

Facility: Surry Scenario No.: 1Op-Test No.: 2009-301

Examiners: _____ Operators: _____

Initial Conditions: Unit 1 is at 100% power and has been since the last refueling outage. All systems and crossties are operable with the following exception:

- 1-FW-P-2, Turbine Driven Auxiliary Feedwater Pump, is tagged out for governor valve maintenance. 62 hours remain in the 72-hour Technical Specification 3.6.F.1 Clock.

Turnover:

Maintain Unit 1 at 100% power and prepare for the return to service of 1-FW-P-2 by the end of your shift. The current PSA analysis for plant conditions is green on both units.

Event No.	Malf. No.	Event Type*	Event Description
1	TBD	I – RO/SRO TS - SRO	Selected pressurizer level channel fails high requiring manual control of charging.
2	TBD	I – BOP/SRO TS - SRO	Selected steam flow channel ('B' SG) requiring manual control of 'B' MFRV.
3	TBD	C – All	Loss of Isophase Bus Duct Cooling Fan, resulting in a ramp to 78% power at one percent per minute.
4	TBD	M – All C – RO/SRO	Main Generator Trip, which should result in an automatic turbine and reactor trip. The reactor trip is complicated by a failure of the reactor to automatically trip. Manual action by the RO will be required.
5	TBD	M – All C – BOP/SRO	Small Break Loss of Coolant Accident outside of containment (ECA-1.2). The safety injection is complicated by a failure of two Phase 1 isolation valves to automatically close.
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS) Technical Specifications			

Surry 2009-301 Scenario #1**Event 1**

The selected pressurizer level channel fails high. The RO should perform the immediate actions of 0-AP-53.00 (Loss of Vital Instrumentation / Controls) and take manual control of charging. The SRO should enter AP-53.00 and direct the RO to restore pressurizer level to normal and de-select the failed channel.

Verifiable Action: (RO) Take manual control of charging (pressurizer level control).

Technical Specification:

- Table 3.7-1 item 9 OA #7 (place channel in trip within 72 hours).

Event 2

1-MS-FT-MS-1484 fails high causing 'B' MFRV to open and 'B' SG level to go up. The BOP should take manual control of 'B' MFRV. The SRO should enter 0-AP-53.00 (Loss of Vital Instrumentation / Controls) and direct the BOP to select redundant steam flow channel and return 'B' MFRV to automatic.

Verifiable Action: (BOP) Take manual control of 'B' MFRV.

Technical Specifications:

- Table 3.7-1 item 17 OA #6 (place channel in trip within 72 hours)
- Table 3.7-2 item 1.e.1 OA #20 (place channel in trip within 72 hours)
- Table 3.7-3 item 2.a (see table 3.7-2 for operability requirements)

Event 3

The 'A' Isophase bus duct-cooling fan will trip and will not be able to be re-started. In accordance with the ARP, the team will ramp the unit to 78% power at 1%/minute and then continue to ramp at the normal ramp rate until generator amps are less than 14250. The SRO will implement 0-AP-23.00, Rapid Load Reduction.

Verifiable Actions: (RO) Utilize the control rods and boric acid during the ramp.
(BOP) Will operate the turbine during the load decrease.

Event 4

A main generator lockout will occur which will be complicated by a failure of the reactor to automatically trip. The team will initiate the actions of 1-E-0, Reactor Trip or Safety Injection.

Verifiable Actions: (RO) Manually trip the reactor.

Critical Task: [WOG E-0—A] Manually trip the reactor within 1 minute of a valid reactor trip demand signal.

Actions required to accomplish:

- Depress either reactor trip pushbutton

Event 5

A Small Break Loss of Coolant Accident outside of containment (ECA-1.2) will initiate and the team should respond by initiating AP-16.00 (RCS Leakage) and manually initiating safety injection. The team will perform 1-E-0 and transition to 1-ECA-1.2 (LOCA Outside Containment). The leak will be isolated by the actions of the ECA, and the team will exit to 1-E-1 (Loss of Reactor or Secondary Coolant).

The safety injection is complicated by a failure of two Phase 1 isolation valves to automatically close.

Verifiable Actions: (RO) Manually initiates safety injection.
(RO) Isolate leakage in accordance with ECA-1.2
(BOP) Secures either LHSI pump
(BOP) Closes 1-CV-TV-150A and 1-CV-TV-150C

Critical Task: [WOG E-1—C] Trip all RCPs within 5 minutes of reaching RCP Trip and Miniflow recirc criteria (KOA).

Actions required to accomplish:

- Trip 1-RC-P-1A
- Trip 1-RC-P-1B
- Trip 1-RC-P-1C

Critical Task: [WOG ECA-1.2 —A] Isolate the LOCA outside containment prior to actuation of RMT AND before transition out of ECA-1.2.

Actions required to accomplish:

- Close 1-SI-MOV-1890C

Initial Conditions:	100% Power IC, MOL – Cycle 23. The unit has been at 100% power since the last refueling outage.		
Pre-load malfunctions: <ul style="list-style-type: none"> ○ Disable automatic reactor trips ○ Disable auto close feature of 1-CH-MOV-1381 ○ Disable auto close feature of 1-CV-TV-150A and 1-CV-TV-150C 			
Equipment Status/ Procedures/ Alignments/ Data Sheets/ etc.: <ul style="list-style-type: none"> ○ 1-FW-P-2 tagged out for planned maintenance 			
Turnover: Maintain full power operation. Unit 2 is at 100% power with all systems operable. All systems and crossties are operable with the following exceptions: <ul style="list-style-type: none"> • 1-FW-P-2 is tagged out for governor valve replacement- 62 hours remain in the 72 hour T.S. 3.6 clock. 			
Event	Malf. #'s	Severity	Instructor Notes and Required Feedback
1	RC4903	N/A	Pressurizer level channel III fails high, resulting in manual control of charging.
2	MS0803	N/A	“B” Steam generator steam flow transmitter 1-MS-FT-484 fails low resulting in manual control of feedwater to “B” steam generator.
3	GL0101	N/A	Loss of Isolated Phase Bus Duct Cooling resulting in rapid load reduction.
4	EL02	N/A	Main Generator Lockout Trip resulting in turbine trip, but failure of the reactor to trip.
5	Various	N/A	LOCA outside containment in safeguards valve pit area.
END			After transition out of 1-ECA-1.2 (LOCA Outside Containment)

SHIFT TURNOVER INFORMATION

OPERATING PLAN:

- The Unit has been at 100% power since the last refueling outage.
- 1-FW-P-2 is tagged out for governor valve replacement- 62 hours remain in the 72 hour T.S. 3.6 clock. Pump is expected to return to service in 40 hours.
- Unit 2 is at 100% Power with all systems and crossties operable.
- Maintain full power operation.

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Event Description: Pressurizer level channel III fails high.

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"> • 1C-C8 PRZR HI LVL HTRS ON • 1E-H3 RX TRIP CH 1 PRZR HI LVL <p>Indications:</p> <ul style="list-style-type: none"> • Charging flow will decrease • VCT level will increase • Pressurizer level (CH 1 and CH 2) will decrease • All pressurizer heaters will energize <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-FV-1122 in manual and raising flow to maintain program level (per AP-53.00).</p>
	SRO	Enters 0-AP-53.00, Loss of Vital Instrumentation / Controls.
	RO	<p>[1] VERIFY REDUNDANT INSTRUMENT CHANNEL(S) INDICATION - NORMAL</p> <p>Verifies 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>Places 1-CH-FCV-1122 in manual and raises charging flow.</p>

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Event Description: Pressurizer level channel III fails high.

Cue: By Examiner.

	SRO	<p>The team will hold a transient brief. During the brief the failure of 1-RC-LI-1461 will be discussed.</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>
	RO	<p>3. VERIFY REACTOR POWER – LESS THAN OR EQUAL TO 100%.</p> <p>RO will identify that reactor power is less than 100%.</p>
	<p>SRO</p> <p>RO</p>	<p>NOTE:</p> <ul style="list-style-type: none"> Step 4 failures are listed in order of performance priority. Only the failed instrument/control and associated step number should be read aloud. When the affected instrument/controller malfunction(s) has been addressed by this procedure, recovery actions should continue at Step 14. <p>*4 DETERMINE THE FAILED INSTRUMENT / CONTROL AND GO TO APPROPRIATE STEP.</p> <ul style="list-style-type: none"> PRZR Level Control, Step 12 <p>The RO will identify that 1-RC-LI-1461 has failed high.</p>
	RO	<p>12. CHECK PRZR LEVEL CONTROL CHANNELS - NORMAL</p> <p>a) Check PRZR LVL Instrumentation - NORMAL</p> <p>Determines Channel III Pressurizer Level indication has failed.</p>

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Event Description: Pressurizer level channel III fails high.

Cue: By Examiner.

		RNO Step 12.a:
	RO	<p>Do the following:</p> <p>1) Place either of the following in MANUAL:</p> <ul style="list-style-type: none"> • 1-CH-FC-1122C, CHG FLOW CNTRL or • 1-CH-LC-1459G, PRZR LEVEL CNTRL <p>Verifies 1-CH-FCV-1122 is in manual control.</p>
	RO	<p>2) Control PRZR level at program level.</p> <p>Controls pressurizer level at program (~53%), a band may be given.</p>
	RO	<p>3) Move PRZR LVL –CH SEL switch to defeat the failed channel.</p> <p>Moves the pressurizer level channel selector switch to defeat the Channel III input into the level control system (position 1).</p>
	RO	<p>4) Verify or place recorder 1-RC-LR-1459 on an operable channel.</p> <p>Determines that recorder is trending an operable channel and no changes required.</p>
	SRO	<p>5) Refer to Tech Spec 3.1.A.5 (if Pressurizer heaters de-energized), Table 3.7-1 Item 9, and Table 3.7-6 Item 13.</p> <p>SRO determines that TS Table 3.7.1, Item 9 is applicable (72-hours to place the channel in trip). SRO determines that 3.1.A.5 is not applicable since pressurizer heaters did not deenergize and that Table 3.7-6 is met.</p>
	SRO	<p>6) Refer to Attachment 3.</p> <p><i>Evaluator Note: This ends the RNO actions and procedure continues at step 12b</i></p>
	RO	b) Verify Pressurizer Heaters – ENERGIZED.
	RO	c) Check letdown – IN SERVICE
	RO	d) Check PRZR level control – IN AUTOMATIC
	SRO	Determines that PRZR level control is in MANUAL and goes to RNO column

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Event Description: Pressurizer level channel III fails high.

Cue: By Examiner.

	RO	<p>12d- RNO –</p> <p>1) Verify PRZR level restored to program</p> <p>Verifies or restores pressurizer level to program band (~53%)</p> <p>2) Unsaturate 1-CH-LC-1459G, PRZR LEVEL CNTRL, as required.</p> <p>RO may place 1-CH-LC-1459G in manual, adjust demand, and return the controller to automatic to unsaturate the controller.</p> <p>3) Return 1-CH-FCV-1122 to AUTOMATIC by verifying or placing the following in AUTOMATIC:</p> <ul style="list-style-type: none"> • 1-CH-FCV-1122, CHG FLOW CNTRL or • 1-CH-LC-1459G, PRZR LEVEL CNTRL <p>Verifies or places 1-CH-LC-1459G and 1-CH-LCV-1122 in automatic control.</p>
	SRO	<p>14. Review ()-OPT-RX-001, reactor power calorimetric using PCS computer program, to determine operability of calorimetric and need to perform ()-OPT-RX-007,</p> <p>SRO/RO determines that OPT-RX-001 is not impacted and OPT-RX-007 will not need to be performed.</p>
	SRO	<p>15. CHECK FAILED INSTRUMENT - IS A REGULATORY GUIDE 1.97 VARIABLE</p> <p><i>SRO directs STA to review Reg. Guide 1.97. The STA will report that 1-RC-LR-1461 is a Reg. Guide 1.97 component.</i></p>
	SRO	<p>16. REVIEW CEP 99-0029, REG GUIDE 1.97 OPERABILITY, REPORTABILITY, AND ALTERNATE INDICATIONS</p> <p><i>SRO directs STA to review CEP 99-0029. The STA will report that the Reg. Guide 1.97 only requires two channels of pressurizer level control and refers the SRO to TS Table 3.7-6.</i></p>

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Event Description: Pressurizer level channel III fails high.

Cue: By Examiner.

	SRO	<p>17. Review the following:</p> <ul style="list-style-type: none">• TS 3.7• VPAP-2802• TRM Section 3.3, Instrumentation <p>SRO determines that TS Table 3.7.1, Item 9 is applicable (72-hours to place the channel in trip). SRO determines that 3.1.A.5 is not applicable since pressurizer heaters did not deenergize and that Table 3.7-6 is met.</p> <p><i>SRO directs STA to review VPAP-2802 and TRM Section 3.3. The STA reports that he has completed his reviews; VPAP-2802 is not impacted, but the TRM is impacted. The STA reports that a 14-day clock to establish a fire watch and a 60-day return to service clock is in effect.</i></p>
	SRO	<p>18. CHECK ADDITIONAL INSTRUMENT / CONTROLLER MALFUNCTION - EXISTS</p> <p>The team will identify that no additional failures exist, proceed to the RNO section, and this will direct the team to Step 20.</p>
	SRO	<p>20. PROVIDE NOTIFICATIONS AS NECESSARY:</p> <ul style="list-style-type: none">• Shift Supervision• OMOC• STA (PRA determination)• I&C <p>- END -</p>

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Event Description: "B" Steam Generator controlling Steam Flow channel failure.

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
	BOP	<p>Diagnoses failure 1-MS-FT-1484 with the following indications/alarms:</p> <p>Alarms:</p> <ul style="list-style-type: none"> 1H-E6 STM GEN 1B FW> < STM FLOW 1F-D8 STM GEN 1B CH 4 FW<STM FLOW 1H-G6 STM GEN 1B LVL ERROR <p>Indications:</p> <ul style="list-style-type: none"> Step decrease in 1B SG Steam Flow indication CH-III Decreasing feedwater flow to B SG
	SRO	Enters 0-AP-53.00 LOSS OF VITAL INSTRUMENTATION / CONTROLS
	BOP	<p>[1] VERIFY REDUNDANT INSTRUMENT CHANNEL(S) INDICATION - NORMAL</p> <p>BOP identifies Channel IV indication for steam flow is NORMAL.</p>
	BOP	<p>[2] PLACE AFFECTED CONTROL(S)/COMPONENT(S) IN MANUAL CONTROL AND STABILIZE PARAMETER USING REDUNDANT INDICATION</p> <p>BOP takes manual control of 'B' SG feed reg valve and increases demand (FF > SF) to restore level to program.</p>
	SRO	<p>The team will hold a transient brief. During the brief the failure of 1-MS-FT-1484 will be discussed.</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>
	RO	<p>3. VERIFY REACTOR POWER – LESS THAN OR EQUAL TO 100%.</p> <p>RO will identify that reactor power is less than 100%.</p>

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Event Description: "B" Steam Generator controlling Steam Flow channel failure.

Cue: By Examiner.

	SRO	NOTE: <ul style="list-style-type: none">• Step 4 failures are listed in order of performance priority. Only the failed instrument/control and associated step number should be read aloud.• When the affected instrument/controller malfunction(s) has been addressed by this procedure, recovery actions should continue at Step 14. <p>*4 DETERMINE THE FAILED INSTRUMENT / CONTROL AND GO TO APPROPRIATE STEP.</p> <ul style="list-style-type: none">• SG Steam Flow, Step 8
	BOP	The BOP will identify that 1-MS-FT-1484 has failed low.
	SRO	Caution prior to step 8 CAUTION: When CALCALC is based on Feedwater, changes in feed flow will affect calorimetric power. Reactor power must be monitored when adjusting feed flow. Team will monitor reactor power during FW flow adjustments.

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Event Description: "B" Steam Generator controlling Steam Flow channel failure.

Cue: By Examiner.

	BOP	<p>8. CHECK STEAM GENERATOR LEVEL CONTROL INSTRUMENTS – NORMAL</p> <ul style="list-style-type: none"> • Steam Pressure • Steam Flow • Feed Flow • Steam Generator Level
	BOP	<p>Determines CH III Steam flow instrumentation for 'B' SG is NOT normal.</p> <p>Step 8- RNO</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>
	BOP	<p>a) Place the associated Feed Reg Valve in MANUAL.</p> <p>Verifies 'B' SG MFRV controller, 1-FW-FCV-1488, in manual</p>
	BOP	<p>b) Control SG level at program level (44%, a band may be given).</p> <p>Verifies 'B' SG NR level is returning to program level.</p>
	RO	<p>c) Select the redundant channel for affected SG(s)</p> <p>Selects Channel IV Steam Flow for 'B' SG using two-position selector switch on Vertical Board 1-2 (applicant may also place the associated Feed Flow channel in Channel IV)</p>
	BOP	<p>d) WHEN SG level returned to normal, THEN place the Feed Reg Valve in AUTOMATIC.</p> <p>When level restored to program (44%) BOP places feed reg valve controller in AUTOMATIC.</p>
	BOP	<p>IF SG Level Channel III has failed, THEN do the following:</p> <p>Determines that no channel III level failure has occurred.</p>

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Event Description: "B" Steam Generator controlling Steam Flow channel failure.

Cue: By Examiner.

	SRO	Step 8- RNO (Continued)
	SRO	Perform follow-up actions:
	SRO	<p>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.</p> <p><i>If asked the Shift Manager will recommend not performing 1-OP-RP-001 at this time.</i></p>
	SRO	<p>b) Refer to the following Tech Spec 3.7 items:</p> <ul style="list-style-type: none"> • Table 3.7-1, 12 and 17 • Table 3.7-2, 1.c, 1.e, and 3.a • Table 3.7-3, 2.a, and 3.a <p>Determines the following Technical Specification LCOs:</p> <ul style="list-style-type: none"> • Table 3.7-1 item 17 OA #6 (place channel in trip within 72 hours) • Table 3.7-2 item 1.e.1 OA #20 (place channel in trip within 72 hours) • Table 3.7-3 item 2.a (see table 3.7-2 for operability requirements) <p>c) Refer to Attachment 1.</p> <p>d) IF no other instrumentation failure exists, THEN GO TO Step 14.</p>
	SRO	<p>14. Review OPT-RX-001, Rx Power Calorimetric using PCS computer program, to determine operability of calorimetric and need to perform OPT-RX-007, Shift Average Power Calculation.</p> <p>SRO/RO determines that OPT-RX-001 is impacted and OPT-RX-007 will need to be performed.</p> <p><i>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.</i></p>

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Event Description: "B" Steam Generator controlling Steam Flow channel failure.

Cue: By Examiner.

	SRO	<p>15. CHECK FAILED INSTRUMENT - IS A REGULATORY GUIDE 1.97 VARIABLE (Go to Step 17 if not Reg. Guide 1.97)</p> <p><i>SRO directs STA to review Reg. Guide 1.97. The STA will report that 1-MS-FT-1484 is a Reg. Guide 1.97 component.</i></p>
	SRO	<p>16. REVIEW CEP 99-0029, REG GUIDE 1.97 OPERABILITY, REPORTABILITY, AND ALTERNATE INDICATIONS</p> <p><i>SRO directs STA to review CEP 99-0029. The STA will report that the Reg. Guide 1.97 only requires one channel of Steam Flow indication per steam generator and no actions are required.</i></p>
	SRO	<p>17. Review the following:</p> <ul style="list-style-type: none"> • TS 3.7 • VPAP-2802 • TRM Section 3.3, Instrumentation <p>Determines the following Technical Specification LCOs:</p> <ul style="list-style-type: none"> • Table 3.7-1 item 17 OA #6 (place channel in trip within 72 hours) • Table 3.7-2 item 1.e.1 OA #20 (place channel in trip within 72 hours) • Table 3.7-3 item 2.a (see table 3.7-2 for operability requirements) <p><i>SRO directs STA to review VPAP-2802 and TRM Section 3.3. The STA reports he has completed these reviews and there is no impact.</i></p>
	SRO	<p>18. CHECK ADDITIONAL INSTRUMENT / CONTROLLER MALFUNCTION - EXISTS</p> <p>The team will identify that no additional failures exist, proceed to the RNO section, and this will direct the team to Step 20.</p>

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Event Description: "B" Steam Generator controlling Steam Flow channel failure.

Cue: By Examiner.

	SRO	<p>20. PROVIDE NOTIFICATIONS AS NECESSARY:</p> <ul style="list-style-type: none">• Shift Supervision• OMOC• STA (PRA determination)• I&C <p>- END -</p>
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Event Description: Loss of Isophase Bus Duct Cooling Fan

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
	BOP	<p>Diagnoses trip of 'A' Iso Phase Bus Duct Cooling Fan with the following indications/alarms:</p> <p>Alarms:</p> <ul style="list-style-type: none"> 1G-E5 GEN LEADS CLG TRBL <p>Indications:</p> <ul style="list-style-type: none"> PCS Point T2817A trending up.
	BOP	<p>NOTE: Computer point T2817A, GEN LEAD COOLING AIR TEMP, may be used to monitor duct temperature trend.</p> <p>BOP may trend T2817A on the PCS.</p> <ol style="list-style-type: none"> SEND OPERATOR TO LOCAL ANNUNCIATOR PANEL LOCALLY CHECK DROP - LOW AIR FLOW <p><i>If contacted/dispatched, the field operator will report that low air flow is indicated for the 'A' Isophase bus duct cooling fan.</i></p> <p>NOTE:</p> <ul style="list-style-type: none"> Low air flow drop may be caused by low air flow, loss of power to the air flow switch(es), or failure of the air flow sensor(s). Ammeters on the Bus Duct Cooling Fan breakers should be checked to determine fan status. <ol style="list-style-type: none"> LOCALLY CHECK ISO BUS DUCT COOLING (IBDC) FANS - ONE OR MORE STOPPED <ul style="list-style-type: none"> 1-EP-F-1A, Breaker 1A2-2-1B 1-EP-F-1C, Breaker 1C2-2-1D <p><i>Booth (cue) report no amps indicated on breaker 1A2-2-1B for 1-EP-F-1A, 'A' Iso Bus Duct Cooling Fan and the breaker appears to be tripped.</i></p>

Cue: By Examiner.

	SRO	CAUTION:
		<ul style="list-style-type: none"> • If one or more fan is inoperable, a unit ramp down to the self cooled rating of 14,250 amps should be initiated immediately. • Power should be reduced at the rate of 1% power per minute to 78% power. Power reduction should continue from 78% power to 14,250 amps at the normal rate of 155 MWe/Hr.
	BOP	4. ATTEMPT TO RESTART FAN:
		a) Locally check circuit breakers:
		<ul style="list-style-type: none"> • MCC 1A2-2-1B, GEN LEADS CLR PH A FAN • MC 1C2-2-1D, GEN LEADS CLR PH C FAN
		<i>Booth (cue) If directed, report the breaker for the ‘A’ IBDC fan has tripped.</i>
		b) Try to start fan
		<i>Team should not reset tripped breaker. If attempted, report that breakers trips immediately after reset.</i>
		c) Check fan running (check ammeters on breakers)
	SRO	<i>If asked the field operator reports zero amps on the ‘A’ IBDC fan.</i>
		RNO: Do the following
		1) Initiate a ramp down to reduce generator amps to 14,250 amps in Accordance with 0-AP-23.00, RAPID LOAD REDUCTION.
		Per previous caution, SRO should immediately initiate a ramp to 78% power at 1%/min per 0-AP-23.00. (AP-23.00 actions on pages 20-24)
		2) GO TO Step 8.
	SRO	8. INITIATE A WORK REQUEST TO REPAIR ANNUNCIATOR
		<i>If SM or STA is contacted, they will accept the responsibility of writing a Work Request on the isolated phase bus duct fan.</i>

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Event Description: Loss of Isophase Bus Duct Cooling Fan

Cue: By Examiner.

	RO	<p>9. CLEAR MCR ALARM BY LOCALLY USING 1-EP-HS-BDUC2, GEN BUS DUCT COOLING ANNUNCIATOR SIGNAL RESET SW</p> <p>Directs field operator to reset local alarm panel.</p> <p><i>If contacted, the field operator will reset the local alarm panel and clear the annunciator in the MCR.</i></p>
		<p>10. NOTIFY SHIFT SUPERVISOR</p> <p>- END ARP – AP-23.00 CONTINUES ON NEXT PAGE</p>

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Event Description: Loss of Isophase Bus Duct Cooling Fan

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
	SRO	<p>The team will hold a short transient brief. During the brief the failure of the Isophase cooling fan will be discussed along with the upcoming ramp.</p> <p><i>If asked: 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>
	SRO	<p>0-AP-23.00, RAPID LOAD REDUCTION</p> <p>CAUTION: Conservative decision-making must be maintained during rapid load reductions. Refer to Attachment 1 for trip criteria.</p> <p>NOTE:</p> <ul style="list-style-type: none"> • Actions that can be completed independently of preceding steps may be performed out of sequence as directed by the SRO. • When the Turbine is not being actively ramped, the REFERENCE and SETTER values must remain matched to prevent inadvertent ramp. • Governor Valve oscillations should be anticipated when ramping in IMP IN on Unit 1. ODM 49 has trigger points for switching to IMP OUT or Turbine Manual to stop the oscillations. • Pre-planned reactivity plans located in the Main Control Room will be used as guidance for ramping down to the desired power level. • The ramp rate in IMP OUT is nonlinear and therefore pre-planned reactivity plans based on IMP IN are not as accurate. However, total amounts of boration and dilution can be used as guidance.
	RO	1. TURN ON ALL PRZR HEATERS
	BOP	2. INITIATE PLANT LOAD REDUCTION AT 5%/MINUTE OR LESS:
		a) Verify turbine valve position - NOT ON LIMITER
		The turbine is NOT on the limiter.
	RO	b) Insert control rods in AUTO or MANUAL as necessary to maintain Tave and Tref within 5°F.
	BOP	c) Verify or place turbine in IMP IN or IMP OUT as determined by Shift Supervision

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Event Description: Loss of Isophase Bus Duct Cooling Fan

Cue: By Examiner.

	BOP	Team can choose either IMP IN or IMP OUT
	BOP	d) Adjust SETTER to desired power level
	BOP	e) Adjust LOAD RATE %/MIN thumbwheel to desired ramp rate (1%/minute)
	BOP	f) Initiate Turbine load reduction using OPERATOR AUTO (pushes the GO button)
	BOP	g) Reduce Turbine Valve Position Limiter as load decreases
		The BOP will periodically reduce the limiter setpoint during the ramp.
	SRO	3. CHECK EMERGENCY BORATION – REQUIRED
		The team will decide to emergency borate based on the Tave – Tref difference.
	SRO	NOTE: Step 4 or Step 5 may be performed repeatedly to maintain Tref and Tave matched Δ Flux in band, and control rod position above the LO-LO insertion limit.
	RO	4. PERFORM AN EMERGENCY BORATION IAW THE FOLLOWING:
		a) Verify or raise CHG flow to greater than 75 gpm
		b) Transfer the in-service BATP to FAST
		c) Open ()-CH-MOV-()350
		d) Monitor EMRG BORATE FLOW
		• ()-CH-FI-()110
		e) After required emergency boration, perform the following:
		1) Close ()-CH-MOV-()350
		2) Transfer the in-service BATP to AUTO
		3) Restore Charging flow control to normal

Op-Test No.: Surry 2009-301 Scenario No.: 1 Event No.: 3

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Event Description: Loss of Isophase Bus Duct Cooling Fan

Cue: By Examiner.

	RO	<p>5. ESTABLISH A NORMAL BORATION TO MAINTAIN CONTROL ROD POSITION ABOVE THE LO-LO INSERTION LIMITS ATTACHMENT 4</p> <p>Attachment 4 Boration instructions are on the last page of this event.</p>
	<p>SRO</p> <p>RO</p>	<p>NOTE:</p> <ul style="list-style-type: none"> • If at any time plant conditions no longer require rapid load reduction, actions should continue at Step 35. • RCS Tave must be maintained less than or equal to 577°F and RCS pressure must be maintained greater than or equal to 2205 psig. Tech Spec 3.12.F.1 should be reviewed if either parameter is exceeded. • I & C should be contacted to provide assistance with adjusting IRPIs. <p>6. CONTROL RAMP RATE TO MAINTAIN RCS PRESSURE GREATER THAN 2205 PSIG</p>
	RO	<p>*7. CHECK LETDOWN ORIFICES – TWO IN SERVICE</p> <p><i>Evaluator note: two orifices will already be in service.</i></p>
	BOP	8. MONITOR STEAM DUMPS FOR PROPER OPERATION
	SRO	<p>9. NOTIFY THE FOLLOWING:</p> <ul style="list-style-type: none"> • Energy Supply (MOC) • Polishing Building • Chemistry • OMOC

Op-Test No.: Surry 2009-301 Scenario No.: 1 Event No.: 3

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Event Description: Loss of Isophase Bus Duct Cooling Fan

Cue: By Examiner.

	SRO	<p>10. EVALUATE THE FOLLOWING:</p> <ul style="list-style-type: none">EPIP applicability <p><i>The Shift Manager will review EPIPs for applicability. They are not applicable.</i></p> <ul style="list-style-type: none">VPAP-2802, NOTIFICATIONS AND REPORTS, applicability <p><i>SRO directs STA to review VPAP-2802. The STA reports that he has completed his review of VPAP-2802 and no notifications are required.</i></p>
	SRO	<p>*11. CHECK REACTOR POWER – HAS DECREASED MORE THAN 15% IN ONE HOUR</p> <ul style="list-style-type: none">Reactor power has NOT decreased more than 15% in one hour
	SRO	<p>11 RNO GO TO STEP 13</p> <p><i>No further actions are expected for this event.</i></p>

Op-Test No.: Surry 2009-301 Scenario No.: 1 Event No.: 3

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Event Description: Loss of Isophase Bus Duct Cooling Fan

Cue: By Examiner.

	<p>Attachment 4 of AP-23.00 Actions</p> <p>RO</p> <p>SRO provides RO a copy of Attachment 4.</p> <ol style="list-style-type: none">1. Place the MAKE-UP MODE CNTRL switch in the STOP position.2. Adjust 1-CH-YIC-1113 to desired total gallons.3. Adjust 1-CH-FC-1113A to the desired flow rate.4. Place the MAKE-UP MODE SEL switch in the BORATE position.5. Place the MAKE-UP MODE CNTRL switch in the START position.6. Verify proper valve positions.7. Adjust boration rate using 1-CH-FC-1113A, as necessary.8. WHEN boration is complete, THEN do the following. IF boric acid is to remain in the Blender to support ramping the Unit, THEN enter N/A.<ol style="list-style-type: none">a. Manually blend approximately 20 gallons to flush the boration path IAW Attachment 5, Manual Makeupsb. Enter N/A for the remaining steps in this attachment. <p><i>It is not anticipated that the team will utilize Attachment 5 during this scenario.</i></p> <ol style="list-style-type: none">9. Place the MAKE-UP MODE CNTRL switch in the STOP position.10. Verify controllers for Primary Grade water and Boric Acid are set correctly.11. Place the MAKE-UP MODE SEL switch in the AUTO position.12. Place the MAKE-UP MODE CNTRL switch in the START position.13. Notify Shift Supervision of Blender status.
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End Event #3

Op-Test No.: Surry 2009-301 Scenario No.: 1 Event No.: 4

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Event Description: Main Generator Lockout and Failure of Reactor to Trip

Cue: By Examiner.

	Team	<p>Diagnoses generator lockout and need to trip the reactor by:</p> <p>Alarms:</p> <ul style="list-style-type: none">• 1F-D1 GEN DIFF LOCKOUT REL TRIP – FIRST OUT• Numerous primary and secondary alarms <p>Indications:</p> <ul style="list-style-type: none">• Control rods inserting in AUTO.• Generator output breakers OPEN.• Reactor trip breakers CLOSED and reactor at power.
	SRO	<p>Direct RO to perform the Immediate Actions of E-0, REACTOR TRIP OR SAFETY INJECTION</p> <p>RO may perform this actions without SRO direction.</p>
	RO	<p>[1] VERIFY REACTOR TRIP:</p> <p>a) Manually trip reactor</p> <p>Pushes the reactor trip push buttons.</p> <p>b) Check the following:</p> <ul style="list-style-type: none">• All Rods On Bottom light – LIT• Reactor trip and bypass breakers – OPEN• Neutron flux – DECREASING

Op-Test No.: Surry 2009-301 Scenario No.: 1 Event No.: 4

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Event Description: Main Generator Lockout and Failure of Reactor to Trip

Cue: By Examiner.

	RO	[2] VERIFY TURBINE TRIP: a) Manually trip the turbine Pushes the turbine trip push buttons. b) Verify all turbine stop valves - CLOSED c) Isolate reheaters by closing MSR steam supply SOV • 1-MS-SOV-104 RO Closes 1-MS-SOV-104 d) Verify generator output breakers – OPEN (Time Delayed) Opened on initiating event- no actions required.
	RO	[3] VERIFY BOTH AC EMERGENCY BUSES - ENERGIZED

Op-Test No.: Surry 2009-301 Scenario No.: 1 Event No.: 4

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Event Description: Main Generator Lockout and Failure of Reactor to Trip

Cue: By Examiner.

	RO	<p>[4] CHECK IF SI INITIATED:</p> <p>a) Check if SI is actuated:</p> <ul style="list-style-type: none"> LHSI pumps – RUNNING (<i>No</i>) SI annunciators – LIT <ul style="list-style-type: none"> A-F-3 SI INITIATED – TRAIN A (<i>No</i>) A-F-4 SI INITIATED – TRAIN B (<i>No</i>) <p>a) RNO - Check is SI is required or imminent as indicated by any of the following:</p> <ul style="list-style-type: none"> Low PRZR Pressure <p>Identifies that pressurizer pressure is slowly recovering (or stable).</p> <ul style="list-style-type: none"> High CTMT Pressure <p>Identifies that containment pressure is stable at about 10.5 psia</p> <ul style="list-style-type: none"> High Steamline Differential Pressure <p>Identifies that there is no steam line differential pressure.</p> <ul style="list-style-type: none"> High Steam Line Flow with Low Tave or Low Line Pressure <p>Identifies no steam flow indicated and determines that SI is not required.</p>
	SRO	<p><u>IF</u> SI is <u>NOT</u> required, <u>THEN</u> GO TO 1-ES-0.1, REACTOR TRIP RESPONSE</p>
	SRO	<p>The team will hold a transition brief. During the brief it will be identified that the generator tripped for an unknown reason and that the reactor did not trip automatically.</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>Following the brief the team will transition to 1-ES-0.1. The team may dispatch personnel to investigate the cause of the generator lockout.</p>
	SRO	SRO initiates 1-ES-0.1

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Event Description: Main Generator Lockout and Failure of Reactor to Trip

Cue: By Examiner.

	RO	<p>1-ES-0.1</p> <p>1. MONITOR RCS AVERAGE TEMPERATURE</p> <ul style="list-style-type: none">• STABLE AT 547°F <p><u>OR</u></p> <ul style="list-style-type: none">• TRENDING TO 547°F <p>RCS temperature is trending to 547 °F</p>
	BOP	<p>1-ES-0.1</p> <p>SRO may provide the BOP with Attachment 5 of 1-ES-0.1 for guidance on AFW control.</p> <p>Actions are summarized below:</p> <ol style="list-style-type: none">1. Maintain minimum AFW flow of 540 gpm with RCP(s) in service until one SG Narrow Range level is greater than 12%2. Maintain minimum AFW flow of 350 gpm with NO RCPs running until one SG Narrow Range level is greater than 12%3. 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.

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Event Description: Main Generator Lockout and Failure of Reactor to Trip

Cue: By Examiner.

	BOP	<p>1-ES-0.1</p> <p>2. CHECK FW STATUS</p> <p>a) Check RCS Average temperatures – LESS THAN 554°F</p> <p>b) Verify Feed Reg valves - CLOSED</p> <p>c) Close SG FW isolation MOVs</p> <ul style="list-style-type: none">• 1-FW-MOV-154A• 1-FW-MOV-154B• 1-FW-MOV-154C <p>BOP closed 1-FW-MOV-154A, B, C</p> <p>d) Check AFW pumps - RUNNING</p> <ul style="list-style-type: none">• Motor Driven AFW pumps• TD AFW pump- (<i>Pump is tagged out- per initial conditions</i>) <p>e) Verify total AFW flow – GREATER THAN 540 GPM (350 W/O RCPs)</p> <p>f) Check emergency buses – BOTH ENERGIZED</p> <p>g) Control feed flow to maintain narrow range level between 22% and 50%.</p>
	RO	<p>3. VERIFY CHARGING IN SERVICE</p>
	BOP	<p>4. CHECK CC SYSTEM STATUS:</p> <p>a) Check SW to CC HXs – IN SERVICE</p> <p>b) Check CC pumps – AT LEAST ONE RUNNING</p>

End of Event 4

Op-Test No.: Surry 2009-301 Scenario No.: 1 Event No.: 5

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Event Description: LOCA outside of containment.

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
	Team	<p><i>Evaluator's note: Team may elect to initiate safety injection and re-enter 1-E-0 rather than perform AP-16.00, in accordance with the continuous action page of ES-0.1:</i></p> <p>SI INITIATION CRITERIA <i>Initiate SI and GO TO 1-E-0, REACTOR TRIP OR SAFETY INJECTION, if EITHER condition listed below occurs, OR is imminent.</i></p> <ul style="list-style-type: none"> • RCS subcooling based on CETCs - LESS THAN 30°F • Any automatic SI setpoint is exceeded: <ul style="list-style-type: none"> • <u>Low PRZR pressure</u> • High CTMT pressure • High steamline differential pressure • High steamline flow with low Tave or low line pressure <p>Diagnoses RCS leak with the following indications/alarms:</p> <p>Alarms:</p> <ul style="list-style-type: none"> • RMA-D6 VENT STACK #2 PART ALERT / HI • RMA-D7 VENT STACK #2 NORMAL RANGE GAS ALERT / HI • 1B-F3 SFGDS AREA SUMP HI LVL • 1E-F6(G6/H6) PRZR LO LVL CH 1 • 1C-D8 PRZR LO LVL <p>Indications:</p> <ul style="list-style-type: none"> • Charging Flow increasing • Pressurizer level decreasing • Pressurizer pressure decreasing • After safety injection initiated, abnormal LHSI flow indication. <p><i>When received the Unit 2 Operator will report and silence the radiation monitor alarms associated with this event.</i></p>
	SRO	Direct initiation of AP-16.00, EXCESSIVE RCS LEAKAGE
	SRO	<p>Note: If SI Accumulators are isolated, 1-AP-16.01, SHUTDOWN LOCA, should be used for guidance.</p> <p>Note: RCS average temperature has a direct impact on pressurizer level.</p>

Op-Test No.: Surry 2009-301 Scenario No.: 1 Event No.: 5

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Event Description: LOCA outside of containment.

Cue: By Examiner.

	RO	<p>[1] MAINTAIN PRZR LEVEL</p> <ul style="list-style-type: none">• Isolate Letdown• Control Charging flow <p>RO closes 1-CH-LCV-1460A and 1-CH-LCV-1460B and places charging in manual and attempts to maintain level at program (immediate action).</p>
	SRO	<p>The team will hold a short transient brief. The brief should establish the priority of addressing RCS leakage then end.</p>
	RO	<p>2 VERIFY THE FOLLOWING PARAMETERS – STABLE OR INCREASING:</p> <ul style="list-style-type: none">• PRZR Level• PRZR Pressure• RCS Subcooling <p>Identifies all parameters are decreasing and goes to step 2 RNO</p>
	TEAM	<p>Step 2 RNO- GO TO 1-E-0, REACTOR TRIP OR SAFETY INJECTION.</p> <p>Team transitions to 1-E-0.</p>

Op-Test No.: Surry 2009-301 Scenario No.: 1 Event No.: 5

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Event Description: LOCA outside of containment.

Cue: By Examiner.

	RO	<p>Only the performance of the high level steps 1,2, and 3 are required:</p> <p>[1] VERIFY REACTOR TRIP</p> <p>[2] VERIFY TURBINE TRIP</p> <p>[3] VERIFY BOTH AC EMERGENCY BUSES - ENERGIZED</p> <p>[4] CHECK IF SI INITIATED:</p> <p>a) Check if SI is actuated:</p> <ul style="list-style-type: none"> • LHSI pumps – RUNNING • SI annunciators – LIT • A-F-3 SI INITIATED – TRAIN A • A-F-4 SI INITIATED – TRAIN B <p>b) Manually initiate SI</p> <p>RO will manually initiate safety injection if an automatic safety injection has not occurred.</p>
	SRO	<p>The team will hold a transition brief. During the brief it will be identified that a LOCA outside containment has occurred and appears to be located in Unit One Safeguards.</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 abnormal as indicated on vent-vent radiation monitors. He will also state that containment conditions and the electrical conditions are as you see them.</i></p> <p>Following the brief the team will perform 1-E-0 and applicable attachments.</p>
	SRO/BOP	<p>5. Initiate Attachment 1 (Attachment 1 actions contained on attachment 1 of this guide.)</p>

Op-Test No.: Surry 2009-301 Scenario No.: 1 Event No.: 5

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Event Description: LOCA outside of containment.

Cue: By Examiner.

	RO	<p>*6. CHECK RCS AVERAGE TEMPERATURE</p> <ul style="list-style-type: none">• STABLE AT 547°F <p>OR</p> <ul style="list-style-type: none">• TRENDING TO 547°F <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> <ul style="list-style-type: none">Stop dumping steamReduce AFW flow to the SGClose MSTVs if cooldown continues
	RO	<p>7. CHECK PRZR PORVs AND SPRAY VALVES:</p> <ul style="list-style-type: none">a) PRZR PORVs – CLOSEDb) PRZR spray controls<ul style="list-style-type: none">• Demand at Zero (or)• Controlling Pressurec) PORV block valves - AT LEAST ONE OPEN

<p>SRO</p> <p>RO</p>	<p>NOTE: 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 – time in event will dictate current subcooling- <i>see note below</i></p> <p>c) Stop all RCPs</p> <p>d) RCS pressure - LESS THAN 1275 psig [1475 PSIG]</p> <p>e) Close CHG pump miniflow recirc valves:</p> <ul style="list-style-type: none"> • 1-CH-MOV-1275A • 1-CH-MOV-1275B • 1-CH-MOV-1275C <p>RNO for the step is to go to step 9.</p> <p>[WOG E-1—C] Trip all RCPs within 5 minutes of reaching RCP Trip and Miniflow recirc criteria (KOA).</p> <p><i>This is a continuous action step and it is anticipated that conditions will be met for trip criteria during E-0 actions.</i></p>
<p>BOP</p>	<p>9. CHECK IF SGs ARE NOT FAULTED:</p> <ul style="list-style-type: none"> • Check pressures in all SGs <p>a) STABLE OR INCREASING AND</p> <p>b) GREATER THAN 100 PSIG</p> <p>BOP 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>

Op-Test No.: Surry 2009-301 Scenario No.: 1 Event No.: 5

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Event Description: LOCA outside of containment.

Cue: By Examiner.

	BOP	10. CHECK IF SG TUBES ARE NOT RUPTURED:
	TEAM	<ul style="list-style-type: none"> • Condenser air ejector radiation – NORMAL • SG blowdown radiation – NORMAL • SG MS radiation – NORMAL • TD AFW pump exhaust radiation – NORMAL • SG NR Level - NOT INCREASING IN AN UNCONTROLLED MANNER <p>TEAM should determine that no indications of a steam generator tube rupture exist.</p>
	RO	<p>11. CHECK RCS - INTACT INSIDE CTMT</p> <ul style="list-style-type: none"> • CTMT radiation - NORMAL • CTMT pressure - NORMAL • CTMT RS sump level – NORMAL <p>All containment indications will be NORMAL.</p>
	RO	<p>12. CHECK RCS - HAS BEEN MAINTAINED INTACT OUTSIDE CTMT</p> <p>a) Radiation Monitors - NORMAL</p> <ul style="list-style-type: none"> • MGPI vent-vent • Auxiliary Building Control Area <p>b) Sump annunciators – NOT LIT</p> <ul style="list-style-type: none"> • VSP-F-4 • B-D-1 • B-D-2 • B-F-3 <p>RO will identify that the MGPI vent-vent radiation monitor is in alarm and that annunciator B-F-3 is LIT.</p>
	SRO	The SRO will go to the RNO step.
	SRO	<p>12 RNO. Determine cause of abnormal conditions. IF the cause is a loss of RCS inventory outside CTMT, THEN GO TO 1-ECA-1.2, LOCA OUTSIDE CONTAINMENT.</p> <p>Team will transition to 1-ECA-1.2, LOCA Outside Containment.</p>

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Event Description: LOCA outside of containment.

Cue: By Examiner.

	SRO	<p>The team will hold a short transient brief. The brief should establish the priority of addressing RCS leakage then end.</p> <p><i>ECA-1.2 actions commence on following page.</i></p>
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Cue: By Examiner.

SRO	ECA-1.2, LOCA OUTSIDE CONTAINMENT
	CAUTION: Depending on break location, higher than normal dose levels should be expected in the Auxiliary Building and the Safeguards after a LOCA outside CTMT.
RO	<p>1. VERIFY PROPER VALVE ALIGNMENT:</p> <ul style="list-style-type: none"> a) Locally unlock and close the following breakers: <ul style="list-style-type: none"> • 1H1-2N 8A for 1-SI-MOV-1890A • 1J1-2E 8B for 1-SI-MOV-1890B • 1H1-2N 9A for 1-SI-MOV-1890C <p>RO will dispatch operator to energize the listed breakers.</p> <ul style="list-style-type: none"> b) LHSI to hot legs - CLOSED <ul style="list-style-type: none"> • 1-SI-MOV-1890A • 1-SI-MOV-1890B <p><i>Evaluator's note- both valves will be found in correct position.</i></p> <ul style="list-style-type: none"> c) SI accumulator test valves - CLOSED <ul style="list-style-type: none"> • HCV-SI-1850A • HCV-SI-1850B • HCV-SI-1850C • HCV-SI-1850D • HCV-SI-1850E • HCV-SI-1850F <p><i>Evaluator's note- all valves will be found in correct position.</i></p> <ul style="list-style-type: none"> d) Letdown isolation valves - CLOSED <ul style="list-style-type: none"> • 1-CH-LCV-1460A • 1-CH-LCV-1460B • 1-CH-HCV-1200A • 1-CH-HCV-1200B • 1-CH-HCV-1200C • 1-CH-TV-1204A • 1-CH-TV-1204B <p><i>Evaluator's note- all valves will be found in correct position.</i></p> <ul style="list-style-type: none"> e) RCP seal return valve - CLOSED <ul style="list-style-type: none"> • 1-CH-MOV-1381 <p><i>Evaluator's note- Valve failed to close when safety injection initiated, it should be closed at this time in accordance with attachment 1 of E-0 (BOP Function)</i></p>

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Event Description: LOCA outside of containment.

Cue: By Examiner.

	RO	<p>1. VERIFY PROPER VALVE ALIGNMENT (continued)</p> <p>f) Charging line isolation valve - CLOSED</p> <ul style="list-style-type: none">• 1-CH-HCV-1310A <p>RO will close 1-CH-HCV-1310A.</p>
	RO	<p>2. TRY TO IDENTIFY AND ISOLATE BREAK:</p> <p>a) Close LHSI to cold legs</p> <ul style="list-style-type: none">• 1-SI-MOV-1890C <p>RO will close 1-SI-MOV-1890C</p> <p><i>Evaluator's Note: this will isolate the LOCA outside containment.</i></p> <p>b) Check RCS pressure – INCREASING</p> <p>Critical Task: [WOG ECA-1.2 —A] Isolate the LOCA outside containment prior to actuation of RMT AND before transition out of ECA-1.2.</p> <p>Team will determine that RCS parameters are improving.</p> <p>c) Place LHSI pumps in PTL</p> <p>d) Close LHSI pump suction from RWST</p> <ul style="list-style-type: none">• 1-SI-MOV-1862A• 1-SI-MOV-1862B <p>e) GO TO 1-E-1, LOSS OF REACTOR OR SECONDARY COOLANT</p>

END SCENARIO

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Scenario No.: 1

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SIMULATOR OPERATOR GUIDE

Simulator Setup

Initial Conditions:

Recall 100% IC and enter the following malfunctions or recall the IC 311 **and implement TRIGGER #30 to activate all passive malfunctions. VERIFY Trigger #30 implemented.**

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

- ASP_AO_OFF = True
- DISA_CV150A_ACL= True
- DISA_CV150C_ACL= True
- V2GE5_RESET

Enter the following MALFUNCTIONS:

Malfunction	Delay	Ramp	Trigger	Value	Final	Trigger Type
RC4903- PRZR LEVEL XMTR CH 3 FAILURE (461)	10	0	1	0	1	Manual
MS0803- SG B STM FLOW TRNSMTR MS-FT-484 FAILURE	10	30	3	0	-1	Manual
GL0101- IBDC FAN A SHEARED SHAFT	10	N/A	5	N/A	N/A	Manual
EL02- MAIN GENERATOR DIFFERENTIAL LOCKOUT TRIP	10	N/A	7	N/A	N/A	Manual
SI1601- FAIL CHECK VALVES SI-79 LOOP A	10	N/A	9	N/A	N/A	Manual
SI1604- FAIL CHECK VALVE SI-241 LOOP A (LHSI)	10	N/A	9	N/A	N/A	Manual
SI1502- SI COLD LEG HDR LEAK UPSTRM MOV-SI-890C	10	0	9	0	7.5	Manual
RD18- FAILURE OF AUTO TRIP TO SCRAM RX	0	0	30	N/A	N/A	Pre-Load
CH59- Disable CH-MOV-381 AUTO closure	0	30	N/A	N/A	AUTO_DISABLE	Pre-load

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SIMULATOR OPERATOR GUIDE

Enter the following REMOTE FUNCTIONS:

Remote Function	Delay	Trigger	Ramp Start Value	Ramp Time	Remote Value	Trigger Type (Auto or Manual)
MS_87- STEAM GENERATOR A STEAM SUPPLY TO FW-P-2	0	30	100	0	0	Pre-load
MS_120- STEAM GENERATOR B STEAM SUPPLY TO FW-P-2	0	30	100	0	0	Pre-load
MS_158- STEAM GENERATOR C STEAM SUPPLY TO FW-P-2	0	30	100	0	0	Pre-load

Enter the following MOV CONTROLS:

Override	Delay	Ramp	Trigger	Remote Value	Trigger Type (Auto or Manual)
SIMOV890A_RACKIN- SI-MOV-1890A LHSI to Th	0	N/A	20	RACKIN	Manual
SIMOV890B_RACKIN- SI-MOV-1890B LHSI to Th	0	N/A	21	RACKIN	Manual
SIMOV890C_RACKIN- SI-MOV-1890C LHSI to Th	0	N/A	22	RACKIN	Manual

Enter the following EVENT TRIGGER:

EVENT Number	Event Text	Command
12	Simov890c<0.1	DMFSI1604

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TRIGGER	TYPE	DESCRIPTION
1	Manual	Pressurizer level channel III fails high, resulting in manual control of charging.
3	Manual	“B” Steam generator steam flow transmitter 1-MS-FT-484 fails low resulting in manual control of feedwater to “B” steam generator.
5	Manual	Loss of Isolated Phase Bus Duct Cooling resulting in rapid load reduction.
7	Manual	Main Generator Lockout Trip resulting in turbine trip, but failure of the reactor to trip.
9	Manual	LOCA outside containment in safeguards valve pit area.
20	Manual- Booth actions	Energize 1-SI-MOV-1890A upon request.
21	Manual- Booth actions	Energize 1-SI-MOV-1890B upon request.
22	Manual- Booth actions	Energize 1-SI-MOV-1890C upon request.
30	PRELOAD MALFUNCTIONS	<ul style="list-style-type: none">• Disable automatic reactor trip• Disable auto closure of 1-CH-MOV-1381• Isolate steam to 1-FW-P-2 (tagged out)

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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:

<input type="checkbox"/> 1-FW-P-2	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- ☐ Verify 1-RM-RI-112 aligned to A/C SG and 1-RM-RI-113 aligned to B SG (magnets).
- ☐ Verify Ovation System operating.
- ☐ Reset ICCMs.
- ☐ Verify Component Switch Flags.
- ☐ Verify Brass Caps properly placed.
- ☐ Verify SG PORVs set for 1035 psig.
- ☐ Verify Rod Control Group Step Counters indicate properly.
- ☐ Verify Ovation CRT display
- ☐ Advance Charts the following charts:

Master chart advance switch

- ☐ Verify Turbine Thumb Wheel Settings @120 rpm/min and Position 6
- ☐ Verify Containment Instrument Air Compressors are on Inside Suction (all RMs reset)
- ☐ Verify all ARPs have been cleaned
- ☐ Verify CLEAN copies of the following procedures are in place:

<input type="checkbox"/> AP-53.00 (2)	<input type="checkbox"/> AP-23.00	<input type="checkbox"/> AP-16.00 (2)	<input type="checkbox"/> ARP 1G-E5
<input type="checkbox"/> E-0 (2)	<input type="checkbox"/> ES-0.1	<input type="checkbox"/> ECA-1.2	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> OP-CH-007		<input type="checkbox"/> Reactivity Sheet	
<input type="checkbox"/> OP-ZZ-002		<input type="checkbox"/>	

- ☐ Verify Reactivity Placard is current.

SIMULATOR OPERATOR GUIDE**Brief**

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

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

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

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

Assign operating positions.

Ask for and answer questions.

Op-Test No.: Surry 2009**Scenario No.: 1****Page 44 of 66****SIMULATOR OPERATOR GUIDE****Conduct shift turnover:**

Provide normal shift turnover materials reflecting the below initial conditions:

The initial conditions have Unit #1 operating steady state at 100% power with a current boron concentration of 750 ppm. All Unit #1 systems and crossties are operable with the following exception:

- 1-FW-P-2, Turbine Driven Auxiliary Feedwater Pump, is tagged out for governor valve maintenance. 62 hours remain in the 72-hour Technical Specification 3.6.F.1 Clock.

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

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

The last shift performed three 30-gallon dilutions followed by manual make-ups.

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

SIMULATOR OPERATOR GUIDE**Session Conduct:**

Ensure conditions in Simulator Set-up are established.

Ensure Trigger 30 is active prior to team entering the simulator.

Verify Exam Security has been established and ASP_AO_OFF = True.

EVENT 1 1-RC-LT-1461 Fails High

When cued by examiner, implement Trigger #1.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the failure of 1-RC-LT-1461. The individual(s) contacted will also acknowledge any TS LCOs and entry into AP-53.00.
- **If contacted**, will take responsibility for writing the WR and CR.

STA:

- **If contacted**, will acknowledge the failure of 1-RC-LT-1461. The individual(s) contacted will also acknowledge (but not confirm/deny) any TS LCOs.
- **If asked**, the STA will report that 1-FW-LR-1461 is a Reg. Guide 1.97 component. The STA will also report that upon review of CEP 99-0029 only two channels of pressurizer level are required, so no actions for Reg. Guide 1.97 are required.
- **If asked**, the STA will review VPAP-2802 and TRM Section 3.3. The STA will report that he has completed his review and this failure does not impact VPAP-2802, but the TRM is impacted. The STA will report that a 14-day clock to establish fire watch is required and a 60-day return to service clock is required in accordance with the TRM. He will also state that the TRM does refer you to TS 3.7.6.
- **If contacted**, will take responsibility for writing the WR and CR.

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SIMULATOR OPERATOR GUIDE

- **If the team has a transient brief:** The STA will state that primary integrity is as the RO reported and that secondary integrity is as the BOP reported. The STA will state that radiological conditions are normal. He will also state that containment conditions and the electrical conditions are as you see them.

Maintenance/ Work Week Coordinator:

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

Role play as other individuals as needed.

SIMULATOR OPERATOR GUIDE**EVENT 2 Selected Steam Flow Channel Fails Low on 'B' SG**

When cued by examiner, implement Trigger #3.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the failure of 1-MS-FT-1484. 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 WR and CR.

STA:

- **If contacted**, will acknowledge the failure of 1-MS-FT-1484. The individual(s) contacted will also acknowledge (but not confirm/deny) any TS LCOs.
- **If asked**, the STA will report that 1-MS-FT-1484 is a Reg. Guide 1.97 component. The STA will also report that upon review of CEP 99-0029 that only one channel of SG steam flow is required per SG, so no actions for Reg. Guide 1.97 are required.
- **If asked**, the STA will review VPAP-2802 and TRM Section 3.3 and report that he has completed his review and this failure does not impact these documents.
- **If contacted**, will take responsibility for writing the WR and CR.
- **If the team has a transient brief:** The STA will state that primary integrity is as the RO reported and that secondary integrity is as the BOP reported. The STA will state that radiological conditions are normal. He will also state that containment conditions and the electrical conditions are as you see them.

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Maintenance/ Work Week Coordinator:

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

Field Operators:

- **If contacted**, field operators will report no issues at the MFRVs.

Unit 2:

- If team directs performance of 1-OPT-RX-007, Shift Average Power Calculation, state that you will have the 4th RO perform the procedure.

Role play as other individuals as needed.

SIMULATOR OPERATOR GUIDE**EVENT 3 Loss of Isophase Bus Duct Cooling Fan 'A'**

When cued by examiner, implement Trigger #5.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the failure of the 'A' Isophase Bus Duct Cooling Fan and the need to ramp at 1%/minute to 78% power and then at the normal ramp rate until generator amps are less than 14250 amps.
- **If contacted**, will take responsibility for writing the WR and CR.
- **If contacted**, will acknowledge entry into AP-23.00.

STA:

- **If contacted**, will acknowledge the failure of the 'A' Isophase Bus Duct Cooling Fan and the need to ramp at 1%/minute to 78% power and then at the normal ramp rate until generator amps are less than 14250 amps.
- **If asked**, the STA will acknowledge the need to borate and use rods (will acknowledge the team review of OP-RX-010, if performed). If asked to perform the OP-RX-010 review, the STA will state that he is not able to at this time.
- **After directed**, the STA will report that he has reviewed VPAP-2802 and no notifications were required.
- **If contacted**, will take responsibility for writing the WR and CR.
- **If the team has a transient brief:** The STA will state that primary integrity is as the RO reported and that secondary integrity is as the BOP reported. The STA will state that radiological conditions are normal. He will also state that containment conditions and the electrical conditions are as you see them.

SIMULATOR OPERATOR GUIDE**Field Operators:**

- **If contacted**, after 1 minute, field operators will report that the “A Phase Low Air Flow” drop is indicated for the ‘A’ iso-phase bus duct cooling fan.
- **If contacted**, the operator will report no amps are indicated on breaker 1A2-2-1B for 1-EP-F-1A (‘A’ Iso-phase Bus Duct Cooling Fans) and the breaker is tripped.
- **If contacted**, the operator will acknowledge and reset the local alarm panel for the IBDC fan and clear the alarm in the MCR. This can be done with V2GE5_RESET on the monitor screen.
- **If contacted**, if attempt to reset breaker is requested, report that breaker immediately trips when reset.
- **If contacted**, the breaker (1C2-2-1D) for the “C” fan is closed with 17 amps indicated.

Maintenance/Work Week Coordinator:

- **If contacted**, will acknowledge the failure and commence investigations.
- **If contacted**, will acknowledge the requirements to sample the RCS.

Role play as other individuals as needed.

SIMULATOR OPERATOR GUIDE**EVENT 4 Generator Lockout and Failure of the Reactor to Trip.**

When cued by examiner, implement Trigger #7.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the generator trip and failure of auto reactor trip.
- **If contacted**, will take responsibility for writing the WR and CR.
- **If contacted**, will acknowledge entry into 1-E-0 and 1-ES-0.1.
- **If contacted**, Unit Two has implemented AP-50.00.

STA:

- **If the team has a transient brief:** The STA will state that primary integrity is as the RO reported and that secondary integrity is as the BOP reported. The STA will state that radiological conditions are normal. He will also state that containment conditions and the electrical conditions are as you see them.

Field Operators:

- **If contacted**, field operators will report no abnormal conditions at the generator or main transformers.

Maintenance/Work Week Coordinator:

- **If contacted**, will acknowledge the failure and commence investigations. 3

Role play as other individuals as needed.

SIMULATOR OPERATOR GUIDE**EVENT 5 LOCA Outside of Containment.**

When cued by examiner, implement Trigger #9.

When requested by the team, implement triggers 20/21/22 for energizing SI MOVs.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the LOCA outside containment.
- **If contacted**, will acknowledge entry into 1-E-0 and 1-ECA-1.2

STA:

- **If the team has a transient brief:** The STA will state that primary integrity is as the RO reported and that secondary integrity is as the BOP reported. The STA will state that radiological conditions are abnormal based on Vent-Vent radiation monitor readings. He will also state that containment conditions and the electrical conditions are as you see them.

Field Operators:

- **If contacted**, field operators will report sound of flow behind the safeguards valve pit door (if contacted prior to leak isolation). No sounds will be heard if 1-SI-MOV-1980C is closed.
- **If contacted**, field operators will energize 1-SI-MOV-1890A/B/C utilizing triggers 20/21/22 respectively.

Maintenance/Work Week Coordinator:

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

Health Physics:

- **If contacted**, will acknowledge leak in safeguards and restrict access.

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Unit Two:

- **If asked**, blowdown and air ejector RM readings are pre-event.
- **If requested**, acknowledge RM alarms, and perform ARP actions.

Role play as other individuals as needed.

→ SCENARIO ENDS UPON TRANSITION OUT OF 1-ECA-1.2.

Simulator Guide Attachment 1Attachment 1 of 1-E-0

Time	Position	Applicant's Action or Behavior
	BOP	<p>ATTACHMENT 1 OF E-0</p> <p>1. VERIFY FW ISOLATION:</p> <ul style="list-style-type: none"> Feed pump discharge MOVs – CLOSED <ul style="list-style-type: none"> 1-FW-MOV-150A 1-FW-MOV-150B MFW pumps – TRIPPED Feed REG valves – CLOSED SG FW bypass flow valves – DEMAND AT ZERO SG blowdown TVs – CLOSED <p>Identifies ALL blowdown trip valves OPEN and manually closes ALL blowdown trip valves.</p>
	BOP	<p>2. VERIFY CTMT ISOLATION PHASE I:</p> <ul style="list-style-type: none"> Phase I TVs – CLOSED 1-CH-MOV-1381 – CLOSED 1-SV-TV-102A – CLOSED PAM isolation valves – CLOSED <ul style="list-style-type: none"> 1-DA-TV-103A 1-DA-TV-103B <p>Operator will close 1-CV-TV-105A and 1-CV-TV-150C</p> <p>Operator will close 1-CH-MOV-1381</p>
	BOP	<p>3. VERIFY AFW PUMPS RUNNING:</p> <ul style="list-style-type: none"> a) MD AFW pumps – RUNNING (Time Delayed) b) TD AFW pump - RUNNING IF NECESSARY

Simulator Guide Attachment 1**Attachment 1 of 1-E-0**

	BOP	<p>4. VERIFY SI PUMPS RUNNING:</p> <ul style="list-style-type: none"> • CHG pumps – RUNNING • LHSI pumps - RUNNING
	BOP	<p>5. CHECK CHG PUMP AUXILIARIES:</p> <ul style="list-style-type: none"> • CHG pump CC pump – RUNNING • CHG pump SW pump - RUNNING
	BOP	<p>6. CHECK INTAKE CANAL:</p> <ul style="list-style-type: none"> • Level - GREATER THAN 24 FT • Level - BEING MAINTAINED BY CIRC WATER PUMPS
	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"> • E-F-10 (High Steam Flow SI) • B-C-4 (Hi Hi CLS Train A) • B-C-5 (Hi Hi CLS Train B) <p>Identifies annunciators not lit and goes to RNO.</p> <p>a) RNO - IF annunciator E-H-10 (Hdr/Line SI) NOT LIT, THEN GO TO Step 8.</p>
	BOP	<p>*8. CHECK IF CS REQUIRED:</p> <p>a) CTMT pressure – HAS EXCEEDED 23 PSIA</p> <p>Identifies pressure has not exceeded 23 or 17.7 psia and goes to step 10.</p>

Simulator Guide Attachment 1**Attachment 1 of 1-E-0**

	BOP	<p>*10. BLOCK LOW PRZR PRESS SI SIGNAL:</p> <ul style="list-style-type: none">a) Check PRZR pressure – LESS THAN 2000 psigb) Turn both LO PRZR PRESS & STM HDR/LINE P switches to blockc) Verify Permissive Status light C-2 - LIT <p>BOP may block the low pressurizer pressure SI signal depending on current RCS pressure.</p>
	BOP	<p>*11. BLOCK LOW TAVE SI SIGNAL:</p> <ul style="list-style-type: none">a) Check RCS Tave - LESS THAN 543°Fb) Turn both HI STM FLOW & LO TAVG OR LP switches to blockc) Verify Permissive Status light F-1 – LIT <p>BOP may block the low Tave SI signal depending on current RCS temperature.</p>

Simulator Guide Attachment 1Attachment 1 of 1-E-0

	BOP	<p>NOTE:</p> <ul style="list-style-type: none"> • CHG pumps should be run in the following order of priority: C, B, A. • Subsequent SI signals may be reset by reperforming Step 12. <p>12. VERIFY SI FLOW:</p> <p>a) HHSI to cold legs - FLOW INDICATED</p> <ul style="list-style-type: none"> • 1-SI-FI-1961 (NQ) • 1-SI-FI-1962 (NQ) • 1-SI-FI-1963 (NQ) • 1-SI-FI-1943 or 1-SI-FI-1943A <p>b) Check CHG pumps - THREE RUNNING</p> <p>c) Reset SI.</p> <p>d) Stop one CHG pump and out in AUTO</p> <p>e) RCS pressure - LESS THAN 185 PSIG</p> <p>RNO: e) IF two LHSI pumps are running, THEN do the following:</p> <ol style="list-style-type: none"> 1) Verify reset or reset SI. 2) Stop one LHSI pump and put in AUTO. 3) GO TO Step 13.
	BOP	<p>13. VERIFY TOTAL AFW FLOW - GREATER THAN 350 GPM [450 GPM]</p> <p>RNO ACTIONS:</p> <ul style="list-style-type: none"> • IF SG narrow range level greater than 12% [18%] in any SG, THEN control feed flow to maintain narrow range level AND GO TO Step 14. • IF SG narrow range level less than 12% [18%] in all SGs, THEN manually start pumps AND align valves as necessary. • IF AFW flow greater than 350 GPM [450 GPM] can NOT be established, THEN GO TO 1-FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK.
	BOP	<p>14. CHECK AFW MOVs - OPEN</p> <p>BOP will identify that all AFW MOVs are not open and will read the RNO portion of this step and manually align valves as necessary.</p>

Simulator Guide Attachment 1**Attachment 1 of 1-E-0**

	BOP	<p>15. INITIATE SI VALVE ALIGNMENT IAW ATTACHMENT 2</p> <p>Attachment 2 of 1-E-0 is contained in attachment 2 of this guide.</p>
	BOP	<p>16. INITIATE VENTILATION ALIGNMENT AND AC POWER ALIGNMENT IAW ATTACHMENT 3</p> <p>See attached copy of Attachment 3 – contained in attachment 3 of this guide.</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> <p><i>All MCR boundary indications will be reported at positive.</i></p>

Simulator Guide Attachment 2Attachment 2 of 1-E-0

Time	Position	Applicant's Action or Behavior
	SRO	ATTACHMENT 2 of 1-E-0 NOTE: Components previously aligned by SI termination steps, must not be realigned by this Attachment.
	RO/BOP	ATTACHMENT 2 of 1-E-0 1. Verify opened or open CHG pump suction from RWST MOVs. <ul style="list-style-type: none">• 1-CH-MOV-1115B• 1-CH-MOV-1115D
	RO/BOP	ATTACHMENT 2 of 1-E-0 2. Verify closed or close CHG pump suction from VCT MOVs. <ul style="list-style-type: none">• 1-CH-MOV-1115C• 1-CH-MOV-1115E
	RO/BOP	ATTACHMENT 2 of 1-E-0 3. Verify running or start at least two CHG pumps. (listed in preferred order) <ul style="list-style-type: none">• 1-CH-P-1C• 1-CH-P-1B• 1-CH-P-1A
	RO/BOP	ATTACHMENT 2 of 1-E-0 4. Verify opened or open HHSI to cold legs MOVs. <ul style="list-style-type: none">• 1-SI-MOV-1867C• 1-SI-MOV-1867D
	RO/BOP	ATTACHMENT 2 of 1-E-0 5. Verify closed or close CHG line isolation MOVs. <ul style="list-style-type: none">• 1-CH-MOV-1289A• 1-CH-MOV-1289B

Simulator Guide Attachment 2Attachment 2 of 1-E-0

	RO/BOP	<p>ATTACHMENT 2 of 1-E-0</p> <p>6. Verify closed or close Letdown orifice isolation valves.</p> <ul style="list-style-type: none"> • 1-CH-HCV-1200A • 1-CH-HCV-1200B • 1-CH-HCV-1200C
	RO/BOP	<p>ATTACHMENT 2 of 1-E-0</p> <p>7. Verify opened or open LHSI suction from RWST MOVs.</p> <ul style="list-style-type: none"> • 1-SI-MOV-1862A • 1-SI-MOV-1862B
	RO/BOP	<p>ATTACHMENT 2 of 1-E-0</p> <p>8. Verify opened or open LHSI to cold legs MOVs.</p> <ul style="list-style-type: none"> • 1-SI-MOV-1864A • 1-SI-MOV-1864B
	RO/BOP	<p>ATTACHMENT 2 of 1-E-0</p> <p>9. Verify running or start at least one LHSI pump.</p> <ul style="list-style-type: none"> • 1-SI-P-1A • 1-SI-P-1B
	RO/BOP	<p>ATTACHMENT 2 of 1-E-0</p> <p>10. Verify High Head SI flow to cold legs indicated.</p> <ul style="list-style-type: none"> • 1-SI-FI-1961 • 1-SI-FI-1962 • 1-SI-FI-1963 • 1-SI-FI-1943 or 1-SI-FI-1943A <p><i>Abnormal flow indication will exist to "A" Loop – Team may decide to align to Th injection to restore normal SI flow.</i></p>

Simulator Guide Attachment 2Attachment 2 of 1-E-0

	RO/BOP	<p>ATTACHMENT 2 of 1-E-0</p> <p>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.</p> <ul style="list-style-type: none">• Alternate SI to Cold legs• Hot leg injection <p>RO will either open 1-SI-MOV-1842, or align HHSI to Th. This will require local actions to energize the associated supply breakers.</p>
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Simulator Guide Attachment 3**1-E-0 Attachment 3**

NUMBER 1-E-0	ATTACHMENT TITLE AUXILIARY VENTILATION AND AC POWER VERIFICATION	ATTACHMENT 3
REVISION 61		PAGE 1 of 5

1. ____ Verify or place REFUEL SFTY MODE switches in NORMAL.

2. ____ Verify 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

Simulator Guide Attachment 3**1-E-0 Attachment 3**

NUMBER 1-E-0	ATTACHMENT TITLE AUXILIARY VENTILATION AND AC POWER VERIFICATION	ATTACHMENT 3
REVISION 61		PAGE 2 of 5

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. ____ Verify filtered exhaust flow: (as read on FI-VS-117A and FI-VS-117B)

- ☐ • Total flow - GREATER THAN 32400 cfm

AND

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

Simulator Guide Attachment 3**1-E-0 Attachment 3**

NUMBER 1-E-0	ATTACHMENT TITLE AUXILIARY VENTILATION AND AC POWER VERIFICATION	ATTACHMENT 3
REVISION 61		PAGE 3 of 5

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. ____ Verify stopped or stop 1-VS-AC-4.
8. ____ Place 1-VS-43-VS103X, MCR ISOLATION switch to the OFF position.
9. ____ Verify closed or close MCR isolation dampers.
- ☐ • 1-VS-MOD-103A
 - ☐ • 1-VS-MOD-103B
 - ☐ • 1-VS-MOD-103C
 - ☐ • 1-VS-MOD-103D
10. ____ IF any MCR PDI on Unit 2 Vent Panel NOT indicating positive pressure, THEN place the following switches to OPEN.
- ☐ • 1-VS-SOV-322, EMERG AIR DUMP TO CONTROL RM
 - ☐ • 1-VS-SOV-100, EMERG AIR DUMP TO C.R.
- NOTE:** The timer should be set for 50 minutes, minus the number of minutes since Safety Injection initiation.
11. ____ Set timer. WHEN SI has been in progress for 50 minutes (when timer goes off), THEN immediately perform Step 18 to start one Emergency Supply Fan.

Simulator Guide Attachment 3**1-E-0 Attachment 3**

NUMBER 1-E-0	ATTACHMENT TITLE AUXILIARY VENTILATION AND AC POWER VERIFICATION	ATTACHMENT 3
REVISION 61		PAGE 4 of 5

12. ____ 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)
13. ____ IF any reading NOT positive, THEN initiate Attachment 6 to secure MCR boundary fans.
14. ____ Verify initiated or initiate 0-AP-50.00, OPPOSITE UNIT EMERGENCY.
15. ____ Verify 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
16. ____ IF both of the following conditions exist, THEN verify that Load Shed is activated.
- ☐ • Unit 2 - SUPPLIED BY RSST
 - ☐ • Unit 2 RCPs - RUNNING
17. ____ IF Load Shed is required and not activated, THEN initiate 0-AP-10.10, LOSS OF AUTO LOAD SHED.

Simulator Guide Attachment 3**1-E-0 Attachment 3**

NUMBER 1-E-0	ATTACHMENT TITLE	ATTACHMENT 3
REVISION 61	AUXILIARY VENTILATION AND AC POWER VERIFICATION	PAGE 5 of 5

***** :

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.

***** :

18. WHEN SI has been in progress for 50 minutes (when timer goes off), THEN 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 18 Caution.

Facility: <u>Surry</u>	Scenario No.: <u>2</u>	Op-Test No.: <u>2009-301</u>	
Examiners: _____ Operators: _____ _____ _____			
<p>Initial Conditions: Unit 1 is at 100% power and has been since the last refueling outage. All systems and crossties are operable with the following exception:</p> <ul style="list-style-type: none"> 1-FW-P-2, Turbine Driven Auxiliary Feedwater Pump, is tagged out for governor valve maintenance. 62 hours remain in the 72-hour Technical Specification 3.6.F.1 clock. <p>Additionally, thunderstorms and high winds are forecast for the area for the next 12 hours. OC-21 is in effect and being coordinated by the desk SRO.</p> <p>Turnover: Maintain Unit 1 at 100% power and prepare for the return to service of 1-FW-P-2 by the end of your shift. Last shift received annunciator 1A-A4 (ACCUM TK 1A Hi-Lo LVL) and verified Technical Specification compliance. A walkdown of the accumulator revealed a sample line drain valve leaking by which has been resolved. You are to fill the accumulator immediately after assuming the watch to normal operating level in accordance with 1-OP-SI-002, Safety Injection Accumulators. The current PSA analysis for plant conditions is green for both units.</p>			
Event No.	Malf. No.	Event Type*	Event Description
1	TBD	N- BOP/SRO	Fill "A" Safety Injection Accumulator in accordance with 1-OP-SI-002.
2	TBD	I- RO/SRO TS- SRO	Selected turbine 1 st stage impulse pressure channel III fails high, resulting in outward rod motion requiring placing rod control to manual.
3	TBD	I- RO/SRO TS- SRO	Pressurizer pressure control channel 1445 fails high resulting in pressurizer PORV 1-RC-PCV-1456 opening, requiring manual action to close.
4	TBD	M- All C – RO/SRO	"A" main steam trip valve spuriously closes resulting in reactor trip. The reactor trip is complicated by the failure of the MSR steam line to isolate during the immediate actions of 1-E-0.
5	TBD	M- All C – BOP/SRO	"A" main steam line faults in safeguards upstream of the main steam trip valve (unisolable). The performance of 1-E-0 is complicated by a failure of the blowdown trip valves to close automatically.
6	TBD	M- All	One motor driven auxiliary feedwater pump will trip, followed shortly by the loss of the remaining motor driven auxiliary feedwater pump. This will result in a total loss of feed capability to the steam generators. Also, auxiliary feedwater crosstie from the opposite unit will be unsuccessful requiring restoration of main feedwater in accordance with 1-FR-H.1.
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS) Technical Specifications			

Surry 2009- NRC Exam Scenario #2**Event #1**

The operating team will fill the “A” safety injection accumulator to normal operating level in accordance with 1-OP-SI-002, Safety Injection Accumulators after assuming the watch. This evolution will be briefed prior to turnover. The unit supervisor will direct the BOP to perform these actions. Field operator(s) will support task performance as required.

Verifiable Action: (BOP) Numerous board manipulations as required to fill the “A” accumulator.

Event #2

First stage pressure transmitter (MS-PT-446) will fail high. This will result in outward rod motion which will be stopped by the RO placing rod control in MANUAL. The team will enter 0-AP-53.00 (Loss of Vital Instrumentation/Controls), place all main feedwater regulating valves in MANUAL and swap control to the unaffected 1st stage pressure transmitter. The team will restore rod control to automatic prior to exiting AP-53.00. The SRO will evaluate technical specifications.

Verifiable Actions: (RO) Place rod control in MANUAL due to outward rod motion.

Technical Specifications:

- 3.7-1 item 20.b & e – OA #13 (Verify permissive status within 1 hour in accordance with 1-OPT-RP-001, Check of Permissive Status Lights P-6, P7, P-8, and P-10).
- 3.7-2 item 1.e.1 – OA #20 (Place inoperable channel in trip within 72 hours).

Event #3

1-RC-PT-1445 will fail high causing 1-RC-PCV-1456 to open. The RO should close 1-RC-PCV-1456 and the SRO will direct entry into 0-AP-53.00 (Loss of Vital Instrumentation / Controls) and transition to AP-31.00 (Increasing or Decreasing RCS Pressure).

Verifiable Actions: (RO) Close 1-RC-PCV-1456.

Technical Specifications:

- 3.1.A.6 – Close associated block valve within 1 hour.

Event #4

“A” main steam trip valve spuriously closes resulting in reactor trip. The reactor trip is complicated by the failure of the MSR steam line to isolate during the immediate actions of 1-E-0. Team will transition out of 1-E-0 to 1-ES-0.1 (Reactor Trip Response).

Verifiable Actions: (All) Manual reactor trip (or AUTO depending on team response).
(RO) Manual isolation of steam to the MSRs in accordance with 1-E-0 immediate actions, step 2 RNO.

Event #5

There is an uncontrolled depressurization of the 'A' steam generator due to unisolable steam leak inside the Main Steam Valve House. SRO should re-enter 1-E-0 and perform a safety injection. The performance of 1-E-0 is complicated by the failure of the blowdown trip valves to close automatically.

Verifiable Actions: (BOP) Manual closure of blowdown trip valves in accordance with 1-E-0 Attachment 1, step 1.
(RO) Isolate the faulted steam generator in accordance with 1-E-0 Attachment 9.

Critical Task: **[WOG E-2 – A] Isolate feed flow to and steam flow from the faulted S/G before RCS temperature is less than 400 degrees AND before transition out of E-2 AND within 30 minutes of the MSLB.**

Actions required to accomplish:

- Close 1-FW-MOV-151E
- Close 1-FW-MOV-151F

Event #6

One motor driven auxiliary feedwater pump will trip, followed shortly by the loss of the remaining motor driven auxiliary feedwater pump. This will result in a total loss of auxiliary feed capability to the steam generators. Also, auxiliary feedwater crosstie from the opposite unit will be unsuccessful requiring restoration of steam generator level using main feedwater in accordance with 1-FR-H.1.

Verifiable Actions: (BOP) Establish heat sink with main feedwater pump flowing to intact SGs.

Critical Tasks: **[WOG FR-H.1 – A] Establish heat sink with main feedwater pump flowing to intact SGs prior to two out of three SGs WR levels less than 7%.**

Actions required to accomplish:

- Reset Safety Injection
- Depress Feedwater Reset Pushbuttons
- Start 1-FW-P-1A or B
- Open 1-FW-MOV-150A or B
- Throttle open either the Main Feed Water Reg Valve or Main Feed Water Reg Valve Bypass Valve associated with the non-faulted steam generators

Initial Conditions:	100% Power IC, MOL – Cycle 23. The unit has been at 100% power since the last refueling outage.		
Pre-load malfunctions: <ul style="list-style-type: none"> ○ Disable 1-MS-FCV-104 switch to OPEN. ○ Disable auto-closure of all blowdown trip valves. 			
Equipment Status/ Procedures/ Alignments/ Data Sheets/ etc.: <ul style="list-style-type: none"> ○ 1-FW-P-2 tagged out for planned maintenance 			
Turnover:	<ul style="list-style-type: none"> • Maintain full power operation. Unit 2 is at 100% power with all systems operable. • When turnover complete, fill 1-SI-TK-1A to normal operating level iaw 1-OP-SI-002. 		
All systems and crossties are operable with the following exceptions: <ul style="list-style-type: none"> • 1-FW-P-2 is tagged out for governor valve replacement- 62 hours remain in the 72 hour T.S. 3.6 clock. 			
Event	Malf. #'s	Severity	Instructor Notes and Required Feedback
1	N/A	N/A	Fill "A" Safety Injection accumulator.
2	MS1401	N/A	Impulse pressure channel III fails high.
3	RC4802	N/A	Pressurizer pressure control channel 1445 fails high.
4	MS0901	N/A	"A" Main Steam Trip Valve spuriously closes.
5	MS0401	N/A	"A" main steam line fault upstream of main steam trip valve (in Safeguards)
6	FW0701/FW0702	N/A	Loss of motor driven Auxiliary feedwater pump- loss of AFW capability.

OPERATING PLAN:

- The Unit has been at 100% power since the last refueling outage.
- 1-FW-P-2 is tagged out for governor valve replacement- 62 hours remain in the 72 hour T.S. 3.6 clock. Pump is expected to return to service in 40 hours.
- Unit 2 is at 100% Power with all systems and crossties operable.
- Maintain full power operation.
- Fill 1-SI-TK-1A to normal operating level after assuming watch responsibilities.

Op-Test No.: Surry 2009-301 Scenario No.: 2 Event No.: 1

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Event Description: Fill 1-SI-TK-1A to normal operating level in accordance with 1-OP-SI-002.

Cue: When team ready.

Time	Position	Applicant's Action or Behavior																		
	BOP	<p>Precautions and limitations of 1-OP-SI-002:</p> <p>4.1 An increase in accumulator volume of $\geq 1\%$ of tank volume (cumulative indicated level increase of 7.2%) from sources other than the RWST, requires a sample within 6 hours to verify that boron concentration is in specification.</p> <p>4.2 The desired accumulator level for normal operations is a minimum level of 70% on the highest channel of SI accumulator level indication. If an accumulator is being frequently filled due to leakage, it should normally be filled at 63% and filled to a level of 75%.</p> <p>4.3 Accumulators should not be drained to account for RCS inleakage unless the Accumulator has been sampled.</p> <p>4.4 One Accumulator may be isolated for a period not to exceed 4 hours.</p> <p>4.5 The Administrative and Technical Specification limits for the Safety Injection Accumulators are as follows:</p> <table border="1"> <thead> <tr> <th colspan="3">SAFETY INJECTION ACCUMULATOR LIMITS</th></tr> <tr> <th>Parameter</th><th>Administrative Limit</th><th>Tech Spec Limit</th></tr> </thead> <tbody> <tr> <td>Level</td><td>Between 60.2% and 76.4%</td><td>Between 55.9% and 80.7%</td></tr> <tr> <td>Δ Level</td><td>N/A</td><td>Increase of $\geq 7.2\%$ of Indicated level</td></tr> <tr> <td>Pressure</td><td>N/A</td><td>Greater than 600 psia</td></tr> <tr> <td>Boron</td><td>Greater than 2350 ppm</td><td>Greater than 2250 ppm</td></tr> </tbody> </table> <p>4.6 If the person performing the Admin Control function for 1-SI-26 or 2-SI-26 is to be stationed outside of the RCA, then they should check out the proper dosimetry prior to assuming Admin Control responsibilities.</p> <p>4.7 The STA must be notified prior to adding or removing water from the RWST in the event that a leakrate is being performed. (Ref. 2.4.7)</p> <p>RO will contact STA and report pending accumulator fill</p>	SAFETY INJECTION ACCUMULATOR LIMITS			Parameter	Administrative Limit	Tech Spec Limit	Level	Between 60.2% and 76.4%	Between 55.9% and 80.7%	Δ Level	N/A	Increase of $\geq 7.2\%$ of Indicated level	Pressure	N/A	Greater than 600 psia	Boron	Greater than 2350 ppm	Greater than 2250 ppm
SAFETY INJECTION ACCUMULATOR LIMITS																				
Parameter	Administrative Limit	Tech Spec Limit																		
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Δ Level	N/A	Increase of $\geq 7.2\%$ of Indicated level																		
Pressure	N/A	Greater than 600 psia																		
Boron	Greater than 2350 ppm	Greater than 2250 ppm																		

Op-Test No.: Surry 2009-301 Scenario No.: 2 Event No.: 1

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Event Description: Fill 1-SI-TK-1A to normal operating level in accordance with 1-OP-SI-002.

Cue: When team ready.

	BOP	<p>Section 5.1 – Filling Any Safety Injection Accumulator</p> <p>Notes prior to step 5.1.1:</p> <ul style="list-style-type: none"> • Administrative control of 1-SI-32 and 1-SI-26 or 2-SI-26 must be assigned to two different operators. • Administrative control of 1-SI-32 is not required unless CTMT integrity is required. • Administrative control of 1-SI-26 or 2-SI-26 is not required unless the RCS is greater than or equal to 350°F / 450 psig.
	BOP	<p>5.1.1 Verify and maintain RWST level greater than 97%. IF RWST level is not or cannot be maintained greater than 97%, THEN the administrative control requirements of 1-SI-26 or 2-SI-26 are not met AND these valves must be closed and the administrative controls secured. (Reference 2.3.9)</p> <p>RO verifies adequate RWST level exists for accumulator fill</p>
	BOP /SRO	<p>5.1.2 Notify Shift Supervision that the following valves will require administrative control.</p> <ul style="list-style-type: none"> • 1-SI-32, Hydro Test Pump Disch Isol to U-1 Accum, will be opened and administrative control will be required IAW Attachment 1. • 1-SI-26, Hydro Test Pump Suct Isol from U-1 RWST, or 2-SI-26, Hydro Test Pump Suct Isol, will be opened and administrative control will be required IAW Attachment 3. <p><i>Evaluator's note- team will be told that briefing of administrative controls already performed.</i></p>
	BOP	<p>5.1.3 Verify open or open 1-SI-29, Hydro Test Pump Disch Isol.</p> <p>5.1.4 Verify open or open 1-SI-27, Hydro Test Pump Suct Isol.</p> <p>5.1.5 Close breaker 2A2-1-5A, Hydro Test Pump, for 1-SI-P-2.</p>

Op-Test No.: Surry 2009-301 Scenario No.: 2 Event No.: 1

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Event Description: Fill 1-SI-TK-1A to normal operating level in accordance with 1-OP-SI-002.

Cue: When team ready.

	BOP	<p>5.1.6 IF Hydro Pump suction is desired from Unit 1 RWST, THEN perform the following. Otherwise, enter N/A.</p> <ol style="list-style-type: none"> Open 1-SI-26, Hydro Test Pump Suct Isol from U-1 RWST. Verify closed or close 2-SI-26, Hydro Test Pump Suct Isol. <p>RO will direct hydro pump suction to be aligned to unit one.</p>
	BOP	<p>5.1.7 IF Hydro Pump suction is desired from Unit 2 RWST, THEN perform the following. Otherwise, enter N/A.</p> <ol style="list-style-type: none"> Open 2-SI-26, Hydro Test Pump Suct Isol. Verify closed or close 1-SI-26, Hydro Test Pump Suct Isol from U-1 RWST. <p>This step will not be performed.</p>
	BOP	<p>5.1.8 Align discharge of 1-SI-P-2, HYDRO TEST PP, to Unit 1 Containment by unlocking and opening 1-SI-32, Hydro Test Pump Disch Isol to U-1 Accum.</p>
	BOP	<p>Notes prior to step 5.1.9:</p> <ul style="list-style-type: none"> Accumulators must NOT be cross-tied while filling is in progress. Two Accumulator Fill HCVs may be opened momentarily (under no circumstances for greater than one hour) while swapping the fill lineup from one Accumulator to another. (Reference 2.3.7, 2.3.8) Accumulators may be cross-tied if the Reactor is not critical.
	BOP	<p>5.1.9 Open the selected ACCUM FILL ISOL VV. Check the valve(s) used.</p> <ul style="list-style-type: none"> HCV-1851A HCV-1851B HCV-1851C <p>RO opens 1-SI-HCV-1851A.</p>
	BOP	<p>5.1.10 Place HIC-947, ACCUMS MAKEUP-HYDRO TEST PP FLOW SETPT, to zero percent output.</p>
	BOP	<p>5.1.11 Start 1-SI-P-2.</p>

Op-Test No.: Surry 2009-301 Scenario No.: 2 Event No.: 1

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Event Description: Fill 1-SI-TK-1A to normal operating level in accordance with 1-OP-SI-002.

Cue: When team ready.

	BOP	5.1.12 Place HIC-947 to 5 percent output for 1 minute to allow pump to self-vent.
	BOP	5.1.13 Adjust HIC-947 as desired to regulate pump capacity.
	BOP	Notes prior to step 5.1.14: <ul style="list-style-type: none"> • The accumulators should be filled to as close to 70% as possible, with 70% on the highest channel of accumulator level indication being the minimum level. • During accumulator recirculation, accumulator level may be cycled between the high and low level alarm setpoints.
	BOP	5.1.14 <u>WHEN</u> Accumulators have reached desired levels, <u>THEN</u> place HIC-947 to zero percent output.
	BOP	5.1.15 Wait 15 seconds for the speed changer motor to reduce speed.
	BOP	5.1.16 Stop 1-SI-P-2.
	BOP	5.1.17 Wait 60 seconds for the pump to stop.
	BOP	5.1.18 Close the selected ACCUM FILL ISOL VV. Check the valve(s) used. <ul style="list-style-type: none"> • HCV-1851A • HCV-1851B • HCV-1851C
	BOP	5.1.19 Close and lock 1-SI-32.
	BOP	5.1.20 Close the Hydro Pump suction valve opened in Step 5.1.6.a or 5.1.7.a. ____ 1-SI-26 OR ____ 2-SI-26
	BOP	5.1.21 Open breaker 2A2-1-5A, Hydro Test Pump, for 1-SI-P-2.

Op-Test No.: Surry 2009-301 Scenario No.: 2 Event No.: 1**Page 10 of 79**

Event Description: Fill 1-SI-TK-1A to normal operating level in accordance with 1-OP-SI-002.

Cue: When team ready.

	BOP /SRO	5.1.22 Notify Shift Supervision that Administrative Control of 1-SI-32 is no longer required.
	BOP /SRO	5.1.23 Notify Shift Supervision that Administrative Control of 1-SI-26 or 2-SI-26 is no longer required.
	BOP	5.1.24 Update the Unit 1 Narrative Log to indicate that Administrative Control of 1-SI-32 and 1-SI-26 or 2-SI-26 is no longer required.
END	END	END

Op-Test No.: Surry 2009-301 Scenario No.: 2 Event No.: 2

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Event Description: Impulse Pressure Channel III Fails High.

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
	RO	<p>Diagnoses failure of 1-MS-PT-446 with the following indications/alarms:</p> <p>Alarms:</p> <ul style="list-style-type: none"> 1G-F8- ROD BANK D WITHDRAWAL 1G-B5- COMPUTER PRINTOUT ROD CONT SYS <p>Indications:</p> <ul style="list-style-type: none"> Outward control rod motion Impulse pressure channel III meter off-scale high <p>In accordance with the immediate actions of AP-53.00 the RO will take the rod control mode selector switch to MANUAL to stop rod motion.</p> <p><i>Evaluator's note- attachment 5 of this guide contains ARP 1G-F8 actions.</i></p>
	SRO	Enters 0-AP-53.00, Loss of Vital Instrumentation / Controls.
	RO	<p>[1] VERIFY REDUNDANT INSTRUMENT CHANNEL(S) INDICATION - NORMAL</p> <p>Verifies 1-MS-PI-1447, Turb 1st Stage Press, NORMAL.</p>
	RO	<p>[2] PLACE AFFECTED CONTROL(S)/COMPONENT(S) IN MANUAL CONTROL AND STABILIZE PARAMETER USING REDUNDANT INDICATION</p> <p>Places ROD CONTROL MODE SEL SWITCH to MAN and verifies rod motion stops.</p>
	SRO	<p>The team will hold a transient brief. During the brief the failure of 1-MS-PI-1446 will be discussed.</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>

Op-Test No.: Surry 2009-301 Scenario No.: 2 Event No.: 2

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Event Description: Impulse Pressure Channel III Fails High.

Cue: By Examiner.

	RO	3. VERIFY REACTOR POWER – LESS THAN OR EQUAL TO 100%. RO will identify that reactor power is less than 100%.
	SRO	NOTE: <ul style="list-style-type: none"> Step 4 failures are listed in order of performance priority. Only the failed instrument/control and associated step number should be read aloud. When the affected instrument/controller malfunction(s) has been addressed by this procedure, recovery actions should continue at Step 14.
	RO	*4 DETERMINE THE FAILED INSTRUMENT / CONTROL AND GO TO APPROPRIATE STEP. <ul style="list-style-type: none"> Turbine First Stage Pressure, Step 9 The RO will identify that 1-MS-PI-1446 has failed high.
	RO	9. CHECK TURBINE FIRST STAGE PRESSURE CHANNELS - NORMAL RO will report 1-MS-PI-1446 failed high.
	SRO	Step 9 RNO- GO TO Attachment 2.
		Attachment 2 of 0-AP-53.00 Caution and Note prior to step 1: CAUTION: Delta flux must be monitored and maintained within band if rods have moved. NOTE: Page 4 of this Attachment shows a one-line diagram of Turbine First Stage Pressure.

Op-Test No.: Surry 2009-301 Scenario No.: 2 Event No.: 2

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Event Description: Impulse Pressure Channel III Fails High.

Cue: By Examiner.

	RO/BOP	<p>Attachment 2 of AP-53.00</p> <ol style="list-style-type: none"> 1. IF the selected Turbine First Stage Pressure channel has failed, THEN do the following: <ol style="list-style-type: none"> a. Verify or place the ROD CONT MODE SEL switch in MANUAL. b. Select redundant Turbine First Stage Pressure channel IAW the following: <ol style="list-style-type: none"> 1. Verify or place STM DUMP CNTRL switch in OFF-RESET. 2. Verify or place ()-CP-43-()CP()01, SUDDEN LOSS LOAD DEFEAT switch in DEFEAT position. 3. Verify or place Main Feed Reg Valves in MANUAL: <ul style="list-style-type: none"> • ()-FW-FCV-()478, SG A FEED REG • ()-FW-FCV- ()488, SG B FEED REG • ()-FW-FCV-()498, SG C FEED REG 4. Verify or place TURB FIRST STAGE PRESS CH SEL switch to redundant channel. <p>RO will report rod control in MANUAL. RO or BOP will place dumps in OFF and 1-CP-43-1CP101 in DEFEAT. RO or BOP will place all feedwater regulating valves in MANUAL while other operator selects the redundant channel.</p>
	SRO	<p>Attachment 2 of AP-53.00</p> <p>Caution prior to step 2.</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>
	RO/BOP	<p>Attachment 2 of AP-53.00</p> <ol style="list-style-type: none"> 2. Return affected components to normal position IAW Shift Supervision direction: <ol style="list-style-type: none"> a. WHEN SG level returned to normal, THEN place Main Feed Reg Valves in AUTO: <ul style="list-style-type: none"> • ()-FW-FCV-()478, SG A FEED REG • ()-FW-FCV- ()488, SG B FEED REG • ()-FW-FCV-()498, SG C FEED REG

Cue: By Examiner.

	<div data-bbox="521 407 803 436">Attachment 2 of AP-53.00</div> <div data-bbox="521 459 604 489">NOTE:</div> <div data-bbox="568 489 1382 1144"> <ul style="list-style-type: none"> • 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. • If ()-MS-PT-()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 ()-MS-PT-()446 failing low and a load reject occurs, then all the steam dumps will open. AMSAC will not function six minutes after the failure. • If ()-MS-PT-()446 fails high, Steam Dump Demand will remain at 0%, and if a load reject signal is present, the dumps will not open (Steam Dump Tref is greater than Tave). However, if a trip signal does occur, the steam dumps will open as they now compare Tave to Tnoload. • If ()-MS-PT-()447 fails low, a load reject signal will develop, but the steam dumps will not open since there is no steam dump demand signal. However, the CP Bldg will be bypassed. The CP Bldg should be returned to service expeditiously to maintain secondary chemistry. AMSAC will not function six minutes after the failure. • If ()-MS-PT-()447 fails high, the load reject arming signal is effectively defeated. </div> <div data-bbox="373 1159 479 1197">RO/BOP</div> <div data-bbox="615 1167 1382 1845"> <ol style="list-style-type: none"> b. Return Steam Dumps to service IAW Shift Supervision direction. <ol style="list-style-type: none"> 1. Momentarily place STM DUMP MODE SEL switch in RESET. 2. Place STM DUMP CNTRL switch in ON. 3. Place ()-CP-43-()CP()01, SUDDEN LOSS LOAD DEFEAT switch in NORMAL position. 4. IF ()-MS-PT-()447 has failed, THEN restore the CP Bldg as required. <ol style="list-style-type: none"> a. Have the CP Bldg Operator open ()-CP-AOV-()22 in MANUAL. b. Close ()-CP-MOV-()00. c. Have the CP Bldg Operator slowly close ()-CP-AOV-()22 in MANUAL. d. Place ()-CP-AOV-()22 in AUTOMATIC and adjust setpoint to 62 psid. 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. c. Return Rod Control to Auto IAW Shift Supervision direction. <ol style="list-style-type: none"> 1. Review appropriate ARP(s) to verify correct rod position. (for example, G-F-8) 2. Place the ROD CONT MODE SEL switch in AUTO. </div>
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Event Description: Impulse Pressure Channel III Fails High.

Cue: By Examiner.

		<p>Attachment 2 of AP-53.00</p> <p>3. Perform follow-up actions:</p> <ol style="list-style-type: none"> 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. Refer to the following Tech Spec 3.7 items. <ul style="list-style-type: none"> Table 3.7-1, 20 (Refer to ()-OPT-RP-001 - one hour clock) and Table 3.7-2, 1.e Refer to VPAP-2802 for AMSAC inoperability. IF no other instrumentation failure exists, THEN GO TO Step 14. <p>SRO will determine the following Technical Specifications required actions:</p> <ul style="list-style-type: none"> 3.7-1 item 20.b & e – OA #13 (Verify permissive status within 1 hour in accordance with 1-OPT-RP-001, Check of Permissive Status Lights P-6, P7, P-8, and P-10). 3.7-2 item 1.e.1 – OA #20 (Place inoperable channel in trip within 72 hours). <p><i>Evaluator's note- 1-OPT-RP-001 actions are contained in attachment 6 of this guide.</i></p>
	SRO/RO	<p>AP-53.00- Step 14 (Back in body of procedure)</p> <p>14. Review ()-OPT-RX-001, reactor power calorimetric using PCS computer program, to determine operability of calorimetric and need to perform ()-OPT-RX-007,</p> <p>SRO/RO determines that OPT-RX-001 is not impacted and OPT-RX-007 will not need to be performed.</p>
	SRO	<p>15. CHECK FAILED INSTRUMENT - IS A REGULATORY GUIDE 1.97 VARIABLE</p> <p><i>SRO directs STA to review Reg. Guide 1.97. The STA will report that 1-MS-PT-1446 is not a Reg. Guide 1.97 component.</i></p> <p><i>RNO is to go to step 17.</i></p>

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Event Description: Impulse Pressure Channel III Fails High.

Cue: By Examiner.

	SRO	<p>17. Review the following:</p> <ul style="list-style-type: none"> • TS 3.7 • VPAP-2802 • TRM Section 3.3, Instrumentation <p>SRO will determine the following Technical Specifications required actions:</p> <ul style="list-style-type: none"> • 3.7-1 item 20.b & e – OA #13 (Verify permissive status within 1 hour in accordance with 1-OPT-RP-001, Check of Permissive Status Lights P-6, P7, P-8, and P-10). • 3.7-2 item 1.e.1 – OA #20 (Place inoperable channel in trip within 72 hours). <p><i>SRO directs STA to review VPAP-2802 and TRM Section 3.3. The STA reports that he has completed his reviews; VPAP-2802 is impacted by AMSAC, but the TRM is not impacted</i></p>
	SRO	<p>18. CHECK ADDITIONAL INSTRUMENT / CONTROLLER MALFUNCTION - EXISTS</p> <p>The team will identify that no additional failures exist, proceed to the RNO section, and this will direct the team to Step 20.</p>
	SRO	<p>20. PROVIDE NOTIFICATIONS AS NECESSARY:</p> <ul style="list-style-type: none"> • Shift Supervision • OMOC • STA (PRA determination) • I&C
End	End	End

Op-Test No.: Surry 2009-301 Scenario No.: 2 Event No.: 3

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Event Description: Pressurizer Pressure control channel 1-RC-PT-1445 fails high.

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
	RO	<p>Diagnose the failure with the following indications:</p> <p>Alarms:</p> <ul style="list-style-type: none"> 1C-D7 PRZR PWR RELIEF LINE HI TEMP 1C-F8 PRZR HI PRESS 1C-F7 PRZR RELIEF TK HI PRESS 1D-H4 PRZR SFTY VV PWR RELIEF VV OPEN <p>Indications:</p> <ul style="list-style-type: none"> Decreasing PRZR pressure 1-RC-PCV-1456 open light ON <p>The following actions will be taken in accordance with AP-53.00:</p> <ul style="list-style-type: none"> Verifies PRZR pressure is low. Places control switch for 1-RC-PCV-1456 to CLOSE.
	SRO	Enters 0-AP-53.00, Loss of Vital Instrumentation / Controls.
	RO	<p>[1] VERIFY REDUNDANT INSTRUMENT CHANNEL (S) INDICATION - NORMAL</p> <p>Verifies 1-RC-PI-1444 (RCS pressure) is indicating normally. Team may look at pressure on CETC or the RCS pressure protection channels.</p>
	RO	<p>[2] PLACE AFFECTED CONTROL(S)/COMPONENT(S) IN MANUAL CONTROL AND STABILIZE PARAMETER USING REDUNDANT INDICATION</p> <p>Closes the Pressurizer PORV (1-RC-PCV-1456).</p> <p>Although the SRO may not report it at this time, TS 3.1.A.6 is applicable.</p>

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Event Description: Pressurizer Pressure control channel 1-RC-PT-1445 fails high.

Cue: By Examiner.

	SRO	<p>The team will hold a transient brief. During the brief the failure of 1-RC-PI-1445 will be discussed.</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>
	RO	<p>3. VERIFY REACTOR POWER – LESS THAN OR EQUAL TO 100%.</p> <p>RO will identify that reactor power, by ΔT, is less than 100%.</p>
	<p>SRO</p> <p>RO</p>	<p>NOTE:</p> <ul style="list-style-type: none"> Step 4 failures are listed in order of performance priority. Only the failed instrument/control and associated step number should be read aloud. When the affected instrument/controller malfunction(s) has been addressed by this procedure, recovery actions should continue at Step 14. <p>*4 DETERMINE THE FAILED INSTRUMENT / CONTROL AND GO TO APPROPRIATE STEP.</p> <ul style="list-style-type: none"> PRZR Pressure Control, Step 5 <p>The RO will identify that 1-RC-PI-1445 has failed high.</p>
	RO	<p>5. CHECK THE FOLLOWING INSTRUMENTS/CONTROLS – AFFECTED</p> <ul style="list-style-type: none"> Nuclear Instrumentation Pressurizer Pressure control
	<p>SRO</p> <p>RO</p>	<p>NOTE: RCS pressure decrease will cause a slight decrease in RCS Tave due to negative reactivity from the moderator pressure coefficient.</p> <p>6. CHECK PRZR SPRAY VALVE CONTROLLERS – NORMAL.</p> <p>Spray Controllers are operating normally.</p>

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Event Description: Pressurizer Pressure control channel 1-RC-PT-1445 fails high.

Cue: By Examiner.

	SRO/RO	<p>CAUTION: Delta flux must be monitored and maintained within band if rods have moved.</p> <p>7. GO TO THE APPROPRIATE ABNORMAL PROCEDURE</p> <ul style="list-style-type: none"> ()-AP-4.00, Nuclear Instrumentation Malfunction ()-AP-31.00, Increasing or Decreasing RCS Pressure. <p>Team transitions to AP-31.00, Increasing or Decreasing RCS Pressure.</p>
	SRO	Enters 1-AP-31.00, INCREASING OR DECREASING RCS PRESSURE
	SRO	<p>NOTE:</p> <ul style="list-style-type: none"> EIPs may be applicable. Attachment 1 may be referred to for a diagram of the pressure control system. <p>1. CHECK TURBINE LOAD - STABLE</p>
	RO	2. CHECK RCS PRESSURE - DECREASING.
	SRO	<p>CAUTION:</p> <ul style="list-style-type: none"> Decreasing RCS pressure will cause the OT ΔT setpoint to decrease. A Safety Injection may occur if the unit is not tripped prior to RCS pressure decreasing below 2100 psig. <p>NOTE:</p> <ul style="list-style-type: none"> PRZR PORV 1-RC-PCV-1455C should be declared inoperable if the Master Controller is placed in Manual. RCS pressure decrease will cause a slight decrease in RCS Tave due to negative reactivity from the moderator pressure coefficient. <p>3. CHECK MASTER CONTROLLER RESPONSE - NORMAL FOR PLANT CONDITIONS</p> <ul style="list-style-type: none"> 1-RC-PC-1444J
	RO	Reports no issues with the master pressure controller.

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Event Description: Pressurizer Pressure control channel 1-RC-PT-1445 fails high.

Cue: By Examiner.

	RO	<p>*4. CHECK RCS PRESSURE – STILL DECREASING.</p> <p>Reports RCS pressure is not decreasing.</p> <p>RNO : GO TO Step 17</p> <p>Team may answer this question as if no actions were taken in AP-53.00 (acceptable method). If so, the team will ...</p> <ol style="list-style-type: none"> 5. Verify no pressure loss through the PRZR PORVs <ol style="list-style-type: none"> a) Close or verify close PRZR PORVs b) Close Block MOV to isolate any PORV which will not close or is leaking. 6. Turn on all PRZR Heaters 7. Verify Closed or close 1-CH-HCV-1311, Aux Spray Isolation. 8. Check Aux Spray Line – Leakage Suspected 8. RNO – GO TO STEP 10 10. Place Spray Valve Controllers in Manual and adjust demand to zero. 11. Check either of the following conditions: <ol style="list-style-type: none"> o Either Spray Valve will not close o Either Spray valve is suspected of leaking 11. RNO – GO TO STEP 13 13. Check RCS Pressure – Stabilizing or increasing 14. GO TO STEP 17
	SRO	<p>17. NOTIFY THE FOLLOWING:</p> <ul style="list-style-type: none"> • OM on call • STA • Instrument Shop
	SRO/RO	<p>18. CHECK PRZR PORVS – EITHER INOPERABLE</p> <ul style="list-style-type: none"> • 1-RC-PCV-1455C • 1-RC-PCV-1456 <p>Reports that 1-RC-PCV-1456 is inoperable.</p> <p>If the team placed the spray valves in manual, they may place them back in automatic control.</p>

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Event Description: Pressurizer Pressure control channel 1-RC-PT-1445 fails high.

Cue: By Examiner.

	RO	19. CLOSE BLOCK VALVE FOR INOPERABLE PORV <ul style="list-style-type: none"> 1-RC-MOV-1536 if 1-RC-PCV-1455C inoperable 1-RC-MOV-1535 if 1-RC-PCV-1456 inoperable Closes 1-RC-MOV-1535.
	SRO	SRO Exits 1-hour TS clock to close the associated block valve for an inoperable PORV (i.e., PORV is in manual)
	BOP	20. MAINTAIN STABLE TURBINE LOAD UNTIL PRESSURE CONTROL SYSTEM IS RETURNED TO NORMAL
	SRO	Determines applicable Technical Specifications: <ul style="list-style-type: none"> LCO 3.12.F.2 <i>if pressurizer pressure was less than 2205 psig.</i> LCO 3.1.A.6.b for PORV 1456 (close block valve w/in 1 hour).
End	End	End

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Event Description: Main Steam Trip Valve Spurious Closure and Reactor Trip

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
	RO/BOP	<p>Diagnose the failure with the following indications:</p> <p>Alarms:</p> <ul style="list-style-type: none"> • 1H-A8- STM LINE ISOL TRIP VVS CLOSED • 1H-A2- ΔT DEVIATION LOOP 1A > < LOOP 1B • 1H-C2- ΔT DEVIATION LOOP 1A > < LOOP 1C • 1F-F5- STM GEN 1B CH 3 HI STM LINE FLOW • 1F-F6- STM GEN 1C CH 3 HI STM LINE FLOW • 1F-G5- STM GEN 1B CH 4 HI STM LINE FLOW • 1F-G6- STM GEN 1C CH 4 HI STM LINE FLOW • 1E-G10- STM GEN LO-LO LVL <p>Indications:</p> <ul style="list-style-type: none"> • Low steam flow on "A" S/G • High steam pressure on "A" S/G • Steam generator level alarms • "A" Main Steam Trip Valve closed indication <p>The SRO and/or RO will indicate a need to perform the immediate actions of 1-E-0, Reactor Trip or Safety Injection.</p>
	RO	<p>[1] VERIFY REACTOR TRIP:</p> <p>a. Manually trip reactor</p> <p>Pushes the reactor trip push buttons.</p> <p>b. Check the following:</p> <ul style="list-style-type: none"> • All Rods On Bottom light – LIT • Reactor trip and bypass breakers – OPEN • Neutron flux - DECREASING

Op-Test No.: Surry 2009-301 Scenario No.: 2 Event No.: 4

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Event Description: Main Steam Trip Valve Spurious Closure and Reactor Trip

Cue: By Examiner.

	RO	<p>[2] VERIFY TURBINE TRIP:</p> <p>a. Manually trip the turbine</p> <p>Pushes the turbine trip push buttons.</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"> • 1-MS-SOV-104
	RO	<p>Observes that 1-MS-FCV-104A/B/C/D are still open and performs step 2c RNO actions:</p> <p>c. RNO- IF reheater FCVs will NOT close, THEN close MSR steam supply MOVs.</p>
	RO	<p>Closes 1-MS-MOV-100A/B/C/D</p> <p>d. Verify generator output breakers – OPEN (Time Delayed)</p>
	RO	<p>[3] VERIFY BOTH AC EMERGENCY BUSES - ENERGIZED</p>

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Event Description: Main Steam Trip Valve Spurious Closure and Reactor Trip

Cue: By Examiner.

	RO	<p>[4] CHECK IF SI INITIATED:</p> <p>a) Check if SI is actuated:</p> <ul style="list-style-type: none"> LHSI pumps – RUNNING SI annunciators – LIT A-F-3 SI INITIATED – TRAIN A A-F-4 SI INITIATED – TRAIN B <p>a) RNO - Check if SI is required or imminent as indicated by any of the following:</p> <ul style="list-style-type: none"> Low PRZR Pressure <p>Identifies that pressurizer pressure is slowly recovering (or stable).</p> <ul style="list-style-type: none"> High CTMT Pressure <p>Identifies that containment pressure is stable at about 10.5 psia</p> <ul style="list-style-type: none"> High Steamline Differential Pressure <p>Identifies that there is no steam line differential pressure.</p> <ul style="list-style-type: none"> High Steam Line Flow with Low Tave or Low Line Pressure <p>Identifies no steam flow indicated and determines that SI is not required.</p>
	SRO	<p><u>IF</u> SI is <u>NOT</u> required, <u>THEN</u> GO TO 1-ES-0.1, REACTOR TRIP RESPONSE</p>
	SRO	<p>The team will hold a transition brief. During the brief the failures associated with the Main Steam Trip Valve and Turbine will be discussed..</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>Following the brief the team will transition to 1-ES-0.1. The team may dispatch personnel to investigate the main steam trip valve closure.</p>
	SRO	SRO initiates 1-ES-0.1

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Event Description: Main Steam Trip Valve Spurious Closure and Reactor Trip

Cue: By Examiner.

	<p>SRO</p> <p>RO</p>	<p>1-ES-0.1</p> <p>Note: 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> <p>1. MONITOR RCS AVERAGE TEMPERATURE</p> <ul style="list-style-type: none"> • STABLE AT 547°F <p style="text-align: center;"><u>OR</u></p> <ul style="list-style-type: none"> • TRENDING TO 547°F <p>RCS temperature is trending to 547 °F</p>
	BOP	<p>1-ES-0.1</p> <p>SRO may provide the BOP with Attachment 5 of 1-ES-0.1 for guidance on AFW control.</p> <p>Actions are summarized below:</p> <ol style="list-style-type: none"> 1. Maintain minimum AFW flow of 540 gpm with RCP(s) in service until one SG Narrow Range level is greater than 12% 2. Maintain minimum AFW flow of 350 gpm with NO RCPs running until one SG Narrow Range level is greater than 12% 3. 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.

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Event Description: Main Steam Trip Valve Spurious Closure and Reactor Trip

Cue: By Examiner.

	BOP	<p>1-ES-0.1</p> <p>2. CHECK FW STATUS</p> <p>a) Check RCS Average temperatures – LESS THAN 554°F</p> <p>b) Verify Feed Reg valves - CLOSED</p> <p>c) Close SG FW isolation MOVs</p> <ul style="list-style-type: none"> • 1-FW-MOV-154A • 1-FW-MOV-154B • 1-FW-MOV-154C <p>BOP closed 1-FW-MOV-154A, B, C</p> <p>d) Check AFW pumps - RUNNING</p> <ul style="list-style-type: none"> • Motor Driven AFW pumps • TD AFW pump <p>e) Verify total AFW flow – GREATER THAN 540 GPM (350 W/O RCPs)</p> <p>f) Check emergency buses – BOTH ENERGIZED</p> <p>g) Control feed flow to maintain narrow range level between 22% and 50%.</p>
End	End	End

Op-Test No.: Surry 2009-301 Scenario No.: 2 Event No.: 5

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Event Description: Main Steam Line Fault in Safeguards

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
	Team	<p>Diagnoses the 'A' SG is faulted with the following indications/alarms:</p> <p>Alarms:</p> <ul style="list-style-type: none"> • 1C-B8, PRZR LO PRESS • 1H-A4, Tavg >< Tref DEVIATION • 1A-F3, SI INITIATED TRAIN A • 1E-H10, STM LINES & HDR HI DP <p>Indications:</p> <ul style="list-style-type: none"> • Steam flow on "A" SG will increase • Steam line pressure will decrease on "A" SG • RCS Pressure will decrease • RCS Tave will decrease • Safety Injection will actuate <p>Other annunciators may also alarm as the transient continues.</p>
	SRO	Transitions back to 1-E-0.
	RO	<p>Only the performance of the high level steps 1,2, and 3 are required:</p> <p>[1] VERIFY REACTOR TRIP</p> <p>[2] VERIFY TURBINE TRIP</p> <p>[3] VERIFY BOTH AC EMERGENCY BUSES - ENERGIZED</p> <p>[4] CHECK IF SI INITIATED:</p> <p>a) Check if SI is actuated:</p> <ul style="list-style-type: none"> • LHSI pumps – RUNNING • SI annunciators – LIT <ul style="list-style-type: none"> ○ A-F-3 SI INITIATED – TRAIN A ○ A-F-4 SI INITIATED – TRAIN B <p>b) Manually initiate SI</p> <p>RO will manually initiate safety injection if an automatic safety injection has not occurred.</p>

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Event Description: Main Steam Line Fault in Safeguards

Cue: By Examiner.

	SRO	<p>Transient Brief</p> <p>The team will hold a transition brief. During the brief the steam line failure will be discussed.</p> <p><i>If asked - 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>
	SRO/BOP	5. Initiate Attachment 1 (Attachment 1 actions contained in attachment 1 of this guide.
	SRO/BOP	SRO may direct the RO to perform Attachment 9 of 1-E-0 for Faulted SG Isolation and AFW Control. This may or may not be initiated at any time during the performance of E-0. Attachment 9 actions are contained on attachment 4 of this guide.

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Event Description: Main Steam Line Fault in Safeguards

Cue: By Examiner.

	RO	<p>*6. CHECK RCS AVERAGE TEMPERATURE</p> <ul style="list-style-type: none"> • STABLE AT 547°F <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • TRENDING TO 547°F <p>The team will identify that RCS temperature is decreasing. The team should attribute this to the injection of SI into the RCS, AFW flow to the SGs, and the faulted SG and proceed to the RNO section of the step.</p>
	RO	<p>6. RNO – <u>IF</u> temperature less than 547°F <u>AND</u> decreasing, <u>THEN</u> do the following:</p> <ul style="list-style-type: none"> a) Stop dumping steam. b) <u>IF</u> cooldown continues, <u>THEN</u> control total feed flow. Maintain total feed flow greater than 350 gpm [450 gpm] until narrow range level greater than 12% [18%] in at least one SG. <p>If AFW was not isolated to the faulted SG with Attachment 9, the RO should isolate AFW to the faulted SG at this point.</p> <ul style="list-style-type: none"> c) <u>IF</u> cooldown continues, <u>THEN</u> close MSTVs. <p>The RO will close the main steam trip valves.</p>
	RO	<p>7. CHECK PRZR PORVs AND SPRAY VALVES:</p> <ul style="list-style-type: none"> a) PRZR PORVs – CLOSED b) PRZR spray controls <ul style="list-style-type: none"> • Demand at Zero (or) • Controlling Pressure c) PORV block valves - AT LEAST ONE OPEN

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Event Description: Main Steam Line Fault in Safeguards

Cue: By Examiner.

	<p>SRO</p> <p>RO</p>	<p>NOTE: 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 will NOT be less than 30 °F</p> <p>RNO for the step is to go to step 9.</p>
	BOP	<p>9. CHECK IF SGs ARE NOT FAULTED:</p> <ul style="list-style-type: none"> • Check pressures in all SGs <ul style="list-style-type: none"> • STABLE OR INCREASING AND • GREATER THAN 100 PSIG <p>BOP will observe a significant decrease in the steam pressure of ‘A’ SG. It will not be stable or increasing and depending on when the team arrives at this step pressure may be less than 100 psig. The team will proceed to the RNO portion of this step.</p> <p>9. RNO – <u>IF</u> any SG pressure decreasing in an uncontrolled manner <u>OR</u> is completely depressurized, <u>THEN</u> GO TO 1-E-2, FAULTED STEAM GENERATOR ISOLATION.</p>
	SRO	<p>The team will hold a transition brief. During the brief it will be identified that ‘A’ SG is faulted, current isolation status of the faulted SG and that the team is transitioning to 1-E-2.</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 with the exception of any previously identified alarms. He will also state that containment conditions and the electrical conditions are as you see them.</i></p>

Cue: By Examiner.

	SRO	<p>CAUTION:</p> <ul style="list-style-type: none">• 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.
	BOP	<p>4. ISOLATE FAULTED SG(s):</p> <ul style="list-style-type: none">• Close AFW MOV(s) <p>BOP will close 1-FW-MOV-151E and 1-FW-MOV-151F.</p> <ul style="list-style-type: none">• Select the faulted SG AFW MOVs using the following switches:<ul style="list-style-type: none">○ H TRAIN DISABLE SELECTOR SWITCH○ J TRAIN DISABLE SELECTOR SWITCH• Defeat the auto-open signal for the selected MOVs by placing the following key switches in the DISABLE SELECTED position:<ul style="list-style-type: none">○ H TRAIN AUTO OPEN ENABLE SWITCH○ J TRAIN AUTO OPEN ENABLE SWITCH
	BOP	<p>BOP will select the switches to defeat the automatic open feature of the ‘A’ SG AFW MOVs.</p> <ul style="list-style-type: none">• Isolate MFW line:<ul style="list-style-type: none">a) Close SG FW isolation MOV(s)<p>Closes or verifies 1-FW-MOV-154A is closed.</p><ul style="list-style-type: none">b) Locally close feed REG bypass valve manual isolation valve(s):<ul style="list-style-type: none">• 1-FW-26 for SG A• 1-FW-57 for SG B• 1-FW-88 for SG C<p>Directs a field operator to close 1-FW-26 in #1MER.</p><p><i>If directed, the field operator will close 1-FW-26 and report the status of the valve back to the MCR.</i></p>

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Event Description: Main Steam Line Fault in Safeguards

Cue: By Examiner.

	BOP	<p>4. ISOLATE FAULTED SG(s): (Continued)</p> <ul style="list-style-type: none"> Locally close steam supply valve(s) to TD AFW pump: <ul style="list-style-type: none"> 1-MS-87 for SG A 1-MS-120 for SG B 1-MS-158 for SG C <p><i>Determines that this action is not possible due to location of the steam line fault.</i></p> <ul style="list-style-type: none"> Close or verify closed SG PORV(s) Close or verify closed SG blowdown TVs
	BOP	<p>Critical Task: [WOG E-2—A] Isolate feed flow to and steam flow from the faulted SG before RCS temperature is less than 400°F is completed during the performance of this step, if it was not completed in Attachment 9 of 1-E-0. Critical task (WOG E-2—A) is completed when the 'A' SG is isolated by closing 1-MS-TV-101A and 1-FW-MOV-151E/F.</p>
	BOP	<p>5. CHECK ECST LEVEL - GREATER THAN 20%</p> <p>Observes ECST indicator on vertical board is greater than 20%.</p>
	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><i>If contacted, the TSC will state that they do not desire to sample the Faulted SG.</i></p> <p>b) Initiate periodic activity sampling of INTACT SGs IAW Attachment 1</p>
	RO/BOP	<p>c) Check unisolated secondary radiation monitors:</p> <ul style="list-style-type: none"> Main steamline TD AFW pump exhaust Condenser air ejector <p>No indications of secondary radiation can be observed or are present.</p> <p>d) Secondary Radiation - NORMAL</p> <p>No indications of secondary radiation can be observed or are present.</p>

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Event Description: Main Steam Line Fault in Safeguards

Cue: By Examiner.

	BOP	<p>7. ADJUST INTACT SG PORVs TO LIMIT RCS HEATUP:</p> <p>a) Determine required PORV pressure setting using Attachment 2</p> <p>Will refer to Attachment 2 to determine desired intact SG PORV setpoint. If the PORVs were set utilizing Attachment 9 of 1-E-0, further adjustment may not be warranted.</p> <p>b) Adjust intact SG PORVs pressure setting</p> <p>BOP will slowly lower the setpoint of the SG PORV. This can either be done in Manual or Automatic.</p> <p>c) Stabilize RCS temperature by controlling SG PORV pressure setting</p>
	BOP	<p>8. CHECK IF SI FLOW SHOULD BE REDUCED:</p> <p>a) RCS subcooling based on CETCs - GREATER THAN 30°F [85°F]</p> <p>b) Secondary heat sink:</p> <ul style="list-style-type: none"> • Total feed flow to INTACT SGs - GREATER THAN 350 gpm [450 gpm] <p>OR</p> <ul style="list-style-type: none"> • Narrow range level in at least one intact SG - GREATER THAN 12% [18%] <p>c) RCS pressure - STABLE OR INCREASING</p> <p>d) PRZR level - GREATER THAN 22% [50%]</p> <p>e) GO TO 1-ES-1.1, SI TERMINATION</p>
		End 1-E-2 actions

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Event Description: Loss of Auxiliary Feedwater Flow to ALL Steam Generators

Cue: By Transition to 1-E-2 and/or before SG NR levels >8% NR

Time	Position	Applicant's Action or Behavior
	TEAM	<p>Actions for FR-H.1</p> <p>Upon transition to 1-E-2 or PRIOR TO SG levels exceeding 12% narrow range, the AFW Pumps will sequentially trip due to the harsh environment of safeguards (for 1-FW-P-3A/3B).</p> <p>The trip of 1-FW-P-3A will be identified by a decrease in AFW flow and an annunciator indicating that the pump has tripped.</p> <p>The trip of 1-FW-P-3B will be identified by a decrease in AFW flow and an annunciator indicating that the pump has tripped.</p> <p>The SRO may ask Unit 2 to prepare for establishing AFW crosstie in accordance with AP-50.00 (Attachment 2).</p> <p><i>The Unit 2 SRO will acknowledge the request (no actions performed). If asked again, he will state he is experiencing difficulty with his Unit and is not able to provide AFW at this time, but he is working to resolve the problem.</i></p> <p>Depending on efficiency of procedure performance, the team will transition to FR-H.1 when the transition is made to E-2 or from Attachment 1 Step 13 RNO for low SG level with no AFW flow.</p>
	SRO	<p>CAUTION:</p> <ul style="list-style-type: none"> If total feed flow is less than 350 gpm [450 gpm] due to operator action, this procedure should NOT be performed. Feed flow should NOT be reestablished to any faulted SG if a non-faulted SG is available.
	RO	<p>1. CHECK IF SECONDARY HEAT SINK IS REQUIRED:</p> <p>a) RCS pressure - GREATER THAN ANY NON-FAULTED SG PRESSURE</p> <p>RO will report that RCS pressure is greater than the intact SGs</p> <p>b) RCS hot leg temperature – GREATER THAN 350°F</p> <p>RO will report that RCS hot leg temperature is greater than 350 °F.</p>

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Event Description: Loss of Auxiliary Feedwater Flow to ALL Steam Generators

Cue: By Transition to 1-E-2 and/or before SG NR levels >8% NR

	SRO	CAUTION: If WIDE RANGE level in any 2 SGs is less than 7% [22%] OR PRZR pressure is greater than or equal to 2335 psig due to loss of secondary heat sink, RCPs should be tripped and Steps 11 through 18 should be immediately initiated for bleed and feed.
	RO	2. TRY TO ESTABLISH AFW FLOW TO AT LEAST ONE SG: a) Check SG blowdown TVs – CLOSED RO will report that all blowdown Trip Valves are closed.
	RO/BOP	b) Verify AFW MOVs – OPEN BOP will report that AFW MOVs to the faulted SG are closed, but that the AFW MOVs to the intact SGs are open. The team will NOT reopen the AFW MOVs to the faulted SG. c) Check ECST – AVAILABLE Reports the ECST is available for use.

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Event Description: Loss of Auxiliary Feedwater Flow to ALL Steam Generators

Cue: By Transition to 1-E-2 and/or before SG NR levels >8% NR

		<p>2. TRY TO ESTABLISH AFW FLOW TO AT LEAST ONE SG: (Continued)</p> <p>d) Check AFW – AVAILABLE</p> <ol style="list-style-type: none"> 1. Start AFW Pumps 2. check total flow to SGs- GREATER THAN 350 GPM [450 gpm] <p>Reports AFW is NOT available due to the failure of the AFW pumps.</p> <p>d) RNO: IF minimum feed flow NOT established, THEN do the following:</p> <ol style="list-style-type: none"> 1) Stop ALL RCPs. <p>Secures all of Unit 1's RCPs.</p> <ol style="list-style-type: none"> 2) IF desired to transfer EDG 3 to Bus 2J to restore power to 2-FW-P-3B, THEN GO TO Attachment 2. <p>This is not desired as 2J is being supplied by off-site power.</p> <p><i>If asked, respond as Unit 2 that 2J is being supplied by off-site power.</i></p> <ol style="list-style-type: none"> 3) Have Unit 2 operator close Unit 2 AFW MOVs. <p>Asks Unit 2 to close the Unit 2 AFW MOVs.</p> <p><i>If directed, report back as Unit 2 that Unit 2 AFW MOVs are closed.</i></p> <ol style="list-style-type: none"> 4) Have Unit 2 operator open the following valves: <ul style="list-style-type: none"> • 1-FW-MOV-160A • 1-FW-MOV-160B <p>Directs Unit 2 to open the auxiliary feedwater crosstie valves.</p> <p><i>If directed, report back as Unit 2 that 1-FW-MOV-160A and B are open.</i></p>
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Event Description: Loss of Auxiliary Feedwater Flow to ALL Steam Generators

Cue: By Transition to 1-E-2 and/or before SG NR levels >8% NR

	<p>SRO</p> <p>2. TRY TO ESTABLISH AFW FLOW TO AT LEAST ONE SG: (Continued)</p> <p>5) Have Unit 2 operator start AFW pump(s).</p> <p>Directs Unit 2 to start AFW pumps.</p> <p><i>If directed, report back as Unit 2 the requested number of pumps has been started. If no direction was given on how many pumps to start, only start the motor driven AFW pumps.</i></p> <p>RO/BOP</p> <p><i>Team will identify that NO AFW flow is indicated on Unit One. Unit two will report low pump amps on running AFW pump and that they will investigate.</i></p> <p>6) Control flow to restore narrow range level in at least one SG greater than 12% [18%].</p> <p>Adjusts AFW flow, if needed, to raise level in at least one SG to greater than 12%.</p> <p>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> <p>8) IF minimum AFW flow NOT established, THEN try to locally restore AFW flow AND GO TO Step 3.</p> <p>Team transitions to step 3</p>
	<p>RO/BOP</p> <p>3. TRY TO ESTABLISH MFW FLOW TO AT LEAST ONE SG:</p> <p>a. Check CN system - IN SERVICE AND INTACT</p> <p>b. Check MFW system - INTACT.</p> <p>c. Reset FW isolation signal:</p> <p>1) Reset both trains of SI if required</p> <p>2) Push both FW isolation reset pushbuttons</p> <p>d. Establish MFW flow:</p> <p>1) Start one MFW pump</p> <p>2) Manually or locally open appropriate feed pump discharge MOV</p> <p>3) Control flow with SG FW bypass flow valve(s) OR feed REG valve(s) locally</p>

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Event Description: Loss of Auxiliary Feedwater Flow to ALL Steam Generators

Cue: By Transition to 1-E-2 and/or before SG NR levels >8% NR

	RO/BOP	<p>4. CHECK SG LEVELS:</p> <p>a. Narrow range level in at least one SG - GREATER THAN 12% [18%]</p> <p>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 5.</p> <p>b. RETURN TO procedure and step in effect</p>
END	END	END SCENARIO #2

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SIMULATOR OPERATOR GUIDE

Simulator Setup

Initial Conditions:

Recall 100% IC and enter the following malfunctions or recall the IC-312 **and implement TRIGGER #30 to activate all passive malfunctions. VERIFY Trigger #30 implemented.**

Drain 1-SI-TK-1A to low level alarm by opening si_73 (monitor screen) and opening 1-SI-HCV-1850A

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

- ASP_AO_OFF = True
- SI_73
- SIP2_PWR_ON

Enter the following REMOTE FUNCTIONS:

Remote Function	Delay	Trigger	Ramp Start Value	Ramp Time	Remote Value	Trigger Type (Auto or Manual)
MS_87- STEAM GENERATOR A STEAM SUPPLY TO FW-P-2	0	30	100	0	0	Pre-load
MS_120- STEAM GENERATOR B STEAM SUPPLY TO FW-P-2	0	30	100	0	0	Pre-load
MS_158- STEAM GENERATOR C STEAM SUPPLY TO FW-P-2	0	30	100	0	0	Pre-load

Enter the following Switch Overrides:

Override	Delay	Ramp	Trigger	Value	Trigger Type (Auto or Manual)
MSSOV104_OPEN- STM TO MSR 1-MS-SOV-104 OPEN	0	N/A	30	ON	Preload

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Enter the following MALFUNCTIONS:

Malfunction	Delay	Ramp	Trigger	Ramp Start/Value	Severity/Final	Trigger Type
MS1401- 1 st STAGE PRSR TRNSMTR MS-PT-446 FAILURE	10	30 sec	1	0	2	Manual
RC4802- PRZR PRESS CONT XMTR FAILURE (445)	10	0	3	0	1	Manual
MS0901- A MAIN STEAM TV FAILS SHUT	10	N/A	5	N/A	N/A	Manual
MS0401- 'A' MAIN STM LINE RUPTURE BEFORE TRIP VV	10	60 sec	7	0	100	Manual
FW0701- AUX FW PUMP FW-P-3A TRIPS OVERCURRENT	0	N/A	9	N/A	N/A	Manual
FW0702- AUX FW PUMP FW-P-3B TRIPS OVERCURRENT	10	N/A	9	N/A	N/A	Manual
BD01- DISABLE BDTV100A AUTO CLOSURE	0	N/A	30	N/A	N/A	Preload
BD02- DISABLE BDTV100B AUTO CLOSURE	0	N/A	30	N/A	N/A	Preload
BD03- DISABLE BDTV100C AUTO CLOSURE	0	N/A	30	N/A	N/A	Preload
BD04- DISABLE BDTV100D AUTO CLOSURE	0	N/A	30	N/A	N/A	Preload
BD05- DISABLE BDTV100E AUTO CLOSURE	0	N/A	30	N/A	N/A	Preload
BD06- DISABLE BDTV100F AUTO CLOSURE	0	N/A	30	N/A	N/A	Preload

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TRIGGER	TYPE	DESCRIPTION
1	Manual	Impulse pressure transmitter 446 fails high
3	Manual	Pressurizer pressure control channel 445 fails high.
5	Manual	“A” Main Steam Trip Valve closes
7	Manual	“A” Main Steam Line Fault in Safeguards
9	Manual	Loss of motor driven AFW pumps

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Verify the following control room setup:

NOTE- the rod control system reset pushbutton must be depressed after each run of this scenario-(PIGMB)

- ☐ Place the simulator in RUN and verify normal 100% power operation indications.
- ☐ Verify Red Magnets on the following components:

<input type="checkbox"/> 1-FW-P-2	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- ☐ Verify 1-RM-RI-112 aligned to A/C SG and 1-RM-RI-113 aligned to B SG (magnets).
- ☐ Verify Ovation System operating.
- ☐ Reset ICCMs.
- ☐ Verify Component Switch Flags.
- ☐ Verify Brass Caps properly placed.
- ☐ Verify SG PORVs set for 1035 psig.
- ☐ Verify Rod Control Group Step Counters indicate properly.
- ☐ Verify Ovation CRT display
- ☐ Advance Charts the following charts:

Master chart advance switch

- ☐ Verify Turbine Thumb Wheel Settings @120 rpm/min and Position 6
- ☐ Verify Containment Instrument Air Compressors are on Inside Suction (all RMs reset)
- ☐ Verify all ARPs have been cleaned
- ☐ Verify CLEAN copies of the following procedures are in place:

<input type="checkbox"/> OP-SI-002	<input type="checkbox"/> AP-53.00 (2)	<input type="checkbox"/> AP-31	<input type="checkbox"/> ARP 1G-F8
<input type="checkbox"/> E-0 (2)	<input type="checkbox"/> ES-0.1	<input type="checkbox"/> E-2	<input type="checkbox"/> Reactivity Sheet
<input type="checkbox"/> OP-CH-007	<input type="checkbox"/> OP-ZZ-002	<input type="checkbox"/> FR-H.1	<input type="checkbox"/>

- ☐ Verify Reactivity Placard is current.

SIMULATOR OPERATOR GUIDE**Brief**

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

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

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

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

Assign operating positions.

Ask for and answer questions.

SIMULATOR OPERATOR GUIDE**Conduct shift turnover:**

Provide normal shift turnover materials reflecting the below initial conditions:

The initial conditions have Unit #1 operating steady state at 100% power with a current boron concentration of 750 ppm. All Unit #1 systems and crossties are operable with the following exception:

- 1-FW-P-2, Turbine Driven Auxiliary Feedwater Pump, is tagged out for governor valve maintenance. 62 hours remain in the 72-hour Technical Specification 3.6.F.1 Clock.

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

The last shift performed three 30-gallon dilutions followed by manual make-ups.

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

Last shift received annunciator 1A-A4 (ACCUM TK 1A Hi-Lo LVL) and verified Technical Specification compliance. A walkdown of the accumulator revealed a sample line drain valve leaking by which has been resolved. You are to fill the accumulator immediately after assuming the watch to normal operating level in accordance with 1-OP-SI-002, Safety Injection Accumulators.

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

SIMULATOR OPERATOR GUIDE**Session Conduct:**

Ensure conditions in Simulator Set-up are established.

Ensure Trigger 30 is active prior to team entering the simulator.

Verify Exam Security has been established and ASP_AO_OFF = True.

EVENT 1 1-SI-TK-1A Fill iaw 1-OP-SI-002

Field Operators:

- Aux Building: when asked about administrative controls, report that desk SRO has previously briefed you on requirements:
 - 1-SI-32 admin control requirements (from 1-OP-SI-002):
 - a. The person assigned Administrative Control of 1-SI-32 understands that no other concurrent job responsibilities have been or shall be accepted during performance of this procedure.
 - b. The person assigned Administrative Control of 1-SI-32 understands the requirement to remain in the immediate vicinity of the valve at all times when 1-SI-32 is open.
 - c. The person assigned Administrative Control of 1-SI-32 understands that continuous communication capability shall be maintained with the Main Control Room at all times by use of either a Portable Radio, (primary method) or Gai-Tronics (secondary method).
 - d. The person assigned Administrative Control of 1-SI-32, understands that 1-SI-32 shall be closed within 30 seconds of notification from the Main Control Room.
 - e. The Main Control Room shall notify the operator who has assumed Administrative Control to close 1-SI-32 upon Safety Injection initiation to ensure that the time limit is not exceeded.

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- Service Building Inside Operator: SI-26 admin control requirements (from 1-OP-SI-002):
 - a. The person assigned Administrative Control of 1-SI-26 understands that no other administrative control actions have been or shall be accepted during performance of this procedure.
 - b. The person assigned Administrative Control of 1-SI-26 understands the requirement to remain accessible to the valve at all times when 1-SI-26 is open.
 - c. The person assigned Administrative Control of 1-SI-26 understands that continuous communication capability shall be maintained with the Main Control Room at all times by use of either a Portable Radio (primary method), or Gai-Tronics (secondary method).
 - d. The person assigned Administrative Control of 1-SI-26 understands that 1-SI-26 shall be closed within 10 minutes of notification from the Main Control Room. (Reference 2.3.9)
 - e. The Main Control Room shall notify the operator who has assumed Administrative Control to close 1-SI-26 upon Safety Injection initiation to ensure that the time limit is not exceeded.
 - f. If the person performing the Admin Control function for 1-SI-26 is to be stationed outside of the RCA, then they should check out the proper dosimetry prior to assuming Admin Control responsibilities.

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- **1-SI-29-** Report valve open when requested- no actions required.
- **1-SI-27-** Report valve open when requested- no actions required.
- **2A2-1-5A Breaker-** when requested to close breaker, set sip2_pwr_on to TRUE on monitor screen.
- **1-SI-26-** Report valve open when requested- no actions required.
- **1-SI-32-** set si_32 to 1.0 and report valve open.
- **Set back valves to previous condition when request made.**

Desk SRO:

- Will conduct brief for administrative controls of field operators.

Op-Test No.: Surry 2009**Scenario No.: 2****Page 49 of 79****SIMULATOR OPERATOR GUIDE****EVENT 2 1-MS-PT-1446 fails high**

When cued by examiner, implement Trigger #1.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the failure of 1-MS-PT-1446. The individual(s) contacted will also acknowledge any TS LCOs and entry into AP-53.00.
- **If contacted**, will take responsibility for writing the WR and CR.

STA:

- **If contacted**, will acknowledge the failure of 1-MS-PT-1446. The individual(s) contacted will also acknowledge (but not confirm/deny) any TS LCOs.
- **If asked**, the STA will report that 1-MS-PT-1446 is not a Reg. Guide 1.97 component.
- **If asked**, the STA will review VPAP-2802 and TRM Section 3.3. The STA will report that he has completed his review and this failure does impact VPAP-2802 for AMSAC, but the TRM is NOT impacted.
- **If contacted**, will take responsibility for writing the WR and CR.
- **If the team has a transient brief:** The STA will state that primary integrity is as the RO reported and that secondary integrity is as the BOP reported. The STA will state that radiological conditions are normal. He will also state that containment conditions and the electrical conditions are as you see them.

Maintenance/ Work Week Coordinator:

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

Role play as other individuals as needed.

SIMULATOR OPERATOR GUIDE**EVENT 3 1-RC-PT-1445 fails high**

When cued by examiner, implement Trigger #3.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the failure of 1-RC-PT-1455. The individual(s) contacted will also acknowledge any TS LCOs (i.e., close associated block valve).
- **If contacted**, will take responsibility for writing the WR and CR.
- **If contacted**, will acknowledge entry into AP-53.00 and AP-31.00.

STA:

- **If contacted**, will acknowledge the failure of 1-RC-PT-1455. The individual(s) contacted will also acknowledge any TS LCOs (i.e., close associated block valve). The STA will not confirm or deny any TS decisions.
- **If contacted**, will take responsibility for writing the WR and CR.
- **If the team has a transient brief:** The STA will state that primary integrity is as the RO reported and that secondary integrity is as the BOP reported. The STA will state that radiological conditions are normal. He will also state that containment conditions and the electrical conditions are as you see them.

Maintenance:

- **If contacted**, will acknowledge the failure of 1-RC-PT-1455 and commence investigations.

Role play as other individuals as needed.

SIMULATOR OPERATOR GUIDE**EVENT 4 “A” Main Steam Trip Valve Closure**

When cued by examiner, implement Trigger #5.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the closure of the “A” Main Steam Trip Valve and subsequent reactor trip.
- **If contacted**, will acknowledge failure of 1-MS-SOV-104 to close from the main control room.
- **If contacted**, will take responsibility for writing the WR and CR.
- **If contacted**, will acknowledge entry into 1-E-0 and 1-ES-0.1.

STA:

- **If the team has a transient brief:** The STA will state that primary integrity is as the RO reported and that secondary integrity is as the BOP reported. The STA will state that radiological conditions are normal. He will also state that containment conditions and the electrical conditions are as you see them.

Field Operators:

- **If contacted**, field operators will report no abnormal conditions at the main steam trip valve.

Maintenance/Work Week Coordinator:

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

Role play as other individuals as needed.

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EVENT 5 “A” Main Steam Line Fault in Safeguards

When cued by examiner, implement Trigger #7

Operations Supervisor/Management:

- **If contacted**, will acknowledge the Steam Break and re-entry into 1-E-0 with safety injection actuated.

STA:

- **If contacted**, will enter the control room and commence reviewing status trees and prepare for the transient brief.
- **If the team has a transient brief:** The STA will state that primary integrity is as the RO reported and that secondary integrity is as the BOP reported. The STA will state that radiological conditions are normal. He will also state that containment conditions and the electrical conditions are as you see them.

Field Operators:

- **If directed**, field operators will perform local manipulations.
- **If contacted**, field operators will report that they are unable to gain access to Unit 1 Safeguards.

Unit 2 Operator:

- **If asked** during the performance of 1-E-0, report that 2-SI-TV-202A and 2-SI-TV-202B are open.

Role play as other individuals as needed.

SIMULATOR OPERATOR GUIDE

EVENT 6 Loss of Auxiliary Feedwater Flow

SUPER IMPORTANT→ This event must be triggered BEFORE any steam generator narrow range level exceeds 12%. As a precaution, do not allow ANY narrow range level exceed 5% PRIOR TO INITIATING THIS FAILURE.

When team transitions to 1-E-2, or any SG NR level approaches 5% narrow range, implement Trigger #9

Operations Supervisor/Management:

- **If contacted**, will acknowledge the failure of all Unit 1 AFW pumps.
- **If contacted**, will acknowledge entry into FR-H.1 (E-2).

STA:

- **If contacted**, will acknowledge the loss of all Unit 1 AFW pumps.
- The STA will walkdown the Unit 1 MCR and determine that a Red Path exists on Heat Sink and state that the Unit is in a red path on FR-H.1 to the Unit Supervisor.
- **If the team has a transient brief:** The STA will state that primary integrity is as the RO reported and that secondary integrity is as the BOP reported. The STA will state that radiological conditions are normal. He will also state that containment conditions and the electrical conditions are as you see them.

SIMULATOR OPERATOR GUIDE**Unit 2 Operator:**

- **If asked prior to Unit 1 Securing Unit 1 RCPs**, then acknowledge the request to establish AFW crosstie. If asked a second time, state that Unit 2 is experiencing difficulty and cannot provide AFW at this time, but we are working to resolve the issues.
- **When asked** state that Bus 2J is powered from off-site power and Unit 2 does not need #3 EDG to power the bus.
- **When asked** to close Unit 2 AFW MOVs, acknowledge the request, wait one minute, set U2 Target Flow Rate on the Unit 2 AFW Simulator Screen = 0 and then report that Unit 2 AFW MOVs are closed.
- **When asked** to close 1-FW-MOV-160A and 1-FW-MOV-160B, acknowledge the request, take the switches on the Unit 2 AFW screen to open, and report that the valves are open when the red lights are out and green lights lit.
- **When asked** to start Unit 2 AFW Pumps, acknowledge the request and ANNOUNCE and start 2-FW-P-3A and 2-FW-P-3B by taking the clicking on the 2-FW-P-3A and 2-FW-P-3B pump buttons and selecting “Start”. After both pumps are started, report this back to the SRO.
- **If asked** state that Unit 2 AFW pump amps are at approximately 30 amps.
- **If asked** report that you will dispatch an operator to investigate lack of AFW flow on Unit One.

Field Operators:

- **If contacted**, field operators will report that they are unable to gain access to Unit 1 Safeguards.
- **If contacted**, both motor driven AFW pump breakers have ground overcurrent trips present.

Simulator Guide Attachment 1Attachment 1 of 1-E-0

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

Simulator Guide Attachment 1Attachment 1 of 1-E-0

	BOP	<p>4. VERIFY SI PUMPS RUNNING:</p> <ul style="list-style-type: none"> • CHG pumps – RUNNING • LHSI pumps - RUNNING
	BOP	<p>5. CHECK CHG PUMP AUXILIARIES:</p> <ul style="list-style-type: none"> • CHG pump CC pump – RUNNING • CHG pump SW pump - RUNNING
	BOP	<p>6. CHECK INTAKE CANAL:</p> <ul style="list-style-type: none"> • Level - GREATER THAN 24 FT • Level - BEING MAINTAINED BY CIRC WATER PUMPS
	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"> • E-F-10 (High Steam Flow SI) • B-C-4 (Hi Hi CLS Train A) • B-C-5 (Hi Hi CLS Train B) <p>Identifies annunciators not lit and goes to RNO.</p> <p>a) RNO - IF annunciator E-H-10 (Hdr/Line SI) LIT, THEN GO TO Step 7d.</p> <p>d) Verify RWST crosstie valves - OPEN</p> <ul style="list-style-type: none"> • 1-SI-TV-102A • 1-SI-TV-102B • 2-SI-TV-202A • 2-SI-TV-202B <p><i>Unit Two will report that 2-SI-TV-202A and 2-SI-TV-202B are open</i></p> <p>e) Check RCS pressure – LESS THAN 185 PSIG</p> <p>Step 7e RNO – Put both RMT mode transfer switches in REFUEL</p>
	BOP	

Simulator Guide Attachment 1Attachment 1 of 1-E-0

	BOP	<p>*8. CHECK IF CS REQUIRED:</p> <p>a) CTMT pressure – HAS EXCEEDED 23 PSIA</p> <p>Identifies pressure has not exceeded 23 or 17.7 psia and goes to step 10.</p>
	BOP	<p>*10. BLOCK LOW PRZR PRESS SI SIGNAL:</p> <p>a) Check PRZR pressure – LESS THAN 2000 psig</p> <p>b) Turn both LO PRZR PRESS & STM HDR/LINE P switches to block</p> <p>c) Verify Permissive Status light C-2 - LIT</p> <p>BOP may block the low pressurizer pressure SI signal depending on current RCS pressure.</p>
	BOP	<p>*11. BLOCK LOW TAVE SI SIGNAL:</p> <p>a) Check RCS Tave - LESS THAN 543°F</p> <p>b) Turn both HI STM FLOW & LO TAVG OR LP switches to block</p> <p>c) Verify Permissive Status light F-1 – LIT</p> <p>BOP may block the low Tave SI signal depending on current RCS temperature.</p>

Simulator Guide Attachment 1Attachment 1 of 1-E-0

	BOP	<p>NOTE:</p> <ul style="list-style-type: none"> • CHG pumps should be run in the following order of priority: C, B, A. • Subsequent SI signals may be reset by reperforming Step 12. <p>12. VERIFY SI FLOW:</p> <p>a) HHSI to cold legs - FLOW INDICATED</p> <ul style="list-style-type: none"> • 1-SI-FI-1961 (NQ) • 1-SI-FI-1962 (NQ) • 1-SI-FI-1963 (NQ) • 1-SI-FI-1943 or 1-SI-FI-1943A <p>b) Check CHG pumps - THREE RUNNING</p> <p>c) Reset SI.</p> <p>d) Stop one CHG pump and out in AUTO</p> <p>e) RCS pressure - LESS THAN 185 PSIG</p> <p>RNO: e) IF two LHSI pumps are running, THEN do the following:</p> <ol style="list-style-type: none"> 1) Verify reset or reset SI. 2) Stop one LHSI pump and put in AUTO. 3) GO TO Step 13.
	BOP	<p>13. VERIFY TOTAL AFW FLOW - GREATER THAN 350 GPM [450 GPM]</p> <p>RNO ACTIONS:</p> <ul style="list-style-type: none"> • IF SG narrow range level greater than 12% [18%] in any SG, THEN control feed flow to maintain narrow range level AND GO TO Step 14. • IF SG narrow range level less than 12% [18%] in all SGs, THEN manually start pumps AND align valves as necessary. • IF AFW flow greater than 350 GPM [450 GPM] can NOT be established, THEN GO TO 1-FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK. <p>Depending on the efficiency of the operator performing this attachment, this step could be reached with AFW lost – if the team had not previously transitioned to FR-H.1, it could occur at this step.</p>

Simulator Guide Attachment 1Attachment 1 of 1-E-0

	BOP	<p>14. CHECK AFW MOVs - OPEN</p> <p>BOP will identify that all AFW MOVs are not open and will read the RNO portion of this step and manually align valves as necessary.</p>
	BOP	<p>15. INITIATE SI VALVE ALIGNMENT IAW ATTACHMENT 2</p> <p>Attachment 2 of 1-E-0 is contained in attachment 2 of this guide.</p>
	BOP	<p>16. INITIATE VENTILATION ALIGNMENT AND AC POWER ALIGNMENT IAW ATTACHMENT 3</p> <p>See attached copy of Attachment 3 – contained in attachment 3 of this guide.</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> <p><i>All MCR boundary indications will be reported at positive.</i></p>

Simulator Guide Attachment 2

1-E-0 Attachment 2

Time	Position	Applicant's Action or Behavior
	SRO	ATTACHMENT 2 of 1-E-0 NOTE: Components previously aligned by SI termination steps, must not be realigned by this Attachment.
	RO/BOP	ATTACHMENT 2 of 1-E-0 1. Verify opened or open CHG pump suction from RWST MOVs. <ul style="list-style-type: none"> • 1-CH-MOV-1115B • 1-CH-MOV-1115D
	RO/BOP	ATTACHMENT 2 of 1-E-0 2. Verify closed or close CHG pump suction from VCT MOVs. <ul style="list-style-type: none"> • 1-CH-MOV-1115C • 1-CH-MOV-1115E
	RO/BOP	ATTACHMENT 2 of 1-E-0 3. Verify running or start at least two CHG pumps. (listed in preferred order) <ul style="list-style-type: none"> • 1-CH-P-1C • 1-CH-P-1B • 1-CH-P-1A
	RO/BOP	ATTACHMENT 2 of 1-E-0 4. Verify opened or open HHSI to cold legs MOVs. <ul style="list-style-type: none"> • 1-SI-MOV-1867C • 1-SI-MOV-1867D
	RO/BOP	ATTACHMENT 2 of 1-E-0 5. Verify closed or close CHG line isolation MOVs. <ul style="list-style-type: none"> • 1-CH-MOV-1289A • 1-CH-MOV-1289B

Simulator Guide Attachment 2**1-E-0 Attachment 2**

	RO/BOP	<p>ATTACHMENT 2 of 1-E-0</p> <p>6. Verify closed or close Letdown orifice isolation valves.</p> <ul style="list-style-type: none"> • 1-CH-HCV-1200A • 1-CH-HCV-1200B • 1-CH-HCV-1200C
	RO/BOP	<p>ATTACHMENT 2 of 1-E-0</p> <p>7. Verify opened or open LHSI suction from RWST MOVs.</p> <ul style="list-style-type: none"> • 1-SI-MOV-1862A • 1-SI-MOV-1862B
	RO/BOP	<p>ATTACHMENT 2 of 1-E-0</p> <p>8. Verify opened or open LHSI to cold legs MOVs.</p> <ul style="list-style-type: none"> • 1-SI-MOV-1864A • 1-SI-MOV-1864B
	RO/BOP	<p>ATTACHMENT 2 of 1-E-0</p> <p>9. Verify running or start at least one LHSI pump.</p> <ul style="list-style-type: none"> • 1-SI-P-1A • 1-SI-P-1B
	RO/BOP	<p>ATTACHMENT 2 of 1-E-0</p> <p>10. Verify High Head SI flow to cold legs indicated.</p> <ul style="list-style-type: none"> • 1-SI-FI-1961 • 1-SI-FI-1962 • 1-SI-FI-1963 • 1-SI-FI-1943 or 1-SI-FI-1943A
	RO/BOP	<p>ATTACHMENT 2 of 1-E-0</p> <p>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.</p> <ul style="list-style-type: none"> • Alternate SI to Cold legs • Hot leg injection

Simulator Guide Attachment 3**1-E-0 Attachment 3**

NUMBER 1-E-0	ATTACHMENT TITLE AUXILIARY VENTILATION AND AC POWER VERIFICATION	ATTACHMENT 3
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1. ____ Verify or place REFUEL SFTY MODE switches in NORMAL.

2. ____ Verify 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

Simulator Guide Attachment 3**1-E-0 Attachment 3**

NUMBER 1-E-0	ATTACHMENT TITLE AUXILIARY VENTILATION AND AC POWER VERIFICATION	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.

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

- ☐ • Total flow - GREATER THAN 32400 cfm

AND

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

Simulator Guide Attachment 3

1-E-0 Attachment 3

NUMBER 1-E-0	ATTACHMENT TITLE AUXILIARY VENTILATION AND AC POWER VERIFICATION	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. ____ Verify stopped or stop 1-VS-AC-4.
8. ____ Place 1-VS-43-VS103X, MCR ISOLATION switch to the OFF position.
9. ____ Verify closed or close MCR isolation dampers.
- ☐ • 1-VS-MOD-103A
 - ☐ • 1-VS-MOD-103B
 - ☐ • 1-VS-MOD-103C
 - ☐ • 1-VS-MOD-103D
10. ____ IF any MCR PDI on Unit 2 Vent Panel NOT indicating positive pressure, THEN place the following switches to OPEN.
- ☐ • 1-VS-SOV-322, EMERG AIR DUMP TO CONTROL RM
 - ☐ • 1-VS-SOV-100, EMERG AIR DUMP TO C.R.
- NOTE:** The timer should be set for 50 minutes, minus the number of minutes since Safety Injection initiation.
11. ____ Set timer. WHEN SI has been in progress for 50 minutes (when timer goes off), THEN immediately perform Step 18 to start one Emergency Supply Fan.

Simulator Guide Attachment 3**1-E-0 Attachment 3**

NUMBER 1-E-0	ATTACHMENT TITLE AUXILIARY VENTILATION AND AC POWER VERIFICATION	ATTACHMENT 3
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12. ____ 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)
13. ____ IF any reading NOT positive, THEN initiate Attachment 6 to secure MCR boundary fans.
14. ____ Verify initiated or initiate 0-AP-50.00, OPPOSITE UNIT EMERGENCY.
15. ____ Verify 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
16. ____ IF both of the following conditions exist, THEN verify that Load Shed is activated.
- ☐ • Unit 2 - SUPPLIED BY RSST
 - ☐ • Unit 2 RCPs - RUNNING
17. ____ IF Load Shed is required and not activated, THEN initiate 0-AP-10.10, LOSS OF AUTO LOAD SHED.

Simulator Guide Attachment 3**1-E-0 Attachment 3**

NUMBER 1-E-0	ATTACHMENT TITLE AUXILIARY VENTILATION AND AC POWER VERIFICATION	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.

***** :

18. WHEN SI has been in progress for 50 minutes (when timer goes off), THEN 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 18 Caution.

Simulator Guide Attachment 4**1-E-0 Attachment 9**

Time	Position	Applicant's Action or Behavior
	RO	<p>ATTACHMENT 9 of 1-E-0</p> <p>ATTACHMENT 9 of 1-E-0 **PART A**</p> <p>This attachment can be performed at any time during 1-E-0. It is a pre-emptive action, so it is not required to be performed.</p> <p>1. Verify SI is in progress. <u>IF</u> SI is <u>NOT</u> in progress, <u>THEN</u> return to procedure step in effect.</p> <p>RO identifies that SI is in progress.</p>
	RO/BOP	<p>ATTACHMENT 9 of 1-E-0 **PART A**</p> <p>2. Verify running or start AFW Pumps, as necessary</p> <ul style="list-style-type: none"> • 1-FW-P-3A • 1-FW-P-3B • 1-FW-P-2 – identifies pump is tagged out
	RO	<p>ATTACHMENT 9 of 1-E-0 **PART A**</p> <p>3. Identify Faulted SG by one of the following conditions:</p> <ul style="list-style-type: none"> • Any SG depressurizing in an uncontrolled manner • Any SG completely depressurized <p>RO with SRO concurrence identifies 'A' SG as the faulted SG</p>
	RO RO	<p>ATTACHMENT 9 of 1-E-0 **PART A**</p> <p>CAUTION: At least one SG must be maintained available for RCS cooldown.</p> <p>4. Isolate the faulted SG(s) by performing the following:</p> <p>a) Verify closed or close the faulted SG(s) MSTV</p> <ul style="list-style-type: none"> • SG A, 1-MS-TV-101A • SG B, 1-MS-TV-101B • SG C, 1-MS-TV-101C

Simulator Guide Attachment 4**1-E-0 Attachment 9**

	RO	<p>ATTACHMENT 9 of 1-E-0 **PART A**</p> <p>b) Verify closed or close the faulted SG(s) AFW Isolation MOVs:</p> <ul style="list-style-type: none"> • 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>RO will close 1-FW-MOV-151E and 1-FW-MOV-151F. <i>Critical task (WOG E-2—A) is completed when the ‘A’ SG is isolated by closing 1-MS-TV-101C and 1-FW-MOV-151A/B.</i></p> <p>c) Verify closed or close the faulted SG(s) PORV:</p> <ul style="list-style-type: none"> • SG A, 1-MS-RV-101A • SG B, 1-MS-RV-101B • SG C, 1-MS-RV-101C <p>RO will identify that 1-MS-RV-101A is closed.</p> <p>d) Select the faulted SG AFW MOVs using the following switches:</p> <ul style="list-style-type: none"> ○ H TRAIN DISABLE SELECTOR SWITCH ○ J TRAIN DISABLE SELECTOR SWITCH <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"> ○ H TRAIN AUTO OPEN ENABLE SWITCH ○ J TRAIN AUTO OPEN ENABLE SWITCH <p>RO</p> <p>RO will select the switches to defeat the automatic open feature of the ‘A’ SG AFW MOVs.</p>
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Simulator Guide Attachment 4**1-E-0 Attachment 9**

		<p>ATTACHMENT 9 of 1-E-0 **PART A**</p> <p>CAUTION: 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">• Minimum AFW flow is 350 gpm [450 gpm] with SI initiated, until one SG Narrow Range level is greater than 12% [18%].• 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">• 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>RO will throttle AFW to the 'B' and 'C' SG as needed.</p> <p>The RO should NOT perform Part B at this time – this ends attachment 9 actions</p>
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Simulator Guide Attachment 5

ARP- 1G-F8 – Rod Bank D Withdrawal

NUMBER	PROCEDURE TITLE	REVISION
1G-F8	ROD BANK D WITHDRAWAL	13
		PAGE
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STEP	ACTION/ EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. ____	VERIFY ALARM - ROD DEMAND POSITION GREATER THAN OR EQUAL TO 228 STEPS ON CONTROL BANK D - GP 1 DEMAND POSTN	<input type="checkbox"/> Initiate a Work Request <u>AND</u> GO TO Step 8.
2. ____	PUT ROD CONTROL MODE SEL SWITCH IN MANUAL	
3. ____	VERIFY ROD MOTION - STOPPED	<input type="checkbox"/> GO TO 1-E-0, REACTOR TRIP OR SAFETY INJECTION.
4. ____	CHECK BOTH CONTROL BANK D STEP COUNTERS - LESS THAN OR EQUAL TO 230 STEPS	<p>Do the following:</p> <p><input type="checkbox"/> a) Step rods <u>out</u> to make both Bank D Step Counters equal. (Group step counters must be equalized by stepping out only, to prevent Rod Group Sequence Error)</p> <p><input type="checkbox"/> b) Reset Bank D Step Counters to 230 steps.</p>
<p>NOTE: Rods may have to be stepped in as many as two steps below the fully withdrawn position to clear Annunciator 1G-F8.</p>		
5. ____	STEP CONTROL BANK D RODS IN AS NECESSARY TO CLEAR 1G-F8, ROD BANK D WITHDRAWAL	
6. ____	POSITION CONTROL BANK D RODS AS DETERMINED BY SHIFT SUPERVISION	
<p>NOTE: Both group step counters for Control Bank D should be the same before performing Step 7.</p>		
7. ____	LOCALLY CHECK THE BANK OVERLAP COUNTER - AT 384 PLUS CURRENT CONTROL BANK D DEMAND POSITION	<input type="checkbox"/> Notify Instrumentation Department.

Simulator Guide Attachment 5

ARP- 1G-F8 – Rod Bank D Withdrawal

NUMBER	PROCEDURE TITLE	REVISION
1G-F8	ROD BANK D WITHDRAWAL	13
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STEP	ACTION/ EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8. ____	NOTIFY SHIFT SUPERVISION	
	- END -	

Simulator Guide Attachment 6**1-OPT-RP-001 Actions**

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2.4 Commitment Documents

2.4.1 CTS 1438, Revised PT's to require performance prior to entry into the applicable mode.

2.4.2 PI S-2003-3523, Tech Spec Amendment 228 not correctly implemented

Init Verif

3.0 INITIAL CONDITIONS

_____ 3.1 Unit may be at any power level to perform this OPT.

4.0 PRECAUTIONS AND LIMITATIONS

4.1 Shift Supervision shall be notified immediately if any acceptance criteria is not met or if any malfunction or abnormal condition occurs.

5.0 SPECIAL TOOLS AND EQUIPMENT

None

Simulator Guide Attachment 6**1-OPT-RP-001 Actions**

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Init Verif

6.0 INSTRUCTIONS**6.1 Status Light Verification**

NOTE: Signoffs for this Subsection will be recorded in Attachment 1 and Attachment 2.

6.1.1 Record actual power level in the Actual Power Level column on Attachment 1 and Attachment 2.

NOTE: If the recorded power level reading is between the upper and lower setpoints the status lights may be ON or OFF. Example: Power Range Instruments are reading 8% Power. On power increasing the comparator trip can be set anywhere between 8 and 10% (P-10 light illuminated) and the reset on power decreasing between 6 and 8% (P-10 light extinguished). Is the reading 8% increasing or 8% decreasing? If the setpoint was 8% power increasing and power has now drifted back down to 6%, then the P-10 light will still be illuminated. To accurately determine the correct status the exact setpoint would have to be known as well as the status of power increasing or decreasing. To eliminate this uncertainty, the determination of Permissive Status Light condition will only be performed when Reactor Power is either above the upper setpoint or below the lower setpoint.

6.1.2 Using the Setpoints given in Attachment 1, determine the correct status of the Permissive Status Lights. Initial in the Initials block to verify the proper status light condition and enter N/A in the Initials block for the non-applicable condition.

6.1.3 Using the Setpoints given in Attachment 2, determine the correct status of the Permissive Computer Points. Initial in the Initials block to verify the proper Computer Point condition and enter N/A in the Initials block for the non-applicable condition.

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7.0 FOLLOW-ON**7.1 Acceptance Criteria**

7.1.1 IF the stated Acceptance Criteria are met, THEN test shall be considered satisfactory.

- Permissive Status Lights are illuminated or extinguished, as required on Attachment 1.
- Permissive Computer Points are in the correct state as required on Attachment 2.

7.2 Follow-On Tasks

_____ 7.2.1 IF test was satisfactory, THEN check SATISFACTORY AND enter N/A for substeps in Step 7.2.2.

Test Result: SATISFACTORY _____ UNSATISFACTORY _____

7.2.2 IF test was unsatisfactory, THEN check UNSATISFACTORY AND perform the following:

- _____ a. Notify Shift Supervision.
- _____ b. Declare equipment inoperable. If permissive status lights are incorrect, declare Nuclear Instrument Channel inoperable. If PCS computer points are incorrect, do not declare channel inoperable.
- _____ c. Notify Supervisor System Engineering.
- _____ d. Initiate Condition Report.

CR No. _____

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7.2.3 Personnel participating in performance of this procedure shall initial, sign, and print name below.

Initials	Signature	Printed Name

7.2.4 Notify Shift Supervision of test completion.

Comments: _____

Completed by: _____ Date: _____
Time: _____

7.3 Review

Comments: _____

Reviewed by: _____ Date: _____
Shift Supervision

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Forward original procedure to Engineering Testing.

Comments: _____

Reviewed by: _____ Date: _____
System Engineer

7.4 Records

Submit original procedure to Station Records in accordance with approved Administrative procedures.

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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	(1) NI Power	1/2 NIs > 1×10^{-10} amps	P-6 NIS INT RGE > 1×10^{-10} % AMPS	B-3 ILLUMINATED	
		2/2 NIs < 5×10^{-11} amps	P-6 NIS INT RGE > 1×10^{-10} % AMPS	B-3 EXTINGUISHED	
P-7	(2) Turb Power	2/2 Turb Pwr < 8.8 % (53 psig) and 3/4 NIs < 6 %	P-7 NIS PWR RGE AND TURB PWR < 10%	B-2 ILLUMINATED	
	(3) NI Power	1/2 Turb Pwr > 10.0% (56 psig) or 2/4 NIs > 10 %	P-7 NIS PWR RGE AND TURB PWR < 10 %	B-2 EXTINGUISHED	
P-8	(3) NI Power	3/4 NIs < 31 %	P-8 NIS PWR RGE < 35 %	A-2 ILLUMINATED	
		2/4 NIs > 35 %	P-8 NIS PWR RGE < 35 %	A-2 EXTINGUISHED	
P-10	(3) NI Power	2/4 NIs > 10 %	P-10 NIS PWR RGE > 10 %	A-3 ILLUMINATED	
		3/4 NIs < 6 %	P-10 NIS PWR RGE > 10 %	A-3 EXTINGUISHED	

(1): As read on Intermediate Range Nuclear Instrumentation. (NI-1-35B and NI-1-36B).

(2): As read on Turbine First Stage Pressure Instrumentation. (PI-1-446 and PI-1-447)

(3): As read on Power Range Nuclear Instrumentation. (NI-1-41B, NI-1-42B, NI-1-43B and NI-1-44B)

Completed by: _____ Date: _____

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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	(1) NI Power	1/2 NIs > 1×10^{-10} amps	N0034D	N31 HIGH FLUX TRIP-- MANUAL BLOCK	ON	
		2/2 NIs < 5×10^{-11} amps	-----	N31 HIGH FLUX TRIP-- MANUAL BLOCK	-----	-----
		1/2 NIs > 1×10^{-10} amps	N0035D	N32 HIGH FLUX TRIP-- MANUAL BLOCK	ON	
		2/2 NIs < 5×10^{-11} amps	-----	N32 HIGH FLUX TRIP-- MANUAL BLOCK	-----	-----
P-7	(2) Turb Power	2/2 Turb Pwr < 8.8% (53 psig) and 3/4 NIs < 6%	Y0003D	NUCLEAR & TB PWR RE TR P7 PERM	ON	
	(3) NI Power	1/2 Turb Pwr > 10.0% (56 psig) or 2/4 NIs > 10%	Y0003D	NUCLEAR & TB PWR RE TR P7 PERM	OFF	
P-8	(3) NI Power	3/4 NIs < 31%	F0499D	RCL LO F PERM P8	ON	
		2/4 NIs > 35%	F0499D	RCL LO F PERM P8	OFF	

(1): As read on Intermediate Range Nuclear Instrumentation. (NI-1-35B and NI-1-36B)

(2): As read on Turbine First Stage Pressure Instrumentation. (PI-1-446 and PI-1-447)

(3): As read on Power Range Nuclear Instrumentation. (NI-1-41B, NI-1-42B, NI-1-43B and NI-1-44B)

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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-10	(1) NI Power	NI-41 > 10%	N0011D	P-10 CHAN. 1 - PARTIAL PERMISSIVE	ON	
		NI-41 < 6%	N0011D	P-10 CHAN. 1 - PARTIAL PERMISSIVE	OFF	
		NI-42 > 10%	N0012D	P-10 CHAN. 2 - PARTIAL PERMISSIVE	ON	
		NI-42 < 6%	N0012D	P-10 CHAN. 2 - PARTIAL PERMISSIVE	OFF	
		NI-43 > 10%	N0013D	P-10 CHAN. 3 - PARTIAL PERMISSIVE	ON	
		NI-43 < 6%	N0013D	P-10 CHAN. 3 - PARTIAL PERMISSIVE	OFF	
		NI-44 > 10%	N0014D	P-10 CHAN. 4 - PARTIAL PERMISSIVE	ON	
		NI-44 < 6%	N0014D	P-10 CHAN. 4 - PARTIAL PERMISSIVE	OFF	

(1): As read on Power Range Nuclear Instrumentation. (NI-1-41B, NI-1-42B, NI-1-43 and NI-1-44B)

Completed by: _____ Date: _____

Facility: SurryScenario No.: 3Op-Test No.: 2009-301

Examiners: _____ Operators: _____

Initial Conditions: Unit 1 has been at 75% power for 3 days due to high vibrations on the “A” high-pressure heater drain pump. The “B” high-pressure heater drain pump has been placed in service and is currently being monitored by maintenance for proper operation. All systems and crossties are operable with the following exceptions:

- 1-SI-P-1B, “B” low head safety injection pump, is tagged out for motor PMs. 62 hours remain in the 72-hour Technical Specification 3.3.B.3 clock. Repairs are scheduled to be complete in 16 hours.
- 1-SD-P-1A, “A” high-pressure heater drain pump, is tagged out for high pump vibrations.

Turnover:

Maintain Unit 1 at 75% power. The ramp to 100% power is scheduled for dayshift tomorrow. Support maintenance as required on 1-SI-P-1B repairs. The current PSA analysis for plant conditions is green for both units.

Event No.	Malf. No.	Event Type*	Event Description
1	TBD	I - BOP/SRO TS - SRO	Power range nuclear instrument Channel 3 loses control power. The selector switch that provides power range nuclear instrument input to the N-16 radiation monitors will fail to operate resulting in a loss of the N-16 monitors.
2	TBD	TS - SRO	Loop “C” RCS hot leg temperature element failure. Results in delta-T and Tave indication errors on “C” loop.
3	TBD	C - RO/SRO TS - SRO	A 20 - 25 gpm tube leak will develop on the “B” steam generator. This event will result in a ramp to hot shutdown.
4	TBD	R - All	Ramp offline due to steam generator tube leakage. The team will also have to restore letdown to service (isolated by AP-16.00 immediate actions) prior to or during the ramp.
5	TBD	M - All C- BOP/SRO	The steam generator tube leak will develop into a large steam generator tube rupture (450 gpm), which will require the team to re-enter AP-16.00, then transition to 1-E-0 with safety injection required. The response to safety injection will be complicated by various ventilation system components failing to and the failure of one of the high head safety injection flow indicators.
6	TBD	M - All C- RO/SRO	During safety injection the containment instrument air supply will spuriously isolate resulting in a loss of containment instrument air. The backup air supply for both pressurizer PORVs will fail to operate, rendering both inoperable. Combined with the loss of containment instrument air, this results in the inability to depressurize the RCS. The team will transition to ECA-3.3.
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS) Technical Specifications			

Event 1

PRNI N-43 will lose control power. The SRO will initiate 0-AP-53.00 (Loss of Vital Instrumentation / Controls, then transition to AP-4.00, Nuclear Instrumentation Malfunction and direct placing the failed channel in trip. The Power Range input to the N-16 Radiation Monitor will fail to the N-44 position as the selector switch will not function. The SRO will review Technical Specifications.

Verifiable Action: (BOP) Performs Attachment 1 to complete MCR portion of placing channel in trip.

Technical Specification:

- Table 3.7-1. item 2 OA #2 (place channel in trip within 72 hours and perform a quadrant power tilt once per 12 hours)
- Table 3.7-1 items 5 & 6 OA #6 (place channel in trip within 72 hours)
- Table 3.7-1 item 20 OA 13 (no action for 1 NI failed).
- 3.12.D – determine quadrant power tilt once/day and after a power change of >10% or >30" of rod motion.

Event 2

The Loop "C" RCS hot leg temperature element will fail in the low direction. This will result in a lower than actual delta-T and Tave indication on "C" loop. The SRO will initiate 0-AP-53.00 (Loss of Vital Instrumentation / Controls and refer to the applicable Technical Specifications.

Technical Specifications:

- 3.7-1 item 5 and 6 – OA #6 (place channel in trip within 72 hours)
- 3.7-2 items 1.e.2 and 6 – OA #20 (place channel in trip within 72 hours)
- 3.7-3 item 2a (refer to 3.7.2.)

Event 3

A Steam generator tube leak (20 - 25 gpm) will develop on 'B' SG while the unit is at power. The team will initiate AP-16.00 (Excessive RCS Leakage), associated ARPs (e.g. AE RM), and transition to AP-24.00 (Minor SG Tube Leak).

Verifiable Actions: (RO) Perform the immediate actions of AP-16.00.

Technical Specifications:

- 3.1.C.1.d – 6 hours to hot shutdown due to primary to secondary leakage > 150 gpd.

Event 4

In accordance with AP-24.00, the team will ramp the unit to hot shutdown at 1%/minute. The SRO will implement 0-AP-23.00, Rapid Load Reduction.

Verifiable Actions: (BOP) Place letdown in service prior to the ramp.
(RO) Utilizes the control rods and boric acid during the ramp.
(BOP) Operate the turbine during the load decrease.

Event 5

The steam generator tube leak will develop into a large steam generator tube rupture (450 gpm), which will require the team to re-enter AP-16.00, then transition to 1-E-0 with safety injection required. The response to safety injection will be complicated by various ventilation system components failing to and the failure of one of the high head safety injection flow indicators.

Verifiable Actions: (RO) Perform the immediate actions of AP-16 and 1-E-0
(BOP) Securing ventilation components as required for safety injection

Critical Task: [SPS E-1—G] Secure one LHSI pump within 30 minutes of initiation of SI (KOA).

Actions required to accomplish:

- Secure 1-SI-P-1A or B

Critical Task: [WOG E-3—A] Isolate feedwater flow into and steam flow from the ruptured SG before a transition to ECA-3.1 occurs (KOA).

Actions required to accomplish:

- Close 1-FW-MOV-151C and D
- Close 1-MS-TV-101B

Critical Task: [WOG E-3—B] Cooldown the RCS to less than target CETC and stabilize temperature such that transition is not made to and ECA or FR based on RCS subcooling less than 30 °F or RCS temperature less than 455 °F (KOA).

Actions required to accomplish:

- Operate Steam Dumps to cooldown at the maximum rate without overcooling the RCS.

Event 6

During Safety Injection the containment instrument air supply will spuriously isolate resulting in a loss of containment instrument air. The backup air supply for both pressurizer PORVs will fail to operate, rendering both inoperable. Combined with the loss of containment instrument air, this results in the inability to depressurize the RCS. The team will transition to ECA-3.3.

Verifiable Actions: (BOP) Dispatch operators to attempt to recover containment instrument air

Initial Conditions:	75% Power IC, MOL – Cycle 23. The unit has been at 75% power for 3 days (equilibrium xenon).		
Pre-load malfunctions: <ul style="list-style-type: none"> ○ Override N-16 selector switch to N-43 position. ○ 1-SI-FI-1961 failed low. ○ Disable 1-VS-F-8A/B and 11-VS-F-7A/B auto trip on SI function. 			
Equipment Status/ Procedures/ Alignments/ Data Sheets/ etc.: <ul style="list-style-type: none"> ○ 1-SI-P-1B tagged out for planned maintenance ○ 1-SD-P-1A tagged out for high vibrations 			
Turnover: <ul style="list-style-type: none"> • Maintain unit at 75% power. Unit 2 is at 100% power with all systems operable. 			
All systems and crossties are operable with the following exceptions: <ul style="list-style-type: none"> • 1-SI-P-1B, “B” low head safety injection pump, is tagged out for motor PMs. 62 hours remain in the 72-hour Technical Specification 3.3.B.3 clock. Repairs are scheduled to be complete in 16 hours. 			
Event	Malf. #'s	Severity	Instructor Notes and Required Feedback
1	NI0703	N/A	NI-43 loss of control power.
2	RC0703	N/A	“C” Loop Thot RTD fails low.
3	RC2402	N/A	“B” SG tube leak (20-25 gpm)
4	RC2402	N/A	“B” SG tube leak develops into rupture.
5	Various	N/A	Containment instrument air is lost and pressurizer PORV air bottle failure.

OPERATING PLAN:

- The Unit has been at 75% power for 3 days following loss of 1-SD-P-1A (high vibrations).
- 1-SI-P-1B, “B” low head safety injection pump, is tagged out for motor PMs. 62 hours remain in the 72-hour Technical Specification 3.3.B.3 clock. Repairs are scheduled to be complete in 16 hours.
- Unit 2 is at 100% Power with all systems and crossties operable.
- Maintain 75% power operation.

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Event Description: NI-43 control power failure.

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
	RO	<p>Diagnose the failure with the following indications:</p> <p>Alarms:</p> <ul style="list-style-type: none"> • 1E-G5 NIS PWR RNG HI STPT CH 3 • 1G-C3 NIS PWR RNG LOSS OF DET VOLT • 1G-C4 UPPER ION CHAMBER DEVIATION OR AUTO DEFEAT <50% • 1G-D4 LOWER ION CHAMBER DEVIATION OR AUTO DEFEAT <50% • 1G-G1 NIS PWR RNG HI FLUX ROD STOP • 1G-E4 NIS PWR RNG CH AVG FLUX DEVIATION • 1G-H1 NIS DROPPED ROD FLUX DECREASE >5% PER 2 SEC <p>Indications:</p> <ul style="list-style-type: none"> • NI-43 indicates off-scale low
	SRO	Enters 0-AP-53.00 LOSS OF VITAL INSTRUMENTATION / CONTROLS
	RO	<p>[1] VERIFY REDUNDANT INSTRUMENT CHANNEL(S) INDICATION - NORMAL</p> <p>RO identifies N-41, 42, 44 are indicating normal.</p>
	BOP	<p>[2] PLACE AFFECTED CONTROL(S)/COMPONENT(S) IN MANUAL CONTROL AND STABILIZE PARAMETER USING REDUNDANT INDICATION</p> <p>No control function is affect and the team will proceed to the RNO section.</p>
	SRO	<p>Step 2 RNO- <u>IF</u> no control function is affected, <u>THEN</u> GO TO Step 4.</p> <p>The team will advance to Step 4 of AP-53.00.</p>

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Event Description: NI-43 control power failure.

Cue: By Examiner.

	SRO	<p>The team will hold a transient brief. During the brief the failure of NI-43 will be discussed.</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>SRO</p> <p>RO</p>	<p>NOTE:</p> <ul style="list-style-type: none"> Step 4 failures are listed in order of performance priority. Only the failed instrument/control and associated step number should be read aloud. When the affected instrument/controller malfunction(s) has been addressed by this procedure, recovery actions should continue at Step 14. <p>*4 DETERMINE THE FAILED INSTRUMENT / CONTROL AND GO TO APPROPRIATE STEP.</p> <ul style="list-style-type: none"> NI Malfunction, Step 5 <p>The RO will identify that NI-43 has failed low.</p>
	RO	<p>5. CHECK THE FOLLOWING INSTRUMENTS/CONTROLS – AFFECTED</p> <ul style="list-style-type: none"> Nuclear Instrumentation Pressurizer Pressure control
	RO	<p>Note prior to set 6</p> <p>NOTE: RCS pressure decrease will cause a slight decrease in RCS Tave due to negative reactivity from the moderator pressure coefficient.</p>
	RO	<p>6. CHECK PRZR SPRAY VALVE CONTROLLERS – NORMAL</p>

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Event Description: NI-43 control power failure.

Cue: By Examiner.

	SRO	<p>5. GO TO THE APPROPRIATE ABNORMAL PROCEDURE</p> <ul style="list-style-type: none"> AP-4.00, Nuclear Instrumentation Malfunction AP-31.00, Increasing or decreasing RCS Pressure <p>Team transitions to AP-4.00, Nuclear Instrumentation Malfunction.</p>
	SRO	Enters AP-4.00- Nuclear Instrumentation Malfunction.
	RO	<p>AP-4.0 Actions</p> <p>1. CHECK NI MALFUNCTION – POWER RANGE FAILURE</p>
	RO/BOP	<p>AP-4.0 Actions</p> <p>2. STABILIZE UNIT CONDITIONS</p>
	RO	<p>AP-4.0 Actions</p> <p>3. CHECK N-44 – FAILED</p> <p>RO will report that NI-44 is NOT failed- SRO will go to RNO column which directs the team to step 6.</p>
	RO	<p>AP-4.0 Actions</p> <p>6. CHECK N-43 - FAILED</p> <p>RO will report NI-43 failed.</p>
	RO/BOP	<p>AP-4.0 Actions</p> <p>7. PLACE 1-MS-43-N16, REACTOR POWER SOURCE, IN THE N44 POSITION (SWITCH LOCATED ON NI PROTECTION CHNL III CABINET)</p> <p>RO/BOP will place N16 selector switch in the N44 position, after swapping they should notice that the N-16 monitors are still reading zero each. This condition may not be noticed, depending on the background indication prior to the failure. If noticed, then team will notify craft personnel.</p>
	RO	<p>AP-4.0 Actions</p> <p>8. CHECK POWER RANGE CHANNELS - ONLY ONE FAILED</p>

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Event Description: NI-43 control power failure.

Cue: By Examiner.

	SRO	<p>AP-4.0 Actions</p> <p>NOTE: Performance of Attachment 1 to place the failed Power Range Channel in trip requires I&C assistance for N-41, N-42, or N-43.</p> <p>9. INITIATE ATTACHMENT 1 TO PLACE FAILED CHANNEL IN TRIP WITHIN 72 HOURS</p> <p>Note: Applicable actions from Attachment 1 begin on the following page.</p>
	RO	<p>AP-4.0 Actions</p> <p>10. CHECK NI MALFUNCTION – INTERMEDIATE RANGE FAILURE</p> <p>10. RNO - GO TO Step 19.</p>
	RO	<p>AP-4.0 Actions</p> <p>19. CHECK NI MALFUNCTION – SOURCE RANGE FAILURE</p> <p>19. RNO - GO TO Step 38.</p>
	SRO	<p>AP-4.0 Actions</p> <p>38. NOTIFY THE FOLLOWING</p> <ul style="list-style-type: none">• Instrument Shop• OM on call

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Event Description: NI-43 control power failure.

Cue: By Examiner.

		AP-4.00 Attachment 1
		AP-4.0 Attachment 1 Actions (Normal Actions for BOP)
	BOP	<p><u>ONE POWER RANGE CHANNEL INOPERABLE</u></p> <p>1. Perform the following at the NIS panel within 72 hours.</p> <ul style="list-style-type: none"> • Comparator and Rate Drawer <ul style="list-style-type: none"> a. Select the failed channel on the COMPARATOR CHANNEL DEFEAT switch. b. Verify annunciator 1G-E4, NIS PWR RANGE CH AVG FLUX DEVIATION - NOT LIT. • Miscellaneous Control and Indication Panel <ul style="list-style-type: none"> a. Select the failed channel on the ROD STOP BYPASS switch. b. Verify annunciator 1G-G1, NIS PWR RNG HI FLUX ROD STOP – NOT LIT. c. Select the failed channel on the UPPER SECTION defeat switch. d. IF Reactor power greater than 50%, THEN verify annunciator 1G-C4, UPPER ION CHAMBER DEVIATION OR AUTO DEFEAT < 50% - NOT LIT. (annunciator will remain LIT if any Power Range channel less than 50%). e. Select the failed channel on the LOWER SECTION defeat switch. f. IF Reactor power greater than 50%, THEN verify annunciator 1G-D4, LOWER ION CHAMBER DEVIATION OR AUTO DEFEAT < 50% - NOT LIT. (annunciator will remain LIT if any Power Range channel less than 50%)

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Event Description: NI-43 control power failure.

Cue: By Examiner.

	BOP	<p>AP-4.0 Attachment 1 Actions (Normal Actions for BOP)</p> <p>NOTE: Annunciator NIS PWR RNG HI STPT (1E-E5, 1E-F5, 1E-G5, or 1E-H5) for the channel being placed in trip, NIS PWR RNG LOSS OF DET VOLT (1G-C3), and NIS DROPPED ROD FLUX DECREASE > 5% PER 2 SEC (1G-H1) will alarm when the instrument power fuses are pulled.</p> <p>2. Place the failed Power Range channel in trip IAW the following:</p> <ol style="list-style-type: none"> At the Power Range drawer, remove the INSTRUMENT POWER fuses. At the Power Range drawer, put the POWER RANGE TEST switch in the TEST position. Verify annunciator 1G-H1, NIS DROPPED ROD FLUX DECREASE > 5% PER 2 SEC - LIT. Verify annunciator 1G-C3, NIS PWR RNG LOSS OF DET VOLT – LIT. IF Reactor power less than 10%, THEN verify annunciator 1E-D5, NIS PWR RNG LO STPT HI FLUX - LIT.
	BOP	<p>AP-4.0 Attachment 1 Actions (Normal Actions for BOP)</p> <p>3. Remove the following PCS points for the failed channel from scan:</p> <ul style="list-style-type: none"> N-43, N0045A and N0046A <p>The team may opt to have I&C remove these points from scan.</p>
		<p>AP-4.0 Attachment 1 Actions (Normal Actions for BOP)</p> <p>4. Have I&C place the OT ΔT and OP ΔT bistables for the failed channel in TRIP and verify the associated annunciators – LIT</p> <p>CHANNEL III</p> <ul style="list-style-type: none"> BS-1-432B-1, Annunciator 1E-E7, RX TRIP CH 3 OP ΔT LOOP 1C BS-1-432B-2, Annunciator 1G-H4, OVPWR ΔT TURB RNBK & ROD STOP CH 3 BS-1-432C-1, Annunciator 1E-E6, RX TRIP CH 3 OT ΔT LOOP 1C BS-1-432C-2, Annunciator 1G-H3, OVTEMP ΔT TURB RNBK & ROD STOP CH 3 <p>SRO will contact I&C to perform these steps, <u>this will not occur during this scenario.</u></p>

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Event Description: NI-43 control power failure.

Cue: By Examiner.

	SRO	<p>AP-4.0 Attachment 1 Actions</p> <p>5. IF reactor power is greater than 75%, THEN do either a OR b below:</p> <p>a) Determine the core quadrant balance using the incore movable detectors when any of the following occur.</p> <ul style="list-style-type: none"> • Twelve hours have passed since the last core quadrant balance was performed. • A change in Reactor power level greater than 10%. • Control rod movement of greater than 30 inches (48 steps) <p>b) Within 12 hours, reduce Reactor power to less than or equal to 75% of rated power, and within 78 hours, reduce the High Flux trip setpoints to less than or equal to 85% of rated power.</p> <p>Outcome of this step will depend on the current power level at the time the team encounters this step. If power is 75% or below, no actions are required.</p>
	SRO	<p>AP-4.0 Attachment 1 Actions</p> <p>6. IF Reactor power is less than or equal to 75%, and will remain there, THEN within 78 hours, reduce the High Flux trip setpoint to less than or equal to 85% of rated power.</p> <p>Outcome of this step will depend on the current power level at the time the team encounters this step. If power is >75%, no actions are required.</p>
	SRO	<p>AP-4.0 Attachment 1 Actions</p> <p>7. Refer to Tech Spec Table 3.7-1, Item 2, 5, 6, and 20.</p> <p>Determines 3.7-1 items 2 and 5 are applicable (trip channel w/in 72 hr; restrict power to 75% and reduce trip setpoints to 85% or 12 hr QPTR)</p> <p>SRO will determine the following Technical Specification limitations:</p> <p>Technical Specification:</p> <ul style="list-style-type: none"> • Table 3.7-1. item 2 OA #2 (place channel in trip within 72 hours and perform a quadrant power tilt once per 12 hours) • Table 3.7-1 items 5 & 6 OA #6 (place channel in trip within 72 hours) • Table 3.7-1 item 20 OA 13 (no action for 1 NI failed). • 3.12.D – determine quadrant power tilt once/day and after a power change of >10% or >30" of rod motion.

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Event Description: NI-43 control power failure.

Cue: By Examiner.

	SRO	AP-4.0 Attachment 1 Actions 8. Refer to Tech Spec 3.12.D. Technical Specification: <ul style="list-style-type: none">3.12.D – determine quadrant power tilt once/day and after a power change of >10% or >30” of rod motion.
END	END	END EVENT 1

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Event Description: "C" Loop Thot RTD failure

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
	Team	<p>Diagnoses failure of "C" Loop Thot with the following indications/alarms:</p> <p>Alarms:</p> <ul style="list-style-type: none"> • 1H-B2 ΔT DEVIATION LOOP 1B > < LOOP 1C • 1H-B4 T AVG LOOP DEVIATION • 1H-C2 ΔT DEVIATION LOOP 1A > < LOOP 1C <p>Indications:</p> <ul style="list-style-type: none"> • "C" Loop Tave indication decrease • "C" Loop Delta-T indication decrease • "C" Over Temperature Delta-T Trip setpoint increase.
	SRO	Enters 0-AP-53.00 LOSS OF VITAL INSTRUMENTATION / CONTROLS
	RO	<p>[1] VERIFY REDUNDANT INSTRUMENT CHANNEL(S) INDICATION - NORMAL</p> <p>RO identifies individual loop Tave indications are normal</p>
	BOP	<p>[2] PLACE AFFECTED CONTROL(S)/COMPONENT(S) IN MANUAL CONTROL AND STABILIZE PARAMETER USING REDUNDANT INDICATION</p> <p>No control function is affect and the team will proceed to the RNO section.</p>
	SRO	<p>Step 2 RNO- <u>IF</u> no control function is affected, <u>THEN</u> GO TO Step 4.</p> <p>The team will advance to Step 4 of AP-53.00.</p>

Event Description: "C" Loop Thot RTD failure

Cue: By Examiner.

	SRO	<p>The team will hold a transient brief. During the brief the failure of “C” Loop Thot will be discussed.</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>SRO</p> <p>NOTE:</p> <ul style="list-style-type: none"> Step 4 failures are listed in order of performance priority. Only the failed instrument/control and associated step number should be read aloud. When the affected instrument/controller malfunction(s) has been addressed by this procedure, recovery actions should continue at Step 14. <p>*4 DETERMINE THE FAILED INSTRUMENT / CONTROL AND GO TO APPROPRIATE STEP.</p> <p>RO</p> <ul style="list-style-type: none"> Loop Tave, Step 10 Loop ΔT, Step 10 <p>The RO will identify that Loop “C” Tave and Delta-T are affected.</p>	
	<p>SRO</p> <p>SRO</p> <p>RO</p>	<p>CAUTION: Delta flux must be monitored and maintained within band if rods have moved.</p> <p>NOTE: Depending on the instrumentation failure, the Tave input to the Steam Dumps may be invalid, causing the Steam Dumps to stay open longer or never open at all.</p> <p>10. CHECK LOOP/MEDIAN ΔT/Tave - NORMAL</p> <p>a) Median Tave - NORMAL</p> <p>b) Loop TAVE / ΔT – NORMAL</p> <p>RO will report Loop Tave and Delta-T are NOT normal</p>

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Event Description: "C" Loop Thot RTD failure

Cue: By Examiner.

	<p>Step 10b RNO</p> <p>b) Do the following:</p> <p>1) Verify ΔT Recorder, ()/TR-()-412 is selected to an operable channel.</p> <p>2) Refer to the following Tech Spec 3.7 items:</p> <ul style="list-style-type: none"> • Table 3.7-1, 5 and 6 • Table 3.7-2, 1.e, and 6 • Table 3.7-3, 2a <p>3) Refer to Attachment 4.</p> <p>4) IF no other instrumentation failure exists, THEN GO TO Step 14.</p> <p>SRO will determine that the following Technical Specification actions apply:</p> <p>Technical Specifications:</p> <ul style="list-style-type: none"> • 3.7-1 item 5 and 6 – OA #6 (place channel in trip within 72 hours) • 3.7-2 items 1.e.2 and 6 – OA #20 (place channel in trip within 72 hours) • 3.7-3 item 2a (refer to 3.7.2.)
	<p>SRO</p> <p>14. Review OPT-RX-001, Rx Power Calorimetric using PCS computer program, to determine operability of calorimetric and need to perform OPT-RX-007, Shift Average Power Calculation.</p> <p>SRO/RO determines that OPT-RX-001 is NOT impacted and OPT-RX-007 does not need to be performed.</p>
	<p>SRO</p> <p>15. CHECK FAILED INSTRUMENT - IS A REGULATORY GUIDE 1.97 VARIABLE (Go to Step 17 if not Reg. Guide 1.97)</p> <p><i>SRO directs STA to review Reg. Guide 1.97. The STA will report this failure has no Reg. Guide 1.97 implications.</i></p>

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Event Description: "C" Loop Thot RTD failure

Cue: By Examiner.

	SRO	<p>17. Review the following:</p> <ul style="list-style-type: none"> • TS 3.7 • VPAP-2802 • TRM Section 3.3, Instrumentation <p>Determines the following Technical Specification LCOs:</p> <ul style="list-style-type: none"> • 3.7-1 item 5 and 6 – OA #6 (place channel in trip within 72 hours) • 3.7-2 items 1.e.2 and 6 – OA #20 (place channel in trip within 72 hours) • 3.7-3 item 2a (refer to 3.7.2.) <p><i>SRO directs STA to review VPAP-2802 and TRM Section 3.3. The STA reports he has completed these reviews and there is no impact.</i></p>
	SRO	<p>18. CHECK ADDITIONAL INSTRUMENT / CONTROLLER MALFUNCTION - EXISTS</p> <p>The team will identify that no additional failures exist, proceed to the RNO section, and this will direct the team to Step 20.</p>
	SRO	<p>20. PROVIDE NOTIFICATIONS AS NECESSARY:</p> <ul style="list-style-type: none"> • Shift Supervision • OMOC • STA (PRA determination) • I&C
END	END	END EVENT 2

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Event Description: "B" SG tube leakage

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"> • 1C-B8 PRZR LO PRESS • RM-G8 Air Ejector RM Alert / Failure (~2 minute delay) • RM-N8 SG Blowdown Radiation Monitor Alert/Failure alarm (~5 minute delay) <p>Indications:</p> <ul style="list-style-type: none"> • Decreasing pressurizer level • Increasing charging flow • Air Ejector Counts increasing <p><i>Unit 2 will silence Radiation Monitors and report the alarms to the Unit Supervisor. The Unit 2 operator will also perform the associated ARPs if so directed.</i></p>
	SRO	Direct initiation of AP-16.00, EXCESSIVE RCS LEAKAGE
	SRO	<p>Note: If SI Accumulators are isolated, 1-AP-16.01, SHUTDOWN LOCA, should be used for guidance.</p> <p>Note: RCS average temperature has a direct impact on pressurizer level.</p>
	RO	<p>[1] MAINTAIN PRZR LEVEL</p> <ul style="list-style-type: none"> • Isolate Letdown • Control Charging flow <p>RO closes 1-CH-LCV-1460A and 1-CH-LCV-1460B and places charging in manual and attempts to maintain level at program (immediate action).</p>

Op-Test No.: Surry 2009-301 Scenario No.: 3 Event No.: 3

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Event Description: "B" SG tube leakage

Cue: By Examiner.

	RO	<p>2 VERIFY THE FOLLOWING PARAMETERS – STABLE OR INCREASING:</p> <ul style="list-style-type: none"> • PRZR Level • PRZR Pressure • RCS Subcooling <p>Identifies all parameters are stable or increasing</p>
	SRO	The team will hold a short transient brief. The brief should establish the priority of addressing RCS leakage then end.
	RO	<p>3. PLACE THE FOLLOWING COMPONENTS IN OFF:</p> <ul style="list-style-type: none"> • CTMT Sump Pumps • CTMT Vacuum Pumps <p>SRO directs the RO to secure the pumps.</p>
	<p>SRO</p> <p>RO</p>	<p>Note: Shift Supervision and STA must remain informed of RCS leak rate for EPIP applicability.</p> <p>*4. CHECK REACTOR TRIP – REQUIRED</p> <ul style="list-style-type: none"> • Leak Rate – GREATER THAN 50 GPM <u>OR</u> • Adequate makeup not being provided by blender <p>The RO determines that leakrate is <50 gpm. (Approximately 23 gpm).</p> <p>Step 4 RNO→ GO TO Step 7</p> <p>SRO transitions to step 7.</p>

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Cue: By Examiner.

	BOP	7. CHECK SECONDARY RADIATION - NORMAL OR STABLE IF THERE IS PRE-EXISTING TUBE LEAK <ul style="list-style-type: none"> • Air Ejector Rad Monitor • SG Blowdown Rad Monitors • Main Steam Line Rad Monitors • Secondary sample • N-16 Rad Monitors <p>BOP identifies air ejector radiation NOT normal. If sufficient time has elapsed, the BOP will observe increasing trend on blowdown radiation monitor RI-RM-113.</p> <p>Step 7 RNO Actions:</p> <p>SRO</p> <p>Do the following:</p> <ol style="list-style-type: none"> a) Consult with Shift Manager. b) IF Reactor trip NOT required, THEN initiate 1-AP-24.00, MINOR SG TUBE LEAK <p>It is expected that the SRO will perform AP-24.00 as a higher priority procedure over AP-16 at this point. The SRO may delegate AP-16 actions to either the RO or BOP.</p> <p>SRO initiates 1-AP-24.00 – AP-24.00 actions start on page 24</p>
	RO	8. CHECK RCS LEAK RATE – LESS THAN 10 GPM <p>Identifies that RCS Leak Rate is greater than 10 gpm.</p> <p>Step 8 RNO Actions:</p> <ol style="list-style-type: none"> a) Initiate Unit Shutdown IAW appropriate operating procedures b) Control charging flow and seal injection to maintain prz level c) Evaluate EPIP applicability <p>Discusses requirement to reduce power level- AP-24.00 will require ramp also.</p>
	RO	9. CHECK UNIT CONDITIONS <ul style="list-style-type: none"> • PRZR Level –STABLE OR INCREASING • PRZR Pressure – STABLE OR INCREASING • Tave – STABLE

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Event Description: "B" SG tube leakage

Cue: By Examiner.

	RO	<p>10. CHECK LETDOWN LEAK - INDICATED</p> <ul style="list-style-type: none"> • Annunciator 0-VSP-F4, AUX BLDG SUMP HI LVL - LIT • Annunciator 1B-A3, CTMT SUMP HI LVL - LIT • Aux Bldg radiation - HIGH • CTMT radiation - HIGH • Local Report of leak • Leak rate decrease following isolation in Step 1 • Abnormal Letdown flow indication prior to isolation in Step 1 • Non-Regenerative HX tube leak - INDICATED • CC Surge Tank level - INCREASING • CC Activity – INCREASING <p>RO/BOP will report that a letdown line leak is NOT indicated</p> <p>Step 10 RNO actions: GO TO Step 12</p>
	RO	<p>12. CHECK RCS LEAKRATE WITH LETDOWN SECURED – REDUCED</p> <p>RO will report that leakrate remains even with letdown isolated.</p> <p>Step 12 RNO actions:</p> <p>Do the following:</p> <p>a) Return letdown to service IAW the following, if desired:</p> <ul style="list-style-type: none"> • Normal letdown, IAW 1-OP-CH-020, RETURNING LETDOWN TO SERVICE FOLLOWING AUTO OR MANUAL ISOLATION OR • Excess letdown, IAW 1-OP-CH-006, SHIFTING LETDOWN <p>b) GO TO Step 15.</p> <p>SRO will direct BOP operator to obtain 1-OP-CH-020 and prepare for placing letdown in service. 1-OP-CH-020 actions are contained in attachment 5 of this guide.</p>
	RO	15. VERIFY ALL RCP NUMBER 1 SEALS – INTACT
	SRO	<p>16. NOTIFY THE FOLLOWING:</p> <ul style="list-style-type: none"> • STA • OM on call

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Event Description: "B" SG tube leakage

Cue: By Examiner.

	RO/BOP	<p>17. VERIFY ALL PRIMARY SAMPLING – SECURED</p> <p>SRO will assign operator to contact chemistry and verify no sampling in progress. Chemistry will report that NO sampling is in progress.</p>
	RO/BOP	<p>18. NOTIFY HP TO TAKE AIR SAMPLES:</p> <ul style="list-style-type: none"> • Containment • Auxiliary Building • Safeguards <p>SRO will direct RO/BOP to discuss step with HP. HP will report that they will initiate sampling.</p>
	RO	19. CHECK PDTT INLEAKAGE RATE – NORMAL
	RO	20. CHECK PRT INLEAKAGE RATE – NORMAL
	BOP	<p>21. CHECK CC SYSTEM:</p> <ul style="list-style-type: none"> • CC Surge TK Level - STABLE OR DECREASING • CC activity – NORMAL
	BOP	<p>22. CHECK CTMT RADIATION - NORMAL</p> <ul style="list-style-type: none"> • CTMT Radiation Monitors • CTMT Air Sample • CTMT Sump level
	BOP	<p>23. CHECK AUXILIARY BUILDING RADIATION - NORMAL</p> <ul style="list-style-type: none"> • Ventilation Vent • Area Monitors • Air Sample
	BOP	<p>24. CHECK PDT INFLUENT - NORMAL</p> <ol style="list-style-type: none"> Put PDTT pumps for both Units in OFF Verify PDT leakage – ZERO Return PDTT pumps to normal

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Event Description: "B" SG tube leakage

Cue: By Examiner.

	BOP	<p>25. CHECK SAFEGUARDS VALVE PIT FOR LEAKS</p> <ul style="list-style-type: none"> • Air Sample • Sump level
	BOP	<p>26. CHECK RCS LEAK RATE:</p> <ul style="list-style-type: none"> • Unidentified leakage – LESS THAN 1 GPM <p>Step 26 RNO actions:</p> <p>Do the following:</p> <ol style="list-style-type: none"> Continue efforts to identify and isolate leakage. GO TO appropriate plant operating procedure for unit shutdown.
	BOP	<p>27. EVALUATE POTENTIAL FOR CC BACK-LEAKAGE INTO RCS FROM PREVIOUSLY IDENTIFIED TUBE LEAKAGE</p>
	BOP	<p>28. EVALUATE SOURCE OF LEAKAGE - UNIT OPERATION MAY CONTINUE IF NONE OF THE FOLLOWING EXISTS:</p> <ul style="list-style-type: none"> • A non-isolable fault in an RCS component body, pipe well, vessel wall, or pipe weld
END	END	END AP-16.00 Actions

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Event Description: "B" SG tube leakage

Cue: By Examiner.

		AP-24.00, MINOR SG TUBE LEAK
	SRO	<p>Note: This is an OC-93 applicable procedure.</p> <p>*1. CHECK REACTOR TRIP - REQUIRED</p> <p>RNO</p> <ul style="list-style-type: none"> a. Initiate 0-AP-23.00, RAPID LOAD REDUCTION. (must be in HSD within six hours) b. GO TO Step 4
	SRO	<p>4. CONSULT WITH OMOC ON THE NEED TO BYPASS THE POLISHER</p> <p>SRO contacts Shift Manager who will request that the CP building remain in service.</p>
	BOP	<p>5. CHECK PCS (ERFCS, if not removed) POINTS USING GROUP 80 REVIEW OR MAIN STEAM P&ID:</p> <ul style="list-style-type: none"> • R1RM204C, RI-MS-124 • R1RM205C, RI-MS-125 • R1RM206C, RI-MS-126
	BOP	<p>6. MONITOR TREND ON SG BLOWDOWN RADIATION MONITORS:</p> <ul style="list-style-type: none"> • RI-SS-112 • RI-SS-113
	BOP	<p>7. MONITOR TREND ON AIR EJECTOR RADIATION MONITOR:</p> <ul style="list-style-type: none"> • RI-SV-111
	SRO	<p>8. CONSULT WITH OMOC AND HP ON NEED TO ALIGN CONDENSER AIR EJECTOR TO CTMT.</p> <p><i>OMOC and HP will recommend that air ejector discharge remain aligned to containment.</i></p>

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Event Description: "B" SG tube leakage

Cue: By Examiner.

	Team	<p>9. IDENTIFY AFFECTED SG(S)</p> <ul style="list-style-type: none"> • Unexpected rise in any SG narrow range level • High radiation from any SG MS line monitor • High radiation from any SG Blowdown line • High radiation from any SG sample • High radiation from any SG N-16 monitor <p>SRO/BOP identifies rising counts on the 'B' SG Blowdown RM and 'B' MS RM.</p>
	SRO	<p>10. REFER TO TECH SPEC 3.6 FOR SG SECONDARY SIDE ACTIVITY LIMITS</p> <p>SRO determines that leakrate is in excess of Technical Specification 3.1 limits of 20 gpd, and that a 6 hour clock to HSD applies.</p>
	BOP	<p>11. MINIMIZE SECONDARY CONTAMINATION:</p> <ol style="list-style-type: none"> Locally shift Aux Steam to Unit 2 Reduce or terminate affected SG blowdown Locally close steam supply valve from affected SG to TDAFW pump <ul style="list-style-type: none"> • 1-MS-120 for SG 'B' Sample Turbine BLDG sumps for contamination and secure sump pumps as necessary (if sump pumps secured, initiate 0-OSP-PL-003, TURBINE BUILDING SUMP PUMP STATUS VERIFICATION)
	SRO	<p>12. PROVIDE NOTIFICATIONS:</p> <ul style="list-style-type: none"> • HP • STA • OMOC
END	END	END Event 3

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Event Description: AP-23.00 ramp offline

Cue: By Examiner.

		0-AP-23.00, RAPID LOAD REDUCTION
	SRO	<p>CAUTION: Conservative decision-making must be maintained during rapid load reductions. Refer to Attachment 1 for trip criteria.</p> <p>NOTE:</p> <ul style="list-style-type: none"> • Actions that can be completed independently of preceding steps may be performed out of sequence as directed by the SRO. • When the Turbine is not being actively ramped, the REFERENCE and SETTER values must remain matched to prevent inadvertent ramp. • Pre-planned reactivity plans located in the Main Control Room will be used as guidance for ramping down to the desired power level. • The ramp rate in IMP OUT is nonlinear and therefore pre-planned reactivity plans based on IMP IN are not as accurate. However, total amounts of boration and dilution can be used as guidance. <p>1. TURN ON ALL PRZR HEATERS</p> <p>2. INITIATE PLANT LOAD REDUCTION AT 5%/MINUTE OR LESS:</p>
	RO	<p>a) Verify turbine valve position - NOT ON LIMITER</p> <p>The turbine is NOT on the limiter.</p>
	BOP	<p>b) Insert control rods in AUTO or MANUAL as necessary to maintain Tave and Tref within 5°F.</p>
	RO	<p>c) Verify or place turbine in IMP IN or IMP OUT as determined by Shift Supervision</p>
	BOP	<p>Team can choose either IMP IN or IMP OUT</p>
	BOP	<p>d) Adjust SETTER to desired power level</p>
	BOP	<p>e) Adjust LOAD RATE %/MIN thumbwheel to desired ramp rate (1%/minute)</p>
	BOP	<p>f) Initiate Turbine load reduction using OPERATOR AUTO (pushes the white GO button)</p>
	BOP	<p>g) Reduce Turbine Valve Position Limiter as load decreases</p>
	BOP	<p>The BOP will periodically reduce the limiter setpoint during the ramp.</p>

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Event Description: AP-23.00 ramp offline

Cue: By Examiner.

	SRO	<p>3. CHECK EMERGENCY BORATION – REQUIRED</p> <p>The team will decide to emergency borate based on the Tave – Tref difference.</p>
	<p>SRO</p> <p>RO</p>	<p>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.</p> <p>4. PERFORM AN EMERGENCY BORATION IAW THE FOLLOWING:</p> <ul style="list-style-type: none"> a) Verify or raise CHG flow to greater than 75 gpm b) Transfer the in-service BATP to FAST c) Open ()-CH-MOV-()350 d) Monitor EMRG BORATE FLOW <ul style="list-style-type: none"> • ()-CH-FI-()110 e) After required emergency boration, perform the following: <ul style="list-style-type: none"> 1) Close ()-CH-MOV-()350 2) Transfer the in-service BATP to AUTO 3) Restore Charging flow control to normal
	RO	<p>5. ESTABLISH A NORMAL BORATION TO MAINTAIN CONTROL ROD POSITION ABOVE THE LO-LO INSERTION LIMITS ATTACHMENT 4</p> <p>Attachment 4 Boration instructions are on the last page of this event.</p>

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Event Description: AP-23.00 ramp offline

Cue: By Examiner.

	SRO	NOTE: <ul style="list-style-type: none"> If at any time plant conditions no longer require rapid load reduction, actions should continue at Step 35. RCS Tave must be maintained less than or equal to 577°F and RCS pressure must be maintained greater than or equal to 2205 psig. Tech Spec 3.12.F.1 should be reviewed if either parameter is exceeded. I & C should be contacted to provide assistance with adjusting IRPIs.
	RO	6. CONTROL RAMP RATE TO MAINTAIN RCS PRESSURE GREATER THAN 2205 PSIG
	RO	*7. CHECK LETDOWN ORIFICES – TWO IN SERVICE <i>Evaluator note: two orifices will already be in service.</i>
	BOP	8. MONITOR STEAM DUMPS FOR PROPER OPERATION
	SRO	9. NOTIFY THE FOLLOWING: <ul style="list-style-type: none"> Energy Supply (MOC) Polishing Building Chemistry OMOC
	SRO	10. EVALUATE THE FOLLOWING: <ul style="list-style-type: none"> EPIP applicability <i>The Shift Manager will review EIPs for applicability. They are not applicable.</i> <ul style="list-style-type: none"> VPAP-2802, NOTIFICATIONS AND REPORTS, applicability <i>SRO directs STA to review VPAP-2802. The STA reports that he has completed his review of VPAP-2802 and no notifications are required.</i>

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Event Description: AP-23.00 ramp offline

Cue: By Examiner.

	SRO	<p>*11. CHECK REACTOR POWER – HAS DECREASED MORE THAN 15% IN ONE HOUR</p> <ul style="list-style-type: none"> Reactor power has NOT decreased more than 15% in one hour <p>Step 11 RNO actions: GO TO Step 13</p>
	RO	<p>Attachment 4 of AP-23.00 Actions</p> <p>SRO provides RO a copy of Attachment 4.</p> <ol style="list-style-type: none"> Place the MAKE-UP MODE CNTRL switch in the STOP position. Adjust 1-CH-YIC-1113 to desired total gallons. Adjust 1-CH-FC-1113A to the desired flow rate. Place the MAKE-UP MODE SEL switch in the BORATE position. Place the MAKE-UP MODE CNTRL switch in the START position. Verify proper valve positions. Adjust boration rate using 1-CH-FC-1113A, as necessary. WHEN boration is complete, THEN do the following. IF boric acid is to remain in the Blender to support ramping the Unit, THEN enter N/A. <ol style="list-style-type: none"> Manually blend approximately 20 gallons to flush the boration path IAW Attachment 5, Manual Makeups Enter N/A for the remaining steps in this attachment. <p><i>It is not anticipated that the team will utilize Attachment 5 during this scenario.</i></p> <ol style="list-style-type: none"> Place the MAKE-UP MODE CNTRL switch in the STOP position. Verify controllers for Primary Grade water and Boric Acid are set correctly. Place the MAKE-UP MODE SEL switch in the AUTO position. Place the MAKE-UP MODE CNTRL switch in the START position. Notify Shift Supervision of Blender status.
END	END	END Event 4

Op-Test No.: Surry 2009-301 Scenario No.: 3 Event No.: 5

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Event Description: "B" SGTR

Cue: By examiner

	Team	<p>Diagnoses the failure with the following indications:</p> <p>Alarms:</p> <ul style="list-style-type: none"> 1C-B8 PRZR LO PRESS 1C-D8 PRZR LO LVL RMA-A2 UNIT 1 MN STM ABC RAD MON ALERT/HI <p>Indications:</p> <ul style="list-style-type: none"> Decreasing pressurizer level <p><i>Unit 2 will silence Radiation Monitors and report the alarms to the Unit Supervisor. The Unit 2 operator will also perform the associated ARPs if so directed.</i></p>
	SRO	Direct initiation of AP-16.00, EXCESSIVE RCS LEAKAGE
	<p>SRO</p> <p>RO</p>	<p>Note: If SI Accumulators are isolated, 1-AP-16.01, SHUTDOWN LOCA, should be used for guidance.</p> <p>Note: RCS average temperature has a direct impact on pressurizer level.</p> <p>[1] MAINTAIN PRZR LEVEL</p> <ul style="list-style-type: none"> Isolate Letdown Control Charging flow <p>RO closes 1-CH-LCV-1460A and 1-CH-LCV-1460B and places charging in manual and attempts to maintain level at program (immediate action).</p>
	RO	<p>2 VERIFY THE FOLLOWING PARAMETERS – STABLE OR INCREASING:</p> <ul style="list-style-type: none"> PRZR Level PRZR Pressure RCS Subcooling <p>Identifies all parameters are DECREASING</p> <p>Step 2 RNO Actions- GO TO 1-E-0, REACTOR TRIP OR SAFETY INJECTION.</p>

Op-Test No.: Surry 2009-301 Scenario No.: 3 Event No.: 5

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Event Description: "B" SGTR

Cue: By examiner

	RO	<p>1-E-0 – Reactor Trip or Safety Injection</p> <p>[1] VERIFY REACTOR TRIP:</p> <p>a) Manually trip reactor</p> <p>Pushes the reactor trip push buttons.</p> <p>b) Check the following:</p> <ul style="list-style-type: none">• All Rods On Bottom light – LIT• Reactor trip and bypass breakers – OPEN• Neutron flux - DECREASING
	RO	<p>[2] VERIFY TURBINE TRIP:</p> <p>a) Manually trip the turbine</p> <p>Pushes the turbine trip push buttons.</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">• 1-MS-SOV-104 <p>Takes control switch for 1-MS-SOV-104 to CLOSE.</p> <p>d) Verify generator output breakers – OPEN (Time Delayed)</p>
	RO	<p>[3] VERIFY BOTH AC EMERGENCY BUSES – ENERGIZED</p>

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Event Description: "B" SGTR

Cue: By examiner

	RO	<p>RO may manually initiate safety injection due to a previously identified leakrate in excess of a charging pump.</p> <p>[4] CHECK IF SI INITIATED:</p> <p>a) Check if SI is actuated:</p> <ul style="list-style-type: none"> • LHSI pumps – RUNNING • SI annunciators – LIT • A-F-3 SI INITIATED – TRAIN A • A-F-4 SI INITIATED – TRAIN B <p>a) RNO - Check if SI is required or imminent as indicated by any of the following:</p> <ul style="list-style-type: none"> • Low PRZR Pressure <p>Determines that SI is imminent due to excessive RCS leakage.</p> <p>RO manually initiates safety injection.</p>
	SRO	<p>The team will hold a transition brief. During the brief it will be identified that SI was initiated and the SGTL has degraded into a SGTR.</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 with the exception of the previously identified alarms. He will also state that containment conditions and the electrical conditions are as you see them.</i></p> <p>Following the brief the team will perform 1-E-0 and applicable attachments.</p>
	SRO/BOP	<p>5. Initiate Attachment 1 (Attachment 1 actions contained in attachment 1 of this guide).</p>
	SRO/RO	<p>SRO may direct the RO to perform Attachment 10 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. Attachment 10 actions are contained in attachment 4 of this guide.</p>

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Event Description: "B" SGTR

Cue: By examiner

	RO	<p>*6. CHECK RCS AVERAGE TEMPERATURE</p> <ul style="list-style-type: none"> • STABLE AT 547°F <p>OR</p> <ul style="list-style-type: none"> • TRENDING TO 547°F <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> <ul style="list-style-type: none"> Stop dumping steam Reduce AFW flow to the SG Close MSTVs if cooldown continues
	RO	<p>7. CHECK PRZR PORVs AND SPRAY VALVES:</p> <ul style="list-style-type: none"> a) PRZR PORVs – CLOSED b) PRZR spray controls <ul style="list-style-type: none"> • Demand at Zero (or) • Controlling Pressure c) PORV block valves - AT LEAST ONE OPEN
	<p>SRO</p> <p>RO</p>	<p>NOTE: Seal injection flow should be maintained to all RCPs.</p> <p>*8. CHECK RCP TRIP AND MINIFLOW RECIRC CRITERIA:</p> <ul style="list-style-type: none"> a) Charging Pumps – AT LEAST ONE RUNNING AND FLOWING TO RCS <p>Two or three Charging pumps will be running and flowing to the RCS.</p> <ul style="list-style-type: none"> b) RCS subcooling - LESS THAN 30°F [85°F] <p>RCS subcooling will NOT be less than 30 °F</p> <p>RNO for the step is to go to step 9.</p>

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Event Description: "B" SGTR

Cue: By examiner

	RO	<p>9. CHECK IF SGs ARE NOT FAULTED:</p> <ul style="list-style-type: none"> • Check pressures in all SGs <ul style="list-style-type: none"> a) STABLE OR INCREASING AND b) GREATER THAN 100 PSIG <p>BOP 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>
	RO/BOP	<p>10. CHECK IF SG TUBES ARE NOT RUPTURED:</p> <ul style="list-style-type: none"> • Condenser air ejector radiation – NORMAL • SG blowdown radiation – NORMAL • SG MS radiation – NORMAL • TD AFW pump exhaust radiation – NORMAL • SG NR Level - NOT INCREASING IN AN UNCONTROLLED MANNER <p>BOP should observe 'B' SG NR level going up uncontrollably.</p>
	SRO	<p>RNO: GO TO 1-E-3, STEAM GENERATOR TUBE RUPTURE.</p>
	SRO	<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 primary integrity is as the RO reported and that secondary integrity is as the BOP reported. The STA will state that radiological conditions are normal with the exception of the previously identified alarms. He will also state that containment conditions and the electrical conditions are as you see them.</i></p>

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Event Description: "B" SGTR

Cue: By examiner

Time	Position	Applicant's Action or Behavior
	RO	<p>1-E-3 Actions</p> <p>NOTE: Seal injection flow should be maintained to all RCPs.</p> <p>*1. CHECK RCP TRIP AND MINIFLOW RECIRC CRITERIA:</p> <p>a) Charging Pumps – AT LEAST ONE RUNNING AND FLOWING TO RCS</p> <p>RO will identify that two charging pumps are running.</p> <p>b) RCS subcooling - LESS THAN 30°F [85°F]</p> <p>RO will identify that RCS subcooling is greater than 30°F</p> <p>RNO is to go to step 2</p>
	SRO	<p>2. IDENTIFY RUPTURED SG(s):</p> <ul style="list-style-type: none"> • Unexpected rise in any SG narrow range level OR • High radiation from any SG MS line monitor OR • High radiation from any SG blowdown line OR • High radiation from any SG sample <p>Crew should observe 'B' SG NR level going up unexpectedly.</p>

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Event Description: "B" SGTR

Cue: By examiner

	SRO	<p>CAUTION:</p> <ul style="list-style-type: none">• 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.• At least one SG must be maintained available for RCS cooldown.
	BOP	<p>3. ISOLATE RUPTURED SG(s):</p> <p>a) Adjust ruptured SG PORV controller setpoint to 1035 psig</p> <p>b) Check ruptured SG(s) PORV – CLOSED</p> <p><i>Valves may be cycling at setpoint – RNO actions are to verify proper operation.</i></p> <p>c) Verify blowdown TVs from ruptured SG(s) – CLOSED</p> <p>d) Locally close steam supply valve(s) to TD AFW pump:</p> <ul style="list-style-type: none">• 1-MS-120 for 'B' SG <p>e) Close ruptured SG(s) MSTV (B)</p> <p><i>1-MS-120 may be already closed as per AP-24.00</i></p>

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Event Description: "B" SGTR

Cue: By examiner

	BOP	<p>CAUTION: If any ruptured SG is faulted, feed flow to that SG should remain isolated during subsequent recovery actions unless needed for RCS cooldown.</p> <p>* 4. CHECK RUPTURED SG LEVEL:</p> <p>a) Narrow range level - GREATER THAN 12% [18%]</p> <p>b) Stop feed flow to ruptured SG(s)</p> <p><i>Partial completion of the critical task (WOG E-3—A) to isolate the SG is accomplished by performance of this step if not previously accomplished.</i></p> <p>c) Select the ruptured SG AFW MOVs using the following switches:</p> <ul style="list-style-type: none"> • H TRAIN DISABLE SELECTOR SWITCH • J TRAIN DISABLE SELECTOR SWITCH <p>d) 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"> • H TRAIN AUTO OPEN ENABLE SWITCH • J TRAIN AUTO OPEN ENABLE SWITCH
	BOP	<p>Critical Task: [WOG E-3—A] Isolate feedwater flow into and steam flow from the ruptured SG before a transition to ECA-3.1 occurs (KOA).</p>
	BOP	<p>CAUTION: Major steam flow paths from the ruptured SG should be isolated before initiating RCS cooldown.</p> <p>5. CHECK RUPTURED SG PRESSURE – GREATER THAN 350 PSIG</p>
	RO	<p>*6. BLOCK LOW PRZR PRESS SI SIGNAL:</p> <p>a) Check PRZR pressure - LESS THAN 2000 PSIG</p> <p>b) Turn both LO PRZR PRESS & STM HDR/LINE DP switches to block</p> <p>c) Verify Permissive Status light C-2 - LIT</p> <p>Depending on RCS pressure the team will either block low pressure SI at this point, during the RCS cooldown, or identify that blocking was performed in E-0 Attachment 1.</p>

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Event Description: "B" SGTR

Cue: By examiner

	RO	<p>*7. BLOCK LOW TAVE SI SIGNAL:</p> <ul style="list-style-type: none">a) Check RCS Tave - LESS THAN 543°Fb) Turn both HI STM FLOW & LO TAVG OR LP switches to blockc) Verify Permissive Status light F-1 – LITd) Hold the STM DUMP CNTRL switch in BYP INTLKe) Verify Bypass Status light D-2 - LIT <p>Depending on RCS temperature the team will either block low pressure SI at this point, during the RCS cooldown, or identify that blocking was performed in E-0 Attachment 1.</p>
	SRO	<p>CAUTION: Flow on each Main Steamline should be kept less than 1.0 x 1E6 PPH to prevent Main Steamline isolation during RCS cooldown with the Steam Dumps.</p> <p>CAUTION: 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 35.</p> <p>NOTE: RCP trip criteria does NOT apply after initiation of an operator controlled cooldown.</p>

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Event Description: "B" SGTR

Cue: By examiner

	RO/SRO	<p>8. INITIATE RCS COOLDOWN:</p> <p>a) Determine required core exit temperature (ONE TIME):</p> <table><tr><th>LOWEST RUPTURED SG PRESSURE (PSIG)</th><th>CORE EXIT TEMPERATURE (°F)</th></tr><tr><td>BETWEEN 1001 AND 1085</td><td>495 [440]</td></tr><tr><td>BETWEEN 901 AND 1000</td><td>485 [430]</td></tr><tr><td>BETWEEN 801 AND 900</td><td>470 [415]</td></tr><tr><td>BETWEEN 701 AND 800</td><td>455 [400]</td></tr><tr><td>BETWEEN 601 AND 700</td><td>440 [385]</td></tr><tr><td>BETWEEN 501 AND 600</td><td>420 [365]</td></tr><tr><td>BETWEEN 401 AND 500</td><td>400 [345]</td></tr><tr><td>BETWEEN 350 AND 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 501 AND 600	420 [365]																			
BETWEEN 401 AND 500	400 [345]																			
BETWEEN 350 AND 400	385 [335]																			
	BOP	<p>Based on current ruptured SG pressure the RO will determine the CETC temperature following the impending cooldown.</p> <p>b) Place Steam Dump Mode Select switch in Steam Pressure mode</p> <p>c) Dump steam to main condenser from from intact SG(s) at maximum rate</p> <p>BOP will manually increase demand on the Steam Dump Controller until demand is at least 25% (full open demand signal to cooldown steam dumps) or 1E6 lbm/hr is reached.</p> <p>d) Check CETCs - LESS THAN REQUIRED TEMPERATURE</p> <p>The first time this is read, CETC temperatures will not be less than the required temperature. The SRO will proceed to the RNO portion of this step and continue in the procedure. Step 8e and 8f will be performed once CETCs are less than the required temperature in accordance with the RNO of step 8d.</p> <p>e) Stop RCS cooldown</p> <p>f) Maintain CETCs - LESS THAN REQUIRED TEMPERATURE</p> <p><i>Partial completion of the critical task (WOG E-3—B) to cooldown the RCS is accomplished during this step.</i></p>																		

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Event Description: "B" SGTR

Cue: By examiner

	BOP	<p>* 9. CHECK INTACT SG LEVELS:</p> <ul style="list-style-type: none"> a) Any narrow range level - GREATER THAN 12% [18%] b) Check emergency buses – BOTH ENERGIZED c) Control feed flow to maintain narrow range level between 22% and 50%
	<p>SRO</p> <p>RO</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>*10. CHECK PRZR PORVs AND BLOCK VALVES:</p> <ul style="list-style-type: none"> a) Power to PRZR PORV block valves - Available b) PRZR PORVs – CLOSED c) PORV block valves - AT LEAST ONE OPEN <p>RO will report that only one PORV block valve is open.</p>
	RO	<p>11. RESET BOTH TRAINS OF SI</p> <p>SI will either be reported as previously reset or it can be reset again.</p>
	RO	<p>12. RESET CLS:</p> <ul style="list-style-type: none"> a) Check CTMT pressure – HAS EXCEEDED 17.7 psia <p>Containment pressure has not exceeded 17.7 psia, the RNO has the team proceed to Step 13.</p>

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Event Description: "B" SGTR

Cue: By examiner

	RO	<p>13. VERIFY INSTRUMENT AIR AVAILABLE:</p> <p>a) Check annunciator B-E-6 - NOT LIT</p> <p>b) Check at least one CTMT IA compressor – RUNNING</p> <ul style="list-style-type: none"> • 1-IA-C-4A or 4B <p>c) Verify 1-IA-TV-100 - OPEN</p> <p>RO will report 1B-E6 is not LIT, a containment instrument air compressor is running, but 1-IA-TV-100 is CLOSED. This will send the team to C RNO</p> <p>Step 13c RNO actions: Open valve 1-IA-TV-100.</p> <p>RO will attempt to open 1-IA-TV-100, but will not be successful. SRO may align turbine building instrument air to containment (in accordance with ARP-1B-F6) but that will not be successful.</p>
	BOP/RO	<p>14. ALIGN CONDENSER AIR EJECTOR TO CTMT:</p> <p>a) Verify the following:</p> <ul style="list-style-type: none"> • 1-SV-TV-102 – OPEN • 1-SV-TV-103 – CLOSED <p>b) Open the following valve:</p> <ul style="list-style-type: none"> • 1-SV-TV-102A <p>The BOP will open 1-SV-TV-102A.</p>

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Event Description: "B" SGTR

Cue: By examiner

	SRO	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.
	RO	<p>15. CHECK IF LHSI PUMPS SHOULD BE STOPPED:</p> <ul style="list-style-type: none"> a) Check LHSI pumps – Any running with suction aligned to RWST b) RCS pressure - GREATER THAN 250 PSIG [400 PSIG] c) Stop LHSI pumps and put in AUTO <p>The RO will stop the final remaining LSHI pump.</p>
	RO	<p>16. Check if RCS Cooldown should be stopped</p> <ul style="list-style-type: none"> a) Check CETCs – LESS THAN REQUIRED TEMPERATURE b) Stop RCS Cooldown c) Maintain CETCs – LESS THAN REQUIRED TEMPERATURE <p>Cooldown the RCS to < target CETCs and stabilize temperature such that transition is not made into an ECA or FR procedure based on RCS subcooling 30 °F or RCS temp , 455 °F (KOA)</p>
	BOP	<p>17. CHECK RUPTURED SG(s) PRESSURE - STABLE OR INCREASING</p> <p>BOP should report that ruptured SG pressure is stable or increasing.</p>
	RO	<p>18. CHECK RCS SUBCOOLING BASED ON CETCs - GREATER THAN 50°F [105°F]</p> <p>RO will report that subcooling is greater than 50 °F.</p>

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Event Description: "B" SGTR

Cue: By examiner

	RO	<p>19. DEPRESSURIZE RCS TO MINIMIZE BREAK FLOW AND REFILL PRZR:</p> <p>a) Check normal spray - AVAILABLE</p> <ul style="list-style-type: none">• RCP C <u>AND</u> 1-RC-PCV-1455B - BOTH AVAILABLE <p>AND</p> <ul style="list-style-type: none">• RCPs A and B <u>AND</u> 1-RC-PCV-PCV-1455A – BOTH AVAILABLE <p>Team will determine that spray is not available due to loss of containment instrument air.</p> <p>Step 19a RNO actions: GO TO step 20.</p>
		<p><i>E-3 actions continue in next section.</i></p>

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Event Description: ECA-3.3

Cue: Inability to reduce RCS pressure.

	SRO	CAUTION: The PRT may rupture if a PRZR PORV is used for RCS depressurization. Rupturing the PRT may result in abnormal containment conditions.
		CAUTION: Cycling of the PRZR PORV should be minimized.
		NOTE: The upper head region may void during RCS depressurization if the RCPs are not running. This will result in a rapidly increasing PRZR level.
	RO	<p>20. 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:</p> <ul style="list-style-type: none"> • PRZR Level – greater than 69% (or) • RCS Subcooling based on CETCs less than 30°F (or) • Both of the following exist: <ul style="list-style-type: none"> 1) RCS Pressure – less than Ruptured SG pressure (and) 2) PRZR level – greater than 22% <p>Attempts to open either pressurizer PORV, but neither will operate.</p> <p>Step 20a RNO actions- GO TO 1-ECA-3.3, SGTR WITHOUT PRESSURE CONTROL.</p>
	SRO	The team will hold a transition brief. During the brief it will be identified that RCS pressure control is not available and the team will transition to 1-ECA-3.3.
	RO	<p>1-ECA-3.3 Actions</p> <p>1. CHECK RUPTURED SG(S) NARROW RANGE LEVEL - LESS THAN 75% [73%]</p> <p>RO will either report that 'B' SG Level is greater than 75%.</p> <p>Step 1 RNO actions - GO TO Step 6</p>

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Event Description: ECA-3.3

Cue: Inability to reduce RCS pressure.

	RO	<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>RO will identify that RCS subcooling is greater than 30°F.</p> <p>b) Check secondary heat sink:</p> <ul style="list-style-type: none"> Total feed flow to SGs – GREATER THAN 350 GPM [450 GPM] AVAILABLE <p>OR</p> <ul style="list-style-type: none"> Narrow range level in at least one intact SG - GREATER THAN 12% [18%] <p>c) Check RVLIS indication - GREATER THAN VALUE FROM TABLE</p> <table border="1" data-bbox="678 1052 1183 1386"> <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>RO will identify that RVLIS Full Range is Greater than 63%.</p> <p>d) Check any ruptured SG narrow range level - INCREASING IN AN UNCONTROLLED MANNER OR OFFSCALE HIGH</p> <p>BOP will identify that 'B' SG Level is Off-Scale High.</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%																	

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Event Description: ECA-3.3

Cue: Inability to reduce RCS pressure.

	RO	7. STOP ALL BUT ONE CHG PUMP AND PUT IN AUTO RO will secure one of the running charging pumps
	RO	8. ISOLATE HHSI TO COLD LEGS: a) Verify the following: 1) CHG pump suctions from RWST - OPEN <ul style="list-style-type: none"> • 1-CH-MOV-1115B • 1-CH-MOV-1115D 2) Check CHG pump miniflow recirc valves - OPEN <ul style="list-style-type: none"> • 1-CH-MOV-1275A • 1-CH-MOV-1275B • 1-CH-MOV-1275C • 1-CH-MOV-1373 b) Close HHSI to Cold Leg: <ul style="list-style-type: none"> • 1-SI-MOV-1867C • 1-SI-MOV-1867D • 1-SI-MOV-1842
END	END	END – Event is terminated upon reduction of SI flow (i.e. Step 7 of ECA-3.3).

END SCENARIO

SIMULATOR OPERATOR GUIDE

Simulator Setup

Initial Conditions:

Recall 75% IC and enter the following malfunctions or recall the IC 313 and implement TRIGGER #30 to activate all passive malfunctions. VERIFY Trigger #30 implemented.

Close the following MOVs:

- 1-SI-MOV-1864B
- 1-SI-MOV-1885B
- 1-SI-MOV-1885C

Start 1-SD-P-1B and secure 1-SD-P-1A

Set the following EVENT – Event #9 – Event- MS2: MS-TV-101B Closed

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

- ASP_AO_OFF = True
- SET → vsps118a_stuck=true
- SET → vsps111a_stuck=true

Enter the following MALFUNCTIONS:

Malfunction	Delay	Ramp	Trigger	Ramp Start/Value	Severity/Final	Trigger Type
NI-0703- LOSS OF INSTR PWR TO POWER RNG CHNL N43	10	N/A	1	N/A	N/A	Manual
RC0703- LOOP 3 NAR RNG THOT INST/RTD FAIL(432A)	10	0	3	0	-1	Manual
RC2402- STEAM GENERATOR B TUBE RUPTURE	10	5 minute	5	0	2.5	Manual
CA04- CNTMNT INSTRUMENT AIR HEADER LEAK	0	0	9	0	25	AUTO TRIGGER
SI0601- SI FLOW TRNSMTR SI-FT- 961 FAILURE	0	0	30	0	-2	Preload

SIMULATOR OPERATOR GUIDE

Enter the following REMOTE FUNCTIONS:

Remote Function	Delay	Trigger	Ramp Start Value	Ramp Time	Remote Value	Trigger Type (Auto or Manual)
CA→ RCP007- BOTTLE AIR PRESSURE FOR RC-PCV-456 (0.0- 2000 psig)	0	9	2000	5 minutes	1.0	Auto Trigger
CA→ RCP008- BOTTLE AIR PRESSURE FOR RC-PCV-455 (0.0- 2000 psig)	0	9	2000	5 minutes	1.0	Auto Trigger
SDP1A_BKRPOS- SD-P-1A BKR 15B6 CUBICLE POSITION	0	30	N/A	N/A	RACK_OUT	Preload
SIP1B_BKRPOS- SI-P-1B BKR 14J3 CUBICLE POSITION	0	30	N/A	N/A	RACK_OUT	Preload

Enter the following Switch Overrides:

Override	Delay	Ramp	Trigger	Value	Trigger Type (Auto or Manual)
RM_N16_SEL_NI43- RM N16 NI43 SELECTED	0	N/A	30	ON	Preload
RM_N16_SEL_NI44- RM N16 NI44 SELECTED	0	N/A	30	OFF	Preload
TVIA100_CLOSE- TV-IA-100 CLOSE	0	N/A	9	ON	Auto Trigger
TVIA100_OPEN- TV-IA-100 OPEN	0	N/A	9	OFF	Auto Trigger

SIMULATOR OPERATOR GUIDE

Enter the following MOV Control:

Override	Delay	Trigger	Remote Value	Trigger Type (Auto or Manual)
SIMOV863B_RACKIN- MOV-SI-863B B LHSI Pump to ALT HHSI	0	30	RACKOUT	Preload
SIMOV864B_RACKIN- MOV-SI-864B B LHSI Pump to Cold Legs	0	30	RACKOUT	Preload
SIMOV885B_RACKIN- SI-MOV-1885B LHSI Recirc Pump B	0	30	RACKOUT	Preload
SIMOV885C_RACKIN- SI-MOV-1885C LHSI Recirc Pump B	0	30	RACKOUT	Preload

TRIGGER	TYPE	DESCRIPTION
1	Manual	NI43 control power failure
3	Manual	“C” Loop Thot RTD fails low
5	Manual	“B” SG tube leakage – 23 gpm
7	Manual	MANUAL UPDATE OF TUBE LEAK TO TUBE RUPTURE
9	Manual	Loss of containment IA on SI initiation.

SIMULATOR OPERATOR 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:

<input type="checkbox"/> 1-SI-P-1B	<input type="checkbox"/> 1-SI-MOV-1864B	<input type="checkbox"/> 1-SI-MOV-1863B
<input type="checkbox"/> 1-SI-MOV-1885B	<input type="checkbox"/> 1-SI-MOV-1885C	<input type="checkbox"/> 1-SD-P-1A

- ☐ Verify 1-RM-RI-112 aligned to A/C SG and 1-RM-RI-113 aligned to B SG (magnets).
- ☐ Verify Ovation System operating.
- ☐ Reset ICCMs.
- ☐ Verify Component Switch Flags.
- ☐ Verify Brass Caps properly placed.
- ☐ Verify SG PORVs set for 1035 psig.
- ☐ Verify Rod Control Group Step Counters indicate properly.
- ☐ Verify Ovation CRT display
- ☐ Advance Charts the following charts:

Master chart advance switch

- ☐ Verify Turbine Thumb Wheel Settings @120 rpm/min and Position 6
- ☐ Verify Containment Instrument Air Compressors are on Inside Suction (all RMs reset)
- ☐ Verify all ARPs have been cleaned
- ☐ Verify CLEAN copies of the following procedures are in place:

<input type="checkbox"/> AP-53.00 (2)	<input type="checkbox"/> AP-23.00	<input type="checkbox"/> AP-16.00 (2)	<input type="checkbox"/> ECA-3.3
<input type="checkbox"/> E-0	<input type="checkbox"/> AP-24.00	<input type="checkbox"/> E-3	<input type="checkbox"/> AP-4.00
<input type="checkbox"/> OP-CH-007		<input type="checkbox"/> Reactivity Sheet	
<input type="checkbox"/> OP-ZZ-002		<input type="checkbox"/>	

- ☐ Verify Reactivity Placard is current.

SIMULATOR OPERATOR GUIDE

Brief

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

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

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

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

Assign operating positions.

Ask for and answer questions.

SIMULATOR OPERATOR GUIDE

Conduct shift turnover:

Provide normal shift turnover materials reflecting the below initial conditions:

Initial Conditions: Unit 1 has been at 75% power for 3 days due to high vibrations on the “A” high-pressure heater drain pump. The “B” high-pressure heater drain pump has been placed in service and is currently being monitored by maintenance for proper operation. All systems and crossties are operable with the following exceptions:

- 1-SI-P-1B, “B” low head safety injection pump, is tagged out for motor PMs. 62 hours remain in the 72-hour Technical Specification 3.3.B.3 clock. Repairs are scheduled to be complete in 16 hours.
- 1-SD-P-1A, “A” high-pressure heater drain pump, is tagged out for high pump vibrations.

Maintain Unit 1 at 75% power. The ramp to 100% power is scheduled for dayshift tomorrow. Support maintenance as required on 1-SI-P-1B repairs. The current PSA analysis for plant conditions is green for both units.

Current RCS boron is: 853 ppm

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

The last shift performed three 30-gallon dilutions followed by manual make-ups.

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

SIMULATOR OPERATOR GUIDE

Session Conduct:

Ensure conditions in Simulator Set-up are established.

Ensure Trigger 30 is active prior to team entering the simulator.

Verify Exam Security has been established and ASP_AO_OFF = True.

EVENT 1 **NI-43 loss of control power**

When cued by examiner, implement Trigger #1

Operations Supervisor/Management:

If contacted, will acknowledge the failure of N-43. The individual(s) contacted will also acknowledge any TS LCOs and entry into AP-53.00 and AP-4.00.

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

If contacted, will acknowledge that N-16 monitors are inoperable, due to failure to align to NI-44.

STA:

If contacted, will acknowledge the failure of N-43. The individual(s) contacted will also acknowledge (but not confirm/deny) any TS LCOs.

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

If directed, will contact reactor engineering.

If the team has a transient brief: The STA will state that primary integrity is as the RO reported and that secondary integrity is as the BOP reported. The STA will state that radiological conditions are normal. He will also state that containment conditions and the electrical conditions are as you see them.

SIMULATOR OPERATOR GUIDE

I&C/Work Week Coordinator:

If contacted, will acknowledge instrumentation failure and commence investigations and/or efforts to place the channel in trip for NI-43.

If contacted, will acknowledge that N-16 monitors are inoperable, due to failure to align to NI-44.

Role play as other individuals as needed.

SIMULATOR OPERATOR GUIDE

EVENT 2 **“C” Loop Thot Failure**

When cued by examiner, implement Trigger #3

Operations Supervisor/Management:

If contacted, will acknowledge the failure of “C” Loop Thot RTD. The individual(s) contacted will also acknowledge any TS LCOs and entry into AP-53.00.

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

STA:

If contacted, will acknowledge the failure of “C” Loop Thot RTD failure. The individual(s) contacted will also acknowledge (but not confirm/deny) any TS LCOs.

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

If the team has a transient brief: The STA will state that primary integrity is as the RO reported and that secondary integrity is as the BOP reported. The STA will state that radiological conditions are normal. He will also state that containment conditions and the electrical conditions are as you see them.

I&C/Work Week Coordinator:

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

Role play as other individuals as needed.

SIMULATOR OPERATOR GUIDE

EVENT 3 Steam Generator Tube Leak into ‘B’ Steam Generator

When cued by examiner, implement Trigger #5.

Operations Supervisor/Management:

If contacted, will acknowledge RCS leakage into the ‘B’ SG (if informed). 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 and the initiation of AP-24.00.

If asked, OMOC will recommend that air ejector discharge remain aligned to containment.

If asked, OMOC will not recommend bypassing the CP building at this time.

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.

SIMULATOR OPERATOR GUIDE

STA:

If contacted, will acknowledge the RCS leakage into the 'B' SG.

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

If the team has a transient brief: The STA will state that primary integrity is as the RO reported and that secondary integrity is as the BOP reported. The STA will state that radiological conditions are normal with the exception of the previously identified radiation monitor alarms. He will also state that containment conditions and the electrical conditions are as you see them.

RP:

If asked, HP will recommend that air ejector discharge remain aligned to containment

Role play as other individuals as needed.

SIMULATOR OPERATOR GUIDE

EVENT 4 **AP-23.00 Ramp**

Operations Supervisor/Management:

If contacted, will acknowledge the requirement to ramp the unit due to technical specification requirement.

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

If contacted, will acknowledge entry into AP-23.00.

STA:

If contacted, will acknowledge the requirement to ramp the unit due to technical specification requirement.

If asked, the STA will acknowledge the need to borate and use rods (will acknowledge the team review of OP-RX-010, if performed). If asked to perform the OP-RX-010 review, the STA will state that he is not able to at this time.

After directed, the STA will report that he has reviewed VPAP-2802 and no notifications were required.

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

If the team has a transient brief: The STA will state that primary integrity is as the RO reported and that secondary integrity is as the BOP reported. The STA will state that radiological conditions are normal. He will also state that containment conditions and the electrical conditions are as you see them.

SIMULATOR OPERATOR GUIDE

Maintenance:

If contacted, will acknowledge the ramp and support as required.

If contacted, will acknowledge the requirements to sample the RCS.

Role play as other individuals as needed.

SIMULATOR OPERATOR GUIDE

EVENT 5 **SGTL on 'B' SG Degrades into a SGTR**

When cued by the evaluator- revise the degradation of RC2402 from 2.5 to 50.

BOOTH: The current degradation of RC2402 is 2.5. Increase the degradation to 50 with no delay and no ramp.

Operations Supervisor/Management:

If contacted, will acknowledge the fact that the tube leak on the 'B' SG has degraded into a tube rupture. Will also acknowledge entry into E-0, the subsequent SI and the need to go to E-3.

If contacted, will acknowledge the isolation of 'B' SG (if informed).

STA:

If asked, will report that he will calculate the time to 'B' fill, time permitting.

If contacted, will enter the control room and commence reviewing status trees and prepare for the transient brief (items are reported "as you see them or previously reported").

Field Operators:

If directed, field operators will perform local manipulations (e.g., close 1-MS-120)

Role play as other individuals as needed.

SIMULATOR OPERATOR GUIDE

EVENT 6 **ECA-3.3**

This event will automatically occur when the “B” MSTV closes actuated.

Operations Supervisor/Management:

If contacted, will acknowledge the fact that 1-IA-TV-100 has closed and cannot be opened.

If contacted, will brief operators to assume admin control of turbine building IA to containment.

Field Operators:

If directed, will report that attempts to align outside air to containment were unsuccessful. (either key will not unlock lock, or valves are stuck- since they may attempt various methods to restore containment IA).

Role play as other individuals as needed.

Simulator Guide Attachment 1Attachment 1 of 1-E-0

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

Simulator Guide Attachment 1**Attachment 1 of 1-E-0**

	BOP	<p>*10. BLOCK LOW PRZR PRESS SI SIGNAL:</p> <ul style="list-style-type: none">a) Check PRZR pressure – LESS THAN 2000 psigb) Turn both LO PRZR PRESS & STM HDR/LINE ΔP switches to blockc) Verify Permissive Status light C-2 - LIT <p>BOP may block the low pressurizer pressure SI signal depending on current RCS pressure.</p>
	BOP	<p>*11. BLOCK LOW TAVE SI SIGNAL:</p> <ul style="list-style-type: none">a) Check RCS Tave - LESS THAN 543°Fb) Turn both HI STM FLOW & LO TAVG OR LP switches to blockc) Verify Permissive Status light F-1 – LIT <p>BOP may block the low Tave SI signal depending on current RCS temperature.</p>

Simulator Guide Attachment 1Attachment 1 of 1-E-0

	BOP	<p>NOTE:</p> <ul style="list-style-type: none"> • CHG pumps should be run in the following order of priority: C, B, A. • Subsequent SI signals may be reset by reperforming Step 12. <p>12. VERIFY SI FLOW:</p> <p>a) HHSI to cold legs - FLOW INDICATED</p> <ul style="list-style-type: none"> • 1-SI-FI-1961 (NQ) • 1-SI-FI-1962 (NQ) • 1-SI-FI-1963 (NQ) • 1-SI-FI-1943 or 1-SI-FI-1943A <p>b) Check CHG pumps - THREE RUNNING</p> <p>c) Reset SI.</p> <p>d) Stop one CHG pump and out in AUTO</p> <p>e) RCS pressure - LESS THAN 185 PSIG</p> <p>RNO: e) IF one LHSI pump running, THEN GO TO Step 13.</p> <p><i>BOP identifies that 1-SI-FI-1961 has failed based on individual loop flows as compared to header flow.</i></p>
	BOP	<p>13. VERIFY TOTAL AFW FLOW - GREATER THAN 350 GPM [450 GPM]</p> <p>RNO ACTIONS:</p> <ul style="list-style-type: none"> • IF SG narrow range level greater than 12% [18%] in any SG, THEN control feed flow to maintain narrow range level AND GO TO Step 14. • IF SG narrow range level less than 12% [18%] in all SGs, THEN manually start pumps AND align valves as necessary. • IF AFW flow greater than 350 GPM [450 GPM] can NOT be established, THEN GO TO 1-FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK. <p><i>Evaluator's note: actions taken in this step will depend on team's alignment of AFW flow prior to reaching this step.</i></p>

Simulator Guide Attachment 1Attachment 1 of 1-E-0

	BOP	<p>14. CHECK AFW MOVs - OPEN</p> <p>BOP will identify that all AFW MOVs are not open and will read the RNO portion of this step and manually align valves as necessary.</p>
	BOP	<p>15. INITIATE SI VALVE ALIGNMENT IAW ATTACHMENT 2</p> <p>Attachment 2 of 1-E-0 is contained in attachment 2 of this guide.</p>
	BOP	<p>16. INITIATE VENTILATION ALIGNMENT AND AC POWER ALIGNMENT IAW ATTACHMENT 3</p> <p>See attached copy of Attachment 3 – contained in attachment 3 of this guide.</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> <p><i>All MCR boundary indications will be reported at positive.</i></p>

Simulator Guide Attachment 2**1-E-0 Attachment 2**

Time	Position	Applicant's Action or Behavior
	SRO	ATTACHMENT 2 of 1-E-0 NOTE: Components previously aligned by SI termination steps, must not be realigned by this Attachment.
	RO/BOP	ATTACHMENT 2 of 1-E-0 1. Verify opened or open CHG pump suction from RWST MOVs. <ul style="list-style-type: none"> • 1-CH-MOV-1115B • 1-CH-MOV-1115D
	RO/BOP	ATTACHMENT 2 of 1-E-0 2. Verify closed or close CHG pump suction from VCT MOVs. <ul style="list-style-type: none"> • 1-CH-MOV-1115C • 1-CH-MOV-1115E
	RO/BOP	ATTACHMENT 2 of 1-E-0 3. Verify running or start at least two CHG pumps. (listed in preferred order) <ul style="list-style-type: none"> • 1-CH-P-1C • 1-CH-P-1B • 1-CH-P-1A
	RO/BOP	ATTACHMENT 2 of 1-E-0 4. Verify opened or open HHSI to cold legs MOVs. <ul style="list-style-type: none"> • 1-SI-MOV-1867C • 1-SI-MOV-1867D
	RO/BOP	ATTACHMENT 2 of 1-E-0 5. Verify closed or close CHG line isolation MOVs. <ul style="list-style-type: none"> • 1-CH-MOV-1289A • 1-CH-MOV-1289B

Simulator Guide Attachment 2

1-E-0 Attachment 2

	RO/BOP	<p>ATTACHMENT 2 of 1-E-0</p> <p>6. Verify closed or close Letdown orifice isolation valves.</p> <ul style="list-style-type: none"> • 1-CH-HCV-1200A • 1-CH-HCV-1200B • 1-CH-HCV-1200C
	RO/BOP	<p>ATTACHMENT 2 of 1-E-0</p> <p>7. Verify opened or open LHSI suction from RWST MOVs.</p> <ul style="list-style-type: none"> • 1-SI-MOV-1862A • 1-SI-MOV-1862B
	RO/BOP	<p>ATTACHMENT 2 of 1-E-0</p> <p>8. Verify opened or open LHSI to cold legs MOVs.</p> <ul style="list-style-type: none"> • 1-SI-MOV-1864A • 1-SI-MOV-1864B – <i>power tagged out – valve closed.</i>
	RO/BOP	<p>ATTACHMENT 2 of 1-E-0</p> <p>9. Verify running or start at least one LHSI pump.</p> <ul style="list-style-type: none"> • 1-SI-P-1A • 1-SI-P-1B - <i>power tagged out</i>
	RO/BOP	<p>ATTACHMENT 2 of 1-E-0</p> <p>10. Verify High Head SI flow to cold legs indicated.</p> <ul style="list-style-type: none"> • 1-SI-FI-1961 • 1-SI-FI-1962 • 1-SI-FI-1963 • 1-SI-FI-1943 or 1-SI-FI-1943A <p><i>RO/BOP identifies that 1-SI-FI-1961 has failed based on individual loop flows as compared to header flow.</i></p>

Simulator Guide Attachment 2**1-E-0 Attachment 2**

	RO/BOP	<p>ATTACHMENT 2 of 1-E-0</p> <p>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.</p> <ul style="list-style-type: none">• Alternate SI to Cold legs• Hot leg injection
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Simulator Guide Attachment 3**1-E-0 Attachment 3**

NUMBER 1-E-0	ATTACHMENT TITLE	ATTACHMENT 3
REVISION 61	AUXILIARY VENTILATION AND AC POWER VERIFICATION	PAGE 1 of 5

1. ____ Verify or place REFUEL SFTY MODE switches in NORMAL.

2. ____ Verify 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

Simulator Guide Attachment 3**1-E-0 Attachment 3**

NUMBER 1-E-0	ATTACHMENT TITLE AUXILIARY VENTILATION AND AC POWER VERIFICATION	ATTACHMENT 3
REVISION 61		PAGE 2 of 5

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. ____ Verify 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		

Simulator Guide Attachment 3**1-E-0 Attachment 3**

NUMBER 1-E-0	ATTACHMENT TITLE AUXILIARY VENTILATION AND AC POWER VERIFICATION	ATTACHMENT 3
REVISION 61		PAGE 3 of 5

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. ____ Verify stopped or stop 1-VS-AC-4.
8. ____ Place 1-VS-43-VS103X, MCR ISOLATION switch to the OFF position.
9. ____ Verify closed or close MCR isolation dampers.
- ☐ • 1-VS-MOD-103A
 - ☐ • 1-VS-MOD-103B
 - ☐ • 1-VS-MOD-103C
 - ☐ • 1-VS-MOD-103D
10. ____ IF any MCR PDI on Unit 2 Vent Panel NOT indicating positive pressure, THEN place the following switches to OPEN.
- ☐ • 1-VS-SOV-322, EMERG AIR DUMP TO CONTROL RM
 - ☐ • 1-VS-SOV-100, EMERG AIR DUMP TO C.R.
- NOTE:** The timer should be set for 50 minutes, minus the number of minutes since Safety Injection initiation.
11. ____ Set timer. WHEN SI has been in progress for 50 minutes (when timer goes off), THEN immediately perform Step 18 to start one Emergency Supply Fan.

Simulator Guide Attachment 3**1-E-0 Attachment 3**

NUMBER 1-E-0	ATTACHMENT TITLE AUXILIARY VENTILATION AND AC POWER VERIFICATION	ATTACHMENT 3
REVISION 61		PAGE 4 of 5

12. ____ 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)

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

14. ____ Verify initiated or initiate 0-AP-50.00, OPPOSITE UNIT EMERGENCY.

15. ____ Verify 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

16. ____ IF both of the following conditions exist, THEN verify that Load Shed is activated.

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

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

Simulator Guide Attachment 3**1-E-0 Attachment 3**

NUMBER 1-E-0	ATTACHMENT TITLE AUXILIARY VENTILATION AND AC POWER VERIFICATION	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.

***** :

18. WHEN SI has been in progress for 50 minutes (when timer goes off), THEN 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 18 Caution.

Simulator Guide Attachment 4**1-E-0 Attachment 10**

	BOP	<p>ATTACHMENT 10 of 1-E-0</p> <p>This attachment can be performed at any time during 1-E-0. It is a pre-emptive action, so it is not required to be performed.</p> <p>1. Verify SI is in progress. <u>IF</u> SI is <u>NOT</u> in progress, <u>THEN</u> return to procedure step in effect.</p> <p>RO identifies that SI is in progress.</p>
	BOP	<p>ATTACHMENT 10 of 1-E-0</p> <p>2. Identify Ruptured SG by one of the following conditions:</p> <ul style="list-style-type: none"> • Unexpected rise in any SG Narrow Range level • High radiation from any SG MS line monitor • High radiation from any SG Blowdown line <p>RO with SRO concurrence identifies 'B' SG as the ruptured SG</p>
	BOP	<p>ATTACHMENT 10 of 1-E-0</p> <p>3. Verify running or start AFW Pumps, as necessary</p> <ul style="list-style-type: none"> • 1-FW-P-3A • 1-FW-P3B • 1-FW-P-2
	BOP	<p>ATTACHMENT 10 of 1-E-0</p> <p>4. When ruptured SG Narrow Range level is greater than 12%, then isolate feed flow to ruptured SG by closing SG AFW Isolation MOVs:</p> <ul style="list-style-type: none"> • SG B, 1-FW-MOV-151C and 1-FW-MOV-151D <p>RO closes 1-FW-MOV-151C/D when SG level is greater than 12% Narrow Range.</p> <p><i>Partial completion of the critical task (WOG E-3—A) to isolate the SG is accomplished by performance of this step.</i></p>

Simulator Guide Attachment 4**1-E-0 Attachment 10**

	BOP	<p>ATTACHMENT 10 of 1-E-0</p> <p>5. Select the ruptured SG AFW MOVs using the following switches:</p> <ul style="list-style-type: none"> • H TRAIN DISABLE SELECTOR SWITCH • J TRAIN DISABLE SELECTOR SWITCH
	BOP	<p>ATTACHMENT 10 of 1-E-0</p> <p>6. 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"> • H TRAIN AUTO OPEN ENABLE SWITCH • J TRAIN AUTO OPEN ENABLE SWITCH
	BOP	<p>ATTACHMENT 10 of 1-E-0</p> <p>CAUTION: At least one SG must be maintained available for RCS cooldown.</p> <p>7. Locally close steam supply valve to the TD AFW pump:</p> <ul style="list-style-type: none"> • 1-MS-120 <p>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><i>Partial completion of the critical task (WOG E-3—A) to isolate the SG is accomplished by performance of this step.</i></p>
	BOP	<p>ATTACHMENT 10 of 1-E-0</p> <p>8. Control Feed Flow to the SG IAW the following requirements:</p> <ul style="list-style-type: none"> • Minimum AFW flow is 350 gpm with SI initiated, until one SG Narrow Range level is greater than 12% • 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"> ○ SG A, 1-FW-MOV-151E and 1-FW-MOV-151F ○ SG C, 1-FW-MOV-151A and 1-FW-MOV-151B
		<p>Critical Task: [WOG E-3—A] Isolate feedwater flow into and steam flow from the ruptured SG before a transition to ECA-3.1 occurs (KOA).</p>

Simulator Guide Attachment 4**1-OP-CH-020 Actions**

Time	Position	Applicant's Action or Behavior
	BOP	<p>Obtains a copy of 1-OP-CH-020</p> <p>BOP reviews the procedure and may provide the SRO a brief on his intended actions.</p> <p>Initial Conditions:</p> <p>3.1 Verify Normal Letdown is not in service.</p> <p>3.2 Verify Excess Letdown is not in service.</p> <p>Precautions and Limitations:</p> <p>4.1 Letdown Ion Exchangers should be initially bypassed when Letdown is returned to service to avoid a temperature or Boron transient. This bypass may not be necessary when Letdown has been out of service for a short duration.</p> <p>4.2 To make certain that the design flow of 60 gpm will not be exceeded, the Cation Bed Demin will not be in service when putting in Normal Letdown.</p> <p>4.3 Letdown Pressure Control Valve, 1-CH-PCV-1145, shall be fully open before an orifice isolation valve is opened.</p> <p>4.4 Valve 1-CC-TCV-103 shall be monitored for proper operation as soon as letdown flow is established.</p> <p>BOP reviews and initials applicable sections.</p>
	BOP	<p>5.1 Placing Letdown in Service Following Auto or Manual Isolation</p> <p>CAUTION: To make certain that the design flow of 60 gpm will not be exceeded, the Cation Bed Demin will not be in service when putting in Normal Letdown.</p> <p>5.1.1 Verify removed or remove the Cation Bed Demin from service IAW 1-OP-CH-012.</p> <p>From the initial conditions, recalls that the Cation Bed is NOT in service.</p> <p>5.1.2 Verify PRZR level is greater than 14.4 percent on selected channels.</p> <p>Identifies that pressurizer level is approximately 53%</p>

Simulator Guide Attachment 4**1-OP-CH-020 Actions**

		<p>5.1.3 Verify Annunciator 1C-E8, PRZR LO LVL HTRS OFF & LETDOWN ISOL, is NOT LIT.</p> <p>Identifies that 1C-E8 is not lit.</p> <p>5.1.4 Verify or place at least one CC pump is in service.</p> <p>Identifies that at least on CC pump is in service.</p> <p>5.1.5 Verify closed or close all of the following valves.</p> <ul style="list-style-type: none"> • 1-CH-LCV-1460A, LETDOWN LINE ISOL • 1-CH-LCV-1460B, LETDOWN LINE ISOL • 1-CH-HCV-1200A, LETDOWN ORIFICE ISOL • 1-CH-HCV-1200B, LETDOWN ORIFICE ISOL • 1-CH-HCV-1200C, LETDOWN ORIFICE ISOL <p>Closes or verifies closed the valves listed above.</p> <p>5.1.6 Verify open or open both of the Letdown Line Trip valves.</p> <ul style="list-style-type: none"> • 1-CH-TV-1204A, LETDOWN LINE I/S TV • 1-CH-TV-1204B, LETDOWN LINE O/S TV <p>5.1.7 Verify or adjust 1-CH-PCV-1145, LETDOWN LINE PRESS CNTRL, setpoint as required. (Approximately 5.0 for 300 psig)</p> <p>5.1.8 Verify or place 1-CH-PCV-1145, LETDOWN LINE PRESS CNTRL, in MAN and OPEN (0% demand).</p> <p>Places 1-CH-PCV-1145 in manual and reduces demand to 0%.</p> <p>5.1.9 Verify or place 1-CH-TCV-1143, LETDOWN LINE DIVERT, in the DIVERT position. Enter N/A if Shift Supervision determines that IXs are to remain in service.</p> <p>SRO directs or RO requests to leave 1-CH-LCV-1143 in its current position, as the IXs will remain in service. RO will N/A this step.</p> <p>5.1.10 Verify or place 1-CH-HCV-1244, DEBOR DEMINS DIVERT, in the NORMAL position. Enter N/A if Shift Supervision determines that IX is to remain in service.</p> <p>SRO directs or RO requests to leave 1-CH-HCV-1244 in its current position, as the IXs will not be placed in service. RO will N/A this step.</p> <p>5.1.11 Verify or place 1-CH-LCV-1115A, VCT LEVEL DIVERT, in AUTO and is aligned to the VCT (red light LIT).</p> <p>Verifies 1-CH-LCV-1115A is in AUTO and the associated red light is lit.</p>
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Simulator Guide Attachment 4**1-OP-CH-020 Actions**

		<p>NOTE: Flashing in the Non-Regen Heat Exchanger is indicated by unstable letdown flow as indicated on 1-CH-FI-1150.</p> <p>5.1.12 Initiate Normal Charging and Letdown by performing the following substeps.</p> <p>a. Open 1-CH-FCV-1122, CHG FLOW CNTRL, and establish a charging flow of greater than or equal to 45 gpm as indicated on 1-CH-FI-1122A, CHG LINE FLOW.</p> <p>Raises demand on 1-CH-FCV-1122 to establish approximately 45-gpm charging flow.</p> <p>b. Open both of the following Letdown Line Isolation valves.</p> <ul style="list-style-type: none"> • 1-CH-LCV-1460A, LETDOWN LINE ISOL • 1-CH-LCV-1460B, LETDOWN LINE ISOL <p>Opens both letdown isolation valves.</p> <p>NOTE: If RCS pressure is low, both 60 gpm orifices and all three may need to be placed in service.</p> <p>NOTE: The 45 gpm orifice should normally be placed in service first.</p> <p>NOTE: Care must be taken to ensure letdown flow does not exceed 125 gpm. Alarm setpoint for 1D-F4, LO PRESS LETDOWN LINE HI FLOW, is 130 gpm.</p> <p>c. Open one of the following valves and place the control switch in AUTO.</p> <ul style="list-style-type: none"> • 1-CH-HCV-1200A, LETDOWN ORIFICE ISOL • 1-CH-HCV-1200B, LETDOWN ORIFICE ISOL • 1-CH-HCV-1200C, LETDOWN ORIFICE ISOL <p>Opens 1-CH-HCV-1200A and places control switch in AUTO.</p> <p>d. Verify 1-CH-FI-1150, LETDOWN LINE FLOW, indicates proper flow rate based on orifice placed in service.</p> <p>e. Verify 1-CC-TCV-103, NRHX OUTLET TEMP CNTRL, is controlling in AUTO as indicated by output demand.</p> <p>f. Verify 1-CH-TI-1144, NON-REGEN HX OUTLET TEMP, is at approximately 100°F.</p> <p>NOTE: If two additional orifices will be placed in service at this time, only one may be placed in service at a time and flow rates must be allowed to stabilize before the third orifice is placed in service.</p> <p>5.1.13 IF additional orifices are desired at this time, THEN place additional Letdown Orifices(s) in service IAW the following substeps. Otherwise, enter N/A.</p>
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Simulator Guide Attachment 4**1-OP-CH-020 Actions**

		<p>SRO directs or RO requests placing two letdown orifices in service (45 gpm and 60 gpm).</p> <p>a. Open and place in AUTO the following Letdown Orifice Isolation valves, as required.</p> <p>____ 1-CH-HCV-1200A, LETDOWN ORIFICE ISOL</p> <p>____ 1-CH-HCV-1200B, LETDOWN ORIFICE ISOL</p> <p>____ 1-CH-HCV-1200C, LETDOWN ORIFICE ISOL</p> <p>b. Verify 1-CH-FI-1150, LETDOWN LINE FLOW, indicates correct flow for orifices in service.</p> <p>5.1.14 Slowly close 1-CH-PCV-1145 to obtain letdown line pressure between 300 psig and 350 psig as indicated on 1-CH-PI-1145, and then place in AUTO.</p> <p>Slowly increases demand on 1-CH-PCV-1145 until letdown pressure indicates approximately 300 psig.</p> <p>5.1.15 Verify 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.</p> <p>5.1.16 IF Ion Exchangers are NOT in service, THEN return Letdown Ion Exchangers to service IAW 1-OP-CH-011. Otherwise, enter N/A.</p> <p>5.1.17 Manipulate charging flow as required for existing plant conditions.</p> <p>Adjusts charging flow to return pressurizer level to program, but does not decrease it such that letdown flashes.</p>
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Facility: <u>Surry</u>	Scenario No.: <u>4</u>	Op-Test No.: <u>2009-301</u>	
Examiners: _____	Operators: _____	_____	
_____	_____	_____	
<p>Initial Conditions: Unit 1 is at 100% power and has been since the last refueling outage. All systems and crossties are operable with the following exception:</p> <ul style="list-style-type: none"> 1-SI-P-1B, "B" low head safety injection pump, is tagged out for motor PMs. 62 hours remain in the 72-hour Technical Specification 3.3.B.3 clock. Repairs are scheduled to be complete in 16 hours. <p>Turnover: Maintain Unit 1 at 100% power. Support maintenance as required on 1-SI-P-1B repairs. The current PSA analysis for plant conditions is green for both units.</p>			
Event No.	Malf. No.	Event Type*	Event Description
1	TBD	N - RO/SRO	Fill the PRT to normal operating level in accordance with 1-OP-RC-011 (PRT Operations)
2	TBD	I – BOP/SRO TS - SRO	Channel III of steam generator level will fail high on "A" S/G. BOP will assume and maintain manual level control of "A" main feed regulating valve.
3	TBD	TS - SRO C - All	Bus 1H 480v will fault resulting in the "H" train of ESF components. This will result in no available LSHI pumps and place the unit in a 6 hours clock to hot shutdown. Team will commence a unit shutdown due to electrical failure in accordance with AP-23.00 (Rapid Load Reduction).
4	TBD	M - All C – BOP/SRO	The #1 seal will fail on 1-RC-P-1A. The team will enter AP-9.00 (RCP Abnormal Conditions) and trip the reactor and secure 1-RC-P-1A. On the reactor trip one motor driven auxiliary feedwater pump will fail to auto-start (will start manually).
5	TBD	M - All C – RO/SRO	Following the reactor trip and stabilization, RCS leakage will develop and increase to a SBLOCA. The team will return to E-0 and upon initiation of safety injection, both HHSI to Tc valves will fail to operate, requiring the team to establish another source of HHSI flow to the core. Additionally, no LHSI pumps will be available and require entry into ECA-1.1, Loss of Emergency Recirculation.
<p>* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS) Technical Specifications</p>			

Surry 2009- NRC Exam Scenario #4**Event #1**

The operating team will fill the pressurizer relief tank to normal operating level in accordance with 1-OP-RC-011, PRT Operations, after assuming the watch. This evolution will be briefed prior to turnover. The unit supervisor will direct the RO to perform these actions.

Verifiable Action: (RO) Manipulation of PRT fill valve to obtain desired level.

Event #2

The 'A' SG controlling level channel fails high, causing actual SG level to go down. The BOP will take manual control of 'A' SG Main Feed Regulating Valve (MFRV). The SRO should enter 0-AP-53.00 and review Technical Specifications. 'A' SG level deviations will occur on subsequent ramp of unit (Event 4).

Verifiable Action: (BOP) Place 'A' MFRV in manual.

Technical Specification:

- Table 3.7-1 item 12 OA #6 (place channel in trip within 72 hours)
- Table 3.7-2 item 3.a. OA #20 (place channel in trip within 72 hours)
- Table 3.7-3 item 3.a OA #20 (place channel in trip within 72 hours)

Event #3

A fault will occur on the 1H 480v load distribution center. Since these components have control power supplied from station 125v DC, light indication will be available for all affected components. This event is complicated by the unavailability of 1-SI-P-1B, since now neither LHSI pump is available. The SRO should implement 1-AP-10.07, Loss of Unit One Power, and review Technical Specifications.

Due to technical specification requirement to shutdown the unit, the SRO will implement 0-AP-23.00, Rapid Load Reduction and commence a ramp to hot shutdown.

Verifiable Actions: (RO) Utilizes the control rods and boric acid during the ramp.
(BOP) Will operate the turbine during the load decrease.

Technical Specification:

- 3.0.1 -- 6 hour clock to hot shutdown due to inability to comply with section 3.3.
- 3.0.1 – 6 hour clock to hot shutdown due to inability to comply with section 3.16

Event #4

The #1 seal will fail on 1-RC-P-1A, 'A' Reactor Coolant Pump, as indicated by high seal leak-off flow. The team will enter AP-9.00 (RCP Abnormal Conditions) and trip the reactor and secure 1-RC-P-1A. On the reactor trip one motor driven auxiliary feedwater pump will fail to auto-start (will start manually).

Verifiable Actions: (RO) Manually trip the reactor
(BOP) Secure 1-RC-P-1A and close the associated seal leak-off isolation valve.
(BOP) Start 1-FW-P-3A, Auxiliary Feedwater Pump

Event #5

Following the reactor trip and stabilization, RCS leakage will develop inside containment and increase to a SBLOCA. The team will return to E-0 and upon initiation of safety injection, both HHSI to Tc valves will fail to operate, requiring the team to establish another source of HHSI flow to the core. As RCS pressure decreases, RCP trip criteria will be met, thus requiring the RCPs to be tripped.

Following the completion of 1-E-0 the team will transition to 1-E-1 and then to 1-ECA-1.1 due to the loss of both LHSI pumps.

Verifiable Actions: (RO) Manually initiate safety injection and trip the RCPs
(RO) Manually align safety injection to flow HHSI system to core.

Critical Task: [WOG E-0—I] Manually align an alternate Safety Injection Flow path from at least one charging pump before RCS subcooling is less than 30 °F (PSA).

Actions required to accomplish:

- Opens 1-SI-MOV-1842 or
- Aligns HHSI flow to the hot leg

Critical Task: [WOG E-1—C] Trip all RCPs within 5 minutes of reaching RCP Trip and Miniflow recirc criteria (KOA).

Actions required to accomplish:

- Trip 1-RC-P-1A
- Trip 1-RC-P-1B
- Trip 1-RC-P-1C

Initial Conditions:	100% Power IC, MOL – Cycle 23. The unit has been at 100% power since the last refueling outage.		
Pre-load malfunctions: <ul style="list-style-type: none"> ○ Disable 1-SI-MOV-1867D switch and auto open feature ○ Set 1-SI-MOV-1867C to thermal on opening ○ Disable autostart of 1-FW-P-3A ○ Drain PRT to low level alarm. 			
Equipment Status/ Procedures/ Alignments/ Data Sheets/ etc.: <ul style="list-style-type: none"> ○ 1-SI-P-1B tagged out for planned maintenance 			
Turnover: <ul style="list-style-type: none"> • Maintain full power operation. Unit 2 is at 100% power with all systems operable. • When turnover complete, fill the PRT to normal operating level in accordance with 1-OP-RC-011, PRT Operations. <p>All systems and crossties are operable with the following exceptions:</p> <ul style="list-style-type: none"> • 1-SI-P-1B, “B” low head safety injection pump, is tagged out for motor PMs. 62 hours remain in the 72-hour Technical Specification 3.3.B.3 clock. Repairs are scheduled to be complete in 16 hours. 			
Event	Malf. #'s	Severity	Instructor Notes and Required Feedback
1	N/A	N/A	Fill the PRT to normal operating level.
2	FW1303	N/A	Channel III level transmitter failure (high) on “A” SG
3	EL1201	N/A	Loss of 1H 480v emergency bus and unit power reduction.
4	RC1201	N/A	#1 seal failure on 1-RC-P-1A
5	RC04	N/A	Seal failure develops into SBLOCA (with no recirc capability).

OPERATING PLAN:

- The Unit has been at 100% power since the last refueling outage.
- 1-SI-P-1B, “B” low head safety injection pump, is tagged out for motor PMs. 62 hours remain in the 72-hour Technical Specification 3.3.B.3 clock. Repairs are scheduled to be complete in 16 hours.
- Unit 2 is at 100% Power with all systems and crossties operable.
- Maintain full power operation.
- Fill the PRT to normal operating level after assuming watch responsibilities.

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Event Description: Fill the PRT to normal operating level in accordance with 1-OP-RC-011.

Cue: When team ready.

Time	Position	Applicant's Action or Behavior
	RO	<p>Precautions and limitations of 1-OP-RC-011:</p> <p>4.1 Extreme care must be used when the N2 transfer valves are being opened. The large ΔP between the PRT and the N2 makeup source can generate a very high flow rate.</p> <p>4.2 The Process Vent and Vent Vent radiation monitors must be watched closely when PRT vent/purge flow is being established.</p> <p>4.3 If using an SI Accumulator as the nitrogen source for the PRT, SI Accumulator pressure will decrease. To prevent making the SI Accumulator inoperable, pressure must be maintained above the 600 psia limit specified in Tech Spec 3.3.A.2 when the Accumulator is required to be operable.</p> <p>4.4 The hose used in Subsections 5.7 and 5.8 to vent the PRT to the Overhead should be stainless steel flex braid rated for at least 150 psig.</p> <p>4.5 HP must be notified concerning the status of the PRZR PORVs to account for the additional gas from the RCS if the PORVs are open. (Reference 2.4.2)</p> <p>4.6 To assure accurate accounting of discharged radioactivity, Health Physics personnel must periodically sample Vent-Vent or Process Vent as appropriate during the release of a PRT. HP must be notified prior to the start OR reinitiation of such a release (Reference 2.4.1).</p> <p>4.7 If the PRT gas sample indicates Xe-133 activity greater than or equal to $5 \times 10^{-2} \mu\text{Ci/ml}$, the release shall be made to the Overhead Gas System.</p> <p>4.8 If any unisolated leakage path exists into the PRT, the release shall be made to the Overhead Gas system.</p> <p>4.9 Values for PRT pressure drop in Subsection 5.6 may not be exceeded. These limits ensure Hydrogen concentration in the Process Vent remains below the 4% flammability limit.</p> <p>4.10 Large changes in PRT level can result in an undesirable atmosphere in the PRT gas space due to PG O2 off-gassing as PRT temperature changes. (Reference 2.4.7)</p>

Op-Test No.: Surry 2009-301 Scenario No.: 4 Event No.: 1

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Event Description: Fill the PRT to normal operating level in accordance with 1-OP-RC-011.

Cue: When team ready.

	RO	<p>5.1.1 Compare PRT parameters with the following table.</p> <table border="1"> <thead> <tr> <th>Parameter (Normal band)</th><th>MCR Instrument</th><th>Computer Point</th><th>Annunciator</th><th>Annunciator Alarm Value</th></tr> </thead> <tbody> <tr> <td>Level (60 to 80%)</td><td>LI-1-470</td><td>L0485A L1RC001A</td><td>1C-G7 1C-H7</td><td>High - 83% Low - 59%</td></tr> <tr> <td>N₂ pressure (Normally 2 to 4 psig) (2 to 10 psig during draindown)</td><td>PI-1-472</td><td>P0485A P1RC001A</td><td>1C-F7</td><td>High 10 psig</td></tr> <tr> <td>Temperature (70 to 120 °F)</td><td>TI-1-471</td><td>T0485A T1RC001A</td><td>1C-E7</td><td>High - 125°F</td></tr> </tbody> </table> <p>RO determines that level is low.</p>	Parameter (Normal band)	MCR Instrument	Computer Point	Annunciator	Annunciator Alarm Value	Level (60 to 80%)	LI-1-470	L0485A L1RC001A	1C-G7 1C-H7	High - 83% Low - 59%	N ₂ pressure (Normally 2 to 4 psig) (2 to 10 psig during draindown)	PI-1-472	P0485A P1RC001A	1C-F7	High 10 psig	Temperature (70 to 120 °F)	TI-1-471	T0485A T1RC001A	1C-E7	High - 125°F
Parameter (Normal band)	MCR Instrument	Computer Point	Annunciator	Annunciator Alarm Value																		
Level (60 to 80%)	LI-1-470	L0485A L1RC001A	1C-G7 1C-H7	High - 83% Low - 59%																		
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Temperature (70 to 120 °F)	TI-1-471	T0485A T1RC001A	1C-E7	High - 125°F																		
	RO	<p>5.1.2 Based on present conditions, perform the required subsection to adjust PRT parameters. (✓) Enter N/A for the subsections that will not be performed.</p> <table border="1"> <thead> <tr> <th>Status (✓)</th><th>Present Conditions</th><th>Actions to be Performed</th><th>Initials</th></tr> </thead> <tbody> <tr> <td></td><td>PRT Tank level low</td><td>Perform Subsection 5.2</td><td>_____</td></tr> <tr> <td></td><td>PRT Tank level high</td><td>Perform Subsection 5.3</td><td>_____</td></tr> <tr> <td></td><td>PRT Tank N₂ pressure low</td><td>Perform Subsection 5.4</td><td>_____</td></tr> <tr> <td></td><td>PRT Tank N₂ pressure high <u>or</u> PRT to be vented/purged of hydrogen and radioactive gases</td><td>Perform Subsection 5.3, 5.5, 5.6, or 5.7</td><td>_____</td></tr> </tbody> </table> <p>Based on low level, RO determines that subsection 5.2 needs to be performed.</p>	Status (✓)	Present Conditions	Actions to be Performed	Initials		PRT Tank level low	Perform Subsection 5.2	_____		PRT Tank level high	Perform Subsection 5.3	_____		PRT Tank N ₂ pressure low	Perform Subsection 5.4	_____		PRT Tank N ₂ pressure high <u>or</u> PRT to be vented/purged of hydrogen and radioactive gases	Perform Subsection 5.3, 5.5, 5.6, or 5.7	_____
Status (✓)	Present Conditions	Actions to be Performed	Initials																			
	PRT Tank level low	Perform Subsection 5.2	_____																			
	PRT Tank level high	Perform Subsection 5.3	_____																			
	PRT Tank N ₂ pressure low	Perform Subsection 5.4	_____																			
	PRT Tank N ₂ pressure high <u>or</u> PRT to be vented/purged of hydrogen and radioactive gases	Perform Subsection 5.3, 5.5, 5.6, or 5.7	_____																			
	RO	<p>Note prior to step 5.2.1:</p> <p>NOTE: Large changes in PRT level can result in an undesirable atmosphere in the PRT gas space due to PG O₂ off-gassing as PRT temperature changes. (Reference 2.4.7)</p>																				
	RO	<p>5.2.1 Notify the STA that the Unit 1 PRT will be filled.</p>																				

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Event Description: Fill the PRT to normal operating level in accordance with 1-OP-RC-011.

Cue: When team ready.

	RO	5.2.2 Record initial PRT level. _____ % Enter N/A if filling PRT to support venting / purging evolutions.
	RO	5.2.3 Open 1-RC-TV-1519A, PRZR RELIEF TK PRI GRADE WTR OTSD TRIP VV.
	RO	5.2.4 Verify closed or close 1-RC-HCV-1523, PRT DRAIN.
	RO	5.2.5 Open 1-RC-HCV-1519B, PRT MAKEUP, to fill the PRT.
	RO	Note prior to step 5.2.6: NOTE: When the Unit is in CSD or RSD, the PRT may be filled to 95% to assist in venting/purging the PRT to the Vent/Vent or Process Vent System.
	RO	5.2.6 <u>WHEN</u> the desired level is reached, <u>THEN</u> close 1-RC-HCV-1519B.
	RO	5.2.7 Record final PRT level. _____ % Enter N/A for Steps 5.2.7 and 5.2.8 if PRT was filled to support multiple venting / purging evolutions.
	RO	5.2.8 IF PRT level increased by 5% or greater, THEN notify Chemistry to sample PRT gas space. Otherwise, enter N/A. (Reference 2.4.7)
	RO	5.2.9 At the direction of Shift Supervision, close 1-RC-TV-1519A. Otherwise, enter N/A.
END	END	END EVENT 1

Op-Test No.: Surry 2009-301 Scenario No.: 4 Event No.: 2

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Event Description: "A" steam generator level channel III (controlling) fails high.

Cue: Evaluator's cue

Time	Position	Applicant's Action or Behavior
	BOP	<p>Diagnoses channel failure with the following indications/alarms:</p> <p>Alarms:</p> <ul style="list-style-type: none"> • 1H-A5 STM GEN 1A HI LVL • 1H-G5 STM GEN 1A LVL ERROR • 1F-C10 STM GEN 1A HI LVL CH 3 <p>Indications:</p> <ul style="list-style-type: none"> • 1-FW-FCV-1478 respond to level channel failure by closing in automatic
	SRO	Enters 0-AP-53.00, Loss of Vital Instrumentation / Controls.
	RO	<p>[1] VERIFY REDUNDANT INSTRUMENT CHANNEL(S) INDICATION - NORMAL</p> <p>Verifies Channel I and II are NORMAL.</p>
	BOP	<p>[2] PLACE AFFECTED CONTROL(S)/COMPONENT(S) IN MANUAL CONTROL AND STABILIZE PARAMETER USING REDUNDANT INDICATION</p> <p>BOP takes manual control of 'A' SG feed reg valve and increases demand (FF > SF) to restore level to program.</p>
	SRO	<p>The team will hold a transient brief. During the brief the failure of 1-FW-LI-1476 will be discussed.</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>
	RO	<p>3. VERIFY REACTOR POWER – LESS THAN OR EQUAL TO 100%.</p> <p>RO will identify that reactor power, by ΔT, is less than 100%.</p>

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Event Description: "A" steam generator level channel III (controlling) fails high.

Cue: Evaluator's cue

	SRO	<p>NOTE:</p> <ul style="list-style-type: none"> • Step 4 failures are listed in order of performance priority. Only the failed instrument/control and associated step number should be read aloud. • When the affected instrument/controller malfunction(s) has been addressed by this procedure, recovery actions should continue at Step 14. <p>*4 DETERMINE THE FAILED INSTRUMENT / CONTROL AND GO TO APPROPRIATE STEP.</p> <ul style="list-style-type: none"> • SG NR Level, Step 8
	RO	<p>The RO will identify that 1-FW-LT-1476 has failed high.</p>
	BOP	<p>Caution prior to step 8:</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>

Op-Test No.: Surry 2009-301 Scenario No.: 4 Event No.: 2

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Event Description: "A" steam generator level channel III (controlling) fails high.

Cue: Evaluator's cue

	BOP	<p>8. CHECK STEAM GENERATOR LEVEL CONTROL INSTRUMENTS – NORMAL</p> <ul style="list-style-type: none"> • Steam Pressure • Steam Flow • Feed Flow • Steam Generator Level <p>Determines CH III Steam Generator Level instrumentation for 'A' SG is NOT normal.</p> <p>Step 8. RNO</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>
	SRO	<p>Determines that none of the listed instruments are affected and continues in the RNO column.</p>
	BOP	<p>IF SG Level Channel III has failed, THEN do the following:</p> <ol style="list-style-type: none"> a) Place the associated Feed Reg Valve in MANUAL. b) IF manual control of Feedwater is inoperable, THEN do the following: (Not Applicable) <ol style="list-style-type: none"> 1) Control SG level with Feedwater Isolation MOVs. 2) Consult with the Shift Manager concerning the need to place the MFRV on the jack. c) Control SG level at program level. d) Main Feed Reg Valve Bypass Valves may be used for fine control of SG level.

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Event Description: "A" steam generator level channel III (controlling) fails high.

Cue: Evaluator's cue

		<p>Step 6. RNO (Continued)</p> <p>Perform follow-up actions:</p> <p>SRO</p> <p>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.</p> <p>SRO</p> <p>b) Refer to the following Tech Spec 3.7 items:</p> <ul style="list-style-type: none"> • Table 3.7-1, 12 and 17 • Table 3.7-2, 1.c, 1.e, and 3.a • Table 3.7-3, 2.a, and 3.a <p>SRO</p> <p>SRO should determine the follow Technical Specification implications for this failure:</p> <p>Technical Specification:</p> <ul style="list-style-type: none"> • Table 3.7-1 item 12 OA #6 (place channel in trip within 72 hours) • Table 3.7-2 item 3.a OA #20 (place channel in trip within 72 hours) • Table 3.7-3 item 3.a OA #20 (place channel in trip within 72 hours) <p>SRO</p> <p>c) Refer to Attachment 1.</p> <p>SRO</p> <p>d) IF no other instrumentation failure exists, THEN GO TO Step 14.</p>
	SRO	<p>14. Review OPT-RX-001, Rx Power Calorimetric using PCS computer program, to determine operability of calorimetric and need to perform OPT-RX-007, Shift Average Power Calculation.</p> <p>If the FRV bypass valves are manipulated, the SRO/RO determines that OPT-RX-001 is impacted and OPT-RX-007 will need to be performed.</p> <p><i>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.</i></p>

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Event Description: "A" steam generator level channel III (controlling) fails high.

Cue: Evaluator's cue

	SRO	<p>15. CHECK FAILED INSTRUMENT - IS A REGULATORY GUIDE 1.97 VARIABLE (Go to Step 17 if not Reg. Guide 1.97)</p> <p><i>SRO directs STA to review Reg. Guide 1.97. The STA will report that 1-FW-LT-1476 is a Reg. Guide 1.97 component.</i></p>
	SRO	<p>16. REVIEW CEP 99-0029, REG GUIDE 1.97 OPERABILITY, REPORTABILITY, AND ALTERNATE INDICATIONS</p> <p><i>SRO directs STA to review CEP 99-0029. The STA will report that Reg. Guide 1.97 only requires one channel of SG Level indication per steam generator and no actions are required.</i></p>
	SRO	<p>17. Review the following:</p> <ul style="list-style-type: none"> • TS 3.7 • VPAP-2802 • TRM Section 3.3, Instrumentation <p><i>SRO directs STA to review VPAP-2802 and TRM Section 3.3. The STA reports he has completed these reviews and there is no impact.</i></p>
	SRO	<p>18. CHECK ADDITIONAL INSTRUMENT / CONTROLLER MALFUNCTION - EXISTS</p> <p>The team will identify that no additional failures exist, proceed to the RNO section, and this will direct the team to Step 20.</p>
	SRO	<p>20. PROVIDE NOTIFICATIONS AS NECESSARY:</p> <ul style="list-style-type: none"> • Shift Supervision • OMOC • STA (PRA determination) • I&C
END	END	END EVENT 2

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Event Description: Loss of 1H 480v Emergency Bus

Cue: On Evaluator's Cue

Time	Position	Applicant's Action or Behavior
	TEAM	<p>Identifies power loss based on the following alarms:</p> <p>Alarms:</p> <ul style="list-style-type: none"> 1K-G5 480V EMERG BUS 1H NORM SUP AUTO TRIP <p>Indications:</p> <ul style="list-style-type: none"> PCS indication of no voltage present on 1H 480v bus. PCS indication of 1H supply breaker OPEN 14H-1 <p>At this point the SRO may direct enter 1-AP-10.07 (Loss of Unit One Power) or perform the ARP 1K-G5.</p>
	BOP	<p>ARP 1K-G5</p> <ol style="list-style-type: none"> CHECK BREAKER(S) - OPEN <ul style="list-style-type: none"> 15H7 14H1 14H15
	BOP	<p>ARP 1K-G5</p> <ol style="list-style-type: none"> CHECK BREAKER(S) - OPENED FOR PLANNED EVOLUTION <p>Step 2 RNO actions- GO TO step 4.</p>
	BOP	<p>ARP 1K-G5</p> <ol style="list-style-type: none"> CONTACT ELECTRICIANS TO DETERMINE CAUSE OF BREAKER MALFUNCTION
	SRO	<p>SRO may elect to contact electricians directly, or have one RO or Desk SRO perform this task.</p>
		<p>ARP 1K-G5</p> <ol style="list-style-type: none"> ATTEMPT TO RESTORE 480V BUS IAW 1-AP-10.07, LOSS OF UNIT 1 POWER <p>SRO enters AP-10.07</p>

Op-Test No.: Surry 2009-301 Scenario No.: 4 Event No.: 3

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Event Description: Loss of 1H 480v Emergency Bus

Cue: On Evaluator's Cue

	BOP	<p>ARP 1K-G5</p> <p>6. PROVIDE NOTIFICATIONS AS NECESSARY:</p> <ul style="list-style-type: none"> • OMOC • STA • Shift Supervision • Electrical Department
	SRO	<p>The team will hold a transient brief. During the brief the loss of 1H 480v emergency bus will be discussed.</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><i>At this point the SRO may call a 6/30 (T.S. 3.0.1) clock due to inoperability of 1-SI-P-1B (tagged out) and 1-SI-P-1A not having a power supply.</i></p> <p>Technical Specification:</p> <ul style="list-style-type: none"> • 3.0.1 -- 6 hour clock to hot shutdown due to inability to comply with section 3.3. • 3.0.1 – 6 hour clock to hot shutdown due to inability to comply with section 3.16 <p><i>The SRO will make a determination during the following steps that a unit shutdown will be required (after report that bus is faulted). The team would then be expected to enter AP-23.00 (Rapid Load Reduction) at which point AP-10.07 may be delegated to a RO or placed on hold to allow both ROs to be engaged in the ramp. AP-23.00 actions immediately follow AP-10.07 actions in this guide.</i></p>
	SRO	<p>1-AP-10.07</p> <p>Notes prior to step 1:</p> <p>NOTE:</p> <ul style="list-style-type: none"> • If both units are affected, local actions should be coordinated. • If the Semi-Vital Bus is not energized, it may be necessary to start the third Condensate Pump and reduce turbine load. • The AAC Diesel Generator will automatically start if an undervoltage occurs on Transfer Buses D and F. • This is an OC-93 applicable procedure. • With Degraded Voltage or Undervoltage on 2J Bus, or a loss of Unit 2B DC Bus, Breaker 15J3 will not close automatically, except with a valid Unit 1 SI signal. • EPIPs may be applicable.

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Event Description: Loss of 1H 480v Emergency Bus

Cue: On Evaluator's Cue

	BOP	<p>1-AP-10.07</p> <p>1. CHECK UNIT - BLACKOUT HAS OCCURRED</p> <ul style="list-style-type: none"> Transfer Buses D and F - DEENERGIZED AND All Station Service Buses – DEENERGIZED <p>Step 1 RNO actions: GO TO step 37</p>
	BOP	<p>1-AP-10.07</p> <p>37. CHECK THE FOLLOWING BREAKERS - ANY OPEN:</p> <ul style="list-style-type: none"> 15D1 OR 15F1 OR 15H8 OR 15J8 <p>Step 37 RNO actions:</p> <ul style="list-style-type: none"> IF any 480V Emergency Bus deenergized, THEN GO TO Step 52. IF all 480V Emergency Buses energized, THEN GO TO Step 71.
	SRO	<p>1-AP-10.07</p> <p>Note prior to step 52:</p> <p>NOTE: If two CHG pump CC pumps or two CHG pump SW pumps are running, one pump should be secured and placed in AUTO.</p>
	RO	<p>1-AP-10.07</p> <p>52. CHECK CHG PUMP AUXILIARIES:</p> <ul style="list-style-type: none"> CHG pump CC pump - RUNNING CHG pump SW pump – RUNNING
	BOP	<p>1-AP-10.07</p> <p>53. CHECK SEMI-VITAL BUS - POWER HAS BEEN INTERRUPTED</p> <p>Step 53 RNO actions: GO TO step 56</p>

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Event Description: Loss of 1H 480v Emergency Bus

Cue: On Evaluator's Cue

	RO	1-AP-10.07 56. VERIFY IA SYSTEM ANNUNCIATORS - NOT LIT: <ul style="list-style-type: none"> • 1B-E6, IA LO HDR PRESS/IA COMPR 1 TRBL • 1B-G5, INST AIR DRYER TRBL • 1B-E5, SA COMPR TRBL • 1B-F5, CTMT INST AIR COMPR TRBL
	RO	1-AP-10.07 57. VERIFY UNIT CONDITIONS <ul style="list-style-type: none"> a) PRZR level - STABLE b) PRZR pressure - STABLE c) RCS TAVE – STABLE
	BOP	1-AP-10.07 58. VERIFY VENTILATION FANS - OPERATING <ul style="list-style-type: none"> • Auxiliary BLDG Central • Safeguards
	BOP	1-AP-10.07 Note prior to step 59: NOTE: Any MCR Chiller that was operating prior to the loss of power will have tripped and the compressor will not automatically restart. The Chiller must be shutdown and then restarted IAW 0-OP-VS-006, Control Room and Relay Room Ventilation System.
	BOP	1-AP-10.07 59. VERIFY THE FOLLOWING MCR VENTILATION EQUIPMENT - OPERATING: <ul style="list-style-type: none"> • One Control Room Chiller (Two Control Room Chillers if SI initiated on either unit AND any MCR or ESGR temperature indicator greater than 84°F) • One Unit 1 Control Room AHU • One Unit 2 Control Room AHU • One Unit 1 ESGR AHU • One Unit 2 ESGR AHU
	BOP	1-AP-10.07 60. VERIFY CRDM FANS - THREE RUNNING

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Event Description: Loss of 1H 480v Emergency Bus

Cue: On Evaluator's Cue

	SRO	<p>1-AP-10.07</p> <p>Cautions prior to step 61:</p> <p>CAUTION:</p> <ul style="list-style-type: none"> • If a HI-HI CLS has occurred on Unit 1, 1-FC-P-1A must not be started on EDG 1 if 1-CS-P-1A is running. • If a HI-HI CLS has occurred on Unit 2, 1-FC-P-1B must not be started on EDG 2 if 2-CS-P-1A is running.
	RO	<p>1-AP-10.07</p> <p>61. CHECK SFP COOLING - EITHER PUMP RUNNING</p> <ul style="list-style-type: none"> • 1-FC-P-1A, 1H1-2N2A • 1-FC-P-1B, 2H1-2S10B
	BOP	<p>1-AP-10.07</p> <p>62. VERIFY AFW MOVES - BOTH TRAINS ENERGIZED</p>
	RO	<p>1-AP-10.07</p> <p>63. VERIFY BORIC ACID ALIGNMENT:</p> <ul style="list-style-type: none"> • One Tank in service • One BATP in service
		<p>1-AP-10.07</p> <p>64. VERIFY CVCS HEAT TRACING PRIMARY AND BACKUP PANELS - ALL ENERGIZED</p> <ul style="list-style-type: none"> • Primary panels 2A1, 2A2, and 2A3 - powered from 1H 480V Bus
	RO	<p>1-AP-10.07</p> <p>Note prior to step 65:</p> <p>NOTE: The N-16 and MGPI Radiation Monitors are powered from Breaker 1H1-1-4B2 or 2H1-1-2D-2 depending on the position of throw-over switch 1-EP-TRS-DB-101 located near MCC 1H1-1.</p>

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Event Description: Loss of 1H 480v Emergency Bus

Cue: On Evaluator's Cue

	BOP	<p>1-AP-10.07</p> <p>65. CHECK RADIATION MONITORS - OPERABLE</p> <ul style="list-style-type: none"> • No sample pump deenergized • No flow faults • No monitors deenergized • Annunciator 1A-C3, N-16 TROUBLE - NOT LIT • Annunciator 0-RMA-C5, PROCESS VENT RAD MON TRBL - NOT LIT • Annunciator 0-RMA-D5, VENT STACK #2 RAD MON TRBL - NOT LIT
	BOP	<p>1-AP-10.07</p> <p>Note prior to step 66:</p> <p>NOTE: The CTMT Particulate and Gas Rad Monitor skids are powered from 1MR1A, Breaker 43, which is supplied from 480V MCC 1C1-2. These monitors are required to comply with Tech Spec 3.1.C.1.</p>
	BOP	<p>1-AP-10.07</p> <p>66. LOCALLY CHECK CTMT PARTICULATE AND GAS RAD MONITOR - OPERABLE (SKID/SAMPLE PUMP ENERGIZED) (IF MCC 1C1-2 CONFIRMED TO BE DEENERGIZED, NO NEED TO CHECK LOCALLY)</p>
	RO	<p>1-AP-10.07</p> <p>67. VERIFY SW SUPPLY MOVS – ALL ENERGIZED</p>
	SRO	<p>1-AP-10.07</p> <p>68. CHECK TECH SPEC LCOS:</p> <ul style="list-style-type: none"> • Tech Spec 3.16 <p>SRO will determine that the following technical specification actions apply:</p> <p>Technical Specification:</p> <ul style="list-style-type: none"> • 3.0.1 -- 6 hour clock to hot shutdown due to inability to comply with section 3.3. • 3.0.1 – 6 hour clock to hot shutdown due to inability to comply with section 3.16

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Event Description: Loss of 1H 480v Emergency Bus

Cue: On Evaluator's Cue

	BOP	<p>1-AP-10.07</p> <p>69. CHECK 4160V EMERGENCY BUS 1H - ENERGIZED FROM OFFSITE POWER</p> <ul style="list-style-type: none"> • 15F1 - CLOSED • 15H8 – CLOSED
	TEAM	<p>1-AP-10.07</p> <p>Caution and Notes prior to step 70:</p> <p>CAUTION: Shift Supervision should direct the loading of EDG 3 to 1J or 2J Emergency Bus to best support plant recovery.</p> <p>NOTE:</p> <ul style="list-style-type: none"> • The RSS transformer cooling fans, heaters, and load tap changer controls are powered from 1J1-1-3B2 or 2J1-1-4A2 depending on position of the throwover switch near 1-SA-TK-2 in Unit 1 Turbine BLDG basement. The switch shall be aligned to an energized bus. • Until the throwover switch is aligned to an energized bus, the RSST load tap changers are inoperable. Tech Spec 3.16.B.2 should be reviewed for required actions.
	BOP	<p>1-AP-10.07</p> <p>70. CHECK AC EMERGENCY BUS 1J - ENERGIZED FROM OFFSITE POWER</p> <ul style="list-style-type: none"> • 15D1 - CLOSED • 15J8 – CLOSED
	BOP	<p>1-AP-10.07</p> <p>71. CHECK ANY STATION SERVICE BUS - DEENERGIZED:</p> <ul style="list-style-type: none"> • 15A1 and 15A2 – OPEN OR • 15B1 and 15B2 - OPEN OR • 15C1 and 15C2 – OPEN <p>Step 71 RNO actions:</p> <ul style="list-style-type: none"> • IF ANY 480V Station Service Bus deenergized, THEN GO TO Step 77. • IF ALL 480V Station Service Buses are energized, THEN GO TO Step 90.

Event Description: Loss of 1H 480v Emergency Bus

Cue: On Evaluator's Cue

	SRO	<p>1-AP-10.07</p> <p>90. NOTIFY THE FOLLOWING:</p> <ul style="list-style-type: none"> • OMOC • STA • Electrical Foreman <p>End 1-AP-10.07</p>
	<p>SRO</p> <p>0-AP-23.00, RAPID LOAD REDUCTION</p> <p>CAUTION: Conservative decision-making must be maintained during rapid load reductions. Refer to Attachment 1 for trip criteria.</p> <p>NOTE:</p> <ul style="list-style-type: none"> • Actions that can be completed independently of preceding steps may be performed out of sequence as directed by the SRO. • When the Turbine is not being actively ramped, the REFERENCE and SETTER values must remain matched to prevent inadvertent ramp. • Pre-planned reactivity plans located in the Main Control Room will be used as guidance for ramping down to the desired power level. • The ramp rate in IMP OUT is nonlinear and therefore pre-planned reactivity plans based on IMP IN are not as accurate. However, total amounts of boration and dilution can be used as guidance. <p>RO</p> <p>1. TURN ON ALL PRZR HEATERS</p>	

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Event Description: Loss of 1H 480v Emergency Bus

Cue: On Evaluator's Cue

		0-AP-23.00, RAPID LOAD REDUCTION 2. INITIATE PLANT LOAD REDUCTION AT 5%/MINUTE OR LESS: BOP a) Verify turbine valve position - NOT ON LIMITER The turbine is NOT on the limiter. RO b) Insert control rods in AUTO or MANUAL as necessary to maintain Tave and Tref within 5°F. BOP c) Verify or place turbine in IMP IN or IMP OUT as determined by Shift Supervision Team can choose either IMP IN or IMP OUT BOP d) Adjust SETTER to desired power level BOP e) Adjust LOAD RATE %/MIN thumbwheel to desired ramp rate (1%/minute) BOP f) Initiate Turbine load reduction using OPERATOR AUTO (pushes the white GO button) BOP g) Reduce Turbine Valve Position Limiter as load decreases The BOP will periodically reduce the limiter setpoint during the ramp.
	SRO	0-AP-23.00, RAPID LOAD REDUCTION 3. CHECK EMERGENCY BORATION – REQUIRED The team will decide to emergency borate based on the Tave – Tref difference.

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Event Description: Loss of 1H 480v Emergency Bus

Cue: On Evaluator's Cue

	SRO	0-AP-23.00, RAPID LOAD REDUCTION
	RO	<p>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.</p> <p>4. PERFORM AN EMERGENCY BORATION IAW THE FOLLOWING:</p> <ol style="list-style-type: none"> Verify or raise CHG flow to greater than 75 gpm Transfer the in-service BATP to FAST Open ()-CH-MOV-()350 Monitor EMRG BORATE FLOW <ul style="list-style-type: none"> ()-CH-FI-()110 After required emergency boration, perform the following: <ol style="list-style-type: none"> Close ()-CH-MOV-()350 Transfer the in-service BATP to AUTO Restore Charging flow control to normal
	RO	<p>0-AP-23.00, RAPID LOAD REDUCTION</p> <p>5. ESTABLISH A NORMAL BORATION TO MAINTAIN CONTROL ROD POSITION ABOVE THE LO-LO INSERTION LIMITS ATTACHMENT 4</p> <p>Attachment 4 Boration instructions are on the last page of this event.</p>
	SRO	<p>0-AP-23.00, RAPID LOAD REDUCTION</p> <p>NOTE:</p> <ul style="list-style-type: none"> If at any time plant conditions no longer require rapid load reduction, actions should continue at Step 35. RCS Tave must be maintained less than or equal to 577°F and RCS pressure must be maintained greater than or equal to 2205 psig. Tech Spec 3.12.F.1 should be reviewed if either parameter is exceeded. I & C should be contacted to provide assistance with adjusting IRPIs.
	RO	<p>6. CONTROL RAMP RATE TO MAINTAIN RCS PRESSURE GREATER THAN 2205 PSIG</p>

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Event Description: Loss of 1H 480v Emergency Bus

Cue: On Evaluator's Cue

	RO	0-AP-23.00, RAPID LOAD REDUCTION *7. CHECK LETDOWN ORIFICES – TWO IN SERVICE <i>Evaluator note: two orifices will already be in service.</i>
	BOP	0-AP-23.00, RAPID LOAD REDUCTION 8. MONITOR STEAM DUMPS FOR PROPER OPERATION
	SRO	0-AP-23.00, RAPID LOAD REDUCTION 9. NOTIFY THE FOLLOWING: <ul style="list-style-type: none"> • Energy Supply (MOC) • Polishing Building • Chemistry • OMOC
	SRO	0-AP-23.00, RAPID LOAD REDUCTION 10. EVALUATE THE FOLLOWING: <ul style="list-style-type: none"> • EPIP applicability <i>The Shift Manager will review EPIPs for applicability. They are not applicable.</i> • VPAP-2802, NOTIFICATIONS AND REPORTS, applicability <i>SRO directs STA to review VPAP-2802. The STA reports that he has completed his review of VPAP-2802 and no notifications are required.</i>
	SRO	0-AP-23.00, RAPID LOAD REDUCTION *11. CHECK REACTOR POWER – HAS DECREASED MORE THAN 15% IN ONE HOUR <ul style="list-style-type: none"> • Reactor power has NOT decreased more than 15% in one hour Step 11 RNO actions: GO TO Step 13 <i>AP-23.00 actions continue next at 70% power- the next event will occur prior to reaching this power level.</i>

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Event Description: Loss of 1H 480v Emergency Bus

Cue: On Evaluator's Cue

	<p>Attachment 4 of AP-23.00 Actions</p> <p>SRO provides RO a copy of Attachment 4.</p> <ol style="list-style-type: none"> Place the MAKE-UP MODE CNTRL switch in the STOP position. Adjust 1-CH-YIC-1113 to desired total gallons. Adjust 1-CH-FC-1113A to the desired flow rate. Place the MAKE-UP MODE SEL switch in the BORATE position. Place the MAKE-UP MODE CNTRL switch in the START position. Verify proper valve positions. Adjust boration rate using 1-CH-FC-1113A, as necessary. WHEN boration is complete, THEN do the following. IF boric acid is to remain in the Blender to support ramping the Unit, THEN enter N/A. <ol style="list-style-type: none"> Manually blend approximately 20 gallons to flush the boration path IAW Attachment 5, Manual Makeups Enter N/A for the remaining steps in this attachment. <p><i>It is not anticipated that the team will utilize Attachment 5 during this scenario.</i></p> Place the MAKE-UP MODE CNTRL switch in the STOP position. Verify controllers for Primary Grade water and Boric Acid are set correctly. Place the MAKE-UP MODE SEL switch in the AUTO position. Place the MAKE-UP MODE CNTRL switch in the START position. Notify Shift Supervision of Blender status.
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Op-Test No.: Surry 2009-301 Scenario No.: 4 Event No.: 4

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Event Description: Failure of #1 seal on 1-RC-P-1A

Cue: On Evaluator's Cue

Time	Position	Applicant's Action or Behavior
	RO	<p>Diagnoses 1-RC-P-1A seal failure with the following indications/alarms:</p> <p>Alarms:</p> <ul style="list-style-type: none"> 1C-A4 RCP 1A SEAL LEAKOFF HI FLOW <p>Indications:</p> <ul style="list-style-type: none"> Seal leakoff flow for 1-RC-P-1A at top of scale of recorder. Decreasing Pressurizer level Increasing charging flow
	BOP/RO	<p>ARP 1C-A4</p> <p>1. CHECK NUMBER 1 SEAL LEAKOFF - GREATER THAN 5 GPM</p> <ul style="list-style-type: none"> 1-CH-FR-1190 (Pen 1 - Red)
	SRO	<p>ARP 1C-A4</p> <p>2. INITIATE 1-AP-9.00, RCP ABNORMAL CONDITIONS</p>
	BOP	<p>ARP 1C-A4</p> <p>3. PROVIDE NOTIFICATIONS AS NECESSARY:</p> <ul style="list-style-type: none"> OMOC STA Shift Supervision System Engineering
	SRO	<p>The team will hold a transient brief. During the brief the indications on 1-RC-P-1A seal condition will be discussed.</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>

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Event Description: Failure of #1 seal on 1-RC-P-1A

Cue: On Evaluator's Cue

	SRO	<p>1-AP-9.00</p> <p>Caution and Note prior to step 1:</p> <p>CAUTION: An RCP with high or low seal leakoff should be secured immediately (within 5 minutes) after a manual Reactor trip if any Attachment 2 parameter is continuously increasing or at Action level.</p> <p>NOTE: Attachment 5 lists PCS points which may be used to monitor RCP performance.</p> <p>This is an OC-93 applicable procedure.</p> <p>SRO hands attachment 2 to BOP for monitoring. Attachment 2 items are immediately following AP-9 actions below.</p>
	RO	<p>1-AP-9.00</p> <p>*1. VERIFY SEAL INJECTION – FLOW INDICATED</p>
	RO	<p>1-AP-9.00</p> <p>Cautions prior to step 2:</p> <p>CAUTION:</p> <ul style="list-style-type: none"> • Total No. 1 Seal leakoff is the total of the indicated leakoff from No. 1 Seal and calculated No. 2 Seal leakoff. • Number 2 Seal leakoff rate should be determined by the difference between PDTT inleakage rate before (from previously calculated 1-OPT-RC-10.0) and after the increase in Number 2 Seal leakoff.

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Event Description: Failure of #1 seal on 1-RC-P-1A

Cue: On Evaluator's Cue

	RO	<p>1-AP-9.00</p> <p>*2. VERIFY SEAL LEAKOFF – WITHIN NORMAL OPERATING RANGE IAW ATTACHMENT 1</p> <ul style="list-style-type: none"> • 1-CH-FR-1190 <p>Step 2 RNO Actions:</p> <ul style="list-style-type: none"> • IF affected RCP is NOT running, THEN GO TO Step 10. • IF affected pump is running, THEN do the following: <ul style="list-style-type: none"> a) IF Number 1 Seal leakoff is low, AND is caused by high Number 2 Seal leakage, THEN GO TO Step 16. <ul style="list-style-type: none"> • PDTT Level – INCREASING <ul style="list-style-type: none"> ○ Gallons (U0911) ○ Percent (Y4020A) • Standpipe Level - HI ALARM IN b) IF seal leakoff is less than 0.8 gpm, THEN GO TO Step 14. c) IF seal leakoff is between 0.8 gpm and 1.0 gpm, THEN GO TO Step 16. d) IF Total No. 1 seal leakoff is greater than 6.0 gpm, THEN assign Admin Control IAW Attachment 6 AND GO TO Step 38. e) IF seal leakoff is between 5.0 gpm and 6.0 gpm, THEN assign Admin Control IAW Attachment 6 AND GO TO Step 6. <p>SRO will direct attachment 6 admin control to be assigned to field operator. If requested, the Desk SRO will perform this function.</p> <p><i>Summary of attachment 6: Operator is assigned admin control of 1-RC-P-1A feeder breaker, so that if the pump could not be stopped from the control room, it would be tripped locally. <u>Attachment 4 of this guide contains attachment 6 of AP-9.00.</u></i></p>
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Event Description: Failure of #1 seal on 1-RC-P-1A

Cue: On Evaluator's Cue

	SRI	<p>1-AP-9.00</p> <p>Cautions prior to step 38:</p> <p>CAUTION:</p> <ul style="list-style-type: none"> An RCP should be secured for low seal leakoff (less than 0.8 gpm) within 8 hours if Attachment 2 parameters are stable. An RCP should be secured for high seal leakoff using the following time limits: <ol style="list-style-type: none"> If RCP Seal leakoff has increased to greater than 8 gpm AND leakoff is confirmed by corresponding changes in seal return temperature or pump bearing temperature, then the Reactor must be tripped, and the RCP secured immediately (within five minutes). Stop the RCP within 8 hours if Total No. 1 seal leakoff flow is greater than 6 gpm and Attachment 2 parameters are stable. An RCP with high or low seal leakoff should be secured immediately (within 5 minutes) after a manual Reactor trip if any Attachment 2 parameter is continuously increasing or at Action level. <p>The two criteria bolded above will be driving the reactor to be tripped and 1-RC-P-1A to be secured.</p>
	RO	<p>1-AP-9.00</p> <p>38. CHECK UNIT STATUS - ON LINE</p>
	SRO	<p>1-AP-9.00</p> <p>39. REMOVE UNIT FROM SERVICE IAW SS DIRECTION:</p> <ul style="list-style-type: none"> GOP-2 Series Operating Procedures OR 1-E-0, REACTOR TRIP OR SAFETY INJECTION OR 0-AP-23.00, RAPID LOAD REDUCTION <p>Due to above CAUTION, 1-E-0 will be implemented.</p> <p>It is important that actions in 1-AP-9.00 continue following the reactor trip, at least the isolation of seal leakoff.</p>
	BOP	<p>1-AP-9.00</p> <p>Caution prior to step 40:</p> <ul style="list-style-type: none"> If an immediate (within 5 minutes) RCP trip was performed due to high or low seal leakoff, the RCP SEAL LKOFF ISOL VV should be closed within five minutes after pump trip.

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Event Description: Failure of #1 seal on 1-RC-P-1A

Cue: On Evaluator's Cue

	RO	1-AP-9.00 40. TRIP AFFECTED RCP IAW SS DIRECTION
	RO	1-AP-9.00 41. CLOSE THE AFFECTED RCP SEAL LEAKOFF ISOLATION VALVE AS NECESSARY: <ul style="list-style-type: none"> • PP A/HCV-1303A, RCP A • PP B/HCV-1303B, RCP B • PP C/HCV-1303C, RCP C
	RO	1-AP-9.00 42. CHECK THERMAL BARRIER CC FLOW ON AFFECTED RCP - IN SERVICE
	SRO	1-AP-9.00 43. PROVIDE NOTIFICATIONS AS NECESSARY: <ul style="list-style-type: none"> • OMO • STA • Shift Supervision 1-AP-9.00 attachment 2 actions are given on following page. 1-E-0 actions commence two pages down.

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Event Description: Failure of #1 seal on 1-RC-P-1A

Cue: On Evaluator's Cue

	BOP	<p>1-AP-9.00 – ATTACHMENT 2</p> <p>NOTE: If the Lower Bearing Seal Water temperature RTD is not operable, indirect monitoring of bearing temperature can be achieved by increased surveillance of Seal Water outlet temperature.</p> <table border="1"> <thead> <tr> <th>PARAMETERS</th><th>INSTRUMENT</th><th>ACTION LEVEL</th></tr> </thead> <tbody> <tr> <td>RCP A, B, C Stator Winding Temperature</td><td>PCS Points: T4014A, RCP A T4015A, RCP B T4016A, RCP C</td><td>Greater than 300°F</td></tr> <tr> <td>RCP A, B, C Motor Upper Thrust Brg Temperature</td><td>PCS Points: T0414A, RCP A T0434A, RCP B T0454A, RCP C</td><td>Greater than 195°F</td></tr> <tr> <td>RCP A, B, C Mtr Upper Radial Brg Temperature</td><td>T0413A, RCP A T0433A, RCP B T0453A, RCP C</td><td>Greater than 195°F</td></tr> <tr> <td>RCP A, B, C Motor Lower Radial Brg Temperature</td><td>T0415A, RCP A T0435A, RCP B T0455A, RCP C</td><td>Greater than 195°F</td></tr> <tr> <td>RCP A, B, C Motor Lower Thrust Brg Temperature</td><td>T0416A, RCP A T0436A, RCP B T0456A, RCP C</td><td>Greater than 195°F</td></tr> <tr> <td>RCP A, B, C Lower Bearing Seal Water Temperature</td><td>PCS Points: T0417A, RCP A T0437A, RCP B T0457A, RCP C</td><td>Greater than 225°F</td></tr> <tr> <td>RCP A, B, C Seal Water Outlet Temperature</td><td>PCS Points: T0181A, RCP A T0182A, RCP B T0183A, RCP C</td><td>Greater than 235°F</td></tr> <tr> <td>Seal Water Inlet Temp (VCT Temp)</td><td>1-CH-TI-1116</td><td>Greater than 150°F</td></tr> <tr> <td>RCP Vibration: RCP Shaft Danger RCP Frame Danger</td><td>Annunciator 1C-H5 Annunciator 1C-H4</td><td>LIT LIT</td></tr> </tbody> </table>	PARAMETERS	INSTRUMENT	ACTION LEVEL	RCP A, B, C Stator Winding Temperature	PCS Points: T4014A, RCP A T4015A, RCP B T4016A, RCP C	Greater than 300°F	RCP A, B, C Motor Upper Thrust Brg Temperature	PCS Points: T0414A, RCP A T0434A, RCP B T0454A, RCP C	Greater than 195°F	RCP A, B, C Mtr Upper Radial Brg Temperature	T0413A, RCP A T0433A, RCP B T0453A, RCP C	Greater than 195°F	RCP A, B, C Motor Lower Radial Brg Temperature	T0415A, RCP A T0435A, RCP B T0455A, RCP C	Greater than 195°F	RCP A, B, C Motor Lower Thrust Brg Temperature	T0416A, RCP A T0436A, RCP B T0456A, RCP C	Greater than 195°F	RCP A, B, C Lower Bearing Seal Water Temperature	PCS Points: T0417A, RCP A T0437A, RCP B T0457A, RCP C	Greater than 225°F	RCP A, B, C Seal Water Outlet Temperature	PCS Points: T0181A, RCP A T0182A, RCP B T0183A, RCP C	Greater than 235°F	Seal Water Inlet Temp (VCT Temp)	1-CH-TI-1116	Greater than 150°F	RCP Vibration: RCP Shaft Danger RCP Frame Danger	Annunciator 1C-H5 Annunciator 1C-H4	LIT LIT
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Event Description: Failure of #1 seal on 1-RC-P-1A

Cue: On Evaluator's Cue

Time	Position	Applicant's Action or Behavior
	RO	<p>1-E-0</p> <p>[1] VERIFY REACTOR TRIP:</p> <ul style="list-style-type: none"> a) Manually trip reactor b) Check the following: <ul style="list-style-type: none"> • All Rods On Bottom light – LIT • Reactor trip and bypass breakers – OPEN • Neutron flux – DECREASING
	RO	<p>1-E-0</p> <p>[2] VERIFY TURBINE TRIP:</p> <ul style="list-style-type: none"> a) Manually trip the turbine <p>Pushes the turbine trip push buttons.</p> <ul style="list-style-type: none"> b) Verify all turbine stop valves - CLOSED c) Isolate reheaters by closing MSR steam supply SOV <ul style="list-style-type: none"> • 1-MS-SOV-104
	RO	<ul style="list-style-type: none"> d) Verify generator output breakers – OPEN (Time Delayed)
	RO	<p>1-E-0</p> <p>[3] VERIFY BOTH AC EMERGENCY BUSES - ENERGIZED</p>

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Event Description: Failure of #1 seal on 1-RC-P-1A

Cue: On Evaluator's 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"> LHSI pumps – RUNNING SI annunciators – LIT A-F-3 SI INITIATED – TRAIN A A-F-4 SI INITIATED – TRAIN B <p>a) RNO - Check if SI is required or imminent as indicated by any of the following:</p> <ul style="list-style-type: none"> Low PRZR Pressure <p>Identifies that pressurizer pressure is slowly recovering (or stable).</p> <ul style="list-style-type: none"> High CTMT Pressure <p>Identifies that containment pressure is stable at about 10.5 psia</p> <ul style="list-style-type: none"> High Steam line Differential Pressure <p>Identifies that there is no steam line differential pressure.</p> <ul style="list-style-type: none"> High Steam Line Flow with Low Tave or Low Line Pressure <p>Identifies no steam flow indicated and determines that SI is not required.</p> <p><u>IF</u> SI is <u>NOT</u> required, <u>THEN</u> GO TO 1-ES-0.1, REACTOR TRIP RESPONSE</p>
	SRO	<p>This brief may be delayed until 1-RC-P-1A is secured and seal leak-off isolated.</p> <p>The team will hold a transition brief. During the brief it will be identified that the 1-FW-P-3A failed to auto-start.</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>Following the brief the team will transition to 1-ES-0.1.</p>

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Event Description: Failure of #1 seal on 1-RC-P-1A

Cue: On Evaluator's Cue

	SRO	SRO initiates 1-ES-0.1
	RO	<p>1-ES-0.1</p> <p>1. MONITOR RCS AVERAGE TEMPERATURE</p> <ul style="list-style-type: none"> • STABLE AT 547°F <p style="text-align: center;"><u>OR</u></p> <ul style="list-style-type: none"> • TRENDING TO 547°F <p>RCS temperature is trending to 547 °F</p>
	BOP	<p>1-ES-0.1</p> <p>SRO may provide the BOP with Attachment 5 of 1-ES-0.1 for guidance on AFW control.</p> <p>Actions are summarized below:</p> <ol style="list-style-type: none"> 1. Maintain minimum AFW flow of 540 gpm with RCP(s) in service until one SG Narrow Range level is greater than 12% 2. Maintain minimum AFW flow of 350 gpm with NO RCPs running until one SG Narrow Range level is greater than 12% 3. 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.

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Event Description: Failure of #1 seal on 1-RC-P-1A

Cue: On Evaluator's Cue

	BOP	<p>1-ES-0.1</p> <p>2. CHECK FW STATUS</p> <p>a) Check RCS Average temperatures – LESS THAN 554°F</p> <p>b) Verify Feed Reg valves - CLOSED</p> <p>c) Close SG FW isolation MOVs</p> <ul style="list-style-type: none"> • 1-FW-MOV-154A • 1-FW-MOV-154B • 1-FW-MOV-154C <p>BOP closed 1-FW-MOV-154A, B, C</p> <p>d) Check AFW pumps - RUNNING</p> <ul style="list-style-type: none"> • Motor Driven AFW pumps • TD AFW pump <p>If not yet started, 1-FW-P-3A will be started at this point.</p> <p>e) Verify total AFW flow – GREATER THAN 540 GPM (350 W/O RCPs)</p> <p>f) Check emergency buses – BOTH ENERGIZED</p> <p>g) Control feed flow to maintain narrow range level between 22% and 50%.</p>
	RO	3. VERIFY CHARGING IN SERVICE
	BOP	<p>4. CHECK CC SYSTEM STATUS:</p> <p>a) Check SW to CC HXs – IN SERVICE</p> <p>b) Check CC pumps – AT LEAST ONE RUNNING</p>

Op-Test No.: Surry 2009-301 Scenario No.: 4 Event No.: 5

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Event Description: SBLOCA

Cue: On Evaluator's Cue

Time	Position	Applicant's Action or Behavior
	Team	<p><i>Evaluator's note: Team may elect to initiate safety injection and re-enter 1-E-0 rather than perform AP-16.00, in accordance with the continuous action page of ES-0.1:</i></p> <p>SI INITIATION CRITERIA <i>Initiate SI and GO TO 1-E-0, REACTOR TRIP OR SAFETY INJECTION, if EITHER condition listed below occurs, OR is imminent.</i></p> <ul style="list-style-type: none"> • RCS subcooling based on CETCs - LESS THAN 30°F • Any automatic SI setpoint is exceeded: <ul style="list-style-type: none"> • <u>Low PRZR pressure</u> • High CTMT pressure • High steamline differential pressure • High steamline flow with low Tave or low line pressure <p>Diagnoses RCS leak with the following indications/alarms:</p> <p>Alarms:</p> <ul style="list-style-type: none"> • 1B-A3 CTMT SUMP HI LVL • 1E-F6(G6/H6) PRZR LO LVL CH 1/2/3 • 1C-D8 PRZR LO LVL • Containment radiation monitor alarms (various) <p>Indications:</p> <ul style="list-style-type: none"> • Charging Flow increasing • Pressurizer level decreasing • Pressurizer pressure decreasing <p><i>When received the Unit 2 Operator will report and silence the radiation monitor alarms associated with this event.</i></p>

Op-Test No.: Surry 2009-301 Scenario No.: 4 Event No.: 5

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Event Description: SBLOCA

Cue: On Evaluator's Cue

	SRO	1-AP-16.00 Note: If SI Accumulators are isolated, 1-AP-16.01, SHUTDOWN LOCA, should be used for guidance. Note: RCS average temperature has a direct impact on pressurizer level.
	RO	[1] MAINTAIN PRZR LEVEL <ul style="list-style-type: none"> Isolate Letdown Control Charging flow RO closes 1-CH-LCV-1460A and 1-CH-LCV-1460B and places charging in manual and attempts to maintain level at program (immediate action).
	SRO	The team will hold a short transient brief. The brief should establish the priority of addressing RCS leakage then end.
	RO	2 VERIFY THE FOLLOWING PARAMETERS – STABLE OR INCREASING: <ul style="list-style-type: none"> PRZR Level PRZR Pressure RCS Subcooling Identifies all parameters are decreasing and goes to step 2 RNO
	TEAM	Step 2 RNO- GO TO 1-E-0, REACTOR TRIP OR SAFETY INJECTION. Team transitions to 1-E-0.

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Event Description: SBLOCA

Cue: On Evaluator's Cue

	RO	<p>1-E-0</p> <p>Only the performance of the high level steps 1,2, and 3 are required:</p> <p>[1] VERIFY REACTOR TRIP</p> <p>[2] VERIFY TURBINE TRIP</p> <p>[3] VERIFY BOTH AC EMERGENCY BUSES - ENERGIZED</p> <p>[4] CHECK IF SI INITIATED:</p> <p>a) Check if SI is actuated:</p> <ul style="list-style-type: none"> • LHSI pumps – RUNNING • SI annunciators – LIT <ul style="list-style-type: none"> • A-F-3 SI INITIATED – TRAIN A • A-F-4 SI INITIATED – TRAIN B <p>b) Manually initiate SI</p> <p>RO will manually initiate safety injection if an automatic safety injection has not occurred.</p>
	SRO	<p>The team should have identified that no HHSI flow exists and hold a short transient brief. The need to align HHSI flow should be discussed, then the brief terminated.</p> <p>Following the brief, it is expected that the SRO will give attachment 1 to the BOP and attachment 2 to the RO to align SI flow. Attachment 2 steps are contained on attachment 2 of this guide.</p>
	SRO/BOP	<p>5. Initiate Attachment 1 (Attachment 1 actions contained on attachment 1 of this guide.)</p>

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Event Description: SBLOCA

Cue: On Evaluator's Cue

	RO	<p>*6. CHECK RCS AVERAGE TEMPERATURE</p> <ul style="list-style-type: none"> • STABLE AT 547°F <p>OR</p> <ul style="list-style-type: none"> • TRENDING TO 547°F <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> <ul style="list-style-type: none"> Stop dumping steam Reduce AFW flow to the SG Close MSTVs if cooldown continues
	RO	<p>7. CHECK PRZR PORVs AND SPRAY VALVES:</p> <ul style="list-style-type: none"> a) PRZR PORVs – CLOSED b) PRZR spray controls <ul style="list-style-type: none"> • Demand at Zero (or) • Controlling Pressure c) PORV block valves - AT LEAST ONE OPEN
	<p>SRO</p> <p>RO</p>	<p>NOTE: Seal injection flow should be maintained to all RCPs.</p> <p>*8. CHECK RCP TRIP AND MINIFLOW RECIRC CRITERIA:</p> <ul style="list-style-type: none"> a) Charging Pumps – AT LEAST ONE RUNNING AND FLOWING TO RCS <p>Two or three Charging pumps will be running and flowing to the RCS.</p> <ul style="list-style-type: none"> b) RCS subcooling - LESS THAN 30°F [85°F] <p>RCS subcooling will NOT be less than 30 °F</p> <p>RNO for the step is to go to step 9.</p>

Event Description: SBLOCA

Cue: On Evaluator's Cue

	BOP	<p>9. CHECK IF SGs ARE NOT FAULTED:</p> <ul style="list-style-type: none"> • Check pressures in all SGs a) STABLE OR INCREASING AND b) GREATER THAN 100 PSIG <p>BOP 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>
	<div>BOP</div> <div>TEAM</div>	<p>10. CHECK IF SG TUBES ARE NOT RUPTURED:</p> <ul style="list-style-type: none"> • Condenser air ejector radiation – NORMAL • SG blowdown radiation – NORMAL • SG MS radiation – NORMAL • TD AFW pump exhaust radiation – NORMAL • SG NR Level - NOT INCREASING IN AN UNCONTROLLED MANNER <p>TEAM should determine that no indications of a steam generator tube rupture exist.</p>
	<div>RO</div> <div>SRO</div>	<p>11. CHECK RCS - INTACT INSIDE CTMT</p> <ul style="list-style-type: none"> • CTMT radiation - NORMAL • CTMT pressure - NORMAL • CTMT RS sump level – NORMAL <p>All containment indications will be ABNORMAL.</p> <p>Step 11 RNO actions: GO TO 1-E-1, LOSS OF REACTOR OR SECONDARY COOLANT.</p>
	SRO	<p>The team will hold a transient brief. During the brief the SBLOCA will be discussed.</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 abnormal for unit one containment. He will also state that containment conditions and the electrical conditions are as you see them.</i></p>

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Event Description: SBLOCA

Cue: On Evaluator's Cue

	SRO	1-E-1, Loss of Reactor or Secondary Coolant
	RO	<p>1-E-1 Actions</p> <p>1. CHECK RCP TRIP AND MINIFLOW RECIRC CRITERIA:</p> <ul style="list-style-type: none"> a) Charging Pumps - AT LEAST ONE RUNNING AND FLOWING TO RCS b) RCS subcooling - LESS THAN 30°F [85°F] c) Stop all RCPs d) RCS pressure - LESS THAN 1275 PSIG [1475 PSIG] e) Close CHG pump miniflow recirc valves: <ul style="list-style-type: none"> • 1-CH-MOV-1275A • 1-CH-MOV-1275B • 1-CH-MOV-1275C
	BOP	<p>1-E-1 Actions</p> <p>2. CHECK IF SGs ARE NOT FAULTED:</p> <ul style="list-style-type: none"> • Check pressures in all SGs: <ul style="list-style-type: none"> • STABLE OR INCREASING AND • GREATER THAN 100 PSIG
	BOP	<p>1-E-1 Actions</p> <p>*3. CHECK INTACT SG LEVELS:</p> <ul style="list-style-type: none"> a) Narrow range level – GREATER THAN 12% [18%] b) Check emergency buses – BOTH ENERGIZED c) Control feed flow to maintain narrow range level between 22% and 50%

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Event Description: SBLOCA

Cue: On Evaluator's Cue

	BOP	<p>1-E-1 Actions</p> <p>4. CHECK IF SG TUBES ARE NOT RUPTURED:</p> <ul style="list-style-type: none"> • Condenser air ejector radiation - NORMAL • SG blowdown radiation - NORMAL • SG main steam radiation - NORMAL • TD AFW pump exhaust radiation - NORMAL • SG NR Level - NOT INCREASING IN AN UNCONTROLLED MANNER
	<p>SRO</p> <p>RO</p>	<p>1-E-1 Actions</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>*5. CHECK PRZR PORVs AND BLOCK VALVES:</p> <ul style="list-style-type: none"> a) Power to PRZR PORV block valves - AVAILABLE b) PRZR PORVs - CLOSED c) PRZR PORV block valves - AT LEAST ONE OPEN
	RO	<p>1-E-1 Actions</p> <p>*6. CHECK IF SI FLOW SHOULD BE REDUCED:</p> <ul style="list-style-type: none"> a) RCS subcooling based on CETCs - GREATER THAN 30°F [85°F] a) RNO - GO TO Step 7 b) Secondary heat sink: <ul style="list-style-type: none"> • Total feed flow to INTACT SGs - GREATER THAN 350 GPM [450 GPM] <p>OR</p> <ul style="list-style-type: none"> • Narrow range level in at least one intact SG - GREATER THAN 12% [18%] c) RCS pressure - STABLE OR INCREASING c) RNO - GO TO Step 7.

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Event Description: SBLOCA

Cue: On Evaluator's Cue

	RO	<p>1-E-1 Actions</p> <p>*7. CHECK IF HI HI CLS INITIATED:</p> <ul style="list-style-type: none"> CS pump(s) - RUNNING <p>OR</p> <ul style="list-style-type: none"> Any Hi Hi CLS annunciator – LIT <p>Step 7 RNO actions: GO TO step 14.</p>
	<p>SRO</p> <p>RO</p>	<p>1-E-1 Actions</p> <p>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.</p> <p>*14. CHECK IF LHSI PUMPS SHOULD BE STOPPED:</p> <p>a) Check RCS pressure:</p> <ol style="list-style-type: none"> Pressure – GREATER THAN 250 PSIG [400 PSIG] Pressure - STABLE OR INCREASING RNO – GO TO Step 15
	RO	<p>1-E-1 Actions</p> <p>15. CHECK RCS AND SG PRESSURES:</p> <ul style="list-style-type: none"> Check pressure in all SGs – STABLE OR INCREASING Check RCS pressure - STABLE OR DECREASING
	BOP	<p>1-E-1 Actions</p> <p>16. CHECK IF EDGs CAN BE STOPPED:</p> <ol style="list-style-type: none"> Verify AC emergency buses – ENERGIZED BY OFFSITE POWER Reset both trains of SI if necessary Stop any unloaded EDGs IAW Attachment 1

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Event Description: SBLOCA

Cue: On Evaluator's Cue

	RO	<p>1-E-1 Actions</p> <p>17. VERIFY INSTRUMENT AIR AVAILABLE:</p> <ul style="list-style-type: none"> a) Check annunciator B-E-6 - NOT LIT b) Check at least one CTMT IA compressor - RUNNING <ul style="list-style-type: none"> • 1-IA-C-4A or 1-IA-C-4B c) Verify 1-IA-TV-100 - OPEN
	RO	<p>1-E-1 Actions</p> <p>18. INITIATE EVALUATION OF PLANT STATUS:</p> <ul style="list-style-type: none"> a) Verify at least one train of cold leg recirculation capability: <ul style="list-style-type: none"> 1) Train A - AVAILABLE <ul style="list-style-type: none"> • 1-SI-P-1A • 1-SI-MOV-1863A • 1-SI-MOV-1885A and D • 1-SI-MOV-1860A • 1-SI-MOV-1862A • 1-CH-MOV-1115B and D 2) Train B - AVAILABLE <ul style="list-style-type: none"> • 1-SI-P-1B • 1-SI-MOV-1863B • 1-SI-MOV-1885B and C • 1-SI-MOV-1860B • 1-SI-MOV-1862B • 1-CH-MOV-1115B and D a) RNO - IF cold leg recirculation capability can NOT be verified, THEN GO TO 1-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION. <p>The team will transition to 1-ECA-1.1 at this point.</p>

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Event Description: SBLOCA

Cue: On Evaluator's Cue

		1-ECA-1.1, Loss of Emergency Coolant Recirculation
	SRO	<p>CAUTION:</p> <ul style="list-style-type: none"> • If emergency coolant recirculation capability is restored, return to the procedure and step in effect. • If suction source is lost to any SI or spray pump, the pump should be stopped. • Maintain greater than or equal to 150 gpm total AFW flow when feeding two or less Steam Generators with the TD AFW pump operating. Methods that may be used to comply with this restriction: <ol style="list-style-type: none"> 1) Increasing total AFW flow to greater than 150 gpm 2) Feeding ALL Steam Generators 3) Securing the TD AFW Pump <p>NOTE:</p> <ul style="list-style-type: none"> • Attachment 2 provides a graph of the minimum amount of RCS makeup flow required to remove decay heat. • If procedure has been entered due to CTMT sump blockage, FRs should NOT be implemented until directed. • The minimum containment sump level for manual restart of LHSI pump suction is 6.0 ft.
	RO	<p>1. CHECK EMERGENCY COOLANT RECIRCULATION EQUIPMENT - AVAILABLE</p> <p>a) Check the following pumps - AVAILABLE:</p> <ul style="list-style-type: none"> • 1-SI-P-1A AND • 1-CH-P-1A, B, or C <p>a) RNO - GO TO Step 2.</p>

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Event Description: SBLOCA

Cue: On Evaluator's Cue

	RO	<p>2. TRY TO RESTORE THE REDUNDANT FLOW PATH FROM THE CTMT SUMP TO THE RCS</p> <p>a) Check the following pumps - AVAILABLE:</p> <ul style="list-style-type: none"> • 1-SI-P-1B <p>AND</p> <ul style="list-style-type: none"> • 1-CH-P-1A, B, or C <p>a) RNO - GO TO Step 3.</p>
	RO	3. RESET BOTH TRAINS OF SI
	RO	4. PUT RMT MODE TRANSFER SWITCHES IN THE REFUEL MODE
	RO	*5. CHECK RWST LEVEL – GREATER THAN 6%
	RO	<p>6. ESTABLISH ONE TRAIN OF SI FLOW:</p> <p>a) Check CHG pumps - ONLY ONE RUNNING</p> <p>a) RNO - IF both LHSI pumps stopped due to CTMT Sump blockage, THEN - do either of the following:</p> <ul style="list-style-type: none"> • IF RWST crosstie unavailable, THEN GO TO Step 7. <p>OR</p> <ul style="list-style-type: none"> • IF RWST crosstie available, THEN do the following: <ul style="list-style-type: none"> 1) Implement FRs as necessary. 2) GO TO Step 33. <p>IF CTMT Sump blockage has NOT occurred, THEN start or stop CHG pumps to establish only one pump running.</p>

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Event Description: SBLOCA

Cue: On Evaluator's Cue

		<p>6. ESTABLISH ONE TRAIN OF SI FLOW (continued):</p> <ul style="list-style-type: none"> b) Place non-running CHG pumps in PTL c) RCS pressure - LESS THAN 250 PSIG [400 PSIG] d) Check LHSI pumps - ONLY ONE RUNNING d) RNO - IF sump blockage has NOT occurred, THEN start or stop LHSI pumps to establish only one pump running. e) Implement FRs as necessary f) GO TO Step 8
		<p>CAUTION: Operation of an OSRS pump without the associated CS pump could cause cavitation as indicated by fluctuating amperage.</p> <p>NOTE: If CLS can NOT be reset, local breaker operation will be required to stop CS and ISRS pumps.</p> <p>8. CHECK RECIRCULATION SPRAY SYSTEM:</p> <ul style="list-style-type: none"> a) Check for EITHER of the following: <ul style="list-style-type: none"> • Any CS pump - RUNNING OR REQUIRED OR • RWST level - LESS THAN 20% <p>If RWST level is greater than 20% the team will GO TO Step 10</p>
		<p>10. MAKE UP TO RWST USING 1-OP-CS-004, REFUELING WATER STORAGE TANK MAKEUP, WHILE CONTINUING WITH THIS PROCEDURE</p>
END	END	END SCENARIO #4

SIMULATOR OPERATOR GUIDE

Simulator Setup

Initial Conditions:

Recall 100% IC and enter the following malfunctions or recall the IC 314 and implement TRIGGER #30 to activate all passive malfunctions. VERIFY Trigger #30 implemented.

Close 1-RC-TV-1519A

Close the following MOVs:

- 1-SI-MOV-1864B
- 1-SI-MOV-1885B
- 1-SI-MOV-1885C

Enter the following EVENT TRIGGER- Event #29 – Event- SI4: SI Train ‘A’ actuated.

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

- ASP_AO_OFF = True

Enter the following REMOTE FUNCTIONS:

Remote Function	Delay	Trigger	Ramp Start Value	Ramp Time	Remote Value	Trigger Type (Auto or Manual)
SIP1B_BKRPOS- SI-P-1B BKR 14J3 CUBICLE POSITION	0	30	N/A	N/A	RACK_OUT	Preload

Enter the following Switch Overrides:

Override	Delay	Ramp	Trigger	Value	Trigger Type (Auto or Manual)
MOV867D_OPEN – HHSI TO RCS COLD LEG VV (OPEN)	0	N/A	30	OFF	Pre-load

SIMULATOR OPERATOR GUIDE

Enter the following MALFUNCTIONS:

Malfunction	Delay	Ramp	Trigger	Ramp Start/Value	Severity/Final	Trigger Type
FW1303- A S/G NAR RNG XMTR LT-476 CH-3 FAILS	10	0	1	0	1	Manual
EL1201- LOSS OF 480v EMERGENCY SWITCHGEAR 1H	10	N/A	3	N/A	N/A	Manual
RC1201- FAILURE OF RCP-A SEAL #1	10	5:00	5	0	100	Manual
RC04- RCS LEAK NONISOLABLE (0-1200 GPM)	10	0	7	0	100	Manual
FW49- DISABLE AFWP3B AUTO START	0	N/A	30	N/A	N/A	Pre-load
SI35- DISABLE SI-MOV-867D AUTO OPEN	0	N/A	30	N/A	N/A	Pre-load
SI4801 – MOVSI867 Thermals	0	N/A	29	N/A	N/A	Auto on SI

Enter the following MOV Control:

Override	Delay	Trigger	Remote Value	Trigger Type (Auto or Manual)
SIMOV863B_RACKIN- MOV-SI-863B B LHSI Pump to ALT HHSI	0	30	RACKOUT	Preload
SIMOV864B_RACKIN- MOV-SI-864B B LHSI Pump to Cold Legs	0	30	RACKOUT	Preload
SIMOV885B_RACKIN- SI-MOV-1885B LHSI Recirc Pump B	0	30	RACKOUT	Preload
SIMOV885C_RACKIN- SI-MOV-1885C LHSI Recirc Pump B	0	30	RACKOUT	Preload

SIMULATOR OPERATOR GUIDE

TRIGGER	TYPE	DESCRIPTION
1	Manual	Channel III of steam generator level will fail high on "A" S/G.
3	Manual	Loss of 1H 480v emergency bus.
5	Manual	Failure of 1-RC-P-1A #1 Seal
7	Manual	SBLOCA
29	AUTO on SI	1-SI-MOV-1867C breaker thermals

SIMULATOR OPERATOR 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:

<input type="checkbox"/> 1-SI-P-1B	<input type="checkbox"/> 1-SI-MOV-1864B	<input type="checkbox"/> 1-SI-MOV-1863B
<input type="checkbox"/> 1-SI-MOV-1885B	<input type="checkbox"/> 1-SI-MOV-1885C	<input type="checkbox"/>

- ☐ Verify 1-RM-RI-112 aligned to A/C SG and 1-RM-RI-113 aligned to B SG (magnets).
- ☐ Verify Ovation System operating.
- ☐ Reset ICCMs.
- ☐ Verify Component Switch Flags.
- ☐ Verify Brass Caps properly placed.
- ☐ Verify SG PORVs set for 1035 psig.
- ☐ Verify Rod Control Group Step Counters indicate properly.
- ☐ Verify Ovation CRT display
- ☐ Advance Charts the following charts:

Master chart advance switch

- ☐ Verify Turbine Thumb Wheel Settings @120 rpm/min and Position 6
- ☐ Verify Containment Instrument Air Compressors are on Inside Suction (all RMs reset)
- ☐ Verify all ARPs have been cleaned
- ☐ Verify CLEAN copies of the following procedures are in place:

<input type="checkbox"/> AP-53.00	<input type="checkbox"/> AP-23.00	<input type="checkbox"/> AP-16.00	<input type="checkbox"/> ECA-3.3
<input type="checkbox"/> E-0	<input type="checkbox"/> 1-AP-10.07	<input type="checkbox"/> ECA-1.1	<input type="checkbox"/> 1-OP-RC-011
<input type="checkbox"/> AP-9.00	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> OP-CH-007	<input type="checkbox"/> Reactivity Sheet		
<input type="checkbox"/> OP-ZZ-002	<input type="checkbox"/>		

- ☐ Verify Reactivity Placard is current.

SIMULATOR OPERATOR GUIDE

Brief

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

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

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

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

Assign operating positions.

Ask for and answer questions.

SIMULATOR OPERATOR GUIDE

Conduct shift turnover:

Provide normal shift turnover materials reflecting the below initial conditions:

Unit 1 is at 100% power and has been since the last refueling outage. All systems and crossties are operable with the following exception:

- 1-SI-P-1B, “B” low head safety injection pump, is tagged out for motor PMs. 62 hours remain in the 72-hour Technical Specification 3.3.B.3 clock. Repairs are scheduled to be complete in 16 hours.

Current RCS boron is: 750 ppm

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

The last shift performed three 30-gallon dilutions followed by manual make-ups.

Shift orders are to maintain 100% power and fill the PRT to normal operating level in accordance with 1-OP-RC-011 after assuming the watch.

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

SIMULATOR OPERATOR GUIDE

Session Conduct:

Ensure conditions in Simulator Set-up are established.

Ensure Trigger 30 is active prior to team entering the simulator.

Verify Exam Security has been established and ASP_AO_OFF = True.

EVENT 1 **Fill of PRT**

No support actions are required for this evolution.

EVENT 2 **1-FW-LT-1476 (Channel III SG Level Transmitter) Fails HIGH**

When cued by examiner, implement Trigger #1.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the failure of 1-FW-LT-1476. The individual(s) contacted will also acknowledge any TS LCOs and entry into AP-53.00.
- **If contacted**, will take responsibility for writing the WR and CR.

STA:

- **If contacted**, will acknowledge the failure of 1-FW-LT-1476. The individual(s) contacted will also acknowledge (but not confirm/deny) any TS LCOs.
- **If asked**, the STA will report that 1-FW-LT-1476 is a Reg. Guide 1.97 component. The STA will also report that upon review of CEP 99-0029 that only one channel of SG level indication is required per SG, so no actions for Reg. Guide 1.97 are required.
- **If asked**, the STA will review VPAP-2802 and TRM Section 3.3 and report that he has completed his review and this failure does not impact these documents.
- **If contacted**, will take responsibility for writing the WR and CR.

SIMULATOR OPERATOR GUIDE

- **If the team has a transient brief:** The STA will state that primary integrity is as the RO reported and that secondary integrity is as the BOP reported. The STA will state that radiological conditions are normal. He will also state that containment conditions and the electrical conditions are as you see them.

Maintenance:

- **If contacted,** will acknowledge instrumentation failure and commence investigations and/or repair efforts.

Field Operators:

- **If contacted,** field operators will report no issues at the MFRVs.

Unit 2:

- If team directs performance of 1-OPT-RX-007, Shift Average Power Calculation, state that you will have the 4th RO perform the procedure.

Role play as other individuals as needed.

SIMULATOR OPERATOR GUIDE

EVENT 3 **Loss of 1H 480v Emergency Bus**

When cued by examiner, implement Trigger #3.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the loss of 1H 480v emergency bus. The individual(s) contacted will also acknowledge any TS LCOs and entry into AP-10.07.
- **If contacted**, will take responsibility for writing the WR and CR.
- **If contacted**, will acknowledge ramp off-line in accordance with AP-23.00.

STA:

- **If contacted**, will acknowledge loss of 1H 480v emergency bus. The individual(s) contacted will also acknowledge (but not confirm/deny) any TS LCOs.
- **If contacted**, will take responsibility for writing the WR and CR.
- **If the team has a transient brief:** The STA will state that primary integrity is as the RO reported and that secondary integrity is as the BOP reported. The STA will state that radiological conditions are normal. He will also state that containment conditions and the electrical conditions are as you see them.

Maintenance:

- **If contacted**, after 10 minutes report that the 1H 480v bus appears to be grounded. Efforts to repair will take 12-24 hours, depending on amount of damage to bus when opened up.

Field Operators:

- **If contacted**, field operators will breaker 14H-1 tripped with a bell lockout and a faint acrid smell. No smoke or fire is noted.

Role play as other individuals as needed.

SIMULATOR OPERATOR GUIDE

EVENT 4 **1-RC-P-1A #1 Seal Failure**

When cued by examiner, implement Trigger #5.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the seal problems on 1-RC-P-1A. The individual(s) contacted will also acknowledge entry into AP-9.00.
- **If contacted**, will take responsibility for writing the WR and CR.
- **If contacted**, will acknowledge need to trip reactor and secure the RCP.
- **If contacted**, will brief field operator for AP-9.00 admin control. *This attachment is included in this guide for reference (attachment 4 of this guide).*

STA:

- **If contacted**, will take responsibility for writing the WR and CR.
- **If the team has a transient brief:** The STA will state that primary integrity is as the RO reported and that secondary integrity is as the BOP reported. The STA will state that radiological conditions are normal. He will also state that containment conditions and the electrical conditions are as you see them.

Field Operators:

- **If contacted**, field operators will report to the MCR for briefing if US decides to perform this function.

Role play as other individuals as needed.

SIMULATOR OPERATOR GUIDE

EVENT 5 **Small Break LOCA**

When cued by examiner or team has completed step 2 of ES-0.1 implement trigger 7.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the transition to back to 1-E-0 and then 1-E-1 and finally to ECA.1,1.
- **If contacted**, will take actions to make-up to Unit 1 RWST.

Field Operators:

- Will make preparations to make-up to Unit 1 RWST when directed.
- Will secure EDGs upon request – no actions required.

The scenario will end upon direction to make-up to Unit 1 RWST.

Simulator Guide Attachment 1Attachment 1 of 1-E-0

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

Simulator Guide Attachment 1Attachment 1 of 1-E-0

	BOP	<p>4. VERIFY SI PUMPS RUNNING:</p> <ul style="list-style-type: none"> • CHG pumps – RUNNING • LHSI pumps – RUNNING <p><i>No LHSI pumps are available at this step.</i></p>
	BOP	<p>5. CHECK CHG PUMP AUXILIARIES:</p> <ul style="list-style-type: none"> • CHG pump CC pump – RUNNING • CHG pump SW pump - RUNNING
	BOP	<p>6. CHECK INTAKE CANAL:</p> <ul style="list-style-type: none"> • Level - GREATER THAN 24 FT • Level - BEING MAINTAINED BY CIRC WATER PUMPS
	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"> • E-F-10 (High Steam Flow SI) • B-C-4 (Hi Hi CLS Train A) • B-C-5 (Hi Hi CLS Train B) <p>Identifies annunciators not lit and goes to RNO.</p> <p>a) RNO - IF annunciator E-H-10 (Hdr/Line SI) NOT LIT, THEN GO TO Step 8.</p>

Simulator Guide Attachment 1**Attachment 1 of 1-E-0**

	BOP	<p>*8. CHECK IF CS REQUIRED:</p> <p>a) CTMT pressure – HAS EXCEEDED 23 PSIA</p> <p>Identifies pressure has not exceeded 23 or 17.7 psia and goes to step 10.</p>
	BOP	<p>*10. BLOCK LOW PRZR PRESS SI SIGNAL:</p> <p>a) Check PRZR pressure – LESS THAN 2000 psig</p> <p>b) Turn both LO PRZR PRESS & STM HDR/LINE P switches to block</p> <p>c) Verify Permissive Status light C-2 - LIT</p> <p>BOP may block the low pressurizer pressure SI signal depending on current RCS pressure.</p>
	BOP	<p>*11. BLOCK LOW TAVE SI SIGNAL:</p> <p>a) Check RCS Tave - LESS THAN 543°F</p> <p>b) Turn both HI STM FLOW & LO TAVG OR LP switches to block</p> <p>c) Verify Permissive Status light F-1 – LIT</p> <p>BOP may block the low Tave SI signal depending on current RCS temperature.</p>

Simulator Guide Attachment 1Attachment 1 of 1-E-0

	BOP	<p>NOTE:</p> <ul style="list-style-type: none"> • CHG pumps should be run in the following order of priority: C, B, A. • Subsequent SI signals may be reset by reperforming Step 12. <p>12. VERIFY SI FLOW:</p> <p>a) HHSI to cold legs - FLOW INDICATED</p> <ul style="list-style-type: none"> • 1-SI-FI-1961 (NQ) • 1-SI-FI-1962 (NQ) • 1-SI-FI-1963 (NQ) • 1-SI-FI-1943 or 1-SI-FI-1943A <p>b) Check CHG pumps - THREE RUNNING</p> <p>c) Reset SI.</p> <p>d) Stop one CHG pump and out in AUTO</p> <p>e) RCS pressure - LESS THAN 185 PSIG</p> <p>RNO: e) IF two LHSI pumps are running, THEN do the following:</p> <p>RNO: e) IF one LHSI pumps are running, THEN GO TO Step 13.</p> <p><i>Rules of usage on substep 12.e sent the performer to step 13.</i></p>
	BOP	<p>13. VERIFY TOTAL AFW FLOW - GREATER THAN 350 GPM [450 GPM]</p> <p>RNO ACTIONS:</p> <ul style="list-style-type: none"> • IF SG narrow range level greater than 12% [18%] in any SG, THEN control feed flow to maintain narrow range level AND GO TO Step 14. • IF SG narrow range level less than 12% [18%] in all SGs, THEN manually start pumps AND align valves as necessary. • IF AFW flow greater than 350 GPM [450 GPM] can NOT be established, THEN GO TO 1-FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK. <p><i>Evaluator's note: actions taken in this step will depend on team's alignment of AFW flow prior to reaching this step.</i></p>

Simulator Guide Attachment 1Attachment 1 of 1-E-0

	BOP	<p>14. CHECK AFW MOVs - OPEN</p> <p>RNO ACTIONS:</p> <ul style="list-style-type: none"> Manually align valves as necessary. <p><i>Evaluator's note: actions taken in this step will depend on team's alignment of AFW flow prior to reaching this step.</i></p>
	BOP	<p>15. INITIATE SI VALVE ALIGNMENT IAW ATTACHMENT 2</p> <p>Attachment 2 of 1-E-0 is contained in attachment 2 of this guide. This should have been completed at this time by the RO.</p>
	BOP	<p>16. INITIATE VENTILATION ALIGNMENT AND AC POWER ALIGNMENT IAW ATTACHMENT 3</p> <p>See attached copy of Attachment 3 – contained in attachment 3 of this guide.</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> <p><i>All MCR boundary indications will be reported at positive.</i></p>

Simulator Guide Attachment 2

1-E-0 Attachment 2

Time	Position	Applicant's Action or Behavior
	SRO	ATTACHMENT 2 of 1-E-0 NOTE: Components previously aligned by SI termination steps, must not be realigned by this Attachment.
	RO/BOP	ATTACHMENT 2 of 1-E-0 1. Verify opened or open CHG pump suction from RWST MOVs. <ul style="list-style-type: none"> • 1-CH-MOV-1115B • 1-CH-MOV-1115D
	RO/BOP	ATTACHMENT 2 of 1-E-0 2. Verify closed or close CHG pump suction from VCT MOVs. <ul style="list-style-type: none"> • 1-CH-MOV-1115C • 1-CH-MOV-1115E
	RO/BOP	ATTACHMENT 2 of 1-E-0 3. Verify running or start at least two CHG pumps. (listed in preferred order) <ul style="list-style-type: none"> • 1-CH-P-1C • 1-CH-P-1B • 1-CH-P-1A
	RO/BOP	ATTACHMENT 2 of 1-E-0 4. Verify opened or open HHSI to cold legs MOVs. <ul style="list-style-type: none"> • 1-SI-MOV-1867C • 1-SI-MOV-1867D <p><i>Evaluator's note: 1-SI-MOV-1867D will not open and 1-SI-MOV-1867C will have no power.</i></p>
	RO/BOP	ATTACHMENT 2 of 1-E-0 5. Verify closed or close CHG line isolation MOVs. <ul style="list-style-type: none"> • 1-CH-MOV-1289A • 1-CH-MOV-1289B

Simulator Guide Attachment 2**1-E-0 Attachment 2**

	RO/BOP	<p>ATTACHMENT 2 of 1-E-0</p> <p>6. Verify closed or close Letdown orifice isolation valves.</p> <ul style="list-style-type: none"> • 1-CH-HCV-1200A • 1-CH-HCV-1200B • 1-CH-HCV-1200C
	RO/BOP	<p>ATTACHMENT 2 of 1-E-0</p> <p>7. Verify opened or open LHSI suction from RWST MOVs.</p> <ul style="list-style-type: none"> • 1-SI-MOV-1862A • 1-SI-MOV-1862B
	RO/BOP	<p>ATTACHMENT 2 of 1-E-0</p> <p>8. Verify opened or open LHSI to cold legs MOVs.</p> <ul style="list-style-type: none"> • 1-SI-MOV-1864A • 1-SI-MOV-1864B
	RO/BOP	<p>ATTACHMENT 2 of 1-E-0</p> <p>9. Verify running or start at least one LHSI pump.</p> <ul style="list-style-type: none"> • 1-SI-P-1A • 1-SI-P-1B <p><i>No LHSI pumps are available at this time.</i></p>
	RO/BOP	<p>ATTACHMENT 2 of 1-E-0</p> <p>10. Verify High Head SI flow to cold legs indicated.</p> <ul style="list-style-type: none"> • 1-SI-FI-1961 • 1-SI-FI-1962 • 1-SI-FI-1963 • 1-SI-FI-1943 or 1-SI-FI-1943A <p>No Flow will be indicated.</p>

Simulator Guide Attachment 2**1-E-0 Attachment 2**

	RO/BOP	<p>ATTACHMENT 2 of 1-E-0</p> <p>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.</p> <ul style="list-style-type: none">• Alternate SI to Cold legs• Hot leg injection <p>RO will either open 1-SI-MOV-1842, or align HHSI to Th. This will require local actions to energize the associated supply breakers.</p>
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Simulator Guide Attachment 3**1-E-0 Attachment 3**

NUMBER 1-E-0	ATTACHMENT TITLE	ATTACHMENT 3
REVISION 61	AUXILIARY VENTILATION AND AC POWER VERIFICATION	PAGE 1 of 5

1. ____ Verify or place REFUEL SFTY MODE switches in NORMAL.

2. ____ Verify 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

Simulator Guide Attachment 3**1-E-0 Attachment 3**

NUMBER 1-E-0	ATTACHMENT TITLE AUXILIARY VENTILATION AND AC POWER VERIFICATION	ATTACHMENT 3
REVISION 61		PAGE 2 of 5

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. ____ Verify filtered exhaust flow: (as read on FI-VS-117A and FI-VS-117B)

- ☐ • Total flow - GREATER THAN 32400 cfm

AND

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

Simulator Guide Attachment 3**1-E-0 Attachment 3**

NUMBER 1-E-0	ATTACHMENT TITLE AUXILIARY VENTILATION AND AC POWER VERIFICATION	ATTACHMENT 3
REVISION 61		PAGE 3 of 5

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. ____ Verify stopped or stop 1-VS-AC-4.
8. ____ Place 1-VS-43-VS103X, MCR ISOLATION switch to the OFF position.
9. ____ Verify closed or close MCR isolation dampers.
 - ☐ • 1-VS-MOD-103A
 - ☐ • 1-VS-MOD-103B
 - ☐ • 1-VS-MOD-103C
 - ☐ • 1-VS-MOD-103D
10. ____ IF any MCR PDI on Unit 2 Vent Panel NOT indicating positive pressure, THEN place the following switches to OPEN.
 - ☐ • 1-VS-SOV-322, EMERG AIR DUMP TO CONTROL RM
 - ☐ • 1-VS-SOV-100, EMERG AIR DUMP TO C.R.

NOTE: The timer should be set for 50 minutes, minus the number of minutes since Safety Injection initiation.
11. ____ Set timer. WHEN SI has been in progress for 50 minutes (when timer goes off), THEN immediately perform Step 18 to start one Emergency Supply Fan.

Simulator Guide Attachment 3**1-E-0 Attachment 3**

NUMBER 1-E-0	ATTACHMENT TITLE AUXILIARY VENTILATION AND AC POWER VERIFICATION	ATTACHMENT 3
REVISION 61		PAGE 4 of 5

12. ____ 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)

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

14. ____ Verify initiated or initiate 0-AP-50.00, OPPOSITE UNIT EMERGENCY.

15. ____ Verify 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

16. ____ IF both of the following conditions exist, THEN verify that Load Shed is activated.

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

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

Simulator Guide Attachment 3**1-E-0 Attachment 3**

NUMBER 1-E-0	ATTACHMENT TITLE AUXILIARY VENTILATION AND AC POWER VERIFICATION	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.

***** :

18. WHEN SI has been in progress for 50 minutes (when timer goes off), THEN 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 18 Caution.

Simulator Guide Attachment 4**1-AP-9.00 Admin Control**

NUMBER 1-AP-9.00	ATTACHMENT TITLE	ATTACHMENT 6
REVISION 26	ADMINISTRATIVE CONTROL OF LOCAL TRIPPING OF RCP BREAKERS	PAGE 1 of 1

1. ____ Perform a pre-job briefing covering the following requirements for establishing Administrative Control of Reactor Coolant Pump Breaker local tripping.
 - ____ a) The person assigned Administrative Control of Reactor Coolant Pump Breaker local tripping understands that no other concurrent job responsibilities have been or shall be accepted during performance of this procedure.
 - ____ b) The person assigned Administrative Control of Reactor Coolant Pump Breaker local tripping understands the requirement to remain available at all times when RCP seal leakoff is greater than 4 gpm.
 - ____ c) The person assigned Administrative Control of Reactor Coolant Pump Breaker local tripping understands that continuous communication capability shall be maintained with the Main Control Room at all times by use of either a Portable Radio, (primary method) or Gai-Tronics (secondary method).
 - ____ d) The person assigned Administrative Control of Reactor Coolant Pump Breaker local tripping understands that whenever a fire in the Main Control Room or the Emergency Switchgear Room occurs, he/she is to report to the Normal Switchgear Room immediately.
 - ____ e) The person assigned Administrative Control of Reactor Coolant Pump Breaker local tripping, understands that Reactor Coolant Pump Breaker local tripping shall be accomplished IAW 0-FCA-15.00, Local Circuit Breaker Operation, upon Notification from the Main Control Room.
 - ____ f) The Main Control Room shall notify the operator who has assumed Administrative Control to perform Reactor Coolant Pump Breaker local tripping when Reactor Coolant Pump breakers cannot be opened from the Main Control Room to ensure that the time limit is not exceeded.
2. ____ Record the name of the person assigned Administrative Control of Reactor Coolant Pump Breaker local tripping in the Unit 1 Narrative Log.