressurizer Spray Valve From Loop A.
		<b>b. IF RCP C affected, THEN close 1-RC-PCV-1455B, Pressurizer Spray Valve From Loop C.</b>
		c. Stop the affected RCP(s).
		<ul style="list-style-type: none"> <li>• 1-RC-P-1A</li> <li>• 1-RC-P-1B</li> <li>• <b>1-RC-P-1C</b></li> </ul>
		d. GO TO Step 9.
	SRO	<b>Conduct a Focus Brief;</b> The RO will be directed to perform E-0, The BOP directed to Monitor "C" SG level and Acknowledge Alarms. After E-0 IAs checked, the BOP will continue 1-AP-9.00 Action to close the Spray Valve and secure C RCP.

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Event No.: 6

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Event Description: "C" RCP #3 Seal Failed

Cue: Lead Evaluator Cue.

	RO	<p>1-E-0, Reactor Trip and Safety Injection</p> <p>[1] CHECK REACTOR TRIP:</p> <p>a) Manually trip reactor</p> <p><b>RO push Reactor Trip pushbutton.</b></p> <p>b) Check the following:</p> <ul style="list-style-type: none"> <li>• All Rods On Bottom light - LIT</li> <li>• Reactor trip and bypass breakers - OPEN</li> <li>• Neutron flux – LOWERING</li> </ul> <p><i>RO will check indications of Reactor Trip as above. Reports Reactor Tripped. SRO Acknowledges.</i></p>
	RO	<p>1-E-0</p> <p>[2] CHECK TURBINE TRIP:</p> <p>a) Manually trip the turbine</p> <p><b>RO Manually pushes both Turbine Trip pushbuttons, simultaneously.</b></p> <p>b) Check all turbine stop valves – CLOSED</p> <p><i>RO Checks turbine stop valves closed.</i></p> <p>c) Isolate reheaters by closing MSR steam supply SOV</p> <ul style="list-style-type: none"> <li>• 1-MS-SOV-104</li> </ul> <p><i>RO checks MSR Steam Supply valves closed; places 1-MS-SOV-104 in CLOSE position.</i></p> <p>d) Check generator output breakers – OPEN (Time Delayed)</p> <p><i>When Generator output breakers open, Reports Turbine Tripped. SRO Acknowledges.</i></p>
	RO	<p>1-E-0</p> <p>[3] CHECK BOTH AC EMERGENCY BUSES – ENERGIZED</p> <p>RO Checks Voltage indicated on "H" and "J" buses using voltmeters on #1 &amp; #3 EDG Control Panels.</p> <p><i>Reports, Both AC Emergency Buses Energized. SRO Acknowledges</i></p>

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Event No.: 6

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Event Description: "C" RCP #3 Seal Failed

Cue: Lead Evaluator Cue.

	RO	<p>1-E-0</p> <p>[4] CHECK IF SI INITIATED:</p> <p>a) Check if SI is actuated:</p> <ul style="list-style-type: none"> <li>• LHSI pumps - RUNNING</li> <li>• SI annunciators - LIT <ul style="list-style-type: none"> <li>• A-F-3</li> <li>• A-F-4</li> </ul> </li> </ul> <p><i>Checks LHSI pumps running by Breaker lights – Green On, Red Off, 0 indicated amps for LHSI pumps.</i></p> <p>Sep a) RNO</p> <p>a) Check if SI is required or imminent as indicated by any of the following:</p> <ul style="list-style-type: none"> <li>• Low PRZR pressure</li> </ul> <p><i>Reports Actual RCS pressure and Trend.</i></p> <ul style="list-style-type: none"> <li>• High CTMT pressure</li> </ul> <p><i>Reports Actual CTMT pressure and Trend</i></p> <ul style="list-style-type: none"> <li>• High steamline differential pressure</li> </ul> <p><i>Reports Actual Steamline D/P.</i></p> <ul style="list-style-type: none"> <li>• High steam flow with low Tave or low line pressure</li> </ul> <p><i>Reports No Steam line flow indicated.</i></p> <p><i>Reports SI is not in service or required, E-0 Immediate Actions Are complete, and recommend a transition to 1-ES-0.1.</i></p> <p>SRO will check off steps of E-0. When Complete, the SRO will hand out ES-0.1 CAPs, and commence a Transition Brief.</p> <p>RO will be asked to provide First-Out Annunciators and Critical Parameters.  <i>RO will provide Manual Reactor Trip as First Out; Critical Parameters, at minimum, C RCP #3 Seal Return Flow, RCS Pressure, RCS Subcooling.</i></p> <p>BOP will be asked to provide First Out and Critical Parameters.  <i>BOP will provide Turbine Tripped by Reactor Trip as First Out; Critical Parameters, at minimum, C SG NR level and trend.</i>  <i>STA will have no Input for the Brief.</i></p> <p><i>SRO will Direct BOP to continue with AP-9.00 Actions, and then throttle AFW Flow using ES-0.1, Att. 5 guidance (Transient AFW Flow Control).</i></p>
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Op-Test No.: Surry 2017-301 Scenario No.: 3

Event No.: 6

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Event Description: "C" RCP #3 Seal Failed

Cue: Lead Evaluator Cue.

	BOP	<p>1-AP-9.00, Step 8, RNO 3)</p> <p>3) WHEN approximately five minutes have elapsed since Reactor Trip, THEN do the following:</p> <p>a. IF RCP A affected, THEN close 1-RC-PCV-1455A, Pressurizer Spray Valve From Loop A.</p> <p><i>Notes that A RCP not effected, GOES TO Substep b.</i></p> <p>b. IF RCP C affected, THEN close 1-RC-PCV-1455B, Pressurizer Spray Valve From Loop C.</p> <p><i>Takes C RCS Loop Spray Valve Controller, 1-RC-PC-1444H, to Manual and Checks Demand at 0%.</i></p> <p>c. Stop the affected RCP(s).</p> <ul style="list-style-type: none"><li>• 1-RC-P-1A</li><li>• 1-RC-P-1B</li><li>• <b>1-RC-P-1C</b></li></ul> <p><b>Secures C RCP.</b></p>
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Event No.: 6

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Event Description: "C" RCP #3 Seal Failed

Cue: Lead Evaluator Cue.

	BOP	<p>1-ES-0.1, Reactor Trip response, Attachment 5</p> <ol style="list-style-type: none"> <li>Maintain minimum AFW flow of 540 gpm with RCP(s) in service until one SG Narrow Range level is greater than 12%. <i>Initials Step.</i></li> <li>Maintain minimum AFW flow of 350 gpm with NO RCPs running, until one SG Narrow Range level is greater than 12%. <i>Marks N/A</i></li> </ol> <p><b>NOTE</b> prior to Step 3: 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.</p> <ol style="list-style-type: none"> <li>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: <ul style="list-style-type: none"> <li>• SG A, 1-FW-MOV-151E and 1-FW-MOV-151F</li> <li>• SG B, 1-FW-MOV-151C and 1-FW-MOV-151D</li> <li>• SG C, 1-FW-MOV-151A and 1-FW-MOV-151B</li> </ul> <p><b>Throttle AFW to ~ 200 gpm A/B SG, ~100 gpm C SG</b></p> </li> <li>Isolate AFW header with deenergized Emergency Bus MOVs by closing the following header isolation valves:  Emergency Bus H deenergized: <input type="checkbox"/> 1-FW-141 <input type="checkbox"/> 1-FW-156 <input type="checkbox"/> 1-FW-171  Emergency Bus J deenergized: <input type="checkbox"/> 1-FW-140 <input type="checkbox"/> 1-FW-155 <input type="checkbox"/> 1-FW-170   <i>Marks Step N/A</i> </li> </ol>
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Event No.: 6

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Event Description: "C" RCP #3 Seal Failed

Cue: Lead Evaluator Cue.

		1-ES-0.1
		<p><b>NOTE:</b> If this procedure is being entered from 1-E-0, REACTOR TRIP OR SAFETY INJECTION, following a tube leak of less than 150 gpm, 1-AP-24.01, LARGE STEAM GENERATOR TUBE LEAK, should be used for guidance instead of this procedure.</p>
	SRO	*1. CHECK RCS TEMPERATURE CONTROL
		a) Check RCPS - ANY RUNNING
	RO	<i>Reports Yes, A &amp; B RCP running (may report A/B/C running depending on BOP action – previous Page).</i>
	SRO	b) Monitor RCS Average Temperature
		1) STABLE AT 547°F
		OR
		2) TRENDING TO 547°F
		Reports Yes, Trending to 547°F (may add "stable on the Seam Dumps")..
		1-ES-0.1
	SRO	2. CHECK FW STATUS:
		a) Check RCS Average temperatures - LESS THAN 554°F
	RO	<i>Reports Yes, Tave &lt; 554 °F (may provide actual Tave Value and Trend).</i>
	SRO	b) Check Feed REG valves – CLOSED
	RO	<i>Reports Yes, Feed Reg Valves closed.</i>
	SRO	c) Close SG FW isolation MOVs
		• 1-FW-MOV-154A
		• 1-FW-MOV-154B
		• 1-FW-MOV-154C
	RO	<b>Closes 1-FW-MOV-154 A/B/C (Two Handed Operation allowed per Ops Standards).</b>
	SRO	d) Check AFW pumps - RUNNING
		• Motor Driven AFW pumps
		• TD AFW pump
	RO	<i>Reports Yes, MD and TD AFW pumps running.</i>
	SRO	e) Check total AFW flow – GREATER THAN 540 GPM (350 GPM W/O RCPs)
	RO	<i>Reports Yes, AFW Flow &gt; 540 gpm (may report actual indicated flow, actual flowrate dependent on BOP action).</i>

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Event Description: "C" RCP #3 Seal Failed

Cue: Lead Evaluator Cue.

		1-ES-0.1, Step 2, Continued
	SRO	f) Check emergency buses – BOTH ENERGIZED
	RO	<i>Reports Yes, both emergency energized.</i>
	SRO	g) Control feed flow to maintain narrow range level between 22% and 50%
	RO/BOP	<i>Acknowledges direction to control AFW flow.</i>
	SRO	h) Initiate Attachment 8 to restore blowdown
	BOP	<i>Acknowledges direction to restore Blowdown.</i>
		<b>End EVENT #6</b>

Op-Test No.: Surry 2017-301 Scenario No.: 3

Event No.: 7

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Event Description: "C" SG Feed Line Break in CTMT, Hi Hi CLS Failure to Actuate

Cue: Lead Evaluator Cue.

Time	Position	Applicant's Action or Behavior
	Crew	Diagnoses Feed Line Break in CTMT using the following Alarms/Indications. Annunciator 1F-C6/D6/E6, STM GEN 1C CH2/CH3/CH4 HI STM LINE & HDR ΔP Annunciator 1A-F3/F4, SI INITIATED TRA/B Annunciator 1B-B4/B5, HI CLS TRA/B C SG NR Level lowering on 1-FW-LI-1494/1495/1496 CTMT Pressure rising on 1-LM-PI-100A/B/C/D
	SRO	1-E-0 Directs RO to manually backup SI and reperform High Level Steps of E-0. Announces Transition to 1-E-0.
	RO	1-E-0, High Level Steps  [1] Check Reactor Tripped  <b>Presses SI pushbuttons.</b> <i>Checks Reactor Tripped, Reports "Reactor Tripped", SRO Acknowledges.</i>  [2] Check Turbine Tripped  <i>Checks Turbine Tripped, Reports "Turbine Tripped", SRO Acknowledges.</i>  [3] Check AC Emergency Buses – Both energized.  <i>Checks both AC emergency buses energized, Reports "both AC Emergency buses energized, SRO Acknowledges.</i>  [4] Check SI Initiated  Checks LHSI Pump A/B running, Annunciator A-F3 and A-F4 LIT, checks SI flow to RCS using 1-SI-FI-1961/1962/1963, 1943, 1943A. <i>Reports E-0 Immediate Actions are complete with SI in service, SRO Acknowledges.</i>



Op-Test No.: Surry 2017-301 Scenario No.: 3

Event No.: 7

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Event Description: "C" SG Feed Line Break in CTMT, Hi Hi CLS Failure to Actuate

Cue: Lead Evaluator Cue.

	1-E-0	
SRO	Conducts Commensurate Brief, queries Crew concerning items identified that have a higher priority than responding to the Fault on "C" SG. SRO closes Brief.	
STA	SRO hands-out E-0 CAPs, assigns RO/ BOP to complete E-0, Attachment 8, Part A for the "C" SG (This Section), then perform E-0, Attachments 1, 2, 3, and 4 ( <b>Event 8</b> ).	
SRO	<i>When the Crew has identified that CTMT pressure has exceeded the Hi Hi CLS setpoint (23 psia) and no CS/RS is running, will hand the SRO the CTMT Status Tree marked to show FR-Z.1 Entry on ORANGE Path.</i>	
BOP	Announces Transition of FR-Z.1.	
	<b>CT-4 Start Time:</b> _____	
	<i>Suspend performance of E-0 Attachments until exit from FR-Z.1.</i>	
	1-FR-Z.1, Response to Containment high Pressure	
	<b>CAUTION</b> prior to Step 1: 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:	
RO	a) Check CTMT pressure - HAS INCREASED TO GREATER THAN 23 PSIA	
SRO	<i>Reports Yes, CTMT pressure has exceeded 23 psia (may report actual pressure and Trend.</i>	
RO	b) Check CS pumps – RUNNING	
SRO	<i>Reports No, CS pumps not running. SRO continues with Substep b) RNO.</i>	
RO	b) RNO IF RWST level greater than 3%, THEN start CS pumps. IF any CS pump can NOT be started, THEN monitor OSRS pumps for cavitation. IF cavitation is indicated, THEN put affected OSRS pump in PTL.	
SRO	<i>Reports Yes, RWST level is &gt; 3%, starts 1-CS-P-1A and 1-CS-P-1B.</i>	
	<b>CT-3 Start Time:</b> _____	
	<b>CT-3:</b> Terminate CS and SI flow from the RWST prior to transition to 1-ES-1.3, Transfer to Cold Leg Recirculation, at RWST level of 20%.	

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Event Description: "C" SG Feed Line Break in CTMT, Hi Hi CLS Failure to Actuate

Cue: Lead Evaluator Cue.

		1-FR-Z.1, Response to Containment high Pressure, Step 1, Continued.
	SRO	<p>c) Check CS system valves - OPEN</p> <p>c) Manually align CS valves.</p> <ul style="list-style-type: none"> <li>• 1-CS-MOV-100A</li> <li>• 1-CS-MOV-100B</li> <li>• <b>1-CS-MOV-101A and B</b></li> <li>• <b>1-CS-MOV-101C and D</b></li> <li>• <b>1-CS-MOV-102A and B</b></li> </ul>
	RO	<b>Opens Valves listed above.</b>
	SRO	d) Stop all RCPs
	RO	<b>Secures 1-RC-P-1A and 1-RC-P-1B.</b>
		CT-4 Stop Time: _____
		<div style="border: 1px solid black; padding: 5px;"> <p><b>Critical Task: (CT-4)</b> Secure A/B RCPs on loss of support conditions (Cooling Water flow) prior to receipt of RCP Frame Danger Annunciator (high vibrations). Approximately 22 minutes following CTMT pressure exceeding the Hi-Hi-CLS setpoint, Annunciator 1C-H4, RCP Frame Danger, will be received if the RCPs have not been secured. Failure to secure the RCPs when directed will adversely complicate Plant Recovery following blowdown of the faulted SG by preventing the use of the RCPs.</p> </div>
		1-FR-Z.1
	SRO	<p>2. CHECK SW FLOW TO RS HXs –</p> <p>GREATER THAN 4750 GPM</p> <p>□ Align valves as necessary.</p> <p>a) Check the following valves - OPEN</p> <ul style="list-style-type: none"> <li>• <b>1-SW-MOV-103A, B, C, and D</b></li> <li>• <b>1-SW-MOV-104A, B, C, and D</b></li> <li>• <b>1-SW-MOV-105A, B, C, and D</b></li> </ul>
	RO	<p><i>Reports No, Valves are closed.</i></p> <p><b>Opens Valves listed above.</b></p> <p><i>When Valves have been manipulated, RO checks SW flow to RSHXs.</i></p>

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Event Description: "C" SG Feed Line Break in CTMT, Hi Hi CLS Failure to Actuate

Cue: Lead Evaluator Cue.

	SRO	1-FR-Z.1 3. CHECK RS SYSTEMS: a) Check RWST level -LESS THAN 60%
	RO	Reports No, RWST level is (provides actual level and Trend).
	SRO	a) Do the following: 1) Monitor RWST level. 2) WHEN RWST level is less than 60%, THEN perform Steps 3b and 3c.
	RO	<i>Acknowledges direction to monitor RWST level.</i>
	SRO	GOES TO step 4
	SRO	1-FR-Z.1 4. CHECK INTAKE CANAL LEVEL – GREATER THAN 24 FT
	BOP	Reports Yes, canal level is (provides canal level and Trend).
	SRO	1-FR-Z.1 5. CHECK CTMT ISOLATION VALVES - CLOSED IAW ATTACHMENT 1  <i>Provides Attachment 1 to BOP. BOP perform Attachment 1 (Attachment 1 on Page 72).</i>
	SRO	1-FR-Z.1 6. CHECK MSTVs – CLOSED
	RO	<i>Reports No, MSTVs Open. RO Closes MSTVs.</i>
	SRO	1-FR-Z.1 <b>CAUTIONs</b> prior to Step 7: • 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
	BOP	<i>Reports Yes, C SG completely Depressurized.</i>

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Event Description: "C" SG Feed Line Break in CTMT, Hi Hi CLS Failure to Actuate

Cue: Lead Evaluator Cue.

		1-FR-Z.1, Step 7, Continued
	SRO	b) Isolate feed flow to affected SG(s): 1) Close or check closed SG FW isolation MOV(s)
	BOP	<i>Reports Yes, SG FW isolation MOVs closed.</i>
	SRO	2) Close or check closed SG Feed REG valve(s)
	BOP	<i>Reports Yes, FRVs are closed.</i>
	SRO	3) Close or check closed SG FW bypass flow valve(s)
	BOP	<i>Reports Yes, FRV bypass HCVs are closed.</i>
	SRO	4) Close AFW MOV(s)
	BOP	<b>Closes 1-FW-MOV-151A and 1-FW-MOV-151B.</b> <i>Reports AFW to C SG isolated.</i>
		1-FR-Z.1
	SRO	8. CHECK SERVICE WATER AVAILABLE: a) Check Intake Canal level – BEING MAINTAINED BY CIRC WATER PUMPS
	BOP	<i>Reports Yes, Canal level being maintained by CW pump.</i>
	SRO	b) RETURN TO procedure and step in effect  SRO announces transition to E-0, RO and BOP Acknowledge. SRO directs BOP to Continue with E-0 Attachment 1, 2, 3, and 4. <b>Note: Attachment 1 through 4 of E-0 are contained in Event 8.</b>

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Event Description: "C" SG Feed Line Break in CTMT, Hi Hi CLS Failure to Actuate

Cue: Lead Evaluator Cue.

1-FR-Z.1, Attachment 1

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

LOCATION: <u>Vertical Board</u>			LIGHTS: <u>GREEN</u>	
___ 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

**Note:** Valves located in Boxes above will be found out of position, and closed by the BOP.

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Event Description: "C" SG Feed Line Break in CTMT, Hi Hi CLS Failure to Actuate

Cue: Lead Evaluator Cue.

	1-E-0
SRO	Direct RO to perform Attachment 8, Part A:
	<b>NOTE:</b> This attachment shall NOT be used if all three SGs are faulted.
RO	PART A
	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. <ul style="list-style-type: none"> <li>• 1-FW-P-3A</li> <li>• 1-FW-P-3B</li> <li>• 1-FW-P-2</li> </ul> <p><i>AFW pumps will be identified as Running.</i></p>
	3. Identify Faulted SG by one of the following conditions: <ul style="list-style-type: none"> <li>• Any SG depressurizing in an uncontrolled manner</li> <li>• Any SG completely depressurized</li> </ul> <p><i>C SG will be identified as Faulted.</i></p>
	<b>CAUTION:</b> At least one SG must be maintained available for RCS heat sink
	4. Isolate the faulted SG(s) by performing the following. <p>a. Check closed or close faulted SG(s) MSTV: <ul style="list-style-type: none"> <li>• SG A, 1-MS-TV-101A</li> <li>• SG B, 1-MS-TV-101B</li> <li>• SG C, 1-MS-TV-101C</li> </ul> <p><i>All MSTVs identified as closed.</i></p> </p> <p>b. Check closed or close faulted SG(s) AFW Isolation MOVs: <ul style="list-style-type: none"> <li>• SG A, 1-FW-MOV-151E and 1-FW-MOV-151F</li> <li>• SG B, 1-FW-MOV-151C and 1-FW-MOV-151D</li> <li>• SG C, 1-FW-MOV-151A and 1-FW-MOV-151B</li> </ul> <p><i>1-FW-MOV-151A and 1-FW-MOV-151B identified as closed.</i></p> </p> <p>c. Check closed or close faulted SG(s) PORV: <ul style="list-style-type: none"> <li>• SG A, 1-MS-RV-101A</li> <li>• SG B, 1-MS-RV-101B</li> <li>• SG C, 1-MS-RV-101C</li> </ul> <p><i>C SG PORV identified as closed.</i></p> </p>

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Event Description: "C" SG Feed Line Break in CTMT, Hi Hi CLS Failure to Actuate

Cue: Lead Evaluator Cue.

	RO	<p>1-E-0, Attachment 8, Continued</p> <p>d. Select the faulted SG AFW MOVs using the following switches:</p> <ul style="list-style-type: none"> <li>• H TRAIN DISABLE SELECTOR SWITCH</li> <li>• J TRAIN DISABLE SELECTOR SWITCH</li> </ul> <p><b>Turns H Train Switch to "A"; Turns J Train Switch to "B".</b></p> <p>e. Defeat the auto-open signal for the selected MOVs by placing the following key switches in the DISABLE SELECTED position:</p> <ul style="list-style-type: none"> <li>• H TRAIN AUTO OPEN ENABLE SWITCH</li> <li>• J TRAIN AUTO OPEN ENABLE SWITCH</li> </ul> <p><b>Turns H and J Train Switches to "DISABLE SELECTED".</b></p> <p><b>CAUTION:</b> Feed flow should remain isolated to any faulted SG if intact SG(s) are available for heat sink.</p> <p>5. Control Feed flow to the intact SGs IAW the following requirements:</p> <ul style="list-style-type: none"> <li>• Minimum AFW flow is 350 gpm [450 gpm] with SI initiated, until one SG Narrow Range level is greater than 12% [18%]</li> <li>• 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:</li> <li>• SG A, 1-FW-MOV-151E and 1-FW-MOV-151F</li> <li>• SG B, 1-FW-MOV-151C and 1-FW-MOV-151D</li> <li>• SG C, 1-FW-MOV-151A and 1-FW-MOV-151B</li> </ul> <p><i>Throttles AFW to the A &amp; B SG as necessary.</i>  <i>Hands SRO completed Attachment.</i></p>
	<p>SRO</p> <p>RO</p>	<p>1-E-0, Step 6</p> <p>*6. CHECK RCS AVERAGE TEMPERATURE</p> <ul style="list-style-type: none"> <li>• STABLE AT 547°F</li> <li>OR</li> <li>• TRENDING TO 547°F</li> </ul> <p><i>Reports RCS Tave and Trend.</i>  Note: Depending on Crew progression, RCS Tave is expected to be &lt;547°F and rising at this time.</p>

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Event Description: "C" SG Feed Line Break in CTMT, Hi Hi CLS Failure to Actuate

Cue: Lead Evaluator Cue.

	SRO	1-E-0
	RO	7. CHECK PRZR PORVs AND SPRAY VALVES:
	SRO	a) PRZR PORVs – CLOSED
	RO	<i>Reports PRZR PORVs Closed.</i>
	SRO	b) PRZR spray controls
	SRO	• Demand at Zero
	RO	OR
	SRO	• Controlling pressure
	RO	c) PORV block valves - AT LEAST ONE OPEN
	RO	<i>Reports Yes, Both PRZR PORV block valves open.</i>
	SRO	1-E-0
	RO	NOTE prior to Step 8: Seal injection flow should be maintained to all RCPs.
	SRO	*8. CHECK RCP TRIP AND MINIFLOW RECIRC CRITERIA:
	RO	a) Charging Pumps - AT LEAST ONE RUNNING AND FLOWING TO RCS
	SRO	<i>Reports Yes, 2 are running and flowing to the RCS.</i>
	RO	<i>Note: Depending on BOP progression through the Attachments, 3 CH pumps may still be running at this time.</i>
	SRO	b) RCS subcooling - LESS THAN 30°F [85°F]
	RO	<i>Reports No, subcooling is (provides value and Trend).</i>
	SRO	GOES TO Step 9.
	SRO	1-E-0
	RO	9. CHECK IF SGs ARE NOT FAULTED:
	SRO	• Check pressures in all SGs:
	RO	• STABLE OR RISING
	SRO	AND
	RO	• GREATER THAN 100 PSIG
	SRO	<i>Reports NO, C SG is Faulted.</i>
	RO	<i>Announces Transition to 1-E-2, Faulted Steam Generator Isolation.</i>
	SRO	<i>Crew Acknowledges Transition to E-2.</i>



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Event Description: "C" SG Feed Line Break in CTMT, Hi Hi CLS Failure to Actuate

Cue: Lead Evaluator Cue.

	SRO	<p>1-E-2</p> <p>Will conduct Commensurate Brief to poll RO/BOP if any item should have a higher priority than continuing with E-2 with goal of reaching E-1 and terminating SI. SRO closes brief. BOP become available for Crew response at this time.</p> <p>STA/Crew may identify CTMT is no longer Adverse.</p>
	<p>SRO</p> <p>RO/BOP</p>	<p>1-E-2</p> <p><b>CAUTIONs</b> prior to Step 1:</p> <ul style="list-style-type: none"> <li>• At least one SG must be maintained available for RCS cooldown.</li> <li>• Any faulted SG or secondary break should remain isolated during subsequent recovery actions unless needed for RCS cooldown.</li> </ul> <p>1. CHECK MSTV AND BYPASS VALVE ON AFFECTED SG(s) - CLOSED</p> <p><i>Reports Yes, C SG MSTV is closed.</i></p>
	<p>SRO</p> <p>RO/BOP</p>	<p>1-E-2</p> <p>2. CHECK IF ANY SG SECONDARY SIDE IS INTACT:</p> <ul style="list-style-type: none"> <li>• Check pressures in all SGs – ANY STABLE OR RISING</li> </ul> <p><i>Reports Yes, A &amp; B SG ae intact.</i></p>
	<p>SRO</p> <p>RO/BOP</p>	<p>1-E-2</p> <p>3. IDENTIFY FAULTED SG(S):</p> <p>a) Check pressures in all SGs:</p> <ul style="list-style-type: none"> <li>• ANY SG PRESSURE LOWERING IN AN UNCONTROLLED MANNER</li> <li>OR</li> <li>• ANY SG COMPLETELY DEPRESSURIZED</li> </ul> <p><i>Reports Yes, C SG is faulted.</i></p>
	<p>SRO</p> <p>RO/BOP</p>	<p>1-E-2</p> <p><b>CAUTION</b> prior to Step 4: If the TD AFW pump is the only available source of feed flow, steam supply to the TD AFW pump must be maintained from at least one SG.</p> <p>4. ISOLATE FAULTED SG(s):</p> <ul style="list-style-type: none"> <li>• Check closed or close faulted SG AFW MOV(s)</li> </ul> <p><i>Reports Yes, C SG AFW MOVs are closed.</i></p>

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Event Description: "C" SG Feed Line Break in CTMT, Hi Hi CLS Failure to Actuate

Cue: Lead Evaluator Cue.

		1-E-2, Step 4, Continued
	SRO	<ul style="list-style-type: none"> <li>• Check faulted SG AFW MOVs auto-open signal – DEFEATED</li> </ul>
	RO/BOP	Reports Yes, C SG AFW MOV Auto open signal defeated.
	SRO	<ul style="list-style-type: none"> <li>• Isolate MFW line: <ul style="list-style-type: none"> <li>a) Check closed or close faulted SG MFW Isolation MOV(s)</li> </ul> </li> </ul>
	RO/BOP	<i>Reports Yes, C SG MFW isolation MOV is closed.</i>
	SRO	<ul style="list-style-type: none"> <li>b) Locally close faulted SG feed REG bypass valve manual isolation valve(s): <ul style="list-style-type: none"> <li>• 1-FW-26 for SG A</li> <li>• 1-FW-57 for SG B</li> <li>• 1-FW-88 for SG C</li> </ul> </li> </ul>
	RO/BOP	<i>Directs Service Building Operator to close 1-FW-88.</i>
	SRO	<ul style="list-style-type: none"> <li>• Locally close faulted SG steam supply valve(s) to TD AFW pump: <ul style="list-style-type: none"> <li>• 1-MS-87 for SG A</li> <li>• 1-MS-120 for SG B</li> <li>• 1-MS-158 for SG C</li> </ul> </li> </ul>
	RO/BOP	<i>Directs Service Building Operator to close 1-MS-158.</i>
	SRO	<ul style="list-style-type: none"> <li>• Check closed or close faulted SG PORV(s)</li> </ul>
	RO/BOP	<i>Reports Yes, C SG PORV closed.</i>
	SRO	<ul style="list-style-type: none"> <li>• Check closed or close faulted SG blowdown TVs</li> </ul>
	RO/BOP	<i>Reports Yes, C SG blowdown TVs are closed.</i>
		1-E-2
	SRO	5. CHECK ECST LEVEL - GREATER THAN 20%
	BOP	<i>Reports Yes, ECST level (provides actual level and trend).</i>

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Event Description: "C" SG Feed Line Break in CTMT, Hi Hi CLS Failure to Actuate

Cue: Lead Evaluator Cue.

		1-E-2
	SRO	<p>6. CHECK SECONDARY RADIATION:</p> <p>a) Consult with TSC or SEM to determine if FAULTED SG should be aligned for sampling</p> <p>b) Initiate periodic activity sampling of INTACT SGs IAW Attachment 1</p> <p><i>SRO contacts the Shift Manager to accomplish Substep a) and b) above.</i></p>
	SRO	<p>c) Check unisolated secondary radiation monitors:</p> <ul style="list-style-type: none"> <li>• Main steamline</li> <li>• TD AFW pump exhaust</li> <li>• Condenser air ejector</li> </ul>
	BOP	<p><i>Reports Yes, main steamline, TDAFW exhaust, and air ejector RM normal. SRO may request Air ejector status from Unit 2 Operator.</i></p>
	SRO	d) Secondary Radiation – NORMAL
	RO/BOP	<i>Report Yes, secondary radiation is Normal.</i>
		1-E-2
	SRO	<p>7. ADJUST INTACT SG PORVs TO LIMIT RCS HEATUP:</p> <p>a) Determine required PORV pressure setting using Attachment 2.</p> <p><i>Hands Attachment 2 to BOP. Attachment 2 follows this Section.</i></p>
	SRO	b) Adjust intact SG PORVs pressure setting
	BOP	<i>Acknowledges direction and uses Attachment 2 to set the approximate A &amp; B SG PORV pressure setpoint.</i>
	SRO	c) Stabilize RCS temperature by controlling SG PORV pressure setting
	BOP	<b>Adjusts A &amp; B SG PORV setpoint further to limit RCS temperature rise.</b>

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Event Description: "C" SG Feed Line Break in CTMT, Hi Hi CLS Failure to Actuate

Cue: Lead Evaluator Cue.

		1-E-2
	SRO	8. CHECK IF SI FLOW SHOULD BE REDUCED:
		a) RCS subcooling based on CETCs - GREATER THAN 30°F [85°F]
	BOP	<i>Reports Yes, Subcooling is (provides actual value and trend)</i>
	SRO	b) Secondary heat sink:
		• Total feed flow to INTACT SGs - GREATER THAN 350 gpm [450 gpm]
		OR
		• Narrow range level in at least one intact SG - GREATER THAN 12% [18%]
	BOP	<i>Reports Yes A &amp; B SG NR level is (provides value and trend) and A &amp; B SG AFW is (provides actual value and trend).</i>
		<b>Note:</b> SRO/BOP may discuss isolating AFW flow A & B SG if NR level is adequate.
	SRO	c) RCS pressure - STABLE OR RISING
	RO	<i>Reports Yes, RCS pressure is (provides value and trend).</i>
	SRO	d) PRZR level - GREATER THAN 22% [50%]
	RO	<i>Reports Yes, PRZR level is (provides value and trend).</i>
	SRO	e) GO TO 1-ES-1.1, SI TERMINATION
		<i>Announces transition to ES-1.1. RO/BOP Acknowledge.</i>

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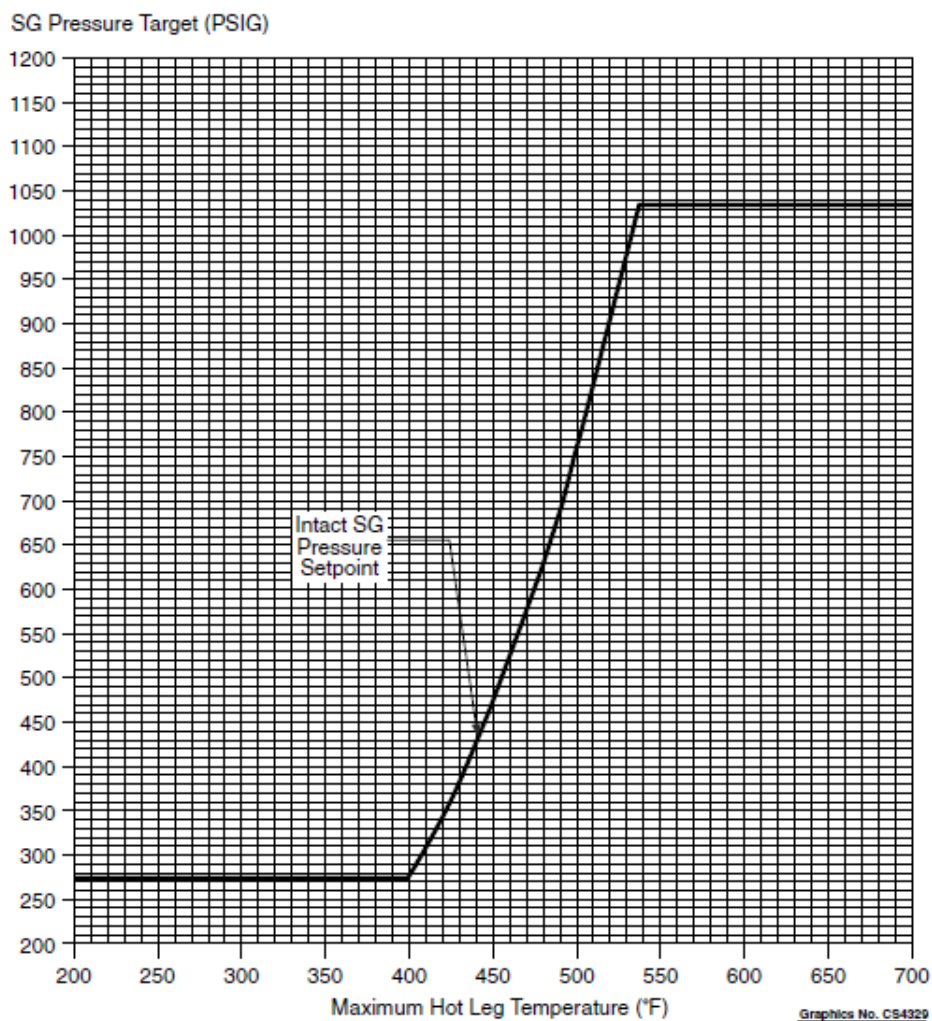
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Event Description: "C" SG Feed Line Break in CTMT, Hi Hi CLS Failure to Actuate

Cue: Lead Evaluator Cue.

1-E-2, Attachment 2:

NUMBER 1-E-2	ATTACHMENT TITLE	ATTACHMENT 2
REVISION 20	SG TARGET PRESSURE VS RCS HOT LEG TEMPERATURE	PAGE 1 of 1



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Event Description: "C" SG Feed Line Break in CTMT, Hi Hi CLS Failure to Actuate

Cue: Lead Evaluator Cue.

Time	Position	Applicant's Action or Behavior
	SRO	1-ES-1.1  Will conduct a commensurate Brief to determine if there are any issues with a higher priority than terminating SI flow. SRO will hand out ES-1.1 CAPs and conclude the brief.
	SRO  RO	1-ES-1.1  1. RESET BOTH TRAINS OF SI  <i>Reports Yes, SI is reset.</i>
	SRO  RO  SRO  RO  SRO  RO	1-ES-1.1  2. RESET CLS: a) Check CTMT pressure – HAS EXCEEDED 17.7 psia  <i>Reports Yes, CTMT pressure has exceeded 23 psia (provides value and trend.)</i>  b) CTMT pressure - LESS THAN 14 PSIA  <i>Reports Yes, CTMT pressure &lt; 14 psia (provides value and trend.)</i>  c) Reset both trains of CLS if necessary  <b>Resets CLS using CLS reset pushbuttons.</b>
	SRO  RO  SRO  RO  SRO  RO	1-ES-1.1  3. CHECK INSTRUMENT AIR AVAILABLE:  a) Check annunciator B-E-6 - NOT LIT  <i>Reports Yes, B-E-6 NOT LIT.</i>  b) Check at least one CTMT IA compressor - RUNNING  • 1-IA-C-4A or 1-IA-C-4B  <i>Reports Yes, 1-IA-C-4A running.</i>  c) Check 1-IA-TV-100 – OPEN  <i>Reports No, 1-IA-TV-100 Not Open.</i> <b>Opens 1-IA-TV-100.</b>

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Event Description: "C" SG Feed Line Break in CTMT, Hi Hi CLS Failure to Actuate

Cue: Lead Evaluator Cue.

	SRO RO	1-ES-1.1 4. STOP ALL BUT ONE CHG PUMP AND PUT IN AUTO <b>Stops CH-P-1B and places in Auto.</b>
	SRO RO	1-ES-1.1 5. CHECK RCS PRESSURE - STABLE OR RISING <i>Reports Yes, RCS pressure is (provides value and trend.)</i>
	SRO  RO SRO  RO SRO  RO	1-ES-1.1 6. ISOLATE HHSI TO COLD LEGS:  a) Check the following:  1) CHG pump suction from RWST - OPEN  • 1-CH-MOV-1115B • 1-CH-MOV-1115D  <i>Reports Yes, 1-CH-MOV-1115B &amp; D open.</i>  2) Check CHG pump miniflow Recirc valves - OPEN  • 1-CH-MOV-1275A • 1-CH-MOV-1275B • 1-CH-MOV-1275C • 1-CH-MOV-1373  <i>Reports Yes, CH pump mini-flow recircs open.</i>  b) Close HHSI to Cold Leg:  • 1-SI-MOV-1867C • 1-SI-MOV-1867D • 1-SI-MOV-1842  <b>Closes 1-SI-MOV-1867C &amp; D. Reports 1-SI-MOV-1867C/D and 1-SI-MOV-1842 closed.</b>

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Event Description: "C" SG Feed Line Break in CTMT, Hi Hi CLS Failure to Actuate

Cue: Lead Evaluator Cue.

		1-ES-1.1
	SRO	7. ____ ESTABLISH CHG FLOW:
		a) Close CHG flow control:
		• 1-CH-FCV-1122
	RO	<b>Places 1-CH-FCV-1122 in Manual and opens valve.</b>
	SRO	b) Check CHG line isolation - OPEN
		• 1-CH-HCV-1310A
	RO	<i>Reports Yes, 1-CH-HCV-1310A open.</i>
	SRO	c) Open CHG line isolation MOVs:
		• 1-CH-MOV-1289A
		• 1-CH-MOV-1289B
	RO	<b>Opens 1-CH-MOV-1289A and B.</b>
	SRO	d) Establish at least 40 gpm charging flow using CHG flow control
	RO	<b>Adjusts 1-CH-FCV-1122 to ~40 gpm on 1-CH-FI-1122, CHG LINE FLOW</b>
		1-ES-1.1
	SRO	8. CONTROL CHG FLOW TO MAINTAIN PRZR LEVEL
	RO	May close 1-CH-FCV-1122 to control PRZR level/press.
		1-ES-1.1
	SRO	9. CHECK IF LHSI PUMPS SHOULD BE STOPPED:
		a) Check LHSI pumps - ANY RUNNING WITH SUCTION ALIGNED TO RWST
	RO	<i>Reports, Yes B LHSI pump running with suction aligned to the RWST.</i>
	SRO	b) Stop LHSI pumps and put in Auto
	RO	<b>Stops 1-SI-P-1B and places in Auto.</b>



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Event Description: "C" SG Feed Line Break in CTMT, Hi Hi CLS Failure to Actuate

Cue: Lead Evaluator Cue.

	SRO	1-ES-1.1 10. CHECK SI FLOW NOT REQUIRED: a) RCS subcooling based on CETCs - GREATER THAN 30°F [85°F]
	RO	<i>Reports, Yes and provides Subcooling value and trend.</i>
	SRO	b) Control charging flow to maintain PRZR level greater than 22% [50%] <i>Acknowledges direction.</i>
	SRO	1-ES-1.1 11. CHECK IF CS SHOULD BE STOPPED: a) Spray pumps - ANY RUNNING
	RO	<i>Reports, Yes both spray pumps running.</i>
	SRO	b) Check for either of the following: • CTMT pressure – LESS THAN 12 psia OR • Both of the following: • RWST - LESS THAN 3% AND • CS Pump amps – FLUCTUATING
	RO	<i>Reports Yes, provides CTMT pressure and Trend; provides RWST level and trend; CS pump amps not fluctuating.</i>
	SRO	c) Stop OSRS pumps and put in AUTO: • 1-RS-P-2A • 1-RS-P-2B
	RO	<b>Stops 1-RS-P-2A and 2B and places in AUTO.</b>
	SRO	d) Stop CS pumps and put in PTL: • 1-CS-P-1A • 1-CS-P-1B
	RO	<b>Stops 1-CS-P-1A and 1B.</b> <b>CT-3 Stop Time: _____</b>
		CT-3: Terminate CS and SI flow from the RWST prior to transition to 1-ES-1.3, Transfer to Cold Leg Recirculation, at RWST level of 20%.

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Event Description: "C" SG Feed Line Break in CTMT, Hi Hi CLS Failure to Actuate

Cue: Lead Evaluator Cue.

		1-ES-1.1, Step 11, Continued
	SRO	e) Close CS discharge valves: <ul style="list-style-type: none"><li>• 1-CS-MOV-101A</li><li>• 1-CS-MOV-101B</li><li>• 1-CS-MOV-101C</li><li>• 1-CS-MOV-101D</li></ul>
	RO	<b>Closes valves listed above.</b>
	SRO	f) Close CHEM ADD TK OUTLT valves: <ul style="list-style-type: none"><li>• 1-CS-MOV-102A</li><li>• 1-CS-MOV-102B</li></ul>
	RO	<b>Closes Valves listed above.</b>
		<b>END OF EVENT 7</b>
		<b>END OF SCENARIO</b>

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Event No.: 8

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Event Description: E-0 Attachment Items that Fail to Reposition on SI.

Cue: Pre-Load Failures.

NUMBER 1-E-0	ATTACHMENT TITLE  SYSTEM ALIGNMENT VERIFICATION	ATTACHMENT 1
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. ____	CHECK FW ISOLATION:	<input type="checkbox"/> Manually close valves and stop pumps.
	<ul style="list-style-type: none"> <li>• Feed pump discharge MOVs - CLOSED</li> </ul>	
	<input type="checkbox"/> • 1-FW-MOV-150A	
	<input type="checkbox"/> • 1-FW-MOV-150B	
	<input type="checkbox"/> • MFW pumps - TRIPPED	
	<input type="checkbox"/> • Feed REG valves - CLOSED	
	<input type="checkbox"/> • SG FW bypass flow valves - DEMAND AT ZERO	
	<input type="checkbox"/> • SG blowdown TVs - CLOSED	
2. ____	CHECK CTMT ISOLATION PHASE I:	<input type="checkbox"/> Manually close valves.
	<input type="checkbox"/> • Phase I TVs - CLOSED	
	<input type="checkbox"/> • 1-CH-MOV-1381 - CLOSED	
	<input type="checkbox"/> • 1-SV-TV-102A - CLOSED	
	• PAM isolation valves - CLOSED	
	<input type="checkbox"/> • 1-DA-TV-103A	
	<input type="checkbox"/> • 1-DA-TV-103B	
3. ____	CHECK AFW PUMPS RUNNING:	
	<input type="checkbox"/> a) MD AFW pumps - RUNNING (Time Delayed)	<input type="checkbox"/> a) Manually start pumps.
	<input type="checkbox"/> b) TD AFW pump - RUNNING IF NECESSARY	b) Manually open steam supply valves.
		<input type="checkbox"/> • 1-MS-SOV-102A
		<input type="checkbox"/> • 1-MS-SOV-102B

Evaluator's Note: 1-CH-TV-1204B, Letdown O/S TV, identified and closed in FR-Z.1, Att. 1.

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Event Description: E-0 Attachment Items that Fail to Reposition on SI.

Cue: Pre-Load Failures.

NUMBER 1-E-0	ATTACHMENT TITLE  SYSTEM ALIGNMENT VERIFICATION	ATTACHMENT 1
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STEP	ACTION/ EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. ____	CHECK SI PUMPS RUNNING: <input type="checkbox"/> • CHG pumps - RUNNING <input type="checkbox"/> • LHSI pumps - RUNNING	<input type="checkbox"/> Manually start pumps.
5. ____	CHECK CHG PUMP AUXILIARIES: <input type="checkbox"/> • CHG pump CC pump - RUNNING <input type="checkbox"/> • CHG pump SW pump - RUNNING	<input type="checkbox"/> Manually start pumps.
6. ____	CHECK INTAKE CANAL: <input type="checkbox"/> • Level - GREATER THAN 24 FT <input type="checkbox"/> • Level - BEING MAINTAINED BY CIRC WATER PUMPS	<input type="checkbox"/> IF level is less than 24 ft OR lowering in an uncontrolled manner, THEN initiate 0-AP-12.01, LOSS OF INTAKE CANAL LEVEL.

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Event Description: E-0 Attachment Items that Fail to Reposition on SI.

Cue: Pre-Load Failures.

NUMBER 1-E-0	ATTACHMENT TITLE  SYSTEM ALIGNMENT VERIFICATION	ATTACHMENT 1
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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:
<input type="checkbox"/>	• E-F-10 (High Steam Flow SI)	<input type="checkbox"/> IF annunciator E-H-10 (Hdr/Line SI) LIT, THEN GO TO Step 7d.
<input type="checkbox"/>	• B-C-4 (Hi Hi CLS Train A)	<input type="checkbox"/> IF annunciator E-H-10 NOT LIT, THEN GO TO Step 8.
<input type="checkbox"/>	• B-C-5 (Hi Hi CLS Train B)	
<input type="checkbox"/>	b) Check MSTVs - CLOSED	<input type="checkbox"/> b) Manually close valves.
<input type="checkbox"/>	c) Check either of the following - ACTUATED	<input type="checkbox"/> c) GO TO Step 8.
<input type="checkbox"/>	• Hi steam flow SI	
	<u>OR</u>	
<input type="checkbox"/>	• Header to line SI	
<input type="checkbox"/>	d) Check RWST crosstie valves - OPEN	<input type="checkbox"/> d) Manually open valves.
<input type="checkbox"/>	• 1-SI-TV-102A	
<input type="checkbox"/>	• 1-SI-TV-102B	
<input type="checkbox"/>	• 2-SI-TV-202A	
<input type="checkbox"/>	• 2-SI-TV-202B	
<input type="checkbox"/>	e) Check RCS pressure - LESS THAN 185 PSIG	<input type="checkbox"/> e) Put BOTH RMT mode transfer switches in REFUEL.

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Event Description: E-0 Attachment Items that Fail to Reposition on SI.

Cue: Pre-Load Failures.

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:	
<input type="checkbox"/>	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:  <input type="checkbox"/> • 1-RM-TV-100A - CLOSED <input type="checkbox"/> • 1-RM-TV-100B - CLOSED <input type="checkbox"/> • 1-RM-TV-100C - CLOSED  <input type="checkbox"/> • 1-SV-TV-102 - CLOSED  <input type="checkbox"/> • 1-IA-TV-101A - CLOSED <input type="checkbox"/> • 1-IA-TV-101B - CLOSED <input type="checkbox"/> • 1-IA-AOV-103 - OPEN  <input type="checkbox"/> 2) GO TO Step 10.
<input type="checkbox"/>	b) Manually initiate HI HI CLS	
<input type="checkbox"/>	c) Trip all RCPs	
<input type="checkbox"/>	d) Check CS pumps - RUNNING	<input type="checkbox"/> d) Manually start pump(s).
<input type="checkbox"/>	e) Initiate Attachment 4	

Evaluator's Note: RCPS tripped in FR-Z.1; CT-4.

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Event Description: E-0 Attachment Items that Fail to Reposition on SI.

Cue: Pre-Load Failures.

NUMBER 1-E-0	ATTACHMENT TITLE  SYSTEM ALIGNMENT VERIFICATION	ATTACHMENT 1
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STEP	ACTION/ EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*9. ____	CHECK IF RS REQUIRED:	
<input type="checkbox"/> a)	Check RWST level - LESS THAN OR EQUAL TO 60%	a) Do the following: <input type="checkbox"/> 1) Continue to monitor RWST level.  2) GO TO Step 10. <u>IF</u> RWST level lowers to less than or equal to 60%, <u>THEN</u> perform Step 9b through Step 9d.
	<div style="border: 1px solid black; padding: 5px;">           Evaluator's Note: BOP will flag Substeps b), c) and d) and perform these steps when RWST level reaches 60%.         </div>	
<input type="checkbox"/> b)	Check ISRS pumps - RUNNING	<input type="checkbox"/> b) Manually Start Pumps.
<input type="checkbox"/> c)	Check OSRS pumps - RUNNING (Time Delayed)	<input type="checkbox"/> c) Manually Start Pumps.
<input type="checkbox"/> d)	Check OSRS pumps - NOT CAVITATING	<input type="checkbox"/> d) Put affected OSRS pump in PTL.
*10. ____	BLOCK LOW PRZR PRESS SI SIGNAL:	
<input type="checkbox"/> a)	Check PRZR pressure - LESS THAN 2000 psig	<input type="checkbox"/> a) GO TO Step 11. <u>WHEN</u> PRZR pressure less than 2000 psig, <u>THEN</u> perform Steps 10b and 10c.
<input type="checkbox"/> b)	Turn both LO PRZR PRESS & STM HDR/LINE ΔP switches to block	
<input type="checkbox"/> c)	Check Permissive Status light C-2 - LIT	
*11. ____	BLOCK LOW TAVE SI SIGNAL:	
<input type="checkbox"/> a)	Check RCS Tave - LESS THAN 543°F	<input type="checkbox"/> a) GO TO Step 12. <u>WHEN</u> Tave less than 543°F, <u>THEN</u> perform Steps 11b and 11c.
<input type="checkbox"/> b)	Turn both HI STM FLOW & LO TAVG OR LP switches to block	
<input type="checkbox"/> c)	Check Permissive Status light F-1 - LIT	

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Event Description: E-0 Attachment Items that Fail to Reposition on SI.

Cue: Pre-Load Failures.

NUMBER 1-E-0	ATTACHMENT TITLE  SYSTEM ALIGNMENT VERIFICATION	ATTACHMENT 1
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STEP	ACTION/ EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• CHG pumps should be run in the following order of priority: C, B, A.</li> <li>• Subsequent SI signals may be reset by reperforming Step 12.</li> </ul>	
12. ____	CHECK SI FLOW:	
	<p>a) HHSI to cold legs - FLOW INDICATED</p> <p><input type="checkbox"/> • 1-SI-FI-1961 (NQ)</p> <p><input type="checkbox"/> • 1-SI-FI-1962 (NQ)</p> <p><input type="checkbox"/> • 1-SI-FI-1963 (NQ)</p> <p><input type="checkbox"/> • 1-SI-FI-1943 or 1-SI-FI-1943A</p>	<p><input type="checkbox"/> a) Manually start pumps and align valves. <u>IF</u> flow <u>NOT</u> established, <u>THEN</u> consult with Shift Supervision to establish another high pressure injection flowpath while continuing with this procedure.</p> <p><input type="checkbox"/> • Alternate SI to cold legs</p> <p><input type="checkbox"/> • Hot leg injection</p>
	<p><input type="checkbox"/> b) Check CHG pumps - THREE RUNNING</p>	<p><input type="checkbox"/> b) GO TO Step 12e.</p>
	<p><input type="checkbox"/> c) Reset SI</p>	
	<p><input type="checkbox"/> d) Stop one CHG pump and put in AUTO</p>	
	<p><input type="checkbox"/> e) RCS pressure - LESS THAN 185 PSIG</p>	<p>e) <u>IF</u> two LHSI pumps are running, <u>THEN</u> do the following:</p> <p><input type="checkbox"/> 1) Check reset or reset SI.</p> <p><input type="checkbox"/> 2) Stop one LHSI pump and put in AUTO.</p> <p><input type="checkbox"/> 3) GO TO Step 13.</p> <p><input type="checkbox"/> <u>IF</u> one LHSI pump running, <u>THEN</u> GO TO Step 13.</p>
	<p><input type="checkbox"/> f) LHSI flow - INDICATED</p>	<p><input type="checkbox"/> f) Manually start pumps and align valves.</p>



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Event Description: E-0 Attachment Items that Fail to Reposition on SI.

Cue: Pre-Load Failures.

NUMBER 1-E-0	ATTACHMENT TITLE  SYSTEM ALIGNMENT VERIFICATION	ATTACHMENT 1
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STEP	ACTION/ EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13. ____	CHECK TOTAL AFW FLOW - GREATER THAN 350 GPM [450 GPM]  <div style="border: 1px solid black; padding: 5px; margin: 10px 0;">           Evaluator's Note: Expected that the RO has throttled AFW by time BOP reaches this Step; if not, BOP will throttle AFW.         </div>	<input type="checkbox"/> IF SG narrow range level greater than 12% [18%] in any SG, <u>THEN</u> control feed flow to maintain narrow range level <u>AND</u> GO TO Step 14.  <input type="checkbox"/> IF SG narrow range level less than 12% [18%] in all SGs, <u>THEN</u> manually start pumps <u>AND</u> align valves as necessary.  <input type="checkbox"/> IF AFW flow greater than 350 GPM [450 GPM] can <u>NOT</u> be established, <u>THEN</u> GO TO 1-FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK.
14. ____	CHECK AFW MOVs - OPEN	<input type="checkbox"/> 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	

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Event Description: E-0 Attachment Items that Fail to Reposition on SI.

Cue: Pre-Load Failures.

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

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Event Description: E-0 Attachment Items that Fail to Reposition on SI.

Cue: Pre-Load Failures.

NUMBER 1-E-0	ATTACHMENT TITLE  CHECKING SI VALVE ALIGNMENT	ATTACHMENT 2
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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

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Event Description: E-0 Attachment Items that Fail to Reposition on SI.

Cue: Pre-Load Failures.

NUMBER 1-E-0	ATTACHMENT TITLE AUXILIARY VENTILATION, AC POWER, AND SFP STATUS CHECKS	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
<input type="checkbox"/>	1-VS-F-4A & B	OFF
<input type="checkbox"/>	1-VS-HV-1A & B	OFF
<input type="checkbox"/>	1-VS-F-8A & B	OFF
<input type="checkbox"/>	1-VS-F-9A & B	GREEN
<input type="checkbox"/>	1-VS-F-59	GREEN
<input type="checkbox"/>	1-VS-F-6	OFF
<input type="checkbox"/>	1-VS-F-39	GREEN
<input type="checkbox"/>	1-VS-F-7A & B	GREEN
<input type="checkbox"/>	1-VS-HV-5	GREEN
<input type="checkbox"/>	1-VS-F-56A & B	GREEN
<input type="checkbox"/>	1-VS-F-40A & B	GREEN
<input type="checkbox"/>	1-VS-HV-4	OFF
<input type="checkbox"/>	2-VS-F-40A or B	RED
<input type="checkbox"/>	2-VS-HV-4	OFF

Evaluator's  
Note: 1-VS-9A  
will be stopped

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Event Description: E-0 Attachment Items that Fail to Reposition on SI.

Cue: Pre-Load Failures.

NUMBER 1-E-0	ATTACHMENT TITLE	ATTACHMENT 3
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TABLE 2  
VNTX PANEL

<u>MARK NUMBER</u>	<u>EXPECTED EQUIPMENT STATUS</u>	<u>RESPONSE NOT OBTAINED</u>
<input type="checkbox"/> a. AOD-VS-107A & B AOD-VS-108	RED GREEN	<input type="checkbox"/> a. Place AUX BLDG CENTRAL AREA MODE switch to FILTER.
<input type="checkbox"/> b. MOD-VS-100A & B AOD-VS-106	RED GREEN	<input type="checkbox"/> b. • Place MOD-VS-100A to FILTER. • Place MOD-VS-100B to FILTER.
<input type="checkbox"/> c. MOD-VS-200A & B AOD-VS-206	GREEN RED	<input type="checkbox"/> c. • Place MOD-VS-200A to UNFILTER. • Place MOD-VS-200B to UNFILTER.
<input type="checkbox"/> d. AOD-VS-103A & B AOD-VS-104	GREEN GREEN	<input type="checkbox"/> d. • Place AOD-VS-103A in UNFILTER. • Place AOD-VS-103B in UNFILTER. • Place AOD-VS-104 in FILTER.
<input type="checkbox"/> e. AOD-VS-101A & B AOD-VS-102	GREEN GREEN	<input type="checkbox"/> e. Place AOD-VS-101A and 101B in UNFILTER.
<input type="checkbox"/> f. AOD-VS-111A & B	GREEN	<input type="checkbox"/> f. Place COMBINE CONTAINMENT EXHAUST in ISOLATE.
<input type="checkbox"/> g. AOD-VS-110	GREEN	<input type="checkbox"/> g. Place AOD-VS-109A and 109B in FILTER.
<input type="checkbox"/> h. AOD-VS-112A & B	GREEN	<input type="checkbox"/> h. • Place AOD-VS-112A in CLOSE. • Place AOD-VS-112B in CLOSE.
<input type="checkbox"/> i. MOD-VS-58A & B 1-VS-F-58A & B	RED RED	<input type="checkbox"/> i. Start 1-VS-F-58A and 1-VS-F-58B
<div> <p>3. ____ Check filtered exhaust flow: (as read on FI-VS-117A and FI-VS-117B)</p> <p><input type="checkbox"/> • Total flow - GREATER THAN 32400 cfm</p> <p align="center"><u>AND</u></p> <p><input type="checkbox"/> • Flow through each filter bank - LESS THAN 39600 cfm</p> </div>		

Evaluator's Note: 1-VS-F-58B must be started.

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Event Description: E-0 Attachment Items that Fail to Reposition on SI.

Cue: Pre-Load Failures.

NUMBER 1-E-0	ATTACHMENT TITLE  AUXILIARY VENTILATION, AC POWER, AND SFP STATUS CHECKS	ATTACHMENT 3
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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

Evaluator's Note: 1-VS-MOD-103C must be closed.

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Event Description: E-0 Attachment Items that Fail to Reposition on SI.

Cue: Pre-Load Failures.

NUMBER 1-E-0	ATTACHMENT TITLE AUXILIARY VENTILATION, AC POWER, AND SFP STATUS CHECKS	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.

Evaluator's Note: Unit 2 will notify BOP that CD flow will be throttled IAW NOTE prior to Step 10.

Op-Test No.: Surry 2017-301 Scenario No.: 3

Event No.: 8

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Event Description: E-0 Attachment Items that Fail to Reposition on SI.

Cue: Pre-Load Failures.

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)

Evaluator's Note: Unit 2 will notify BOP that these indications match the pressure indicated on the First four gauges.

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.

Evaluator's Note: Unit 2 will notify BOP 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

Evaluator's Note: Unit 2 will notify BOP that Unit 2 is NOT being supplied by RSSTs, and Unit 2 RCPs are running.

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



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Event No.: 8

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Event Description: E-0 Attachment Items that Fail to Reposition on SI.

Cue: Pre-Load Failures.

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

Evaluator's Note: Unit 2 will take responsibility for Page 6 of Att. 3.

- 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.

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.

Op-Test No.: Surry 2017-301 Scenario No.: 3

Event No.: 8

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Event Description: E-0 Attachment Items that Fail to Reposition on SI.

Cue: Pre-Load Failures.

NUMBER 1-E-0	ATTACHMENT TITLE  CLS COMPONENT VERIFICATION	ATTACHMENT 4
REVISION 71		PAGE 1 of 2

LOCATION: Vertical BoardVALVE POSITION: CLOSED  
LIGHTS: GREEN

\_\_\_ 1-RM-TV-100C

\_\_\_ 1-RM-TV-100B

\_\_\_ 1-RM-TV-100A

Evaluator's Note: These TVs were  
positioned in FR-Z.1, Att. 1.

\_\_\_ 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 PanelRECIRC FAN STATUS: OFF  
LIGHTS: AMBER

\_\_\_ 1-VS-F-1A

Evaluator's Note:  
BOP secures Fans.

\_\_\_ 1-VS-F-1B

LOCATION: Bench BoardEvaluator's Note: Valves  
positioned in FR-Z.1.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 PanelPUMPS: RUNNING (Time delayed)

\_\_\_ 1-SW-P-5A

\_\_\_ 1-SW-P-5B

\_\_\_ 1-SW-P-5C

\_\_\_ 1-SW-P-5D

Evaluator's Note:  
BOP Starts Pumps.

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Event No.: 8

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Event Description: E-0 Attachment Items that Fail to Reposition on SI.

Cue: Pre-Load Failures.

NUMBER 1-E-0	ATTACHMENT TITLE  CLS COMPONENT VERIFICATION	ATTACHMENT 4
REVISION 71		PAGE 2 of 2

LOCATION: Annunciator Panel AALARMS: 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

**NOTE:** CLS must be reset to allow securing rad monitor pumps from the MCR.

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

LOCATION: Bench BoardVALVE POSITION: OPEN  
LIGHTS: RED

☐ 1-CS-MOV-102A    ☐ 1-CS-MOV-102B  
☐ 1-RS-MOV-156A    ☐ 1-RS-MOV-156B

Evaluator's Note:  
Valves positioned in  
FR-Z.1.

☐ 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

Evaluator's Note: Section Not Applicable, no LOOP in effect.

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

LOCATION: Bench BoardVALVE 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

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Event No.: N/A

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FOLDOUT PAGES FOR REFERENCED PROCEDURES

NUMBER 1-E-0	CONTINUOUS ACTIONS PAGE	REVISION 71
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1. RCP TRIP CRITERIATrip 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 CRITERIAUse 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 CRITERIAAMSAC 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

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Event No.: N/A

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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)

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FOLDOUT PAGES FOR REFERENCED PROCEDURES

CONTINUOUS ACTIONS PAGE FOR 1-ES-1.11. 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.

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## SIMULATOR OPERATOR'S GUIDE

**Simulator Scenario Checklist**

- ☐ Perform Simulator Turnover Pre-session, and Post-session Checklist prior to the first Scenario of the day.
- ☐ Perform Simulator Turnover Post-session Checklist after the last Scenario of the day.

**Perform/Verify Simulator Setup:**

- ☐ ☐ ☐ Recall IC -403 [T-Rex: 424] (90%) **and implement TRIGGER #30 to activate all passive malfunctions and verify Trigger #30 implemented.**
- ☐ ☐ ☐ Verify 1-SI-P-1A in Pull-To-Lock, with red (tagged) magnet
- ☐ ☐ ☐ Open SimView [Insight] and add the following points
- ☐ ☐ ☐ asp\_ao\_off
- ☐ ☐ ☐ **Enter/Verify the following MALFUNCTIONS:**

Malfunction	Delay	Ramp	Trigger	Value	Final	Trigger Type (Auto or Manual)
MS1401, 1st Stage PRSR Trnsmttr MS-P-446, Fail Low	10	120	1	0	-2	M
MS2102, MS Pressure Trnsmttr MS-PT-101B Fail High	10	10	3	0	+1	M
FW1309, "C" SG NR Level XMTR CH-3 Fail Low	10	60	7	0	-1	M
RC1403, Failure of RCP-C Seal #3	10	60	9	0	100	M
FW1603, C SG Feed Line Break in CNTMNT	10	60	11	0	100	M
RS1001, Hi Hi CLS TR A Fail	5		11	False	True	M
RS1002, Hi Hi Cls Fail	5		11	False	True	M
VS0102, Pressure Switch VS-P-127B Sticks As Is	5		11	False	True	M
VS1501, VS-PS-118A Sticks As Is (VS-F-9A)	5		11	False	True	M
SI2509, SI Relay CI1B Fails to Actuate	5		11	False	True	M
FP0301, FACP07 Alarm Horn Fail	0		30	False	True	M
FP0302, FPS PC Speaker Fail	0		30	False	True	M

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## SIMULATOR OPERATOR'S GUIDE

☐ ☐ ☐ Enter/Verify the following REMOTE FUNCTIONS:

Description	Delay	Ramp	Trigger	Value	Final	Trigger Type (Auto or Manual)
FW_88, C FRV Bypass Isolation	0	60	14	100	0	Man
MS_158, C Stm Line to TDAFW pp	0	60	15	100	0	Man
SIP1A_BKRPOS	10	0	30	Connect	Disconnect	Man

☐ ☐ ☐ Enter/Verify the following SWITCH OVERRIDES:

Override	Set Condition	Trigger
CHLC112C_SETPT, LCV-1115A VCT LVL SETPT, Fail Low	Set to 0, 10 Second Delay, 10 Second Ramp	5
FWFC498F_MANUAL	O/R OFF, 5 Sect TD	7
TVCC105A_Close	5 Sec Delay, O/R ON	21
TVCC105B_Close	5 Sec Delay, O/R ON	21
TVCC105C_Close	5 Sec Delay, O/R ON	21

☐ ☐ ☐ Enter/Verify the following EVENT TRIGGERS:

Trigger#	EVENT	Command
21	CVP000>23, CTMT Pressure >23 psia	CTMT Pressure > 23 psia, Trigger 21 actuates to O/R Closed TV-CC-105 A thru C



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## SIMULATOR OPERATOR'S GUIDE

Trigger Summary:

TRIGGER	TYPE	DESCRIPTION
1	Manual	Actuate Event 2, Turbine 1 <sup>st</sup> Stage Failure
3	Manual	Actuate Event 3, "B" SG PORV Open
5	Manual	Actuate Event 4, CHLC112C_SETPT Fail , CH-LCV-1115A Divert Opens
7	Manual	Actuate Event 5, "C" SG NR level Fail Low coupled with "C" FRV Manual Lower Button fail
9	Manual	Actuate Event 6, "C" RCP #3 Seal Fail; RX Trip – E-0, ES-0.1
11	Manual	Actuate Event 7, Feed Break in CTMT; Also Fails Hi Hi CLS TR A&B Actuation, 58A fan start, VS-F-9A trip, VS-MOD-103C and CH-TV-1204B closure.
14	Manual	Closes 1-FW-88, C FRV Bypass Manual Isolation
15	Manual	Closes 1-MS-158, C Stm Line to TDAFW pump
21	Auto	Overrides TV-CC-105A/B/C closed when CTMT pressure >23 psia to establish conditions for RCP secure [CT].
30	Manual	Initial setup; 1-SAI-P-1A racked out, FPS panel alarms failed.

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## SIMULATOR OPERATOR'S GUIDE

**Verify the following control room setup:**

- ☐ ☐ ☐ Place the simulator in RUN and verify normal 100% power operation indications.
- ☐ ☐ ☐ Verify Red Magnets on the following components: **1-SI-P-1A**
- ☐ ☐ ☐ Verify All pink magnets collected from previous scenarios.
- ☐ ☐ ☐ Verify vertical board PCS monitor on ALARM SCREEN.
- ☐ ☐ ☐ Reset ICCMs.
- ☐ ☐ ☐ Verify all calcalc points are displayed on PCS: U9103, U9104, U9105V.
- ☐ ☐ ☐ Verify Component Switch Flags; 1-VS-F-58A and 1-VS-F-58B switches (AUTO AFTER STOP).
- ☐ ☐ ☐ Verify Brass Caps properly placed (Hi-Hi CLS, MSTVs, CH-MOV-1350, CW and SW MOVs, CTMT Hogger suction, CNDSR Vacuum breaker).
- ☐ ☐ ☐ Radiation Monitors all clear.
- ☐ ☐ ☐ Verify SG PORVs set for 1035 psig.
- ☐ ☐ ☐ Verify "D" bank rod height at 209 steps and Bank Overlap Counter at 593.
- ☐ ☐ ☐ Advance Charts.
- ☐ ☐ ☐ Verify Containment Instrument Air Compressors are on Inside Suction (all RMs reset).
- ☐ ☐ ☐ Verify SYNC keys in proper place.
- ☐ ☐ ☐ Verify MOL reactivity plans and benchboard Reactivity Placard is current.
- ☐ ☐ ☐ Reset Blender Integrators for Boric Acid to 100 and PG to 1000.
- ☐ ☐ ☐ Verify Simulator "Session In Progress" light is turned ON.
- ☐ ☐ ☐ Verify no persons are logged onto network computer to ensure no procedures displayed.
- ☐ ☐ ☐ Verify PCS time matches Sim time.
- ☐ ☐ ☐ Spot check all ARPs are clean, **verify** the following ARPs are clean.

1C-C5	1C-F4	1F-C6	1F-D6
1F-E6	1F-F4	1F-F5	1F-F6
1H-A4	1H-A7	1H-C7	1H-G5

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## SIMULATOR OPERATOR'S GUIDE

1H-G6	1H-G7	1H-H7	
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- ☐ ☐ ☐ Verify CLEAN copies of the following procedures are in place.

0-AP-53.00 (4)	1-AP-38.00	1-AP-9.00	1-OP-TM-005 (3), marked through Step 5.4.14
1-E-2	1-ES-1.1	FR-Z.1	Ramp Plan
1-OP-ZZ-002	1-OPT-RX-001	1-OP-CH-007	1-OP-CH-021 (3)
1-MOP-FW-015 (3)	1-OPT-RP-001		

**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.**

	<b>TEAM 1</b>	<b>TEAM 2</b>	<b>TEAM 3</b>
<b>SRO</b>			
<b>RO</b>			
<b>BOP</b>			

**Ask for and answer questions.**

**Op-Test No.: Surry 2017-3****Scenario No.: 3****Page 111 of 121****SIMULATOR OPERATOR'S GUIDE****Conduct shift turnover:**

The initial conditions.

Unit conditions 90% power, Stable.

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. The Extra Reactor Operator will perform these checks.
- 1-SI-P-1A is tagged out for breaker work (8 hours ago). 72 hour TS clock in effect. Return to service expected later this shift.

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

Shift orders are to ramp Unit 1 to 100% IAW 1-OP-TM-005, Unit Ramping Operations, Starting at Step 5.4.15; an approved Ramp Plan and a blank copy of 1-OP-CH-021, . Alternate Dilution Using Blender, is provided.

The last shift borated or diluted as necessary to maintain Tave/Tref matched.

Blend is in the Blender.

When the team has accepted the shift, proceed to the Session Conduct Section.

## SIMULATOR TURNOVER CHECKLIST

Pre Session Checks:			
Safety Injection Section (Magnets)	CW/SW Section	RCS Section	CVCS
SI-MOV-1865A <input type="checkbox"/> R <input type="checkbox"/> G SI-MOV-1865B <input type="checkbox"/> R <input type="checkbox"/> G SI-MOV-1865C <input type="checkbox"/> R <input type="checkbox"/> G SI-MOV-1869A <input type="checkbox"/> R <input type="checkbox"/> G SI-MOV-1869B <input type="checkbox"/> R <input type="checkbox"/> G SI-MOV-1890A <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> T/O SI-MOV-1890B <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> T/O SI-MOV-1890C <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> T/O Brass Cap <input type="checkbox"/> CLS TR A <input type="checkbox"/> CLS TR B	Brass Caps SW MOVs <input type="checkbox"/> 103A <input type="checkbox"/> 103B <input type="checkbox"/> 103C <input type="checkbox"/> 103D CW MOVs <input type="checkbox"/> 106A <input type="checkbox"/> 106B <input type="checkbox"/> 106C <input type="checkbox"/> 106D CW Inlet Throttle Plaques (10%) <input type="checkbox"/> 100A <input type="checkbox"/> 100B <input type="checkbox"/> 100C <input type="checkbox"/> 100D CTMT Hogger Suction Cap <input type="checkbox"/>	Tcold Loop Stop Pos (R – O) <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C Loop Bypass Valves (G – C) <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C Thot Loop Stop Pos (R - O) <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C SFP PPs Pwr <input type="checkbox"/> Norm <input type="checkbox"/> Alt PZR Level Recorder <input type="checkbox"/>	Core Life Plaque <input type="checkbox"/> Ramp Plan Book <input type="checkbox"/> OP-RX-010 Book <input type="checkbox"/> PG Int Set 1000 <input type="checkbox"/> BA Int Set 100 <input type="checkbox"/> Tavg/Tref Rec. <input type="checkbox"/> NI-NR-B <input type="checkbox"/> Group Step Ctrs <input type="checkbox"/> CERPIs <input type="checkbox"/> CH-MOV-1350 <input type="checkbox"/>
Main Steam/Feedwater	Electrical/VSP	PCS	RM/WD/BR
SG PORVs Set <input type="checkbox"/> MSTV Caps <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C SF/FF Rec Scale <input type="checkbox"/> Cond Vac Bkr Cap <input type="checkbox"/>	Synch Key <input type="checkbox"/> SVB Power <input type="checkbox"/> H <input type="checkbox"/> J LO System Switches <input type="checkbox"/> VS-F-58A Pwr <input type="checkbox"/> H <input type="checkbox"/> J <input type="checkbox"/> Grn Flag VS-F-58B Pwr <input type="checkbox"/> H <input type="checkbox"/> J <input type="checkbox"/> Grn Flag	PCS Main Screen U9103 <input type="checkbox"/> U9104 <input type="checkbox"/> U9105V <input type="checkbox"/> Alarm Screen (List) <input type="checkbox"/>	RM-112 <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C RM-113 <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C Comm RM Pwr <input type="checkbox"/> 1J <input type="checkbox"/> 2J Synch Key <input type="checkbox"/>
Post Session Checks:			
PCS Screens (Cleared/Display) <input type="checkbox"/> RO <input type="checkbox"/> BOP <input type="checkbox"/> SM <input type="checkbox"/> STA <input type="checkbox"/> PCs Logged OFF (including Booth) <input type="checkbox"/> Phone cleared <input type="checkbox"/> Recall IC-1 <input type="checkbox"/> Advance Charts <input type="checkbox"/> Procedures Changed <input type="checkbox"/> Red Light <input type="checkbox"/> Binders Stored <input type="checkbox"/> Trash Picked Up/Emptied <input type="checkbox"/> Vacuum Req'd? <input type="checkbox"/> Pink Magnets in Drawer <input type="checkbox"/> BB and VB Scenario Magnets removed <input type="checkbox"/> E-Mail to SSG Required <input type="checkbox"/> DVD Finalized <input type="checkbox"/> EAL Charts <input type="checkbox"/> Note Pads <input type="checkbox"/> Manning Sheets <input type="checkbox"/> Sticky Tabs (SRO/SM/ARPs) <input type="checkbox"/> Markers (ARPs) <input type="checkbox"/> Personnel/Comms Tracking Sheets (Booth) <input type="checkbox"/> Floor timers reset/In place <input type="checkbox"/> Booth timers reset/In place <input type="checkbox"/> Printers ready/have paper			

**Op-Test No.: Surry 2017-301****Scenario No.: 3****Page 113 of 121****SIMULATOR OPERATOR'S GUIDE****Session Conduct:**

- Ensure conditions in Simulator Set-up are established.

**EVENT 1      Ramp to 100% Power IAW 1-OP-TM-005**

BOOTH: 30 minutes prior to beginning the Scenario, provide the Crew with a copy of 1-OP-TM-005, Unit Ramping Operations, signed off to Step 5.4.15; a copy of the approved Ramp Plan; and a blank copy of 1-OP-CH-021, Alternate Dilution Using Blender.

Operations Supervisor/Management/Work Week Coordinator:

- **If contacted**, Acknowledge start of Ramp to 100% power

Field Operators:

- If Contacted as Turbine Building Operator, you have been briefed and are monitoring Turbine Building parameters.

Role play as other individuals as needed.

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## SIMULATOR OPERATOR'S GUIDE

**EVENT 2      Channel III Turbine First Stage Pressure Fails Low**

When cued by examiner, implement **Trigger #1**.

**Critical Task: (CT-1)**, Place rod control in manual prior to reactor trip and SI on High Steam Flow. Should the RO/BOP fail to take timely action to place rod control in manual, a reactor trip and SI will occur on High Steam Flow. Actuation of the reactor protection system for this event would be considered failure of this CT. A Plant Representative will be available for consult during the Scenario.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the failure of Channel III Impulse Pressure (1-MS-PI-1446); entry into 0-AP-53.00, acknowledge but confirm entry into TS LCOs.
- **If contacted**, will concur with SRO recommendation to perform 1-OP-RP-001 at this time when I&C ready to place the channel in trip.
- **If contacted**, will take responsibility for writing the CR.

STA:

- **If contacted**, will acknowledge failure of Channel III Impulse Pressure (1-MS-PI-1446); entry into 0-AP-53.00, direction to review TS for the failure.
- **If asked**, will report to the Control Room (10 minutes following request.)
- **When directed**, will review TRM Section 3.3, RG 1.97, TS 3.7, VPAP-2802, and EP-AA-303 and notify SRO that review have been completed and results discussed with the Shift Manager.
- **If the team has a transient brief:** The STA will have no input for the brief.

Field Operators:

- **If contacted**, field operators will report no issues in the area of the Impulse Pressure transmitter.

Maintenance/Work Week Coordinator:

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

Unit 2 Operator:

- **If notified**, will acknowledge failure of 1-MS-PI-1446.
- **When asked:** provide Copy of 1-OPT-RP-001 to Unit 1 SRO/BOP.



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## SIMULATOR OPERATOR'S GUIDE

Role play as other individuals as needed.

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## SIMULATOR OPERATOR'S GUIDE

**EVENT 3      B SG PORV Opens, 1-MS-PT-101B Fail High.**

When cued by examiner, implement **Trigger #3**.

Operations Supervisor/Management:

- **If contacted**, acknowledge failure of 1-MS-PT-101B, MS Line B Press, entry into 0-AP-53.00 and 1-AP-38.00.
- **If asked** will take responsibility for writing CR.

STA:

- **If contacted**, acknowledge failure of 1-MS-PT-101B, "B" SG PORV input, entry into 0-AP-53.00 and 1-AP-38.00.
- **If asked**, will report to the Control Room (10 minutes following request).
- **If asked**, will take responsibility for writing CR.
- **If directed**, will add failed transmitter to PSA analysis.
- **Crew transient brief:** The STA will have no input for the brief.

Maintenance/ Work Week Coordinator:

- **If contacted**, will acknowledge the failure of 1-MS-PT-101B, notify I&C to commence investigation.

Field Operators: (3 minutes from notification to report to MCR).

- **If contacted**, will report 1-MS-PT-101B, MS Line B Press, indications indicates off-scale high (> 1450 psig) on the Aux Shutdown Panel.

Unit 2:

- **If contacted**, will acknowledge Failure of 1-MS-PT-101B, and Entry into 0-AP-53.00/1-AP-38.00.

HP:

- **If contacted**, will acknowledge short term lift of "B" SG PORV.

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## SIMULATOR OPERATOR'S GUIDE

Role-play as other individuals as needed.

**EVENT 4      CVCT Level Controller Setpoint Fail Low, 1-CH-LCV-1115A Divert.**

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

Operations Supervisor/Management:

- **If contacted**, will acknowledge failure of VCT level controller and entry into 0-AP-53.00.
- **If contacted**, will take responsibility for writing the CR.

STA:

- **If contacted**, will acknowledge failure of VCT level controller and entry into 0-AP-53.00.
- **If asked**, will report to the Control Room (10 minutes following request.)
- **When directed**, will review TRM Section 3.3, RG 1.97, TS 3.7, VPAP-2802, and EP-AA-303 and notify SRO that review have been completed and results discussed with the Shift Manager.
- **If the team has a transient brief:** The STA have no input for the brief.
- **When directed**, will review TRM Section 3.3, RG 1.97, TS 3.7, VPAP-2802, and EP-AA-303 and notify SRO that review have been completed and results discussed with the Shift Manager.

Field Operators:

- **If asked**, will find no abnormal conditions in the vicinity of the VCT.

Maintenance/ Work Week Coordinator:

- **If contacted**, will notify I&C of the failure and commence investigation.

Unit 2:

- **If contacted**, will acknowledge VCT divert.

Role-play as other individuals as needed.

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## SIMULATOR OPERATOR'S GUIDE

**EVENT 5: Channel III C SG NR Level Fail Low/Failure of Controller to Shift to Manual.**

When cued by examiner, implement **Trigger #7.**

**Critical Task: (CT-2):** Control “C” SG NR level to prevent an automatic turbine trip/reactor trip on high SG NR level at 75%. Should the BOP fail to take timely action to control “C” SG NR level an automatic turbine trip/reactor trip will occur. Actuation of the reactor protection system for this event would be considered failure of this CT. A Plant Representative will be available for consult during the Scenario.

## Operations Supervisor/Management:

- **If contacted**, acknowledge failure of 1-FW-LI-1496, C SG Chan. III NR Level, C FRV Controller failing to shift to Manual, C SG level controlled by throttling 1-FW-MOV-154C, C FRV isolation, and entry into 0-AP-53.00.
- **If contacted**, will acknowledge TS LCO entry to place channel in trip, but not confirm/deny SRO determination of LCO.
- **If requested**, will notify OMOC of the failure.
- **If requested**, will print copies of 1-MOP-FW-015, Main Feedwater Regulating Valve Jacking Operations, for the MCR and take responsibility to brief Field Operators to place C FRV on the Jack.
- **If requested**, will contact Training to request JITT for Field Operators for placing C FRV on the Jack.
- **If requested**, will take responsibility for writing CR.

## Maintenance/ Work Week Coordinator:

- **If contacted**, will notify I&C of the failure and commence investigation.

## Unit 2 Operator:

- **If requested**, Unit 2 BOP unavailable to assist Unit 1.
- **If requested**, provide Unit 1 SRO with copy of 1-MOP-FW-015, Main Feedwater Regulating Valve Jacking Operations.

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STA:

- **When contacted**, The STA will acknowledge failure of C SG NR Level transmitter, C SG NR level controlled using 1-FW-MOV-154C.
- **When contacted**, will report to the Control Room (10 minutes after request).
- **Crew transient brief**: Will have no input for the brief.
- **When notified**, will acknowledge entry into TS LCO for the failed channel, will not confirm SRO determination of TS LCO.
- **If requested**, will take responsibility for writing CR.
- **When directed**, will review TRM Section 3.3, RG 1.97, TS 3.7, VPAP-2802, and EP-AA-303 and notify SRO that review have been completed and results discussed with the Shift Manager.

Field Operators: (3 minutes from request to report to the MCR).

- If directed, to locally check for abnormal condition of C FRV, report no local abnormalities found.

Role play as other individuals as needed.

**Op-Test No.: Surry 2017-301****Scenario No.: 3****Page 120 of 121****SIMULATOR OPERATOR'S GUIDE****EVENTS 6 : #3 Seal Fail C RCP.**

When cued by examiner, implement **Trigger #9.**

Operations Supervisor/Management:

- **If contacted**, acknowledge failure of #3 Seal C RCP, entry into AP-9.00, and impending trip of Unit 1.
- **If requested**, will take responsibility for writing CR.
- **If requested**, will notify OMOC.

STA:

- **When notified**, will acknowledge failure of #3 Seal on C RCP and impending trip of Unit 1.
- **If the team has a transient brief:** The STA will have no input.

Unit Two:

- **If requested**, acknowledge CTMT RM alarms, and perform ARP actions.
- **If contacted**, Unit Two has implemented AP-50.00, and all conditions on U2 are normal.

Role play as other individuals as needed.

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## SIMULATOR OPERATOR'S GUIDE

**EVENT 7/8 Feed Line Break in CTMT/Hi Hi CLS Failure/SI Relay Failures-**

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

**Critical Task: (CT-3):** Terminate CS and SI flow from the RWST prior to transition to 1-ES-1.3, Transfer to Cold Leg Recirculation, at RWST level of 20%. Critical Task start begins at initiation of CS and SI flow from RWST and ends when CS and SI flow is terminated. Time to reach RWST level of 20% is approximately 50 minutes.

**Critical Task: (CT-4)** Secure A/B RCPs on loss of support conditions (Cooling Water flow) prior to receipt of RCP Frame Danger Annunciator (high vibrations). Approximately 22 minutes following CTMT pressure exceeding the Hi-Hi-CLS setpoint, Annunciator 1C-H4, RCP Frame Danger, will be received if the RCPs have not been secured. Failure to secure the RCPs when directed will adversely complicate Plant Recovery following blowdown of the faulted SG by preventing the use of the RCPs.

**Booth: Trigger 21** actuates when CTMT pressure exceeds 23 psia, causing TV-CC-105A/B/C to close

Operations Supervisor/Management:

- **If contacted**, will acknowledge E-0 entry with SI in service.
- **If contacted**, will notify OMOC.

Unit 2 Operator:

- **If** radiation alarms sound on the radiation alarm panel, silence the alarms when directed and report the alarm to the Unit 1 SRO.
- **When asked**, E-0, Attachment 3 items:
  - Step 10, Chilled Water flow throttled IAW Note prior to Step 10.
  - Step 11: MCR pressure matches indications on Unit Ventilation Panel.
  - Step 13: 0-AP-50.00 has been initiated.
  - Step 17: Unit will assume responsibility for Attachment 3, Page 6 items.

Field Operators: (Wait three minutes from direction to report of task completion)

- **When directed**, to close 1-FW-88, C FRV Bypass Manual Isolation, **Trigger 14**.
- **When directed**, to close 1-MS-158, C Steam Line to TDAFW pump, **Trigger 15**.

Role play as other individuals as needed.

The scenario will end upon completion of Step 11 1-ES-1.1 or at the lead examiners discretion.

Facility: <u>Surry Power Station</u>	Scenario No.: <u>4</u>	Op-Test No.: <u>2017-004</u>	
Examiners: _____		Operators: _____	
_____		_____	
_____		_____	
<p>Initial Conditions: Unit 1 at ~5%, BOL, 1415 ppm Boron. Unit 2 at 100% power</p> <ul style="list-style-type: none"> <li>• Unit startup in progress, 1-GOP-1.8 and 1-OP-TM-001.</li> <li>• Unit 1 SVB aligned to the “J” Bus supply.</li> <li>• 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. The Extra Reactor Operator will perform these checks.</li> <li>• 1-SI-P-1A is tagged out for breaker work (8 hours ago). 72 hour TS clock in effect. Return to service expected later this shift.</li> </ul> <p>Turnover: The Crew will pre-brief placing the generator on-line and ramping up in power prior to entering the Simulator.</p>			
Event No.	Malfunction 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 Valve fails open (AP-53.00) <span style="float: right;">(CT-1)</span>
5	EL0801	C-BOP/SRO	Loss of 1G Screenwell Transformer (AP-12.01) <span style="float: right;">(CT-2)</span>
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. <span style="float: right;">(CT-3, CT-4)</span>
<p>* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor</p>			



CT #	EVENT	DESCRIPTION	MET (✓)
CT-1	4, PRZR Spray Valve Fails Open	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 at ~1885 psig; an unanticipated reactor trip should be considered as failure criteria. An Operations representative will be available for consultation as necessary.	
CT-2	5, Loss of 1G Transformer	If the BOP re-starts the Unit 1 CW pumps prior to the required wait time of five (5) minutes, the CW pump(s) will trip on overcurrent. The five minute wait period is required to allow CW backflow through the CW pump to cease; this backflow causes the CW pump(s) to rotate in the reverse direction. This CT is based on the Crew demonstrating non-compliance with procedural Notes designed to prevent damage to the CW pump, which can lead to power escalation limitations for Unit 1 and potentially affect full power operation of Unit 2. An operations representative will be available for consult during the Scenario.	
CT-3	6, Loss of All AC Power	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	
CT-4	6, Loss of All AC Power	Energize the 1J emergency bus from the AAC diesel within 10 minutes of entering AP-17.06.  Based on SPS-CT-1, Re-energize an Emergency Bus on the AAC DG. (WOG E-0-C).	

**Event 1: Place Unit On-Line and Ramp Up in Power.** (R – RO/SRO, N- BOP)

The Crew 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 Crew to use during the pre-brief and in the Simulator for the Ramp up in power. The Crew will place the Unit on-line and commence a ramp up in power. A surrogate operator will be available for SG Feed control until the FRVs are in AUTO and the Bypass valves are closed; then the surrogate will turnover to the BOP and exit the Simulator.

**Verifiable Action(s):**

- 1) RO – Manipulate rod control and CVCS Blender to control Tave and  $\Delta$ Flux during the power escalation.
- 2) BOP – manipulate Generator output breakers.
- 3) Surrogate Operator actions limited to Feed Control; the Candidates are responsible for providing peer checking of control board manipulations as necessary..

**Technical Specifications:** None.

**Event 2: 1-CC-RI-105, CC RM, Fail high without associated auto action.** (I – BOP/SRO, TS – SRO).

After the Crew 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.

**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, Primary Grade Water Pump.

**Verifiable Action(s):**

- 1) RO – Start 1-PG-P-1B, Primary Grade Water Pump.

**Technical Specifications:** 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 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.

**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 at ~1885 psig; 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.

**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.

**Critical Task 2:** If the BOP re-starts the Unit 1 CW pumps prior to the required wait time of five (5) minutes, the CW pump(s) will trip on overcurrent. The five minute wait period is required to allow CW backflow through the CW pump to cease; this backflow causes the CW pump(s) to rotate in the reverse direction. This CT is based on the Crew demonstrating non-compliance with procedural Notes designed to prevent damage to the CW pump, which can lead to power escalation limitations for Unit 1 and potentially affect full power operation of Unit 2. An operations representative will be available for consult during the Scenario.

**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 Crew 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 Crew 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 Diesel Generator is loaded on the 1J bus, ECA-0.0 will send the Team to Step 33, where operating equipment is checked. The Crew 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-3:** 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-4:** Energize the 1J emergency bus from the AAC diesel within 10 minutes of entering AP-17.06.

Based on SPS-CT-1, Re-energize an Emergency Bus on the AAC DG. (WOG E-0-C).

Critical Task start time **begins** when crew enters 0-AP-17.06, 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.  
 Unit 1 SVB power aligned to “J” Bus supply.

**Pre-load malfunctions: (Trigger 30’s)**

- FW47, Disable FW-P-2 Auto Start
- CC07, Disable CC-HCV-100 Auto closure
- FP0301, FACP07 ALARM HORN FAILURE
- FP0302, FPS SPEAKER FAILURE

**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.

- 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. The Extra Reactor Operator will perform these checks.
- 1-SI-P-1A is tagged out for breaker work (8 hours ago). 72 hour TS clock in effect. Return to service expected later this shift.

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 CC07	+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) <b>(CT-1)</b>
5	EL0801 CW0101 CW0102 CW0104 CW0103	TRUE	Loss of Screenwell Transformer (0-AP-12.01) <b>(CT-2)</b>

6	EL01 ED0201 ED0602 FW47	TRUE	Loss of Offsite power with failure of EDG #1, and EDG #2. TDAFW pump failure. (ECA-0.0)  <b>(CT-3, CT-4)</b>
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## SHIFT TURNOVER INFORMATION

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### **OPERATING PLAN:**

Unit 1 is stable at ~5% reactor power with RCS boron concentration of 1415 ppm.

Unit 1 SVB is aligned to the "J" Bus supply.

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. The Extra Reactor Operator will perform these checks.

1-SI-P-1A is tagged out for breaker work (8 hours ago). 72 hour TS clock in effect. Return to service expected later this shift.

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 with all systems and crossties operable.

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.

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## SHIFT TURNOVER INFORMATION

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### **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 Crew 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. (Crew) When conditions established, place FRVs in automatic.

##### **Event Two: 1-CC-RI-105, CC RM, Fail high without associated auto action.**



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## SHIFT TURNOVER INFORMATION

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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: Two, RM0209, CC07.

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.

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## SHIFT TURNOVER INFORMATION

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**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: Five, EL0801, CW0101, CW0102, CW0104, CW0103

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.

**Critical Task 2:** : If the BOP re-starts the Unit 1 CW pumps prior to the required wait time of five (5) minutes, the CW pump(s) will trip on overcurrent. The five minute wait period is required to allow CW backflow through the CW pump to cease; this backflow causes the CW pump(s) to rotate in the reverse direction. This CT is based on the Crew demonstrating non-compliance with procedural Notes designed to prevent damage to the CW pump, which can lead to power escalation limitations for Unit 1 and potentially affect full power operation of Unit 2. An operations representative will be available for consult during the Scenario.

**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 fail to 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

Malfunctions required: Four; EL01, ED0201, ED0602, and FW47

Objectives: (RO) Perform immediate actions of ECA-0.0. Close MSTVs.

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## SHIFT TURNOVER INFORMATION

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(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.

### Critical Tasks:

- 1) **CT-3:** 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-4:** Energize the 1J emergency bus from the AAC diesel within 10 minutes of entering AP-17.06. Based on SPS-CT-1, Re-energize an Emergency Bus on the AAC DG. (WOG E-0-C). Critical Task start time **begins** when the Crew enters 0-AP-17.06, and Critical Task stop time **ends** when AAC DG is loaded on the 1J bus.

### Scenario Recapitulation

Total Malfunctions: 14

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)

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**Cue: When team ready.**

Time	Position	Applicant's Action or Behavior
	Team	<p><b>1-GOP-1.8</b></p> <p>Team will pre-brief Initial Conditions, Precautions and Limitations, and procedure prior to entering simulator.</p>
	<p>RO</p> <p>BOP</p> <p>BOP</p> <p>BOP</p>	<p><b>1-GOP-1.8</b></p> <p><i>1-OP-CH-021 (Alternate Dilution Using Blender) procedure steps are contained in this guide starting at page 22.</i></p> <p>5.6.13 IF the Steam Dumps are in Auto in Steam Pressure Mode, THEN do the following. Otherwise, enter N/A.</p> <p>a. <b>Increase Reactor power to approximately 6% -10% by withdrawing the Control Rods and/or using chemical shim.</b></p> <p>b. Check that the Steam Dumps come open to maintain Steam Header pressure at approximately 1005 psig.</p> <p>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.</p> <p>5.6.15 Notify the System Operator and Energy Supply (MOC) that the unit is coming on line.</p> <p>5.6.16 Check that at least five Polishing beds are in service. <i>CP operator will report 6 polishers in service.</i></p>
	SRO	<p><b>1-GOP-1.8</b></p> <p>Note prior to Step 5.6.17:</p> <ul style="list-style-type: none"> <li>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.</li> </ul>
	SRO	<p><b>1-GOP-1.8</b></p> <p>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.</p> <p>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 18 of this guide.</p>

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Event Description: Place Unit on line and ramp up in power.

Cue: When team ready.

	RO	<b>1-GOP-1.8</b> 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).
	SRO	<b>1-GOP-1.8</b> <b>CAUTION</b> prior to Step 5.6.21: <ul style="list-style-type: none"> <li>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.</li> </ul>
	SRO	<b>NOTES</b> prior to Step 5.6.21: <ul style="list-style-type: none"> <li>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.</li> <li>Chemistry should be notified when power level changes are equal to or greater than 15 percent/hr.</li> <li>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.</li> </ul>
	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.

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Event Description: Place Unit on line and ramp up in power.

Cue: When team ready.

		<b>1-GOP-1.8</b>
	SRO	<b>CAUTION</b> prior to Step 5.6.22: <ul style="list-style-type: none"> <li>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.</li> </ul>
		<b>1-GOP-1.8</b>
	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. <ul style="list-style-type: none"> <li>_____ 1. Trip Status Light E1, NIS PWR RGE P-10 CH-1</li> <li>_____ 2. Trip Status Light F1, NIS PWR RGE P-10 CH-2</li> <li>_____ 3. Trip Status Light G1, NIS PWR RGE P-10 CH-3</li> <li>_____ 4. Trip Status Light H1, NIS PWR RGE P-10 CH-4</li> </ul>
	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. <b>Depress 1/N 38A TRA, INT RNG TRIP - BLOCK, pushbutton.</b> 2. <b>Depress 1/N 38B TRB, INT RNG TRIP - BLOCK, pushbutton.</b> 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. <b>Depress 1/N 47A TRA, PWR RNG (LO SETPT) TRIP - BLOCK, pushbutton.</b> 2. <b>Depress 1/N 47B TRB, PWR RNG (LO SETPT) TRIP - BLOCK, pushbutton.</b> 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. <ul style="list-style-type: none"> <li>a. WHEN turbine power increases through 10 percent, THEN check that the following Trip Status Lights are LIT. <ul style="list-style-type: none"> <li>_____ 1. Trip Status Light E3, TURB PWR &gt; 10% CH-3</li> <li>_____ 2. Trip Status Light F3, TURB PWR &gt; 10% CH-4</li> </ul> </li> <li>b. WHEN turbine power increases through 15 percent, THEN check Perm Status Light K1, P-2 AUTO ROD CONTROL BLOCKED TURB PWR &lt; 15%, is NOT LIT.</li> </ul>

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Event Description: Place Unit on line and ramp up in power.

Cue: When team ready.

		<b>1-GOP-1.8</b>
	SRO	<p><b>NOTE</b> prior to Step 5.6.24:</p> <ul style="list-style-type: none"> <li>When Steam Dumps close, a reduction in RCS temperature should be anticipated and compensatory actions taken.</li> </ul>
	RO/BOP	<p>5.6.24 IF Steam Dumps in Auto, THEN verify the Steam Dumps modulate closed as Turbine Power is raised.</p> <p>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.</p>
	BOP	<p>5.6.26 Maintain Turbine Valve Position Limiter approximately 5% above Governor Valve demand.</p> <p><b>NOTE:</b> Steam Flow / Feed Flow indications do not have to be matched to be considered stable.</p> <p>All three MFRVs should be placed in Auto at the same time to ease the transition to Auto feed control.</p>
	TEAM SURROGATE	<p>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:</p> <ol style="list-style-type: none"> <li>Check that the MFRVs are closed.</li> <li>Place the MFRVs in Auto.</li> <li>WHEN MFRV demand exceeds approximately 9%, THEN slowly close the MFRV Bypass HCVs as the MFRVs come open.</li> </ol> <p><b>NOTE:</b> When the Steam Dumps are fully closed, Tave will lower as Turbine power is raised.</p>
	RO/BOP	<p>5.6.28 IF the Steam Header Pressure controller is in Auto, THEN as Turbine power level is raised, perform the following. Enter N/A if controller in Manual.</p> <ol style="list-style-type: none"> <li>Check that the Steam Dumps modulate closed.</li> <li>WHEN the Steam Dumps are closed, THEN place the Steam Header Pressure controller in Manual.</li> </ol>
	SRO	<p>5.6.29 IF the Steam Header Pressure controller is in Manual, THEN as Turbine power level continues to rise, reduce the STM DUMP VVS DEMAND signal to zero while maintaining Reactor power constant. Enter N/A if controller was operated in Auto.</p>

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Event Description: Place Unit on line and ramp up in power.

Cue: When team ready.

	RO/BOP	<b>1-GOP-1.8</b>  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.  <b>END OF GOP ACTIONS – 1-OP-TM-001 ACTIONS BEGIN NEXT PAGE.</b>
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Event Description: Place Unit on line and ramp up in power.

Cue: When team ready.

		<b>1-OP-TM-001</b>  <b>5.7 Synchronizing and Loading the Turbine to 5% Rated Load in the OPER AUTO Mode</b>  <b>NOTES</b> prior to Step 5.7.1: <ul style="list-style-type: none"> <li>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.</li> <li>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.</li> </ul>
	BOP	
	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
		<b>1-OP-TM-001</b>  <b>CAUTION</b> prior to Step 5.7.2: <ul style="list-style-type: none"> <li>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.</li> </ul>
	SRO	
	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.  <i>Field operator will report pumps and fans in service</i>
		<b>1-OP-TM-001</b>  5.7.4 Check that UNIT NO. 1 LOAD MEGAWATTS chart recorder is ON.
	BOP	
	BOP	5.7.5 Check or depress the VV POSTN LIMITER raise button until the VV POSTN LIMIT indicator registers 30% 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.

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Event Description: Place Unit on line and ramp up in power.

Cue: When team ready.

	BOP	<b>1-OP-TM-001</b>
	BOP	<p><b>NOTE</b> prior to Step 5.7.7: Shift Supervision may adjust the ramp rate to aid in unit stabilization.</p> <p>5.7.7 Verify or place the LOAD RATE % PER MIN thumbwheel to position 1. (1%/MIN)</p>
	SRO	<p><b>CAUTIONS</b> prior to step 5.7.8:</p> <ul style="list-style-type: none"> <li>• The Sync Switch should not be turned to the AUTO position as the AUTO SYNC function is inoperative.</li> <li>• 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.</li> </ul>
	BOP	<p>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.</p> <ol style="list-style-type: none"> <li><b>Insert the Sync Key into CS-G102, GEN OUTPUT BKR SYNC SWITCH.</b></li> <li><b>Turn CS-G102 to MAN.</b></li> <li><b>Raise the SETTER to 1805 rpm and press the GO button.</b></li> <li>Check that voltage is indicated on the INCOMING and RUNNING voltmeters.</li> </ol> <p><b>NOTE:</b> Slow in the fast direction is one clockwise rotation in 20 or more seconds.</p> <ol style="list-style-type: none"> <li><b>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.</b></li> </ol>

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Event Description: Place Unit on line and ramp up in power.

Cue: When team ready.

	BOP	<p><b>1-OP-TM-001</b></p> <p><i>5.7.8 (Continued)</i></p> <p><b>NOTE:</b> INCOMING and RUNNING voltages should be within 2 volts.</p> <p>f. <b>Equalize the INCOMING voltage with the RUNNING voltage using the EXCITATION LEVEL control switch.</b></p> <p><b>CAUTION:</b> If Generator output is not indicated at the time of synchronization and no operator action is taken, an anti-motoring trip will occur</p> <p><b>NOTE:</b> With the Synchroscope running as close to a 20-second cycle as possible, very little load will be placed on the generator.</p> <p><b>NOTE:</b> Reflexes should be mentally checked with respect to the Synchroscope needle speed so that the Generator Breaker is closed at 12:00 o'clock.</p> <p>g. <b>WHEN the Synchroscope is at (approximately) 2 minutes to 12:00 o'clock, THEN close OCB-G102, Generator Output Breaker.</b></p> <p><b>NOTE:</b> Approximately 15 to 20 seconds may elapse before the Setter indication increases above zero.</p> <p>h. Check that the following indications are NOT LIT.</p> <ul style="list-style-type: none"> <li>• Permissive Status Light E-3 GEN NO. 1 MOTORING INITIATED</li> <li>• Annunciator 1J-D7, GEN MOTORING TURB LO ΔP</li> </ul> <p>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.)</p> <p>j. <b>Turn CS-G102, GEN OUTPUT BKR SYNC SWITCH, to OFF.</b></p> <p>k. <b>Insert the Sync Key into CS-G1T240, GEN OUTPUT BKR SYNC SWITCH.</b></p> <p>l. <b>Turn CS-G1T240 to MAN.</b></p> <p>m. <b>Check that the synchroscope needle stopped at approximately the 12:00 o'clock position.</b></p> <p>n. Check that the INCOMING and RUNNING voltages are within 2 volts.</p> <p>o. <b>Close OCB-G1T240.</b></p> <p>p. <b>Turn CS-G1T240 to OFF and remove the Sync Key.</b></p>
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Event Description: Place Unit on line and ramp up in power.

Cue: When team ready.

	SRO/BOP	<b>1-OP-TM-001</b>  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	Caution and Notes prior to Step 5.7.10: <ul style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>The Turbine should not be continuously operated on the VV POSTN LIMIT.</li> <li>If Steam Dumps are open and controlling in Auto, raising limiter setting to remove turbine from the limiter will trade steam to dumps for steam to turbine.</li> </ul>
	BOP/SRO   BOP  BOP	5.7.10 IF the VALVE POS LIMIT light is LIT, THEN do the following: <ol style="list-style-type: none"> <li>IF Steam Dumps are open and controlling in Auto, THEN slowly raise limiter setting to remove Turbine from limiter.</li> <li>IF steam dumps are not open, OR not in Auto, THEN do the following:               <ol style="list-style-type: none"> <li>Stop the ramp.</li> <li>Lower Unit load until the VALVE POS LIMIT light is NOT LIT.</li> <li>Adjust the VV POS LIMIT setpoint as required.</li> <li>Resume ramp.</li> </ol> </li> </ol> 5.7.11 Verify that the SPEED light is <u>NOT</u> LIT and the LOAD light is LIT. 5.7.12 RETURN TO appropriate startup GOP to continue the Unit Startup.  <b>THE team will return to GOP-1.8 (momentarily).</b>
	SRO	<b>CAUTIONS</b> prior to Step 5.8.1: <ul style="list-style-type: none"> <li>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.</li> <li>Rapid Loading of the Turbine - Generator may cause a Steam Generator High Level Trip. <b>(Reference 2.4.1)</b></li> </ul>

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Event No.: 1

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Event Description: Place Unit on line and ramp up in power.

Cue: When team ready.

	SRO/BOP	<p><b>1-OP-TM-001</b></p> <p><b>NOTES</b> prior to Step 5.8:</p> <ul style="list-style-type: none"><li>• 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.</li><li>• 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.</li><li>• In the OPER AUTO mode, Turbine loading may be stopped by depressing the HOLD pushbutton and may be restarted by depressing the GO pushbutton.</li></ul> <p>5.8.1 With the OPER AUTO mode selected, set the desired load in the SETTER and depress the GO pushbutton.</p> <p>5.8.2 Maintain the System Voltage on the 230 KV BUS VOLT meter as requested by the System Operator.</p> <p>5.8.3 WHEN Turbine power increases above 10%, THEN check PCS alarm Y2060D, Exh Hood Sprays OFF, is received.</p> <p>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.</p> <p><i>Evaluator's Note: No further actions are expected for this event.</i></p>
	BOP	<b>END EVENT 1</b>

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Event No.: 1

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Event Description: Place Unit on line and ramp up in power.

Cue: When team ready.

Time	Position	Applicant's Action or Behavior
	RO	<p>1-OP-CH-021, Alternate Dilution Using Blender</p> <p>3.0 Initial Conditions</p> <p>3.1 Check Primary Grade water is available to the Blender.</p> <p>4.0 Precautions and Limitations</p> <p>4.1 Control rod position, Tav<sub>g</sub>, and/or power level should be observed when making up to the RCS.</p> <p>4.2 Operation of pressurizer heaters and spray valves should be used to equalize Boron concentration (CB) when changing CB.</p> <p>4.3 The blender must be frequently monitored for proper operation during the entire duration of the makeup. <b>(Reference 2.4.1)</b></p> <p>4.4 The Reactor Operator shall notify Shift Supervision before performing any Blender evolution. <b>(Reference 2.4.1)</b></p> <p>4.5 Rapidly changing VCT level and pressure may affect RCP Seal leakoff, which should be monitored for normal response.</p> <p>4.6 Operation of the Blender must be Peer checked.</p> <p>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.</p> <p>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). <b>(Ref. 2.4.2)</b></p>
	RO	<p>1-OP-CH-021, Alternate Dilution Using Blender</p> <p>4.0 Precautions and Limitations (Continued)</p> <p>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.</p> <p>4.10 Dilutions of greater than 2000 gallons can result in RCS H<sub>2</sub> 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.</p>

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Event No.: 1

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Event Description: Place Unit on line and ramp up in power.

Cue: When team ready.

	RO	<p>1-OP-CH-021, Alternate Dilution Using Blender</p> <p>5.1 Alternate Dilution</p> <p><b>NOTE:</b> 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.</p> <p><b>NOTE:</b> If unit on excess letdown, 1-OP-CH-007 should be used.</p> <p>5.1.1 Determine the required integrator setpoint by performing the following:</p> $\frac{\text{_____ gal (-)}}{\text{(Desired Dilution)}} = \frac{\text{_____}}{\text{(anticipated additional flow, dependent on flowrate)}} \text{ Integrator setpoint}$ <p>5.1.2 Notify Shift Supervision of impending Alternate Dilution. (<b>Reference 2.4.1</b>)</p> <p>5.1.3 Notify STA of impending Alternate Dilution.</p> <p>5.1.4 Place the MAKE-UP MODE CNTRL switch in the STOP position.</p> <p>5.1.5 Adjust both of the following controllers for the flow rate and total gallons of Primary Grade water for the dilution. IF the <b>PG FLOW CNTRL</b> controller setpoint has previously been set, THEN enter N/A for that substep.</p> <p>a. 1-CH-FC-1114A, PG FLOW CNTRL (N/A) _____ GPM (IAW Attachment 2)</p> <p>b. 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</p> <ol style="list-style-type: none"> <li>1. Depress PRESET A Button (Controller will read the last value entered into the controller; reads in gallons.)</li> <li>2. To clear PRESET A, depress the CLR Button. Enter N/A if not required.</li> <li>3. Enter desired PRESET A value. Enter N/A if not required.</li> <li>4. Depress ENT Button.</li> </ol>
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Event No.: 1

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Event Description: Place Unit on line and ramp up in power.

Cue: When team ready.

	RO	<p>1-OP-CH-021, Alternate Dilution Using Blender</p> <p>5.1.6 Place the MAKE-UP MODE SEL switch in the ALT DIL position.</p> <p>5.1.7 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.</p> <p>5.1.8 Place the MAKE-UP MODE CNTRL switch in the START position.</p> <p>5.1.9 Check all of the following conditions.</p> <p class="list-item-l1">a. 1-CH-FCV-1113A, BORIC ACID TO BLENDER, is closed.</p> <p class="list-item-l1">b. 1-CH-FCV-1113B, BLENDER TO CHG PUMP, is open.</p> <p class="list-item-l1">c. 1-CH-FCV-1114A, PGW TO BLENDER, is controlling in AUTO.</p> <p class="list-item-l1">d. 1-CH-1114B, BLENDER TO VCT, is OPEN – N/A</p> <p>5.1.10 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.</p> <p>5.1.11 WHEN the desired amount of makeup has been reached, THEN check both of the following valves closed.</p> <ul style="list-style-type: none"><li>• 1-CH-FCV-1113B</li><li>• 1-CH-FCV-1114B</li></ul>
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Event No.: 1

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Event Description: Place Unit on line and ramp up in power.

Cue: When team ready.

	RO	<p>1-OP-CH-021, Alternate Dilution Using Blender</p> <p>5.1.12 Check or place 1-CH-FCV-1114B in AUTO. Otherwise, enter N/A.</p> <p>5.1.13 Check or place the following controllers in Automatic.</p> <p>1-CH-FC-1113A, BA FLOW CNTRL</p> <p>1-CH-FC-1114A, PG FLOW CNTRL</p> <p>5.1.14 Place the MAKE-UP MODE SEL switch in the AUTO position.</p> <p>5.1.15 Place the MAKE-UP MODE CNTRL switch in the START position.</p> <p>5.1.16 Notify Shift Supervision of Blender status. <b>(Reference 2.4.1)</b></p> <p><i>Additional Alternate Dilutions will be performed using 1-OP-CH-021, Attachment 1 (Next Page).</i></p>
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Event No.: 1

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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 <u>IF</u> it is desired to direct the dilution water to the charging pump suction only, <u>THEN</u> 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 <u>WHEN</u> the desired amount of makeup has been reached, <u>THEN</u> 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)						

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**Cue: By Examiner when FRVs have been placed in Auto, and Feed Control Role Player relieved.**

[illegible]

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Scenario No.: 4

Event No.: 2

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Event Description: CC RM Fail upscale with failure of HCV-CC-100 to auto close.

Cue: By Examiner when FRVs have been placed in Auto, and Feed Control Role Player relieved.

		<p>0-OPT-RM-001</p> <p>Precautions and Limitations</p> <p>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.</p> <p>4.2 Check Sources for the Victoreen digital radiation monitors operate as follows.</p> <ul style="list-style-type: none"> <li>• For digital PROCESS monitors - The Check Source is exposed to the detector by depressing and holding the CHECK SOURCE pushbutton.</li> <li>• 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.</li> </ul>
	BOP	<p>0-OPT-RM-001</p> <p>6.1 Work Preparation</p> <p>6.1.1 IF a radiation monitor is out of service, THEN enter OOS in applicable spaces of Attachments.</p> <p>NOTE: • A failed Digital Rate Meter is indicated by “EEEEEs” in the digital display window, and the FAIL Alarm light LIT.</p> <ul style="list-style-type: none"> <li>• If the Radiation Monitor has associated automatic actions, those actions will occur when the monitor fails.</li> </ul> <p>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.</p> <p>a. IF Radiation Monitor has associated automatic actions, THEN check or perform actions as necessary. Otherwise, enter N/A.</p> <p><i>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.</i></p>

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Event No.: 2

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Event Description: CC RM Fail upscale with failure of HCV-CC-100 to auto close.

**Cue: By Examiner when FRVs have been placed in Auto, and Feed Control Role Player relieved.**

	BOP	<p>0-OPT-RM-001</p> <p>b. On the front panel of rate meter, depress the ON/OFF push button, and check the meter is OFF.</p> <p><b>BOP places On/Off switch in Off.</b></p> <p>c. WHEN 30 seconds have elapsed, THEN perform Step 6.1.2.d.</p> <p>d. On the front panel of rate meter, depress the ON/OFF push button, and check the meter is ON.</p> <p>BOP Places RM in On, Meter immediately goes to all “EEEE’s” with the HIGH, WARN and RANGE lights Lit.</p> <p>BOP Notifies SRO RM has failed and I&amp;C assistance is required.</p>
	SRO	<p>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.</p> <p>The SRO may review Technical Specification Table 3.7-5, which will refer the SRO to Technical Specification 3.13.</p>
	SRO	<p>The team will hold a transient brief. During the brief the failure of the CC RM and Vent Valve will be discussed.</p> <p>The RO/BOP will report Annunciators received related to the event, and Critical Parameters affected.</p> <p>STA will have no input for the brief.</p>
	SRO	<p>SRO will notify the Shift Manager of the failure and request I&amp;C assistance.</p>

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Event No.: 2

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Event Description: CC RM Fail upscale with failure of HCV-CC-100 to auto close.

**Cue: By Examiner when FRVs have been placed in Auto, and Feed Control Role Player relieved.**

	BOP	<p>RM-M5</p> <p><b>Note:</b> Candidate may refer to this ARP initially in response to the High Alarm.</p> <p><b>NOTE:</b></p> <ul style="list-style-type: none"><li>• If a monitor fails, the automatic functions associated with that monitor should be verified or performed.</li><li>• 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.</li><li>• Tech Spec 3.13.C requires that HCV-CC-100 remain closed if either CC radiation monitor is inoperable.</li></ul> <p>1 VERIFY ALARM - READING ON MONITOR GREATER THAN OR EQUAL TO HIGH SETPOINT</p> <ul style="list-style-type: none"><li>• 1-CC-RI-105, HDR A</li><li>• 1-RM-RI-150C, Pen 1</li></ul> <p><i>Identifies Monitor reading is greater than High Alarm.</i></p>
	BOP	<p>RM-M5</p> <p>2 VERIFY CC HEAD TANK VENT VALVE - CLOSED</p> <p>a) Place HCV-CC-100 in OFF (Unit 1)</p> <p><b>Places HCV-CC-100 in Off.</b></p> <p>b) Place SOV-CC-200 in CLOSE (Unit 2)</p> <p><i>Directs Unit 2 operator to place SOV-CC-200 in close.</i></p>

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Event No.: 2

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Event Description: CC RM Fail upscale with failure of HCV-CC-100 to auto close.

Cue: By Examiner when FRVs have been placed in Auto, and Feed Control Role Player relieved.

	BOP	<p>RM-M5</p> <p><b>NOTE:</b> The following components are the most likely sources of inleakage to the CC System:</p> <ul style="list-style-type: none"> <li>• RCP Thermal Barrier</li> <li>• NRHX</li> <li>• Primary Sample coolers</li> <li>• Excess Letdown HX</li> <li>• HRSS coolers</li> <li>• RHR HX</li> <li>• SFP coolers</li> <li>• RHR Pump Seal coolers</li> </ul> <p>3 MONITOR CC HEAD TANK LEVEL AND CC TEMP FOR INCREASING LEAKAGE TO CC SYSTEM</p>
	BOP	<p>RM-M5</p> <p>4 NOTIFY HP TO DO THE FOLLOWING:</p> <ul style="list-style-type: none"> <li>• Verify area evacuated as necessary</li> <li>• Control access as necessary</li> <li>• Investigate cause</li> <li>• Determine need for setpoint change</li> </ul> <p><i>Notifies HP.</i></p>
	BOP	<p>RM-M5</p> <p>5 PERFORM ( )-OPT-RC-10.0, REACTOR COOLANT LEAKAGE OR ( )-AP-16.00, EXCESSIVE RCS LEAKAGE, AS NECESSARY</p> <p><i>Notifies RO/SRO to perform 1-OPT-RC-10.0, as necessary.</i></p>
	BOP	<p>RM-M5</p> <p>6 DETERMINE LEAKAGE SOURCE BY SAMPLING AS NECESSARY</p> <p><i>Notifies SRO concerning Step.</i></p>
	BOP	<p>RM-M5</p> <p>7 ISOLATE LEAKAGE</p> <p><i>Notifies SRO of need to isolate leakage if discovered by sampling.</i></p>

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Scenario No.: 4

Event No.: 2

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Event Description: CC RM Fail upscale with failure of HCV-CC-100 to auto close.

Cue: By Examiner when FRVs have been placed in Auto, and Feed Control Role Player relieved.

	BOP	RM-M5  8 PROVIDE NOTIFICATIONS AS NECESSARY:  • Shift Supervision • OMO • STA • Health Physics • Instrumentation Department  <i>Inform SRO of required notifications.</i>
		<b>END EVENT 2</b>



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Scenario No.: 4

Event No.: 3

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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	<p>Diagnose the failure using the following:</p> <p>Alarms: BR-D10, PRI GRADE WTR LO HDR PRESS 1D-B4, PRI WTR TO BLEND LO PRESS</p> <p>Indications: 1-PG-P-1A RED indication light OFF. 1-PG-P-1B does not Auto Start as expected.</p> <p><b>NOTE:</b> Actions for 1D-B4, at the end of this section.</p>
	SRO	<p>Directs the BOP to implement the ARP for BR-D10 Annunciator SRO notifies Unit 2 that PG water flow has been lost.</p>
	BOP	<p>NOTE: The standby PG Pump should automatically start when system pressure decreases to less than or equal to 50 psig.</p> <p>1 VERIFY PG SYSTEM PRESSURE LESS THAN OR EQUAL TO 75 PSIG</p> <ul style="list-style-type: none"> <li>PI-BR-121, Pri Wtr Sup Press</li> </ul> <p><i>BOP checks 1-BR-PI-121, PRI WTR SUP PRESS meter on BR Panel and notes pressure has decreased to 0 psig.</i></p>
	BOP	<p>2 VERIFY PG PUMPS - RUNNING AS NECESSARY</p> <ul style="list-style-type: none"> <li>One in Hand</li> <li>One in Auto</li> </ul> <p>Do the following a) Align switches as necessary b) IF PG Pumps off for planned evolution, THEN return to procedure in effect</p>
	RO	<p><b>Starts 1-PG-P-1B by placing control switch in HAND.</b></p>
	BOP	<p><i>Verifies PG pressure returns to Normal pressure. (1D-B4 annunciator clears).</i></p>
	SRO	<p><i>Informs Unit 2 of PG system status. Directs RO to dispatch operator to check status of 1-PG-P-1A breaker.</i></p>

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Scenario No.: 4

Event No.: 3

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Event Description: 1-PG-P-1A trips on overcurrent, 1-PG-P-1B fails to auto start

Cue: When initiated by Team

	BOP	<p>3 CHECK EXCESSIVE USE OF PG WATER AS INDICATED ON FI-BR-126, PRI WTR SUP PPS FLOW</p> <p>Identifies 0 indicated flow on FR-BR-126, PRI WTR SUP PPS FLOW.</p> <p>Step 3 RNO Do the following:</p> <p>a) Locally check PG Pump for proper operation.</p> <p><i>BOP directs Service Building North Yard to check status of 1-PG –P-1A and 1B.</i></p> <p>b) Locally check for system integrity</p> <p><i>Directs Auxiliary Building operator/SB North Yard to check system integrity.</i></p> <p>c) IF system leakage or rupture exists, THEN isolate as necessary AND GO TO Step 6.</p> <p>d) GO TO <b>Step 5</b>.</p>
	BOP	<p>5 VERIFY PROPER OPERATION OF PUMP RECIRCULATION VALVE</p> <p>• 1-BR-PCV-114, PRI SUP WATER PUMPS 1A/B RECIRC HDR</p> <p><i>Identifies PG header pressure normal.</i></p>
	BOP	<p>6 SUBMIT CONDITION REPORT AS NECESSARY</p>
	BOP	<p>7 PROVIDE NOTIFICATION AS NECESSARY</p> <p>• Shift Supervision</p> <p>Notifies SRO that ARP actions complete.</p>
	BOP	<p>Reviews ARP for 1D-B4, PRI WTR TO BLEND LO PRESS.</p>
	BOP	<p>1D-B4</p> <p>1 CHECK PG HDR PRESS - LESS THAN OR EQUAL TO 65 PSIG ON 1-BR- PI-121 AT THE BORON RECOVERY PANEL</p> <p>Identifies 0 psig indicated.</p>

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Event No.: 3

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Event Description: 1-PG-P-1A trips on overcurrent, 1-PG-P-1B fails to auto start

Cue: When initiated by Team

	BOP	1D-B4 2 CHECK PRIMARY GRADE WATER PUMPS - ONE RUNNING  • 1-PG-P-1A • 1-PG-P-1B
	RO	<i>Identifies no PG pump running.</i>
	RO	Step 2 RNO: Start a pump.  <b>Starts 1-PG-P-1B</b>
	BOP	1D-B4 3 CHECK 1-BR-PCV-114 - THROTTLING TO RAISE HDR PRESS
	BOP	<i>Identifies PG Pressure returns to normal.</i>
	BOP	1D-B4 4 CHECK VALVE LINEUP – CORRECT  <i>Identifies PG pump alignment correct.</i>  <i>BOP may direct Auxiliary Building Operator to walk down PG system for abnormalities.</i>
	BOP	1D-B4 5 CHECK PG HDR PRESS – GREATER THAN 65 PSIG  <i>Identifies PG pressure normal and stable.</i>
	BOP	1D-B4 6 NOTIFY SHIFT SUPERVISION  <i>Notifies SRO that ARP review complete.</i>

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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.
		<b>END EVENT #3</b>

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Event No.: 4

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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	<p>Performs the Immediate Actions of 0-AP-53.00</p> <p>[1] <b>Checks redundant indications of pressurizer pressure – NORMAL</b></p> <p>[2] <b>Places the PRZR SPRAY LOOP C Controller in MANUAL closes spray valve.</b></p> <div style="border: 1px solid black; padding: 5px;"> <p><b>Critical Task 1: Close the Spray valve before Reactor trip on low pressure.</b> 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.</p> </div> <p>Announces completion of Immediate Actions of AP-53.00.</p>
	SRO RO	<p>Step 1, 0-AP-53.00</p> <p>CHECK REDUNDANT INSTRUMENT CHANNEL(S) INDICATION – NORMAL.</p> <p>Reports Redundant indications of Pressurizer pressure normal.</p>
	SRO RO	<p>Step 2, 0-AP-53.00</p> <p>PLACE AFFECTED CONTROL(S)/ COMPONENT(S) IN MANUAL CONTROL AND STABILIZE PARAMETER USING REDUNDANT INDICATION</p> <p>Reports 1-RC-PCV-1455B, Spray from Loop C in manual and closed.</p>
	SRO	<p>The SRO will lead a transient brief. During the brief, the failure of 1-RC-PCV-1455B, Spray from Loop C will be discussed.</p> <p>The RO/BOP will report Annunciators received related to the event, and Critical Parameters affected.</p> <p>STA will have no input for the brief; monitor RCS pressure using PCS if SRO directs.</p>
	SRO RO	<p>Step 3, 0-AP-53.00</p> <p>* VERIFY REACTOR POWER – LESS THAN OR EQUAL TO 100%</p> <p>Reports indicated reactor power using PR Control Board Indicators.</p>

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Event Description: Pressurizer Spray valve fails open.

Cue: By Examiner.

	SRO	<p>Step 4, 0-AP-53.00</p> <p><b>CAUTION:</b> If Reactor power has been affected by a secondary transient, Turbine adjustment may be needed to control Tave.</p> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>Step 4 failures are listed in order of performance priority. Only the failed instrument/control and associated step number should be read aloud.</li> <li>When the affected instrument/controller malfunction(s) has been addressed by this procedure, recovery actions should continue at Step 11.</li> </ul>
	<p>SRO</p> <p>RO</p>	<p>Step 4, 0-AP-53.00, Continued</p> <p>* DETERMINE THE FAILED INSTRUMENT / CONTROL AND GO TO APPROPRIATE STEP OR PROCEDURE:</p> <ul style="list-style-type: none"> <li>PRZR Pressure Control, Step 5</li> </ul>
	<p>SRO</p> <p>SRO</p> <p>RO</p>	<p>Step 5, 0-AP-53.00</p> <p><b>NOTE:</b> RCS pressure decrease will cause a slight lowering in RCS Tave due to negative reactivity from the moderator pressure coefficient.</p> <p>CHECK PRZR SPRAY VALVE CONTROLLERS – NORMAL</p> <p>Reports No, PRZR Spray Valve Controller is NOT Normal.</p>
	<p>SRO</p> <p>RO</p>	<p>Step 5 RNO, 0-AP-53.00</p> <ol style="list-style-type: none"> <li>Place failed controller in Manual.</li> <li>Restore pressure to normal and stabilize.</li> <li>Check or stabilize Turbine load.</li> <li>If manual control is ineffective or unavailable, <u>THEN</u> GO TO 1-AP-31.00.</li> <li>If RCS pressure returns to normal <u>THEN</u> do the following: <ol style="list-style-type: none"> <li>Maintain stable Turbine load until pressure control system is returned to normal.</li> <li>If no other instrumentation failure exists, <u>THEN</u> GO TO Step 11. Otherwise, GO TO Step 7.</li> </ol> </li> </ol> <p>Reports that Spray valve controller is in Manual. Pressure is stable or returning to normal.</p> <p>GO TO step 11.</p>
	<p>SRO</p> <p>RO</p>	<p>Step 11, AP-53.00</p> <p>11. Check Calorimetric – Functional IAW 1-OPT-RX-001, Attachment 4.</p> <p><i>Determines that Calorimetric is functional.</i></p> <p>Note: 1-OPT-RX-001, Attachment 4 is included after step 15.</p>

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Event Description: Pressurizer Spray valve fails open.

Cue: By Examiner.

	SRO	0-AP-53.00
	STA	<p>12. REVIEW THE FOLLOWING</p> <ul style="list-style-type: none"> <li>• Tech Spec 3.7</li> </ul> <p><i>Determines Tech Spec 3.7 is met.</i></p> <p><i>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.</i></p> <ul style="list-style-type: none"> <li>• VPAP-2802, NOTIFICATIONS - None</li> <li>• TRM SECTION 3.3, INSTRUMENTATION – None.</li> <li>• Reg. Guide 1.97: None</li> <li>• EP-AA-303, EQ. IMPORTANT TO EMERGENCY RESPONSE - None</li> </ul> <p><i>The STA reports completion of review and has discussed the results with the Shift Manager.</i></p>
	SRO	0-AP-53.00
	BOP	13 CHECK ADDITIONAL INSTRUMENT / CONTROLLER MALFUNCTION – EXISTS
	SRO	Reports no additional failure exists
	SRO	GOES TO Step 15
	SRO	0-AP-53.00
	SRO	<p>15. PROVIDE NOTIFICATIONS AS NECESSARY:</p> <ul style="list-style-type: none"> <li>• Shift Supervision</li> <li>• OMOC</li> <li>• STA (PRA determination)</li> <li>• I&amp;C</li> </ul>

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Event Description: Pressurizer Spray valve fails open.

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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.



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Event Description: Pressurizer Spray valve fails open.

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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			

		<b><u>END EVENT #4</u></b>
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Event No.: 5

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Event Description: Loss of 1G Screenwell Transformer.

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
	BOP	<p>Diagnoses failure using the following indications/alarms:</p> <ul style="list-style-type: none"> <li>• VSP-J6 – 230 KV HSE TRBL</li> <li>• VSP L7 - LLIS TROUBLE <ul style="list-style-type: none"> <li>• PCS Alarms: <ul style="list-style-type: none"> <li>• IS-C8 – S/W NO.1 OR NO. 2 XFMR TRBL</li> <li>• IS-D9 - XFMR NO. 1 DIFF OPER</li> </ul> </li> <li>• PCS screens indicating a loss of Unit 1 CW pumps</li> </ul> </li> </ul> <p><i>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 &amp; 2G busses then initiates 0-AP-12.01.</i></p>
	SRO  RO	<p>Enters 0-AP-12.01, LOSS OF INTAKE CANAL LEVEL</p> <p><b>NOTE:</b> EIPs may be applicable.</p> <p>1. CHECK ENTRY INTO THIS PROCEDURE-FROM AN EOP OR AN AP TO RESTORE SW FLOW TO THE CCHXs</p> <p>Step 1 RNO actions: GO TO Step 3.</p> <p>Determines entry is not from an EOP or an AP to restore SW flow to the CCHXs and goes to step 3</p>
	SRO   RO BOP	<p>Caution and Note prior to step 3</p> <p><b>CAUTION:</b></p> <ul style="list-style-type: none"> <li>• 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%.</li> <li>• Abnormal Procedure ( )-AP-14.00, LOSS OF CONDENSER VACUUM, should be reviewed if turbine vacuum can NOT be maintained.</li> </ul> <p><b>NOTE:</b> If both units are at power, it may be necessary to trip one unit to reduce the rate of Intake Canal inventory loss.</p> <p>*3. TRY TO MAINTAIN INTAKE CANAL LEVEL:</p> <ul style="list-style-type: none"> <li>• <b>Throttle Waterboxes</b></li> <li>• Reduce Unit load as necessary to maintain Condenser vacuum</li> </ul>

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**Cue: By Examiner.**

	SRO RO/BOP	AP-12.01 4. CHECK INTAKE CANAL LEVEL – LOWERING <i>RO/BOP reports canal level trending down</i> Goes to step 8.
	SRO RO/BOP SRO	AP-12.01 5. CHECK INTAKE CANAL LEVEL - LOWERING DUE TO SUSPECTED BREACH • Local observation • Canal level trend <i>Reports Canal level lowering due to loss of CW pumps</i> Goes to Step 8
	SRO SRO BOP	AP-12.01 8. START CIRC WATER PUMPS AS REQUIRED FROM THE MCR IAW ATTACHMENT 3 Directs BOP to perform attachment 3. <div style="border: 2px solid black; padding: 10px; margin: 10px 0;"><b>Critical Task 2:</b> If the BOP re-starts the Unit 1 CW pumps prior to the required wait time of five (5) minutes, the CW pump(s) will trip on overcurrent. The five minute wait period is required to allow CW backflow through the CW pump to cease; this backflow causes the CW pump(s) to rotate in the reverse direction. This CT is based on the Crew demonstrating non-compliance with procedural Notes designed to prevent damage to the CW pump, which can lead to power escalation limitations for Unit 1 and potentially affect full power operation of Unit 2. An operations representative will be available for consult during the Scenario.</div> AP-12.01, Attachment 3: 1. <u>STARTING CIRCULATING WATER PUMPS FROM THE MCR OR LLIS</u> <b>CAUTION:</b> To prevent long term degradation of electrical cables between 1G / 2G Transformers and the associated 1G / 2G 4KV bus, when the 1G & 2G 4KV buses are crosstied with only one Screenwell Transformer supplying both buses, no more than 7 CW pumps should be running. <b>NOTE:</b> • If starting circ water pumps that have just tripped, 5 minutes must be allowed for coastdown before starting. • If loss of power is due to a loss of transformer or is feeder related, the bus voltmeter will read 0 VAC by PCS due to voltmeter tapping off upstream of ()-EP-BKR-()5G1.

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Event Description: Loss of 1G Screenwell Transformer.

Cue: By Examiner.

		<p>AP-12.01, Attachment 3, Continued</p> <ul style="list-style-type: none"><li>a. Check 4160 VAC G bus energized by Normal Supply or X-Tie.</li><li>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.</li><li>c. <b>Select Soft Control for the pump to be started. N/A if local start to occur.</b></li><li>d. <b>Enable Soft Control and verify red border. N/A if local start to occur.</b></li><li>e. <b>Start the selected Circulating Water Pump by pushing the START button.</b> IF local start to occur due to inoperable PCS, THEN start CW pumps locally.</li><li>f. Check amps indicated for pump started.</li><li>g. Direct Outside Operator to perform local operational checks IAW OP-48.1.1.</li></ul> <p>Note: BOP will wait 5 minutes before REMOTELY starting all CW pumps that had previously tripped.</p>
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Event Description: Loss of 1G Screenwell Transformer.

Cue: By Examiner.

	SRO	AP-12.01, Notes prior to step 9
	BOP	<p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• A PIN Number and a Key are required for entry into the ESW Pump house.</li> <li>• A Key is required for entry into the ESW Pump house and the Low Level Switchgear Room.</li> <li>• There are no restrictions on the number of CW pumps which may be started with the 1G and 2G buses crosstied.</li> </ul> <p>9. SEND OPERATOR TO LOW LEVEL INTAKE TO PERFORM THE FOLLOWING PROCEDURES:</p> <ul style="list-style-type: none"> <li>• Attachment 2, LOW LEVEL INTAKE RESPONSES</li> <li>• 0-OP-SW-002, EMERGENCY SERVICE WATER PUMP OPERATION</li> <li>• OP-48.1.1, STARTING ANY CW PUMP</li> </ul>
	SRO/RO	<p>AP-12.01</p> <p>10. CHECK INTAKE CANAL LEVEL – GREATER THAN TRIP SETPOINT</p> <ul style="list-style-type: none"> <li>• Annunciator ( )F-G1, INTK CANAL LO LVL TRIP - NOT LIT</li> <li>• Intake Canal level – GREATER THAN 23.5 FEET</li> </ul>
	SRO/RO	<p>AP-12.01</p> <p>11. CHECK CW LOSS - SUSTAINED WITH NO EXPECTATION OF RECOVERY</p> <p>Step 11 RNO actions: GO TO Step 13.</p>
	SRO	<p>AP-12.01</p> <p>13. CONTINUE TO REDUCE UNIT LOAD AS NECESSARY TO MAINTAIN VACUUM</p> <p>Team will determine not necessary to reduce turbine load.</p> <p><b>NOTE:</b> Gravel Neck makeup is a portable system placed near the Intake Canal. By design, makeup to Gravel Neck cannot be supplied with the Intake Canal less than 23.5 ft. Gravel Neck notifies the MCR prior to use.</p> <p>14. CHECK GRAVEL NECK MAKEUP FROM INTAKE CANAL – IN SERVICE. GO TO STEP 16</p> <p>16. CHECK INTAKE CANAL LEVEL – STABLE OR RISING</p> <p>17. GO TO STEP 32</p>

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Event Description: Loss of 1G Screenwell Transformer.

**Cue: By Examiner.**

	SRO	AP-12.01 32. NOTIFY THE FOLLOWING: <ul style="list-style-type: none"><li>• OM on call</li><li>• Manager Nuclear Operations</li><li>• STA</li></ul>
	SRO    RO	AP-12.01, Note prior to step 33  <b>NOTE:</b> Intake canal level must be maintained above 17.2 FT for adequate RS HX inventory.  33. CHECK INTAKE CANAL LEVEL - RISING  34. CHECK INTAKE CANAL LEVEL - GREATER THAN 17.2 FT
	SRO    RO	AP-12.01, Note prior to step 35  <b>NOTE:</b> 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. THROTTLER OPEN CC HX SW OUTLET VALVES AS NECESSARY TO LOWER CC TEMPERATURE  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
		<b>End Event #5</b>

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Event No.: 6

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Event Description: Loss of Offsite Power, ECA-0.0

Cue: By Examiner.

	Crew	<p>Diagnoses loss of power to both Unit 1 Emergency AC busses.</p> <p>Crew may directly enter 1-ECA-0.0. Crew may perform 1-E-0 and enter 1-ECA-0.0 at step 3 of E-0. Either way is acceptable.</p>
	RO	<p>ECA-0.0, Loss of All AC Power</p> <p>Performs ECA-0.0 Immediate Actions, OR SRO Prompts ECA-0.0 IAs.</p> <p><b>NOTE Prior to Step 1:</b> CSF Status Trees should be monitored for information only. FRs should NOT be implemented.</p> <p>[1] CHECK REACTOR TRIP: a) Manually trip reactor b) Check the following: Reactor trip and bypass breakers - OPEN Neutron Flux – LOWER</p> <p>Reports “Reactor Tripped”</p>
	SRO	<p>Acknowledges “Reactor Tripped”</p>
	RO	<p>ECA-0.0, Loss of All AC Power</p> <p>[2] CHECK TURBINE TRIP: a) Manually trip the turbine b) Close MSTVs</p> <p><b>Closes MSTVs</b> Reports “Turbine Tripped”, Immediate Actions of ECA-0.0 complete.</p>
	SRO	<p>Acknowledges “Turbine Tripped” and completion of ECA-0.0 Immediate Actions.</p> <p><b>Note:</b> MSTVs may have been closed on E-0, Step 2.</p>

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Event Description: Loss of Offsite Power, ECA-0.0

Cue: By Examiner.

		ECA-0.0
SRO	3. CHECK RCS ISOLATION:	
RO	a) Letdown isolation valves - CLOSED	
	1-CH-LCV-1460A – <b>Manually Closes Valve</b>	
	1-CH-LCV-1460B – <b>Manually Closes Valve</b>	
	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	



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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).
		<b>CT-3: Establish AFW Flow during SBO.</b> Establish greater than 350 gpm AFW flow before wide range level in any 2 steam generators is less than 7%.

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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 <u>Unit 2</u> J Bus, except with a valid <u>Unit 1</u> 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	<b>Places #1 EDG in EXERCISE.</b>
	SRO	2) Start EDG.
	BOP	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.

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Event Description: Loss of Offsite Power, ECA-0.0

Cue: By Examiner.

	SRO RO/BOP SRO	<p>ECA-0.0, Step 5 (Continued)</p> <p>c) Check AC emergency buses - AT LEAST ONE ENERGIZED</p> <p>Reports No, 1H and 1J emergency busses are NOT energized.</p> <p>1) IF both EDGs <u>NOT</u> running THEN initiate 0-AP-17.06, AAC DIESEL GENERATOR – EMERGENCY OPERATIONS <u>AND</u> GO TO Step 6.</p> <div><p><b>CT - 4:</b> Energize the 1J emergency bus from the AAC diesel within 10 minutes of entering AP-17.06. Based on SPS-CT-1, Re-energize an Emergency Bus on the AAC DG. (WOG E-0-C). Critical Task start time <b>begins</b> when the Crew enters 0-AP-17.06, and Critical Task stop time <b>ends</b> when AAC DG is loaded on the 1J bus.</p></div> <p><b>NOTE:</b> 0-AP-17.06 Actions begin on Page 57.</p>
	SRO RO SRO	<p>ECA-0.0, Step 6</p> <p>6. CHECK LOSS OF EMERGENCY BUSES - DUE TO APPENDIX R FIRE</p> <p>Reports No, Loss due to a loss of off-site power.</p> <p>Goes to Step 8.</p>

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Event Description: Loss of Offsite Power, ECA-0.0

Cue: By Examiner.

		ECA-0.0, Step 8
	SRO	<b>Caution Prior to Step 8:</b> 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:
		<b>Air recirc fans</b> ("A" & "C" CTMT Recirc Fans)
		<b>LHSI pumps</b>
		<b>OSRS pumps</b>
		<b>ISRS pumps</b>
		<b>CS pumps</b>
		<b>BC pumps</b>
		<b>PRZR heaters</b> ("A" PRZR heater)
		<b>CHG pumps</b>
		<b>MD AFW pumps</b>
		<b>CN pumps</b>
		<b>Filter exhaust fans</b> (1-VS-F-58A)
		<b>CC pumps</b>
	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.

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Event Description: Loss of Offsite Power, ECA-0.0

Cue: By Examiner.

	SRO	ECA-0.0, Step 9
	RO	<p>9. LOCALLY ISOLATE RECP SEALS.</p> <ul style="list-style-type: none"> <li>• RCP Seal Return, 1-CH-MOV-1381</li> <li>• RCP Seal injection, 1-CH-MOV-1370</li> <li>• Seal Injection needle valves, 1-CH-294, 1-CH-297, 1-CH-300.</li> <li>• Thermal barrier CC, 1-CC-96.</li> </ul> <p><i>RO directs Field operator to close, 1-CH-MOV-1381, 1-CH-MOV-1370, Seal Injection valves 1-CH-294, 1-CH-297, and 1-CH-300; and 1-CC-96.</i></p>
	SRO	ECA-0.0 Step 10
	RO	<p>10. CHECK COMMUNICATIONS CAPABILITY.</p> <ul style="list-style-type: none"> <li>• Gaitronics or</li> <li>• <b>Station Radios</b></li> </ul>
	SRO	ECA-0.0 Step 11
	RO	<p>11. TAKE ACTION TO CONSERVE INTAKE CANAL INVENTORY.</p> <p>a. Check Unit 2J bus – ENERGIZED. <i>RO reports 2J IS ENERGIZED.</i></p> <p>b. Check closed or close condenser circ water isolation valves:</p> <ul style="list-style-type: none"> <li>• <b>1-CW-MOV-100A</b></li> <li>• <b>1-CW-MOV-106B</b></li> <li>• <b>1-CW-MOV-100C</b></li> <li>• <b>1-CW-MOV-106D</b></li> </ul> <p>c. Initiate SW isolation IAW Attachment 4.</p> <p><i>RO closes Circ Water isolation valves.</i></p> <p><i>RO directs field operator to initiate SW isolation IAW Attachment 4</i></p>
	SRO	ECA-0.0 Step 12
		<p>Caution before Step 12</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> </ul> <p>12. TRY TO LOCALLY RESTORE AC POWER.</p> <p>a. Initiate AP-17 series procedures to restore EDGs.</p> <p>b. Initiate 0-AP-10.08, STATION POWER RESTORATION, to restore power to transfer buses.</p> <p>c. Initiate backfeed alignment.</p> <p>Note: At this time power should be restored to 1J bus from the AAC Diesel Generator</p>

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Event Description: Loss of Offsite Power, ECA-0.0

Cue: By Examiner.

	SRO  RO/BOP	<p>ECA-0.0 Step 33.</p> <p>33. CHECK IF 4160V AC EMERGENCY POWER IS RESTORED.</p> <p>a. AC emergency buses – AT LEAST ONE ENERGIZED FROM THE FOLLOWING.</p> <ul style="list-style-type: none"> <li>• Off Site Source</li> <li>• Associated EDG</li> <li>• <b>AAC Diesel Generator</b></li> </ul> <p>b. Check FSGs – Any implemented. <i>No, go to Step 33.d</i></p> <p>c. Perform 1-FSG-13. <i>Not needed goes to next step.</i></p> <p>d. Check Bus 1H or 1J ENERGIZED FROM ANY OF THE FOLLOWING.</p> <ul style="list-style-type: none"> <li>• Off Site Source</li> <li>• Associated EDG</li> <li>• <b>AAC Diesel Generator</b></li> </ul> <p>Goes to Step 34.</p>
	SRO  RO	<p>ECA-0.0 Step 34</p> <p>34. MANUALLY OR LOCALLY CONTROL SG PORVS TO STABILIZE SG PRESSURES.</p> <p><i>RO checks SG PORVs and adjusts if necessary. (Should not be necessary at this time)</i></p>
	SRO  RO	<p>ECA-0.0 Step 35</p> <p>35. CHECK FOLLOWING EQUIPMENT LOADED ON AC EMERGENCY BUS</p> <ul style="list-style-type: none"> <li>• CHG pump SW pump</li> <li>• CHG pump CC pump</li> <li>• 480 VAC MCCs</li> <li>• Vital bus UPS</li> <li>• Gaitronics</li> <li>• One control room chiller(Two Control Room Chillers if any MCR or ESGR temperature indicator greater than 84°F, monitor approximately every hour)</li> <li>• One Unit 1 Control Room AHU and one Unit 2 Control Room AHU.</li> <li>• One Unit 1 ESGR AHU and one Unit 2 ESGR AHU</li> <li>• Aux Vent filtered exhaust fan</li> <li>• Turning Gear oil pump</li> <li>• Turbine Turning Gear</li> <li>• Common Radiation monitoring cabinets</li> <li>• Semi Vital Bus</li> <li>• IA Compressor.</li> </ul> <p><i>RO checks all equipment available or directs field operator to start equipment as necessary.</i></p>

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Event Description: Loss of Offsite Power, ECA-0.0

Cue: By Examiner.

		<p>ECA-0.0 Step 36</p> <p>Note before Step 36.</p> <p>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.</p> <p>36. IDENTIFY RECOVERY PROCEDURE.</p> <ul style="list-style-type: none"><li>a. Check RCS subcooling based on CETCs – GREATER THAN 30°F [85 °F].</li><li>b. Check PRZR level – GREATER THAN 22% [50%].</li><li>c. Check SI equipment status:<ul style="list-style-type: none"><li>• SI equipment HAS REMAINED SECURED UPON AC POWER RESTORATION.</li><li>• SI flow – isolated.</li></ul></li><li>d. GO TO 1-ECA-0.1, LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED.</li></ul> <p>The Scenario may be terminated when Lead Evaluator determines.</p>
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Event Description: Loss of Offsite Power, ECA-0.0

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
	BOP	<p>0-AP-17.06, AAC DG Generator – Emergency Operations</p> <p>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.</p> <p>1. CHECK EMERGENCY BUSES 1J AND 2H - EITHER OR BOTH DEENERGIZED</p> <p>Yes, both de-energized.</p> <div style="border: 1px solid black; padding: 5px;"> <p><b>CT-4:</b> Energize the 1J emergency bus from the AAC diesel within 10 minutes of entering AP-17.06. Based on SPS-CT-1, Re-energize an Emergency Bus on the AAC DG. (WOG E-0-C). Critical Task start time <b>begins</b> when the Crew enters 0-AP-17.06, and Critical Task stop time <b>ends</b> when AAC DG is loaded on the 1J bus.</p> </div>
	BOP	<p>0-AP-17.06</p> <p>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.</p> <p>2. GO TO THE APPROPRIATE STEP BASED ON DESIRED USE OF THE AAC DIESEL GENERATOR</p> <p>Step 3, Only Bus 1J to be energized</p> <p>Goes to Step 3.</p>
	BOP	<p>0-AP-17.06</p> <p>3. CHECK AAC DIESEL GENERATOR - AVAILABLE AND RUNNING</p> <p>Annunciator 0-WD-C2, AAC SYSTEM AVAILABLE BUS 1D - LIT AND Annunciator 0-WD-D1, AAC GENERATOR TRIP - NOT LIT</p> <p>Locates to the Waste Disposal Board and verifies annunciator status as above.</p>



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Event Description: Loss of Offsite Power, ECA-0.0

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	BOP	<p>0-AP-17.06</p> <p><b>CAUTION Prior to Step 4:</b> An overcurrent fault on 15D1 will prevent 0-AAC-BKR-05L3 from closing.</p> <p><b>NOTE Prior to Step 4:</b> Annunciator 0-WD-C2, AAC SYSTEM AVAILABLE BUS 1D, should go out when 0-AAC-BKR-05L3 closes.</p> <p>Acknowledge CAUTION and NOTE.</p> <p>4. ENERGIZE TRANSFER BUS D BY CLOSING 0-AAC-BKR-05L3</p> <p>a) At Unit 1 EDG 3 Control Panel, place Transfer Switch NORMAL/AAC, 0-AAC-43-15J8, in AAC position</p> <p><b>Locates to the #3 EDG Panel and places Switch in AAC Position.</b></p> <p>b) Check Annunciator 1K-D3, BUS 1D UNDERVOLT - NOT LIT</p> <p>Verifies annunciator 1K-D3 – Not LIT.</p> <p>:</p>
	BOP	<p>0-AP-17.06</p> <p>5. CHECK OR PLACE THE FOLLOWING LOADS IN PTL</p> <p>a) Put the following switches in PTL / LOCKOUT:</p> <p><b>1-VS-F-1B (14J7)</b>  <b>1-SI-P-1B (14J3)</b>  <b>1-RS-P-2B (14J8)</b>  <b>1-RS-P-1B (14J4)</b>  <b>1-CS-P-1B (14J5)</b>  <b>PRZR Heater Group A (14J9)</b>  <b>1-CH-P-1B (15J5)</b>  <b>1-CH-P-1C (15J2, ALT)</b>  <b>1-FW-P-3B (15J4)</b>  <b>1-CC-P-1B (15J10)</b>  1-VS-F-58B, if powered from Alternate source, 14J13</p> <p>Places control switches in PTL / Lockout (bolded above).</p> <p>b) Check breakers open by checking breaker position indicating lights - RED LIGHTS NOT LIT</p> <p>1-CS-P-1B (14J-5)  1-RS-P-1B (14J-4)</p> <p>Verifies indicating lights OUT.</p>

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Event Description: Loss of Offsite Power, ECA-0.0

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	BOP	<p>0-AP-17.06, Step 5 c)</p> <p>c) Check breaker open by checking breaker position indicating lights - RED LIGHTS NOT LIT</p> <p>1-FW-P-3B (15J4)</p> <p>Identifies Red Light NOT LIT; Goes to Step 5.</p>
	BOP	<p>0-AP-17.06 Step 6</p> <p>6. ENERGIZE EMERGENCY BUS 1J</p> <p>a) <b>Place the Sync switch for 15J8 in ON</b></p> <p>b) Check breaker 15J3 is OPEN</p> <p><b>Note:</b> May reset amber light by taking 15J8 control switch to Trip and return to Auto-After-Trip position.</p> <p>Notifies the Team that 1J Emergency Bus will be energized.</p> <p>c) <b>Close breaker 15J8 by holding control switch in the Closed position for at least five seconds</b></p> <p><b>CT-4 Stop Time:</b> _____</p> <p>d) <b>Place the Sync switch for 15J8 in OFF</b></p> <p>Performs actions bolded above. Reports that 1J Bus has been Energized.</p>
		<p><b>End EVENT #6</b></p> <p><b>End SCENARIO</b></p>

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FOLDOUT PAGES FOR REFERENCED PROCEDURES

CONTINUOUS ACTIONS PAGE FOR 1-ECA-0.01. 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 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

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## SIMULATOR OPERATOR'S GUIDE

## Simulator Scenario Checklist

- ☐ Perform Simulator Turnover Pre-session, and Post-session Checklist prior to the first Scenario of the day.
- ☐ Perform Simulator Turnover Post-session Checklist after the last Scenario of the day.
- ☐ Ensure Feed Control Role Player has been briefed concerning expectations.

**Perform/Verify Simulator Setup:**

- ☐ ☐ ☐ Recall IC -404 [T-Rex: 425] (~5%) **and implement TRIGGER #30 to activate all passive malfunctions and verify Trigger #30 implemented.**
- ☐ ☐ ☐ Verify Semi-Vital Bus and Power Source Magnet on "J" bus supply.
- ☐ ☐ ☐ Verify 1-SI-P-1A in Pull-To-Lock, with red (tagged) magnet
- ☐ ☐ ☐ Verify 4 CW pumps running on Unit 1, 3 CW pumps running on Unit 2
- ☐ ☐ ☐ Verify BC, Remotes, BC\_505\_INST\_ASST, AUTO
- ☐ ☐ ☐ Open SimView [Insight] and add the following points
- ☐ ☐ ☐ asp\_ao\_off
- ☐ ☐ ☐ Verify 1K-F2, MN XFMR TROUBLE, Clear.
- ☐ ☐ ☐ **Enter/Verify the following MALFUNCTIONS:**

Malfunction	Delay	Ramp	Trigger	Value	Final	Trigger Type (Auto or Manual)
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
CW0101 1-CW-P-1A TRIP ON OVERCURRENT	5	0	20	FALSE	TRUE	AUTO
CW0102 1-CW-P-1B TRIP ON OVERCURRENT	5	0	21	FALSE	TRUE	AUTO
CW0104 1-CW-P-1D TRIP ON OVERCURRENT	5	0	22	FALSE	TRUE	AUTO
CW0103 1-CW-P-1C TRIP ON OVERCURRENT	5	0	23	FALSE	TRUE	AUTO

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## SIMULATOR OPERATOR'S GUIDE

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
FP0301 FACP07 ALARM HORN FAILURE	0	0	30	FALSE	TRUE	ACTIVE
FP0302, FPS SPEAKER FAILURE	0	0	30	FALSE	TRUE	ACTIVE

☐ ☐ ☐ Enter/Verify the following REMOTE FUNCTIONS:

Description	Delay	Ramp	Trigger	Value	Final	Trigger Type (Auto or Manual)
LW_130 CONTAMINATION DRAIN PUMP A RECIRC	10	600	7	0	100	MAN
SA_223 SERVICE AIR COMPRESSOR SA-C-2C DISCHARGE ISO VALVE	2:00	1:00	11	0	100	MAN
CHMOV381 CH-MOV-381 RCP SEAL RETURN	2:00	0	13	100	0	MAN
CHMOV370 CH-MOV-370 RCP SEAL INJECTION	2:00	0	13	100	0	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
CC_96 THERMAL BARRIER RCP RTRN VV	2:00	0	13	100	0	
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
SIP1A_BKRPOS, 1-SI-P-1A BKR POSITION	0	0	30	0	2	MAN

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## SIMULATOR OPERATOR'S GUIDE

☐ ☐ ☐ Enter/Verify the following EVENT TRIGGERS:

AUTO TRIGGER SETUP	DESCRIPTION
20	Trigger07 & lw_130 > 0.1 & lw_130 < 0.5 & CWP1A_BKR Trip CW-P-1A if started < 5 minutes after loss of Bus Power
21	Trigger07 & lw_130 > 0.1 & lw_130 < 0.5 & CWP1B_BKR Trip CW-P-1B if started < 5 minutes after loss of Bus Power
22	Trigger07 & lw_130 > 0.1 & lw_130 < 0.5 & CWP1D_BKR Trip CW-P-1D if started < 5 minutes after loss of Bus Power
23	Trigger07 & lw_130 > 0.1 & lw_130 < 0.5 & CWP1C_BKR Trip CW-P-1C if started < 5 minutes after loss of Bus Power

Trigger Summary:

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
20	AUTO	TRIP 1-CW-P-1A IF START < 5 MINUTES
21	AUTO	TRIP 1-CW-P-1B IF START < 5 MINUTES
22	AUTO	TRIP 1-CW-P-1D IF START < 5 MINUTES
23	AUTO	TRIP 1-CW-P-1C IF START < 5 MINUTES
30	MAN	DISABLE FW-P-2 AUTO START
30	MAN	DISABLE CC-HCV-100 AUTO CLOSURE
30	MAN	FP0301, Disable FP Alarm
30	MAN	FP0302, Disable FPS Speaker
30	MAN	SIP1A_BKPOS RACK_OUT

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## SIMULATOR OPERATOR'S GUIDE

**Verify the following control room setup:**

- ☐ ☐ ☐ Place the simulator in RUN and verify normal 100% power operation indications.
- ☐ ☐ ☐ Verify Red Magnets on the following components: **1-SI-P-1A**
- ☐ ☐ ☐ Verify All pink magnets collected from previous scenarios.
- ☐ ☐ ☐ Verify vertical board PCS monitor on ALARM SCREEN.
- ☐ ☐ ☐ Reset ICCMs.
- ☐ ☐ ☐ Verify all calcalc points are displayed on PCS: U9103, U9104, U9105V.
- ☐ ☐ ☐ Verify Component Switch Flags; 1-VS-F-58A and 1-VS-F-58B switches (AUTO AFTER STOP).
- ☐ ☐ ☐ Verify Brass Caps properly placed (Hi-Hi CLS, MSTVs, CH-MOV-1350, CW and SW MOVs, CTMT Hogger suction, CNDSR Vacuum breaker).
- ☐ ☐ ☐ Radiation Monitors all clear.
- ☐ ☐ ☐ Verify SG PORVs set for 1035 psig.
- ☐ ☐ ☐ Verify "D" bank rod height at 149 steps and Bank Overlap Counter at 533.
- ☐ ☐ ☐ Advance Charts.
- ☐ ☐ ☐ Verify Containment Instrument Air Compressors are on Inside Suction (all RMs reset).
- ☐ ☐ ☐ Verify SYNC keys in proper place.
- ☐ ☐ ☐ Verify BOL reactivity plans and benchboard Reactivity Placard is current.
- ☐ ☐ ☐ Reset Blender Integrators for Boric Acid to 100 and PG to 1000.
- ☐ ☐ ☐ Verify Simulator "Session In Progress" light is turned ON.
- ☐ ☐ ☐ Verify no persons are logged onto network computer to ensure no procedures displayed.
- ☐ ☐ ☐ Verify PCS time matches Sim time.
- ☐ ☐ ☐ Spot check all ARPs are clean, **verify** the following ARPs are clean.

<input type="checkbox"/> 1C-B8	<input type="checkbox"/> 1D-B4	<input type="checkbox"/> VSP-J6	<input type="checkbox"/> VSP-L7
<input type="checkbox"/> 0-RM-L5	<input type="checkbox"/> 0-RM-M5	<input type="checkbox"/> 0-BR-D10	<input type="checkbox"/>

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## SIMULATOR OPERATOR'S GUIDE

☐ ☐ ☐ Verify CLEAN copies of the following procedures are in place.

<input type="checkbox"/> 1-GOP-1.8	<input type="checkbox"/> 1-OP-TM-001	<input type="checkbox"/> 1-OP-CH-021	<input type="checkbox"/> 0-OPT-RM-001
<input type="checkbox"/> 1-AP-31.00	<input type="checkbox"/> 0-AP-12.01	<input type="checkbox"/> 0-AP-17.06	<input type="checkbox"/> 1-ECA-0.0
<input type="checkbox"/> 0-AP-53.00	<input type="checkbox"/> Ramp Plan	<input type="checkbox"/>	<input type="checkbox"/>



**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.**

	<b>TEAM 1</b>	<b>TEAM 2</b>	<b>TEAM 3</b>
<b>SRO</b>			
<b>RO</b>			
<b>BOP</b>			

**Ask for and answer questions.**

## SIMULATOR OPERATOR'S GUIDE

Conduct shift turnover:

The initial conditions.

Unit 1 currently operating at ~5% reactor Power. Semi-Vital Bus is on the "J" Supply.

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. The Extra Reactor Operator will perform these checks.
- 1-SI-P-1A is tagged out for breaker work (8 hours ago). 72 hour TS clock in effect. Return to service expected later this shift.

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 1487 ppm. 8.0 weight percent in the "A" BAST. Blend is in the Blender.

## SIMULATOR TURNOVER CHECKLIST

Pre Session Checks:			
Safety Injection Section (Magnets)	CW/SW Section	RCS Section	CVCS
SI-MOV-1865A <input type="checkbox"/> R <input type="checkbox"/> G SI-MOV-1865B <input type="checkbox"/> R <input type="checkbox"/> G SI-MOV-1865C <input type="checkbox"/> R <input type="checkbox"/> G SI-MOV-1869A <input type="checkbox"/> R <input type="checkbox"/> G SI-MOV-1869B <input type="checkbox"/> R <input type="checkbox"/> G SI-MOV-1890A <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> T/O SI-MOV-1890B <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> T/O SI-MOV-1890C <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> T/O Brass Cap <input type="checkbox"/> CLS TR A <input type="checkbox"/> CLS TR B	Brass Caps SW MOVs <input type="checkbox"/> 103A <input type="checkbox"/> 103B <input type="checkbox"/> 103C <input type="checkbox"/> 103D CW MOVs <input type="checkbox"/> 106A <input type="checkbox"/> 106B <input type="checkbox"/> 106C <input type="checkbox"/> 106D CW Inlet Throttle Plaques (10%) <input type="checkbox"/> 100A <input type="checkbox"/> 100B <input type="checkbox"/> 100C <input type="checkbox"/> 100D CTMT Hogger Suction Cap <input type="checkbox"/>	Tcold Loop Stop Pos (R – O) <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C Loop Bypass Valves (G – C) <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C Thot Loop Stop Pos (R - O) <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C SFP PPs Pwr <input type="checkbox"/> Norm <input type="checkbox"/> Alt PZR Level Recorder <input type="checkbox"/>	Core Life Plaque <input type="checkbox"/> Ramp Plan Book <input type="checkbox"/> OP-RX-010 Book <input type="checkbox"/> PG Int Set 1000 <input type="checkbox"/> BA Int Set 100 <input type="checkbox"/> Tavg/Tref Rec. <input type="checkbox"/> NI-NR-B <input type="checkbox"/> Group Step Ctrs <input type="checkbox"/> CERPIs <input type="checkbox"/> CH-MOV-1350 <input type="checkbox"/>
Main Steam/Feedwater	Electrical/VSP	PCS	RM/WD/BR
SG PORVs Set <input type="checkbox"/> MSTV Caps <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C SF/FF Rec Scale <input type="checkbox"/> Cond Vac Bkr Cap <input type="checkbox"/>	Synch Key <input type="checkbox"/> SVB Power <input type="checkbox"/> H <input type="checkbox"/> J LO System Switches <input type="checkbox"/> VS-F-58A Pwr <input type="checkbox"/> H <input type="checkbox"/> J <input type="checkbox"/> Grn Flag VS-F-58B Pwr <input type="checkbox"/> H <input type="checkbox"/> J <input type="checkbox"/> Grn Flag	PCS Main Screen U9103 <input type="checkbox"/> U9104 <input type="checkbox"/> U9105V <input type="checkbox"/> Alarm Screen (List) <input type="checkbox"/>	RM-112 <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C RM-113 <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C Comm RM Pwr <input type="checkbox"/> 1J <input type="checkbox"/> 2J Synch Key <input type="checkbox"/>
Post Session Checks:			
PCS Screens (Cleared/Display) <input type="checkbox"/> RO <input type="checkbox"/> BOP <input type="checkbox"/> SM <input type="checkbox"/> STA <input type="checkbox"/> PCs Logged OFF (including Booth) <input type="checkbox"/> Phone cleared <input type="checkbox"/> Recall IC-1 <input type="checkbox"/> Advance Charts <input type="checkbox"/> Procedures Changed <input type="checkbox"/> Red Light <input type="checkbox"/> Binders Stored <input type="checkbox"/> Trash Picked Up/Emptied <input type="checkbox"/> Vacuum Req'd? <input type="checkbox"/> Pink Magnets in Drawer <input type="checkbox"/> BB and VB Scenario Magnets removed <input type="checkbox"/> E-Mail to SSG Required <input type="checkbox"/> DVD Finalized <input type="checkbox"/> EAL Charts <input type="checkbox"/> Note Pads <input type="checkbox"/> Manning Sheets <input type="checkbox"/> Sticky Tabs (SRO/SM/ARPs) <input type="checkbox"/> Markers (ARPs) <input type="checkbox"/> Personnel/Comms Tracking Sheets (Booth) <input type="checkbox"/> Floor timers reset/In place <input type="checkbox"/> Booth timers reset/In place <input type="checkbox"/> Printers ready/have paper			

## SIMULATOR TURNOVER CHECKLIST

### **Session Conduct:**

- Ensure conditions in Simulator Set-up are established.
- Ensure Feed Control Role Player has been briefed.

### **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 TURNOVER CHECKLIST

**EVENT 2**      **1-CC-RI-105 Fails high with no Auto Action**

When cued by examiner, implement **Trigger #1**.

**Have copy of 0-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.

## SIMULATOR TURNOVER CHECKLIST

**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.

## SIMULATOR TURNOVER CHECKLIST

**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.

## SIMULATOR TURNOVER CHECKLIST

**EVENT 5      Loss of 1G Screenwell Transformer-.**

When cued by examiner, implement **Trigger #7.**

Booth Operator: Triggers 20, 21, 22, and 23 are set to actuate if the CW pumps are started < 5 minutes from the time of the Screenwell transformer trip. Monitor the time from the transformer trip and verify the triggers actuate correctly.

**Critical Task 2:** If the BOP re-starts the Unit 1 CW pumps prior to the required wait time of five (5) minutes, the CW pump(s) will trip on overcurrent. The five minute wait period is required to allow CW backflow through the CW pump to cease; this backflow causes the CW pump(s) to rotate in the reverse direction. This CT is based on the Crew demonstrating non-compliance with procedural Notes designed to prevent damage to the CW pump, which can lead to power escalation limitations for Unit 1 and potentially affect full power operation of Unit 2. An operations representative will be available for consult during the Scenario.

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.



**SIMULATOR TURNOVER CHECKLIST**

- **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.

## SIMULATOR TURNOVER CHECKLIST

**EVENTS 6    Loss of Offsite power, ECA-0.0.**

When cued by examiner, implement **Trigger #9**.

**Critical Tasks**

**CT-3:** 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-4:** Energize the 1J emergency bus from the AAC diesel within 10 minutes of entering AP-17.06.

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 RCP Seal isolation , **Insert Trigger 13**, and inform operator after 2 minutes that RCP Seal isolation completed.
- **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.

### SIMULATOR TURNOVER CHECKLIST

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

SR 17-301

**Simulator** Job Performance Measure [KA 006A1.13 3.5/3.7]  
[Alternate Path]

Applicant \_\_\_\_\_

Start Time \_\_\_\_\_

Examiner \_\_\_\_\_

Date \_\_\_\_\_

Stop Time \_\_\_\_\_

**Title**

**ISOLATE/VENT SAFETY INJECTION ACCUMULATORS (Faulted)**

**K/A: 006A1.13 Accumulator pressure (level, boron concentration) 3.5/3.7**

**Applicability**

**Estimated Time**

**Actual Time**

RO/SRO(I)/SRO(U)

20 Minutes

\_\_\_\_\_ Minutes

**Conditions**

- Task is to be PERFORMED in the simulator.
- An RCS leak to Containment exists. The Unit was tripped and SI initiated. 1-E-0 and 1-E-1 have been completed and 1-ES-1.2 has been performed up to Step 26.

**Standards**

- SI Accumulators isolated/venting IAW 1-ES-1.2, Post-LOCA Cooldown and Depressurization, Step 26.

**Initiating Cues**

- 1-ES-1.2, Post-LOCA Cooldown and Depressurization, Step 26.
- Shift Manager direction.

**Terminating Cues**

- 1-ES-1.2, Post-LOCA Cooldown and Depressurization, Step 26 completed.

**Procedures**

- 1-ES-1.2, Post-LOCA Cooldown and Depressurization, Rev. 49.

**Tools and Equipment**

**Safety Considerations**

- Keys 11, 12, 13

- None

**Simulator Setup**

- Recall IC –405 (T-Rex: 415), OR
- Call up 100% power IC and initialize. Switch override MOV865B\_OPEN, On, ACTIVE. Switch override MOV865B\_CLOSE, Off, ACTIVE. Malfunction FP-0301, FP0302, ACTIVE. PCS105SPKR\_NULL, ACTIVE.
- Initiate 420 gpm RCS leak (RC04 at 40% deg). Trip Rx & perform 1-E-0, transfer to 1-E-1 & to 1-ES-1.2 where 1-ES-1.2 is performed up to Step 26. Freeze simulator & verify subcooling > 80°F, Przr level > 50%, and CTMT pressure < 20 psia (CTMT NOT adverse).
- Throttle AFW flow to stabilize A/B/C SG level.
- Place SIMOV865A\_BKR, SIMOV865B\_BKR SIMOV865C\_BKR, Closed, on **Trigger 1**.
- If called to open breakers IAW step 26.d.3, double click on Remote function for each MOV, select Open, then click Modify.
- Verify keys NOT in accumulator defeat switches. Have keys 11, 12 & 13 readily available to deliver to Operator upon request.
- An Instructor will be needed on the floor to perform Unit 2 duties.

**Initial Conditions**

- I am the Shift Manager and you are the Unit 1 BOP.
- Unit 1 currently has an RCS leak to containment in progress. The Unit was tripped and Safety Injection initiated. 1-E-0 and 1-E-1 have been completed and 1-ES-1.2 has been performed up to Step 26.

**Initiating Cues**

- Here is a copy of 1-ES-1.2, Post-LOCA Cooldown and Depressurization, Step 26. I need you to perform Step 26 to isolate Safety Injection Accumulators.
- When you finish the actions necessary to accomplish this, please inform me.

**Notes to the Evaluator:**

Task critical elements are bolded and denoted by an asterisk (\*).

- **This is a Faulted JPM – MOV-1865B fails to shut. Must apply RNO and vent “B” SI Accumulator.**

**PERFORMANCE CHECKLIST****Notes to the Evaluator**

- Task critical elements are bolded and denoted by an asterisk (\*).
- *An additional instructor is stationed on Unit 2 to silence alarms for the examinee.*
- **START TIME**\_\_\_\_\_:

<p><b>STEP 1:</b></p> <p>STEP 26, CHECK IF SI ACCUMULATORS SHOULD BE ISOLATED [<i>Step 26, a</i>]):</p> <p><b>STANDARD:</b></p> <p>a) RCS subcooling based on CETCs - GREATER THAN 80°F [135°F]. Determines Abnormal Containment conditions do not exist by observing the following conditions: Ctmt pressure is &lt; 20 psia on 1-LM-PI-100A/B/C/D, and Ctmt radiation is &lt; 10<sup>5</sup>R/hr on 1-RM-RI-127 and 1-RM-RI-128 (CHRRMS).</p> <p>(b) Determines RCS subcooling is greater than 80°F by observing Train A and/or Train B ICCM.</p> <p><b>EVALUATOR'S NOTE:</b></p> <ul style="list-style-type: none"> <li>• <b>If asked:</b> Ctmt radiation has never exceeded 10<sup>5</sup>R/hr.</li> </ul> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
<p><b>STEP 2:</b></p> <p>STEP 26, CHECK IF SI ACCUMULATORS SHOULD BE ISOLATED [<i>Step 26, b</i>]):</p> <p><b>STANDARD:</b></p> <p>b. PRZR level - GREATER THAN 22% [50%]. Determines Przr level &gt; 22% by observing 1-RC-LI-1459A, -1460 and/or -1461</p> <p><b>EVALUATOR'S NOTE:</b></p> <p>None.</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>

<p><b>STEP 3:</b></p> <p>STEP 26, CHECK IF SI ACCUMULATORS SHOULD BE ISOLATED [Step 26, c)]:</p> <p><b>STANDARD:</b></p> <p>c. Check power to Accumulator discharge isolation valves - AVAILABLE Determines SI Acc. Disch MOVs de-energized by checking:</p> <ul style="list-style-type: none"> <li>• 1-SI-MOV-1865A. (Green and Red Indicating Lights out.)</li> <li>• 1-SI-MOV-1865B. (Green and Red Indicating Lights out.)</li> <li>• 1-SI-MOV-1865C. (Green and Red Indicating Lights out.)</li> </ul> <p>*d. Locally close the following breakers (key required): Contacts an auxiliary operator to locally close the following breakers:</p> <ul style="list-style-type: none"> <li>• 1H1-2N 5B, 1-SI-MOV-1865A, "A" SI Acc. Disch MOV).</li> <li>• 1J1-2E 1B, 1-SI-MOV1865B, "B" SI Acc. Disch MOV).</li> <li>• 1J1-2E 1C, 1-SI MOV01865C, "C" SI Acc. Dich MOV).</li> </ul> <p>e. Check SI Acc. Disch MOVs energized:</p> <ul style="list-style-type: none"> <li>• 1-SI-MOV-1865A, (Red Light Lit, Green Light OFF).</li> <li>• 1-SI-MOV-1865B, (Red Light Lit, Green Light OFF).</li> <li>• 1-SI-MOV-1865C, (Red Light Lit, Green Light OFF).</li> </ul> <p><b>EVALUATOR'S NOTE:</b></p> <p><b>If asked:</b> Supply Key 11, 12, and 13 to Candidate.</p> <p><b>Simulator Instructor's Note:</b></p> <p><b>When directed:</b> Energize SI Acc. Disch MOVs, using Trigger 1.</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
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<p><b>STEP 4:</b></p> <p>STEP 26, CHECK IF SI ACCUMULATORS SHOULD BE ISOLATED. [Step 26, d)]</p> <p><b>STANDARD:</b></p> <p>a) Obtains keys 11, 12 and 13.</p> <p><b>*b) Places a key into appropriate keyswitch for each of the following:</b></p> <ul style="list-style-type: none"> <li>• 1-SI-MOV-1865A.</li> <li>• 1-SI-MOV-1865B.</li> <li>• 1-SI-MOV-1865C.</li> </ul> <p><b>*c) Places keyswitch to DEFEAT position for each of the following:</b></p> <ul style="list-style-type: none"> <li>• 1-SI-MOV-1865A.</li> <li>• 1-SI-MOV-1865B.</li> <li>• 1-SI-MOV-1865C.</li> </ul> <p><b>*d) Momentarily places the control switch to CLOSE for each of the following:</b></p> <ul style="list-style-type: none"> <li>• 1-SI-MOV-1865A.</li> <li>• 1-SI-MOV-1865B.</li> <li>• 1-SI-MOV-1865C.</li> </ul> <p>e) Acknowledges annunciators 1A-D4 (SI VV OUT OF POSTN), 1A-C4 (ACCUM TK 1A OUTLT VV CLOSED) and 1A-C6 (ACCUM TK 1C OUTLT VV CLOSED).</p> <p>f) Verifies MOV closure by observing valve position lights for each of the following:</p> <ul style="list-style-type: none"> <li>• 1-SI-MOV-1865A,</li> <li>• 1-SI-MOV-1865C.</li> </ul> <p>g) Recognizes 1-SI-MOV-1865B is NOT going closed.</p> <p>h) Notifies Shift Manager that 1-SI-MOV-1865B is NOT closing.</p> <p><b>EVALUATOR'S NOTE:</b></p> <ul style="list-style-type: none"> <li>• <b>If asked:</b> Provide operator with keys 11, 12 &amp; 13.</li> <li>• Substep g) above begins <b>faulted</b> portion of JPM.</li> <li>• <b>Note:</b> Candidate may elect to direct opening of SI Accumulator Breakers at this step or upon JPM completion.</li> </ul> <p><b>Simulator Instructor's Note</b></p> <ul style="list-style-type: none"> <li>• <b>If called upon to open breakers IAW step 26.d.3,</b> double click on the Remote functions for each, Select Open, Click Modify.</li> </ul> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
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<p><b>STEP 5:</b></p> <p>STEP 26, CHECK IF SI ACCUMULATORS SHOULD BE ISOLATED. [Step 26, d) RNO]</p> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>a) IF CTMT and Turbine BLDG IA available, THEN do the following to vent any unisolated SI ACC: <ul style="list-style-type: none"> <li>Checks if Ctmt IA is available by observing the following: <ul style="list-style-type: none"> <li>• Adequate Ctmt IA pressure indicated on PI-IA-101, and</li> <li>• One Ctmt IA Compressor running (1-IA-C-4A or -4B).</li> </ul> </li> <li>Checks if Turb Bldg IA is available by observing the following: <ul style="list-style-type: none"> <li>• Adequate IA pressure indicated on PI-IA-100, and</li> <li>• Annunciator 1B-E6, IA LO HDR PRESS/IA COMPR 1 TRBL, clear.</li> </ul> </li> </ul> </li> <li>b) Informs Shift Manager to consult with TSC or HP on venting the SI Acc.</li> <li>c) Checks Process Vent System in service by performing the following: <ul style="list-style-type: none"> <li>• Checks one PV Blower, GW-F-1A in service by observing indicating lights.</li> <li>• Checks PV Vent System flow of ~294 cfm indicated on FI-GW-100.</li> <li>• Checks PV RMs in service by observing RM meters indicating for MGPI Radiation Monitors.</li> </ul> </li> <li>d) Checks with Unit 2 RO to verify that 2-SI-TV-201A and B are closed.</li> </ul> <p><b>EVALUATOR'S NOTE:</b></p> <ul style="list-style-type: none"> <li>• <b>If asked:</b> Consultations with TSC and HP have been completed. Venting is recommended.</li> </ul> <p><b>Simulator Instructor's Note:</b></p> <p><b>If asked:</b> Report Yes, 2-SI-TV-201A and B are closed.</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
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<p><b>STEP 6:</b></p> <p>STEP 26, CHECK IF SI ACCUMULATORS SHOULD BE ISOLATED. [Step 26, d) RNO]</p> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>a) Checks 1-RC-HCV-1549, PRT Vent, closed by observing valve switch in CLOSED position and GREEN position indicating light lit.</li> <li><b>*b) Opens Accum Vnt VV, HCV-1853B by placing control switch to OPEN.</b></li> <li>c) Verifies HCV-1853B opens by observing valve position indicating lights change to RED light on &amp; GREEN light OFF.</li> <li><b>*d) Opens Ctmt isolation, 1-SI-TV-101A, by depressing OPEN pushbutton (RED light) until RED light remains illuminated and green light goes out.</b></li> <li><b>*e) Opens Ctmt isolation, 1-SI-TV-101B, by depressing OPEN pushbutton (RED light) until RED light remains illuminated and green light goes out.</b></li> <li>g) Notes initial pressure of "B" Accumulator by observing PI-1-925 and PI-1-927 or PCS.</li> <li><b>*h) Begins opening HCV-1936 by rotating control pot clockwise to raise valve demand.</b></li> <li>i) Monitors MGPI Process Vent RMs for any indications of increased activity in the PV System.</li> <li>j) Checks for accumulator pressure lowering by observing PI-1-925 and PI-1-927 or PCS indication.</li> </ul> <p><b>EVALUATOR'S NOTE:</b></p> <ul style="list-style-type: none"> <li>• <b>If asked:</b> Unit 2 will continue to monitor Process Vent Activity.</li> <li>• <b>NOTE:</b> The order of substep d) and e) above are not critical.</li> <li>• Following substep j) above: Candidate <u>may</u> raise HCV-1936 demand further to raise Accumulator vent rate.</li> </ul> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
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<p><b>STEP 7:</b></p> <p>STEP 26, CHECK IF SI ACCUMULATORS SHOULD BE ISOLATED. [Step 26]</p> <p><b>STANDARD:</b></p> <p>REPORTS TO SHIFT MANAGER (EVALUATOR).</p> <p><u><b>Standards</b></u></p> <p>Verbal status report made that "B" Accumulator venting is in progress.</p> <p><b>EVALUATOR'S NOTE:</b></p> <p>If "B" SI Acc. Venting in progress, the Evaluator may end the JPM, at Evaluator discretion.</p> <p><b>STOP TIME:</b> _____</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
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Comments:

[illegible]

NUMBER	PROCEDURE TITLE	REVISION
1-ES-1.2	POST LOCA COOLDOWN AND DEPRESSURIZATION	49
		PAGE 17 of 24

STEP	ACTION/ EXPECTED RESPONSE	RESPONSE NOT OBTAINED
26. ____	CHECK IF SI ACCUMULATORS SHOULD BE ISOLATED:	
<input checked="" type="checkbox"/>	a) RCS subcooling based on CETCs - GREATER THAN 80°F [135°F]	<input type="checkbox"/> a) <u>WHEN</u> at least two RCS hot leg temperatures less than 435°F, <u>THEN</u> GO TO Step 26c. GO TO Step 28.
<input checked="" type="checkbox"/>	b) PRZR level - GREATER THAN 22% [50%]	<input type="checkbox"/> b) RETURN TO Step 14.
	c) Check power to Accumulator discharge isolation valves - AVAILABLE	c) Locally close the following breakers (key required):
<input checked="" type="checkbox"/>	• 1-SI-MOV-1865A	<input type="checkbox"/> • 1H1-2N 5B
<input checked="" type="checkbox"/>	• 1-SI-MOV-1865B	<input type="checkbox"/> • 1J1-2E 1B
<input checked="" type="checkbox"/>	• 1-SI-MOV-1865C	<input type="checkbox"/> • 1J1-2E 1C
(STEP 26 CONTINUED ON NEXT PAGE)		

STEP	ACTION/ EXPECTED RESPONSE	RESPONSE NOT OBTAINED
26.	CHECK IF SI ACCUMULATORS SHOULD BE ISOLATED: (Continued)	
	d) Isolate SI Accumulators:	d) <u>IF</u> CTMT and Turbine BLDG IA available, <u>THEN</u> do the following to vent any unisolated SI ACC:
	1) Put ACC interlock key switches in DEFEAT: (keys 11, 12, and 13)	
<input checked="" type="checkbox"/>	• 1-SI-MOV-1865A	<input checked="" type="checkbox"/> 1) Consult with TSC or HP.
<input checked="" type="checkbox"/>	• 1-SI-MOV-1865B	<input checked="" type="checkbox"/> 2) Check or place in service the Process Vent system.
<input checked="" type="checkbox"/>	• 1-SI-MOV-1865C	<input checked="" type="checkbox"/> 3) Close or check closed 2-SI-TV-201A and B.
	2) Close the following:	<input checked="" type="checkbox"/> 4) Close or check closed 1-RC-HCV-1549.
<input checked="" type="checkbox"/>	• 1-SI-MOV-1865A	<input checked="" type="checkbox"/> 5) Open ACC vent line isolation valve, HCV-1853A, B, or C.
<input type="checkbox"/>	• 1-SI-MOV-1865B	<input checked="" type="checkbox"/> 6) Open 1-SI-TV-101A and B.
<input checked="" type="checkbox"/>	• 1-SI-MOV-1865C	<input checked="" type="checkbox"/> 7) Adjust HCV-1936 to vent SI ACC(s). <u>IF</u> accumulators can <u>NOT</u> be vented, <u>THEN</u> do the following:
		<input type="checkbox"/> 1) Maintain SG pressure greater than 300 psig.
		<input type="checkbox"/> 2) Consult with TSC.
	e) Locally open the following breakers:	
<input checked="" type="checkbox"/>	• 1H1-2N 5B	
<input checked="" type="checkbox"/>	• 1J1-2E 1B	
<input checked="" type="checkbox"/>	• 1J1-2E 1C	

**Operator Directions Handout  
(TO BE GIVEN TO APPLICANT)**

**Initial Conditions**

- I am the Shift Manager and you are the Unit 1 BOP.
- Unit 1 currently has an RCS leak to containment in progress. The Unit was tripped and Safety Injection initiated. 1-E-0 and 1-E-1 have been completed and 1-ES-1.2 has been performed up to Step 26.

**Initiating Cues**

- Here is a copy of 1-ES-1.2, Post-LOCA Cooldown and Depressurization, Step 26. I need you to perform Step 26 to isolate Safety Injection Accumulators.
- When you finish the actions necessary to accomplish this, please inform me.

NUMBER	PROCEDURE TITLE	REVISION
1-ES-1.2	POST LOCA COOLDOWN AND DEPRESSURIZATION	49
		PAGE 17 of 24

STEP	ACTION/ EXPECTED RESPONSE	RESPONSE NOT OBTAINED
26. ____	CHECK IF SI ACCUMULATORS SHOULD BE ISOLATED:	
<input type="checkbox"/>	a) RCS subcooling based on CETCs - GREATER THAN 80°F [135°F]	<input type="checkbox"/> a) <u>WHEN</u> at least two RCS hot leg temperatures less than 435°F, <u>THEN</u> GO TO Step 26c. GO TO Step 28.
<input type="checkbox"/>	b) PRZR level - GREATER THAN 22% [50%]	<input type="checkbox"/> b) RETURN TO Step 14.
<input type="checkbox"/>	c) Check power to Accumulator discharge isolation valves - AVAILABLE	<input type="checkbox"/> c) Locally close the following breakers (key required):
<input type="checkbox"/>	• 1-SI-MOV-1865A	<input type="checkbox"/> • 1H1-2N 5B
<input type="checkbox"/>	• 1-SI-MOV-1865B	<input type="checkbox"/> • 1J1-2E 1B
<input type="checkbox"/>	• 1-SI-MOV-1865C	<input type="checkbox"/> • 1J1-2E 1C
(STEP 26 CONTINUED ON NEXT PAGE)		

NUMBER	PROCEDURE TITLE	REVISION
1-ES-1.2	POST LOCA COOLDOWN AND DEPRESSURIZATION	49
		PAGE 18 of 24

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
26.	CHECK IF SI ACCUMULATORS SHOULD BE ISOLATED: (Continued)	
	d) Isolate SI Accumulators:	d) <u>IF</u> CTMT and Turbine BLDG IA available,
	1) Put ACC interlock key switches in DEFEAT: (keys 11, 12, and 13)	<u>THEN</u> do the following to vent any unisolated SI ACC:
<input type="checkbox"/>	• 1-SI-MOV-1865A	<input type="checkbox"/> 1) Consult with TSC or HP.
<input type="checkbox"/>	• 1-SI-MOV-1865B	<input type="checkbox"/> 2) Check or place in service the Process Vent system.
<input type="checkbox"/>	• 1-SI-MOV-1865C	<input type="checkbox"/> 3) Close or check closed 2-SI-TV-201A and B.
	2) Close the following:	<input type="checkbox"/> 4) Close or check closed 1-RC-HCV-1549.
<input type="checkbox"/>	• 1-SI-MOV-1865A	<input type="checkbox"/> 5) Open ACC vent line isolation valve, HCV-1853A, B, or C.
<input type="checkbox"/>	• 1-SI-MOV-1865B	<input type="checkbox"/> 6) Open 1-SI-TV-101A and B.
<input type="checkbox"/>	• 1-SI-MOV-1865C	<input type="checkbox"/> 7) Adjust HCV-1936 to vent SI ACC(s). <u>IF</u> accumulators can <u>NOT</u> be vented, <u>THEN</u> do the following:
<input type="checkbox"/>		<input type="checkbox"/> 1) Maintain SG pressure greater than 300 psig.
<input type="checkbox"/>		<input type="checkbox"/> 2) Consult with TSC.
	e) Locally open the following breakers:	
<input type="checkbox"/>	• 1H1-2N 5B	
<input type="checkbox"/>	• 1J1-2E 1B	
<input type="checkbox"/>	• 1J1-2E 1C	

U.S. Nuclear Regulatory Commission  
Surry Power Station

SR 17-301

**Simulator** Job Performance Measure [062A2.05 3.1/3.4]

Applicant \_\_\_\_\_

Start Time \_\_\_\_\_

Examiner \_\_\_\_\_

Date \_\_\_\_\_

Stop Time \_\_\_\_\_

**Title****Respond to a Loss of Semi-Vital Bus****K/A: 062 A2.04 Effect on plant of de-energizing a bus****Applicability****Estimated Time****Actual Time**

RO/SRO(I)/SRO(U)

10 Minutes

\_\_\_\_\_ Minutes

**Conditions**

- Task is to be PERFORMED in the simulator.
- A Loss of Unit 1 Semi-Vital Bus has occurred.

**Standards**

- Respond to a Loss of Unit 1 Semi-Vital Bus IAW 1-AP-10.05, Steps 1 through 9.

**Initiating Cues**

- A loss of Unit 1 Semi-Vital Bus has occurred.
- Shift Manager direction.

**Terminating Cues**

- Completion of Step 9 of 1-AP-10.05.

**Procedures**

- 1-AP-10.05, Loss of Semi-Vital Bus, Rev. 33.

**Tools and Equipment**

- None

**Safety Considerations**

- None



**Simulator Setup**

- Recall IC-406 (T-Rex: 416), OR
- Call up 100% power IC and initialize. Place simulator in RUN.
- Implement EL14, Loss of Semi-Vital Bus. Malfunction FP0301, FP0302, ACTIVE. PCS105SPKR\_NULL, ACTIVE.
- Freeze and store IC until needed for Evaluation.

**Initial Conditions**

- A Loss of Unit 1 Semi-Vital Bus has occurred.

**Initiating Cues**

- I am the Nuclear Shift Manager. You are the Unit 1 BOP.
- You are to respond to a loss of Unit 1 Semi-Vital Bus IAW 1-AP-10.05, Steps 1 through 9
- When you finish the actions necessary to accomplish this task, please inform me.

**Notes to the Evaluator:**

Task critical elements are bolded and denoted by an asterisk (\*).

If **Candidate asks** to review procedure, state "You must expedite performance of these steps."

**PERFORMANCE CHECKLIST**


**Notes to the Evaluator**

- Task critical elements are bolded and denoted by an asterisk (\*).
- *An additional instructor may be needed to silence alarms for the Candidate.*
- **If Candidate asks** to review procedure, state "You must expedite performance of these steps."
- **START TIME**\_\_\_\_\_:

<p><b>STEP 1:</b> CAUTION prior to STEP 1</p> <ul style="list-style-type: none"> <li>• <b>CAUTION:</b> Low vacuum Turbine trip may occur within five minutes. Steps 1 through 4 must be performed without delay.</li> </ul> <p>Step 1: CHECK MAIN CONDENSER - REQUIRED</p> <p><b>STANDARD:</b></p> <ol style="list-style-type: none"> <li>a) Acknowledges CAUTION.</li> <li>b) Checks Main Condenser Vacuum Required             <ol style="list-style-type: none"> <li>1) Identifies Reactor Power ~100% using Control Board PR NI Indication NI-1-41B, NI-1-42B, NI-1-43B, NI-1-44B.</li> <li>2) Identifies turbine ~100% using Turbine 1<sup>ST</sup> Stage Pressure 1-MS-PI-1446, 1-MS-PI-1447</li> </ol> </li> </ol> <p><b>EVALUATOR'S NOTE:</b> None</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
<p><b>STEP 2:</b></p> <p>Step 2: CHECK AUX STEAM TO AIR EJECTOR - VALVES DEENERGIZED</p> <ul style="list-style-type: none"> <li>• 1-AS-FCV-100A</li> <li>• 1-AS-FCV-100B</li> </ul> <p><b>STANDARD:</b></p> <ol style="list-style-type: none"> <li>a) Checks 1-AS-FCV-100A/100B Valve Position. Identifies FCV-AS-100A on BB-2 Sloping Section, Green and Red Lights - Out. Identifies FCV-AS-100B on BB-2 Sloping Section, Green and Red Lights - Out.</li> </ol> <p><b>EVALUATOR'S NOTE:</b> None</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>

<p><b>STEP 3:</b></p> <p>Step 3: ALIGN AIR EJECTOR DISCHARGE TO CONTAINMENT:</p> <ul style="list-style-type: none"><li>• Close or check closed 1-SV-TV-103 (AE DISCH TO VENT VENT TV)</li><li>• Open or check open 1-SV-TV-102A (AE DISCH TO SFGD TV)</li><li>• Open or check open 1-SV-TV-102 (AE DISCH TO CTMT TB TV)</li></ul> <p><b>STANDARD:</b></p> <p>Candidate locates to VB1, Trip Valves Section</p> <p><b>*a) Closes 1-SV-TV-103.</b></p> <p>b) Checks 1-SV-TV-102A Open.</p> <p><b>*c) Opens 1-SV-TV-102.</b></p> <p><b>EVALUATOR'S NOTE: None.</b></p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
<p><b>STEP 4:</b></p> <p><b>NOTE</b> prior to Step 4: Main Condenser Vacuum can only be monitored locally or using PCS.</p> <p>Step *4: CHECK MAIN CONDENSER VACUUM - GREATER THAN 26.5 IN HG.</p> <p><b>STANDARD:</b></p> <p>a) Acknowledges Note.</p> <p>b) Checks Condenser Vacuum using PCS.</p> <p><b>EVALUATOR'S NOTE:</b></p> <p>Candidate may also use Condenser Vacuum indications on VB2, CN-PR-101A &amp; B. These indications are powered from a portion of the Instrumentation System with a Battery Backup</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>

<p><b>STEP 5:</b></p> <p>Step 5: CHECK REACTOR POWER – GREATER THAN OR EQUAL TO 75%</p> <p><b>STANDARD:</b></p> <p>a) Checks Reactor Power using BB2 PR NI indication and determine power is &gt;75%. NI-1-41B, NI-1-42B, NI-1-43B, NI-1-44B.</p> <p><b>EVALUATOR’S NOTE:</b></p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
<p><b>STEP 6:</b></p> <p>Step 6: START THIRD CONDENSATE PUMP</p> <p><b>STANDARD:</b></p> <p>*a) <b>Starts 1-CN-P-1A, A CN Pump.</b> b) Checks 1-CN-P-1A ammeter settling to post start amps of approximately 360 amps.</p> <p><b>EVALUATOR’S NOTE:</b></p> <p>Before 1-CN-P-1A is started Feed Flow will be less than Steam flow for A/B/C SGs, with SG NR level indications on VB2 lowering.</p> <p><b>If the Candidate fails to start 1-CN-P-1A within ~ 5 minutes of runtime, the Unit will trip on Low Low SG level (17%).</b></p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>

<p><b>STEP 7:</b></p> <p><b>Note</b> prior to Step 7: With unit at 100% power, Turbine load should be lowered approximately 50 MW.</p> <p>7: REDUCE TURBINE LOAD APPROXIMATELY 50 MW USING LIMITER.</p> <p><b>STANDARD:</b></p> <p>a) Checks MW indication on BB2, Sloping Section.</p> <p><b>*b) Reduces Turbine Load using Limiter until GEN-MEGAWATTS indication on BB2 has been lowered ~ 50 MW.</b></p> <p><b>EVALUATOR'S NOTE:</b></p> <p>Vertical Board MW Chart is de-energized on Loss of Semi-Vital Bus.</p> <p>Candidate may reduce Turbine Load further to reduce Loop <math>\Delta T</math> indication to value less than 100%, on VB2 recorder 1-RC-TR-1412, <math>\Delta</math> TEMP – PROTECTION..</p> <p>Candidate may elect to shift to Turbine Manual, and reduce Turbine Load using the GV  Pushbutton on the Turbine Controls section of BB2. This is also acceptable (Turbine Manual Operation is listed in the RNO for the Step, and allows for a finer control of Turbine Power reduction; Operator Auto could also be used, but is less likely due to timeliness.)</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
<p><b>STEP 8:</b></p> <p>Step *8: CHECK ALL SG FLOWS - STEAM FLOW IS LESS THAN OR EQUAL TO FEED FLOW.</p> <p><b>STANDARD:</b></p> <p>a) Checks Steam Flow is less than Feed Flow using VB 2 SF/FF Meters, or SG A/B/C Feed Flow &amp; Steam Flow Recorders (1-FW-FR-1478/1488/1498).</p> <p><b>EVALUATOR'S NOTE: None</b></p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>

<p><b>STEP 9:</b></p> <p>Step *9: CHECK REACTOR POWER – LESS THAN OR EQUAL TO 100%</p> <p><b>STANDARD:</b></p> <p>a) Checks Reactor Power less than 100% using PR NIs and/or Loop Tave Recorder on VB2.</p> <p><b>EVALUATOR’S NOTE:</b></p> <p>Calorimetric power may be &gt; 100% due to FW overshoot transient. Candidate may begin action to initiate Attachment 1, Prompt Actions to Reduce Reactor Power.</p> <p><b>IF Candidate Initiates Attachment 1:</b> Tell Candidate that another operator will perform Attachment 1.</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
<p><b>STEP 10</b></p> <p><b>STANDARD:</b></p> <p>REPORTS TO SHIFT MANAGER (EVALUATOR)</p> <p>1-AP-10.05, Loss of Semi-Vital Bus, Steps 1 through 9 are complete.</p> <p><b>STOP TIME:</b> _____</p>	

**Comments:**

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





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NUMBER 1-AP-10.05	PROCEDURE TITLE LOSS OF SEMI-VITAL BUS	REVISION 33  PAGE 2 of 11
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p><b>CAUTION:</b> Low vacuum Turbine trip may occur within five minutes. Steps 1 through 4 must be performed without delay.</p> <p>*****</p>		
1.	 CHECK MAIN CONDENSER - REQUIRED	<input type="checkbox"/> GO TO Step 10.
2.	 CHECK AUX STEAM TO AIR EJECTOR - VALVES DEENERGIZED	<input type="checkbox"/> GO TO Step 9.
	 • 1-AS-FCV-100A  • 1-AS-FCV-100B	
3.	 ALIGN AIR EJECTOR DISCHARGE TO CONTAINMENT:	
	<div style="border: 2px solid red; padding: 5px;">  • Close or check closed 1-SV-TV-103   • Open or check open 1-SV-TV-102A   • Open or check open 1-SV-TV-102                     </div>	
<p><b>NOTE:</b> Main Condenser Vacuum can only be monitored locally or using PCS.</p>		
*4.	 CHECK MAIN CONDENSER VACUUM - GREATER THAN 26.5 IN HG	<input type="checkbox"/> Locally place Condenser Hogs in service IAW 1-AP-14.00, Loss of Main Condenser Vacuum, Attachment 1.

NUMBER	PROCEDURE TITLE	REVISION
1-AP-10.05	LOSS OF SEMI-VITAL BUS	33
		PAGE 3 of 11

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5. ↓	CHECK REACTOR POWER - GREATER THAN OR EQUAL TO 75%	<p>Do the following:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> a) Monitor response of Main Feed Reg valves and control as necessary to maintain SG level.</li> <li><input type="checkbox"/> b) Lower Turbine load in small increments to stabilize loop <math>\Delta T</math>.</li> <li><input type="checkbox"/> c) Start third condensate pump, as required by plant conditions.</li> <li><input type="checkbox"/> d) Continue to reduce Turbine load until Steam Flow is Less than or Equal to Feed Flow.</li> <li><input type="checkbox"/> e) GO TO Step 10.</li> </ul>
6. ↓	START THIRD CONDENSATE PUMP	
	<p><b>NOTE:</b> With unit at 100% power, Turbine load should be lowered approximately 50 MW.</p>	
7. ↓	REDUCE TURBINE LOAD APPROXIMATELY 50 MW USING LIMITER	<input type="checkbox"/> Use Operator Auto or Turbine Manual to reduce load.
*8. ↓	CHECK ALL SG FLOWS - STEAM FLOW IS LESS THAN OR EQUAL TO FEED FLOW	<input type="checkbox"/> Continue to reduce Turbine load.
*9. ↓	CHECK REACTOR POWER - LESS THAN OR EQUAL TO 100%	<input type="checkbox"/> Initiate Attachment 1.

END



**Operator Directions Handout  
(TO BE GIVEN TO APPLICANT)**

**Initial Conditions**

- A Loss of Unit 1 Semi-Vital Bus has occurred.

**Initiating Cues**

- I am the Nuclear Shift Manager. You are the Unit 1 BOP.
- You are to respond to a loss of Unit 1 Semi-Vital Bus IAW 1-AP-10.05, Steps 1 through 9.
- When you finish the actions necessary to accomplish this task, please inform me.

NUMBER  1-AP-10.05	PROCEDURE TITLE  LOSS OF SEMI-VITAL BUS	REVISION 33  PAGE 2 of 11
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STEP	ACTION/ EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p><b>CAUTION:</b> Low vacuum Turbine trip may occur within five minutes. Steps 1 through 4 must be performed without delay.</p> <p>*****</p>		
1. ____	CHECK MAIN CONDENSER - REQUIRED	<input type="checkbox"/> GO TO Step 10.
2. ____	CHECK AUX STEAM TO AIR EJECTOR - VALVES DEENERGIZED  <input type="checkbox"/> • 1-AS-FCV-100A <input type="checkbox"/> • 1-AS-FCV-100B	<input type="checkbox"/> GO TO Step 9.
3. ____	ALIGN AIR EJECTOR DISCHARGE TO CONTAINMENT:  <input type="checkbox"/> • Close or check closed 1-SV-TV-103 <input type="checkbox"/> • Open or check open 1-SV-TV-102A <input type="checkbox"/> • Open or check open 1-SV-TV-102	
<p><b>NOTE:</b> Main Condenser Vacuum can only be monitored locally or using PCS.</p>		
*4. ____	CHECK MAIN CONDENSER VACUUM - GREATER THAN 26.5 IN HG	<input type="checkbox"/> Locally place Condenser Hoggers in service IAW 1-AP-14.00, Loss of Main Condenser Vacuum, Attachment 1.

NUMBER  1-AP-10.05	PROCEDURE TITLE  LOSS OF SEMI-VITAL BUS	REVISION 33  PAGE 3 of 11
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STEP	ACTION/ EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5. ____	CHECK REACTOR POWER - GREATER THAN OR EQUAL TO 75%	Do the following:  <input type="checkbox"/> a) Monitor response of Main Feed Reg valves and control as necessary to maintain SG level.  <input type="checkbox"/> b) Lower Turbine load in small increments to stabilize loop $\Delta T$ .  <input type="checkbox"/> c) Start third condensate pump, as required by plant conditions.  <input type="checkbox"/> d) Continue to reduce Turbine load until Steam Flow is Less than or Equal to Feed Flow.  <input type="checkbox"/> e) GO TO Step 10.
6. ____	START THIRD CONDENSATE PUMP	
	<b>NOTE:</b> With unit at 100% power, Turbine load should be lowered approximately 50 MW.	
7. ____	REDUCE TURBINE LOAD APPROXIMATELY 50 MW USING LIMITER	<input type="checkbox"/> Use Operator Auto or Turbine Manual to reduce load.
*8. ____	CHECK ALL SG FLOWS - STEAM FLOW IS LESS THAN OR EQUAL TO FEED FLOW	<input type="checkbox"/> Continue to reduce Turbine load.
*9. ____	CHECK REACTOR POWER - LESS THAN OR EQUAL TO 100%	<input type="checkbox"/> Initiate Attachment 1.

U.S. Nuclear Regulatory Commission  
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**Simulator** Job Performance Measure APE054AA1.01 4.5/4.4]  
[Alternate Path]

Applicant \_\_\_\_\_

Start Time \_\_\_\_\_

Examiner \_\_\_\_\_

Date \_\_\_\_\_

Stop Time \_\_\_\_\_

**Title**

**Perform FR-H.1**

**K/A: APE054AA1.01, AFW controls, including the use of alternate AFW sources, 4.5/4.4.**

**Applicability**

**Estimated Time**

**Actual Time**

RO/SRO(I)/SRO(U)

18 Minutes

\_\_\_\_\_ Minutes

**Conditions**

- Task is to be PERFORMED in the simulator.
- A Loss of Secondary Heat Sink has occurred.

**Standards**

- Heat sink restored IAW 1-FR-H.1, Response to Loss of Secondary Heat Sink, using MFW.

**Initiating Cues**

- I am the Shift Manager and you are the Unit 1 BOP.
- A loss of Secondary Heat Sink has occurred.
- Here is a copy of 1-FR-H.1, and I want you to respond to the Loss of Heat Sink IAW 1-FR-H.1.
- When you have restored Unit 1 Heat Sink, please inform me.

**Terminating Cues**

- 1-FR-H.1, Step 4 complete.

**Procedures**

- 1-FR-H.1, Response to Loss of Secondary Heat Sink, Rev. 38.

**Tools and Equipment**

- None

**Safety Considerations**

- None

**Simulator Setup**

- Recall IC-407 (T-Rex: 417), OR
- Call up 100% power IC and initialize. Place simulator in RUN.
- Load the following MALFUNCTIONS:
  - EL2102, Loss of J 4160V Bus, Trigger 1.
  - FW09, TDAFW Pump FW-P-2 TTV Trip, Trigger 1.
  - RC04, RCS Leak, 50% Deg, Trigger 1.
  - FW1102, FWP3A Impeller Crack, 20% Deg, Trigger 1.
  - FP0301, FPS FACP07 Alarm Horn Failure, Active.
  - FP0302, FPS PC Speaker Failure, Active.
  - Set U2\_FWMOV251X\_RF to 0% on eXtremeView AFW2.
  - U2\_FWP2\_RUNNING, Trigger 7.

Load the following REMOTES:

- FW, FWMOV150A\_BKR, Open, Trigger 3.
- FW, FWMOV150A, 100%, 60 Sec Ramp, Trigger 4.
- FW, FWMOV150B\_BKR, Open, Trigger 5.
- FW, FWMOV150B, 100%, 60 Sec Ramp, Trigger 6.
- PCS105SPKR\_NULL, ACTIVE.

Place the Simulator in RUN and Insert Trigger 1.

Perform AP-16.00 Actions, Trip the Reactor and SI. (Approximately 40-50gpm AFW will be available to the SGs.)

When SG WR levels are trending up and SG NR levels <0%; Ensure SI actuated, NOT reset; Freeze the Simulator and Save the IC.

Unit 2 will Simulate attempting to establish AFW cross-tie.

Success path is to establish FW flow to the SGs.

**Initial Conditions**

- Unit 2 operating at 100% power with all cross-ties operable.
- Unit 1 initially operating at 100%.
- Unit 1 Reactor tripped and SI actuated due to an RCS leak.
- Unit 1 "J" 4160V emergency bus was lost.
- #3 EDG started, but its output breaker (15J3) tripped.
- Annunciator KG4, 4KV EMERG BUS EMERG SUP BKR AUTO TRIP, actuated.
- The TDAFW pump, 1-FW-P-2, tripped on startup, local investigation in progress.

**Initiating Cues**

I am the Nuclear Shift Manager. You are the Unit 1 BOP.

Unit 1 is experiencing a Loss of Secondary Heat Sink.

You are to perform 1-FR-H.1, Response to Loss of Secondary Heat Sink, to restore flow to the Steam Generators.

When you finish the actions necessary to accomplish this task, please inform me.

**Notes**

Task critical elements are bolded and denoted by an asterisk (\*).

**PERFORMANCE CHECKLIST****Notes to the Evaluator**

- Task critical elements are bolded and denoted by an asterisk (\*).
- *An additional instructor will be needed to silence alarms for the examinee.*
- **START TIME\_\_\_\_\_:**

<p><b>STEP 1:</b></p> <p>CAUTIONs prior to Step 1:</p> <ul style="list-style-type: none"> <li>• If total feed flow is less than 350 gpm [450 gpm] due to operator action, this procedure should NOT be performed.</li> <li>• Feed flow should NOT be reestablished to any faulted SG if a non-faulted SG is available.</li> </ul> <p>Step 1: CHECK IF SECONDARY HEAT SINK IS REQUIRED:</p> <ul style="list-style-type: none"> <li>a) RCS pressure - GREATER THAN ANY NON-FAULTED SG PRESSURE</li> <li>b) RCS hot leg temperature – GREATER THAN 350°F</li> </ul> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>a) Acknowledges CAUTIONS.</li> <li>b) Identifies RCS pressure greater than SG pressure.</li> <li>c) Identifies RCS hot leg temperature &gt; 350°F.</li> </ul> <p><b>EVALUATOR’S NOTE: None.</b></p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
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<p><b>STEP 2:</b>  Step *2: CHECK IF BLEED AND FEED IS REQUIRED  a) Check for either of the following conditions  • Wide range level in any 2 SGs - LESS THAN 12% [27%]  OR  • RCS pressure – GREATER THAN 2335 PSIG DUE TO LOSS OF SECONDARY HEAT SINK  a) RNO GO TO Step 3.  <b>STANDARD:</b>  a) Checks Abnormal Containment conditions do not exist by observing the following conditions:  Ctmt pressure is &lt; 20 psia on 1-LM-PI-100A/B/C/D, and  Ctmt radiation is &lt; 105R/hr on 1-RM-RI-127 and 1-RM-RI-128 (CHRRMS).  b) Determines SG WR levels are &gt; 12% and rising using SG LEVEL (WIDE) recorder, 1-FW-LR-1477 on VB2.  c) Checks RCS pressure &lt; 2335 psig using ICCM RCS WR pressure indication, or RCS WR pressure indicator meters.  d) Goes to Step 3.  <b>EVALUATOR’S NOTE: None.</b>  <b>COMMENTS:</b></p>	<p>_____ <b>SAT</b>  _____ <b>UNSAT</b></p>
<p><b>STEP 3:</b>  Step 3: TRY TO ESTABLISH AFW FLOW TO AT LEAST ONE SG:  a) Check SG blowdown TVs – CLOSED  b) Check AFW MOVs – OPEN  c) Check ECST – AVAILABLE  d) Check AFW – AVAILABLE  1) Start AFW Pumps  2) Check total flow to SGs – GREATER THAN 350 GPM [450 GPM]  Goes to Step 3 d) RNO  <b>STANDARD:</b>  a) Identifies all SG BD TVs closed using valve position pushbuttons on VB1, TV section.  b) Identifies “H” Train AFW MOVs, FW-MOV-151E/C/A, indicate Open, (RED light LIT, Green light OUT), and “J” Train MOVs, FW-MOV-151F/D/B, De-energized (RED and GREEN lights OUT).  c) Checks ECST available using EMERG CST NO. 1 Indicators (1-CN-LI-100/1-CN-LI-101) on VB2 &gt; 90%.  d) Identifies:  1) 1-FW-P-3A running using breaker position indicating lights (RED ON, GREEN OFF); 1-FW-P-3B – De-Energized; 1-FW-P-2 Tripped.  2) AFW flow &lt; 350 gpm (~50 gpm to each SG) using AFW Flow meters (1-FW-FI-100A/100B/100C on VB2)  <b>EVALUATOR’S NOTE:</b>    <b>If asked,</b> For Step b) above, “J” Train AFW MOVs were not throttled prior to the “J” bus loss.  <b>Note:</b> Candidate should not attempt to start 1-FW-P-3B.  <b>COMMENTS:</b></p>	

<p><b>STEP 4:</b></p> <p>Step 3 d) RNO IF minimum feed flow NOT established, THEN do the following:</p> <ol style="list-style-type: none"> <li>1) Stop ALL RCPs.</li> <li>2) IF desired to transfer EDG 3 to Bus 2J to restore power to 2-FW-P-3B, THEN GO TO Attachment 2.</li> <li>3) Have Unit 2 operator close Unit 2 AFW MOVs.</li> <li>4) Have Unit 2 operator open the following valves: <ul style="list-style-type: none"> <li>• 1-FW-MOV-160A (AUX FEEDWATER CROSSTIE.)</li> <li>• 1-FW-MOV-160B (AUX FEEDWATER CROSSTIE.)</li> </ul> </li> <li>5) Have Unit 2 operator start AFW pump(s).</li> <li>6) Control flow to restore narrow range level in at least one SG greater than 12% [18%].</li> <li>7) WHEN narrow range level in at least one SG greater than 12% [18%], THEN RETURN TO procedure and step in effect.</li> <li>8) IF minimum AFW flow NOT established, THEN try to locally restore AFW flow AND GO TO Step 4.</li> </ol> <p>GOES TO STEP 4.</p> <p><b>STANDARD:</b></p> <ol style="list-style-type: none"> <li>*1) <b>Stops RCPs by placing control switch in PTL position and leaving switch in PTL or allowing switch to return to Auto-After-Stop position.</b></li> <li>2) Determines #3 EDG not available to supply Unit 1 "J" bus due to Annunciators indicating a fault on 1J emergency bus, GOES TO substep 3).</li> <li>3) Directs Unit 2 to close AFW MOVs.</li> <li>4) Directs Unit 2 to open AFW cross-tie valves.</li> <li>5) Directs Unit 2 to start AFW pumps.</li> <li>8) Determines AFW flow through the cross-tie unavailable (no change in indicated AFW flow) and goes to Step 4.</li> </ol> <p><b>EVALUATOR'S NOTE:</b></p> <p><b>If asked</b>, for Step 2) above, state that #3 EDG is not supplying Unit 2.</p> <p><b>If asked</b>, Unit 2 "J" Bus energized by off-site power.</p> <p><b>Simulator Instructor's Note:</b></p> <p><b>When directed</b> to close Unit 2 AFW MOVs, wait 2 minutes and report MOVs closed.</p> <p><b>When directed</b> to open AFW cross-tie MOVs, wait 1 minute and report MOVs open.</p> <p><b>When directed</b> to start AFW pumps, wait 30 seconds and report 2-FW-P-3A and B started with low amps indicated.</p> <p><b>If directed</b>, to start 2-FW-P-2, actuate <b>Trigger 7</b>, and report 2-FW-P-2, Unit 2 TDAFW pump started.</p> <p><b>If directed</b>, operators dispatched to check AFW alignment.</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
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<p><b>STEP 5:</b></p> <ol style="list-style-type: none"> <li>4. a) Check CN system - IN SERVICE AND INTACT</li> <li>b) Check MFW system – INTACT</li> <li>c) Reset FW isolation signal: <ol style="list-style-type: none"> <li>1) Reset both trains of SI if required</li> <li>2) Push both FW isolation reset pushbuttons</li> </ol> </li> <li>d) Establish MFW flow: <ol style="list-style-type: none"> <li>1) Start one MFW pump</li> <li>2) Manually or locally open appropriate feed pump discharge MOV</li> <li>3) Control flow with SG FW bypass flow valve(s) OR feed REG valve(s) locally</li> </ol> </li> </ol> <p><b>STANDARD:</b></p> <ol style="list-style-type: none"> <li>a) Checks CN system intact by noting 1-CN-P-1B/1C running.</li> <li>b) Check MFW system intact by noting secondary parameters or asking Evaluator or Unit 2 (Simulator Instructor.)</li> <li>c) <b>*Reset SI Signal:</b> Identify SI is Reset or push SI Reset Pushbuttons (BB1, sloping section.)  <b>*Push BOTH FW RESET Pushbuttons,</b> on BB2.</li> <li><b>*d) Establish MFW Flow:</b> <ol style="list-style-type: none"> <li>1) <b>Start 1-FW-P-1A</b>, by closing 1-FW-P-1A1 and 1A2 breakers, and checking amps indicated on BB2, sloping section. <b>OR Start 1-FW-P-1B</b>, by closing 1-FW-P-1B1 and 1B2 breakers, and checking amps indicated on BB2, sloping section.</li> <li>2) <b>Open 1-FW-MOV-150A</b>, if “A” FW pump started; <b>OR Open 1-FW-MOV-150B</b>, if 1-FW-P-1B started.</li> <li>3) <b>Open one or more FRV bypass valves</b>, by raising demand on 1-FW-HCV-155A/155B/155C on BB2.</li> </ol> </li> </ol> <p><b>EVALUATOR’S NOTE:</b></p> <p><b>If asked</b>, for a) or b) above, state there have been no reports of leakage in Unit 1 Turbine Building.</p> <p><b>Step d) above:</b> Candidate may reset “A” or “B” MFP breaker Amber lights by taking breaker control switch to PTL and returning to Auto.</p> <p><b>Simulator Instructor’s Note:</b></p> <p><b>If asked</b>, for a) or b) above, state there have been no reports of leakage in Unit 1 Turbine Building.</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
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<p><b>STEP 6:</b></p> <p>Step 5: CHECK SG LEVELS:</p> <ul style="list-style-type: none"> <li>a) Narrow range level in at least one SG - GREATER THAN 12% [18%]</li> <li>a) RNO IF feed flow to at least one SG verified, THEN maintain flow to restore narrow range level to greater than 12% [18%]. IF flow NOT verified, THEN GO TO Step 6.</li> </ul> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>a) Checks SG NR level using meters on VB2 and determines SG NR level not on scale.</li> <li>b) RNO Verifies MFW flow established using <b>ANY</b> of the following:             <ul style="list-style-type: none"> <li>1) PCS FW flow indication.</li> <li>2) SG WR level rate of change rise.</li> <li>3) RCS Temperature lowering.</li> </ul> </li> </ul> <p><b>EVALUATOR'S NOTE:</b></p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
<p><b>STEP 7:</b></p> <p><b>STANDARD:</b></p> <p>REPORTS TO SHIFT MANAGER (EVALUATOR).</p> <p>Flow restored to A/B/C SG IAW FR-H.1 with a MFP and the FRV bypass valves.</p> <p><b>STOP TIME:</b> _____</p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>

COMMENTS:

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NUMBER	PROCEDURE TITLE	REVISION
1-FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	38
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p><b>CAUTION:</b> • If total feed flow is less than 350 gpm [450 gpm] due to operator action, this procedure should NOT be performed.</p> <p>• Feed flow should NOT be reestablished to any faulted SG if a non-faulted SG is available.</p> <p>*****</p>		
1.	<p>↓ CHECK IF SECONDARY HEAT SINK IS REQUIRED:</p> <p><input checked="" type="checkbox"/> a) RCS pressure - GREATER THAN ANY NON-FAULTED SG PRESSURE</p> <p><input checked="" type="checkbox"/> b) RCS hot leg temperature - GREATER THAN 350°F</p>	<p><input type="checkbox"/> a) RETURN TO procedure and step in effect.</p> <p><input type="checkbox"/> b) Try to put RHR system in service while continuing this procedure. Refer to 1-OP-RH-001, RHR OPERATIONS.</p> <p><input type="checkbox"/> IF adequate cooling with RHR is established, <u>THEN</u> RETURN TO procedure and step in effect.</p>

NUMBER	PROCEDURE TITLE	REVISION
1-FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	38
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*2. ↓	CHECK IF BLEED AND FEED IS REQUIRED	
	a) Check for either of the following conditions <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Wide range level in any 2 SGs - LESS THAN 12% [27%]</li> <li><u>OR</u></li> <li><input checked="" type="checkbox"/> RCS pressure - GREATER THAN 2335 PSIG DUE TO LOSS OF SECONDARY HEAT SINK</li> </ul>	<input type="checkbox"/> a) GO TO Step 3.
	<input type="checkbox"/> b) Stop all RCPs <input type="checkbox"/> c) GO TO Step 12	
3. ↓	TRY TO ESTABLISH AFW FLOW TO AT LEAST ONE SG:	
	<input checked="" type="checkbox"/> a) Check SG blowdown TVs - CLOSED <input checked="" type="checkbox"/> b) Check AFW MOVs - OPEN <input checked="" type="checkbox"/> c) Check ECST - AVAILABLE	<input type="checkbox"/> a) Manually close valves. <input type="checkbox"/> b) Manually align valves. <input type="checkbox"/> c) Use alternate ECST supply IAW Attachment 1.
(STEP 3 CONTINUED ON NEXT PAGE)		

NUMBER	PROCEDURE TITLE	REVISION
1-FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	38
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3.	TRY TO ESTABLISH AFW FLOW TO AT LEAST ONE SG: (Continued)	
	<p>d) Check AFW - AVAILABLE</p> <p><input checked="" type="checkbox"/> 1) Start AFW Pumps</p> <p><input checked="" type="checkbox"/> 2) Check total flow to SGs - GREATER THAN 350 GPM [450 GPM]</p>	<p><input type="checkbox"/> d) IF minimum feed flow <u>NOT</u> established, <u>THEN</u> do the following:</p> <p><input checked="" type="checkbox"/> 1) Stop ALL RCPs.</p> <p><input checked="" type="checkbox"/> 2) IF desired to transfer EDG 3 to Bus 2J to restore power to 2-FW-P-3B, <u>THEN</u> GO TO Attachment 2.</p> <p><input checked="" type="checkbox"/> 3) Have Unit 2 operator close Unit 2 AFW MOVs.</p> <p>4) Have Unit 2 operator open the following valves:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> • 1-FW-MOV-160A</li> <li><input checked="" type="checkbox"/> • 1-FW-MOV-160B</li> </ul> <p><input checked="" type="checkbox"/> 5) Have Unit 2 operator start AFW pump(s).</p> <p><input type="checkbox"/> 6) Control flow to restore narrow range level in at least one SG greater than 12% [18%].</p> <p><input type="checkbox"/> 7) <u>WHEN</u> narrow range level in at least one SG greater than 12% [18%], <u>THEN</u> RETURN TO procedure and step in effect.</p> <div style="border: 2px solid red; padding: 5px;"> <p><input type="checkbox"/> 8) IF minimum AFW flow <u>NOT</u> established, <u>THEN</u> try to locally restore AFW flow <u>AND</u> GO TO Step 4.</p> </div>
	<p><input type="checkbox"/> e) RETURN TO procedure and step in effect</p>	

NUMBER	PROCEDURE TITLE	REVISION
1-FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	38
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.	TRY TO ESTABLISH MFW FLOW TO AT LEAST ONE SG:	
<input checked="" type="checkbox"/>	a) Check CN system - IN SERVICE AND INTACT	a) Do the following:
		<input type="checkbox"/> 1) Try to put the CN system in service.
		<input type="checkbox"/> 2) IF CN system can <u>NOT</u> be placed in service <u>OR NOT</u> intact, <u>THEN</u> GO TO Step 11.
<input checked="" type="checkbox"/>	b) Check MFW system - INTACT	<input type="checkbox"/> b) GO TO Step 11.
	c) Reset FW isolation signal:	
<input checked="" type="checkbox"/>	1) Reset both trains of SI if required	
<input checked="" type="checkbox"/>	2) Push both FW isolation reset pushbuttons	
	d) Establish MFW flow:	<input type="checkbox"/> d) GO TO Step 6.
<input checked="" type="checkbox"/>	1) Start one MFW pump	
<input checked="" type="checkbox"/>	2) Manually or locally open appropriate feed pump discharge MOV	
<input checked="" type="checkbox"/>	3) Control flow with SG FW bypass flow valve(s) OR feed REG valve(s) locally	
5.	CHECK SG LEVELS:	
<input checked="" type="checkbox"/>	a) Narrow range level in at least one SG - GREATER THAN 12% [18%]	<input checked="" type="checkbox"/> a) IF feed flow to at least one SG verified, <u>THEN</u> maintain flow to restore narrow range level to greater than 12% [18%]. IF flow <u>NOT</u> verified, <u>THEN</u> GO TO Step 6.
<input type="checkbox"/>	b) RETURN TO procedure and step in effect	

**Operator Directions Handout  
(TO BE GIVEN TO APPLICANT)**

**Initial Conditions**

- Unit 2 operating at 100% power with all cross-ties operable.
- Unit 1 initially operating at 100%.
- Unit 1 Reactor tripped and SI actuated due to an RCS leak.
- Unit 1 “J” 4160V emergency bus was lost.
- #3 EDG started, but its output breaker (15J3) tripped.
- Annunciator KG4, 4KV EMERG BUS EMERG SUP BKR AUTO TRIP, actuated.
- The TDAFW pump, 1-FW-P-2, tripped on startup, local investigation in progress.

**Initiating Cues**

I am the Nuclear Shift Manager. You are the Unit 1 BOP.

Unit 1 is experiencing a Loss of Secondary Heat Sink.

You are to perform 1-FR-H.1, Response to Loss of Secondary Heat Sink, to restore flow to the Steam Generators.

When you finish the actions necessary to accomplish this task, please inform me.

NUMBER	PROCEDURE TITLE	REVISION
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STEP	ACTION/ EXPECTED RESPONSE	RESPONSE NOT OBTAINED						
<p>*****</p> <p><b>CAUTION:</b> • If total feed flow is less than 350 gpm [450 gpm] due to operator action, this procedure should NOT be performed.</p> <p>• Feed flow should NOT be reestablished to any faulted SG if a non-faulted SG is available.</p> <p>*****</p>								
1. ____	<p>CHECK IF SECONDARY HEAT SINK IS REQUIRED:</p> <table border="0"> <tr> <td><input type="checkbox"/> a) RCS pressure - GREATER THAN ANY NON-FAULTED SG PRESSURE</td> <td><input type="checkbox"/> a) RETURN TO procedure and step in effect.</td> </tr> <tr> <td><input type="checkbox"/> b) RCS hot leg temperature - GREATER THAN 350°F</td> <td><input type="checkbox"/> b) Try to put RHR system in service while continuing this procedure. Refer to 1-OP-RH-001, RHR OPERATIONS.</td> </tr> <tr> <td></td> <td><input type="checkbox"/> IF adequate cooling with RHR is established, <u>THEN</u> RETURN TO procedure and step in effect.</td> </tr> </table>		<input type="checkbox"/> a) RCS pressure - GREATER THAN ANY NON-FAULTED SG PRESSURE	<input type="checkbox"/> a) RETURN TO procedure and step in effect.	<input type="checkbox"/> b) RCS hot leg temperature - GREATER THAN 350°F	<input type="checkbox"/> b) Try to put RHR system in service while continuing this procedure. Refer to 1-OP-RH-001, RHR OPERATIONS.		<input type="checkbox"/> IF adequate cooling with RHR is established, <u>THEN</u> RETURN TO procedure and step in effect.
<input type="checkbox"/> a) RCS pressure - GREATER THAN ANY NON-FAULTED SG PRESSURE	<input type="checkbox"/> a) RETURN TO procedure and step in effect.							
<input type="checkbox"/> b) RCS hot leg temperature - GREATER THAN 350°F	<input type="checkbox"/> b) Try to put RHR system in service while continuing this procedure. Refer to 1-OP-RH-001, RHR OPERATIONS.							
	<input type="checkbox"/> IF adequate cooling with RHR is established, <u>THEN</u> RETURN TO procedure and step in effect.							



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*2. ____	CHECK IF BLEED AND FEED IS REQUIRED	
	a) Check for either of the following conditions <ul style="list-style-type: none"> <li><input type="checkbox"/> • Wide range level in any 2 SGs - LESS THAN 12% [27%]</li> </ul> <p style="text-align: center;"><u>OR</u></p> <li><input type="checkbox"/> • RCS pressure - GREATER THAN 2335 PSIG DUE TO LOSS OF SECONDARY HEAT SINK</li>	<input type="checkbox"/> a) GO TO Step 3.
	<input type="checkbox"/> b) Stop all RCPs <input type="checkbox"/> c) GO TO Step 12	
3. ____	TRY TO ESTABLISH AFW FLOW TO AT LEAST ONE SG:	
	<input type="checkbox"/> a) Check SG blowdown TVs - CLOSED <input type="checkbox"/> b) Check AFW MOVs - OPEN <input type="checkbox"/> c) Check ECST - AVAILABLE	<input type="checkbox"/> a) Manually close valves. <input type="checkbox"/> b) Manually align valves. <input type="checkbox"/> c) Use alternate ECST supply IAW Attachment 1.
(STEP 3 CONTINUED ON NEXT PAGE)		

NUMBER	PROCEDURE TITLE	REVISION
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3.	TRY TO ESTABLISH AFW FLOW TO AT LEAST ONE SG: (Continued)	
	d) Check AFW - AVAILABLE	<input type="checkbox"/> d) IF minimum feed flow <u>NOT</u> established, <u>THEN</u> do the following:
<input type="checkbox"/>	1) Start AFW Pumps	<input type="checkbox"/> 1) Stop ALL RCPs.
<input type="checkbox"/>	2) Check total flow to SGs - GREATER THAN 350 GPM [450 GPM]	<input type="checkbox"/> 2) IF desired to transfer EDG 3 to Bus 2J to restore power to 2-FW-P-3B, <u>THEN</u> GO TO Attachment 2.
		<input type="checkbox"/> 3) Have Unit 2 operator close Unit 2 AFW MOVs.
		4) Have Unit 2 operator open the following valves:
		<input type="checkbox"/> • 1-FW-MOV-160A
		<input type="checkbox"/> • 1-FW-MOV-160B
		<input type="checkbox"/> 5) Have Unit 2 operator start AFW pump(s).
		<input type="checkbox"/> 6) Control flow to restore narrow range level in at least one SG greater than 12% [18%].
		<input type="checkbox"/> 7) <u>WHEN</u> narrow range level in at least one SG greater than 12% [18%], <u>THEN</u> RETURN TO procedure and step in effect.
		<input type="checkbox"/> 8) IF minimum AFW flow <u>NOT</u> established, <u>THEN</u> try to locally restore AFW flow <u>AND</u> GO TO Step 4.
<input type="checkbox"/>	e) RETURN TO procedure and step in effect	

NUMBER  1-FR-H.1	PROCEDURE TITLE  RESPONSE TO LOSS OF SECONDARY HEAT SINK	REVISION 38  PAGE 5 of 22
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STEP	ACTION/ EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. ____	TRY TO ESTABLISH MFW FLOW TO AT LEAST ONE SG:	
	<input type="checkbox"/> a) Check CN system - IN SERVICE AND INTACT	a) Do the following:
		<input type="checkbox"/> 1) Try to put the CN system in service.
		<input type="checkbox"/> 2) IF CN system can <u>NOT</u> be placed in service <u>OR NOT</u> intact, <u>THEN</u> GO TO Step 11.
	<input type="checkbox"/> b) Check MFW system - INTACT	<input type="checkbox"/> b) GO TO Step 11.
	c) Reset FW isolation signal:	
	<input type="checkbox"/> 1) Reset both trains of SI if required	
	<input type="checkbox"/> 2) Push both FW isolation reset pushbuttons	
	d) Establish MFW flow:	<input type="checkbox"/> d) GO TO Step 6.
	<input type="checkbox"/> 1) Start one MFW pump	
	<input type="checkbox"/> 2) Manually or locally open appropriate feed pump discharge MOV	
	<input type="checkbox"/> 3) Control flow with SG FW bypass flow valve(s) OR feed REG valve(s) locally	
5. ____	CHECK SG LEVELS:	
	<input type="checkbox"/> a) Narrow range level in at least one SG - GREATER THAN 12% [18%]	<input type="checkbox"/> a) IF feed flow to at least one SG verified, <u>THEN</u> maintain flow to restore narrow range level to greater than 12% [18%]. IF flow <u>NOT</u> verified, <u>THEN</u> GO TO Step 6.
	<input type="checkbox"/> b) RETURN TO procedure and step in effect	

U.S. Nuclear Regulatory Commission  
Surry Power Station

SR17-301

**Simulator** Job Performance Measure [EPE007EA2.02 4.3/4.6]  
[Alternate Path]

Applicant \_\_\_\_\_

Start Time \_\_\_\_\_

Examiner \_\_\_\_\_

Date \_\_\_\_\_

Stop Time \_\_\_\_\_

**Title**

**Perform E-0, Immediate Actions**

**K/A: EPE007EA2.02 Proper actions to be taken if the automatic safety functions have not taken place 4.3/4/6**

**Applicability**

**Estimated Time**

**Actual Time**

RO/SRO(I)

5 Minutes

\_\_\_\_\_ Minutes

**Conditions**

- Task is to be PERFORMED in the simulator.
- Unit 1 operating at 100%, and stable.

**Standards**

- Perform E-0, Reactor Trip or Safety Injection, Steps 1 through 4, from memory.

**Initiating Cues**

- Given an automatic reactor trip, perform E-0 Immediate Actions from memory.
- Shift manager direction.

**Terminating Cues**

- 1-E-0, Reactor Trip or Safety Injection, Step 4 Completed.

**Procedures**

- 0-AP-1.00, Rod Control System Malfunction, Rev. 27.
- 1-E-0, Reactor Trip or Safety Injection, Rev. 72.

**Tools and Equipment**

- None

**Safety Considerations**

- None

**Simulator Setup**

- Recall IC-408 (T-Rex: 418), OR
- Call up 100% power IC and initialize. Place simulator in RUN.
- Load the following:  
Remotes, EH, TURB\_TRIP\_LOC, Trigger 1.  
RD18, Failure of Auto Trip to SCRAM Reactor, Active.  
MS16, Failure of Relay MS-RLY-104, TRUE, Active.  
FP0301, FP0302, Active.  
Load Switch Override:  
MS, MSSOV104\_OPEN, Override ON, Active.  
PCS105SPKR\_NULL, Active.
- Freeze the Simulator and Store the IC for later performance.

**Initial Conditions**

- Unit 1 is operating at 100% and stable.

**Initiating Cues**

- I am the Nuclear Shift Manager. You are the Unit 1 RO.
- Respond to Plant Events.

**Notes to the Evaluator:**

- Task critical elements are bolded and denoted by an asterisk (\*).

**PERFORMANCE CHECKLIST**

**Notes to the Evaluator**

- Task critical elements are bolded and denoted by an asterisk (\*).
- *An additional instructor will be needed to silence alarms for the examinee.*
- **START TIME\_\_\_\_\_:**

<p><b>STEP 1:</b></p> <p>Identifies Manual Reactor trip required using the following Alarms and indications:  1E-A8, REACTOR TRIPPED BY TURB TRIP, FIRST OUT (RED) LIT.  Annunciators 1F-F4/5/6 RX TRIP CH 1/2/3 AUTO STOP OIL DUMP – LIT.  Reactor Trip Breakers indicate Closed (Red Lights LIT, Green OFF)  Control Rods FULL OUT (228 Steps) using CERPI Trains “A” and “B” Display.  “D” Bank Control Rods Inserting at 72 Steps per Minute.</p> <p>[1] CHECK REACTOR TRIP:  a) Manually trip reactor  b) Check the following:  • All Rods On Bottom light - LIT  • Reactor trip and bypass breakers - OPEN  • Neutron flux - LOWERING</p> <p><b>STANDARD:</b></p> <p><b>*a) Pushes Reactor Trip Pushbutton on Benchboard 1-1 or 1-2.</b>  b) Checks the following:  All Rods on Bottom Light LIT on CERPI A and/or B.  Identifies Reactor Trip and Bypass breakers Open on BB2, sloping section.  Identifies Neutron Flux Lowering using PR NIs (BB2) near zero %, and IR Nis (BB2) indication lowering, IR SUR indication (-) 0.5 DPM.  c) Reports “Reactor Tripped” to Evaluator.</p> <p><b>EVALUATOR’S NOTE:</b></p> <p>Candidate announces and commences E-0 Immediate Actions.</p> <p>Discretionary for Evaluator to repeat back “Reactor Tripped.”</p> <p><b>Simulator Instructor's Note</b></p> <p>The Simulator should be in Run when the Candidate enters. When the Candidate is ready, implement <b>Trigger 1</b>.</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
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<p><b>STEP 2:</b></p> <p>[2] CHECK TURBINE TRIP:</p> <ul style="list-style-type: none"> <li>a) Manually trip the turbine</li> <li>b) Check all turbine stop valves – CLOSED</li> <li>c) Isolate reheaters by closing MSR steam supply SOV <ul style="list-style-type: none"> <li>• 1-MS-SOV-104</li> </ul> </li> <li>c) RNO IF reheater FCVs will NOT close, THEN close MSR steam supply MOVs.</li> <li>d) Check generator output breakers – OPEN (Time Delayed)</li> <li>e) RNO IF Generator Output Breakers do NOT open within 30 seconds, THEN manually open output breakers AND place the EXCITATION control switch in OFF.</li> </ul> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>a) Pushes BOTH Turbine Trip pushbuttons simultaneously.</li> <li>b) Checks Turbine Stop Valves closed using Valve Position Lights on Turbine Controls Section (SV1/SV2/SV3/SV4 – GREEN Light ON, RED Light OFF).</li> <li>*c) Identifies MSR Steam Supply Open (RED) Lights LIT, <b>Places 1-MS-SOV-104 switch to CLOSE</b>, Identifies MSR Steam Supply OPEN lights remain LIT.</li> <li>*d) <b>RNO Takes control switch for 1-MS-MOV-100A/100B/100C/100D to close</b>, and identifies MS MOV indicating lights intermediate.</li> <li>e) Identifies Generator Output Breakers open after 30 Seconds.</li> <li>f) Reports “Turbine Tripped”.</li> </ul> <p><b>EVALUATOR’S NOTE:</b></p> <p>Discretionary for Evaluator to repeat back “Turbine Tripped”.</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
<p><b>STEP 7:</b></p> <p>[3] CHECK BOTH AC EMERGENCY BUSES - ENERGIZED</p> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>a) Checks “H” and “J” Emergency buses energized by noting voltage between 4000 and 4400 VAC on #1 EDG Panel and #3 EDG Panel, respectively.</li> <li>b) Reports “AC Emergency Buses Energized.”</li> </ul> <p><b>EVALUATOR’S NOTE:</b></p> <p>Candidate may also vocalize “H” and “J” Frequency when checking voltages for emergency buses.</p> <p>Discretionary for Evaluator to repeat back “AC Emergency Buses Energized.”</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>

<p><b>STEP 8:</b></p> <p>[4] CHECK IF SI INITIATED:</p> <p>a) Check if SI is actuated:</p> <ul style="list-style-type: none"> <li>• LHSI pumps - RUNNING</li> <li>• SI annunciators - LIT <ul style="list-style-type: none"> <li>• A-F-3</li> <li>• A-F-4</li> </ul> </li> </ul> <p>a) RNO Check if SI is required or imminent as indicated by any of the following:</p> <ul style="list-style-type: none"> <li>• Low PRZR pressure</li> <li>• High CTMT pressure</li> <li>• High steamline differential pressure</li> <li>• High steam flow with low Tave or low line pressure</li> </ul> <p>IF SI is NOT required, THEN GO TO 1-ES-0.1, REACTOR TRIP RESPONSE.</p> <p><b>STANDARD:</b></p> <p>a) Check if SI Actuated Identifies 1-SI-P-1A and 1-SI-P-1B Not running by checking breaker indicating Lights (GREEN Light LIT, RED Light OUT), and 0 amps indicated (BB1, sloping section). Identifies SI Initiated Train A and Train B, Not LIT.</p> <p>a) RNO Check SI required or imminent Identifies RCS Pressure &gt; 1885 psig and rising, using ICCM WR pressure (VB 2) or RCS Pressure Protection channels (VB 1.) Identifies CTMT Pressure &lt; 17.7 psia (Hi CLS setpoint) and stable using CTMT pressure indications 1-LM-PI-100A/100B/100C/100D (VB1). Identifies no steam line differential (&lt; 120 psid) using Steam Header Pressure and Steam Generator Pressure meters on VB2. Identifies Hi Steam Flow Logic not met using A/B/C Steam Line Flow meters on VB2.</p> <p>b) Reports "SI is not in service or required, E-0 Immediate Actions are complete, and recommend Transition to ES-0.1."</p> <p><b>EVALUATOR'S NOTE:</b></p> <p>Imminent is defined as "within the next one to two hours" as defined in the Emergency Plan. Discretionary to repeat back "SI is not in service or required, E-0 Immediate Actions are complete, and recommend Transition to ES-0.1."</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
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NUMBER	PROCEDURE TITLE	REVISION
1-E-0	REACTOR TRIP OR SAFETY INJECTION	71
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STEP	ACTION/ EXPECTED RESPONSE	RESPONSE NOT OBTAINED
[ 1 ]	<p><del>/</del> CHECK REACTOR TRIP:</p> <p><input checked="" type="checkbox"/> a) Manually trip reactor</p> <p>b) Check the following:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> • All Rods On Bottom light - LIT</li> <li><input checked="" type="checkbox"/> • Reactor trip and bypass breakers - OPEN</li> <li><input checked="" type="checkbox"/> • Neutron flux - LOWERING</li> </ul>	<p><input type="checkbox"/> IF reactor will NOT trip, THEN GO TO 1-FR-S.1, RESPONSE TO NUCLEAR POWER GENERATION/ATWS.</p>
[ 2 ]	<p><del>/</del> CHECK TURBINE TRIP:</p> <p><input checked="" type="checkbox"/> a) Manually trip the turbine</p> <p><input checked="" type="checkbox"/> b) Check all turbine stop valves - CLOSED</p> <p><input type="checkbox"/> c) Isolate reheaters by closing MSR steam supply SOV</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> • 1-MS-SOV-104</li> </ul> <p><input type="checkbox"/> d) Check generator output breakers - OPEN (Time Delayed)</p>	<p>b) Check either of the following:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> • All Turbine Governor Valves - CLOSED</li> <li>OR</li> <li><input type="checkbox"/> • Turbine speed - LOWERING</li> <li>OR</li> <li><input type="checkbox"/> • Generator Motoring - INITIATED</li> <li><input type="checkbox"/> IF turbine will NOT trip, THEN close MSTVs.</li> </ul> <p><input type="checkbox"/> c) IF reheater FCVs will NOT close, THEN close MSR steam supply MOVs.</p> <p><input type="checkbox"/> d) IF Generator Output Breakers do NOT open within 30 seconds, THEN manually open output breakers AND place the EXCITATION control switch in OFF.</p>

NUMBER	PROCEDURE TITLE	REVISION
1-E-0	REACTOR TRIP OR SAFETY INJECTION	71
		PAGE 3 of 15

STEP	ACTION/ EXPECTED RESPONSE	RESPONSE NOT OBTAINED
[ 3 ]	CHECK BOTH AC EMERGENCY BUSES - ENERGIZED	<p>Do the following:</p> <p><input type="checkbox"/> a) IF no AC Emergency Bus is energized, THEN GO TO 1-ECA-0.0, LOSS OF ALL AC POWER.</p> <p><input type="checkbox"/> b) Try to restore power to deenergized AC Emergency Bus. Initiate 1-AP-10.07, LOSS OF UNIT 1 POWER.</p>
[ 4 ]	<p>CHECK IF SI INITIATED:</p> <p>a) Check if SI is actuated:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> • LHSI pumps - RUNNING</li> <li><input checked="" type="checkbox"/> • SI annunciators - LIT</li> <li><input checked="" type="checkbox"/> • A-F-3</li> <li><input checked="" type="checkbox"/> • A-F-4</li> </ul> <p><input type="checkbox"/> b) Manually initiate SI</p>	<p>a) Check if SI is required or imminent as indicated by any of the following:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> • Low PRZR pressure</li> <li><input checked="" type="checkbox"/> • High CTMT pressure</li> <li><input checked="" type="checkbox"/> • High steamline differential pressure</li> <li><input checked="" type="checkbox"/> • High steam flow with low Tave or low line pressure</li> <li><input type="checkbox"/> IF SI is required, THEN GO TO Step 4b.</li> <li><input checked="" type="checkbox"/> IF SI is NOT required, THEN GO TO 1-ES-0.1, REACTOR TRIP RESPONSE.</li> </ul>

**Operator Directions Handout  
(TO BE GIVEN TO APPLICANT)**

**Initial Conditions**

- Unit 1 is operating at 100% and stable.

**Initiating Cues**

- I am the Nuclear Shift Manager. You are the Unit 1 RO.
- Respond to Plant Events.

U.S. Nuclear Regulatory Commission  
Surry Power Station

SR17-301

**Simulator** Job Performance Measure [APE025AA1.09 3.2/3.1]

Applicant\_\_\_\_\_

Start Time\_\_\_\_\_

Examiner\_\_\_\_\_

Date \_\_\_\_\_

Stop Time\_\_\_\_\_

**Title****RESPOND TO A LOSS OF THE OPERATING RHR PUMP**

**K/A: APE025AA1.09 LPI pump switches, ammeter, discharge pressure gauge, flow meter, and indicators  
3.2/3.1**

**Applicability****Estimated Time****Actual Time**

RO/SRO(I)

15 Minutes

\_\_\_\_\_ Minutes

**Conditions**

- Task is to be PERFORMED in the simulator.
- 1-RH-P-1A is in service on "A" RHR HX.

**Standards**

- 1-RH-P-1B started and RHR flow restored in accordance with 1-AP-27.00, Loss of Decay Heat Removal Capability.

**Initiating Cues**

- Trip of the operating RHR pump.
- Shift Manager direction.

**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. 28.

**Tools and Equipment**

- None

**Safety Considerations**

- None

**Simulator Setup**

- Call up IC -409 (T-Rex: 419) or IC with RHR in service (IC-28) and initialize. Place simulator in RUN.
- Verify "A" RHR pump running and "B" in AUTO.
- Malfunction FP0301, FP0302, Active. Remote PCS105SPKR\_NULL, Active.
- Verify 1-RH-FCV-1605 in auto with flowrate set at 3600 gpm. Set 1-RH-HCV-1758 to 90% Demand.
- Reduce Steam Dump Demand to lower Cooldown rate; Fill VCT to 50%, Place Blender Control Switch in "OFF".
- Insert RH0501 on Trigger 1, RHR PUMP 1-RH-P-1A OVERCURRENT TRIP, Activate Trigger 1, and allow annunciators B-G-6 & B-G-7 to alarm.
- 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.

**Initial Conditions**

- I am the Shift Manager and you are the Unit RO.
- The unit has been operating on RHR with 1-RH-P-1A, "A" RHR pump is in service on "A" RHR heat exchanger.
- We just received annunciator B-G-6, RHR HX LO FLOW, and 1-RH-P-1A has tripped.

**Initiating Cues**

- Here is a copy of 1-AP-27.00, Loss of Decay Heat Removal Capability. I need you to perform the necessary steps to address this condition and restore RHR flow. No RCS draindown evolutions are in progress.
- When you complete AP-27.00, please inform me.

**Notes to the Evaluator:**

- Task critical elements are bolded and denoted by an asterisk (\*).
- Critical step sequencing requirements: 4 before 5 before 6.

**PERFORMANCE CHECKLIST**

**Notes to the Evaluator**

- Task critical elements are bolded and denoted by an asterisk (\*).
- *An additional instructor will be needed to silence alarms for the examinee.*
- **START TIME\_\_\_\_\_:**

<p><b>STEP 1:</b></p> <p>CAUTIONS prior to Step 1:</p> <ul style="list-style-type: none"> <li>• Loss of RHR due to a total loss of IA is addressed by 0-AP-40.00, NON-RECOVERABLE LOSS OF IA.</li> <li>• 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.</li> <li>• Loss of RHR may cause CTMT radiological and heat stress conditions to degrade. Local actions in CTMT should be coordinated with HP.</li> <li>• During solid plant operation, inadvertent actuation of the OPMS may occur if letdown is isolated.</li> <li>• If RCS boiling occurs, non-essential personnel should be evacuated from CTMT.</li> </ul> <p>NOTE prior to Step 1: EIPs may be applicable</p> <p>1. CHECK RCS INVENTORY – LOWERING</p> <ul style="list-style-type: none"> <li>• PRZR level - LOWERING</li> <li>• Standpipe level - LOWERING</li> <li>• Reactor cavity level - LOWERING</li> <li>• RCS Narrow Range level – LOWERING</li> <li>• CTMT sump level - RISING</li> <li>• Makeup rate - RISING</li> <li>• PRT level, pressure, or temperature - RISING</li> <li>• PDTT level - RISING</li> <li>• RWST level – RISING</li> </ul> <p>1. RNO GO TO Step 4.</p> <p><b>STANDARD:</b></p> <p>a) Acknowledges CAUTIONS and NOTE prior to Step 1.</p> <p>b) Determines Inventory not lowering.</p> <p>c) Goes to Step 4.</p> <p><b>EVALUATOR’S NOTE:</b></p> <p><b>If asked:</b> No personnel are in Containment.</p> <p><b>If asked:</b> Provide cue Rx head is on; cavity is not flooded.</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
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<p><b>STEP 2:</b></p> <p>4. CHECK RHR PUMP - ONE RUNNING</p> <p>4. RNO IF Emergency Bus power is available, THEN do the following:</p> <ul style="list-style-type: none"> <li>a) IF stub bus NOT energized, THEN do the following:</li> <li>b) IF Unit 1 CC pump NOT running, THEN do the following:</li> <li>c) IF CC pump NOT running on either unit, THEN do the following:</li> <li>d) Manually close RH control valves: <ul style="list-style-type: none"> <li>• 1-RH-FCV-1605</li> <li>• 1-RH-HCV-1758</li> </ul> </li> <li>e) Start one RHR pump.</li> <li>f) Adjust RH control valves to return flow to pre-event rate: <ul style="list-style-type: none"> <li>• 1-RH-FCV-1605</li> <li>• 1-RH-HCV-1758</li> </ul> </li> <li>g) IF an RHR pump can NOT be started, THEN GO TO Step 16.</li> </ul> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>a) Identifies stub bus energized using PCS.</li> <li>b) Identifies 1-CC-P-1A and 1-CC-P-1B running using CC Pump breaker indicating Lights (RED ON, Green OFF) on VB2, and CC Pump amps indicated (VB2).</li> <li>*c) Places 1-RH-FCV-1605 in Manual and lowers demand to 0.</li> <li>*d) Adjusts 1-RH-1758 to 100% demand using POT.</li> <li>*e) Announces and starts 1-RH-P-1B.</li> <li>*f) Adjusts 1-RH-FCV-1605 to ~3500 gpm flow and places in Auto.</li> <li>*g) Adjusts 1-RH-HCV-1758 to ~ 90% demand.</li> <li>h) Identifies 1-RH-P-1B started, GOES TO next page).</li> <li>i) Identifies RHR pump not lost due to Loss of Emergency Bus, GOES TO Step 5.</li> </ul> <p><b>EVALUATOR'S NOTE:</b></p> <p>If asked, no one is in CTMT to perform pre-start checks on 1-RH-P-1B.</p> <p>If Candidate: Opens 1-RH-HCV-1758 fully prior to starting "B" RHR pump; the limits for CC temperature exiting "A" RHR HX and RHR System Heatup and Cooldown rate will both be violated.</p> <p><b>COMMENTS:</b></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>
<p><b>STEP 3:</b></p> <p>5. CHECK RHR FLOW - INDICATED ON RHR SYS FLOW</p> <ul style="list-style-type: none"> <li>• 1-RH-FI-1605</li> </ul> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>a) Checks flow on 1-RH-FI-1605 at ~ 3500 gpm using 1-RH-FI-1605 (VB1) or PCS.</li> </ul> <p><b>EVALUATOR'S NOTE:</b></p> <p>May use PCS to adjust RHR flowrate to ~3500 gpm.</p> <p><b>NOTE:</b> Candidate may place 1-RH-P-1A in PTL to clear lock-out alarm (1B-G7)</p> <p><b>COMMENTS:</b></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>



<p><b>STEP 4:</b></p> <p>6. CHECK RHR PUMP - VORTEXING</p> <ul style="list-style-type: none"> <li>• Flow indication on 1-RH-FI-1605 - OSCILLATING</li> <li>• Amperage indication – OSCILLATING</li> </ul> <p>6. RNO GO TO Step 12</p> <p><b>STANDARD:</b></p> <p>a) Checks flow indicator 1-RH-FI-1605 (VB1) or PCS stable.</p> <p>b) Checks amp indicator for 1-RH-P-1B stable on BB1 sloping section.</p> <p>c) Goes to Step 12.</p> <p><b>EVALUATOR’S NOTE: None.</b></p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
<p><b>STEP 5:</b></p> <p>12. CHECK RHR HEAT SINK:</p> <p>a) Flow on 1-RH-FI-1605 – NORMAL</p> <p>b) CC to RHR HX</p> <p>1) In-Service RHR HX CC Outlet HDR Flow - NORMAL</p> <ul style="list-style-type: none"> <li>• 1-CC-FI-110A</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• 1-CC-FI-110B</li> </ul> <p>2) In-Service RHR HX CC Outlet HDR TEMP - NORMAL</p> <ul style="list-style-type: none"> <li>• 1-CC-TI-109A</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• 1-CC-TI-109B</li> </ul> <p><b>STANDARD:</b></p> <p>a) Checks 1-RH-FI-1605 flow ~3500 gpm</p> <p>b) Identifies 1-CC-FI-110A indication ~5200 gpm using meter on VB1.</p> <p>c) Identifies 1-CC-TI-109A indication ~95°F using meter on VB1.</p> <p><b>EVALUATOR’S NOTE: None.</b></p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>

<p><b>STEP 6:</b></p> <p>13. CHECK RCS TEMPERATURE - STABLE OR LOWERING</p> <p><b>STANDARD:</b></p> <p>a) Checks RCS temperature using C Loop WR Temperature Recorder, 1-RC-TR-1433 on VB2, or RHR Temp Recorder, 1-RH-TR-1604 on VB1.</p> <p>b) Adjusts 1-RH-HCV-1758 and/or Steam Dump Demand as necessary to control temperature.</p> <p><b>EVALUATOR'S NOTE:</b></p> <p>If asked, maintain RCS Cooldown rate of &lt; 40°F/hr.</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
<p><b>STEP 7:</b></p> <p>14. RETURN TO PROCEDURE IN EFFECT</p> <p>REPORTS TO SHIFT MANAGER (EVALUATOR).</p> <p><b>STANDARD:</b></p> <p>Verbal report that 1-RH-P-1B has been started and Actions of 1-AP-27.00 are complete</p> <p><b>EVALUATOR'S NOTE:</b></p> <p>Candidate may add that they will continue to monitor RCS Cooldown rate</p> <p><b>STOP TIME:</b> _____</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>

Comments:

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NUMBER	PROCEDURE TITLE	REVISION 28
1-AP-27.00	LOSS OF DECAY HEAT REMOVAL CAPABILITY	PAGE 2 of 20

STEP	ACTION/ EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<div style="border: 1px solid black; padding: 5px;"> <p>*****</p> <p><b>CAUTION:</b></p> <ul style="list-style-type: none"> <li>Loss of RHR due to a total loss of IA is addressed by 0-AP-40.00, NON-RECOVERABLE LOSS OF IA.</li> <li>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.</li> <li>Loss of RHR may cause CTMT radiological and heat stress conditions to degrade. Local actions in CTMT should be coordinated with HP.</li> <li>During solid plant operation, inadvertent actuation of the OPMS may occur if letdown is isolated.</li> <li>If RCS boiling occurs, non-essential personnel should be evacuated from CTMT.</li> </ul> <p>*****</p> <p><b>NOTE:</b> EIPs may be applicable.</p> <p>1. <input checked="" type="checkbox"/> CHECK RCS INVENTORY - LOWERING → <input checked="" type="checkbox"/> GO TO Step 4.</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> • PRZR level - LOWERING</li> <li><input checked="" type="checkbox"/> • Standpipe level - LOWERING</li> <li><input checked="" type="checkbox"/> • Reactor cavity level - LOWERING</li> <li><input checked="" type="checkbox"/> • RCS Narrow Range level - LOWERING</li> <li><input checked="" type="checkbox"/> • CTMT sump level - RISING</li> <li><input checked="" type="checkbox"/> • Makeup rate - RISING</li> <li><input checked="" type="checkbox"/> • PRT level, pressure, or temperature - RISING</li> <li><input checked="" type="checkbox"/> • PDTT level - RISING</li> <li><input checked="" type="checkbox"/> • RWST level - RISING</li> </ul> </div>		

NUMBER	PROCEDURE TITLE	REVISION
1-AP-27.00	LOSS OF DECAY HEAT REMOVAL CAPABILITY	28
		PAGE 4 of 20

STEP	ACTION/ EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4. /	CHECK RHR PUMP - ONE RUNNING	<p>IF Emergency Bus power is available, THEN do the following:</p> <p>a) IF stub bus NOT energized, THEN do the following:</p> <p>1) Put CC Pump(s) in PTL:</p> <p><input type="checkbox"/> • 1-CC-P-1A</p> <p><input type="checkbox"/> • 1-CC-P-1B</p> <p>2) Put RHR Pump(s) in PTL:</p> <p><input type="checkbox"/> • 1-RH-P-1A</p> <p><input type="checkbox"/> • 1-RH-P-1B</p> <p>3) Locally close stub bus supply breakers:</p> <p><input type="checkbox"/> • 1-EP-BKR-15H9</p> <p><input type="checkbox"/> • 1-EP-BKR-15J9</p> <p>b) IF Unit 1 CC pump NOT running, THEN do the following:</p> <p><input type="checkbox"/> 1) Check at least one CC pump running on Unit 2.</p> <p>2) Start a Unit 1 CC Pump.</p> <p><input type="checkbox"/> • 1-CC-P-1A</p> <p><input type="checkbox"/> • 1-CC-P-1B</p>

(STEP 4 CONTINUED ON NEXT PAGE)

<p>NUMBER</p> <p>1-AP-27.00</p>	<p>PROCEDURE TITLE</p> <p>LOSS OF DECAY HEAT REMOVAL CAPABILITY</p>	<p>REVISION</p> <p>28</p> <p>PAGE</p> <p>5 of 20</p>
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>4.</p>	<p>CHECK RHR PUMP - ONE RUNNING (Continued)</p>	<p><del>e)</del> IF CC pump <u>NOT</u> running on either unit, <u>THEN</u> do the following:</p> <p>1) Throttle one CC Pump discharge to approximately 25% open:</p> <p><input type="checkbox"/> • 1-CC-558 (1-CC-P-1A)</p> <p><input type="checkbox"/> • 1-CC-564 (1-CC-P-1B)</p> <p>2) Start CC Pump with throttled discharge.</p> <p><input type="checkbox"/> • 1-CC-P-1A</p> <p><input type="checkbox"/> • 1-CC-P-1B</p> <p><input type="checkbox"/> 3) Open discharge valve.</p> <p><del>d)</del> Manually close RH control valves:</p> <p><del><input checked="" type="checkbox"/></del> • 1-RH-FCV-1605</p> <p><del><input checked="" type="checkbox"/></del> • 1-RH-HCV-1758</p> <p><del>e)</del> Start one RHR pump.</p> <p><del>f)</del> Adjust RH control valves to return flow to pre-event rate:</p> <p><del><input checked="" type="checkbox"/></del> • 1-RH-FCV-1605</p> <p><del><input checked="" type="checkbox"/></del> • 1-RH-HCV-1758</p> <p><input type="checkbox"/> g) IF an RHR pump can <u>NOT</u> be started, <u>THEN</u> GO TO Step 16.</p>

(STEP 4 CONTINUED ON NEXT PAGE)

NUMBER	PROCEDURE TITLE	REVISION
1-AP-27.00	LOSS OF DECAY HEAT REMOVAL CAPABILITY	28
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.	CHECK RHR PUMP - ONE RUNNING (Continued)	<p><del>IF</del> loss of RHR due to loss of Emergency Bus power, <u>THEN</u> do the following:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> a) Check initiated or initiate 1-AP-10.07, LOSS OF UNIT 1 POWER.</li> <li><input type="checkbox"/> b) <u>IF</u> no emergency bus energized, <u>THEN</u> GO TO 1-AP-10.27, Loss of All AC Power While on RHR.</li> <li><input type="checkbox"/> c) <u>IF</u> RHR pump can <u>NOT</u> be started, <u>THEN</u> GO TO Step 16.</li> </ul>
5. <del>✓</del>	CHECK RHR FLOW - INDICATED ON RHR SYS FLOW  <del>✓</del> • 1-RH-FI-1605	<p>Check opened or open the following valves:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> • 1-RH-MOV-1700</li> <li><input type="checkbox"/> • 1-RH-MOV-1701</li> <li><input type="checkbox"/> • 1-RH-MOV-1720A</li> <li><input type="checkbox"/> • 1-RH-MOV-1720B</li> </ul>
6. <del>✓</del>	CHECK RHR PUMP - VORTEXING  <del>✓</del> • Flow indication on 1-RH-FI-1605 - OSCILLATING  <del>✓</del> • Amperage indication - OSCILLATING	<ul style="list-style-type: none"> <li><input type="checkbox"/> GO TO Step 12.</li> </ul>

NUMBER	PROCEDURE TITLE	REVISION
1-AP-27.00	LOSS OF DECAY HEAT REMOVAL CAPABILITY	28
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12. ✓	CHECK RHR HEAT SINK:	
✓	a) Flow on 1-RH-FI-1605 - NORMAL	<input type="checkbox"/> a) Adjust 1-RH-HCV-1758 and 1-RH-FCV-1605 to control flow.
	b) CC to RHR HX	
	1) In-Service RHR HX CC Outlet HDR Flow - NORMAL	<input type="checkbox"/> 1) Check opened or open 1-CC-TV-109A or 1-CC-TV-109B.
✓	• 1-CC-FI-110A <u>OR</u>	<input type="checkbox"/> IF TV can <u>NOT</u> be opened due to a localized loss of IA, <u>THEN</u> locally open IAW 0-FCA-16.00, LOCAL OPERATION OF AIR OPERATED VALVES.
□	• 1-CC-FI-110B	<input type="checkbox"/> IF the in-service RHR HX TV can <u>NOT</u> be opened, <u>THEN</u> place the other RHR HX in service IAW Attachment 11.
		<input type="checkbox"/> IF CC flow can <u>NOT</u> be established to either RHR HX, <u>THEN</u> do the following:
		<input type="checkbox"/> a. Evaluate initiating 1-AP-15.00, LOSS OF COMPONENT COOLING.
		<input type="checkbox"/> b. GO TO Step 16.
	2) In-Service RHR HX CC Outlet HDR TEMP - NORMAL	2) Do the following:
✓	• 1-CC-TI-109A <u>OR</u>	<input type="checkbox"/> a. Check open or open 1-SW-MOV-102A or B.
□	• 1-CC-TI-109B	<input type="checkbox"/> b. Adjust SW flow to CC HXs.
		<input type="checkbox"/> IF temperature can <u>NOT</u> be stabilized, <u>THEN</u> GO TO Step 16.

NUMBER	PROCEDURE TITLE	REVISION 28
1-AP-27.00	LOSS OF DECAY HEAT REMOVAL CAPABILITY	PAGE 10 of 20

STEP	ACTION/ EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13. <del>/</del>	CHECK RCS TEMPERATURE - STABLE OR LOWERING	<input type="checkbox"/> Adjust 1-RH-HCV-1758 to control temperature. <input type="checkbox"/> IF temperature can <u>NOT</u> be stabilized, <u>THEN</u> GO TO Step 16.
14. <del>/</del>	RETURN TO PROCEDURE IN EFFECT	



**Operator Directions Handout  
(TO BE GIVEN TO APPLICANT)**

**Initial Conditions**

- I am the Shift Manager and you are the Unit RO.
- The unit has been operating on RHR with 1-RH-P-1A, "A" RHR pump is in service on "A" RHR heat exchanger.
- We just received annunciator 1B-G6, RHR HX LO FLOW, and 1-RH-P-1A has tripped.

**Initiating Cues**

- Here is a copy of 1-AP-27.00, Loss of Decay Heat Removal Capability. I need you to perform the necessary steps to address this condition and restore RHR flow. No RCS draindown evolutions are in progress.
- When you complete AP-27.00, please inform me.

U.S. Nuclear Regulatory Commission  
Surry Power Station

SR17-301  
**Simulator** Job Performance Measure [007A2.02 2.6/3.2  
[Alternate Path]

Applicant \_\_\_\_\_

Start Time \_\_\_\_\_

Examiner \_\_\_\_\_

Date \_\_\_\_\_

Stop Time \_\_\_\_\_

**Title****Venting the PRT to Process Vent IAW 1-OP-RC-011****K/A: 007A2.02, Abnormal pressure in the PRT, 2.6/3.2****Applicability****Estimated Time****Actual Time**

RO/SRO(I)

10 Minutes

\_\_\_\_\_ Minutes

**Conditions**

- Task is to be PERFORMED in the simulator.
- Leakage from 1-RC-PCV-1456 has caused an abnormal pressure in the PRT.

**Standards**

- Actions taken IAW ARP 0-RMA-C7, Process Vent Normal Range Gas Alert/High, to Manually isolate release paths following the failure of Auto isolation.

**Initiating Cues**

- Vent the PRT to Process Vent IAW 1-OP-RC-011, Pressurizer Relief Tank Operations.

**Terminating Cues**

- Manually isolate release following failure of Auto Isolation IAW 0-RMA-C7, Process Vent Normal Range Gas Alert/High.

**Procedures**

- 1-OP-RC-011, Pressurizer Relief Tank Operations, Rev. 28.
- 0-RMA-C7, Process Vent Normal Range Gas Alert/High, Rev. 3.

**Tools and Equipment**

- None

**Safety Considerations**

- None

**Simulator Setup**

- Recall IC-410 (T-rer: 420), OR
- Call up 100% power IC and initialize. Place simulator in RUN.
- Malfunctions, RC4002, PRZR PORV 1456 Leak, 53% Deg, Active. Run until 1C-F7 alarms, PRZR RELIEF TK HI PRESS. Close 1-RC-MOV-1535 and place 1-RC-PCV-1456 switch in close. Freeze the Simulator.
- Load the following Malfunction:
  - RM0602, MGP Process Vent NR Gas Fail, 65% Deg, 120 Sec Ramp, Trigger 3.
  - GW02, GW-FCV-160 Auto Close Failure, Active.
  - GW03, GW-FCV-260 Auto Close Failure, Active.
  - FP0301, FP0302, Active.
- Load the following REMOTE
  - SI\_312, 0%, 30 Sec Ramp, Trigger 1, Active.
  - PCS105SPKR\_NULL, Active.
- Place Simulator in RUN, Freeze, and Store the IC for Evaluation.

**Initial Conditions**

- Leakage through 1-RCPCV-1456, PRZR PORV has caused annunciator 1C-F7, PRZR RELIEF TK HI PRESS, to actuate.
- 1-RC-MOV-1535, 1-RC-PCV-1456 Isolation MOV has been closed and the control switch for 1-RC-PCV-1456, PRZR PORV has been placed in close.

**Initiating Cues**

- I am the Nuclear Shift Manager. You are the Unit 1 BOP.
- Here is a copy of 1-OP-RC-011, Pressurizer Relief Tank Operations signed off to Step 5.6.10. You are to vent the PRT to the Process Vent system until the PRT has been reduced to approximately 5 psig.
- Due to low activity in the PRT a release permit is not required.
- Current H2 concentration in the PRT is 13.4%.
- The Auxiliary Building Operator has been briefed and is standing by to perform local actions, as required.
- When you finish the actions necessary to accomplish this task, please inform me.

**Notes**

- 30 minutes prior to JPM Evaluation the Candidate will be provided with a copy of 1-OP-RC-011, marked off to Step 5.6.10; pre-briefed on JPM **Initial Conditions** and **Initiating Cues** prior to Simulator entry. Candidate will begin Evaluation on Simulator entry.
- Task critical elements are denoted by an asterisk (\*). If substeps of a critical element also have an asterisk (\*), then only those asterisked substeps are critical to performance of that task element.

**PERFORMANCE CHECKLIST**

**Notes to the Evaluator**

- Task critical elements are bolded and denoted by an asterisk (\*).
- *An additional instructor may be needed to silence alarms for the examinee.*
- **START TIME**\_\_\_\_\_:

<p><b>STEP 1:</b></p> <p>Step 5.6.10: Open 1-RC-HCV-1549, PRT VENT.</p> <p><b>STANDARD:</b></p> <p><b>*a) Opens 1-RC-HCV-1549, PRT VENT (RED Light ON, GREEN Light OFF), on BB1 RCS section.</b></p> <p><b>EVALUATOR'S NOTE:</b> None.</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
<p><b>STEP 2:</b></p> <p>Step 5.6.11: IF the PRT is to be vented once to the Process Vent System, THEN perform the following. Otherwise, enter N/A.</p> <p>a. Record the PRT pressure and level on the release form.</p> <p>b. Open 1-SI-TV-101A, ACCUM VENT HDR I/S TV.</p> <p>c. Open 1-SI-TV-101B, ACCUM VENT HDR O/S TV.</p> <p>d. Record PRT Hydrogen concentration. _____%</p> <p><b>STANDARD:</b></p> <p>a) Remembers from brief that no release form required, marks step N/A.</p> <p><b>*b) Opens 1-SI-TV-101A</b> and checks RED Light ON, GREEN Light OFF, using valve pushbuttons on VB1 Trip Valve Section.</p> <p><b>*c) Opens 1-SI-TV-101B</b> and checks RED Light ON, GREEN Light OFF, using valve pushbutton on VB1 Trip Valve section.</p> <p>d) Records 13.4% for hydrogen concentration.</p> <p><b>EVALUATOR'S NOTE:</b></p> <p>If asked, Release form is not required.</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>

<p><b>STEP 3:</b></p> <p>NOTES prior to Step 5.6.11 e.:</p> <ul style="list-style-type: none"> <li>• For PRT Hydrogen concentrations between the values listed, the higher Hydrogen concentration (lower rate) must be used.</li> <li>• The maximum allowable PRT pressure drop values are based on a maximum PRT pressure of 10 psig.</li> </ul> <p>Step 5.6.11 e.: Based on PRT Hydrogen concentration, note the maximum allowable PRT pressure drop allowed in a ten minute period.</p> <p><b>STANDARD:</b></p> <p>a) Acknowledges NOTES prior to Step 5.6.11 e. b) Uses Table listed in Step 5.6.11 e. and selects PRT H<sub>2</sub> 15%, 13 psig / 10 MIN value.</p> <p><b>EVALUATOR'S NOTE:</b> None.</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
<p><b>STEP 4:</b></p> <p>NOTE prior to Step 5.6.11 f.: Valve 1-SI-312 should be adjusted as PRT Hydrogen concentration lowers to maintain maximum release rate.</p> <p>Step 5.6.11 f.: To maintain Rad Monitors below the ALERT setpoint, AND to prevent exceeding the maximum allowable pressure drop, SLOWLY throttle open 1-SI-312, ACCUMS VENT HDR OUTSIDE ISOL, and/or cycle 1-SI-TV-101B, as required.</p> <p><b>STANDARD:</b></p> <p>c) Acknowledges NOTE prior to Step 5.6.11 f. d) Contacts Aux Bldg Operator to slowly open 1-SI-312.</p> <p><b>EVALUATOR'S NOTE:</b></p> <p>Candidate may direct Aux Bldg Operator to close 1-SI-312 when RMA annunciator alarms. <b>Alternate Path Begins</b> when 1-SI-312 has been reported throttled open.</p> <p><b>Simulator Instructor's Note:</b></p> <p><b>When contacted</b> to open 1-SI-312, <b>Actuate Trigger 3</b>. Report that a time compression has occurred and 1-SI-312 has been throttled open approximately 1 turn.</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>

<p><b>STEP 5:</b></p> <p>0-RMA-C7, PROCCES VENT NORMAL RANGE GAS ALERT / HI Alarm.</p> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>a) Locates to MGPI indicators and acknowledges alarm on RMA Annunciator Panel, and on 1-GW-RI-130B, PROCESS VENT NORMAL GAS INDICATOR module (BLUE button).</li> <li>b) Identifies Alert and High Lights LIT on 1-GW-RI, and Bar Graph indication.</li> <li>c) Identifies rising trend on Process Vent Radiation Monitor recorder, 1-RM-RR-132.</li> <li>d) Initiates 0-RMA-C7 Annunciator procedure.</li> </ul> <p><b>EVALUATOR'S NOTE:</b></p> <p>Candidate may direct Aux Bldg Operator to close 1-SI-312 when RMA annunciator alarms.</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
<p><b>STEP 6:</b></p> <p>Notes prior to Step 1:</p> <ul style="list-style-type: none"> <li>• The MGP Process Vent channel sensing high radiation will buzz with an audible alarm. Pressing the blue SEL key on the display unit will silence the alarm.</li> <li>• This annunciator does NOT have reflash capability. This MGP remote display unit indicating high radiation will buzz with an audible alarm.</li> </ul> <p>Step 1: CHECK ALARM - READING ON MONITOR OR CHART RECORDER GREATER THAN OR EQUAL TO ALERT SETPOINT</p> <ul style="list-style-type: none"> <li>• 1-GW-RI-130B</li> <li>• 1-RM-RR-132, Ch 2</li> <li>• 1-RM-RR-132, Ch 5</li> </ul> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>a) Acknowledges Notes prior to Step 1.</li> <li>b) Identifies Alert and High LEDs LIT on 1-GW-RI-130B.</li> <li>c) Identifies 1-RM-RR-132, Ch 2 trend rising.</li> </ul> <p><b>EVALUATOR'S NOTE: None.</b></p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>

<p><b>STEP 7:</b></p> <p>Step 2: CHECK PROCESS VENT FLOW RATE DEVICE 1-GW-FI-100 - OPERABLE</p> <p>Step 3: CONSULT SHIFT SUPERVISION TO DETERMINE IF GW SHOULD BE ISOLATED</p> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>a) Remembers from 1-OP-RC-011 Initial Conditions that 1-GW-FI-100 Operable.</li> <li>b) Notifies Shift Supervision (Evaluator) of Step 3 consult.</li> </ul> <p><b>EVALUATOR'S NOTE:</b></p> <p>Step 2, Candidate may locate to Waste Disposal Board and check 1-GW-FI-100. Step 3, Direct Candidate to continue actions in ARP.</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
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<p><b>STEP 8:</b></p> <p><b>CAUTION</b> prior to Step 4: When CTMT Vacuum Pump Discharge Isolation valve 1-GW-FCV-160 or 1-GW-FCV-260 is closed, the associated Vacuum Pumps must be placed in OFF.</p> <p><b>NOTE</b> prior to Step 4: If a high alarm has actuated, the automatic functions associated with that monitor shall be verified or performed.</p> <p>Step 4: CHECK AUTOMATIC ACTIONS:</p> <ol style="list-style-type: none"> <li>Decay Tank Bleed Isolation valve 1-GW-FCV-101 – CLOSED</li> <li>Check the following <ul style="list-style-type: none"> <li>CTMT Vacuum Pump Discharge Isolation valve 1-GW-FCV-160 – CLOSED</li> <li>CTMT Vacuum Pump Discharge Isolation valve 1-GW-FCV-260 – CLOSED</li> </ul> </li> </ol> <p>Step 4 b) RNO: Do the following:</p> <ol style="list-style-type: none"> <li>Check or place Ctmt Vacuum pumps in OFF <ul style="list-style-type: none"> <li>1-CV-P-1A</li> <li>1-CV-P-1B</li> <li>2-CV-P-1A</li> <li>2-CV-P-1B</li> </ul> </li> <li>Manually close valve(s).</li> <li>GO TO Step 6.</li> </ol> <p><b>STANDARD:</b></p> <ol style="list-style-type: none"> <li>Acknowledges CAUTION and NOTE prior to Step 4.</li> <li>Checks 1-GW-FCV-101 control switch in OFF on Waste Disposal Board.</li> <li>Identifies 1-GW-FCV-160 / 1-GW-FCV-260 are NOT Closed on Waste Disposal Board, GOES TO Step 4 b) RNO.</li> <li><b>*d) Places 1-CV-P-1A in OFF</b>, checks 1-CV-P-1B in OFF, on BB1 CTMT Section.</li> <li>Directs Unit 2 to place 2-CV-P-1A and 1B in OFF.</li> <li><b>*f) Closes 1-GW-FCV-160 and 1-GW-FCV-260</b>, on Waste Disposal Board.</li> <li>GOES TO Step 6.</li> </ol> <p><b>EVALUATOR'S NOTE:</b></p> <ul style="list-style-type: none"> <li><b>JPM may be terminated at this point</b>, at Evaluator's discretion if Candidate has directed the Aux Bldg Operator to close 1-SI-312. Steps continue through Step 7, where substep a) directs securing PRT venting.</li> </ul> <p><b>Simulator Instructor's Note:</b></p> <p>When directed, report 2-CV-P-1A and 2-CV-P-1B are in OFF.</p> <p><b>COMMENTS:</b></p> <p><b>STOP TIME:</b> _____ (if any of the following valves have been closed to terminate the release: 1-SI-312, 1-RC-HCV-1549, 1-SI-TV-101A, or 1-SI-TV-101B.)</p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
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<p><b>STEP 9:</b></p> <p>Step 6: NOTIFY HP TO DO THE FOLLOWING:</p> <ul style="list-style-type: none"> <li>a) Check area evacuated as necessary</li> <li>b) Control access as necessary</li> <li>c) Sample</li> <li>d) Contact HP to check activity within limits</li> <li>e) Investigate cause</li> </ul> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>a) Contacts HP and discusses items a) through e) above, or Notifies Shift Manager (Evaluator) that HP should perform items a) through e) above.</li> </ul> <p><b>EVALUATOR'S NOTE:</b></p> <p>If <b>notified</b> to contact HP, acknowledge HP contact required.</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
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<p><b>Step 10:</b></p> <p>Step 7: ISOLATE KNOWN RELEASES TO PROCESS VENTS:</p> <ul style="list-style-type: none"> <li>a) Secure any known venting evolution:             <ul style="list-style-type: none"> <li>• SI ACCUM(s)</li> <li>• PRT</li> </ul> </li> <li>b) Attempt to isolate leakage:             <ul style="list-style-type: none"> <li>• WGDT</li> <li>• CTMT VAC PUMPS</li> <li>• PRT</li> <li>• SI ACCUM(s)</li> </ul> </li> <li>c) Coordinate with HP to determine need for setpoint change</li> </ul> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>a) * <b>Contacts Aux Bldg Operator to close 1-SI-312.</b></li> <li>b) * <b>Candidate isolates the release by closing 1-RC-HCV-1549, 1-SI-TV-101A, 1-SI-TV-101B, or 1-SI-312.</b></li> </ul> <p><b>EVALUATOR'S NOTE:</b></p> <p><b>Any of the four valves listed above will isolate the release and will satisfy the Critical step.</b></p> <p><b>JPM may be terminated</b>, at discretion of Evaluator when the release is isolated (Aux Bldg Operator has been directed to close 1-SI-312, or any of the other valves listed above), and the Candidate has closed 1-GW-FCV-160/260.</p> <p><b>Simulator Instructor's Note:</b></p> <p><b>If directed</b>, report a time compression has occurred and 1-SI-312 has been closed.</p> <p><b>COMMENTS:</b></p> <p><b>STOP TIME:</b> _____</p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
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Comments:

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**CAUTION**

To prevent damage due to overpressuring, high pressure N<sub>2</sub> must not be lined up to the Process Vent System.

5.6.8 Check the following valves are closed.

Init

a. Check closed 1-SI-TV-100, ACCUM & PRZR RELIEF TK N2 SUP.

Init

b. Check closed 1-SI-TV-101A, ACCUM VENT HDR I/S TV.

Init

c. Check closed 1-SI-TV-101B, ACCUM VENT HDR O/S TV.

Init

d. Check closed HCV-1936, ACCUMS VNT LINE FLOW SETPT.

Init

e. Check closed HCV-1898, PRZR RELIEF TK N2 ISOL VV.

Init

f. Check closed HCV-1853A, ACCUM N2 & VNT LINE ISOL VVS,  
ACCUM A.

Init

g. Check closed HCV-1853B, ACCUM N2 & VNT LINE ISOL VVS,  
ACCUM B.

Init

h. Check closed HCV-1853C, ACCUM N2 & VNT LINE ISOL VVS,  
ACCUM C.

Init

i. Check closed 1-SS-TV-104A, PRT GAS SPACE SMPL I/S TV.

Init

j. Check closed 1-SS-TV-104B, PRT GAS SPACE SMPL O/S TV.

Init

5.6.9 Close 1-SI-312, ACCUMS VENT HDR OUTSIDE ISOL.

Init

5.6.10 Open 1-RC-HCV-1549, PRT VENT.

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5.6.11 IF the PRT is to be vented once to the Process Vent System, THEN perform the following. Otherwise, enter N/A.

N/A

a. Record the PRT pressure and level on the release form.

Init

b. Open 1-SI-TV-101A, ACCUM VENT HDR I/S TV.

Init

c. Open 1-SI-TV-101B, ACCUM VENT HDR O/S TV.

Init

d. Record PRT Hydrogen concentration.

13.4 %

**NOTE:** • For PRT Hydrogen concentrations between the values listed, the higher Hydrogen concentration (lower rate) must be used.

- The maximum allowable PRT pressure drop values are based on a maximum PRT pressure of 10 psig.

Init

e. Based on PRT Hydrogen concentration, note the maximum allowable PRT pressure drop allowed in a ten minute period.

PRT H<sub>2</sub> CONCENTRATION

PRT PRESSURE DROP / 10 MIN

15%

13 PSIG / 10 MIN

10%

30 PSIG / 10 MIN

**NOTE:** Valve 1-SI-312 should be adjusted as PRT Hydrogen concentration lowers to maintain maximum release rate.

Init

- f. To maintain Rad Monitors below the ALERT setpoint, AND to prevent exceeding the maximum allowable pressure drop, SLOWLY throttle open 1-SI-312, ACCUMS VENT HDR OUTSIDE ISOL, and/or cycle 1-SI-TV-101B, as required. (Reference 4.11)

**NOTE:** PRT level can be raised IAW Subsection 5.2 to maximize volume released.

- g. Monitor PRT pressure until pressure is approximately at one of the following. (✓)
- ( ) 0 to 2 psig if Containment vacuum has been broken.
  - ( ) Between 6 and 8 psig if Containment vacuum has not been broken.

NUMBER	PROCEDURE TITLE	REVISION
0-RMA-C7	PROCESS VENT NORMAL RANGE GAS ALERT / HI	3
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STEP	ACTION/ EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p><b>NOTE:</b> ⚡ The MGP Process Vent channel sensing high radiation will buzz with an audible alarm. Pressing the blue SEL key on the display unit will silence the alarm.</p> <p>⚡ This annunciator does NOT have reflash capability. This MGP remote display unit indicating high radiation will buzz with an audible alarm.</p>		
1. ⚡	<p>CHECK ALARM - READING ON MONITOR OR CHART RECORDER GREATER THAN OR EQUAL TO ALERT SETPOINT</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> • 1-GW-RI-130B</li> <li><input checked="" type="checkbox"/> • 1-RM-RR-132, Ch 2</li> <li><input type="checkbox"/> • 1-RM-RR-132, Ch 5</li> </ul>	<p>Do the following:</p> <ul style="list-style-type: none"> <li>a) Increase surveillance on the following monitors: <ul style="list-style-type: none"> <li><input type="checkbox"/> • 1-GW-RI-130A</li> <li><input type="checkbox"/> • 1-GW-RI-130C</li> </ul> </li> <li><input type="checkbox"/> b) Evaluate entry into 0-AP-10.13, LOSS OF MAIN CONTROL ROOM ANNUNCIATORS.</li> <li><input type="checkbox"/> c) Initiate a Condition Report.</li> <li><input type="checkbox"/> d) GO TO Step 18.</li> </ul>
2. ⚡	<p>CHECK PROCESS VENT FLOW RATE DEVICE 1-GW-FI-100 - OPERABLE</p>	<p>Do the following:</p> <ul style="list-style-type: none"> <li>a) Check one Process Vent Blower in service: <ul style="list-style-type: none"> <li><input type="checkbox"/> • 1-GW-F-1A</li> <li><input type="checkbox"/> • 1-GW-F-1B</li> </ul> </li> <li><input type="checkbox"/> b) Estimate flow rate every 4 hrs.</li> <li><input type="checkbox"/> c) Record flow rate in Unit 1 Narrative Log in MCR.</li> </ul>
3. ⚡	<p>CONSULT SHIFT SUPERVISION TO DETERMINE IF GW SHOULD BE ISOLATED</p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> GO TO Step 6.</li> </ul>

<p>NUMBER</p> <p>0-RMA-C7</p>	<p>PROCEDURE TITLE</p> <p>PROCESS VENT NORMAL RANGE GAS ALERT / HI</p>	<p>REVISION</p> <p>3</p> <p>PAGE</p> <p>3 of 8</p>
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p><b>CAUTION:</b> When CTMT Vacuum Pump Discharge Isolation valve 1-GW-FCV-160 or 1-GW-FCV-260 is closed, the associated Vacuum Pumps must be placed in OFF.</p> <p>*****</p> <p><b>NOTE:</b> If a high alarm has actuated, the automatic functions associated with that monitor shall be verified or performed.</p>		
4. /	CHECK AUTOMATIC ACTIONS:	
	<input checked="" type="checkbox"/> a) Decay Tank Bleed Isolation valve 1-GW-FCV-101 - CLOSED	<input type="checkbox"/> a) Manually close valve(s).
	b) Check the following	b) Do the following:
	<input checked="" type="checkbox"/> • CTMT Vacuum Pump Discharge Isolation valve 1-GW-FCV-160 - CLOSED	<input checked="" type="checkbox"/> 1) Check or place Ctmt Vacuum pumps in OFF
	<input checked="" type="checkbox"/> • CTMT Vacuum Pump Discharge Isolation valve 1-GW-FCV-260 - CLOSED	<input checked="" type="checkbox"/> • 1-CV-P-1A
		<input checked="" type="checkbox"/> • 1-CV-P-1B
		<input checked="" type="checkbox"/> • 2-CV-P-1A
		<input checked="" type="checkbox"/> • 2-CV-P-1B
		<input checked="" type="checkbox"/> 2) Manually close valve(s).
		<input checked="" type="checkbox"/> 3) GO TO Step 6.
5. ____	CHECK OR PLACE CTMT VACUUM PUMPS IN OFF	
	<input type="checkbox"/> • 1-CV-P-1A	
	<input type="checkbox"/> • 1-CV-P-1B	
	<input type="checkbox"/> • 2-CV-P-1A	
	<input type="checkbox"/> • 2-CV-P-1B	

NUMBER	PROCEDURE TITLE	REVISION
0-RMA-C7	PROCESS VENT NORMAL RANGE GAS ALERT / HI	3
		PAGE 4 of 8

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. /	NOTIFY HP TO DO THE FOLLOWING:	
/	a) Check area evacuated as necessary	
/	b) Control access as necessary	
/	c) Sample	
/	d) Contact HP to check activity within limits	<input type="checkbox"/> d) Initiate a Condition Report.
/	e) Investigate cause	
7. /	ISOLATE KNOWN RELEASES TO PROCESS VENTS:	
	a) Secure any known venting evolution:	
/	• SI ACCUM(s)	
/	• PRT	1-SI-312 directed to be closed
	b) Attempt to isolate leakage:	
<input type="checkbox"/>	• WGD	
<input type="checkbox"/>	• CTMT VAC PUMPS	
<input type="checkbox"/>	• PRT	
<input type="checkbox"/>	• SI ACCUM(s)	
<input type="checkbox"/>	c) Coordinate with HP to determine need for setpoint change	



**Operator Directions Handout  
(TO BE GIVEN TO APPLICANT)**

**Initial Conditions**

- Leakage through 1-RCPCV-1456, PRZR PORV has caused annunciator 1C-F7, PRZR RELIEF TK HI PRESS, to actuate.
- 1-RC-MOV-1535, 1-RC-PCV-1456 Isolation MOV has been closed and the control switch for 1-RC-PCV-1456, PRZR PORV has been placed in close.

**Initiating Cues**

- I am the Nuclear Shift Manager. You are the Unit 1 BOP.
- Here is a copy of 1-OP-RC-011, Pressurizer Relief Tank Operations signed off to Step 5.6.10. You are to vent the PRT to the Process Vent system until PRT has been reduced to approximately 5 psig.
- Due to low activity in the PRT a release permit is not required.
- Current H<sub>2</sub> concentration in the PRT is 13.4%.
- The Auxiliary Building Operator has been briefed and is standing by to perform local actions, as required.
- When you finish the actions necessary to accomplish this task, please inform me.

U.S. Nuclear Regulatory Commission  
Surry Power Station

SR17-301

**Simulator Job Performance Measure [KA 015A4.03 3.8 / 3.9]**

Applicant \_\_\_\_\_

Start Time \_\_\_\_\_

Examiner \_\_\_\_\_

Date \_\_\_\_\_

Stop Time \_\_\_\_\_

**Title****Remove Source Range NIs From Service During a Reactor Startup.****K/A: 015A4.03 Ability to manually operate and/or monitor in the control room: Trip bypasses 3.8 / 3.9****Applicability****Estimated Time****Actual Time**

RO/SRO(I)

6 Minutes

\_\_\_\_\_ Minutes

**Conditions**

- Task is to be PERFORMED in the simulator.
- Reactor power at approximately  $1.2 \times 10^{-10}$  amps during a startup, and the SR high voltage cannot be removed from either N-31 or N-32.

**Standards**

- Source Range Channel N31 and N32 Deenergized IAW 1-AP-4.00, Step 22 RNO.

**Initiating Cues**

- Shift manager Direction.

**Terminating Cues**

- 1-AP-4.00, Nuclear Instrumentation Malfunction, Step 38 complete.

**Procedures**

- 1-AP-4.00, Nuclear Instrumentation Malfunction, Rev 34.

**Tools and Equipment**

- None

**Safety Considerations**

- None

### **Simulator Setup**

- Recall IC-411 (T-Rex: 421), OR
- Call up IC-14, Cycle 28 10-8 Amps D+131 Steps MSTV Shut, and initialize. Place simulator in RUN.
- Malfunction FP0301, FP0302, Active. Remote, PCS105SPKR\_NULL, Active.
- Perform the startup to obtain power at  $\approx 1.2 \times 10^{-10}$  amps (or slightly greater), then implement switch overrides (SRTRP\_BLK\_TRA\_PB, and SRTRP\_BLK\_TRB\_PB, override OFF, Insert), Flux Level Trip Cutout Pushbuttons. Freeze the simulator until ready for operator to perform JPM.
- Do not allow the SUR to be greater than +0.1 dpm.

### **Initial Conditions**

- During a Reactor startup, when P-6 was reached the Operator pushed 1/N-33A TR A and 1/N-33B TR B to de-energize the Source Range NIs. Both N-31 and N-32 failed to de-energize.

### **Initiating Cues**

- You are the RO. Respond to a failure of both Source Range NIs to de-energize in accordance with 1-AP-4.00, Nuclear Instrumentation Malfunction, so the Reactor startup can continue.
- When you finish the actions necessary to accomplish this, please inform me.

### **Notes**

- This task is to be **performed** in the Simulator.
- Task critical elements are denoted by an asterisk (\*). If substeps of a critical element also have an asterisk (\*), then only those asterisked substeps are critical to performance of that task element.

**PERFORMANCE CHECKLIST****Notes to the Evaluator**

- Task critical elements are bolded and denoted by an asterisk (\*).
- *An additional instructor may be needed to silence alarms for the examinee.*
- **START TIME:** \_\_\_\_\_.

<p><b>STEP 1:</b></p> <p>AP-4.00, (<i>Step 1</i>)</p> <p>DETERMINES PROCEDURAL STEPS TO RESPOND TO SRNI FAILURE.</p> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>(a) Enters 1-AP-4.00 at Step 1.</li> <li>(b) Acknowledges Note prior to Step 1.</li> <li>(c) Determines failure not in Power Range NI and goes to Step 10.</li> <li>(d) Determines failure not in Intermediate Range NI and goes to Step 19.</li> </ul> <p><b>EVALUATOR'S NOTE:</b></p> <p>None.</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
<p><b>STEP 2:</b></p> <p>CHECK NI MALFUNCTION – SOURCE RANGE FAILURE</p> <p><b>STANDARD:</b></p> <p>Identifies failure is in the SR NIs.</p> <p><b>EVALUATOR'S NOTE:</b></p> <p>None.</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>








<p><b>STEP 3:</b></p> <p>AP-4.00, Step 20</p> <p>STABILIZE UNIT CONDITIONS.</p> <p><b>STANDARD:</b></p> <p>(a) Verifies Unit conditions stable with a zero startup rate.  (b) Maintains power with zero startup rate.</p> <p><b>EVALUATOR'S NOTE:</b></p> <p>Candidate may adjust control rods IN or OUT to stabilize SUR.  A manual Reactor trip is <b>NOT</b> an acceptable action.</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
<p><b>STEP 4:</b></p> <p>AP-4.00. (Step 21)</p> <p>CHECK REACTOR POWER GREATER THAN P-6 (<math>1 \times 10^{-10}</math>).</p> <p><b>STANDARD:</b></p> <p>a) Checks Reactor power level greater than P-6 (<math>1 \times 10^{-10}</math> amps) by:</p> <ul style="list-style-type: none"> <li>• observing INT RNG FLUX meters NI-1-35B and NI-1-36B, Benchboard 1-2, <math>\sim 1.2 \times 10^{-10}</math> amps</li> <li>• Meters on the IR CH 1 and CH2 Drawers <math>\sim 1.2 \times 10^{-10}</math> amps.</li> <li>• Permissive Status Light on Vertical Board 1-2, B-3, LIT.</li> <li>• Trip Status Lights on Vertical Board 1-2, C-2 and D-2 LIT</li> <li>• Bistable Light, Power Above Permissive P6, on IR CH-1 and CH2 Drawer, LIT.</li> </ul> <p><b>EVALUATOR'S NOTE:</b></p> <p>None.</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>

<p><b>STEP 5:</b></p> <p>AP-4.00. (Step 22)</p> <p>CHECK BOTH SOURCE RANGE CHANNELS- HIGH VOLTAGE OFF</p> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>(a) Determines that both SRNI Channels are still energized. Goes to Step 22 RNO.</li> <li>(b) Pushes "1/N 33A TR A" pushbutton and "1/N 33B TR B" pushbutton.</li> <li>(c) Notes that N-31 and N-32 still have high voltage applied to the detectors.</li> <li>(d) Informs Evaluator (Shift Manager) that Annunciator 1G-D1, "Source or INT RNG NIS TRIP BYP" will be received.</li> <li><b>*(e) Places LEVEL TRIP switch for N-31 in BYPASS.</b></li> <li><b>*(f) Removes INSTRUMENT POWER fuses for N-31.</b></li> <li><b>*(g) Places LEVEL TRIP switch for N-32 in BYPASS.</b></li> <li><b>*(h) Removes INSTRUMENT POWER fuses for N-32.</b></li> <li>(i) Notes requirement to refer to Tech Spec Table 3.7-1 Item 4.</li> <li>(j) Notes requirement to make entry in PSL and Shift Turnover to reinstall fuses.</li> <li>(k) Goes to Step 38 of 1-AP-4.00.</li> <li>(l) Informs the Shift Manager that I&amp;C and the OMOC must be notified</li> </ul> <p><b>EVALUATOR'S NOTE:</b></p> <p><b>When notified:</b> Acknowledge that Tech Spec Table 3.7-1, item 4 requires review.</p> <p><b>When notified:</b> Acknowledge PSL and Turnover entries are required.</p> <p><b>When notified:</b> Acknowledge that I&amp;C and OM on Call must be notified.</p> <ul style="list-style-type: none"> <li>• When the Instrument Power fuses are pulled on the <b>first</b> channel, annunciator 1G-A3, "NIS SOURCE RNG LOSS OF DET VOLT" is received.</li> <li>• It is acceptable to place <b>BOTH</b> N-31 and N-32 Channel LEVEL TRIP switches in the BYPASS position before removing the INSTRUMENT POWER fuses for (e) through (h) above.</li> </ul> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
<p><b>STEP 6</b></p> <p>REPORT TO NUCLEAR SHIFT MANAGER (EVALUATOR).</p> <p><u><b>Standard</b></u></p> <p>Verbal status report that N-31 and N-32 have been removed from service IAW 1-AP-4.00.</p> <p><u><b>Evaluator's Comments</b></u>                      <b>STOP TIME:</b> _____</p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>

Comments:

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

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1-AP-4.00	NUCLEAR INSTRUMENTATION MALFUNCTION	34
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><b>NOTE:</b> Attachments 6, 7, and 8 show one-line diagrams of Nuclear Instrumentation.</p> <p>1.  CHECK NI MALFUNCTION - POWER RANGE FAILURE</p>	<p> <input type="checkbox"/> GO TO Step 10.</p>
	<p>10.  CHECK NI MALFUNCTION - INTERMEDIATE RANGE FAILURE</p>	<p> <input type="checkbox"/> GO TO Step 19.</p>
	<p>19.  CHECK NI MALFUNCTION - SOURCE RANGE FAILURE</p>	<p><input type="checkbox"/> GO TO Step 38.</p>
	<p>20.  STABILIZE UNIT CONDITIONS</p>	
	<p>21.  CHECK REACTOR POWER - GREATER THAN P-6 (<math>1 \times 10^{-10}</math> AMPS)</p>	<p><input type="checkbox"/> GO TO Step 27.</p>



22. ☒ CHECK BOTH SOURCE RANGE CHANNELS- HIGH VOLTAGE OFF

Do the following:

- ☒ a) Attempt to block high voltage by depressing SOURCE RNG BLOCK pushbuttons:
    - ☒ • 1/N 33A, TR A
    - ☒ • 1/N 33B, TR B
  - ☐ b) IF Source Range high voltage OFF, THEN GO TO Step 38.
  - ☒ c) IF high voltage still NOT OFF, THEN do the following:
    - ☒ 1) Place LEVEL TRIP switch for failed channel(s) in BYPASS.
    - ☒ 2) Pull the instrument power fuses on the failed channel(s).
    - ☒ 3) Refer to Tech Spec Table 3.7-1, Item 4.
    - ☒ 4) Make entry in Plant Status Log and Shift turnover sheets to reinstall fuses when RX power lowers to less than  $5 \times 10^{-11}$  amps.
  - 5) WHEN RX power lowers to less than  $5 \times 10^{-11}$  amps, THEN do the following:
    - ☐ a. Reinstall the instrument power fuses on the failed channel(s).
    - ☐ b. Place the LEVEL TRIP switch(es) in NORMAL.
    - ☐ c. IF both Source Range Channels failed, THEN perform Attachment 3.
    - ☐ d) GO TO Step 38.
38. ☐ NOTIFY THE FOLLOWING
- ☐ • Instrument Shop
  - ☐ • OM on call

- END -

**Operator Directions Handout  
(TO BE GIVEN TO APPLICANT)**

**Initial Conditions**

- During a Reactor startup, when P-6 was reached the Operator pushed 1/N-33A TR A and 1/N-33B TR B to de-energize the Source Range NIs. Both N-31 and N-32 failed to de-energize.

**Directions to the Operator**

- You are the RO. Respond to a failure of both Source Range NIs to de-energize in accordance with 1-AP-4.00, Nuclear Instrumentation Malfunction, so the Reactor startup can continue.
- When you finish the actions necessary to accomplish this, please inform me.



SURRY POWER STATION

ABNORMAL PROCEDURE

NUMBER	PROCEDURE TITLE	REVISION
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#### PURPOSE

To provide guidance for malfunctions of the Nuclear Instrumentation System.

#### ENTRY CONDITIONS

- 1) Malfunction of any NI channel indicated by erratic, erroneous, or lost indication.
- 2) Malfunction of any NI channel indicated by any of the following annunciators:
  - 1G-A3, NIS SOURCE RNG LOSS OF DET VOLT
  - 1G-B3, NIS INT RNG LOSS OF DET VOLT
  - 1G-C3, NIS PWR RNG LOSS OF DET VOLT
  - 1G-D3, NIS INT RNG CH 1 LOSS OF COMPENSATION VOLT
  - 1G-E3, NIS INT RNG CH 2 LOSS OF COMPENSATION VOLT
- 3) Invalid Reactor Trip signal exists from any NI channel.
- 4) Invalid Rod Stop signal exists from any PR or IR NI channel.
- 5) Transition from 0-AP-53.00, Loss of Vital Instrumentation.

***CONTINUOUS USE***

NUMBER  1-AP-4.00	PROCEDURE TITLE  NUCLEAR INSTRUMENTATION MALFUNCTION	REVISION 34
		PAGE 2 of 10

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p><b>NOTE:</b> Attachments 6, 7, and 8 show one-line diagrams of Nuclear Instrumentation.</p>		
1. ____	CHECK NI MALFUNCTION - POWER RANGE FAILURE	<input type="checkbox"/> GO TO Step 10.
2. ____	STABILIZE UNIT CONDITIONS	
3. ____	CHECK N-44 - FAILED	<input type="checkbox"/> GO TO Step 6.
4. ____	CHECK ROD CONTROL - IN MANUAL	<input type="checkbox"/> Place Rod Control in MANUAL.
<p>*****</p> <p><b>CAUTION:</b> To prevent operation with delta flux outside of target band, delta flux must be monitored and maintained within band if rods have moved.</p> <p>*****</p>		
5. ____	PLACE 1-MS-43-N16, REACTOR POWER SOURCE, IN THE N43 POSITION (SWITCH LOCATED ON NI PROTECTION CHNL III CABINET)	
6. ____	CHECK N-43 - FAILED	<input type="checkbox"/> GO TO Step 8.
7. ____	PLACE 1-MS-43-N16, REACTOR POWER SOURCE, IN THE N44 POSITION (SWITCH LOCATED ON NI PROTECTION CHNL III CABINET)	
8. ____	CHECK POWER RANGE CHANNELS - ONLY ONE FAILED	<p>Do the following:</p> <p><input type="checkbox"/> a) Place the unit in HSD within six hours.</p> <p><input type="checkbox"/> b) Initiate 1-OPT-RP-001, CHECK OF PERMISSIVE STATUS LIGHTS P-6, P-7, P-8, AND P-10, to check Power Range permissives within one hour.</p> <p><input type="checkbox"/> c) GO TO Step 10.</p>

NUMBER  1-AP-4.00	PROCEDURE TITLE  NUCLEAR INSTRUMENTATION MALFUNCTION	REVISION 34  PAGE 3 of 10
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><b>NOTE:</b> Performance of Attachment 1 to place the failed Power Range Channel in trip requires I&amp;C assistance for N-41, N-42, or N-43.</p>	
9. ____	INITIATE ATTACHMENT 1 TO PLACE FAILED CHANNEL IN TRIP WITHIN 72 HOURS	
10. ____	CHECK NI MALFUNCTION - INTERMEDIATE RANGE FAILURE	<input type="checkbox"/> GO TO Step 19.
	<p><b>NOTE:</b> A failed Intermediate Range instrument has the potential to prevent P-6 from operating properly.</p>	
11. ____	CHECK INTERMEDIATE RANGE FLUX	
	a) Check Flux:	<input type="checkbox"/> a) GO TO Step 12.
	<input type="checkbox"/> • Less than $5 \times 10^{-11}$ on Operable Channel	
	<u>OR</u>	
	<input type="checkbox"/> • Less than $5 \times 10^{-6}$ on Gamma-Metrics	
	<input type="checkbox"/> b) Check Source Range - ENERGIZED	b) Manually energize Source Range detectors by depressing SOURCE RANGE TRIP-RESET pushbuttons:
		<input type="checkbox"/> • TRA, 1/N 39A
		<input type="checkbox"/> • TRB, 1/N 39B
(STEP 11 CONTINUED ON NEXT PAGE)		

NUMBER	PROCEDURE TITLE  NUCLEAR INSTRUMENTATION MALFUNCTION	REVISION 34
1-AP-4.00		PAGE 4 of 10

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11.	CHECK INTERMEDIATE RANGE FLUX (Continued)	
	<input type="checkbox"/> c) Check energized or energize the Source Range NI Scaler/Timer Drawer IAW the following:	
	<input type="checkbox"/> 1) Turn on Scaler Timer power	
	<input type="checkbox"/> 2) Momentarily press RESET pushbutton	
	<input type="checkbox"/> 3) Momentarily press START pushbutton and check GATE lamp is LIT	
	<input type="checkbox"/> 4) Check ARMED lamp flashes ON and GATE lamp flashes OFF approximately every 10 seconds	
	<input type="checkbox"/> d) Monitor source range counts	
12. ____	STABILIZE UNIT CONDITIONS	
13. ____	INITIATE ATTACHMENT 2	
14. ____	CHECK REACTOR POWER - GREATER THAN 11%	<input type="checkbox"/> GO TO Step 19.
*15. ____	CHECK THE FOLLOWING:	
	<input type="checkbox"/> • Reactor shutdown - REQUIRED  <u>AND</u>	
	<input type="checkbox"/> • Both IR channels - FAILED LOW	<input type="checkbox"/> GO TO Step 19. IF Reactor shutdown becomes necessary <u>AND</u> both IR channels are failed low, <u>THEN</u> perform Steps 16 and 17.

NUMBER  1-AP-4.00	PROCEDURE TITLE  NUCLEAR INSTRUMENTATION MALFUNCTION	REVISION 34  PAGE 5 of 10
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p><b>NOTE:</b> The P-6 permissive is not enabled if both Intermediate Range channels fail low.</p>		
16. ____	<p>PERFORM A REACTOR SHUTDOWN:</p> <p>a) Initiate power reduction IAW the appropriate GOP:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> • 1-GOP-2.1, UNIT SHUTDOWN, POWER DECREASE FROM MAXIMUM ALLOWABLE POWER TO 25% - 30% REACTOR POWER</li> <li><input type="checkbox"/> • 1-GOP-2.2, UNIT SHUTDOWN, 25% - 30% REACTOR POWER TO 2% REACTOR POWER</li> </ul> <p>b) At 15% power, manually trip the Reactor and initiate 1-E-0, REACTOR TRIP OR SAFETY INJECTION</p>	
17. ____	<p>CHECK SOURCE RANGE CHANNELS - BOTH ENERGIZED</p>	<p>Energize Source Range high voltage by pushing the Source Range trip reset pushbuttons:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> • 1/N 39A, TR A</li> <li><input type="checkbox"/> • 1/N 39B, TR B</li> </ul>





NUMBER	PROCEDURE TITLE	REVISION
1-AP-4.00	NUCLEAR INSTRUMENTATION MALFUNCTION	34
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
22. ____	CHECK BOTH SOURCE RANGE CHANNELS- HIGH VOLTAGE OFF	<p>Do the following:</p> <p>a) Attempt to block high voltage by depressing SOURCE RNG BLOCK pushbuttons:</p> <p><input type="checkbox"/> • 1/N 33A, TR A</p> <p><input type="checkbox"/> • 1/N 33B, TR B</p> <p><input type="checkbox"/> b) <u>IF</u> Source Range high voltage OFF, <u>THEN</u> GO TO Step 38.</p> <p>c) <u>IF</u> high voltage still <u>NOT</u> OFF, <u>THEN</u> do the following:</p> <p><input type="checkbox"/> 1) Place LEVEL TRIP switch for failed channel(s) in BYPASS.</p> <p><input type="checkbox"/> 2) Pull the instrument power fuses on the failed channel(s).</p> <p><input type="checkbox"/> 3) Refer to Tech Spec Table 3.7-1, Item 4.</p> <p><input type="checkbox"/> 4) Make entry in Plant Status Log and Shift turnover sheets to reinstall fuses when RX power lowers to less than <math>5 \times 10^{-11}</math> amps.</p> <p>5) <u>WHEN</u> RX power lowers to less than <math>5 \times 10^{-11}</math> amps, <u>THEN</u> do the following:</p> <p><input type="checkbox"/> a. Reinstall the instrument power fuses on the failed channel(s).</p> <p><input type="checkbox"/> b. Place the LEVEL TRIP switch(es) in NORMAL.</p> <p><input type="checkbox"/> c. <u>IF</u> both Source Range Channels failed, <u>THEN</u> perform Attachment 3.</p> <p><input type="checkbox"/> d) GO TO Step 38.</p>
23. ____	PLACE LEVEL TRIP BYPASS SWITCH FOR FAILED CHANNEL(s) IN BYPASS	

NUMBER	PROCEDURE TITLE	REVISION
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		10 of 10

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
34. ____	CHECK REACTOR TRIP BREAKERS - CLOSED WITH CONTROL RODS CAPABLE OF WITHDRAWAL	<p>Do the following:</p> <p><input type="checkbox"/> a) Maintain Reactor power below P-6.</p> <p><input type="checkbox"/> b) <u>IF</u> both Source Range channels inoperable, <u>THEN</u> check adequate Shutdown Margin within one hour and once each 12 hours thereafter.</p> <p><input type="checkbox"/> c) GO TO Step 38.</p>
35. ____	MAINTAIN REACTOR POWER BELOW P-6	
36. ____	IMMEDIATELY SUSPEND REACTIVITY CHANGES THAT ARE MORE POSITIVE THAN NECESSARY TO MEET THE REQUIRED SHUTDOWN MARGIN OR REFUELING BORON CONCENTRATION	
37. ____	CHECK THE FAILED CHANNEL - RESTORED WITHIN 48 HOURS	<p>Do the following:</p> <p><input type="checkbox"/> a) Open the Reactor Trip breakers within the next hour.</p> <p><input type="checkbox"/> b) Check adequate Shutdown Margin within one hour and once each 12 hours thereafter.</p>
38. ____	NOTIFY THE FOLLOWING	
	<input type="checkbox"/> • Instrument Shop	
	<input type="checkbox"/> • OM on call	
- END -		

U.S. Nuclear Regulatory Commission  
Surry Power Station

SR14301

**Simulator** Job Performance Measure EPEE02.EK3.3 (3.9/3.9)

Applicant\_\_\_\_\_

Start Time\_\_\_\_\_

Examiner\_\_\_\_\_

Date \_\_\_\_\_

Stop Time\_\_\_\_\_

**Title****Re-establish Normal Letdown Following SI**

**K/A: EPEE02.EK3.3 Knowledge of the reasons for the following responses as they apply to the (SI Termination): Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations. 3.9 / 3/9**

**Applicability****Estimated Time****Actual Time**

RO

10 Minutes

\_\_\_\_\_ Minutes

**Conditions**

- Task is to be PERFORMED in the simulator.
- A spurious SI has occurred. E-0 has been performed, SI reduction criteria are satisfied, transition made to ES-1.1, and it has been performed through Step 14.

**Standards**

- Establish normal letdown following SI.

**Initiating Cues**

- 1-ES-1.1, SI Termination, Step 15.
- Shift Manager direction.

**Terminating Cues**

- Step 15 of 1-ES-1.1 complete.

**Procedures**

- 1-ES-1.1, SI Termination, Rev. 51.

**Tools and Equipment**

- None

**Safety Considerations**

- None

**Simulator Setup**

- Recall IC-426 (T-Rex) or call up 100% power IC. Place simulator in RUN.
- Enter malfunctions: FP0301, FP0302, active.
- Enter Remote; PCS105SPKR\_null.
- Initiate SI. Perform E-0, reset SI, verify SI reduction criteria satisfied, transition to ES-1.1 and perform it through Step 14.
- Close 1-CH-LCV-1460A & B.
- Set seal injection at 8 gpm.
- **Verify PRZR Level Control Channel Select Switch is in the III/II position.**
- Freeze simulator at these conditions for JPM performance.

**Initial Conditions**

- Plant was at 100% power with all systems operating normal and in automatic.

**Initiating Cues**

- The crew is currently recovering from a spurious SI initiation.
- 1-ES-1.1, SI Termination has been completed up to Step 15.
- SI has been reset.
- You are the Unit 1 RO. Re-establish letdown by performing step 15 of 1-ES-1.1.
- When you finish the actions necessary to accomplish this, please inform me.

**Notes**

Task critical elements are bolded and denoted by an asterisk (\*).

**PERFORMANCE CHECKLIST****Notes to the Evaluator**

- Operator is given a copy of 1-ES-1.1, SI Termination, Step 15.
- Task critical elements are bolded and demoted by an asterisk (\*).
- **START TIME:** \_\_\_\_\_

<b>STEP 1:</b> Adjust CHG line flow to establish greater than 40 gpm ( <i>Step 15a of ES-1.1</i> ) <b>STANDARD:</b> Raises CHG line flow to > 40 gpm, using 1-CH-FCV-1122. <b>EVALUATOR'S NOTE:</b>  <b>COMMENTS:</b>	____ SAT ____ UNSAT
<b>STEP 2:</b> Open Letdown Line pressure control valve, 1-CH-PCV-1145. ( <i>Step 15 b</i> ) <b>STANDARD:</b> (a) Places 1-CH-PCV-1145 controller into MANUAL. *(b) <b>Adjusts demand increase button until 1-CH-PCV-1145 indicates open (zero demand indicated).</b> <b>EVALUATOR'S NOTE:</b>  <b>COMMENTS:</b>	____ SAT ____ UNSAT

<p><b>STEP 3:</b></p> <p>Check closed or close letdown orifice isolation valves; 1-CH-HCV-1200A, 1-CH-HCV-1200B, 1-CH-HCV-1200C. <i>(Step 15 c)</i></p> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>a) Checks 1-CH-HCV-1200A closed.</li> <li>b) Checks 1-CH-HCV-1200B closed.</li> <li>c) Checks 1-CH-HCV-1200C closed.</li> </ul> <p><b>EVALUATOR'S NOTE:</b></p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
<p><b>STEP 4:</b></p> <p>Open letdown isolation valves; 1-CH-TV-1204A, 1-CH-TV-1204B, 1-CH-LCV-1460A, and 1-CH-LCV-1450B. <i>(Step 15 d)</i></p> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>*a) Opens 1-CH-TV-1204A.</li> <li>*b) Opens 1-CH-TV-1204B.</li> <li>*c) Open 1-CH-LCV-1460A.</li> <li>*d) Open 1-CH-LCV-1460B.</li> </ul> <p><b>EVALUATOR'S NOTE:</b></p> <p><b>Candidate</b> should perform Steps a) or b) in any order, then steps c) or d) in any order. Best Practice is to open LD TVs first, and then open LD LCVs to prevent lifting the LD relief valve if LD orifice isolation valves (1200's) leak when closed. <b>Critical</b> that <b>ALL</b> valves are opened, since the valves are in series; <b>sequence</b> of valve opening is <b>NOT</b> critical.</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>

<p><b>STEP 5:</b></p> <p>Open Letdown orifice isolation valves; 1-CH-HCV-1200A, and 1-CH-HCV-1200B or 1-CH-HCV-1200C. (Step 15e)</p> <p><b>STANDARD:</b></p> <p><b>*a) Opens 1-CH-HCV-1200A.</b>  <b>*b) Opens 1-CH-HCV-1200B or 1-CH-HCV-1200C.</b></p> <p><b>EVALUATOR'S NOTE:</b></p> <ul style="list-style-type: none"> <li>• Normally 1-CH-HCV-1200A, and 1-CH-HCV-1200B are open to establish 105 gpm letdown flow.</li> <li>• Normally the 45 gpm orifice, 1-CH-HCV-1200A is placed in service first.</li> <li>• <b>If asked which orifice isolation valves should be opened:</b> Respond "Open the 45 gpm and one 60 gpm orifice isolation valve."</li> <li>• Opening <b>ANY</b> of the Letdown Orifice Isolation valves satisfactorily completes this Step.</li> </ul> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
<p><b>STEP 6:</b></p> <p>Adjust letdown line pressure control valve to maintain letdown pressure: (Step 15f)</p> <p><b>STANDARD:</b></p> <p><b>*a) Adjust 1-CH-PCV-1145 setpoint to obtain approximately 300 psig, and place in AUTO.</b></p> <p><b>EVALUATOR'S NOTE:</b></p> <p>The setpoint value is approximately 5.0 for 300 psig.  <b>Candidate</b> may leave 1-CH-PCV-1145 in Manual. Acceptable for performance of this step.  <b>Acceptable</b> adjustment of 1-CH-PCV-1145 is accomplished if 1) No flashing of letdown is observed on 1-CH-FI-1150, Letdown Line Flow oscillating, or 2) Annunciator 1D-G4, LO PRESS RELIEF LINE HI TEMP, remains clear, indicating LD relief did not lift on high pressure.</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>

<p><b>STEP 7:</b></p> <p>Adjust NRHX outlet temperature control valve to control letdown temperature, if necessary. (Step 15g)</p> <p><b>STANDARD:</b></p> <p>a) Verify/adjust 1-CC-TCV-103, NRHX Outlet Temp control to maintain NRHX outlet temperature by checking demand of approximately 80%.</p> <p><b>EVALUATOR'S NOTE:</b></p> <ul style="list-style-type: none"> <li>• Normal temperature is approximately 100°F.</li> </ul> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
<p><b>Step 12</b></p> <p>REPORTS TO SHIFT MANAGER (EVALUATOR).</p> <p><b><u>Standards</u></b></p> <p>Verbal status report made that Step 15 completed and letdown has been re-established.</p> <p><b><u>Evaluator's Comments</u></b></p> <p><b>STOP TIME:</b> _____</p>	

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NUMBER	PROCEDURE TITLE	REVISION
1-ES-1.1	SI TERMINATION	51
		PAGE 10 of 29

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15.	<p>↓ ESTABLISH LETDOWN:</p> <p><input checked="" type="checkbox"/> a) Adjust CHG line flow to establish greater than 40 gpm</p> <p><input checked="" type="checkbox"/> b) Open letdown line pressure control valve:</p> <ul style="list-style-type: none"> <li>• 1-CH-PCV-1145</li> </ul> <p><input checked="" type="checkbox"/> c) Check closed or close letdown orifice isolation valves:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> • 1-CH-HCV-1200A</li> <li><input checked="" type="checkbox"/> • 1-CH-HCV-1200B</li> <li><input checked="" type="checkbox"/> • 1-CH-HCV-1200C</li> </ul> <p><input checked="" type="checkbox"/> d) Open letdown isolation valves:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> • 1-CH-TV-1204A</li> <li><input checked="" type="checkbox"/> • 1-CH-TV-1204B</li> <li><input checked="" type="checkbox"/> • 1-CH-LCV-1460A</li> <li><input checked="" type="checkbox"/> • 1-CH-LCV-1460B</li> </ul> <p><input checked="" type="checkbox"/> e) Open letdown orifice isolation valve(s)</p> <p><input checked="" type="checkbox"/> f) Adjust letdown line pressure control valve to maintain letdown pressure:</p> <ul style="list-style-type: none"> <li>• 1-CH-PCV-1145</li> </ul> <p><input checked="" type="checkbox"/> g) Adjust NRHX outlet temperature control valve to control letdown temperature, if necessary:</p> <ul style="list-style-type: none"> <li>• 1-CC-TCV-103</li> </ul>	<p><input type="checkbox"/> Establish excess letdown IAW 1-OP-CH-006, SHIFTING OR INCREASING/DECREASING LETDOWN FLOW.</p>

**Operator Directions Handout  
(TO BE GIVEN TO APPLICANT)**

**Initial Conditions**

- Plant was at 100% power with all systems operating normal and in automatic.

**Initiating Cues**

- The crew is currently recovering from a spurious SI initiation.
- 1-ES-1.1, SI Termination has been completed up to Step 15.
- You are the Unit 1 RO. Re-establish letdown by performing step 15 of 1-ES-1.1.
- When you finish the actions necessary to accomplish this, please inform me.

NUMBER  1-ES-1.1	PROCEDURE TITLE  SI TERMINATION	REVISION 51
		PAGE 10 of 29

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15. ____	<p>ESTABLISH LETDOWN:</p> <p><input type="checkbox"/> a) Adjust CHG line flow to establish greater than 40 gpm</p> <p><input type="checkbox"/> b) Open letdown line pressure control valve:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> • 1-CH-PCV-1145</li> </ul> <p><input type="checkbox"/> c) Check closed or close letdown orifice isolation valves:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> • 1-CH-HCV-1200A</li> <li><input type="checkbox"/> • 1-CH-HCV-1200B</li> <li><input type="checkbox"/> • 1-CH-HCV-1200C</li> </ul> <p><input type="checkbox"/> d) Open letdown isolation valves:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> • 1-CH-TV-1204A</li> <li><input type="checkbox"/> • 1-CH-TV-1204B</li> <li><input type="checkbox"/> • 1-CH-LCV-1460A</li> <li><input type="checkbox"/> • 1-CH-LCV-1460B</li> </ul> <p><input type="checkbox"/> e) Open letdown orifice isolation valve(s)</p> <p><input type="checkbox"/> f) Adjust letdown line pressure control valve to maintain letdown pressure:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> • 1-CH-PCV-1145</li> </ul> <p><input type="checkbox"/> g) Adjust NRHX outlet temperature control valve to control letdown temperature, if necessary:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> • 1-CC-TCV-103</li> </ul>	<p><input type="checkbox"/> Establish excess letdown IAW 1-OP-CH-006, SHIFTING OR INCREASING/DECREASING LETDOWN FLOW.</p>

U.S. Nuclear Regulatory Commission  
Surry Power Station

SR15301

**In Plant** Job Performance Measure EPEE11 EA1.1  
**TIME CRITICAL**

Applicant \_\_\_\_\_

Start Time \_\_\_\_\_

Examiner \_\_\_\_\_

Date \_\_\_\_\_

Stop Time \_\_\_\_\_

**Title****LOCALLY ESTABLISH CHARGING PUMP CROSSTIE FROM UNIT 1 TO UNIT 2.**

**K/A: EPE E11EA1.1 Ability to operate and/or monitor the following as they apply to the Loss of Emergency Coolant Recirculation: Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features. (3.9/4.0)**

**Applicability****Estimated Time****Actual Time**

RO/SRO(I)/SRO(U)

16 Minutes (**Time Critical**)

\_\_\_\_\_ Minutes

**Conditions**

- Task is to be SIMULATED in the plant.
- Fire has been reported in the Unit 2 Emergency Switchgear Room.

**Standards**

- 2-CH-447 and 1-CH-728 opened IAW 0-FCA-14.00, Establishing Stable RCS Makeup Flowpaths, Att. 1
- Charging crosstie established from Unit 1 to Unit 2.

**Initiating Cues**

- 0-FCA-14.00, Establishing Stable RCS Makeup Flowpaths.
- Shift Manager direction.

**Terminating Cues**

- Charging crosstie established from Unit 1 to Unit 2.
- 0-FCA-14.00, Attachment 1, step 7 complete.

**Procedures**

- 0-FCA-14.00, Establishing Stable RCS Makeup Flowpaths, Revision 10

**Tools and Equipment**

- None

**Safety Considerations**

- None

**Initial Conditions**

- We are currently experiencing a fire in Unit 2 Emergency Switchgear Room.
- Unit 2 RCP seals have been isolated

**Initiating Cues**

- **This JPM is \*\*TIME CRITICAL\*\*.**
- Here is a copy of 0-FCA-14.00, Establishing Stable RCS Makeup Flowpaths, Attachment 1. Steps 1-4 have been completed.
- I need you to perform Attachment 1 of FCA-14.00 steps 5-7 in order to establish Charging Pump crosstie from Unit 1 to Unit 2.
- When you finish the actions necessary to accomplish this, please inform me so I can have the Operating Team establish makeup flow IAW step 8.

**Notes:**

- **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.
- **This JPM is TIME CRITICAL in that the charging pump crosstie must be established within 16 minutes after entry into the Aux Building. (Failure to establish charging crosstie within 16 minutes is deemed UNSAT)**
- **The time clock is not in effect when processing through HP.**

**PERFORMANCE CHECKLIST**

**Notes to the Evaluator**

- Task critical elements are **bolded** and denoted by an asterisk (\*).
- **START TIME (Entry into Aux Bldg)\_\_\_\_\_:**

<p><b>STEP 1:</b></p> <p>Check open or open Manual Charging Cross-Connect valve on <u>UNIT 1</u>. (located on Unit 1 side of Gate 23 walkway, near RT pumps). (<i>Attachment 1, Step 5</i>)</p> <ul style="list-style-type: none"> <li>• 1-CH-728, CH Sys Xconn Hdr Root Valve</li> </ul> <p><b>STANDARD:</b></p> <ol style="list-style-type: none"> <li>Proceeds to Unit 1 side of Aux Bldg.</li> <li>Locates 1-CH-728 (see location sketch on next page).</li> <li>Places the ratchet selector in the UP position (rotates selector lever counter-clockwise until top stop reached).</li> <li>* <b>Opens 1-CH-728 by "ratcheting" the valve handwheel to turn the valve handwheel in the counter-clockwise direction.</b></li> </ol> <p><b>EVALUATOR'S CUE:</b></p> <ul style="list-style-type: none"> <li>• <b>If asked:</b> The valve ratchet selector is as indicated.</li> <li>• <b>Tell operator:</b> if operator attempts to reposition valve with ratchet selector in the DOWN position, as he/she pulls down on handwheel, it will not move since valve is closed. If room exists to push up on handwheel, it will "click".</li> <li>• <b>Tell operator:</b> AFTER moving ratchet selector to UP position, handwheel "clicks" as it is moved down &amp; valve moves counter-clockwise &amp; begins opening as handwheel is pushed up.</li> <li>• <b>Tell operator:</b> When 1-CH-728 properly operated, tell operator that flow noise is heard through the line.</li> <li>• <b>When properly operated:</b> Valve stem extends, operator ratchets the valve until valve no longer travels and flow noise heard.</li> </ul> <p><b>EVALUATOR'S NOTE:</b></p> <p>In order to open valve, the ratchet selector must be in the "UP" position. The ratchet selector in the DOWN position will close the valve.</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
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**STEP 2:**

Vent cross-connect piping: (located outside of Gate 23. (*Attachment 1, step 6*))

- 1-CH-732, CH Sys Xconn Hdr Drain.

**STANDARD:**

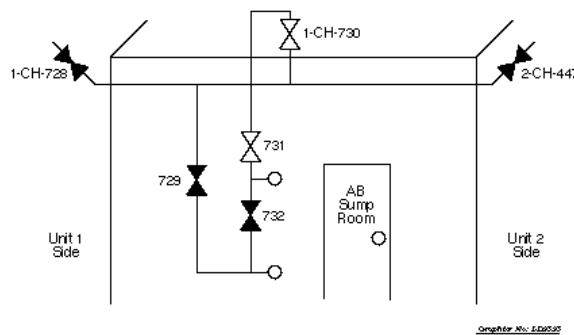
- Locates 1-CH-732 (see location sketch).
- Begins venting by opening 1-CH-732 (turning valve in the counter-clockwise direction).
- Recloses 1-CH-732 by turning valve in the clockwise direction.

**EVALUATOR'S CUE**

- **Tell operator:** When 1-CH-732 properly operated, intermittent flow noises are heard from behind gate 23, followed by a steady flow noise.
- **If asked:** Pressure indication on pressure gauge is steady after a couple of seconds.

**EVALUATOR'S NOTE:**

Area location sketch



**COMMENTS:**

\_\_\_\_\_ SAT  
\_\_\_\_\_ UNSAT

<p><b>STEP 3:</b></p> <p>Check open or open manual Charging Cross-connect on <u>UNIT 2</u>. (<i>Attachment 1 step 7</i>)</p> <ul style="list-style-type: none"> <li>• 2-CH-447, CHG Pumps Xconn to Unit 1 Isol</li> </ul> <p><b>STANDARD:</b></p> <ol style="list-style-type: none"> <li>Proceeds to Auxiliary Building Basement Unit 2 side.</li> <li>Locates 2-CH-447 (see location sketch).</li> <li>* <b>Opens 2-CH-447 (by turning valve handwheel in the counter-clockwise direction).</b></li> </ol> <p><b>EVALUATOR'S CUE:</b></p> <ul style="list-style-type: none"> <li>• <b>When correctly operated:</b> Handwheel rotates, stem extends out, then the handwheel stops, and flow noise is heard for a short period of time, then it stops.</li> </ul> <p><b>** TIME CRITICAL STOP TIME:</b> _____ (must be less than 16 minutes).</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
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<p><b>STEP 4:</b></p> <p>Report to Shift Manager that Charging is crosstied, Unit 1 supplying Unit 2.</p> <p><b>STANDARD:</b></p> <p>a) Verbal report made that task is complete.</p> <p><b>EVALUATOR'S NOTE:</b></p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
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**STOP TIME:** \_\_\_\_\_

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**Operator Directions Handout  
(TO BE GIVEN TO APPLICANT)**

**Initial Conditions**

- We are currently experiencing a fire in Unit 2 Emergency Switchgear Room.
- Unit 2 RCP seals have been isolated

**Initiating Cues**

- **This JPM is \*\*TIME CRITICAL\*\*.**
- Here is a copy of 0-FCA-14.00, Establishing Stable RCS Makeup Flowpaths, Attachment 1.
- I need you to perform Attachment 1 of FCA-14.00 steps 5-7 in order to establish Charging Pump crosstie from Unit 1 to Unit 2.
- When you finish the actions necessary to accomplish this, please inform me so I can have the Operating Team establish makeup flow IAW step 8.

NUMBER 0-FCA-14.00	ATTACHMENT TITLE CHARGING PUMP CROSS-CONNECT - UNIT 1 SUPPLYING UNIT 2	ATTACHMENT 1
REVISION 10		PAGE 1 of 5

\*\*\*\*\*  
**CAUTION:** Communication between Aux BLDG and Service BLDG is required to check that MOVs on the fire-affected unit are deenergized before locally checking position or manually re-positioning. This will prevent spurious component operation from fire damage.  
 \*\*\*\*\*

\*\*\*\*\*  
**NOTE:** • Attachment 5 provides contingency actions for any valve that can not be aligned to the desired position.  
 • If fire is not in the MCR, valve position verification may be performed in the MCR for the MOVs listed in Step 1.  
 \*\*\*\*\*

1. Check or align valves on UNIT 1 to the following positions:

   a. Check Charging Pump Suction from RWST:

- ☒ • 1-CH-MOV-1115B - OPEN
- ☒ • 1-CH-MOV-1115D - OPEN

   b. Check Charging Pump Suction from VCT.

- ☒ • 1-CH-MOV-1115C - CLOSED
- ☒ • 1-CH-MOV-1115E - CLOSED

   c. Check Charging Pump Miniflow RECIRC path.

- ☒ • 1-CH-MOV-1373 - OPEN

   d. Check Seal Injection flow path.

- ☒ • 1-CH-MOV-1370 - OPEN
- ☒ • 1-CH-HCV-1186 - FAIL OPEN

   e. Check open or open CHG Pump C Discharge MOVs.

- ☒ • 1-CH-MOV-1286C, Normal Discharge
- ☒ • 1-CH-MOV-1287C, Alternate Discharge

   f. Adjust Seal Injection flow to between 6 and 8 GPM using the following.

- ☒ • 1-CH-294, RCP A
- ☒ • 1-CH-297, RCP B
- ☒ • 1-CH-300, RCP C

NUMBER 0-FCA-14.00	ATTACHMENT TITLE CHARGING PUMP CROSS-CONNECT - UNIT 1 SUPPLYING UNIT 2	ATTACHMENT 1
REVISION 10		PAGE 2 of 5

- ☒ g. Check Seal Return flow path.
- ☒ • 1-CH-MOV-1381 - OPEN
- ☒ h. Check Charging flow path:
- ☒ • 1-CH-MOV-1289A - CLOSED
  - ☒ • 1-CH-MOV-1289B - CLOSED
- ☒ i. Check High Head SI valves - CLOSED:
- ☒ • 1-SI-MOV-1867C
  - ☒ • 1-SI-MOV-1867D
  - ☒ • 1-SI-MOV-1842
  - ☒ • 1-SI-MOV-1869A
  - ☒ • 1-SI-MOV-1869B
- ☒ j. Check running Charging Pump MOVs - OPEN:
- ☒ • Normal Discharge
  - ☒ • Alternate Discharge
  - ☒ • Normal Suction
  - ☒ • Alternate Suction
  - ☒ • Pump RECIRC

**NOTE:** Valve position verification must be performed locally for the MOVs listed in Step 2.

2. Check or align valves on UNIT 2 CHG system to the following positions. Coordinate with Service Building Operator to de-energize MOVs before checking position or manually re-positioning.

- ☒ a. Check Charging flow path - AT LEAST ONE CLOSED:
- ☒ • 2-CH-MOV-2289A
  - ☒ • 2-CH-MOV-2289B
- ☒ b. Check High Head SI valves - ALL CLOSED:
- ☒ • 2-SI-MOV-2867C
  - ☒ • 2-SI-MOV-2867D
  - ☒ • 2-SI-MOV-2842
  - ☒ • 2-SI-MOV-2869A
  - ☒ • 2-SI-MOV-2869B

NUMBER 0-FCA-14.00	ATTACHMENT TITLE CHARGING PUMP CROSS-CONNECT - UNIT 1 SUPPLYING UNIT 2	ATTACHMENT 1
REVISION 10		PAGE 3 of 5

- ☒ c. Check open or open CHG Pump C Discharge MOVs.
  - ☒ • 2-CH-MOV-2286C, Normal Discharge
  - ☒ • 2-CH-MOV-2287C, Alternate Discharge
3. ☒ Check or place all Unit 2 Charging Pumps in PTL.
4. ☒ Check isolated or isolate Unit 2 RCP Seals IAW the following lineup:
- ☒ • 2-CH-277, RCP Seal Inj Flow HCV-2186 Outlet Isol - CLOSED
  - ☒ • 2-CC-96, RCP Thermal Barrier CC Ret Hdr Isol - CLOSED
  - ☒ • RCP Seal Return, 2-CH-MOV-2381 - CLOSED AND DEENERGIZED
5. ☐ Check open or open Manual Charging Cross-Connect valve on UNIT 1. (located on Unit 1 side of Gate 23 walkway, near RT pumps)
- ☐ • 1-CH-728, CH Sys Xconn Hdr Root Valve
6. ☐ Vent cross-connect piping: (located outside of Gate 23)
- ☐ • 1-CH-732, CH Sys Xconn Hdr Drain
7. ☐ Check open or open manual Charging Cross-connect on UNIT 2.
- ☐ • 2-CH-447, CHG Pumps Xconn to Unit 1 Isol

NUMBER 0-FCA-14.00	ATTACHMENT TITLE CHARGING PUMP CROSS-CONNECT - UNIT 1 SUPPLYING UNIT 2	ATTACHMENT 1
REVISION 10		PAGE 4 of 5

**NOTE:** • RCS makeup to Unit 2 will be through ONE of the three lines:

1. Normal charging line (preferred);
2. HHSI to Cold Leg through 2-SI-MOV-2867C or 2-SI-MOV-2867D;
3. HHSI to Cold Leg through 2-SI-MOV-2842.

- The normal charging line is the preferred flowpath since it can be controlled from the MCR or ESGR.
- Flow from the running Charging Pump will be divided between units. Communication must be maintained between both units and the Aux Building Operator to maintain stable RCS inventory conditions on both units.

8. \_\_\_\_ Control RCS Makeup flow through the normal Charging header IAW the following. Enter N/A if SI flowpath will be used.

a. Open CHG Line Isol MOVs.

- ☐ • 2-CH-MOV-2289A
- ☐ • 2-CH-MOV-2289B

b. IF 2-CH-FCV-2122 is inoperable, THEN do the following:

- ☐ 1) Close 2-CH-304, 2-CH-FCV-2122 outlet.
- ☐ 2) Control Charging flow using 2-CH-305, 2-CH-FCV-2122 bypass.

☐ c. IF 2-CH-FCV-2122 is under control of operator, THEN control FCV to maintain RCS inventory.

☐ d. GO TO Step 11.

NUMBER 0-FCA-14.00	ATTACHMENT TITLE CHARGING PUMP CROSS-CONNECT - UNIT 1 SUPPLYING UNIT 2	ATTACHMENT 1
REVISION 10		PAGE 5 of 5

**NOTE:** MOVs 2-SI-MOV-2867C/D are powered from the ESGR. If the ESGR is not accessible due to fire, 2-SI-MOV-2842 should be used for flowpath.

9. \_\_\_\_ Control RCS Makeup flow through 2-SI-MOV-2867C/D IAW the following.  
Enter N/A if 2-SI-MOV-2842 will be used.

a. Check HHSI to Cold Leg MOVs - DEENERGIZED.

- ☐ • 2-SI-MOV-2867C
- ☐ • 2-SI-MOV-2867D

☐ b. Establish communications between MCR and Aux Bldg Operator.

☐ c. Manually throttle 2-SI-MOV-2867C or 2-SI-MOV-2867D to maintain RCS inventory.

☐ d. GO TO Step 11.

**NOTE:** MOV 2-SI-MOV-2842 is powered from the Cable Vault. This MOV may be deenergized at the breaker or in the ESGR by opening Breaker 24H1-3.

10. \_\_\_\_ Control RCS Makeup flow through 2-SI-MOV-2842 IAW the following.  
Enter N/A if 2-SI-MOV-2867C/D will be used.

a. Check ALT SI to Cold Leg MOV - DEENERGIZED.

- ☐ • 2-SI-MOV-2842

☐ b. Establish communications between MCR and Aux Bldg Operator.

☐ c. Manually throttle 2-SI-MOV-2842 to maintain RCS inventory.

11. \_\_\_\_ Notify SRO and RO that Charging Pump cross-connect has been established.

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Surry Power Station

SR15301

**In Plant Job Performance Measure 086A2.04**  
**[Alternate Path]**

Applicant \_\_\_\_\_

Start Time \_\_\_\_\_

Examiner \_\_\_\_\_

Date \_\_\_\_\_

Stop Time \_\_\_\_\_

**Title****MANUAL ACTUATION OF THE UNDERGROUND FUEL OIL PUMP HOUSE CO2 SYSTEM**

**SYS086 A2.04 K/A: Ability to (a) predict the impacts of the following malfunctions or operations on the Fire Protection System; and (b) based on those predictions, use procedures to correct, control or mitigate the consequences of those malfunctions or operations: Failure to actuate the FPS when required, resulting in fire damage. (3.3/3.9)**

**Applicability****Estimated Time****Actual Time**

RO/SRO(I)/SRO(U)

8 Minutes

\_\_\_\_\_ Minutes

**Conditions**

- Task is to be SIMULATED in the plant.
- Plant is at 100% power with all systems in their normal configuration.

**Standards**

- CO2 is actuated per 0-OP-FP-006 OPERATION OF FIRE PROTECTION SYSTEMS.

**Initiating Cues**

- Shift Manager direction.

**Terminating Cues**

- CO2 dump initiated and verified to "B" FUEL OIL PUMP HOUSE IAW 0-OP-FP-006, OPERATION OF FIRE PROTECTION SYSTEMS.

**Procedures**

- 0-OP-FP-006, OPERATION OF FIRE PROTECTION SYSTEMS, Revision 14.



Surry

2017-301

(JPM j) Actuate CO2 to FOPH

**Tools and Equipment**

- None

**Safety Considerations**

- None

**Initial Conditions**

- This task is to be SIMULATED. Do NOT turn switches, manipulate controls or reposition valves.
- There is a confirmed fire in the “B” Underground Fuel Oil Pump House.

**Initiating Cues**

- You are to actuate the “B” Underground Fuel Oil Pump House HP CO2 System IAW 0-OP-FP-006 section 5.3.
- When you finish the actions necessary to accomplish this task, please inform me.

**Notes:**

- **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

**PERFORMANCE CHECKLIST**

**Notes to the Evaluator**

- Task critical elements are **bolded** and denoted by an asterisk (\*).
- **START TIME**\_\_\_\_\_:

<p><b>STEP 1:</b></p> <p>CAUTION: If the Underground Fuel Oil Pump House CO2 system control power is de-energized, both the automatic and electrical initiation of the system will be disabled. (<i>CAUTION prior to step 5.3.1</i>).</p> <p><b>STANDARD:</b></p> <p>a) Verbalizes Caution.</p> <p><b>EVALUATOR’S CUE:</b></p> <ul style="list-style-type: none"> <li>• <b>If asked:</b> There are no reports of a loss of control power to Fire protection.</li> </ul> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
<p><b>STEP 2:</b></p> <p>Determine which Underground fuel oil pump house requires CO2. (<i>Step 5.3.1</i>)</p> <p><b>STANDARD:</b></p> <p>a) Determines “B” Underground Fuel Oil Pump House requires CO2 actuation from handout.</p> <p><b>EVALUATOR’S Cue:</b></p> <ul style="list-style-type: none"> <li>• <b>If asked:</b> If asked for confirmation of which Underground Fuel oil pump house requires CO2 respond: “All the information you need has been provided.”</li> <li>• <b>If asked:</b> Dark black smoke is coming out of the ‘B’ FOPH exhaust louvers. These are the exhaust louvers on the left as you are facing them. (closest to the CO2 bottle house)</li> </ul> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>

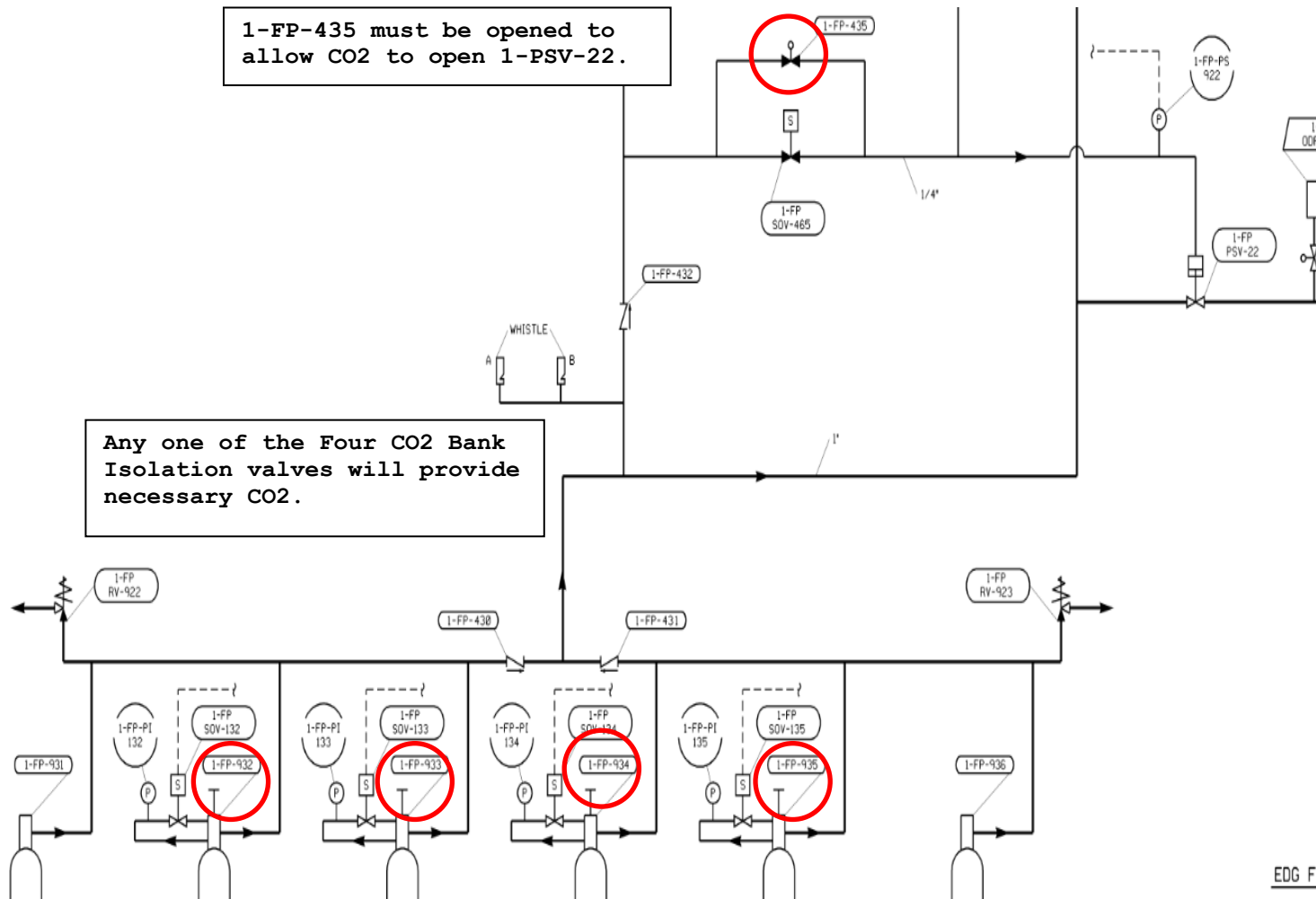
<p><b>STEP 3:</b></p> <p>Initiate CO2 for affected area by pulling down on the lever for one of the two available manual actuation stations (one station is located at entrance to the associated fuel oil pump house and the other is located inside the CO2 bottle storage house). (<i>Step 5.3.2</i>)</p> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"><li>• Proceeds to either “B” Underground Fuel Oil Pump House manual actuation station.</li><li>• Pulls down on lever for “B” Fuel Oil Pump House CO2 actuation station.</li></ul> <p><b>EVALUATOR’S CUE:</b></p> <ul style="list-style-type: none"><li>• <b>If asked:</b> There is no preference as to which actuation station is used.</li></ul> <p><b>EVALUATOR’S NOTE:</b></p> <ul style="list-style-type: none"><li>• One manual actuation station is located at the entrance to the associated fuel oil pump house and the other is located inside the CO<sub>2</sub> bottle storage house. Either is acceptable.</li><li>• This is the start for the Alternate path as this is an <u>unexpected outcome</u> which the procedure addresses.</li></ul> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
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<p><b>STEP 4:</b></p> <p>Check CO2 initiation and notify Main Control Room. <i>(Step 5.3.3)</i></p> <ul style="list-style-type: none"><li>• Exhaust fan for affected house tripped.</li><li>• Frost on piping.</li><li>• Discharge horn sounds.</li><li>• Discharge light flashes.</li></ul> <p><b>STANDARD:</b></p> <p>a) Observes that the “B” Underground Fuel Oil Pump House CO2 system fails to initiate. b) Notifies Main Control Room of CO2 failure.</p> <p><b>EVALUATOR’S CUE:</b></p> <ul style="list-style-type: none"><li>• <b>If asked:</b> Exhaust fan not tripped.</li><li>• <b>If asked:</b> No frost on piping.</li><li>• <b>If asked:</b> Discharge horn does not sound.</li><li>• <b>If asked:</b> Discharge light does not flash.</li></ul> <p><b>EVALUATOR’S NOTES:</b></p> <ul style="list-style-type: none"><li>• The Operator may attempt to actuate the other CO2 station. This is acceptable but not required. The Manual Actuation <u>will not work for any location.</u></li></ul> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
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<p><b>STEP 5:</b></p> <p>IF CO2 fails to initiate, <u>THEN</u> perform the following steps. Otherwise enter N/A (<i>Step 5.3.4.a</i>)</p> <p>a) Secure the ventilation exhaust fan for the <u>affected</u> house by pushing the STOP pushbutton on the breaker.</p> <ul style="list-style-type: none"> <li>1-VS-F-46A (1-EP-BKR-1B1-1B-1E) A House.</li> <li><b>1-VS-F-46B (2-EP-BKR-2B1-1B-2A) B House.</b></li> </ul> <p><b>STANDARD:</b></p> <p>a) Proceeds to Unit 2 VP house.</p> <p>b) <b>*Pushes STOP pushbutton on breaker 2-EP-BKR-2B1-1B-2A.</b></p> <p><b>EVALUATOR'S CUE:</b></p> <ul style="list-style-type: none"> <li><b>If asked:</b> Exhaust fan is not running.</li> </ul> <p><b>EVALUATOR'S NOTE:</b></p> <ul style="list-style-type: none"> <li>Both breakers are located in Unit 2 Valve Pump house.</li> </ul> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
<p><b>STEP 6:</b></p> <p><b>NOTE:</b> The following valves are located in the high pressure CO2 bottle storage house next to the 'B' Underground fuel oil pump house.</p> <p>Open the bypass valve for the <u>affected</u> Fuel Oil pump house. (<i>Step 5.3.4.b</i>)</p> <ul style="list-style-type: none"> <li>1-FP-433 (Fuel Oil pump house A)</li> <li><b>1-FP-435 (Fuel Oil pump house B)</b></li> </ul> <p><b>STANDARD:</b></p> <p>a) Reads and acknowledges Note.</p> <p>b) <b>*Opens 1-FP-435.</b></p> <p><b>EVALUATOR'S NOTE:</b></p> <p>"This step is sequence critical". 1-FP-435 must be opened before dumping CO2 in the next step.</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>

<p><b>STEP 7:</b></p> <p>Dump CO2 in accordance with <u>ONE</u> of the following: <i>(Step 5.3.4.c)</i></p> <p>1) Dump main CO2 bank by opening <u>ONE</u> of the following:</p> <ul style="list-style-type: none"> <li>• <b>1-FP-932</b> (1-FP-TK-132)</li> <li>• <b>1-FP-933</b> (1-FP-TK-133)</li> </ul> <p style="text-align: center;">OR</p> <p>2) Dump reserve CO2 bank by opening <u>ONE</u> of the following:</p> <ul style="list-style-type: none"> <li>• <b>1-FP-934</b> (1-FP-TK-134)</li> <li>• <b>1-FP-935</b> (1-FP-TK-135)</li> </ul> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>• * <b>Operator opens any one of the above listed valves.</b></li> <li>• Note: Opening more than one valve is acceptable.</li> </ul> <p><b>EVALUATOR'S NOTES:</b></p> <ul style="list-style-type: none"> <li>• Valve pin must be pulled to operate valve.</li> </ul> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
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[illegible]



EDG F



**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 confirmed fire in the “B” Underground Fuel Oil Pump House.

**Initiating Cues**

- You are to actuate the “B” Underground Fuel Oil Pump House HP CO2 System IAW 0-OP-FP-006 section 5.3.
- When you finish the actions necessary to accomplish this task, please inform me.

### 5.3 Manual Actuation of the Underground Fuel Oil Pump House CO2 System

#### INFORMATION USE

#### CAUTION

If the Underground Fuel Oil Pump House CO2 system control power is de-energized, both the automatic and electrical initiation of the system will be disabled.

- \_\_\_\_\_ 5.3.1 Determine which Underground fuel oil pump house requires CO2.
- \_\_\_\_\_ 5.3.2 Initiate CO2 for affected area by pulling down on the lever for one of the two available manual actuation stations (one station is located at entrance to the associated fuel oil pump house and the other is located inside the CO2 bottle storage house).
- \_\_\_\_\_ 5.3.3 Check CO2 initiation and notify Main Control Room.
- Exhaust fan for affected house tripped
  - Frost on piping
  - Discharge horn sounds
  - Discharge light flashes
- \_\_\_\_\_ 5.3.4 IF CO2 fails to initiate, THEN perform the following steps. Otherwise, enter N/A.
- \_\_\_\_\_ a. Secure the ventilation exhaust fan for the affected house by pushing the STOP pushbutton on the breaker.
- 1-VS-F-46A (1-EP-BKR-1B1-1B-1E) A House
  - 1-VS-F-46B (2-EP-BKR-2B1-1B-2A) B House

**NOTE:** The following valves are located in the high pressure CO2 bottle storage house next to the B Underground fuel oil pump house.

\_\_\_\_\_

b. Open the bypass valve for the affected Fuel Oil pump house.

- 1-FP-433 (Fuel Oil pump house A)
- 1-FP-435 (Fuel Oil pump house B)

c. Dump CO2 IAW ONE of the following:

\_\_\_\_\_

1. Dump main CO2 bank by opening ONE of the following:

\_\_\_\_\_ 1-FP-932 (1-FP-TK-132)

\_\_\_\_\_ 1-FP-933 (1-FP-TK-133)

OR

\_\_\_\_\_

2. Dump reserve CO2 bank by opening ONE of the following:

\_\_\_\_\_ 1-FP-934 (1-FP-TK-134)

\_\_\_\_\_ 1-FP-935 (1-FP-TK-135)

\_\_\_\_\_

d. Check CO2 system actuation and notify Main Control Room.

- Discharge horn sounds
- Discharge light flashes
- Frost on piping

Performed by: \_\_\_\_\_  
Signature Initial Print Date

U.S. Nuclear Regulatory Commission  
Surry Power Station

SR15301  
**In Plant** Job Performance Measure 073A2.01

Applicant\_\_\_\_\_

Start Time\_\_\_\_\_

Examiner\_\_\_\_\_

Date \_\_\_\_\_

Stop Time\_\_\_\_\_

**Title****SWAP N-16 AND MGPI RADIATION MONITOR POWER SUPPLIES**

**K/A: 073A2.01 Ability to (a) predict the impacts of the following malfunctions or operations on the PRM system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Erratic or failed power supply (2.5/2.9)**

**Applicability****Estimated Time****Actual Time**

RO/SRO(I)

17 minutes

\_\_\_\_\_ minutes

**Conditions**

- Task is to be SIMULATED in the plant.

**Standards**

- 2-AP-10.07, Loss of Unit 2 Power and 0-OP-RM-001, Radiation Monitor Equipment.

**Initiating Cues**

- Both Units were at 100% power with all systems in their normal configuration when a loss of the 2H emergency bus occurred. 2-AP-10.07, LOSS OF UNIT 2 POWER has been implemented and Step 24 RNO is being performed.

**Terminating Cues**

- Report from operator that steps 5.10.5 thru 5.10.12 are complete.

**Procedures**

- 0-OP-RM-001, Radiation Monitor Equipment, Rev 15.

**Tools and Equipment****Safety Considerations**

- None

- None

**Initial Conditions**

- This task is to be SIMULATED. Do NOT turn switches, manipulate controls or reposition valves.
- I am the Shift Manager. Both Units were stable with all systems in their normal configuration when a loss of the 2H emergency bus occurred. Step 24 RNO of 2-AP-10.07 is being performed at this time.
- Currently, the N-16 and MGPI Radiation Monitors are aligned to the 2H bus

**Initiating Cues**

- Here is a copy of 0-OP-RM-001, RADIATION MONITORING SYSTEM, section 5.10, Transferring Power Supply to N-16 and MGPI Radiation Monitors. Steps 5.10.1 thru 5.10.4 have been completed.
- I need you to transfer the power supply for the N-16 and MGPI Radiation Monitors to the 1H bus IAW 0-OP-RM-001, RADIATION MONITORING SYSTEM, **Steps 5.10.5 thru 5.10.12**.
- When you finish the actions necessary to accomplish this, please inform me.

**Notes:**

- **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

**PERFORMANCE CHECKLIST**

**Notes to the Evaluator**

- Task critical elements are **bolded** and denoted by an asterisk (\*).
- **START TIME**\_\_\_\_\_:

<p><b>STEP 1:</b></p> <p><b>NOTES:</b></p> <ul style="list-style-type: none"> <li>• If the H Busses on both units are energized, the N-16 Radiation Monitors for both units will lose power during the power supply transfer. Annunciator 1A-C3, N-16 Trouble and 2A-C3, N-16 Trouble, will be received.</li> <li>• The key for the N-16 LPDU switches may be obtained from the I&amp;C key locker.</li> </ul> <p>Place the key switches on all six N-16 LPDUs in the OFF position. (<i>Step 5.10.5</i>)</p> <ul style="list-style-type: none"> <li>• 1-MS-RI-190</li> <li>• 1-MS-RI-191</li> <li>• 1-MS-RI-192</li> <li>• 2-MS-RI-290</li> <li>• 2-MS-RI-291</li> <li>• 2-MS-RI-292</li> </ul> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>• Reads the NOTE regarding the effects of losing both H busses, and notes that it doesn't apply.</li> <li>• Reads the NOTE regarding location of the key for the N-16 LPDUs (Local Power Display Units).</li> <li>• Proceeds to the U-1 Cable Spreading Room (CSR) and places the 3 LPDU key switches in OFF.</li> <li>• Proceeds to the U-2 Cable Spreading Room (CSR) and places the 3 LPDU key switches in OFF.</li> </ul> <p><b>EVALUATOR'S CUE:</b></p> <ul style="list-style-type: none"> <li>• <b>When the Operator asks for the Key:</b> Ask him where would he go to obtain key? Answer: I&amp;C or Control Room Key locker in the Annex.</li> <li>• <b>When asked:</b> Inform Operator that the LPDU lights go out.</li> </ul> <p><b>EVALUATOR'S NOTE:</b></p> <ul style="list-style-type: none"> <li>• This step is not critical. The equipment is designed to deenergize and restart following loss of power.</li> </ul> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
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<p><b>STEP 2:</b></p> <p>NOTE: If the H Buses on both units are energized, the MGPI Process Vent and Vent Vent Radiation Monitors will lose power during the power supply transfer. Annunciators 0-RMA-C5, Process Vent Rad Mon Trbl, and 0-RMA-D5, Vent Stack #2 Rad Mon Trbl, will be received.</p> <p>Open the following breakers on 1-EP-DB-101, N-16 Radiation Monitor Distribution Panel, located in Unit 2 Cable Spreading Room. (<i>Step 5.10.6</i>)</p> <ul style="list-style-type: none"> <li>• Breaker No. 2, 1-GW-RM-130-1 Control (Surge Protection)</li> <li>• Breaker No. 4, 1-GW-RM-130-2 Control (Surge Protection)</li> <li>• Breaker No. 5, 1-VG-RM-131-1 Pump &amp; 1-VG-RM-131-2 Heater</li> <li>• Breaker No. 6, 1-VG-RM-131-2 Control (Surge Protection)</li> <li>• Breaker No. 7, 1-VG-RM-131-1 Control (Surge Protection)</li> <li>• Breaker No. 8, 1-GW-RM-130-1 Pump &amp; 1-GW-RM-130-2 Heater</li> </ul> <p><b>STANDARD:</b></p> <ol style="list-style-type: none"> <li>a) Reads the NOTE regarding the effects of losing both H busses, and notes that it doesn't apply.</li> <li>b) Locates the breaker in U-2 CSR.</li> <li>c) Verifies correct breaker ID tag/label.</li> <li>d) Simulates opening the following breakers: Breakers no. 2, 4, 5, 6, 7, 8</li> </ol> <p><b>EVALUATOR'S CUE:</b></p> <ul style="list-style-type: none"> <li>• Acknowledge the position as OPEN.</li> </ul> <p><b>EVALUATOR'S NOTE:</b></p> <ul style="list-style-type: none"> <li>• This step is not critical. The equipment is designed to deenergize and restart following loss of power.</li> </ul> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
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<p><b>STEP 3:</b></p> <p>Check open or open 1-EP-BKR-1H1-1-4B2, Unit 1 N-16 Power Supply. <i>(Step 5.10.7)</i></p> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>a) Locates the breaker.</li> <li>b) Verifies correct breaker using the ID tag/label.</li> <li>c) Verifies breaker is already open.</li> </ul> <p><b>EVALUATOR'S CUE:</b></p> <ul style="list-style-type: none"> <li>• Breaker is OPEN. <i>Actual breaker position may be OPEN or CLOSED but for purposes of this JPM the as-found position of this breaker is OPEN.</i></li> </ul> <p><b>EVALUATOR'S NOTE:</b></p> <ul style="list-style-type: none"> <li>• Pinch hazard on steps down to the ESGR (below MCR doors).</li> <li>• Must "badge in" to gain access from the stairwell to the ESGR.</li> </ul> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
<p><b>STEP 4:</b></p> <p>Check open or open 2-EP-BKR-2H1-1-2D2, Unit 2 N-16 Power Supply. <i>(Step 5.10.8)</i></p> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>a) Locates the breaker.</li> <li>b) Verifies correct breaker using the ID tag/label.</li> <li>c) * <b>Simulates opening breaker 2-EP-BKR-2H1-1-2D2.</b></li> </ul> <p><b>EVALUATOR'S CUE:</b></p> <ul style="list-style-type: none"> <li>• As-Found Breaker position is CLOSED. <i>Actual breaker position may be OPEN or CLOSED but for purposes of this JPM the as-found position of this breaker is CLOSED.</i></li> <li>• As-Left Breaker position is OPEN by indicating that breaker handle is pointing to the "OPEN" position.</li> </ul> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>



<p><b>STEP 5:</b></p> <p>Swap throwover switch 1-EP-TRS-DB-101 (near MCC 1H1-1) to align desired power supply. <i>(Step 5.10.9)</i></p> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>a) Locates the throwover switch.</li> <li>b) Verifies correct component using the ID tag/label.</li> <li>c) * <b>Simulates swapping to Unit 1 supply powered from 1H bus.</b></li> </ul> <p><b>EVALUATOR'S CUE:</b></p> <ul style="list-style-type: none"> <li>• As-Found throwover switch position is Unit 2.</li> <li>• As-Left throwover switch position is Unit 1.</li> </ul> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
<p><b>STEP 6:</b></p> <p>Close desired supply breaker. <i>(Step 5.10.10)</i></p> <ul style="list-style-type: none"> <li>• <b>1-EP-BKR-1H1-1-4B2, Unit 1 N-16 Power Supply.</b></li> <li>• 2-EP-BKR-2H1-1-2D2, Unit 2 N-16 Power Supply.</li> </ul> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>a) Locates breaker 1-EP-BKR-1H1-1-4B2, Unit 1 N-16 Power Supply.</li> <li>b) Verifies correct component using the ID tag/label.</li> <li>c) * <b>Simulates closing breaker 1-EP-BKR-1H1-1-4B2, Unit 1 N-16 Power Supply.</b></li> </ul> <p><b>EVALUATOR'S CUE:</b></p> <ul style="list-style-type: none"> <li>• Breaker is closed by indicating that the breaker handle is pointing to the "CLOSED" position.</li> </ul> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>

<p><b>STEP 7:</b></p> <p>Place the keyswitches on all six N-16 LPDUs in the ON position. <i>(Step 5.10.11)</i></p> <ul style="list-style-type: none"> <li>• 1-MS-RI-190</li> <li>• 1-MS-RI-191</li> <li>• 1-MS-RI-192</li> <li>• 2-MS-RI-290</li> <li>• 2-MS-RI-291</li> <li>• 2-MS-RI-292</li> </ul> <p><b>STANDARD:</b></p> <ol style="list-style-type: none"> <li>Proceeds to the U-1 Cable Spreading Room (CSR) and places the 3 LPDU key switches in ON.</li> <li>Proceeds to the U-2 Cable Spreading Room (CSR) and places the 3 LPDU key switches in ON.</li> </ol> <p><b>EVALUATOR'S CUE:</b></p> <ul style="list-style-type: none"> <li>• Inform operator that the LPDU lights come on.</li> </ul> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
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<p><b>STEP 8:</b></p> <p>Close the following breakers on 1-EP-DB-101, N-16 Radiation Monitor Distribution Panel, located in Unit 2 Cable Spreading Room. (<i>Step 5.10.12</i>)</p> <ul style="list-style-type: none"><li>• Breaker No. 2, 1-GW-RM-130-1 Control (Surge Protection)</li><li>• Breaker No. 4, 1-GW-RM-130-2 Control (Surge Protection)</li><li>• Breaker No. 5, 1-VG-RM-131-1 Pump &amp; 1-VG-RM-131-2 Heater</li><li>• Breaker No. 6, 1-VG-RM-131-2 Control (Surge Protection)</li><li>• Breaker No. 7, 1-VG-RM-131-1 Control (Surge Protection)</li><li>• Breaker No. 8, 1-GW-RM-130-1 Pump &amp; 1-GW-RM-130-2 Heater</li></ul> <p><b>STANDARD:</b></p> <ol style="list-style-type: none"><li>a) Locates the breaker in U-2 CSR.</li><li>b) Verifies correct breaker ID tag/label.</li><li>c) Simulates closing the following breakers: Breakers no. 2, 4, 5, 6, 7, 8.</li></ol> <p><b>EVALUATOR'S CUE:</b></p> <p><b>If asked:</b> Acknowledge the need for an IV and state that it will be done by another operator.</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
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<p><b>STEP 9:</b></p> <p>Reports to Shift Manager (MCR) that steps 5.10.5 through 5.10.12 of 0-OP-RM-001 have been completed.</p> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>Verbal status report made that the task is completed.</li> </ul> <p><b>EVALUATOR'S NOTE:</b></p> <p><b>COMMENTS:</b></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>
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**STOP TIME:** \_\_\_\_\_

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

**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.
- I am the Shift Manager. Both Units were stable with all systems in their normal configuration when a loss of the 2H emergency bus occurred. Step 24 RNO of 2-AP-10.07 is being performed at this time.
- Currently, the N-16 and MGPI Radiation Monitors are aligned to the 2H bus

**Initiating Cues**

- Here is a copy of 0-OP-RM-001, RADIATION MONITORING SYSTEM, section 5.10, Transferring Power Supply to N-16 and MGPI Radiation Monitors. Steps 5.10.1 thru 5.10.4 have been completed.
- I need you to transfer the power supply for the N-16 and MGPI Radiation Monitors to the 1H bus IAW 0-OP-RM-001, RADIATION MONITORING SYSTEM, **Steps 5.10.5 thru 5.10.12**.
- When you finish the actions necessary to accomplish this, please inform me.

#### 5.10 Transferring Power Supply to N-16 and MGPI Radiation Monitors

0

5.10.1 Review Technical Specification 4.13 for applicable clocks.

0

5.10.2 Initiate required actions of VPAP-2103S, Offsite Dose Calculation Manual (Surry) for removal of MGPI Process Vent and Vent Vent Radiation Monitors.

0

5.10.3 Review ET CEP 99-0029 for removal of MGPI Process Vent and Vent Vent Radiation Monitors.

5.10.4 Perform the following to prepare for loss of 1-GW-RM-130A/B/C, MGPI Process Vent Monitors:

0

a. Check secured or secure WGDТ release IAW OP-23.2.3 or OP-23.2.4, Release of Waste Gas Decay Tank 1A or 1B.

b. Check or place CTMT Vacuum Pumps in OFF.

0

- 1-CV-P-1A

0

- 1-CV-P-1B

0

- 2-CV-P-1A

0

- 2-CV-P-1B

0

c. Check closed or close 1-GW-FCV-160, Unit 1 CTMT Vacuum Pump Discharge Isolation.

0

d. Check closed or close 1-GW-FCV-260, Unit 2 CTMT Vacuum Pump Discharge Isolation.

0

e. Direct I&C to standby to reset the WGDТ Discharge and CTMT Vacuum Pump Discharge lockout latch for 1-GW-RM-130-B, MGPI Process Vent Normal Range Monitor, IAW IMP-C-RM-36, Radiation Monitoring System Maintenance.

- NOTE:**
- If the H Buses on both units are energized, the N-16 Radiation Monitors for both units will lose power during the power supply transfer. Annunciators 1A-C3, N-16 Trouble, and 2A-C3, N-16 Trouble, will be received.
  - The key for the N-16 LPDU switches may be obtained from the I&C key locker.

5.10.5 Place the keyswitches on all six N-16 LPDUs in the OFF position.

- 1-MS-RI-190
- 1-MS-RI-191
- 1-MS-RI-192
- 2-MS-RI-290
- 2-MS-RI-291
- 2-MS-RI-292

**NOTE:** If the H Buses on both units are energized, the MGPI Process Vent and Vent Vent Radiation Monitors will lose power during the power supply transfer. Annunciators 0-RMA-C5, Process Vent Rad Mon Trbl, and 0-RMA-D5, Vent Stack #2 Rad Mon Trbl, will be received.

5.10.6 Open the following breakers on 1-EP-DB-101, N16 Radiation Monitor Distribution Panel, located in Unit 2 Cable Spreading Room.

- Breaker No. 2, 1-GW-RM-130-1 Control (Surge Protection)
- Breaker No. 4, 1-GW-RM-130-2 Control (Surge Protection)
- Breaker No. 5, 1-VG-RM-131-1 Pump & 1-VG-RM-131-2 Heater
- Breaker No. 6, 1-VG-RM-131-2 Control (Surge Protection)

- \_\_\_\_\_ • Breaker No. 7, 1-VG-RM-131-1 Control (Surge Protection)

- \_\_\_\_\_ • Breaker No. 8, 1-GW-RM-130-1 Pump & 1-GW-RM-130-2 Heater

\_\_\_\_\_ 5.10.7 Check open or open 1-EP-BKR-1H1-1-4B2, Unit 1 N-16 Power Supply.

\_\_\_\_\_ 5.10.8 Check open or open 2-EP-BKR-2H1-1-2D2, Unit 2 N-16 Power Supply.

\_\_\_\_\_ 5.10.9 Swap throwover switch 1-EP-TRS-DB-101 (near MCC 1H1-1) to align  
desired power supply.

\_\_\_\_\_ 5.10.10 Close desired supply breaker. (✓)

\_\_\_\_\_ 1-EP-BKR-1H1-1-4B2, Unit 1 N-16 Power Supply

\_\_\_\_\_ 2-EP-BKR-2H1-1-2D2, Unit 2 N-16 Power Supply

5.10.11 Place the keyswitches on all six N-16 LPDUs in the ON position.

- \_\_\_\_\_ • 1-MS-RI-190

- \_\_\_\_\_ • 1-MS-RI-191

- \_\_\_\_\_ • 1-MS-RI-192

- \_\_\_\_\_ • 2-MS-RI-290

- \_\_\_\_\_ • 2-MS-RI-291

- \_\_\_\_\_ • 2-MS-RI-292



5.10.12 Close the following breakers on 1-EP-DB-101, N16 Radiation Monitor Distribution Panel, located in Unit 2 Cable Spreading Room.

\_\_\_\_ IV

- Breaker No. 2, 1-GW-RM-130-1 Control (Surge Protection)

\_\_\_\_ IV

- Breaker No. 4, 1-GW-RM-130-2 Control (Surge Protection)

\_\_\_\_ IV

- Breaker No. 5, 1-VG-RM-131-1 Pump & 1-VG-RM-131-2 Heater

\_\_\_\_ IV

- Breaker No. 6, 1-VG-RM-131-2 Control (Surge Protection)

\_\_\_\_ IV

- Breaker No. 7, 1-VG-RM-131-1 Control (Surge Protection)

\_\_\_\_ IV

- Breaker No. 8, 1-GW-RM-130-1 Pump & 1-GW-RM-130-2 Heater

**NOTE:** The time delay may take up to 10 minutes and is indicated clear by the green light on the N-16 LPDUs coming on.

\_\_\_\_

5.10.13 After a time delay, check that annunciators 1A-C3 and 2A-C3 are clear.

\_\_\_\_

5.10.14 Direct I&C to reset the WGDT Discharge and CTMT Vacuum Pump Discharge lockout latch for 1-GW-RM-130-B, MGPI Process Vent Normal Range Monitor, IAW IMP-C-RM-36, Radiation Monitoring System Maintenance.

U.S. Nuclear Regulatory Commission  
Surry Power Station

SR17301

**Administrative** Job Performance Measure G2.1.7

Applicant \_\_\_\_\_

Start Time \_\_\_\_\_

Examiner \_\_\_\_\_

Date \_\_\_\_\_

Stop Time \_\_\_\_\_

**Title****Perform a Quadrant Power Tilt Calculation.****K/A: G.2.1.7 Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.****Applicability****Estimated Time****Actual Time**

SRO(D)/SRO(U) ALL (mgd, 10/17)

15 Minutes

**Conditions**

- Task is to be PERFORMED in the classroom.

**Standards**

- Correctly calculates Quadrant Power Tilt for given core conditions on the Calculation of Excore Quadrant Power Tilt Ratios, Attachment 6 of 0-AP-1.00, Rod Control System Malfunction.

**Initiating Cues**

- A dropped rod has occurred on Unit 1.
- A Quadrant Power Tilt Calculation needs to be performed as directed by 0-AP-1.00. Rod Control System Malfunction.
- When you have determined the Quadrant Power Tilt, inform the examiner.

**Terminating Cues**

- Applicant has completed the QPTR Calculation.

**Procedures**

- 0-AP-1.00, Rod Control System Malfunction, Rev. 27

**Tools and Equipment**

- Calculator
- NIS Setpoints and Power Range Currents Data Sheet. (Included with Current detector currents)

**Initial Conditions:**

- Unit 1 operating at 100% power.
  - Control Rod D-10, Control Bank B, Group 1 dropped and is currently indicating 0 steps.

**Initiating Cues**

- Perform the Quadrant Power Tilt Calculation in accordance with Attachment 6, Calculation of Excore Quadrant Power Tilt Ratios, of 0-AP-1.00, Rod Control System Malfunction.
- You are provided a copy of the Power Range Currents from the NIS Data Book providing Normalized Values.
- When you have determined the Quadrant Power Tilt, inform the examiner.

Actual current detector currents taken from the Power Range NIs:

N-41 Upper Detector Current      120.5  
 N-41 Lower Detector Current      124.2

N-42 Upper Detector Current      96.5  
 N-42 Lower Detector Current      94.23

N-43 Upper Detector Current      114.7  
 N-43 Lower Detector Current      115.5

N-44 Upper Detector Current      119.1  
 N-44 Lower Detector Current      121.8

**Surry Unit 1 NI Calibration Data**

Power Range Currents

	N41		N42		N43		N44	
DELTA FLUX @	I (Top) μamps	I (Bottom) μamps	I (Top) μamps	I (Bottom) μamps	I (Top) μamps	I (Bottom) μamps	I (Top) μamps	I (Bottom) μamps
100%								
0	118.8	119.5	118.5	119.3	119.1	119.5	119.1	119.5
DELTA FLUX @	I (Top) μamps	I (Bottom) μamps	I (Top) μamps	I (Bottom) μamps	I (Top) μamps	I (Bottom) μamps	I (Top) μamps	I (Bottom) μamps
120%								
0	142.5	143.4	142.2	143.1	142.9	143.5	142.9	143.4
8	148.6	137.2	148.3	137.0	149.1	137.3	149.1	137.2
- 24	124.2	161.8	123.9	161.5	124.5	161.9	124.6	161.9

Data based on flux map number S1C28M15A

Computer and Recorder Constants

Recorder = K0411 = K0412 = K0413 = K0414 = 18.647

Performed / Verified By: LaFrance / Davis      Date: 9/21/17

**PERFORMANCE CHECKLIST**

**Notes to the Evaluator**

- Task critical elements are bolded and denoted by an asterisk (\*).
- At the completion of the JPM **all SRO Candidates** will have a Follow-Up question.
- **START TIME:** \_\_\_\_\_

<p>STEP 1:    <b>[Step 1 NOTE, Att. 6]</b></p> <p>NOTE: Calculations for QPTR should be carried out to four places to the right of the decimal place to provide accuracy and consistency of results.</p> <p><b>STANDARD</b></p> <p>Acknowledges NOTE prior to Step 1 of Att. 6.</p> <p><b>COMMENTS:</b></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>
<p>STEP 2:    <b>[Step 1, Att. 6]</b></p> <p>Record Reactor Power, Date, and Time in appropriate blocks.</p> <p><b>STANDARD:</b></p> <p>Records 100% for Reactor Power block, Current Date in Date block, Time in Time block.</p> <p><b>EVALUATOR'S NOTE:</b></p> <p>    <b>If Asked:</b> Current Reactor Power is 100%.</p> <p>    <b>If Asked:</b> Use todays date.</p> <p>    <b>If Asked:</b> Use current time.</p> <p><b>COMMENTS:</b></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>
<p>STEP 3:    <b>[Step 2, Att. 6]</b></p> <p>Record the following Excore Detector Data:</p> <ul style="list-style-type: none"> <li>• Actual Excore Detector Readings.</li> <li>• Expected Excore Detector Readings.</li> </ul> <p><b>STANDARD:</b></p> <p>Places PR NI currents and Normalized Currents in appropriate location on Calculation of Excore Quadrant Power Tilt Ratios.</p> <p><b>COMMENTS:</b></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>

<p>STEP 4:   <b>[STEP 3, Att. 6]</b>          Normalize the Upper detector readings.</p> <p><b>STANDARD:</b></p> <p>      * Divides Upper Detector currents by Normalized currents for each detector.</p> <p><b>EVALUATOR' S NOTE:</b>          (See attached Calculation of Excore Quadrant Power Tilt Ratios for calculations.)</p> <p><b>COMMENTS:</b></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>
<p>STEP 5:   <b>[STEP 3, Att. 6]</b>          Sum the normalized values for the Upper detectors.</p> <p><b>STANDARD:</b></p> <p>      * Adds Upper Detector Normalized currents for all Upper detectors</p> <p><b>EVALUATOR' S NOTE:</b>          (See attached Calculation of Excore Quadrant Power Tilt Ratios for calculations.)</p> <p><b>COMMENTS:</b></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>
<p>STEP 6:   <b>[STEP 3, Att. 6]</b>          Normalize the Lower detectors readings.</p> <p><b>STANDARD:</b></p> <p>      * Divides Lower Detector currents by Normalized currents for each detector.</p> <p><b>EVALUATOR' S NOTE:</b>          (See attached Calculation of Excore Quadrant Power Tilt Ratios for calculations.)</p> <p><b>COMMENTS:</b></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>

<p>STEP 7:    <b>[Step 3, Att. 6]</b>  Sum the normalized values for the Lower detectors.</p> <p><b>STANDARD:</b>                * Adds Lower Detector Normalized currents for all Lower Detectors.</p> <p><b>EVALUATOR' S NOTE:</b>  (See attached Calculation of Excore Quadrant Power Tilt Ratios for calculations.)</p> <p><b>COMMENTS:</b></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>
<p>STEP 8:    <b>[Step 4, Att. 6]</b>  Record the Number of Detectors in use.</p> <p><b>STANDARD:</b>                Records "4".</p> <p><b>EVALUATOR' S NOTE:</b>  (See attached Calculation of Excore Quadrant Power Tilt Ratios for calculations.)</p> <p><b>COMMENTS:</b></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>
<p>STEP 9:    <b>[Step 5, Att. 6]</b>  Calculate the average upper and lower detector current values.</p> <p><b>STANDARD:</b>                a) Transcribes Upper and Lower detector Sum of Normalized Values from Step 3 of Attachment 6.                *b) Divides each Sum by the number of Detectors in use.</p> <p><b>EVALUATOR' S NOTE:</b>  (See attached Calculation of Excore Quadrant Power Tilt Ratios for calculations.)</p> <p><b>COMMENTS:</b></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>

<p>STEP 10: <b>[Step 6, Att. 6]</b>          From Step 3, Record the Maximum Normalized Upper and Lower Detector Currents.</p> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>* a) Records the Maximum Normalized Upper Detector Current from Step 3 (N41 value of 1.0143.)</li> <li>* b) Records the Maximum Normalized Lower Detector Current From Step 3 (N41 value of 1.0393.)</li> </ul> <p><b>EVALUATOR' S NOTE:</b>          (See attached Calculation of Excore Quadrant Power Tilt Ratios for calculations.)</p> <p><b>COMMENTS:</b></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>
<p>STEP 11: <b>[Step 7, Att. 6]</b>          Calculate the maximum upper and lower Excore Quadrant Power Tilt Ratios.</p> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>*a) Divides Maximum Upper channel current by the Average Upper Detector currents to determine the Upper Excore Quadrant Power Tilt Ratio.</li> <li>*b) Divides Maximum Lower channel current by the Average Lower Detector current to determine the Lower Excore Quadrant Power Tilt Ratio.</li> </ul> <p><b>EVALUATOR' S NOTE:</b>          (See attached Calculation of Excore Quadrant Power Tilt Ratios for calculations.)</p> <p><b>COMMENTS:</b></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>
<p>STEP 12: <b>[Step 8, Att. 6]</b>          Calculate Tilt %.</p> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>*a) Calculates Tilt % for Upper channels.</li> <li>*b) Calculates Tilt % for Lower channels.</li> </ul> <p><b>EVALUATOR' S NOTE:</b>          (See attached Calculation of Excore Quadrant Power Tilt Ratios for calculations.)</p> <p><b>COMMENTS:</b></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>





NUMBER 0-AP-1.00	ATTACHMENT TITLE  CALCULATION OF EXCORE QUADRANT POWER TILT RATIOS	ATTACHMENT 6
REVISION 27		PAGE 1 of 2

NOTE: Calculations for QPTR should be carried out to four places to the right of the decimal place to provide for accuracy and consistency of results.

1. \_\_\_\_ Record the following data:

Reactor Power \_\_\_\_\_ % Date \_\_\_\_\_ Time \_\_\_\_\_

2. \_\_\_\_ Record the following Excore Detector Data:

Actual Excore Detector Readings				Expected Excore Detector Readings at 100% Power			
Upper		Lower		Upper		Lower	
N41U	120.5	N41L	124.2	N41U <sub>100</sub>	118.8	N41L <sub>100</sub>	119.5
N42U	96.5	N42L	94.2	N42U <sub>100</sub>	118.5	N42L <sub>100</sub>	119.3
N43U	114.7	N43L	115.5	N43U <sub>100</sub>	119.1	N43L <sub>100</sub>	119.5
N44U	119.1	N44L	121.8	N44U <sub>100</sub>	119.1	N44L <sub>100</sub>	119.5

3. \_\_\_\_ Normalize the Actual Excore Detector Readings to the expected Excore Detector readings at 100% power, and sum the normalized values for both the upper and lower detectors.

Upper Detector Fraction	Upper Detector Fraction Values	Normalized Value ( I <sub>U</sub> )	Lower Detector Fraction	Lower Detector Fraction Values	Normalized Value ( I <sub>L</sub> )
$\frac{N41U}{N41U_{100}}$	$\frac{120.5}{118.8} =$	1.0143	$\frac{N41L}{N41L_{100}}$	$\frac{124.2}{119.5} =$	1.0393
$\frac{N42U}{N42U_{100}}$	$\frac{96.5}{118.5} =$	0.8143	$\frac{N42L}{N42L_{100}}$	$\frac{94.2}{119.3} =$	0.7896
$\frac{N43U}{N43U_{100}}$	$\frac{114.7}{119.1} =$	0.9631	$\frac{N43L}{N43L_{100}}$	$\frac{115.5}{119.5} =$	0.9665
$\frac{N44U}{N44U_{100}}$	$\frac{119.1}{119.1} =$	1.0000	$\frac{N44L}{N44L_{100}}$	$\frac{121.8}{119.5} =$	1.0192
Sum of Normalized Values = $\Sigma I_U =$		3.7917	Sum of Normalized Values = $\Sigma I_L =$		3.8146

NUMBER 0-AP-1.00	ATTACHMENT TITLE  CALCULATION OF EXCORE QUADRANT POWER TILT RATIOS	ATTACHMENT 6
REVISION 27		PAGE 2 of 2

4. \_\_\_\_ Record N = the No. of Detectors in use = 4

5. \_\_\_\_ Calculate the average upper and lower detector current values.

$$\text{Average } I_U = \frac{\sum I_U}{N} = \frac{3.7917}{4} = 0.9479$$

$$\text{Average } I_L = \frac{\sum I_L}{N} = \frac{3.8146}{4} = 0.9537$$

6. \_\_\_\_ From Step 3, record the following values.

$$\text{Maximum Normalized Upper Detector Current} = I_{U\max} = 1.0143$$

$$\text{Maximum Normalized Lower Detector Current} = I_{L\max} = 1.0393$$

7. \_\_\_\_ Calculate the maximum upper and lower Excore Quadrant Power Tilt Ratios.

$$\square \text{ a. Upper Excore Quadrant Power Tilt Ratio} = \frac{I_{U\max}}{\text{Average } I_U} = 1.0700$$

$$\square \text{ b. Lower Excore Quadrant Power Tilt Ratio} = \frac{I_{L\max}}{\text{Average } I_L} = 1.0898$$

8. \_\_\_\_ Calculate tilt%:

$$\square \text{ a. Subtract 1 from Step 7.a and multiply by 100 for Upper Tilt \%} = 7.00\%$$

$$\square \text{ b. Subtract 1 from Step 7.b and multiply by 100 for Lower Tilt \%} = 8.98\%$$

9. \_\_\_\_ Notify Unit Supervisor.

10. \_\_\_\_ IF additional Quadrant Power Tilt Ratio Calculations are required, THEN 0-NPT-RX-011, Quadrant Power Tilt Ratio Calculations and Corrective Actions, Attachment 2, should be used.

Completed by: \_\_\_\_\_ Date: \_\_\_\_\_

Reviewed by: \_\_\_\_\_ Date: \_\_\_\_\_

**SRO ONLY ANSWER KEY****NOT FOR TRAINEE**

## QPTR FOLLOW-UP Question

Are there any Tech Spec implications?

ANSWER: TS 3.12.B.6 requires:

- 3.12.B.6.a Within 2 hours either hot channel factors shall be determined and power level adjusted to meet the requirement OR
- 3.12.B.6.b Power level to be reduced from Rated Power 2% for each percent of Quadrant Power Tilt. Therefore for a QPTR of 9% power must be reduced 18%. The high neutron flux trip setpoint shall also be reduced within the following 4 hours.

## **SRO ONLY** Candidate

QPTR FOLLOW-UP Question

Are there any Tech Spec implications?

## Operator Directions Handout (TO BE GIVEN TO APPLICANT)

### Initial Conditions:

- Unit 1 operating at 100% power.
  - Control Rod D-10, Control Bank B, Group 1 dropped and is currently indicating 0 steps.

### Initiating Cues

- Perform the Quadrant Power Tilt Calculation in accordance with Attachment 6, Calculation of Excore Quadrant Power Tilt Ratios, of 0-AP-1.00, Rod Control System Malfunction.
- You are provided a copy of the Power Range Currents from the NIS Data Book providing Normalized Values.
- When you have determined the Quadrant Power Tilt, inform the examiner.

Actual current detector currents taken from the Power Range NIs:

N-41 Upper Detector Current	120.5
N-41 Lower Detector Current	124.2
N-42 Upper Detector Current	96.5
N-42 Lower Detector Current	94.23
N-43 Upper Detector Current	114.7
N-43 Lower Detector Current	115.5
N-44 Upper Detector Current	119.1
N-44 Lower Detector Current	121.8

## Surry Unit 1 NI Calibration Data

Power Range Currents

	N41		N42		N43		N44	
DELTA FLUX @ 100%	I (Top) $\mu$ amps	I (Bottom) $\mu$ amps	I (Top) $\mu$ amps	I (Bottom) $\mu$ amps	I (Top) $\mu$ amps	I (Bottom) $\mu$ amps	I (Top) $\mu$ amps	I (Bottom) $\mu$ amps
0	118.8	119.5	118.5	119.3	119.1	119.5	119.1	119.5
DELTA FLUX @ 120%	I (Top) $\mu$ amps	I (Bottom) $\mu$ amps	I (Top) $\mu$ amps	I (Bottom) $\mu$ amps	I (Top) $\mu$ amps	I (Bottom) $\mu$ amps	I (Top) $\mu$ amps	I (Bottom) $\mu$ amps
0	142.5	143.4	142.2	143.1	142.9	143.5	142.9	143.4
8	148.6	137.2	148.3	137.0	149.1	137.3	149.1	137.2
- 24	124.2	161.8	123.9	161.5	124.5	161.9	124.6	161.9

Data based on flux map number S1C28M15A

Computer and Recorder Constants

Recorder = K0411 = K0412 = K0413 = K0414 = 18.647

Performed / Verified By: LaFrance / Davis Date: 9/21/17

NUMBER 0-AP-1.00	ATTACHMENT TITLE  CALCULATION OF EXCORE QUADRANT POWER TILT RATIOS	ATTACHMENT 6
REVISION 27		PAGE 1 of 2

NOTE: Calculations for QPTR should be carried out to four places to the right of the decimal place to provide for accuracy and consistency of results.

1. \_\_\_\_ Record the following data:

Reactor Power \_\_\_\_\_ % Date \_\_\_\_\_ Time \_\_\_\_\_

2. \_\_\_\_ Record the following Excore Detector Data:

Actual Excore Detector Readings				Expected Excore Detector Readings at 100% Power			
Upper		Lower		Upper		Lower	
N41U		N41L		N41U <sub>100</sub>		N41L <sub>100</sub>	
N42U		N42L		N42U <sub>100</sub>		N42L <sub>100</sub>	
N43U		N43L		N43U <sub>100</sub>		N43L <sub>100</sub>	
N44U		N44L		N44U <sub>100</sub>		N44L <sub>100</sub>	

3. \_\_\_\_ Normalize the Actual Excore Detector Readings to the expected Excore Detector readings at 100% power, and sum the normalized values for both the upper and lower detectors.

Upper Detector Fraction	Upper Detector Fraction Values	Normalized Value ( I <sub>U</sub> )	Lower Detector Fraction	Lower Detector Fraction Values	Normalized Value ( I <sub>L</sub> )
$\frac{N41U}{N41U_{100}}$	-----=		$\frac{N41L}{N41L_{100}}$	-----=	
$\frac{N42U}{N42U_{100}}$	-----=		$\frac{N42L}{N42L_{100}}$	-----=	
$\frac{N43U}{N43U_{100}}$	-----=		$\frac{N43L}{N43L_{100}}$	-----=	
$\frac{N44U}{N44U_{100}}$	-----=		$\frac{N44L}{N44L_{100}}$	-----=	
Sum of Normalized Values = $\Sigma I_U$ =			Sum of Normalized Values = $\Sigma I_L$ =		

NUMBER 0-AP-1.00	ATTACHMENT TITLE  CALCULATION OF EXCORE QUADRANT POWER TILT RATIOS	ATTACHMENT 6
REVISION 27		PAGE 2 of 2

4. \_\_\_\_ Record N = the No. of Detectors in use = \_\_\_\_\_

5. \_\_\_\_ Calculate the average upper and lower detector current values.

$$\text{Average } I_U = \frac{\sum I_U}{N} = \text{-----} = \text{-----}$$

$$\text{Average } I_L = \frac{\sum I_L}{N} = \text{-----} = \text{-----}$$

6. \_\_\_\_ From Step 3, record the following values.

Maximum Normalized Upper Detector Current =  $I_{Umax}$  = \_\_\_\_\_

Maximum Normalized Lower Detector Current =  $I_{Lmax}$  = \_\_\_\_\_

7. \_\_\_\_ Calculate the maximum upper and lower Excore Quadrant Power Tilt Ratios.

☐ a. Upper Excore Quadrant Power Tilt Ratio =  $\frac{I_{Umax}}{\text{Average } I_U} = \text{-----}$

☐ b. Lower Excore Quadrant Power Tilt Ratio =  $\frac{I_{Lmax}}{\text{Average } I_L} = \text{-----}$

8. \_\_\_\_ Calculate tilt%:

☐ a. Subtract 1 from Step 7.a and multiply by 100 for Upper Tilt %: \_\_\_\_\_

☐ b. Subtract 1 from Step 7.b and multiply by 100 for Lower Tilt %: \_\_\_\_\_

9. \_\_\_\_ Notify Unit Supervisor.

10. \_\_\_\_ IF additional Quadrant Power Tilt Ratio Calculations are required, THEN 0-NPT-RX-011, Quadrant Power Tilt Ratio Calculations and Corrective Actions, Attachment 2, should be used.

Completed by: \_\_\_\_\_ Date: \_\_\_\_\_

Reviewed by: \_\_\_\_\_ Date: \_\_\_\_\_

U.S. Nuclear Regulatory Commission  
Surry Power Station

SR17301

**Administrative** Job Performance Measure GEN2.1.7 (4.4/4.7)

Applicant \_\_\_\_\_

Start Time \_\_\_\_\_

Examiner \_\_\_\_\_

Date \_\_\_\_\_

Stop Time \_\_\_\_\_

**Title****DETERMINE REQUIRED NITROGEN DILUTION FOR OUT OF SPEC WASTE GAS DECAY TANK**

**K/A: G2.1.7**      **Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and *instrument interpretation*. (4.4/4.7)**

**Applicability****Estimated Time****Actual Time**

ALL

20 Minutes

**Conditions**

- Task is to be PERFORMED in the classroom.

**Standards**

- Applicant correctly calculates 1B WGDT pressure for O<sub>2</sub> dilution, per OP-23.2.4, within  $\pm 1$  psig.
- SRO applicants make the correct TS determination.

**Initiating Cues**

- Alarm WD-D9 (WASTE GAS DECAY TANKS HI O<sub>2</sub>) has just been received.

**Terminating Cues**

- Final WGDT pressure after dilution determined using Attachment 2 of OP-23.2.4, Release of Waste Gas Decay Tank 1B.

**Procedures**

- 0-WD-D9, Waste Gas Decay Tank HI O<sub>2</sub>, Rev. 8.
- OP-23.2.4, Release of Waste Gas Decay Tank 1B, Rev. 20.
- Surry Technical Specifications.

**Tools and Equipment**

- None



### **Initial Conditions**

- Unit 1 and 2 are operating at 100% power.
- WGDT "A" is isolated.
- WGDT "B" is in service on the "A" Oxygen analyzer.
- Annunciator WD-D9, Waste Gas Decay Tanks HI O<sub>2</sub>, has been received.

### **Initiating Cues**

- I am the Shift Manager and you are a licensed operator assigned to the control room.
- No maintenance or testing activities are in progress.
- The indication on the oxygen analyzer has been trending up slowly with NO spiking or other abnormalities noted (both **Local** and **MCR** indications are NORMAL with NO indications of analyzer failure present)
- You are to review WD-D9 and determine the following:
  - RO – Required actions and amount of Nitrogen dilution to restore the WGDT to the desired concentration.
  - SRO – Required actions and amount of Nitrogen dilution to restore the WGDT to the desired concentration, and applicable Tech Spec LCOs and applicable time requirements.
- Due to activity level in the "B" WGDT, release is not desired at this time.
- Neither unit's PRT is aligned to the Process Vent System.

### **Notes**

#### **Simulator Setup for Screen Captures**

- Call up IC-1 and initialize.
- Meter override 1B Waste Gas Decay Tank pressure to 30 psig (0.136), and override GW-AIT-150A, pen # (green) to an indicated concentration of 3.9% (0.39).
- Verify in service / isolated tanks swapped ("Isolated" magnet on WGDT "A")

**PERFORMANCE CHECKLIST**

**Notes to the Evaluator**

- Task critical elements are bolded and denoted by an asterisk (\*).
- **Prior to starting the JPM in WD-D9 all SRO Candidates** should determine applicable Tech Spec actions. Do not hand out procedures to SRO candidates until they have determined Tech Spec actions.
- **START TIME:** \_\_\_\_\_

**FOR SRO ONLY: (TECH SPECS)**

**SRO TECH SPEC REVIEW:**

**3.11 - RADIOACTIVE GAS STORAGE**

**A. Explosive Gas Mixture**

1. The concentration of oxygen in the waste gas holdup system shall be limited to less than or equal to 2% by volume whenever the hydrogen concentration could exceed 4% by volume.
  - a. **With the concentration of oxygen in the waste gas holdup system greater than 2% by volume but less than or equal to 4% by volume, reduce the oxygen concentration to the above limits within 48 hours.**
  - b. With the concentration of oxygen in the waste gas holdup system greater than 4% by volume, immediately suspend all additions of waste gases to the affected tank and reduce the concentration of oxygen to less than or equal to 4% by volume, then take the action in 1.a above.
  - c. With the requirements of action 1.a above not satisfied, immediately suspend all additions of waste gases to the affected tank until the oxygen concentration is restored to less than or equal to 2% by volume, and submit a special report to the Commission within the next 30 days outlining the following:
    - (1) The cause of the waste gas decay tank exceeding the 2% oxygen limit.
    - (2) The reason why the oxygen concentration could not be returned to within the limits.
    - (3) The actions taken and the time required to return the oxygen concentration to within limits.
2. The requirements of Specification 3.0.1 are not applicable.

**STANDARD:**

- SRO CANDIDATE LISTS REQUIRED TECH SPEC ACTIONS AS:  
**Take action to reduce the oxygen concentration to <2% within 48 hours. (TS 3.11.A.1.a)**

**COMMENTS:**

\_\_\_\_\_ SAT

\_\_\_\_\_ UNSAT

<p><b>STEP 1: (WD-D9)</b></p> <p>Step 6 RNO Actions: IF oxygen concentration is greater than 2%, and less than or equal to 4%, THEN GO TO STEP 12.</p> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>Identifies oxygen concentration is greater than 2% and less than or equal to 4%.</li> <li>GOES to STEP 12.</li> </ul> <p><b>EVALUATOR'S NOTE: N/A</b></p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
<p><b>STEP 2: (WD-D9)</b></p> <p>Step 12 - CHECK SAMPLE OXYGEN CONCENTRATION – GREATER THAN 2% ON INSERVICE TANK.</p> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>Confirms that Oxygen concentration is 3.9%.</li> </ul> <p><b>EVALUATOR'S NOTE: N/A</b></p> <p><b>COMMENTS:</b></p>	
<p><b>STEP 3: (WD-D9)</b></p> <p>Note prior to step 13:</p> <ul style="list-style-type: none"> <li>The maximum pressure allowed in the WGDT is 115 psig. (Actual Pressure 30 psig – See Handout)</li> </ul> <p>Step 13 - REDUCE OXYGEN TO LESS THAN OR EQUAL TO 2.0% WITHIN 48 HOURS ON OUT-OF-SPEC TANK IAW APPROPRIATE OPERATING PROCEDURE:</p> <ul style="list-style-type: none"> <li>OP-23.2.3, RELEASE OF WASTE GAS DECAY TANK 1A OR</li> <li>OP-23.2.4, RELEASE OF WASTE GAS DECAY TANK 1B</li> </ul> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>Trainee requests copy of OP-23.2.4 to reduce Oxygen concentration.</li> </ul> <p><b>EVALUATOR'S NOTE:</b></p> <ul style="list-style-type: none"> <li>Cue: Provide procedure requested (OP-23.2.3, or OP-23.2.4).</li> <li>OP-23.2.4 actions begin on next Step (Step 3) of the JPM. Remaining ARP actions for WD-D9 continue at Step 10.</li> </ul> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>

<p><b>STEP 4: (OP-23.2.4)</b></p> <p><b>STANDARD:</b></p> <p>Candidate Reviews Initial Conditions, and Precautions and Limitations of OP-23.2.4.</p> <p>3.0 INITIAL CONDITIONS</p> <p>3.1 Check that the Waste Gas Decay Tank has been on Holdup for as long as possible. (Holdup is <b>not</b> required for purging the tank after maintenance.) (Ref. 2.4.1)</p> <p>3.2 Neither unit PRT is aligned to the Process Vent System.</p> <p>4.0 PRECAUTIONS AND LIMITATIONS</p> <p>4.1 To ensure the maximum Holdup time for the Waste Gas Decay Tank, an evaluation of existing plant conditions must be made before release. (Ref. 2.4.1)</p> <p>4.2 When the Waste Gas Decay Tank H2 concentration is greater than 4 percent by volume, the O2 concentration must <b>not</b> be greater than 2 percent by volume. (Ref. 2.4.2)</p> <p>4.3 The minimum operable channels for the Surry Radioactive Gaseous Effluent Monitoring Instrumentation for the Process Vent System are listed in VPAP-2103S.</p> <p>4.4 If the MGPI Process Vent skid is inoperable, Health Physics must adjust Process Vent Accountability Sampler Flow to between 1.0 to 3.0 cfm.</p> <p>4.5 With both WGDT Gas Analyzer A and Analyzer B out of service, a WGDT in service, and 1-BR-79, 1-BR-TK-6 to 1-GW-TK-2 Isol, open, grab samples shall be collected at least once each 4 hours during degassing operations to the WGDT and at least once each 24 hours during other operations. Samples shall be analyzed within four hours after collection. (Ref. 2.4.2)</p> <p>4.6 The WGDT maximum pressure is 115 psig. (Ref. 2.4.2)</p> <p>4.7 If the Operations Computer Calculation Program is used, the procedure revision number and the calculation revision number must be the same.</p> <p><b>COMMENTS:</b></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>
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<p><b>STEP 5: (OP-23.2.4)</b></p> <p>Section 5.1 Waste Gas Decay Tank 1B Sampling and/or Dilution</p> <p>Note: A Chemistry sample is required to determine H2 concentration for release rate adjustments.</p> <p>Step 5.1.1 - Sample 1-GW-TK-1B IAW OP-23.2.12. IF WGDT is NOT being Prepared for release, THEN enter N/A.</p> <p><b>STANDARD:</b> Candidate N/A's step</p> <p><b>EVALUATOR'S NOTE:</b> If Candidate lists actions of Section 5.5 of OP-23.2.4, this constitutes Failure Criteria: This section is designed for maintenance; it releases the tank to atmosphere to a final pressure of 0 psig for tank entry.</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
<p><b>STEP 6: (OP-23.2.4)</b></p> <p>5.1.2 IF the O2 concentration is greater than 1.65 percent and N2 addition is desired OR the tank is being purged after maintenance, THEN open 1-GW-755, 1-GW-FCV-104B Outlet Isolation. Otherwise, enter N/A. (Ref. 2.4.4)</p> <p><b>STANDARD:</b> * Candidate lists OPENING 1-GW-755 as a required action.</p> <p><b>EVALUATOR'S NOTE:</b> N/A</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>

<p><b>STEP 7: (OP-23.2.4)</b></p> <p>5.1.3 IF O2 concentration is greater than 1.65 percent and N2 addition is Desired OR the tank is being purged for maintenance, THEN dilute the O2 concentration using Attachment 2 and/or Attachment 3 as applicable By performing the following Substeps. Otherwise, enter N/A. (Ref. 2.4.2)</p> <p>a) * <b>Place 1-GW-43-GW-104B, 1-GW-FCV-104B Control Switch, in open.</b></p> <p>b) Locally check that 1-GW-FCV-104B is open.</p> <p>c) * <b>Adjust nitrogen flow as necessary using 1-GW-PCV-140, N2 Regulator.</b></p> <p>d) * <b>Determines final pressure is 77 psig (Attachment 2).</b></p> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>* Candidate lists determination of final WGDT pressure as (77 <math>\pm</math>1, psig).</li> <li>* Candidate lists locally opening 1-GW-43-GW-104B as a required action</li> <li>* Candidate lists locally adjusting N2 flow as a required action.</li> </ul> <p><b>EVALUATOR'S NOTE: N/A</b></p> <ul style="list-style-type: none"> <li>Attachment 2 is used to determine WGDT pressure for O2 &lt; 2%.</li> <li><b>Evaluator's Cue:</b> If asked, O2 indication at 77 psig is 1.95%.</li> </ul> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
<p><b>STEP 8: (OP-23.2.4)</b></p> <p>5.1.4 WHEN tank pressure is at desired pressure, THEN perform the following. IF tank was NOT diluted in Step 5.1.3, THEN enter N/A.</p> <p>a. Place 1-GW-43-GW-104B, 1-GW-FCV-104B Control Switch, in close.</p> <p>b. Locally check that 1-GW-FCV-104B is closed.</p> <p><b>STANDARD:</b></p> <p><b>EVALUATOR'S NOTE: N/A</b></p> <p><b>COMMENTS:</b></p> <p style="text-align: center;">** JPM COMPLETE **</p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>

COMMENTS:

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## KEY

Required actions (**SRO/RO**) - Bolded items are Critical Steps.

1. Step 6 of JPM: **Candidate lists OPENING 1-GW-755 as a required action.**
2. Step 7 of JPM: (See Attachment 2 and 3 on next two pages)
  - **Candidate lists final WGDT pressure as \_\_\_\_\_ (77  $\pm$ 1 psig).**
  - **Candidate lists locally opening 1-GW-43-GW-104B as a required action.**
  - **Candidate lists locally adjusting N2 flow (PCV 140) as a required action.**

Required actions (**SRO**) Bolded items are Critical Steps

1. SRO CANDIDATE LISTS REQUIRED TECH SPEC ACTIONS AS:  
**With the concentration of oxygen in the waste gas holdup system greater than 2% by volume but less than or equal to 4% by volume, reduce the oxygen concentration to the above limits within 48 hours. (TS 3.11.A.1.a).**

DOMINION  
Surry Power Station

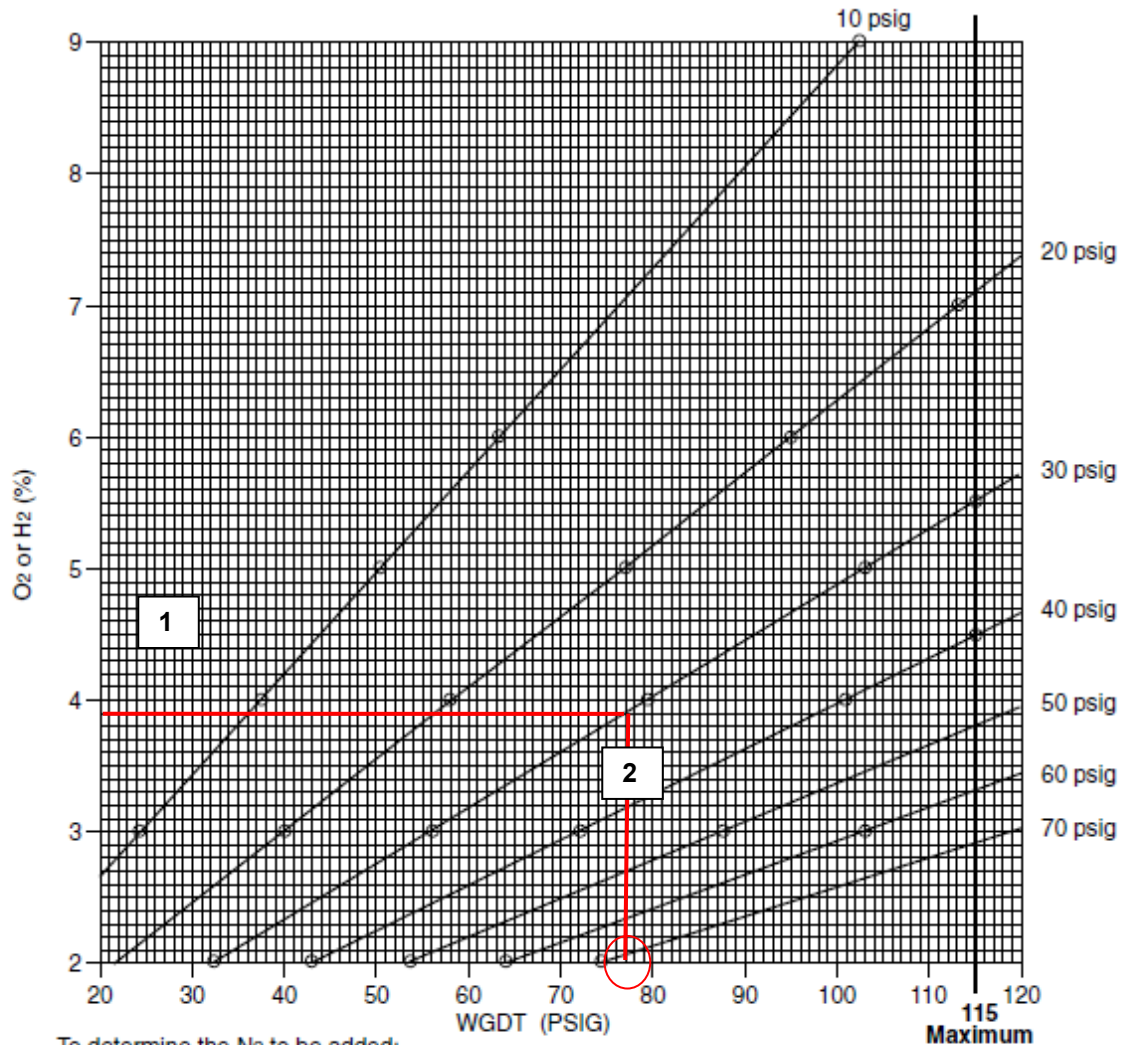
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**Attachment 2**

**WGDT O<sub>2</sub> OR H<sub>2</sub> DILUTION TO LESS THAN 2%**

(Ref. 2.4.2)



To determine the N<sub>2</sub> to be added:

1. The % gas line is followed until it intersects with the current WGDT pressure line.
2. From this intersection, the graph is followed down to the x-axis.
3. This point on the x-axis is the WGDT pressure after the N<sub>2</sub> addition.

Graphics No: KM1624

**WGDT O<sub>2</sub> OR H<sub>2</sub> DILUTION TO LESS THAN 2%**



<p>NUMBER</p> <p>0-WD-D9</p>	<p>PROCEDURE TITLE</p> <p>WASTE GAS DECAY TANKS HI O<sub>2</sub></p>	<p>REVISION</p> <p>8</p> <p>PAGE</p> <p>2 of 5</p>
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STEP	ACTION/ EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<del>1.</del>	<p>CHECK I&amp;C TESTING - IN PROGRESS</p> <p><input type="checkbox"/> • 1-GW-AIT-150A</p> <p style="text-align: center;"><u>OR</u></p> <p><input type="checkbox"/> • 1-GW-AIT-150B</p> <p>2. DECLARE IN-SERVICE TANK ANALYZER - INOPERABLE</p> <p>*****</p> <p><b>CAUTION:</b> With both WGDT Analyzer A <u>and</u> Analyzer B out of service, with a WGDT in service, and with 1-BR-79 open, grab samples shall be collected at least once each 4 hours during degassing operations to the WGDT and at least once each 24 hours during other operations.</p> <p>*****</p> <p>3. REVIEW TECH SPEC TABLE 3.7-5(a) <u>AND</u> COORDINATE SAMPLING AS REQUIRED</p> <p>4. CHECK I&amp;C TESTING - COMPLETE</p> <p><input type="checkbox"/> a) Check 0-WD-D9 alarm - NOT LIT</p> <p><input type="checkbox"/> b) Declare in-service tank analyzer operable</p> <p>5. TERMINATE THIS PROCEDURE</p>	<p><input type="checkbox"/> GO TO Step 6.</p> <p><input type="checkbox"/> WHEN I&amp;C testing is complete, <u>THEN</u> declare in-service tank analyzer operable.</p>

NUMBER	PROCEDURE TITLE	REVISION
0-WD-D9	WASTE GAS DECAY TANKS HI O <sub>2</sub>	8
		PAGE
		3 of 5

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>Recorder Trace spiking is indicative of a clogged or worn sensing device.</li> <li>Red pen indicates for Analyzer A. Green pen indicates for Analyzer B.</li> <li>Based on sampling techniques and analysis, grab samples historically indicate higher than the chart recorder. Chemistry uses an oxygen level quality control chart that is based on a 1% standard calibration gas. The warning level for the control chart, which is based on statistical data over time, is +/- 0.29%. The acceptance level for this chart is +/- 0.43%. Grab samples can be as much as 0.43% greater than meter indication and still be within the allowable tolerances of analysis.</li> </ul>		
6.	<p>CHECK RECORDER FOR IN-SERVICE TANK ANALYZER - FAILED</p> <p><input type="checkbox"/> • Recorder Trace - SPIKING</p> <p style="text-align: center;"><u>OR</u></p> <p><input type="checkbox"/> • Local Power Light - OFF</p> <p style="text-align: center;"><u>OR</u></p> <p><input type="checkbox"/> • Local oxygen concentration - NOT INDICATED</p>	<p>IF oxygen concentration is greater than 4%, THEN do the following:</p> <p><input type="checkbox"/> a) Immediately suspend all additions of waste gases to the affected tank by closing 1-BR-79 and reduce oxygen concentration to less than or equal to 4%.</p> <p><input type="checkbox"/> b) GO TO Step 13.</p> <p><input checked="" type="checkbox"/> IF oxygen concentration is greater than 2.0% and less than or equal to 4%, THEN GO TO Step 12.</p> <p>IF oxygen concentration is greater than or equal to 1.65% and less than or equal to 2.0%, THEN do the following:</p> <p><input type="checkbox"/> a) Increase surveillance of in-service tank analyzer. IF desired, THEN reduce Oxygen concentration IAW appropriate procedure.</p> <p><input type="checkbox"/> b) At the direction of Shift Supervision, sample tank as required to check oxygen concentration.</p> <p><input type="checkbox"/> c) Attempt to identify and isolate source of oxygen intrusion as practicable.</p> <p><input type="checkbox"/> d) GO TO Step 15.</p> <p><input type="checkbox"/> IF oxygen concentration is less than 1.65%, THEN initiate a Condition Report.</p>

<p>NUMBER</p> <p>0-WD-D9</p>	<p>PROCEDURE TITLE</p> <p>WASTE GAS DECAY TANKS HI O<sub>2</sub></p>	<p>REVISION</p> <p>8</p> <p>PAGE</p> <p>5 of 5</p>
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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**CAUTION:** Tech Spec 3.11.A requires that the Oxygen concentration in the Waste Gas Decay Tanks be maintained at less than or equal to 2%.

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12. ☒ CHECK SAMPLE OXYGEN CONCENTRATION - GREATER THAN 2% ON INSERVICE TANK ☐ GO TO Step 15.

**NOTE:** The maximum pressure allowed in the WGDT is 115 psig.

13. ☒ REDUCE OXYGEN TO LESS THAN OR EQUAL TO 2.0% WITHIN 48 HOURS ON OUT-OF-SPEC TANK IAW APPROPRIATE OPERATING PROCEDURE:

- ☐ • OP-23.2.3, RELEASE OF WASTE GAS DECAY TANK 1A

OR


- ☐ • OP-23.2.4, RELEASE OF WASTE GAS DECAY TANK 1B

14. ☐ CHECK OXYGEN CONCENTRATION - LESS THAN OR EQUAL TO 2.0% WITHIN 48 HOURS ON THE OUT-OF-SPEC TANK ☐ Review Tech Spec 3.11.A.1.c.

15. ☐ PROVIDE NOTIFICATIONS AS NECESSARY:

- ☐ • OMOC
- ☐ • Shift Supervision
- ☐ • STA

- END -

 <b>Dominion</b> <b>SURRY POWER STATION</b>						PROCEDURE NO: <b>OP-23.2.4</b>	
						REVISION NO: <b>20</b>	
PROCEDURE TYPE: <b>OPERATING PROCEDURE</b>						UNIT NO: <b>1 &amp; 2</b>	
PROCEDURE TITLE: <b>RELEASE OF WASTE GAS DECAY TANK 1B</b>							
REVISION SUMMARY:  Revised IAW OPFB-2017-007728: <ul style="list-style-type: none"> <li>• Changed 1 DAC to 10 DAC in Step 5.5.4.b.</li> </ul> Revised IAW Writers Guide: <ul style="list-style-type: none"> <li>• Changed Step 5.4.4 monitored items to bulleted items.</li> <li>• Added full equipment locations.</li> </ul>							
<h1>COMMON</h1>							
PROCEDURE USED: <input type="checkbox"/> Entirely <input type="checkbox"/> Partially <b>Note:</b> If used partially, note reasons in remarks.							
PROBLEMS ENCOUNTERED: <input type="checkbox"/> NO <input type="checkbox"/> YES <b>Note:</b> If YES, note problems in remarks.							
REMARKS: _____ _____ _____ _____ _____ _____ (Use back for additional remarks.)							
SHIFT SUPERVISION:						DATE:	

# CONTINUOUS USE

Dominion  
Surry Power Station

OP-23.2.4  
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## **1.0 PURPOSE**

- 1.1 To provide instructions for diluting, purging, and releasing 1-GW-TK-1B, Waste Gas Decay Tank 1B.

## **2.0 REFERENCES**

### **2.1 Source Documents**

- 2.1.1 UFSAR 11.2.5.3.4

### **2.2 Technical Specifications Surry Power Station Units 1 and 2**

- 2.2.1 Technical Specifications 3.7.E and 3.11

### **2.3 Technical References**

- 2.3.1 11448-FM-090A (Sheet 1 of 2), Gaseous Waste Disposal System
- 2.3.2 11448-FM-090B (Sheet 1 of 2), Gaseous Waste Disposal System
- 2.3.3 OP-23.2.12, Sampling 1-GW-TK-1B
- 2.3.4 MOP-23.3, Removal from Service of Waste Gas Decay Tank 1B
- 2.3.5 Surry Power Station WGDT Dilution Calculation, 6-5-91 Memorandum from W. A. Thornton to J. A. Price (Attachment 2)
- 2.3.6 Surry Power Station WGDT Dilution Calculation, 6-19-91 Memorandum from W. A. Thornton to J. I. Kelly (Attachment 3)

- 2.3.7 DCP 97-006, Waste Gas Decay Tank Oxygen Analyzer Enhancement  
(Changed valving arrangement so that either analyzer can be aligned to either tank. Added new A, B, BOTH switch to allow Operator to locally select analyzer signal that goes to a new recorder in the Main Control Room. Added new alarm 0-WD-D9 to replace alarms 0-WD-C9 and 0-WD-D9.)
- 2.3.8 DCP 98-041, GW Flow Transmitter Replacement /Surry/Unit 1 & 2
- 2.3.9 Safety Evaluation 97-110, UFSAR Change FS-97-35
- 2.3.10 DCP 01-022, Ventilation Radiation Monitoring (Kaman) System Replacement

## 2.4 Commitment Documents

- 2.4.1 SCARF 87-5255-011, Reduce the Curie content of discharged radioactive waste to reasonably achievable levels
- 2.4.2 SCARF 89-1377-002, Revision to Technical Specification 3.11.B.5 (revised to 3.11.A), Explosive Gas Mixture
- 2.4.3 CTS-3822, GW Releases with Wind Speed greater than 35 mph Safety Evaluation 97-110 justified elimination of the 35 mph wind speed number from the UFSAR and justified elimination from this procedure of Step 4.7, The Process Vent System design prevents any significant down drafting of the vent effluent with wind speed greater than 35 mph.
- 2.4.4 DR S-2000-0741, Pressure in 1-GW-TK-1B Increased with Tank Isolated. 1-GW-FCV-104A and 1-GW-FCV-104B leak by when closed.

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### 3.0 INITIAL CONDITIONS

8

- 3.1 Check that the Waste Gas Decay Tank has been on Holdup for as long as possible. (Holdup is not required for purging the tank after maintenance.) (Ref. 2.4.1)

8

- 3.2 Neither unit PRT is aligned to the Process Vent System.

### 4.0 PRECAUTIONS AND LIMITATIONS

8

- 4.1 To ensure the maximum Holdup time for the Waste Gas Decay Tank, an evaluation of existing plant conditions must be made before release. (Ref. 2.4.1)

N/A

- 4.2 When the Waste Gas Decay Tank H<sub>2</sub> concentration is greater than 4 percent by volume, the O<sub>2</sub> concentration must not be greater than 2 percent by volume. (Ref. 2.4.2)

8

- 4.3 The minimum operable channels for the Surry Radioactive Gaseous Effluent Monitoring Instrumentation for the Process Vent System are listed in VPAP-2103S.

8

- 4.4 If the MGPI Process Vent skid is inoperable, Health Physics must adjust Process Vent Accountability Sampler Flow to between 1.0 to 3.0 cfm.

N/A

- 4.5 With both WGDT Gas Analyzer A and Analyzer B out of service, a WGDT in service, and 1-BR-79, 1-BR-TK-6 to 1-GW-TK-2 Isol, open, grab samples shall be collected at least once each 4 hours during degassing operations to the WGDT and at least once each 24 hours during other operations. Samples shall be analyzed within four hours after collection. (Ref. 2.4.2)

8

- 4.6 The WGDT maximum pressure is 115 psig. (Ref. 2.4.2)

8

- 4.7 If the Operations Computer Calculation Program is used, the procedure revision number and the calculation revision number must be the same.



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## 5.0 INSTRUCTIONS

### 5.1 Waste Gas Decay Tank 1B Sampling and/or Dilution

**NOTE:** A Chemistry sample is required to determine H<sub>2</sub> concentration for release rate adjustments.

5.1.1 Sample 1-GW-TK-1B IAW OP-23.2.12. IF WGDT is NOT being prepared for release, THEN enter N/A.

5.1.2 IF the O<sub>2</sub> concentration is greater than 1.65 percent and N<sub>2</sub> addition is desired OR the tank is being purged after maintenance, THEN open 1-GW-755, 1-GW-FCV-104B Outlet Isolation. Otherwise, enter N/A. (Ref. 2.4.4)

5.1.3 IF O<sub>2</sub> concentration is greater than 1.65 percent and N<sub>2</sub> addition is desired OR the tank is being purged for maintenance, THEN dilute the O<sub>2</sub> concentration using Attachment 2 and/or Attachment 3 as applicable by performing the following Substeps. Otherwise, enter N/A. (Ref. 2.4.2)

- a. Place 1-GW-43-GW-104B, 1-GW-FCV-104B Control Switch, in open.
- b. Locally check that 1-GW-FCV-104B is open.
- c. Adjust nitrogen flow as necessary using 1-GW-PCV-140, N<sub>2</sub> Regulator.

5.1.4 WHEN tank pressure is at desired pressure, THEN perform the following. IF tank was NOT diluted in Step 5.1.3, THEN enter N/A.

- a. Place 1-GW-43-GW-104B, 1-GW-FCV-104B Control Switch, in close.
- b. Locally check that 1-GW-FCV-104B is closed.

5.1.5 Close 1-GW-755. IF 1-GW-755 was NOT opened in Step 5.1.2, THEN enter N/A. (Ref. 2.4.4)

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**NOTE:** After the WGDT Discharge Record has been assigned a number, the form must be accounted for and **not** destroyed.

N/A

5.1.6 Get the WGDT Discharge Record from Health Physics. Record the number and the release rate. IF WGDT is NOT being prepared for release, THEN enter N/A.

Number: \_\_\_\_\_

Release Rate: \_\_\_\_\_ cfm

NUMBER	PROCEDURE TITLE	REVISION
0-WD-D9	WASTE GAS DECAY TANKS HI O <sub>2</sub>	8
		PAGE 5 of 5

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p><b>CAUTION:</b> Tech Spec 3.11.A requires that the Oxygen concentration in the Waste Gas Decay Tanks be maintained at less than or equal to 2%.</p> <p>*****</p>		
12.	CHECK SAMPLE OXYGEN CONCENTRATION - GREATER THAN 2% ON INSERVICE TANK	<input type="checkbox"/> GO TO Step 15.
<p><b>NOTE:</b> The maximum pressure allowed in the WGDT is 115 psig.</p>		
13.	REDUCE OXYGEN TO LESS THAN OR EQUAL TO 2.0% WITHIN 48 HOURS ON OUT-OF-SPEC TANK IAW APPROPRIATE OPERATING PROCEDURE:	
	<input type="checkbox"/> • OP-23.2.3, RELEASE OF WASTE GAS DECAY TANK 1A	
	<u>OR</u>	
	<input type="checkbox"/> • OP-23.2.4, RELEASE OF WASTE GAS DECAY TANK 1B	
14.	CHECK OXYGEN CONCENTRATION - LESS THAN OR EQUAL TO 2.0% WITHIN 48 HOURS ON THE OUT-OF-SPEC TANK	<input type="checkbox"/> Review Tech Spec 3.11.A.1.c.
15.	PROVIDE NOTIFICATIONS AS NECESSARY:	
	<input type="checkbox"/> • OMOG	
	<input type="checkbox"/> • Shift Supervision	
	<input type="checkbox"/> • STA	

**Operator Directions Handout  
(TO BE GIVEN TO APPLICANT)**

**Initial Conditions**

- Unit 1 and 2 are operating at 100% power.
- WGDT "A" is isolated.
- WGDT "B" is in service on the "A" Oxygen analyzer.
- Annunciator WD-D9, Waste Gas Decay Tanks HI O<sub>2</sub>, has been received.

**Initiating Cues**

- I am the Shift Manager and you are a licensed operator assigned to the control room.
- No maintenance or testing activities are in progress.
- The indication on the oxygen analyzer has been trending up slowly with NO spiking or other abnormalities noted (both **Local** and **MCR** indications are NORMAL with NO indications of analyzer failure present)
- You are to review WD-D9 and determine the following:
  - RO – Required actions and amount of Nitrogen dilution to restore the WGDT to the desired concentration.
  - SRO – Required actions and amount of Nitrogen dilution to restore the WGDT to the desired concentration, and applicable Tech Spec LCOs and applicable time requirements.
- Due to activity level in the "B" WGDT, release is not desired at this time.
- Neither unit's PRT is aligned to the Process Vent System.

**Operator Directions Handout  
(TO BE GIVEN TO APPLICANT)**

Required actions (**SRO/RO**):

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Applicable Tech Spec LCOs and Required Actions (**SRO ONLY**):

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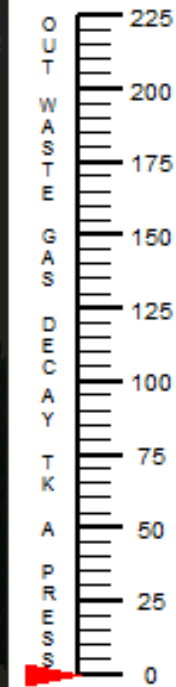
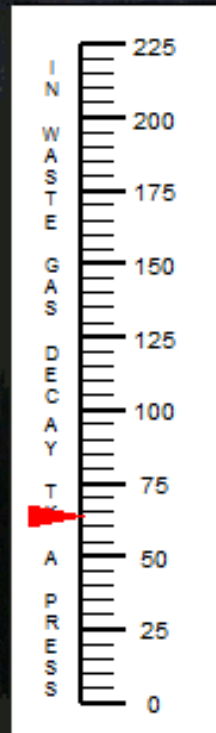
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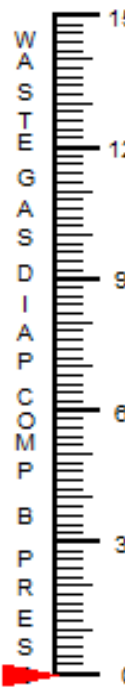
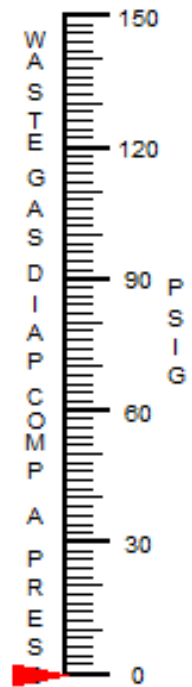
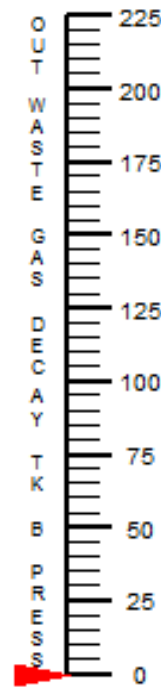
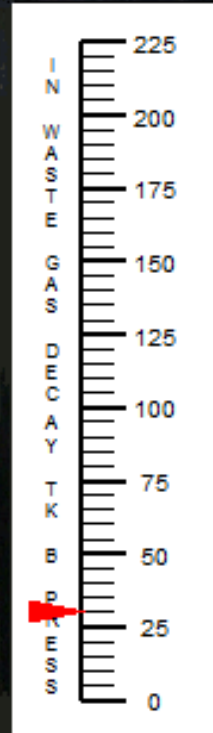
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## ISOLATED



## IN SERVICE



INNER WGDT A  
PRESS  
1-GW-PI-102A

OUTER WGDT A  
PRESS  
1-GW-PI-102B

INNER WGDT B  
PRESS  
1-GW-PI-102C

OUTER WGDT B  
PRESS  
1-GW-PI-102D

WASTE GAS DIAPHRAGM COMPR P  
COMPR A  
1-GW-PI-101A

COMPR B  
1-GW-PI-

YOKOGAWA ◆

GW-AR-150A

%

H

3.90

GW-AR-150B

%

H

0.00

WGDT OXYGEN ANALYZER

1-GW-AR-150 A & B

PEN 1 (RED)  
150A

PEN 2 (GRN)  
150B

DISP/  
ENTER



SURRY POWER STATION  
ANNUNCIATOR RESPONSE PROCEDURE

NUMBER	PROCEDURE TITLE	REVISION
		8
0-WD-D9	WASTE GAS DECAY TANKS HI O <sub>2</sub>	PAGE 1 of 5

REFERENCES	WD-38
<ul style="list-style-type: none"><li>1) UFSAR, Section 11.2.2</li><li>2) 11448-FM-90A</li><li>3) 11448-ESK-10W, 10BA</li><li>4) Tech Spec 3.11.A</li><li>5) Tech Spec Table 3.7-5(a)</li><li>6) DCP 97-006, Waste Decay Tank Oxygen Analyzer Enhancement</li></ul>	
PROBABLE CAUSE	
<ul style="list-style-type: none"><li>1) Alarm actuates when 1-GW-AIT-150A or 1-GW-AIT-150B senses Oxygen in Waste Gas Decay Tank 1-GW-TK-1A or 1-GW-TK-1B greater than or equal to 1.65%.  High oxygen content can be caused by oxygen inleakage or venting to the overhead system.</li><li>2) Instrumentation failure has occurred.</li></ul>	

***CONTINUOUS USE***



NUMBER	PROCEDURE TITLE	REVISION
0-WD-D9	WASTE GAS DECAY TANKS HI O <sub>2</sub>	8
		PAGE
		2 of 5

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. <input checked="" type="checkbox"/>	CHECK I&C TESTING - IN PROGRESS <input type="checkbox"/> • 1-GW-AIT-150A <u>OR</u> <input type="checkbox"/> • 1-GW-AIT-150B	<input type="checkbox"/> GO TO Step 6. <div style="border: 1px solid black; padding: 2px; display: inline-block;">NO</div>
2. <input type="checkbox"/>	DECLARE IN-SERVICE TANK ANALYZER - INOPERABLE	
<p>*****</p> <p><b>CAUTION:</b> With both WGDT Analyzer A <u>and</u> Analyzer B out of service, with a WGDT in service, and with 1-BR-79 open, grab samples shall be collected at least once each 4 hours during degassing operations to the WGDT and at least once each 24 hours during other operations.</p> <p>*****</p>		
3. <input type="checkbox"/>	REVIEW TECH SPEC TABLE 3.7-5(a) <u>AND</u> COORDINATE SAMPLING AS REQUIRED	
4. <input type="checkbox"/>	CHECK I&C TESTING - COMPLETE	<input type="checkbox"/> <u>WHEN</u> I&C testing is complete, <u>THEN</u> declare in-service tank analyzer operable.
	<input type="checkbox"/> a) Check 0-WD-D9 alarm - NOT LIT <input type="checkbox"/> b) Declare in-service tank analyzer operable	
5. <input type="checkbox"/>	TERMINATE THIS PROCEDURE	

NUMBER	PROCEDURE TITLE	REVISION
0-WD-D9	WASTE GAS DECAY TANKS HI O <sub>2</sub>	8
		PAGE
		3 of 5

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>Recorder Trace spiking is indicative of a clogged or worn sensing device.</li> <li>Red pen indicates for Analyzer A. Green pen indicates for Analyzer B.</li> <li>Based on sampling techniques and analysis, grab samples historically indicate higher than the chart recorder. Chemistry uses an oxygen level quality control chart that is based on a 1% standard calibration gas. The warning level for the control chart, which is based on statistical data over time, is +/- 0.29%. The acceptance level for this chart is +/- 0.43%. Grab samples can be as much as 0.43% greater than meter indication and still be within the allowable tolerances of analysis.</li> </ul>		
6.	<p>CHECK RECORDER FOR IN-SERVICE TANK ANALYZER - FAILED</p> <p><input type="checkbox"/> • Recorder Trace - SPIKING</p> <p style="text-align: center;"><u>OR</u></p> <p><input type="checkbox"/> • Local Power Light - OFF</p> <p style="text-align: center;"><u>OR</u></p> <p><input type="checkbox"/> • Local oxygen concentration - NOT INDICATED</p>	<p>IF oxygen concentration is greater than 4%, THEN do the following:</p> <p><input type="checkbox"/> a) Immediately suspend all additions of waste gases to the affected tank by closing 1-BR-79 and reduce oxygen concentration to less than or equal to 4%.</p> <p><input type="checkbox"/> b) GO TO Step 13.</p> <p><input type="checkbox"/> IF oxygen concentration is greater than 2.0% and less than or equal to 4%, THEN GO TO Step 12.</p> <p>IF oxygen concentration is greater than or equal to 1.65% and less than or equal to 2.0%, THEN do the following:</p> <p><input type="checkbox"/> a) Increase surveillance of in-service tank analyzer. IF desired, THEN reduce Oxygen concentration IAW appropriate procedure.</p> <p><input type="checkbox"/> b) At the direction of Shift Supervision, sample tank as required to check oxygen concentration.</p> <p><input type="checkbox"/> c) Attempt to identify and isolate source of oxygen intrusion as practicable.</p> <p><input type="checkbox"/> d) GO TO Step 15.</p> <p><input type="checkbox"/> IF oxygen concentration is less than 1.65%, THEN initiate a Condition Report.</p>

NUMBER	PROCEDURE TITLE	REVISION
0-WD-D9	WASTE GAS DECAY TANKS HI O <sub>2</sub>	8
		PAGE
		4 of 5

STEP	ACTION/ EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. ____	DECLARE IN-SERVICE TANK ANALYZER - INOPERABLE	
8. ____	SWAP TO OTHER ANALYZER IF AVAILABLE	
<p>*****</p> <p><b>CAUTION:</b> • With both WGD T Analyzer A <u>and</u> Analyzer B out of service, with a WGD T in service, and with 1-BR-79 open, grab samples shall be collected at least once each 4 hours during degassing operations to the WGD T and at least once each 24 hours during other operations.</p> <p>• Samples shall be analyzed within 4 hours after collection.</p> <p>*****</p>		
9. ____	COORDINATE WITH CHEMISTRY TO INITIATE SAMPLING IAW TECH SPEC TABLE 3.7-5(a)	
10. ____	INITIATE A CONDITION REPORT	
<p>*****</p> <p><b>CAUTION:</b> Tech Spec 3.11.A requires that the Oxygen concentration in the Waste Gas Decay Tanks be maintained at less than or equal to 2%.</p> <p>*****</p>		
11. ____	CHECK SAMPLE OXYGEN CONCENTRATION - LESS THAN 4% ON INSERVICE TANK IAW APPROPRIATE OPERATING PROCEDURE:	Do the following
	<input type="checkbox"/> • OP-23.2.11, SAMPLING ALIGNMENT FOR WGD T 1A <div style="text-align: center;"><u>OR</u></div> <input type="checkbox"/> • OP-23.2.12, SAMPLING ALIGNMENT FOR WGD T 1B	<input type="checkbox"/> a) <u>IF</u> oxygen concentration is greater than 4%, <u>THEN</u> immediately suspend all additions of waste gases to the affected tank by closing 1-BR-79 <u>AND</u> reduce oxygen concentration to less than or equal to 4%. <input type="checkbox"/> b) GO TO Step 12.

NUMBER	PROCEDURE TITLE	REVISION
0-WD-D9	WASTE GAS DECAY TANKS HI O <sub>2</sub>	8
		PAGE 5 of 5

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p><b>CAUTION:</b> Tech Spec 3.11.A requires that the Oxygen concentration in the Waste Gas Decay Tanks be maintained at less than or equal to 2%.</p> <p>*****</p>		
12. ____	CHECK SAMPLE OXYGEN CONCENTRATION - GREATER THAN 2% ON INSERVICE TANK	<input type="checkbox"/> GO TO Step 15.
<p><b>NOTE:</b> The maximum pressure allowed in the WGDT is 115 psig.</p>		
13. ____	REDUCE OXYGEN TO LESS THAN OR EQUAL TO 2.0% WITHIN 48 HOURS ON OUT-OF-SPEC TANK IAW APPROPRIATE OPERATING PROCEDURE:	
	<input type="checkbox"/> • OP-23.2.3, RELEASE OF WASTE GAS DECAY TANK 1A	
	<u>OR</u>	
	<input type="checkbox"/> • OP-23.2.4, RELEASE OF WASTE GAS DECAY TANK 1B	
14. ____	CHECK OXYGEN CONCENTRATION - LESS THAN OR EQUAL TO 2.0% WITHIN 48 HOURS ON THE OUT-OF-SPEC TANK	<input type="checkbox"/> Review Tech Spec 3.11.A.1.c.
15. ____	PROVIDE NOTIFICATIONS AS NECESSARY:	
	<input type="checkbox"/> • OMO	
	<input type="checkbox"/> • Shift Supervision	
	<input type="checkbox"/> • STA	
- END -		

U.S. Nuclear Regulatory Commission  
Surry Power Station

SR17301

**Administrative** Job Performance Measure G2.3.4 (RO 3.2 / SRO 3.7)

Applicant \_\_\_\_\_

Start Time \_\_\_\_\_

Examiner \_\_\_\_\_

Date \_\_\_\_\_

Stop Time \_\_\_\_\_

**Title**

Calculate Transit Dose and allowed time on station.

**K/A: G2.3.4 Knowledge of radiation exposure limits under normal or emergency conditions. (3.2/3.7)**

**Applicability**

**Estimated Time**

**Actual Time**

ALL

20 minutes

**Conditions**

- Task is to be PERFORMED in the classroom.

**Standards**

- Determines the maximum allowable time for opening 1-RH-MOV-1700 is 2 minutes.

**Initial Conditions:**

- Unit 1 has experienced a small break LOCA with a safety injection.

**Initiating Cues**

You have been directed to determine:

- The maximum time you will have to open 1-RH-MOV-1700 without exceeding your allowable dose.

**Terminating Cues**

- Determines the maximum time for opening 1-RH-MOV-1700 without exceeding dose limits.

**Tools and Equipment**

- Calculator
- Survey Data
- VPAP-2101

**Safety Considerations**

- None

## PERFORMANCE CHECKLIST

### Notes to the Evaluator

- Task critical elements are bolded and denoted by an asterisk (\*).
- Provide survey map to candidate.
- **START TIME:** \_\_\_\_\_

<p><b>STEP 1:</b></p> <p>Calculate path exposure to and from 1-RH-MOV-1700.</p> <p><b>STANDARD:</b></p> <p>___ 1.      (3 R/HR)(1000 MR/R)(1 HR/60 MIN)(0.5 MIN)(2 TRIPS) = 50 MR.                  (Personnel Hatch to Stairway)</p> <p>___ 2.      (3 R/HR)(1000 MR/R)(1 HR/60 MIN)(1.5 MIN)(2 TRIPS) = 150 MR.                  (Stairway)</p> <p>___ 3.      (12 R/HR)(1000 MR/R)(1 HR/60 MIN)(1 MIN)(2 TRIPS) = 400 MR.                  (Stairway on -3'6" to valve)</p> <p>___ 4.      (50 MR)+(150 MR)+(400MR) = * <b>600 MR.</b></p> <p><b>EVALUATOR'S NOTES:</b> Total exposure to travel to the valve and back: 600 mr. <b>THIS IS A CRITICAL STEP</b></p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
<p><b>STEP 2:</b></p> <p>Calculate remaining allowable exposure at valve.</p> <p><b>STANDARD:</b></p> <p>___ 1.      Allowable Dose to open the valve - (1000 MR) - (600 MR) = * <b>400 MR</b></p> <p><b>EVALUATOR'S NOTES:</b> Total allowable dose: 400 MR. <b>THIS IS A CRITICAL STEP</b></p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>

<p><b>STEP 3:</b></p> <p>Determine the maximum allowable time the operator has to open 1-RH-MOV-1700.</p> <p><b>STANDARD:</b></p> <p>___ 1. (400 MR)(HR/12R)(1R/1000 MR)(60 MIN/1 HR) = * <b>2 MIN.</b></p> <p><b>EVALUATOR'S NOTES:</b> Determines maximum allowable time to operate the valve is 2 minutes. <b>THIS IS A CRITICAL STEP</b></p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
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**STOP TIME:**

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<p><b>EVALUATOR NOTE: Proceed to Follow-up question for SRO Candidates.</b></p>
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## **SRO ONLY ANSWER KEY**

### **NOT FOR TRAINEE**

#### **DOSE CALC FOLLOW-UP Question**

While working on 1-RH-MOV-1770, you inadvertently lacerated your left thigh. Medical attention is required and you will need to be transported to a nearby hospital. HP reports that you are contaminated and will to be accompanied by an HP Tech to the hospital.

Are there any reportability requirements?

ANSWER: VPAP-2802, section 6.3.5.a.6 requires an 8-hour report for any event requiring the transport of a radioactively contaminated person to an off-site medical facility for treatment.



**Operator Directions Handout  
(TO BE READ TO APPLICANT BY EXAMINER)**

**Initial Conditions:**

- Unit 1 has experienced a small break LOCA with a safety injection.
- The Operating Team is attempting to place the Residual Heat Removal System in service, but they are unable to open 1-RH-MOV-1700 from the Main Control Room.
- You have been tasked with entering Containment and locally opening 1-RH-MOV-1700.
- Your allowable dose limit for this job is 1000 mr based on Emergency DAD limits.
- General area radiation levels have been manually estimated based on installed radiation monitor readings. Health Physics personnel are currently unavailable to provide assistance for dose determination.
- Survey maps of the Unit 1 Containment are available, showing dose rates and one way travel time to reach the valve via the chosen route.
- One way travel time is as follows:
  - Personnel Hatch to Stairwell                      30 seconds
  - Stairwell to 3'6" elevation                      1.5 minutes
  - 3'6" elevation to 1-RH-MOV-1700                      1 minutes

**Initiating Cues**

You have been directed to determine:

- The maximum time you will have to open 1-RH-MOV-1700 without exceeding your allowable dose.

## **SRO ONLY** Candidate

### Dose Calc FOLLOW-UP Question

While working on 1-RH-MOV-1770, you inadvertently lacerated your left thigh. Medical attention is required and you will need to be transported to a nearby hospital. HP reports that you are contaminated and will to be accompanied by an HP Tech to the hospital.

Are there any reportability requirements?

**Operator Directions Handout  
(TO BE GIVEN TO APPLICANT)**

**Initial Conditions:**

- Unit 1 has experienced a small break LOCA with a safety injection.
- The Operating Team is attempting to place the Residual Heat Removal System in service, but they are unable to open 1-RH-MOV-1700 from the Main Control Room.
- You have been tasked with entering Containment and locally opening 1-RH-MOV-1700.
- Your allowable dose limit for this job is 1000 mr based on Emergency DAD limits.
- General area radiation levels have been manually estimated based on installed radiation monitor readings. Health Physics personnel are currently unavailable to provide assistance for dose determination.
- Survey maps of the Unit 1 Containment are available, showing dose rates and one way travel time to reach the valve via the chosen route.
- One way travel time is as follows:
  - Personnel Hatch to Stairwell                      30 seconds
  - Stairwell to 3'6" elevation                      1.5 minutes
  - 3'6" elevation to 1-RH-MOV-1700              1 minutes

**Initiating Cues**

You have been directed to determine:

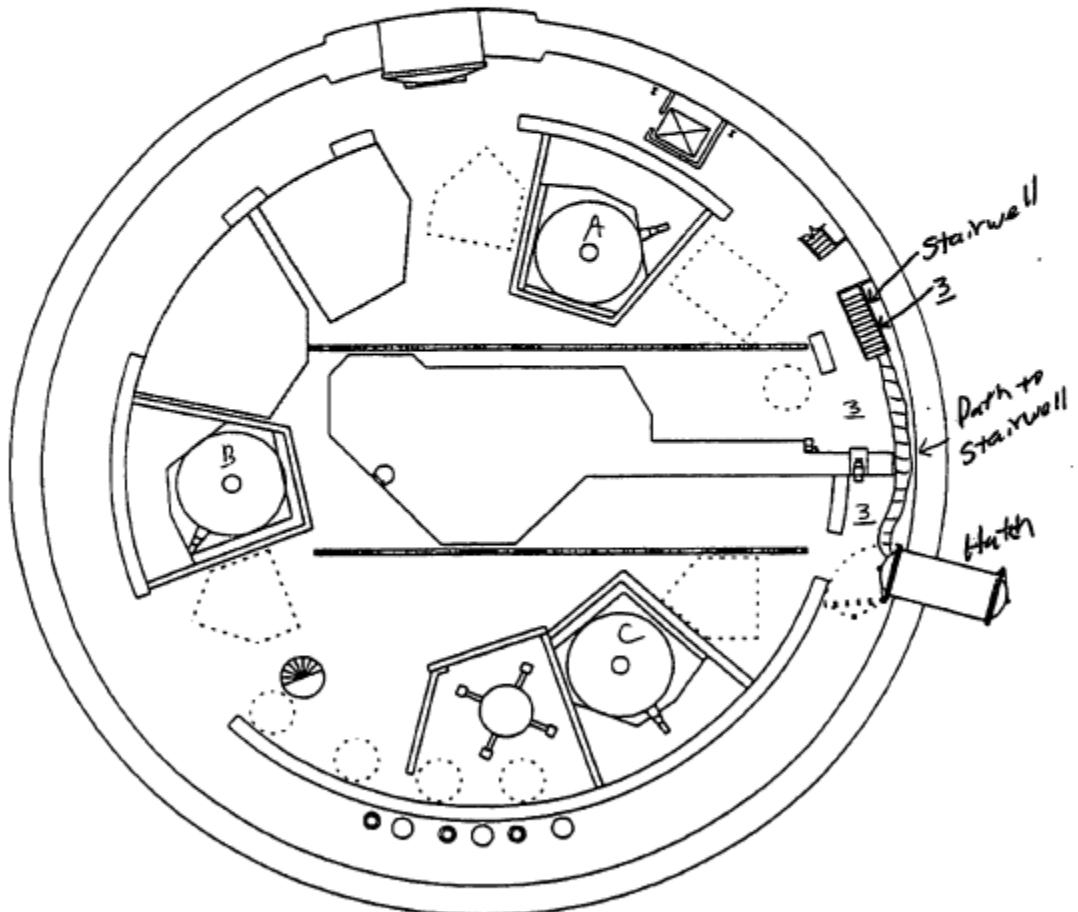
- The maximum time you will have to open 1-RH-MOV-1700 without exceeding your allowable dose.

DOMINION

Stairway Pathway

RP-AA-221  
Revision 0  
Page 13 of 13ATTACHMENT B  
(Page 1 of 1)

Map Number <b>100</b>	Location/Description <b>Unit 1 Containment 47' Elevation</b>		Reactor Power Unit(s) Unit 1 1SD% Unit 2 100%	
Purpose: <input type="checkbox"/> Routine <input checked="" type="checkbox"/> Special <input type="checkbox"/> RWP		Type: Radiation <input checked="" type="checkbox"/> Gamma <input type="checkbox"/> Beta <input type="checkbox"/> Neutron	Contamination <input type="checkbox"/> GA <input type="checkbox"/> LA <input type="checkbox"/> DRP	
Instrument Model	Serial #	<input type="checkbox"/> All GA Smears < 1000 dpm/100cm <sup>2</sup> <input type="checkbox"/> All GA Smears < 20 dpm/100cm <sup>2</sup> Alpha <input type="checkbox"/> All LA Smears < 1000 dpm/LAS		Air Sample <input type="checkbox"/> GA <input type="checkbox"/> WS <input type="checkbox"/> BZ <input type="checkbox"/> Air Sample Results _____ %DAC <input type="checkbox"/> No DRP Detected <input checked="" type="checkbox"/> All Gamma readings in mR/hr unless noted on map
Installed	N/A			
Radiation monitors				
throughout containment		Comments: General area based on Containment Radiation Monitors. 1000mR=1R		
Surveyed By (Print/Signature) <i>John De</i>		Date Today	Time Now	Reviewed By (Print/Signature) <i>Jack Bauer</i>
				Date Today



\* All measurements in R/hr

RA = Radiation Area HRA = High Radiation Area LHRA = Locked High Radiation Area VHRA = Very High Radiation Area	CA = Contaminated Area RCA = Radiological Control Area ARA = Airborne Radioactivity Area RMA = Radioactive Material(s) Area	LDWA = Low Dose Waiting Area HPA = Hot Particle Area NEA = Neutron Exposure Area DRP = Discrete Radioactive Particle
--	--	---

① = Smear Location    Δ = A/S Location    # = G/A Dose Rate    #\* = Contact Dose Rate    -X-X-X- = Radiological Boundary

DOMINION

Stairway Passway

RP-AA-221  
Revision 0  
Page 13 of 13ATTACHMENT B  
(Page 1 of 1)

Sp Number <b>150</b>	Location/Description <b>Unit One Containment -3'6" Elevation</b>		Reactor Power Unit(s) <b>Unit 1 1SD% Unit 2 100%</b>	
Purpose: <input type="checkbox"/> Routine <input checked="" type="checkbox"/> Special <input type="checkbox"/> RWP		Type: Radiation <input checked="" type="checkbox"/> Gamma <input type="checkbox"/> Beta <input type="checkbox"/> Neutron	Contamination <input type="checkbox"/> GA <input type="checkbox"/> LA <input type="checkbox"/> DRP	
Air Sample <input type="checkbox"/> GA <input type="checkbox"/> WS <input type="checkbox"/> BZ		Air Sample Results ____ %DAC <input type="checkbox"/> No DRP Detected <input checked="" type="checkbox"/> All Gamma readings in mR/hr unless noted on map		
Instrument Model	Serial #	<input type="checkbox"/> All GA Smears < 1000 dpm/100cm <sup>2</sup> <input type="checkbox"/> All GA Smears < 20 dpm/100cm <sup>2</sup> Alpha <input type="checkbox"/> All LA Smears < 1000 dpm/LAS		
Installed Rad Monitors		Comments: General area based on Containment Radiation Monitors. 1000mR=1R Denotes Travel Path		
throughout Containment				
Surveyed By (Print/Signature) <i>[Signature]</i>		Date Today	Time Now	Reviewed By (Print/Signature) <i>[Signature]</i> Date Today

*\* All measurements in R/hr*

1 = Radiation Area 1RA = High Radiation Area LHRA = Locked High Radiation Area VHRA = Very High Radiation Area	CA = Contaminated Area RCA = Radiological Control Area ARA = Airborne Radioactivity Area RMA = Radioactive Material(s) Area	LDWA = Low Dose Waiting Area HPA = Hot Particle Area NEA = Neutron Exposure Area DRP = Discrete Radioactive Particle
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① = Smear Location    △ = A/S Location    # = G/A Dose Rate    #\* = Contact Dose Rate    -X-X-X- = Radiological Boundary

U.S. Nuclear Regulatory Commission  
Surry Power Station

SR17301

**Administrative** Job Performance Measure G2.4.39  
**TIME CRITICAL**

Applicant \_\_\_\_\_

Start Time \_\_\_\_\_

Examiner \_\_\_\_\_

Date \_\_\_\_\_

Stop Time \_\_\_\_\_

**Title**

**Complete EPIP-2.01**

**K/A: G.2.4.39 – Knowledge of RO responsibilities in emergency plan implementation. (3.9/3.8)**

**Applicability**

**Estimated Time**

**Actual Time**

RO only.

15 Minutes

\_\_\_\_\_ Minutes

**Conditions**

- Task is to be PERFORMED in the simulator.

**Standards**

- EPIP-2.01, Report of Emergency to State and Local Governments, Attachment 2 completed and transmitted.

**Initiating Cues**

- EPIP-1.01, Emergency Manager Controlling Procedure
- EPIP-2.01, Report of Emergency to State and Local Governments.

**Terminating Cues**

- All State and Local Governments notified and EPIP-2.01 complete through step 9.

**Procedures**

- EPIP-2.01, Notification of State and Local Governments, Rev. 44.

**Tools and Equipment**

- None

**Safety Considerations**

- None

**Simulator Setup**

- Reset to IC 423, or call up 100% power IC.
- Initiate the following malfunctions:
  - RC0501, RCP-1A overcurrent ground fault trip.
  - RD18, RPS Auto trip failure
  - MM0101, Wind Speed Upper Detector Failure – Setting 12 (12 mph).
  - MM0201, Wind Direction Upper Detector Failure – Setting 300 (300 degrees).
- Perform immediate actions for E-0.
- Throttle AFW so that SG 'A' has 60-100 gpm, and SG 'B' and 'C' has 250 gpm/SG.
- Check PCS on SM does not show any displays.
- Verify Instaphone works.
- Stabilize the plant and place Simulator in FREEZE.

**Initial Conditions**

- **This JPM is Time Critical.**
- I am the Station Emergency Manager (SEM) and you are the State and Local Communicator. A Reactor Coolant Pump tripped and the reactor failed to automatically trip. The reactor was manually tripped and the team is responding IAW the EOP network. I have declared an ALERT SA2.1 due to an auto trip failure to shutdown the reactor requiring a manual trip, which was successful.

**Initiating Cues**

- I need you to initiate EPIP-2.01 and notify state and local governments of our emergency.
- There are no releases in progress, and site access is available.
- When you finish the actions necessary to accomplish this task, please inform me.

**Notes**

- **Student should use State & Local Communicator Book in the Simulator for use of the procedure and the ROE.**

**Notes to the Evaluator**

- **This JPM is Time Critical-15 minutes.** Time starts from the JPM start time until transmittal is complete and time recorded on Report of Emergency (ROE) (step 7 of JPM).
- Task critical elements are bolded and denoted by an asterisk (\*).
- Critical step sequencing requirements: Steps 4 and 5 before Step 6.
- **Role play as the Station Emergency Manager. Approve Attachment 2 when given to you by student.**
- **Time declared for the ALERT will be the JPM start time. Use TODAY'S date.**

**START TIME:** \_\_\_\_\_:

<p><b>STEP 1:</b></p> <p>INITIATES PROCEDURE.</p> <p><b>STANDARD:</b></p> <p>Fills in name, date, time, and location in step 1 of EPIP-2.01.</p> <p><b>EVALUATOR'S NOTE:</b></p> <ul style="list-style-type: none"> <li>• <b>If asked:</b> Use today's date. Time should be current time. Location is Surry Power Station Control Room (simulated).</li> <li>• A partial copy of EPIP-2.01 is included for the Evaluator at the end of this JPM. The candidate should use the same copy as provided in the State &amp; Local Communicator binder in the MCR.</li> </ul> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
<p><b>STEP 2:</b></p> <p>CHECKS FIRST REPORT OF EMERGENCY FOR EVENT REQUIRED</p> <p><b>STANDARD:</b></p> <p>Answers yes to step 2 based on direction to perform EPIP-2.01.</p> <p><b>EVALUATOR'S NOTE:</b></p> <p><b>If asked:</b> First report of emergency for event is required.</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>



<p><b>STEP 3:</b></p> <p>Reviews notes prior to step 3:</p> <ul style="list-style-type: none"> <li>• The initial notification of any emergency classification must be made (meaning contact initiated with the first agency) within 15 minutes of declaring the emergency class.</li> <li>• Attachment 1, Instructions for Completing Report of Emergency to State and Local Governments, may be referenced as needed.</li> <li>• Items 7 through 11 on the Report of Emergency to State and Local Governments are optional for a message reporting initial entry into the Emergency Plan or an emergency class change.</li> </ul> <p><b>STANDARD:</b></p> <p>Acknowledges notes.</p> <p><b>EVALUATOR'S NOTE:</b></p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
<p><b>STEP 4:</b></p> <p>CHECKS EMERGENCY REMAINS IN EFFECT (<i>Step 3</i>)</p> <p><b>STANDARD:</b></p> <p>Determines emergency still in effect.</p> <p><b>EVALUATOR'S NOTE:</b></p> <p><b>If asked:</b> The emergency does remain in effect.</p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>

<p><b>STEP 5:</b></p> <p>RECORDS INFORMATION ON REPORT OF EMERGENCY TO STATE AND LOCAL GOVERNMENTS (ATTACHMENT 2). <i>(Step 4)</i></p> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>a) Records message #1 on page 1 and 2 of attachment 2.</li> <li>b) Checks box for Drill Message.</li> <li>c) * <b>Item 1, Emergency Classification: ALERT checked, SA 2.1, Declared at time (given to trainee) and date (given to trainee). Writes name in space for Emergency Communicator.</b></li> <li>d) * <b>Item 2, MET Data: Obtains MET Data from PCS or MCR Indications. Uses Lower Met Tower data (WS approx. 280°, WD approx. 10 mph)</b></li> <li>e) * <b>Item 3, Release of Radioactive Material. "No radiological release: Will NOT transmit Report of Radiological conditions to Virginia EOC" block is checked.</b></li> <li>f) * <b>Item 4, Site Access: "Available" block is checked.</b></li> <li>g) * <b>Item 5, Protective Action Recommendation: "Is not required" block is checked.</b></li> <li>h) Item 6, Update Schedule: Will be checked after transmittal.</li> <li>i) Items 7-11, "Excluded from message" blocks are checked.</li> </ul> <p><b>EVALUATOR'S NOTE:</b></p> <ul style="list-style-type: none"> <li>• <b>Item 1, If asked, what is declaration time?</b> Provide time given at start of JPM. Item 1 must be filled in completely after notification made.</li> <li>• <b>Item 2, If asked is MET data available in MCR?</b> Respond, "Use MET data specified by EPIP-2.01." PCS EMCOMM should be accessed and data recorded from that screen. Note: <b>Lower tower should be used</b> and data recorded will be approx. 280°, and 10 mph. <ul style="list-style-type: none"> <li>▪ Evaluator Note: Upper Tower wind speed and direction have failures programmed in for this JPM.</li> </ul> </li> <li>• <b>Item 2, If asked to verify MET data, or is MET data verified?</b> Respond, "MET data has been verified." Normally all MET data is verified by a second person (Training note).</li> <li>• <b>Item 3, If asked, are there any releases?</b> Respond "No release in progress."</li> <li>• <b>Item 4, If asked, Is Site access available?</b> Respond, "Site Access is available."</li> <li>• <b>Item 5, If asked, are there any PARs?</b> Respond, "There are no PARs."</li> <li>• <b>If asked for any other information:</b> Respond, "All the information you need has been provided."</li> </ul> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
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<p><b>STEP 6:</b> HAVE SEM APPROVE REPORT. (<i>Step 5</i>)</p> <p><b>STANDARD:</b>  SEM reviews and approves report.</p> <p><b>EVALUATOR'S NOTE:</b></p> <ul style="list-style-type: none"> <li>• Sign the report at top of the page as SEM.</li> <li>• Inform the candidate that they have permission to transmit report to State and Local governments.</li> <li>• A copy of Attachment 2 (before SEM approves) is included at end of JPM.</li> </ul> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
<p><b>STEP 7:</b>  SEND REPORT OF EMERGENCY TO STATE AND LOCAL GOVERNMENTS. (<i>Step 6</i>)</p> <p><b>STANDARD:</b></p> <ol style="list-style-type: none"> <li>a) Acknowledges Note prior to step 6.</li> <li>b) Check Instaphone clear of conflicting message or traffic.</li> <li>c) Contacts State and Local governments.</li> <li>d) Reads item 1.</li> <li>e) Perform acknowledgement roll-call (check boxes) as EOC answers.</li> <li>f) Repeat any information in Item 1 upon request.</li> <li>g) Check Virginia EOC acknowledged message.</li> <li>h) Check all local EOC(s) answered acknowledgement roll call.</li> <li>i) * <b>Record date and time transmittal of item 1 completed. The TIME CRITICAL clock stops after transmittal of item 1 is completed. STOP TIME_____.</b></li> <li>j) * <b>Read Items 2 through 5.</b></li> <li>k) * <b>Consult with Virginia EOC Watch officer to determine desired update schedule.</b></li> <li>l) * <b>Completes item 6, Update Schedule.</b></li> <li>m) Read Items 7 through 11.</li> <li>n) Repeat any items upon request.</li> <li>o) Record time and date transmittal of items 2 – 11 completed.</li> <li>p) Go to step 9.</li> </ol> <p><b>EVALUATOR'S NOTE:</b></p> <ul style="list-style-type: none"> <li>• Booth instructor: will role-play the State and Local governments and will acknowledge all information.</li> <li>• Booth instructor: will request a 60 minute update.</li> <li>• Booth instructor: Virginia EOC duty officer's name is John Smith.</li> </ul> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

NUMBER EPIP-2.01	ATTACHMENT TITLE REPORT OF EMERGENCY TO STATE AND LOCAL GOVERNMENTS	ATTACHMENT 2
REVISION 44		PAGE 1 of 1

REPORT OF EMERGENCY TO STATE AND LOCAL GOVERNMENTS	
ROE MESSAGE # <u>1</u>	APPROVAL: <u>[Signature]</u> (Station Emergency Manager or Recovery Manager)
ATTENTION ALL STATIONS. This is Surry Power Station. Standby for a(n) <input checked="" type="checkbox"/> Drill Message <input type="checkbox"/> Emergency Message <input type="checkbox"/> Drill Termination Message <input type="checkbox"/> Emergency Termination Message. Use the Report of Emergency form to copy message. (READ SLOWLY)	
<b>Item 1. EMERGENCY CLASSIFICATION:</b> <input type="checkbox"/> NOUE <input checked="" type="checkbox"/> Alert <input type="checkbox"/> Site Area Emergency <input type="checkbox"/> General Emergency In accordance with EAL <u>S A 2.1</u> Declared at <u>Now</u> (24-hr time) on <u>Today</u> (date). This is (name) <u>Name</u> / Emergency Communicator. Please acknowledge receipt of this message: (Conduct roll-call and check boxes as each party answers.) <input checked="" type="checkbox"/> VA EOC <input checked="" type="checkbox"/> Surry County <input checked="" type="checkbox"/> Isle of Wight County <input checked="" type="checkbox"/> James City County <input checked="" type="checkbox"/> Williamsburg <input checked="" type="checkbox"/> Newport News <input checked="" type="checkbox"/> York County Notification completed at <u>Now</u> (24-hr time) on <u>Today</u> (date).	
<b>Item 2. METEOROLOGICAL DATA:</b> Based on: <input checked="" type="checkbox"/> On-site Measurements <input type="checkbox"/> Off-site Measurements <input type="checkbox"/> Not Available Time: <u>Now</u> AVE Wind Speed <u>10</u> mph; AVE Wind Direction from <u>280</u> degrees (0° to 360°) (24-hr time)	
<b>Item 3. RELEASE OF RADIOACTIVE MATERIAL:</b> Routine releases ongoing due to plant operations. Additional radiological releases associated with the event: <input checked="" type="checkbox"/> A. No radiological release. Will NOT transmit Report of Radiological Conditions to Virginia EOC. <input type="checkbox"/> B. Radiological release in progress. Will transmit Report of Radiological Conditions to Virginia EOC. <input type="checkbox"/> C. Radiological release now terminated. Will transmit Report of Radiological Conditions to Virginia EOC. <input type="checkbox"/> D. Radiological release projected to occur. Will transmit Report of Radiological Conditions to Virginia EOC.	
<b>Item 4. SITE ACCESS:</b> <input checked="" type="checkbox"/> Available <input type="checkbox"/> Not Available	
<b>Item 5. PROTECTIVE ACTION RECOMMENDATION:</b> <input checked="" type="checkbox"/> is NOT required <input type="checkbox"/> will be transmitted to VEOC <input type="checkbox"/> has been transmitted to VEOC.	
<b>Item 6. UPDATE SCHEDULE:</b> <input checked="" type="checkbox"/> 60 minutes (recommended); <input type="checkbox"/> Other _____; EOC Watch Officer: <u>Name</u>	
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.	
<b>Item 7. EMERGENCY RESPONSE ACTIONS UNDERWAY:</b> <input checked="" type="checkbox"/> Excluded from message <input type="checkbox"/> None <input type="checkbox"/> Station emergency personnel called in <input type="checkbox"/> Station monitoring teams dispatched off-site <input type="checkbox"/> Other _____	
<b>Item 8. EVACUATION OR COMPANY DISMISSAL OF SITE PERSONNEL:</b> <input checked="" type="checkbox"/> Excluded from message <input type="checkbox"/> No <input type="checkbox"/> Evacuation to Primary Remote Assembly Area: <input type="checkbox"/> Planned <input type="checkbox"/> In progress <input type="checkbox"/> Completed <input type="checkbox"/> Released from RAA <input type="checkbox"/> Evacuation to Secondary Remote Assembly Area: <input type="checkbox"/> Planned <input type="checkbox"/> In progress <input type="checkbox"/> Completed <input type="checkbox"/> Released from RAA <input type="checkbox"/> Company Dismissal: <input type="checkbox"/> Planned <input type="checkbox"/> In progress <input type="checkbox"/> Completed <input type="checkbox"/> Other _____	
<b>Item 9. PROGNOSIS OF SITUATION SINCE LAST REPORT:</b> <input checked="" type="checkbox"/> Excluded from message <input type="checkbox"/> Stable <input type="checkbox"/> Worsening <input type="checkbox"/> Improving <input type="checkbox"/> Other _____	
<b>Item 10. ASSISTANCE REQUESTED OR BEING PROVIDED:</b> <input checked="" type="checkbox"/> Excluded from message <input type="checkbox"/> None (#) Fire Units from _____ (#) Police Units from _____ (#) Rescue Units from _____ (#) Other _____	
<b>Item 11. ADDITIONAL INFORMATION (Do not use abbreviations, mark numbers or acronyms.):</b> <input checked="" type="checkbox"/> Excluded from message _____ _____	
This is Surry Power Station out at <u>Now</u> (24-hr time) on <u>Today</u> (date).	
<b>Item 12. TERMINATION INFORMATION (Complete ONLY for termination message):</b> Event Terminated at: _____ (24-hr time) on _____ (date). Please acknowledge receipt of this message: (Conduct roll-call and check boxes as each party answers.) <input type="checkbox"/> VA EOC <input type="checkbox"/> Surry County <input type="checkbox"/> Isle of Wight County <input type="checkbox"/> James City County <input type="checkbox"/> Williamsburg <input type="checkbox"/> Newport News <input type="checkbox"/> York County This is Surry Power Station out at _____ (24-hr time) on _____ (date).	



SURRY POWER STATION

EMERGENCY PLAN IMPLEMENTING PROCEDURE

NUMBER	PROCEDURE TITLE	REVISION
EPIP-2.01	NOTIFICATION OF STATE AND LOCAL GOVERNMENTS (WITH 5 ATTACHMENTS)	44
		PAGE 1 of 26

PURPOSE

To initially notify State and local governments of the declaration of an emergency and to provide status updates related to the event.

ENTRY CONDITIONS

Any of the following:

- 1) An emergency has been declared.
- 2) Entry directed by Station Emergency Manager.

COMMON

***REFERENCE USE***

NUMBER  EPIP-2.01	PROCEDURE TITLE  NOTIFICATION OF STATE AND LOCAL GOVERNMENTS	REVISION 44  PAGE 2 of 26
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
_____ 1	<b>INITIATE PROCEDURE:</b>  <input type="checkbox"/> • By: _____ Date: _____ Time: _____ Location: _____	
_____ 2	<b>CHECK FIRST REPORT OF EMERGENCY FOR EVENT - REQUIRED</b>	<input type="checkbox"/> <u>IF</u> procedure previously initiated, <u>THEN</u> continue from step in effect identified during relief/turnover.
	<p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• The initial notification of any emergency classification must be made (meaning the state and local Emergency Operations Centers (EOCs) have been provided with the emergency classification level) within 15 minutes of declaring the emergency class.</li> <li>• Attachment 1, Instructions for Completing Report of Emergency to State and Local Governments, may be referenced as needed.</li> <li>• Items 7 through 11 on the Report of Emergency to State and Local Governments are optional for a message reporting initial entry into the Emergency Plan, an emergency class change or PAR changes.</li> </ul>	
_____ 3	<b>CHECK EMERGENCY - REMAINS IN EFFECT</b>	<input type="checkbox"/> <u>IF</u> initial message is also termination message, <u>THEN</u> GO TO Step 23.  <input type="checkbox"/> <u>IF</u> termination message, <u>THEN</u> GO TO Step 25.
_____ 4	<b>RECORD INFORMATION ON REPORT OF EMERGENCY TO STATE AND LOCAL GOVERNMENTS</b>	
_____ 5	<b>HAVE SEM/RM APPROVE REPORT</b> (initial/sign at top of Report of Emergency to State and Local Governments)	

NUMBER	PROCEDURE TITLE	REVISION
EPIP-2.01	NOTIFICATION OF STATE AND LOCAL GOVERNMENTS	44
		PAGE 3 of 26

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><b>NOTE:</b> Outbound calls may be made using these methods:</p> <ul style="list-style-type: none"> <li>• 8-1-(area code)-xxx-xxxx [PBX System telephones]</li> <li>• 9-1-(area code)-xxx-xxxx [Unrestricted PBX telephones for non-local calling area]</li> <li>• 9-1-xxx-xxxx [Unrestricted PBX telephones for local calling area]</li> <li>• 1-(area code)-xxx-xxxx [Satellite Phones]</li> </ul>	
6	<p>SEND REPORT OF EMERGENCY TO STATE AND LOCAL GOVERNMENTS (i.e., Initial or Follow-up Report, as required):</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><input type="checkbox"/> a) Check Instaphone - CLEAR OF CONFLICTING MESSAGE TRAFFIC</p> </div> <div style="width: 45%;"> <p>a) <u>IF</u> Instaphone - <u>NOT</u> AVAILABLE, <u>THEN</u> do the following:</p> <p><input type="checkbox"/> 1) Call Virginia EOC on VEOC ARD or VEOC autodial pushbutton (ask for Watch Officer (Alternate: (804) 674-2400 or (804) 310-8868)).</p> <p><input type="checkbox"/> 2) Notify Virginia EOC Watch Officer of need to transmit message.</p> <p><input type="checkbox"/> 3) <u>WHEN</u> Instaphone available for message transmittal, <u>THEN</u> GO TO Step 6.b.</p> </div> </div>	
<p>(STEP 6 CONTINUED ON NEXT PAGE)</p>		



NUMBER	PROCEDURE TITLE	REVISION
EPIP-2.01	NOTIFICATION OF STATE AND LOCAL GOVERNMENTS	44
		PAGE
		4 of 26

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6.	<p>SEND REPORT OF EMERGENCY TO STATE AND LOCAL GOVERNMENTS (i.e., Initial or Follow-up Report, as required): (Continued)</p> <p><input type="checkbox"/> b) Use Instaphone to contact State and local Emergency Operations Centers (EOCs)</p> <p><input type="checkbox"/> c) Read Item 1</p> <p><input type="checkbox"/> d) Perform acknowledgement roll-call (check boxes as EOC(s) answer or circle if no response)</p> <p><input type="checkbox"/> e) Repeat any information in Item 1 upon request</p>	<p>b) <u>IF</u> Instaphone nonfunctional in Control Room, TSC, or LEOF, <u>THEN</u> call all EOCs (State and Local) using autodial phone by doing the following.</p> <p><input type="checkbox"/> 1) Pick up receiver or use "Handsfree" feature on phone to get dial tone.</p> <p><input type="checkbox"/> 2) Select pushbutton labeled Conference All EOCs.</p> <p><input type="checkbox"/> 3) After receiving "Welcome to the conference call. You are the only person in the meeting now" <b>SLOWLY</b> dial <b>*21#</b> to begin conference call.</p> <p><input type="checkbox"/> 4) <u>IF</u> autodial phone nonfunctional, <u>THEN</u> GO TO Step 8.</p> <p><input type="checkbox"/> <u>IF</u> Instaphone nonfunctional in CEOF, <u>THEN</u> establish conference call using Attachment 5, INSTRUCTIONS FOR ESTABLISHING CONFERENCE CALL FROM CENTRAL EMERGENCY OPERATIONS FACILITY (CEO).</p>

(STEP 6 CONTINUED ON NEXT PAGE)

NUMBER	PROCEDURE TITLE	REVISION
EPIP-2.01	NOTIFICATION OF STATE AND LOCAL GOVERNMENTS	44
		PAGE 5 of 26

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6.	<p>SEND REPORT OF EMERGENCY TO STATE AND LOCAL GOVERNMENTS (i.e., Initial or Follow-up Report, as required): (Continued)</p> <p><input type="checkbox"/> f) Check Virginia EOC acknowledged message</p>	<p>f) <u>IF</u> Virginia EOC did <u>NOT</u> acknowledge message, <u>THEN</u> do the following:</p> <p><input type="checkbox"/> 1) Use VEOC ARD phone to contact Virginia EOC or VEOC autodial pushbutton (ask for Watch Officer (Alternate: (804) 674-2400 or (804) 310-8868)).</p> <p><input type="checkbox"/> 2) Read Items 1 through 11.</p> <p><input type="checkbox"/> <u>IF</u> all means of communications with Virginia EOC are nonfunctional, <u>THEN</u> notify the SEM/RM.</p>
(STEP 6 CONTINUED ON NEXT PAGE)		

NUMBER	PROCEDURE TITLE	REVISION
EPIP-2.01	NOTIFICATION OF STATE AND LOCAL GOVERNMENTS	44
		PAGE 6 of 26

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED												
6.	<p>SEND REPORT OF EMERGENCY TO STATE AND LOCAL GOVERNMENTS (i.e., Initial or Follow-up Report, as required): (Continued)</p> <p><input type="checkbox"/> g) Check all local EOC(s) answered acknowledgement roll call</p>	<p>g) <u>IF</u> any local EOC(s) did <u>NOT</u> answer roll call, <u>THEN</u> do the following:</p> <p><input type="checkbox"/> 1) Use autodial pushbutton(s) to call EOC(s) that did not answer.</p> <p><input type="checkbox"/> 2) Refer to the table below for order of priority and list of local EOC phone numbers:</p> <table border="1"> <tbody> <tr> <td>Surry</td> <td>(757) 294-5264</td> </tr> <tr> <td>James City</td> <td>(757) 566-0112</td> </tr> <tr> <td>Isle of Wight</td> <td>(757) 357-2151</td> </tr> <tr> <td>Williamsburg</td> <td>(757) 220-2331</td> </tr> <tr> <td>Newport News</td> <td>(757) 247-2578</td> </tr> <tr> <td>York</td> <td>(757) 890-3603</td> </tr> </tbody> </table> <p><input type="checkbox"/> 3) Read Item 1.</p> <p>4) Record the following on Report of Emergency to State and Local Governments:</p> <p><input type="checkbox"/> • Method of contact.</p> <p><input type="checkbox"/> • Reason Instaphone or AutoDial phone failed (if known).</p> <p><input type="checkbox"/> • Date and time of contact.</p>	Surry	(757) 294-5264	James City	(757) 566-0112	Isle of Wight	(757) 357-2151	Williamsburg	(757) 220-2331	Newport News	(757) 247-2578	York	(757) 890-3603
Surry	(757) 294-5264													
James City	(757) 566-0112													
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Williamsburg	(757) 220-2331													
Newport News	(757) 247-2578													
York	(757) 890-3603													

(STEP 6 CONTINUED ON NEXT PAGE)

NUMBER	PROCEDURE TITLE	REVISION
EPIP-2.01	NOTIFICATION OF STATE AND LOCAL GOVERNMENTS	44
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STEP	ACTION/ EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6.	<p>SEND REPORT OF EMERGENCY TO STATE AND LOCAL GOVERNMENTS (i.e., Initial or Follow-up Report, as required): (Continued)</p> <p><input type="checkbox"/> h) Record time and date transmittal of Item 1 completed</p> <p><input type="checkbox"/> i) Read Items 2 through 5</p> <p><input type="checkbox"/> j) Consult with Virginia EOC Watch Officer to determine desired update message schedule</p> <p><input type="checkbox"/> k) Complete Item 6, Update Schedule</p> <p><input type="checkbox"/> l) Read Items 7 through 11</p> <p><input type="checkbox"/> m) Repeat any items upon request</p> <p><input type="checkbox"/> n) Record time and date transmittal of Items 2 - 11 completed</p> <p><input type="checkbox"/> o) Check if Item 5 on Report of Emergency to State and Local Governments indicates Report of Protective Action Recommendation - REQUIRED</p>	<p><input type="checkbox"/> o) GO TO Step 9.</p>
	<p><b>NOTE:</b> The numbering sequence for Report of Protective Action Recommendation starts at #1 for the first report issued and is separate from the numbering sequence for Reports of Emergency to State and Local Governments.</p> <p><input type="checkbox"/> p) Obtain Report of Protective Action Recommendation from SEM/RM</p> <p><input type="checkbox"/> q) Confirm that SEM/RM approved report:</p> <p><input type="checkbox"/> EPIP-1.06, Attachment 3, Report of Protective Action Recommendation</p> <p style="text-align: center;"><u>OR</u></p> <p><input type="checkbox"/> EPIP-4.07, Attachment 3, Radiological Protective Action Recommendation</p>	

NUMBER	PROCEDURE TITLE	REVISION
EPIP-2.01	NOTIFICATION OF STATE AND LOCAL GOVERNMENTS	44
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	<p>TRANSMIT REPORT OF PROTECTIVE ACTION RECOMMENDATION:</p> <p><input type="checkbox"/> a) Use VEOC ARD phone to contact Virginia EOC or VEOC autodial pushbutton (ask for Watch Officer (Alternate: (804) 674-2400 or (804) 310-8868))</p> <p><input type="checkbox"/> b) Read Protective Action Recommendation to Virginia EOC Watch Officer</p> <p><input type="checkbox"/> c) Record time transmittal of PAR to Virginia EOC complete</p> <p><input type="checkbox"/> d) Record Virginia EOC Watch Officer's Name</p> <p><input type="checkbox"/> e) GO TO Step 9</p>	<p>a) <u>IF</u> all means of communications with Virginia EOC are nonfunctional, <u>THEN</u> do the following:</p> <p><input type="checkbox"/> 1) Use Instaphone to transmit Report of Protective Action Recommendation.</p> <p><input type="checkbox"/> 2) Perform roll-call (check boxes as EOC(s) answer):</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Surry</li> <li><input type="checkbox"/> James City</li> <li><input type="checkbox"/> Isle of Wight</li> <li><input type="checkbox"/> Williamsburg</li> <li><input type="checkbox"/> Newport News</li> <li><input type="checkbox"/> York</li> </ul> <p><input type="checkbox"/> 3) Record the following on Report of Protective Action Recommendation:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> • "Transmitted PAR to local EOC(s)."</li> <li><input type="checkbox"/> • Date and time transmitted to local EOC(s).</li> </ul> <p><input type="checkbox"/> 4) GO TO Step 9.</p>

NUMBER	PROCEDURE TITLE	REVISION
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p><b>NOTE:</b> Other personnel may assist by making notifications simultaneously using other telephones.</p>	
8	<p>SEND REPORT OF EMERGENCY TO STATE AND LOCAL GOVERNMENTS USING ALTERNATIVE MEANS:</p> <p>a) Call Virginia EOC:</p> <p><input type="checkbox"/> 1) Use VEOC ARD (ask for Watch Officer (Alternate: (804) 674-2400 or (804) 310-8868))</p> <p><input type="checkbox"/> 2) Read entire Report of Emergency to State and Local Governments</p> <p><input type="checkbox"/> 3) Record time/date transmittal to Virginia EOC completed</p> <p><input type="checkbox"/> b) Use Attachment 4, NOTIFICATION OF LOCAL EOCs USING DIRECT DIAL, to notify local EOC(s)</p>	
9	<p>NOTIFY SEM/RM TRANSMITTAL WAS SENT</p>	
10	<p>KEEP REPORT OF EMERGENCY TO STATE AND LOCAL GOVERNMENTS AND REPORT OF PROTECTIVE ACTION RECOMMENDATION WITH THIS PROCEDURE</p>	
11	<p>CHECK IF ITEM 3 ON REPORT OF EMERGENCY TO STATE AND LOCAL GOVERNMENTS INDICATES REPORT OF RADIOLOGICAL CONDITIONS - REQUIRED</p>	<p><input type="checkbox"/> GO TO Step 14.</p>

NUMBER EPIP-2.01	ATTACHMENT TITLE REPORT OF EMERGENCY TO STATE AND LOCAL GOVERNMENTS	ATTACHMENT 2
REVISION 44		PAGE 1 of 1

### REPORT OF EMERGENCY TO STATE AND LOCAL GOVERNMENTS

ROE MESSAGE # \_\_\_\_\_

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)

<b>Item 1. EMERGENCY CLASSIFICATION:</b> <input type="checkbox"/> NOUE <input type="checkbox"/> Alert <input type="checkbox"/> Site Area Emergency <input type="checkbox"/> General Emergency In accordance with EAL _____ Declared at _____ (24-hr time) on _____ (date). This is (name) _____ / Emergency Communicator. Please acknowledge receipt of this message: (Conduct roll-call and check boxes as each party answers.) <input type="checkbox"/> VA EOC <input type="checkbox"/> Surry County <input type="checkbox"/> Isle of Wight County <input type="checkbox"/> James City County <input type="checkbox"/> Williamsburg <input type="checkbox"/> Newport News <input type="checkbox"/> York County Notification completed at _____ (24-hr time) on _____ (date).	
<b>Item 2. METEOROLOGICAL DATA:</b> Based on: <input type="checkbox"/> On-site Measurements <input type="checkbox"/> Off-site Measurements <input type="checkbox"/> Not Available Time: _____ AVE Wind Speed _____ mph; AVE Wind Direction from _____ degrees (0° to 360°) (24-hr time)	
<b>Item 3. RELEASE OF RADIOACTIVE MATERIAL:</b> Routine releases ongoing due to plant operations. Additional radiological releases associated with the event: <input type="checkbox"/> A. No radiological release. Will NOT transmit Report of Radiological Conditions to Virginia EOC. <input type="checkbox"/> B. Radiological release in progress. Will transmit Report of Radiological Conditions to Virginia EOC. <input type="checkbox"/> C. Radiological release now terminated. Will transmit Report of Radiological Conditions to Virginia EOC. <input type="checkbox"/> D. Radiological release projected to occur. Will transmit Report of Radiological Conditions to Virginia EOC.	
<b>Item 4. SITE ACCESS:</b> <input type="checkbox"/> Available <input type="checkbox"/> Not Available	
<b>Item 5. PROTECTIVE ACTION RECOMMENDATION:</b> <input type="checkbox"/> is NOT required <input type="checkbox"/> will be transmitted to VEOC <input type="checkbox"/> has been transmitted to VEOC.	
<b>Item 6. UPDATE SCHEDULE:</b> <input type="checkbox"/> 60 minutes (recommended); <input type="checkbox"/> Other _____; EOC Watch Officer: _____	
<b>NOTE:</b> 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.	
<b>Item 7. EMERGENCY RESPONSE ACTIONS UNDERWAY:</b> <input type="checkbox"/> Excluded from message <input type="checkbox"/> None <input type="checkbox"/> Station emergency personnel called in <input type="checkbox"/> Station monitoring teams dispatched off-site <input type="checkbox"/> Other _____	
<b>Item 8. EVACUATION OR COMPANY DISMISSAL OF SITE PERSONNEL:</b> <input type="checkbox"/> Excluded from message <input type="checkbox"/> No <input type="checkbox"/> Evacuation to Primary Remote Assembly Area: <input type="checkbox"/> Planned <input type="checkbox"/> In progress <input type="checkbox"/> Completed <input type="checkbox"/> Released from RAA <input type="checkbox"/> Evacuation to Secondary Remote Assembly Area: <input type="checkbox"/> Planned <input type="checkbox"/> In progress <input type="checkbox"/> Completed <input type="checkbox"/> Released from RAA <input type="checkbox"/> Company Dismissal: <input type="checkbox"/> Planned <input type="checkbox"/> In progress <input type="checkbox"/> Completed <input type="checkbox"/> Other _____	
<b>Item 9. PROGNOSIS OF SITUATION SINCE LAST REPORT:</b> <input type="checkbox"/> Excluded from message <input type="checkbox"/> Stable <input type="checkbox"/> Worsening <input type="checkbox"/> Improving <input type="checkbox"/> Other _____	
<b>Item 10. ASSISTANCE REQUESTED OR BEING PROVIDED:</b> <input type="checkbox"/> Excluded from message <input type="checkbox"/> None _____ (#) Fire Units from _____ (#) Police Units from _____ _____ (#) Rescue Units from _____ (#) Other _____	
<b>Item 11. ADDITIONAL INFORMATION (Do not use abbreviations, mark numbers or acronyms.):</b> <input type="checkbox"/> Excluded from message _____ _____	
This is Surry Power Station out at _____ (24-hr time) on _____ (date).	
<b>Item 12. TERMINATION INFORMATION (Complete ONLY for termination message):</b> Event Terminated at: _____ (24-hr time) on _____ (date). Please acknowledge receipt of this message: (Conduct roll-call and check boxes as each party answers.) <input type="checkbox"/> VA EOC <input type="checkbox"/> Surry County <input type="checkbox"/> Isle of Wight County <input type="checkbox"/> James City County <input type="checkbox"/> Williamsburg <input type="checkbox"/> Newport News <input type="checkbox"/> 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**

- **This JPM is Time Critical.**
- I am the Station Emergency Manager (SEM) and you are the State and Local Communicator. A Reactor Coolant Pump tripped and the reactor failed to automatically trip. The reactor was manually tripped and the team is responding IAW the EOP network. I have declared an ALERT SA2.1 due to an auto trip failure to shutdown the reactor requiring a manual trip, which was successful.

**Initiating Cues**

- I need you to initiate EPIP-2.01 and notify state and local governments of our emergency.
- There are no releases in progress, and site access is available.
- When you finish the actions necessary to accomplish this task, please inform me.



**Operator Directions Handout  
(TO BE GIVEN TO APPLICANT)**

**Initial Conditions**

- **This JPM is Time Critical.**
- I am the Station Emergency Manager (SEM) and you are the State and Local Communicator. A Reactor Coolant Pump tripped and the reactor failed to automatically trip. The reactor was manually tripped and the team is responding IAW the EOP network. I have declared an ALERT SA2.1 due to an auto trip failure to shutdown the reactor requiring a manual trip, which was successful.

**Initiating Cues**

- I need you to initiate EPIP-2.01 and notify state and local governments of our emergency.
- There are no releases in progress, and site access is available.
- When you finish the actions necessary to accomplish this task, please inform

U.S. Nuclear Regulatory Commission  
Surry Power Station

SR17301

**Administrative** Job Performance Measure G2.2.12

Applicant\_\_\_\_\_

Start Time\_\_\_\_\_

Examiner\_\_\_\_\_

Date \_\_\_\_\_

Stop Time\_\_\_\_\_

**Title****Review 1-OPT-FW-006, Auxiliary Feedwater MOV Test.****K/A: G.2.2.12 – Knowledge of surveillance procedures. RO: 3.7/ SRO: 4.1****Applicability****Estimated Time****Actual Time**

SRO Only

15 minutes

**Conditions**

- Task is to be PERFORMED in the CLASSROOM.

**Standards**

- Review 1-OPT-FW-006, Auxiliary Feedwater MOV Test.

**Initiating Cues**

- 1-OPT-FW-006 has been completed by another operator earlier in the shift.
- You are to perform the supervisory review of 1-OPT-FW-006.

**Terminating Cues**

- 1-OPT-FW-006 review complete.

**Procedures**

- 1-OPT-FW-006 (marked up), Revision 13.

**Tools and Equipment**

- None

**Safety Considerations**

- None

**Initial Conditions:**

- Unit 1 at 100% power.

**Initiating Cues**

- 1-OPT-FW-006 has been completed by another operator earlier in the shift.
- You are to perform the supervisory review of 1-OPT-FW-006 by completing step 7.4.
- Document any issues identified during your review in accordance with the requirements of the OPT.
- When you have completed the review of 1-OPT-FW-006, inform your examiner.

**PERFORMANCE CHECKLIST**

**Notes to the Evaluator**

- Task critical elements are bolded and denoted by an asterisk (\*).
- **START TIME:** \_\_\_\_\_

<p>STEP 1: Evaluate the Test results by reviewing the Acceptance criteria for the components tested.</p> <ul style="list-style-type: none"> <li>▪ The valve(s) tested travel(s) full stroke within the specified acceptable range. (step 7.1.1)</li> </ul> <p><b>STANDARD:</b></p> <p>a) Reviews the following:</p> <ul style="list-style-type: none"> <li>• Starts reviewing each section starting with section 6.2.</li> </ul> <p><b>EVALUATOR NOTES:</b></p> <ul style="list-style-type: none"> <li>• If asked, it is desired to perform this Review now.</li> </ul> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
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<p>STEP 2:     Reviews section 6.2, Testing 1-FW-MOV-151E, SG A AFW Flow Isol.</p> <p><b>STANDARD:</b></p> <p>a) Step 6.2.1: Cycle 1-FW-MOV-151E and verify full stroke. Record the time required to close <b>and</b> to open the MOV.</p> <ul style="list-style-type: none"> <li>• <b>*Identifies Close time is outside the Acceptable Range*. This is a critical task.</b></li> <li>• Identifies Open time within the Acceptable Range.</li> </ul> <p>b) Step 6.2.2: Return 1-FW-MOV-151E to position specified by Shift Supervision. Circle as left position.</p> <ul style="list-style-type: none"> <li>• Identifies OPEN circled.</li> <li>• Identifies Return to position correctly verified by initial in verification blank.</li> </ul> <p>c) Step 6.2.3: record the stopwatch SQC No. and Cal Due Date.</p> <ul style="list-style-type: none"> <li>• Identifies SQC No. and Cal Due Date blanks filled out appropriately.</li> </ul> <p><b>EVALUATOR NOTES: NONE</b></p> <ul style="list-style-type: none"> <li>• Acknowledge that 1-FW-MOV-151E Close time is outside the acceptable range. This may be done now or at step 7.1.2.</li> <li>• Have the Candidate continue with the PT review.</li> <li>• <b>If candidate asks for a CR #:</b> Respond as follows, "A CR will be generated."</li> </ul> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
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<p>STEP 3:     Reviews section 6.3, Testing 1-FW-MOV-151F, SG A AFW Flow Isol.</p> <p><b>STANDARD:</b></p> <p>a) Step 6.3.1: Cycle 1-FW-MOV-151F and verify full stroke. Record the time required to close <b>and</b> to open the MOV.</p> <ul style="list-style-type: none"> <li>Identifies Close and Open times within the Acceptable Range.</li> </ul> <p>b) Step 6.3.2: Return 1-FW-MOV-151F to position specified by Shift Supervision. Circle as left position.</p> <ul style="list-style-type: none"> <li>Identifies OPEN circled.</li> <li>Identifies Return to position correctly verified by initial in verification blank.</li> </ul> <p>c) Step 6.3.3: record the stopwatch SQC No. and Cal Due Date.</p> <ul style="list-style-type: none"> <li>Identifies SQC No. and Cal Due Date blanks filled out appropriately.</li> </ul> <p><b>EVALUATOR NOTES: NONE</b></p> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
<p>STEP 4:     Reviews section 6.4, Testing 1-FW-MOV-151C, SG B AFW Flow Isol.</p> <p><b>STANDARD:</b></p> <p>a) Step 6.4.1: Cycle 1-FW-MOV-151C and verify full stroke. Record the time required to close <b>and</b> to open the MOV.</p> <ul style="list-style-type: none"> <li><b>*Identifies Close and Open times are outside the Acceptable Range*. This is a critical task.</b></li> </ul> <p>b) Step 6.4.2: Return 1-FW-MOV-151C to position specified by Shift Supervision. Circle as left position.</p> <ul style="list-style-type: none"> <li>Identifies OPEN circled.</li> <li>Identifies Return to position correctly verified by initial in verification blank.</li> </ul> <p>c) Step 6.4.3: record the stopwatch SQC No. and Cal Due Date.</p> <ul style="list-style-type: none"> <li>Identifies SQC No. and Cal Due Date blanks filled out appropriately.</li> </ul> <p><b>EVALUATOR NOTES: NONE</b></p> <ul style="list-style-type: none"> <li>Acknowledge that return 1-FW-MOV-151C OPEN and CLOSE times are outside the acceptable range. This may be done now or at step 7.1.2.</li> <li>Have the Candidate continue with the PT review.</li> <li><b>If candidate asks for a CR #:</b> Respond as follows, "A CR will be generated."</li> </ul> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>

<p>STEP 5: Reviews section 6.5, Testing 1-FW-MOV-151D, SG B AFW Flow Isol.</p> <p><b>STANDARD:</b></p> <p>a) Step 6.5.1: Cycle 1-FW-MOV-151D and verify full stroke. Record the time required to close <b>and</b> to open the MOV.</p> <ul style="list-style-type: none"> <li>Identifies Close time is at the minimum limit and Open time is within the Acceptable Range.</li> </ul> <p>b) Step 6.5.2: Return 1-FW-MOV-151D to position specified by Shift Supervision. Circle as left position.</p> <ul style="list-style-type: none"> <li>Identifies OPEN circled.</li> <li>Identifies Return to position correctly verified by initial in verification blank.</li> </ul> <p>c) Step 6.5.3: record the stopwatch SQC No. and Cal Due Date.</p> <ul style="list-style-type: none"> <li>Identifies SQC No. and Cal Due Date blanks filled out appropriately.</li> </ul> <p><b>EVALUATOR NOTES:</b></p> <ul style="list-style-type: none"> <li>Acknowledge 1-FW-MOV-151D CLOSE time is at the minimum limit.</li> <li>Have the Candidate continue the PT Review.</li> <li><b>If candidate asks for a CR #:</b> Respond as follows, "A CR will be generated."</li> </ul> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
<p>STEP 6: Reviews section 6.6, Testing 1-FW-MOV-151A, SG C AFW Flow Isol.</p> <p><b>STANDARD:</b></p> <p>a) Step 6.6.1: Cycle 1-FW-MOV-151A and verify full stroke. Record the time required to close <b>and</b> to open the MOV.</p> <ul style="list-style-type: none"> <li>Identifies Close and Open times within the Acceptable Range.</li> </ul> <p>b) Step 6.6.2: Return 1-FW-MOV-151A to position specified by Shift Supervision. Circle as left position.</p> <ul style="list-style-type: none"> <li>Identifies OPEN circled.</li> <li>Identifies Return to position correctly verified by initial in verification blank.</li> </ul> <p>c) Step 6.6.3: record the stopwatch SQC No. and Cal Due Date.</p> <ul style="list-style-type: none"> <li>Identifies SQC No. is NOT filled in.</li> </ul> <p><b>EVALUATOR NOTES: NONE</b></p> <ul style="list-style-type: none"> <li>Acknowledge SQC No. is not filled in.</li> <li>Have the Candidate continue the PT Review.</li> <li><b>If candidate asks for a CR #:</b> Respond as follows, "A CR will be generated."</li> </ul> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>

<p>STEP 7:    Reviews section 6.7, Testing 1-FW-MOV-151B, SG C AFW Flow Isol.</p> <p><b>STANDARD:</b></p> <p>a) Step 6.7.1: Cycle 1-FW-MOV-151B and verify full stroke. Record the time required to close <b>and</b> to open the MOV.</p> <ul style="list-style-type: none"> <li>Identifies Close time is within the Acceptable range and Open time is at the upper limit.</li> </ul> <p>b) Step 6.7.2: Return 1-FW-MOV-151B to position specified by Shift Supervision. Circle as left position.</p> <ul style="list-style-type: none"> <li>Identifies OPEN circled.</li> <li>Identifies Return to position correctly verified by initial in verification blank.</li> </ul> <p>c) Step 6.7.3: record the stopwatch SQC No. and Cal Due Date.</p> <ul style="list-style-type: none"> <li>Identifies SQC No. and Cal Due Date blanks filled out appropriately.</li> </ul> <p><b>EVALUATOR NOTES:</b></p> <ul style="list-style-type: none"> <li>Acknowledge 1-FW-MOV-151B OPEN time is at the upper limit.</li> <li>Have the Candidate continue the PT Review</li> </ul> <p><b>COMMENTS:</b></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>
<p>STEP 8:    Reviews Section 7.1, Acceptance Criteria.</p> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>Initials Step 7.1.1.</li> <li>Notes check mark on step 7.1.2, Satisfactory results. <b>*Identifies that the test results are in fact Unsatisfactory. This is a critical task.</b></li> </ul> <p><b>EVALUATOR NOTES:</b></p> <p><b>Candidate may identify why test is unsat (1-FW-MOV-151E Close time; 1-FW-MOV-151C Open and Close time) at this time.</b></p> <p><b>COMMENTS:</b></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>



<p>STEP 9:      Reviews Section 7.2 Follow-On Tasks.</p> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>7.2.1) Identifies step 7.2.1 was filled out incorrectly as the test was unsatisfactory. <ul style="list-style-type: none"> <li>a) * <b>Identifies that the test was unsatisfactory.* This is a critical task.</b></li> <li>b) Notify System Engineer and record the name.</li> <li>c) Notify the IST Engineer and record the name.</li> <li>d) Initiate a Condition Report and Record the number.</li> </ul> </li> <li>N/A step 7.2.2.</li> <li>Initials 7.2.3.</li> </ul> <p><b>EVALUATOR NOTES:</b></p> <ul style="list-style-type: none"> <li><b>Operator identifies 1-FW-MOV-151E, and 1-FW-MOV-151C stroke times are outside acceptable range. The candidate may document reason or return the test for correction.</b></li> <li>Operator will probably also document: <ul style="list-style-type: none"> <li>1-FW-MOV-151D CLOSE time at lower limit.</li> <li>1-FW-MOV-151B OPEN time at upper limit.</li> </ul> </li> <li><b>If candidate asks for a CR #:</b> Respond as follows, "A CR will be generated."</li> <li>If Asked System Engineer: Jignesh Jain, and IST Engineer: John Rayno.</li> <li>Operator may hand back OPT with instructions that the RO must correctly perform step 7.2.1. This meets the intent of the step.</li> </ul> <p><b>COMMENTS:</b></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>
<p>STEP 10:      Reviews Section 7.3 Notification, Documentation, and Procedure Closeout.</p> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>Initial for Step 7.3.1.</li> <li>Initials/Prints Name in Table.</li> <li>Signature and date at bottom of page.</li> <li>Identifies that Operator comments needs to be filled out. Fills out (or directs RO to correctly fill out) Operator Comments section. Includes <b>1-FW-MOV-151E (Close time outside acceptable range), 1-FW-MOV-151C (Close and Open outside acceptable range), 1-FW-MOV-151D (Close time at lower limit), and 1-FW-MOV-151B (Open time at upper limit).</b></li> </ul> <p><b>EVALUATOR NOTES: NONE</b></p> <p>Operator may direct RO to correctly fill out section 7.2, and 7.3. This is acceptable.</p> <p><b>COMMENTS:</b></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>

STOP TIME: \_\_\_\_\_

**Notes:**

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**KEY**

The items that are critical are **bolded**.

**Step 6.2.1: Identifies Close time for 1-FW-MOV-151E is outside the Acceptable range.**

**Step 6.4.1: Identifies Close and Open times for 1-FW-MOV-151C are outside the Acceptable range.**

Step 6.5.1: Identifies Close time for 1-FW-MOV-151D is at the minimum limit. Engineering will need to be notified.

Step 6.6.3: Identifies SQC No. is missing for stop watch.

Step 6.7.1: Identifies Open time for 1-FW-MOV-151B is at the upper limit. Engineering will need to be notified.

**Step 7.1.2: Identifies that test results are Unsat.** Note this can be done during JPM debrief.

**Step 7.2.1: Identifies that step 7.2.1 needs to be performed as test is Unsat.**

Step 7.3: Identifies that step 7.3 needs to be annotated in the "Operator Comments" why the test was unsat.

Step 7.4: Candidate does not sign for Review until corrections are made.

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## 6.2 Testing 1-FW-MOV-151E, SG A AFW FLOW ISOL

**NOTE:** Full stroke time is the interval from switch actuation until the light that was LIT at switch actuation changes to NOT LIT.

6.2.1 Cycle 1-FW-MOV-151E and check full stroke. Record the time required to close and to open the MOV.

	Stroke Time	Reference	Acceptable Range
• 1-FW-MOV-151E	Close: <u>23.4</u>	20.1 sec	17.1 - 23.1 sec
	Open: <u>19.0</u>	20.3 sec	17.3 - 23.3 sec

6.2.2 Return 1-FW-MOV-151E to the position as specified by Shift Supervision. Circle as-left position.

OPEN/CLOSED

6.2.3 Record the stopwatch SQC No. and Cal Due Date.

SQC No.: 3704 Cal Due Date: 8/21/14

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### 6.3 Testing 1-FW-MOV-151F, SG A AFW FLOW ISOL

**NOTE:** Full stroke time is the interval from switch actuation until the light that was LIT at switch actuation changes to NOT LIT.

6.3.1 Cycle 1-FW-MOV-151F and check full stroke. Record the time required to close **and** to open the MOV.

Stroke Time	Reference	Acceptable Range
-------------	-----------	------------------

• 1-FW-MOV-151F	Close: <u>20.6</u>	20.5 sec	17.5 - 23.5 sec
	Open: <u>20.5</u>	21.0 sec	17.9 - 24.1 sec

6.3.2 Return 1-FW-MOV-151F to the position as specified by Shift Supervision Circle as-left position.

OPEN / CLOSED

6.3.3 Record the stopwatch SQC No. and Cal Due Date.

SQC No.: 3704 Cal Due Date: 8/21/14

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#### 6.4 Testing 1-FW-MOV-151C, SG B AFW FLOW ISOL

~~NOTE:~~ Full stroke time is the interval from switch actuation until the light that was LIT at switch actuation changes to NOT LIT.

6.4.1 Cycle 1-FW-MOV-151C and check full stroke. Record the time required to close **and** to open the MOV.

	Stroke Time	Reference	Acceptable Range
• 1-FW-MOV-151C	Close <u>24.0</u>	20.0 sec	17.0 - 23.0 sec
	Open <u>24.0</u>	20.1 sec	17.1 - 23.1 sec

6.4.2 Return 1-FW-MOV-151C to the position as specified by Shift Supervision. Circle as-left position.

OPEN CLOESD

6.4.3 Record the stopwatch SQC No. and Cal Due Date.

SQC No.: 3704 Cal Due Date: 8/21/14

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6.5 Testing 1-FW-MOV-151D, SG B AFW FLOW ISOL

~~NOTE~~: Full stroke time is the interval from switch actuation until the light that was LIT at switch actuation changes to NOT LIT.

6.5.1 Cycle 1-FW-MOV-151D and check full stroke. Record the time required to close **and** to open the MOV.

	Stroke Time	Reference	Acceptable Range
• 1-FW-MOV-151D	Close: <u>16.1</u>	18.9 sec	16.1 - 21.7 sec
	Open: <u>19.0</u>	19.8 sec	16.9 - 22.7 sec

6.5.2 Return 1-FW-MOV-151D to the position as specified by Shift Supervision.  
Circle as-left position.

OPEN / CLOSED

6.5.3 Record the stopwatch SQC No. and Cal Due Date.

SQC No.: 3704 Cal Due Date: 8/21/14

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# 6.6 Testing 1-FW-MOV-151A, SG C AFW FLOW ISOL

**NOTE:** Full stroke time is the interval from switch actuation until the light that was LIT at switch actuation changes to NOT LIT.

6.6.1 Cycle 1-FW-MOV-151A and check full stroke. Record the time required to close **and** to open the MOV.

	Stroke Time	Reference	Acceptable Range
• 1-FW-MOV-151A	Close: <u>19.2</u>	20.6 sec	17.6 - 23.6 sec
	Open: <u>19.3</u>	20.8 sec	17.7 - 23.9 sec

6.6.2 Return 1-FW-MOV-151A to the position as specified by Shift Supervision.  
Circle as-left position.

OPEN CLOS

6.6.3 Record the stopwatch SQC No. and Cal Due Date.

SQC No.: \_\_\_\_\_ Cal Due Date: 8/21/14



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6.7 Testing 1-FW-MOV-151B, SG C AFW FLOW ISOL

**NOTE:** Full stroke time is the interval from switch actuation until the light that was LIT at switch actuation changes to NOT LIT.

6.7.1 Cycle 1-FW-MOV-151B and check full stroke. Record the time required to close **and** to open the MOV.

Stroke Time	Reference	Acceptable Range
-------------	-----------	------------------

• 1-FW-MOV-151B	Close: <u>20.6</u>	20.7 sec	17.6 - 23.8 sec
	Open: <u>23.9</u>	20.8 sec	17.7 - 23.9 sec

6.7.2 Return 1-FW-MOV-151B to the position as specified by Shift Supervision. Circle as-left position.

OPEN CLOSED

6.7.3 Record the stopwatch SQC No. and Cal Due Date.

SQC No.: 3704 Cal Due Date: 8/21/14

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## 7.0 FOLLOW-ON

### 7.1 Acceptance Criteria

7.1.1 Evaluate the test results by reviewing the Acceptance Criteria for the components tested.

- The valve(s) tested travel(s) full stroke within the specified acceptable range.

7.1.2 Document the test results. (✓)

☒ Satisfactory

☐ Unsatisfactory

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## 7.2 Follow-On Tasks

7.2.1 IF the test was satisfactory, THEN enter N/A in the following substeps.

IF the test was unsatisfactory, THEN do the following:

a. Document the reason for the unsatisfactory test in Operator Comments.

b. Notify the System Engineer and record the name.

System Engineer: \_\_\_\_\_

c. Notify the IST Engineer and record the name.

IST Engineer: \_\_\_\_\_

d. Initiate a Condition Report and record the number.

CR No. \_\_\_\_\_

7.2.2 IF a partial operability test was done, THEN document the reason for the partial test in Operator Comments. IF a full test was done, THEN enter N/A.

7.2.3 Check that an entry has been made or make an entry in the Measuring and Test Equipment Usage Log for each SQC device used in this procedure.

N/A



✓

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### 7.3 Notification, Documentation, and Procedure Closeout

**7.3.1 Notify Unit 1 Shift Supervision that the test is complete.**

**The Initials in this procedure will be identified by the Printed Name.**

Initials	Printed Name
8	I. M. Strong
xx	J. Doe

Operator Comments: \_\_\_\_\_

Completed by: \_\_\_\_\_

Date: Today

**EVALUATOR'S REFERENCE COPY  
Operator Directions Handout  
(TO BE READ TO APPLICANT BY EXAMINER)**

**Initial Conditions:**

- Unit 1 at 100% power.

**Initiating Cues**

- 1-OPT-FW-006 has been completed by another operator earlier in the shift.
- You are to perform the supervisory review of 1-OPT-FW-006 by completing step 7.4.
- Document any issues identified during your review in accordance with the requirements of the OPT.
- When you have completed the review of 1-OPT-FW-006, inform your examiner.

**Operator Directions Handout  
(TO BE GIVEN TO APPLICANT)**

**Initial Conditions:**

- Unit 1 at 100% power.

**Initiating Cues**

- 1-OPT-FW-006 has been completed by another operator earlier in the shift.
- You are to perform the supervisory review of 1-OPT-FW-006 by completing step 7.4.
- Document any issues identified during your review in accordance with the requirements of the OPT.
- When you have completed the review of 1-OPT-FW-006, inform your examiner.

U.S. Nuclear Regulatory Commission  
Surry Power Station

SR17301  
**Administrative** Job Performance Measure G2.4.39  
**TIME CRITICAL**

Applicant \_\_\_\_\_

Start Time \_\_\_\_\_

Examiner \_\_\_\_\_

Date \_\_\_\_\_

Stop Time \_\_\_\_\_

**Title****Complete EPIP-2.01****K/A: G2.4.40 - Knowledge of SRO responsibilities in emergency plan implementation. (2.7/4.5)****Applicability****Estimated Time****Actual Time**SRO only.

15 Minutes

\_\_\_\_\_ Minutes

**Conditions**

- Task is to be PERFORMED in the classroom.

**Standards**

- EPIP-2.01, Report of Emergency to State and Local Governments, Attachment 2 reviewed and errors identified.

**Initiating Cues**

- EPIP-2.01, Report of Emergency to State and Local Governments.

**Terminating Cues**

- Reviewed ROE and determined errors that need to be fixed before transmitting.

**Procedures**

- EPIP-2.01, Notification of State and Local Governments, Rev. 44.

**Tools and Equipment**

- None

**Safety Considerations**

- None

**Initial Conditions**

- **This JPM is Time Critical.**
- You are the Station Emergency Manager (SEM). At 1026 today (11-1-17), an earthquake was felt and verified by the National Earthquake Information Center. At 1030 today you declared a NOUE HU 1.1.

**Initiating Cues**

- MET Data has been obtained and verified.
- There are no releases in progress, and site access is available.
- Review EPIP-2.01 Attachment 2, Report of Emergency to State and Local Governments, for accuracy and sign for approval.
- When you finish the actions necessary to accomplish this task, please inform me.

**Notes**



**Notes to the Evaluator**

- **This JPM is Time Critical-15 minutes.** Time starts from the JPM start time until the candidate announces he has completed his review.
- Task critical elements are bolded and denoted by an asterisk (\*).
- Critical step sequencing requirements: Steps 4 and 5 before Step 6.
- **Role play as the Emergency Communicator.**
- **Time declared for the ALERT will be the JPM start time. Use TODAY'S date.**

**START TIME:** \_\_\_\_\_:

<p><b>STEP 1:</b></p> <p>REVIEWS INFORMATION ON REPORT OF EMERGENCY TO STATE AND LOCAL GOVERNMENTS (ATTACHMENT 2). (<i>Step 4</i>)</p> <p><b>STANDARD:</b></p> <ul style="list-style-type: none"> <li>a) Checks ROE message #1 recorded on ROE.</li> <li>b) Message type: * <b>Identifies that box for Drill termination checked.</b></li> <li>c) Item 1, Emergency Classification: * <b>Identifies that <u>Wrong Box (Alert)</u> is checked.</b></li> <li>d) Item 2, MET Data: * <b>Identifies that box for On-Site Measurements is not checked.</b></li> <li>e) Item 3, Release of Radioactive Material: * <b>Identifies Wrong box (B) is checked instead of Box A.</b></li> <li>f) Item 4, Site Access: Available block is checked.</li> <li>g) Item 5, Protective Action Recommendation: * <b>Identifies that Item 5 is left blank.</b></li> <li>h) Item 6, Update Schedule: 60 minutes recommended block is not checked.</li> <li>i) Items 7-11, "Excluded from message" blocks are checked.</li> </ul> <p><b>EVALUATOR'S NOTE:</b></p> <ul style="list-style-type: none"> <li>• <b>If asked for any other information:</b> Respond, "All the information you need has been provided."</li> <li>• <b>If asked to make correction to ROE:</b> Respond, "Continue the review and identify if there are any other errors."</li> </ul> <p><b>COMMENTS:</b></p>	<p>_____ <b>SAT</b></p> <p>_____ <b>UNSAT</b></p>
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<p><b>STEP 6:</b></p> <p>SEM APPROVES REPORT. (<i>Step 5</i>)</p> <p><b>STANDARD:</b></p> <p>SEM reviews and does <b>NOT</b> approve the report, and does one of the following:</p> <ul style="list-style-type: none"> <li>▪ Identifies all errors and turns ROE back in for correction. OR</li> <li>▪ Identifies all errors and makes corrections.</li> </ul> <p><b>EVALUATOR'S NOTE:</b></p> <ul style="list-style-type: none"> <li>• A copy of Attachment 2 (before SEM approves) is included at end of JPM.</li> </ul> <p><b>COMMENTS:</b></p>	<p>_____ SAT</p> <p>_____ UNSAT</p>
<p style="text-align: center;">** JPM COMPLETE **</p>	

**STOP TIME:** \_\_\_\_\_

Comments:

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

**Key**

The following items need to be identified:

- 1) **The “Drill Termination” box was checked.** The “Drill Message” box should have been checked.
- 2) **In Item 1, The Alert box was checked.** The NOUE box should have been checked.
- 3) **In Item 2, No check marks.** Should have checked “On-site measurements.”
- 4) **In Item 3, the wrong box (B) was checked.** The (A) box, “No radiological release” should have been checked.
- 5) **In Item 5, no box was checked.** The “is not required” box should have been checked.

NUMBER EPIP-2.01	ATTACHMENT TITLE REPORT OF EMERGENCY TO STATE AND LOCAL GOVERNMENTS	ATTACHMENT 2
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REPORT OF EMERGENCY TO STATE AND LOCAL GOVERNMENTS	
ROE MESSAGE # <u>1</u>	APPROVAL: _____ (Station Emergency Manager or Recovery Manager)
ATTENTION ALL STATIONS. This is Surry Power Station. Standby for a(n) <input type="checkbox"/> Drill Message <input type="checkbox"/> Emergency Message <input checked="" type="checkbox"/> Drill Termination Message <input type="checkbox"/> Emergency Termination Message. Use the Report of Emergency form to copy message. (READ SLOWLY)	
Item 1. EMERGENCY CLASSIFICATION: <input type="checkbox"/> NOUE <input checked="" type="checkbox"/> Alert <input type="checkbox"/> Site Area Emergency <input type="checkbox"/> General Emergency	
In accordance with EAL <u>H U 1 . 1</u> Declared at <u>1030</u> (24-hr time) on <u>11-1-17</u> (date). This is (name) <u>John Wayne</u> / Emergency Communicator.	
Please acknowledge receipt of this message: (Conduct roll-call and check boxes as each party answers.) <input type="checkbox"/> VA EOC <input type="checkbox"/> Surry County <input type="checkbox"/> Isle of Wight County <input type="checkbox"/> James City County <input type="checkbox"/> Williamsburg <input type="checkbox"/> Newport News <input type="checkbox"/> York County	
Notification completed at _____ (24-hr time) on _____ (date).	
Item 2. METEOROLOGICAL DATA: Based on: <input checked="" type="checkbox"/> On-site Measurements <input type="checkbox"/> Off-site Measurements <input type="checkbox"/> Not Available Time: <u>1035</u> (24-hr time) AVE Wind Speed <u>10</u> mph; AVE Wind Direction from <u>280</u> degrees (0° to 360°)	
Item 3. RELEASE OF RADIOACTIVE MATERIAL: Routine releases ongoing due to plant operations. Additional radiological releases associated with the event: <input checked="" type="checkbox"/> A. No radiological release. Will NOT transmit Report of Radiological Conditions to Virginia EOC. <input type="checkbox"/> B. Radiological release in progress. Will transmit Report of Radiological Conditions to Virginia EOC. <input type="checkbox"/> C. Radiological release now terminated. Will transmit Report of Radiological Conditions to Virginia EOC. <input type="checkbox"/> D. Radiological release projected to occur. Will transmit Report of Radiological Conditions to Virginia EOC.	
Item 4. SITE ACCESS: <input checked="" type="checkbox"/> Available <input type="checkbox"/> Not Available	
Item 5. PROTECTIVE ACTION RECOMMENDATION: <input type="checkbox"/> is NOT required <input type="checkbox"/> will be transmitted to VEOC <input type="checkbox"/> has been transmitted to VEOC.	
Item 6. UPDATE SCHEDULE: <input type="checkbox"/> 60 minutes (recommended); <input type="checkbox"/> 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: <input checked="" type="checkbox"/> Excluded from message <input type="checkbox"/> None <input type="checkbox"/> Station emergency personnel called in <input type="checkbox"/> Station monitoring teams dispatched off-site <input type="checkbox"/> Other _____	
Item 8. EVACUATION OR COMPANY DISMISSAL OF SITE PERSONNEL: <input checked="" type="checkbox"/> Excluded from message <input type="checkbox"/> No <input type="checkbox"/> Evacuation to Primary Remote Assembly Area: <input type="checkbox"/> Planned <input type="checkbox"/> In progress <input type="checkbox"/> Completed <input type="checkbox"/> Released from RAA <input type="checkbox"/> Evacuation to Secondary Remote Assembly Area: <input type="checkbox"/> Planned <input type="checkbox"/> In progress <input type="checkbox"/> Completed <input type="checkbox"/> Released from RAA <input type="checkbox"/> Company Dismissal: <input type="checkbox"/> Planned <input type="checkbox"/> In progress <input type="checkbox"/> Completed <input type="checkbox"/> Other _____	
Item 9. PROGNOSIS OF SITUATION SINCE LAST REPORT: <input checked="" type="checkbox"/> Excluded from message <input type="checkbox"/> Stable <input type="checkbox"/> Worsening <input type="checkbox"/> Improving <input type="checkbox"/> Other _____	
Item 10. ASSISTANCE REQUESTED OR BEING PROVIDED: <input checked="" type="checkbox"/> Excluded from message <input type="checkbox"/> None ____ (#) Fire Units from _____ (#) Police Units from _____ ____ (#) Rescue Units from _____ (#) Other _____	
Item 11. ADDITIONAL INFORMATION (Do not use abbreviations, mark numbers or acronyms.): <input checked="" type="checkbox"/> 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.) <input type="checkbox"/> VA EOC <input type="checkbox"/> Surry County <input type="checkbox"/> Isle of Wight County <input type="checkbox"/> James City County <input type="checkbox"/> Williamsburg <input type="checkbox"/> Newport News <input type="checkbox"/> York County This is Surry Power Station out at _____ (24-hr time) on _____ (date).	

Form No. 730850(Mar 2014)

**Operator Directions Handout  
(TO BE READ TO APPLICANT BY EXAMINER)**

**Initial Conditions**

- **This JPM is Time Critical.**
- You are the Station Emergency Manager (SEM). At 1026 today (11-1-17), an earthquake was felt and verified by the National Earthquake Information Center. At 1030 today you declared a NOUE HU 1.1.

**Initiating Cues**

- There are no releases in progress, and site access is available.
- Review EPIP-2.01 Attachment 2, Report of Emergency to State and Local Governments, and sign for approval.
- When you finish the actions necessary to accomplish this task, please inform me.

**Operator Directions Handout  
(TO BE GIVEN TO APPLICANT)**

**Initial Conditions**

- **This JPM is Time Critical.**
- You are the Station Emergency Manager (SEM). At 1026 today (11-1-17), an earthquake was felt and verified by the National Earthquake Information Center. At 1030 today you declared a NOUE HU 1.1.

**Initiating Cues**

- MET Data has been obtained and verified.
- There are no releases in progress, and site access is available.
- Review EPIP-2.01 Attachment 2, Report of Emergency to State and Local Governments, and sign for approval.
- When you finish the actions necessary to accomplish this task, please inform me.

NUMBER EPIP-2.01	ATTACHMENT TITLE REPORT OF EMERGENCY TO STATE AND LOCAL GOVERNMENTS	ATTACHMENT 2
REVISION 44		PAGE 1 of 1

REPORT OF EMERGENCY TO STATE AND LOCAL GOVERNMENTS	
ROE MESSAGE # <u>1</u>	APPROVAL: _____ (Station Emergency Manager or Recovery Manager)
<b>ATTENTION ALL STATIONS.</b> This is Surry Power Station. Standby for a(n) <input type="checkbox"/> Drill Message <input type="checkbox"/> Emergency Message <input checked="" type="checkbox"/> Drill Termination Message <input type="checkbox"/> Emergency Termination Message. Use the Report of Emergency form to copy message. (READ SLOWLY)	
<b>Item 1. EMERGENCY CLASSIFICATION:</b> <input type="checkbox"/> NOUE <input checked="" type="checkbox"/> Alert <input type="checkbox"/> Site Area Emergency <input type="checkbox"/> General Emergency In accordance with EAL <u>H U I . I</u> Declared at <u>1030</u> (24-hr time) on <u>11-1-17</u> (date). This is (name) <u>John Wayne</u> / Emergency Communicator. Please acknowledge receipt of this message: (Conduct roll-call and check boxes as each party answers.) <input type="checkbox"/> VA EOC <input type="checkbox"/> Surry County <input type="checkbox"/> Isle of Wight County <input type="checkbox"/> James City County <input type="checkbox"/> Williamsburg <input type="checkbox"/> Newport News <input type="checkbox"/> York County Notification completed at _____ (24-hr time) on _____ (date).	
<b>Item 2. METEOROLOGICAL DATA:</b> Based on: <input type="checkbox"/> On-site Measurements <input type="checkbox"/> Off-site Measurements <input type="checkbox"/> Not Available Time: <u>1035</u> AVE Wind Speed <u>10</u> mph; AVE Wind Direction from <u>280</u> degrees (0° to 360°) (24-hr time)	
<b>Item 3. RELEASE OF RADIOACTIVE MATERIAL:</b> Routine releases ongoing due to plant operations. Additional radiological releases associated with the event: <input type="checkbox"/> A. No radiological release. Will NOT transmit Report of Radiological Conditions to Virginia EOC. <input checked="" type="checkbox"/> B. Radiological release in progress. Will transmit Report of Radiological Conditions to Virginia EOC. <input type="checkbox"/> C. Radiological release now terminated. Will transmit Report of Radiological Conditions to Virginia EOC. <input type="checkbox"/> D. Radiological release projected to occur. Will transmit Report of Radiological Conditions to Virginia EOC.	
<b>Item 4. SITE ACCESS:</b> <input checked="" type="checkbox"/> Available <input type="checkbox"/> Not Available	
<b>Item 5. PROTECTIVE ACTION RECOMMENDATION:</b> <input type="checkbox"/> is NOT required <input type="checkbox"/> will be transmitted to VEOC <input type="checkbox"/> has been transmitted to VEOC.	
<b>Item 6. UPDATE SCHEDULE:</b> <input checked="" type="checkbox"/> 60 minutes (recommended); <input type="checkbox"/> Other _____; EOC Watch Officer: _____	
<b>NOTE:</b> 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.	
<b>Item 7. EMERGENCY RESPONSE ACTIONS UNDERWAY:</b> <input checked="" type="checkbox"/> Excluded from message <input type="checkbox"/> None <input type="checkbox"/> Station emergency personnel called in <input type="checkbox"/> Station monitoring teams dispatched off-site <input type="checkbox"/> Other _____	
<b>Item 8. EVACUATION OR COMPANY DISMISSAL OF SITE PERSONNEL:</b> <input checked="" type="checkbox"/> Excluded from message <input type="checkbox"/> No <input type="checkbox"/> Evacuation to Primary Remote Assembly Area: <input type="checkbox"/> Planned <input type="checkbox"/> In progress <input type="checkbox"/> Completed <input type="checkbox"/> Released from RAA <input type="checkbox"/> Evacuation to Secondary Remote Assembly Area: <input type="checkbox"/> Planned <input type="checkbox"/> In progress <input type="checkbox"/> Completed <input type="checkbox"/> Released from RAA <input type="checkbox"/> Company Dismissal: <input type="checkbox"/> Planned <input type="checkbox"/> In progress <input type="checkbox"/> Completed <input type="checkbox"/> Other _____	
<b>Item 9. PROGNOSIS OF SITUATION SINCE LAST REPORT:</b> <input checked="" type="checkbox"/> Excluded from message <input type="checkbox"/> Stable <input type="checkbox"/> Worsening <input type="checkbox"/> Improving <input type="checkbox"/> Other _____	
<b>Item 10. ASSISTANCE REQUESTED OR BEING PROVIDED:</b> <input checked="" type="checkbox"/> Excluded from message <input type="checkbox"/> None _____ (#) Fire Units from _____ (#) Police Units from _____ _____ (#) Rescue Units from _____ (#) Other _____	
<b>Item 11. ADDITIONAL INFORMATION (Do not use abbreviations, mark numbers or acronyms.):</b> <input checked="" type="checkbox"/> Excluded from message _____ _____	
This is Surry Power Station out at _____ (24-hr time) on _____ (date).	
<b>Item 12. TERMINATION INFORMATION (Complete ONLY for termination message):</b> Event Terminated at: _____ (24-hr time) on _____ (date). Please acknowledge receipt of this message: (Conduct roll-call and check boxes as each party answers.) <input type="checkbox"/> VA EOC <input type="checkbox"/> Surry County <input type="checkbox"/> Isle of Wight County <input type="checkbox"/> James City County <input type="checkbox"/> Williamsburg <input type="checkbox"/> Newport News <input type="checkbox"/> York County This is Surry Power Station out at _____ (24-hr time) on _____ (date).	