

Appendix D

**Scenario Outline
NRC EXAM – SCENARIO #1**

Facility: <u>Surry Power Station</u>	Scenario No.: <u>1</u>	Op-Test No.: <u>2012-001</u>
Examiners: _____	Operators: _____	_____
_____	_____	_____
Initial Conditions: Time in Core Life – Middle of Life; Core Cycle – Cycle 25		
<p>Unit 1 is at 99.7% power to support swapping condensate pumps. All systems and crossties are operable with the following exception:</p> <ul style="list-style-type: none"> • #1 EDG is tagged out for a major overhaul. Four days remain in the seven-day Technical Specification 3.16 clock. The EDG is expected to be returned to service in approximately two days. Two independent off-site power sources were verified 2 hours ago as per Tech Spec 3.16.B.1.a., and 11 days remain on the AFW crosstie clock iaw Tech Spec 3.6.I.3. <p>Turnover: Upon relieving the watch, perform 1-OP-CN-001 (Condensate System Operations) to start 1-CN-P-1A and secure 1-CN-P-1B to support tagout later in the shift. The performance of this procedure has been analyzed based on the current plant configurations and the PSA indicates green.</p>		

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N-BOP/SRO	Swap CN PUMPS 1-OP-CN-001
2	MS0805	I-BOP/SRO TS- SRO	1-FW-FT-1494 - Selected Steam Flow Chan Fails High for "C" S/G (AP-53.00)
3	RD1221	C-RO/SRO TS-SRO	Dropped Control Rod , G-7, SBB (AP-1.00)
4	N/A	R - SRO/RO N - BOP	Ramp Down AP-23.00
5	RC2403	C-RO/SRO	"C" SG Tube Leak ~70 gpm (AP-16.00) (C SG; 8% DEG)
6	GM0701/ 0702	M - (ALL) C- RO/SRO	Rx Trip (E-0) Generator Output Breakers fail to open (E-0, Step 2)
7	Update #5 to 50%	M - (ALL)	SG Tube Leak increases to SG Tube Rupture (~450 gpm) (E-0/E-3) [CT1,2,3]
8	SI34/SI35 SI2409/ 2504/2505	C- All	Failures during 1-E-0 Verification: <ul style="list-style-type: none"> • 1-SI-MOV-1867 C/D do not auto open on SI Signal • SI Relay Failures, Manual re-position using E-0 Attachments
9	MS0403 Auto Trig MS3	M - (ALL)	Ruptured SG Faults when MSTV Closed [CT 4] ECA-3.1 Entry

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

Event 1: **Swap Running Condensate Pumps (N – BOP/SRO)**

The Team will be provided a copy of initial plant conditions. The Team will pre-brief 1-OP-CN-001, Section 5.4, prior to entering the Simulator. The Unit 1 Turbine Building Operator has been separately briefed by the Desk SRO and will be standing by in the Turbine basement to perform local actions. The Team will be allotted several minutes to walkdown the control boards when the Team enters the Simulator. The Team will start 1-CN-P-1A and secure 1-CN-P-1B for the Electricians to perform motor heater PMs.

Verifiable Action: (BOP) Manipulate 1-CN-P-1A and 1-CN-P-1B Control Switches.

Event 2: **Selected Steam Flow Chan Fails High (“C” SG Channel III – 1-FW-FT-1494), (AP-53.00)**
(I – BOP/SRO & TS-SRO)

Identify failure of selected steam flow channel by noting increased feed flow to “C” SG and alarms received. The BOP will take the Immediate Actions of AP-53.00 to place the “C” FRV in manual control and adjust feed flow to match the non-selected steam flow channel. The SRO will read AP-53.00 to the Team; refer to Tech Specs and determine a 72 hour clock is in effect to place the channel in trip. The RO will de-select the failed channel and the BOP will return the “C” FRV to Automatic.

Verifiable Action: (BOP) Place “C” FRV in manual and control “C” SG NR level at program

Technical Specifications:

- TS Table 3.7-1, item 17, Operator Action 6.
- TS Table 3.7-2, item 1.e. 1), Operator Action 20.
- TS Table 3.7-3, item 2.a., (Refer to Table 3.7-2).

Event 3: **Dropped Control Rod , G-7, SB B (AP-1.00) (C – RO/SRO & TS- SRO):**

Identify Rod G-7 dropped into the core by indications and alarms received, and place rod control in manual to prevent “D” bank rods from stepping out IAW AP-1.00. The SRO will read AP-1.00. The Team will verify that the rod has dropped. SRO refers to Tech Specs and determines a one (1) hour clock in effect to reduce reactor power <75% due to the INOPERABLE rod.

Verifiable Actions: (RO) Place Rod Control in Manual.

Technical Specification: TS 3.12.C.1; TS 3.12.C.3

Event 4: Ramp Down AP-23.00 (R – SRO/RO N-BOP)

Upon review of the technical specifications associated with the dropped rod (or as directed by 1-AP-1.00), the SRO will identify the need to ramp Unit 1 to less than 75% power to ensure compliance with Technical Specification 3.12. The SRO will direct this power reduction in accordance with 0-AP-23.00 (Rapid Load Reduction)

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

Event 5: “C” SG Tube Leak ~70 gpm (AP-16.00) (C SG; 8% DEG) (C – RO/SRO)

The RO will diagnose the SGTL based on alarms and indications received and perform the Immediate Action steps of AP-16.00. The RO will determine RCS leakage in excess of 50 gpm. The SRO will read AP-16.00 to the RO/BOP and direct a Reactor Trip after CH pump suction has been swapped to the RWST.

Verifiable Action: (RO) Perform Immediate Action Steps of AP-16.00; isolate Letdown by closing CH-LCV-1460 A/B, and placing CH FCV-1122 in manual control.

Technical Specification: TS 3.1.C.1.d

Event 6: Reactor Trip/Generator output breakers fail to open. (M-All & C-RO/SRO)

On step 2 of E-0 IAs, the RO will manually open the generator output breakers and secure generator excitation due to failure of the output breakers to automatically open.

Verifiable Action: (RO) Manually open generator output breakers and verify excitation secured.

Event 7: SG Tube Leak increases to SG Tube Rupture (M-All)

Upon the reactor trip (during the immediate actions of 1-E-0), the SGTL on “C” SG will increase to ~450 gpm. The RO will identify increased RCS leakage and imminent SI during the immediate actions of 1-E-0 and manually initiate SI. The RO will identify SI flow not established due to failure of 1-SI-MOV-1867C/D to automatically open.

Verifiable Action: (RO) Maximize CH flow to determine RCS leak not within capacity of CH pump.
(RO) Manually Initiate SI

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

Actions required to accomplish the critical task:

- 1-SI-P-1A or 1-SI-P-1B stopped.

Critical Task 2: Isolate feedwater flow into and steam flow from the ruptured SG before a transition to ECA-3.1 occurs AND within 30 minutes of the SGTR.
[SPS E-3 -- A]

Actions required to accomplish the critical task:

- Closure of “C” SG MSTV.
- Isolation of AFW flow to ruptured S/G when level >12% NR.

Event 8: **Failures during 1-E-0 Verification (C – All)**

SRO verifies the IAs of E-0. Directs RO to perform Attachment 2 of E-0, BOP to perform Attachments 1 and 3. After RO aligns SI flow IAW Attachment 2, the SRO will direct the RO to perform Attachment 10 to isolate “C” SG. RO/SRO then continue in E-0 and transition to E-3.

During performance of E-0 Attachments 1,2, and 3 the BOP will find:

- 1-CH-HCV-1200 A/B, 1-DA-TV-100A/B, 1-MS-TV-109, 1-CC-TV-109B, 1-VS-MOD-103A and 1-VS-MOD-103B NOT CLOSED
- 1-SI-P-1B did not auto start

Verifiable Action: (RO) Aligns SI flow IAW Attachment 2 of E-0.
(BOP) Manually aligns components IAW Attachment 1 and 3 of E-0.

less than **Critical Task 3:** **Manually actuate at least one train of SI before RCS subcooling is 30 °F. [WOG E-0 –D]**

Actions required to accomplish the critical task:

- Open 1-SI-MOV-1867C and/or 1-SI-MOV-1867D.

Event 9: **“C” SG faults when “C” MSTV closed in E-3. (M-ALL)**

When “C” MSTV closed, the RO will diagnose decreasing pressure in “C” SG.

The SRO will use the CAP of E-3 to transition to E-2 to perform faulted SG isolation. After isolation actions of E-2 complete [CT-4], the SRO will transition back to E-3. On step 5 of E-3, the SRO will identify Transition criteria to ECA-3.1.

Critical Task 4: **Isolate the faulted SG before transition out of E-2 [WOG E-2 – A]**

Actions required to accomplish the critical task:

- Isolate feed and steam to “C” SG.

Scenario Ends after several steps of ECA-3.1 have been completed, or upon Lead Evaluator Cue.

Facility: Surry Power Station Scenario No.: 1 Op-Test No.: 2012-001

Examiners: _____ Operators: _____

Initial Conditions: Time in Core Life – Middle of Life; Core Cycle – Cycle 25

Unit 1 is at 99.7% power to support swapping condensate pumps. All systems and crossties are operable with the following exception:

- #1 EDG is tagged out for a major overhaul. Four days remain in the seven-day Technical Specification 3.16 clock. The EDG is expected to be returned to service in approximately two days. Two independent off-site power sources were verified 2 hours ago as per Tech Spec 3.16.B.1.a., and 11 days remain on the AFW crosstie clock iaw Tech Spec 3.6.I.3.

Turnover: Upon relieving the watch, perform 1-OP-CN-001 (Condensate System Operations) to start 1-CN-P-1A and secure 1-CN-P-1B to support tagout later in the shift. The performance of this procedure has been analyzed based on the current plant configurations and the PSA indicates green.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N-BOP/SRO	Swap CN PUMPS 1-OP-CN-001
2	MS0805	I-BOP/SRO TS- SRO	1-FW-FT-1494 - Selected Steam Flow Chan Fails High for "C" S/G (AP-53.00)
3	RD1221	C -RO/SRO TS-SRO	Dropped Control Rod , G-7, SBB (AP-1.00)
4	N/A	R - SRO/RO N - BOP	Ramp Down AP-23.00
5	RC2403	C-RO/SRO	"C" SG Tube Leak ~70 gpm (AP-16.00) (C SG; 8% DEG)
6	GM0701/ 0702	M - (ALL) C- RO/SRO	Rx Trip (E-0) Generator Output Breakers fail to open (E-0, Step 2)
7	Update #5 to 50%	M - (ALL)	SG Tube Leak increases to SG Tube Rupture (~450 gpm) (E-0/E-3) [CT1,2,3]
8	SI34/SI35 SI2409/ 2504/2505	C- All	Failures during 1-E-0 Verification: <ul style="list-style-type: none"> 1-SI-MOV-1867 C/D do not auto open on SI Signal SI Relay Failures, Manual re-position using E-0 Attachments
9	MS0403 Auto Trig MS3	M - (ALL)	Ruptured SG Faults when MSTV Closed [CT 4] ECA-3.1 Entry

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

Event 1: **Swap Running Condensate Pumps (N – BOP/SRO)**

The Team will be provided a copy of initial plant conditions. The Team will pre-brief 1-OP-CN-001, Section 5.4, prior to entering the Simulator. The Unit 1 Turbine Building Operator has been separately briefed by the Desk SRO and will be standing by in the Turbine basement to perform local actions. The Team will be allotted several minutes to walkdown the control boards when the Team enters the Simulator. The Team will start 1-CN-P-1A and secure 1-CN-P-1B for the Electricians to perform motor heater PMs.

Verifiable Action: (BOP) Manipulate 1-CN-P-1A and 1-CN-P-1B Control Switches.

Event 2: **Selected Steam Flow Chan Fails High (“C” SG Channel III – 1-FW-FT-1494), (AP-53.00)**
(I – BOP/SRO & TS-SRO)

Identify failure of selected steam flow channel by noting increased feed flow to “C” SG and alarms received. The BOP will take the Immediate Actions of AP-53.00 to place the “C” FRV in manual control and adjust feed flow to match the non-selected steam flow channel. The SRO will read AP-53.00 to the Team; refer to Tech Specs and determine a 72 hour clock is in effect to place the channel in trip. The RO will de-select the failed channel and the BOP will return the “C” FRV to Automatic.

Verifiable Action: (BOP) Place “C” FRV in manual and control “C” SG NR level at program

Technical Specifications:

- TS Table 3.7-1, item 17, Operator Action 6.
- TS Table 3.7-2, item 1.e. 1), Operator Action 20.
- TS Table 3.7-3, item 2.a., (Refer to Table 3.7-2).

Event 3: **Dropped Control Rod , G-7, SB B (AP-1.00) (C – RO/SRO & TS- SRO):**

Identify Rod G-7 dropped into the core by indications and alarms received, and place rod control in manual to prevent “D” bank rods from stepping out IAW AP-1.00. The SRO will read AP-1.00. The Team will verify that the rod has dropped. SRO refers to Tech Specs and determines a one (1) hour clock in effect to reduce reactor power <75% due to the INOPERABLE rod.

Verifiable Actions: (RO) Place Rod Control in Manual.

Technical Specification: TS 3.12.C.1; TS 3.12.C.3

Event 4: Ramp Down AP-23.00 (R – SRO/RO N-BOP)

Upon review of the technical specifications associated with the dropped rod (or as directed by 1-AP-1.00), the SRO will identify the need to ramp Unit 1 to less than 75% power to ensure compliance with Technical Specification 3.12. The SRO will direct this power reduction in accordance with 0-AP-23.00 (Rapid Load Reduction)

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

Event 5: “C” SG Tube Leak ~70 gpm (AP-16.00) (C SG; 8% DEG) (C – RO/SRO)

The RO will diagnose the SGTL based on alarms and indications received and perform the Immediate Action steps of AP-16.00. The RO will determine RCS leakage in excess of 50 gpm. The SRO will read AP-16.00 to the RO/BOP and direct a Reactor Trip after CH pump suction has been swapped to the RWST.

Verifiable Action: (RO) Perform Immediate Action Steps of AP-16.00; isolate Letdown by closing CH-LCV-1460 A/B, and placing CH FCV-1122 in manual control.

Technical Specification: TS 3.1.C.1.d

Event 6: Reactor Trip/Generator output breakers fail to open. (M-All & C- RO/SRO)

On step 2 of E-0 IAs, the RO will manually open the generator output breakers and secure generator excitation due to failure of the output breakers to automatically open.

Verifiable Action: (RO) Manually open generator output breakers and verify excitation secured.

Event 7: SG Tube Leak increases to SG Tube Rupture (M-All)

Upon the reactor trip (during the immediate actions of 1-E-0), the SGTL on “C” SG will increase to ~450 gpm. The RO will identify increased RCS leakage and imminent SI during the immediate actions of 1-E-0 and manually initiate SI. The RO will identify SI flow not established due to failure of 1-SI-MOV-1867C/D to automatically open.

Verifiable Action: (RO) Maximize CH flow to determine RCS leak not within capacity of CH pump.
(RO) Manually Initiate SI

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

Actions required to accomplish the critical task:

- 1-SI-P-1A or 1-SI-P-1B stopped.

Critical Task 2: Isolate feedwater flow into and steam flow from the ruptured SG before a transition to ECA-3.1 occurs AND within 30 minutes of the SGTR. [SPS E-3 -- A]

Actions required to accomplish the critical task:

- Closure of “C” SG MSTV.
- Isolation of AFW flow to ruptured S/G when level >12% NR.

Event 8: **Failures during 1-E-0 Verification (C – All)**

SRO verifies the IAs of E-0. Directs RO to perform Attachment 2 of E-0, BOP to perform Attachments 1 and 3. After RO aligns SI flow IAW Attachment 2, the SRO will direct the RO to perform Attachment 10 to isolate “C” SG. RO/SRO then continue in E-0 and transition to E-3.

During performance of E-0 Attachments 1,2, and 3 the BOP will find:

- 1-CH-HCV-1200 A/B, 1-DA-TV-100A/B, 1-MS-TV-109, 1-CC-TV-109B, 1-VS-MOD-103A and 1-VS-MOD-103B NOT CLOSED
- 1-SI-P-1B did not auto start

Verifiable Action: (RO) Aligns SI flow IAW Attachment 2 of E-0.
(BOP) Manually aligns components IAW Attachment 1 and 3 of E-0.

Critical Task 3: Manually actuate at least one train of SI before RCS subcooling is less than 30 °F. [WOG E-0 –D]

Actions required to accomplish the critical task:

- Open 1-SI-MOV-1867C and/or 1-SI-MOV-1867D.

Event 9: **“C” SG faults when “C” MSTV closed in E-3. (M-ALL)**

When “C” MSTV closed, the RO will diagnose decreasing pressure in “C” SG.

The SRO will use the CAP of E-3 to transition to E-2 to perform faulted SG isolation. After isolation actions of E-2 complete [CT-4], the SRO will transition back to E-3. On step 5 of E-3, the SRO will identify Transition criteria to ECA-3.1.

Critical Task 4: Isolate the faulted SG before transition out of E-2 [WOG E-2 – A]

Actions required to accomplish the critical task:

- Isolate feed and steam to “C” SG.

Scenario Ends after several steps of ECA-3.1 have been completed, or upon Lead Evaluator Cue.

Initial Conditions: IC #1 100%, MOL – Cycle 25. The unit has been at 100% power for > 30 days

Pre-load malfunctions:

- SI-MOV-1867C/D fail to open on Safety Injection (SI flowpath isolation valves)
- Main Generator Output Breakers fail to Auto-Open
- Various SI components fail to re-align due to SI relay failures

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

- #1 EDG is tagged out for a major overhaul. Four days remain in the seven-day Technical Specification 3.16 clock. The EDG is expected to be returned to service in approximately two days.

Turnover:

Unit 1 is at 99.7% power to support swapping condensate pumps. All systems and crossties are operable with the following exception:

- #1 EDG is tagged out for a major overhaul. Four days remain in the seven-day Technical Specification 3.16 clock. The EDG is expected to be returned to service in approximately two days. Two independent off-site power sources were verified 2 hours ago as per Tech Spec 3.16.B.1.a., and 11 days remain on the AFW crosstie clock law Tech Spec 3.6.I.3.

Turnover: Upon relieving the watch, perform 1-OP-CN-001 (Condensate System Operations) to start 1-CN-P-1A and secure 1-CN-P-1B to support tagout later in the shift. The performance of this procedure has been analyzed based on the current plant configurations and the PSA indicates green.

Event	Malf. #'s	Severity	Instructor Notes and Required Feedback
1	N/A	N/A	Swap CN PUMPS 1-OP-CN-001
2	MS0805	1 (100%)	1-FW-FT-1494 - Selected Steam Flow Chan Fails High for "C" S/G (AP-53.00)
3	RD1221	Full inserted	Dropped Control Rod , G-7, SBB (AP-1.00)
4	N/A		Ramp Down AP-23.00
5	RC2403	8%	"C" SG Tube Leak ~70 gpm (AP-16.00) (C SG)
6	GM0701/ 0702	N/A	Rx Trip (E-0) Generator Output Breakers fail to open (E-0, Step 2)
7.	Update RC2403	50%	SG Tube Leak increases to SG Tube Rupture (~450 gpm) (E-0/E-3) [CT-1/2]
8	SI34/SI35 SI2409/ 2504/2505	N/A	Failures during 1-E-0 Verification: <ul style="list-style-type: none"> • SI-MOV-1867 C/D do not auto open on SI Signal [CT 3] • SI Relay Failures, Manual re-position using E-0 Attachments
9	MS0403 Auto Trig MS3	50%	Ruptured SG Faults when MSTV Closed [CT-4] ECA-3.1 Entry

SHIFT TURNOVER INFORMATION

OPERATING PLAN:

The initial conditions have Unit 1 is at 99.7% power with RCS boron concentration of 740 ppm.

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

All systems and crossties are operable with the following exception:

- #1 EDG is tagged out for a major overhaul. Four days remain in the seven-day Technical Specification 3.16 clock. The EDG is expected to be returned to service in approximately two days. Two independent off-site power sources were verified 2 hours ago as per Tech Spec 3.16.B.1.a., and 11 days remain on the AFW crosstie clock iaw Tech Spec 3.6.I.3.

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

Shift orders are to maintain 100% power on Unit #1 and upon relieving the watch, place 1-CN-P-1A in service and secure 1-CN-P-1B in accordance with 1-OP-CN-001 (Condensate System Operations) to support tagout later this shift. Performance of 1-OP-CN-001 has been authorized and has been PSA analyzed for current plant conditions.

The last shift performed one 30 gallon dilution and allowed power to drift to below 99.8% to support condensate pump swap. Previous to this, shifts had been performing three 30 gallon dilutions.

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 1

Page 7 of 80

Event Description: Swap Running Condensate Pumps iaw 1-OP-CN-001 (Condensate System Operations).

Cue: When team ready.

Time	Position	Applicant's Action or Behavior
	SRO/BOP	<p>1-OP-CN-001</p> <p>Team will pre-brief Initial Conditions, Precautions and Limitations, and procedure prior to entering simulator.</p> <p>Prior to entering the simulator the team will be provided with the following information to aide in completion of the initial conditions prior to entering the simulator:</p> <p>Initial Conditions of 1-OP-CN-001 (Condensate System Operations):</p> <p>3.1 Check Bearing Cooling Water System is operable or in operation to support the operation of the Condensate System and the associated Condensate subsystems.</p> <p>3.2 Check makeup water is available to fill the condenser.</p>
	SRO/BOP	<p>Precautions and Limitations of 1-OP-CN-001 (Condensate System Operations):</p> <p>4.1 Bearing Cooling water shall be in service..</p> <p>4.2 The recirculation line flow restrictions do not permit sustained two condensate pump operation with the Condensate System on recirculation.</p> <p>4.3 The restarts for the 4160 VAC condensate pump motor shall be limited to the following:</p> <ul style="list-style-type: none"> • One restart attempt is permissible provided that the motor has coasted to a complete stop before a restart is attempted. • A second restart attempt is permissible when the motor windings and core have been cooled sufficiently by either running for a period of 45 minutes or by standing idle for a period of 60 minutes. <p>4.4 A condensate pump will automatically start, unless the idle pump(s) are in PTL, when either of the following conditions exist.</p> <ul style="list-style-type: none"> • Condensate discharge header pressure is less than 350 psig. • Less than 2 condensate pumps are running. <p>4.5 Load reductions associated with the removal from service of selected extraction point heaters in each train are: (Reference 2.3.13)</p> <ul style="list-style-type: none"> • A 10 percent MWe load reduction will result from bypassing the 5th and 6th point heaters and the drain cooler, as a group, with higher pressure heaters remaining in service. • A 20 percent MWe load reduction will result from bypassing the 4th, 3rd, and 2nd point heaters, as a group, with the 1st point heaters remaining in service. • No MWe load reduction will result from the removal of the 1st point heaters, as a pair, provided the maximum output of the unit is not exceeded.

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 1

Page 8 of 80

Event Description: Swap Running Condensate Pumps iaw 1-OP-CN-001 (Condensate System Operations).

Cue: When team ready.

	SRO/BOP	<p>I-OP-CN-001</p> <p>4.6 An Operator shall be stationed in the Turbine Building Basement to monitor condensate pump starts and to walk down the Condensate System after the pump start.</p> <p>4.7 Chemistry shall check the Sodium content of all water to be transferred from trucks to either the Unit 1 or the Unit 2 Condensate Storage Tanks.</p> <p>4.8 Chemistry samples for Carbohydrazide / Hydrazine must be taken before any condensate is discharged to the river.</p> <p>4.9 Condensate recirculation valve flow greater than 3600 gpm could cause serious piping erosion/corrosion and valve damage.</p> <p>4.10 Minimum Condensate recirculation valve flow should be maintained greater than 2500 gpm.</p> <p>4.11 The condensate recirculation valve, 1-CN-FCV-107, will fail closed with all three condensate pump breakers open. This valve should be throttled to 30 percent open as soon as possible after starting the first condensate pump.</p> <p>4.12 Before placing the Condensate System in service, hotwell chemistry must be verified acceptable. (Reference 2.4.2)</p> <p>4.13 Condensate Polishing Building demineralizers must be operated to maintain flow between 1750 to 2800 gpm per vessel.</p> <p>4.14 Prior to Main Condensate Shutdown, both HP Heater Drain Pumps discharge piping, both First Point Feedwater Heater bypass lines, and the Fourth through Second Point Feedwater Heater bypass line must be cooled to less than 210°F. (Reference 2.4.10)</p> <p>4.15 The Main Feed Pump breakers, if in CONNECT or TEST, will trip when the last Condensate Pump is shut down.</p> <p>4.16 Evolutions that affect Feedwater flow or Feedwater temperature may affect RCS temperature and Reactor Power. This effect will be greater at BOL due to a lower value or ITC. (Reference 2.4.8)</p> <p>4.17 To minimize Iron transport to the Steam Generators, a Condensate pump should not be continuously operated for greater than 48 hours without Main Condenser vacuum established and chemical injection in service. Expected continuous operation greater than 48 hours without these conditions satisfied requires Station Management and Chemistry consultation.</p>
--	---------	--

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 1

Page 9 of 80

Event Description: Swap Running Condensate Pumps iaw 1-OP-CN-001 (Condensate System Operations).

Cue: When team ready.

	BOP	<p>I-OP-CN-001</p> <p>5.4 Shifting Condensate Pumps with One or Two Condensate Pumps Running</p> <p>5.4.1 Check all of the following conditions for the condensate pump to be started.</p> <ul style="list-style-type: none"> • Seal water is in service. • Bearing Cooling water flow is indicated to the pump and motor. • Oil level in the reservoir sight glass is mid-range. (one of six motors may have two sight glasses) <p>NOTE: When the Condensate Pump is started, HP Heater Drain Pump flow will be affected. The system should be monitored for proper response.</p> <p>5.4.2 Check CALCALC 10 Minute Avg Power is less than or equal to 99.80%. IF CALCALC non-functional, THEN check Reactor Power is less than or equal to 100%. IF starting a Condensate Pump due to a secondary transient, THEN enter N/A.</p> <p>5.4.3 Start the selected condensate pump and record the equipment location of the condensate pump started.</p> <ul style="list-style-type: none"> • 1-CN-P- _____ <p>5.4.4 Check condensate pump discharge pressure, indicated on the local discharge pressure gauge, is between 550 psig and 650 psig, and LI-CN-103, CNDSR HOTWELL LVL, is stable.</p> <p>5.4.5 Stop the condensate pump that is to be removed from service and place in AUTO or PTL. Record the equipment location of the condensate pump stopped.</p> <ul style="list-style-type: none"> • 1-CN-P- _____ <p>NOTE: A stuck open check valve could result in a loss of feed or auto start of the third condensate pump.</p> <p>5.4.6 Check Main Feed Pump suction pressure is normal. IF pressure is NOT normal, THEN perform the following substeps. Otherwise enter N/A for the following substeps.</p> <ol style="list-style-type: none"> a. Start or check started the pump stopped in Step 5.4.5. b. Stop the pump started in Step 5.4.3. c. Submit a Condition Report for the failed check valve. d. Enter N/A for Steps 5.4.7, 5.4.8, and 5.4.11. <p>5.4.7 Close the Condensate Pump Discharge Vent valve of the condensate pump started in Step 5.4.3. (✓) (Reference 2.3.15)</p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;"><u>1-CN-P-1A</u></td> <td style="text-align: center;"><u>1-CN-P-1B</u></td> <td style="text-align: center;"><u>1-CN-P-1C</u></td> </tr> <tr> <td style="text-align: center;">___ 1-CN-34</td> <td style="text-align: center;">___ 1-CN-46</td> <td style="text-align: center;">___ 1-CN-58</td> </tr> </table>	<u>1-CN-P-1A</u>	<u>1-CN-P-1B</u>	<u>1-CN-P-1C</u>	___ 1-CN-34	___ 1-CN-46	___ 1-CN-58
<u>1-CN-P-1A</u>	<u>1-CN-P-1B</u>	<u>1-CN-P-1C</u>						
___ 1-CN-34	___ 1-CN-46	___ 1-CN-58						

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 1

Page 10 of 80

Event Description: Swap Running Condensate Pumps iaw 1-OP-CN-001 (Condensate System Operations).

Cue: When team ready.

	<p>1-OP-CN-001</p> <p>5.4.8 Open the Condensate Pump Discharge Vent valve of the condensate pump stopped in Step 5.4.5. (✓) (Reference 2.3.15) 1-CN-P-1A 1-CN-P-1B 1-CN-P-1C ___ 1-CN-34 ___ 1-CN-46 ___ 1-CN-58</p> <p>5.4.9 Close the CN Pump Suction PI Test isolation valve for pump stopped in Step 5.4.5. (✓) 1-CN-P-1A 1-CN-P-1B 1-CN-P-1C ___ 1-CN-29 ___ 1-CN-41 ___ 1-CN-53</p> <p>5.4.10 Throttle open the CN Pump Suction PI Test isolation valve for pump started in Step 5.4.5 as requested by Chemistry. (✓) 1-CN-P-1A 1-CN-P-1B 1-CN-P-1C ___ 1-CN-29 ___ 1-CN-41 ___ 1-CN-53</p> <p>5.4.11 Monitor the condensate pump just started until condensate pump and motor temperatures have stabilized.</p> <p>END EVENT 1</p>
--	--

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 2

Page 11 of 80

Event Description: 1-FW-FT-1494 - "C" S/G Selected Steam Flow Chan Fails High (AP-53.00)

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
	BOP	<p>Diagnoses failure of 1-MS-FT-1494 with the following indications/alarms:</p> <p>Alarms:</p> <ul style="list-style-type: none"> • 1F-F6 – STM GEN 1C CH 3 HI STM LINE FLOW • 1H-G7 – STM GEN 1C LVL ERROR <p>Indications:</p> <ul style="list-style-type: none"> • Step increase in 1C SG Steam Flow indication CH-III • Increasing level on 'C' SG. <p>In accordance with the immediate actions of AP-53.00 (Loss of Vital Instrumentation/Control), the BOP will take manual control of the 'C' Main Feed Regulating Valve (MFRV) and return 'C' Steam Generator Level to program (44%).</p>
	SRO	<p>0-AP-53.00</p> <p>Enters 0-AP-53.00 LOSS OF VITAL INSTRUMENTATION / CONTROLS</p>
	BOP	<p>[1] VERIFY REDUNDANT INSTRUMENT CHANNEL(S) INDICATION - NORMAL</p> <p>BOP identifies Channel IV indication for Steam Flow on 'C' SG 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 'C' SG MFRV and reduces demand to restore level to program.</p>
	SRO	<p>The team will hold a transient brief. During the brief the failure of 1-MS-FT-1494 will be discussed.</p> <p>The RO and BOP will report out critical parameters, as per placard on Main Control Room Bench Board.</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 2012-1

Scenario No.: 1

Event No.: 2

Page 12 of 80

Event Description: 1-FW-FT-1494 - "C" S/G Selected Steam Flow Chan Fails High (AP-53.00)

Cue: By Examiner.

	RO	<p>0-AP-53.00</p> <p>*3. VERIFY REACTOR POWER – LESS THAN OR EQUAL TO 100%.</p> <p>RO will identify that reactor power is less than 100%.</p>
	SRO	<p>Notes Prior to Step 4:</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 13.
	SRO BOP	<p>*4 DETERMINE THE FAILED INSTRUMENT / CONTROL AND GO TO APPROPRIATE STEP OR PROCEDURE:</p> <ul style="list-style-type: none"> • SG Steam Flow, Step 7 <p>The BOP will identify that 1-MS-FT-1494 has failed.</p>
	SRO	<p>Caution prior to step 7:</p> <p>CAUTION: When CALCALC is based on Feedwater, changes in feed flow will affect calorimetric power. Reactor power must be monitored when adjusting feed flow.</p> <p>Team will monitor reactor power during FW flow adjustments.</p>
	BOP	<p>7. CHECK STEAM GENERATOR LEVEL CONTROL INSTRUMENTS – NORMAL</p> <ul style="list-style-type: none"> • Steam Pressure • <u>Steam Flow</u> • Feed Flow • Steam Generator Level <p>Determines CH III Steam flow instrumentation for 'C' SG is NOT normal.</p>

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 2

Page 13 of 80

Event Description: 1-FW-FT-1494 - "C" S/G Selected Steam Flow Chan Fails High (AP-53.00)

Cue: By Examiner.

	0-AP-53.00
	7. RNO
	<u>IF</u> the selected steam flow, steam pressure, or feed flow input to the SG Water Level Control system has failed, <u>THEN</u> do the following:
BOP	a) Place the associated Feed Reg Valve in MANUAL.
	Verifies 'C' SG MFRV controller, 1-FW-FCV-1498, in manual
SRO/BOP	b) Control SG level at program level (44%, a band may be given).
	c) Select the redundant channel for affected SG(s)
RO/BOP	Selects Channel IV Steam Flow for 'C' SG using two-position selector switch on Vertical Board 1-2 (applicant may also place the associated Feed Flow channel in Channel IV)
BOP	d) WHEN SG level returned to normal, THEN place the Feed Reg Valve in AUTOMATIC.
	When level is restored the BOP places feed reg valve controller in AUTOMATIC.
BOP	<u>IF</u> SG Level Channel III has failed, <u>THEN</u> do the following:
	Determines that no channel III level failure has occurred.
SRO	Perform follow-up actions:
	a) Consult with Shift Manager on need to initiate ()-OP-RP-001, ALIGNING CONTROL SYSTEM FOR PERFORMANCE OF CHANNEL I, II, III, AND IV PROCESS AND PROTECTION TESTING.
	<i>If asked the Shift Manager will recommend not performing 1-OP-RP-001 at this time.</i>
SRO	b) Refer to the following Tech Spec 3.7 items:
	• Table 3.7-1, 12 and 17
	• Table 3.7-2, 1.c, 1.e, and 3.a
	• Table 3.7-3, 2.a, and 3.a
	• Table 3.7-6, 15 and 16
SRO	Determines the following Technical Specification LCOs:
	• 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 - OA #20)

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 2

Page 14 of 80

Event Description: 1-FW-FT-1494 - "C" S/G Selected Steam Flow Chan Fails High (AP-53.00)

Cue: By Examiner.

	SRO	<p>0-AP-53.00</p> <p>8. RNO – Continued</p> <p>c) Refer to Attachment 1 (SGWLC Block Diagram)</p> <p>d) IF no other instrumentation failure exists, THEN GO TO Step 13.</p> <p>The Team will identify that no other new instrumentation failures exist and transition to Step 13 (i.e., all instrumentation failures have been assessed).</p>
	SRO	<p>13. CHECK CALORIMETRIC – FUNCTIONAL IAW ()-OPT-RX-001</p> <p>Step 13 RNO Actions:</p> <p>a) Initiate ()-OPT-RX-007, SHIFT AVERAGE POWER CALCULATION, as necessary.</p> <p>b) Immediately check or initiate power reduction to less than or equal to 100% IAW Attachment 7 by monitoring alternate power indications.</p> <p>c) Refer to TRM 3.3.5, Feedwater Ultrasonic Flow Meter Calorimetric, for required actions.</p> <ul style="list-style-type: none"> • SRO/RO determines that OPT-RX-001 is impacted and OPT-RX-007 will need to be performed. • Team verifies power <100% • The STA will review the TRM for required actions. <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> <p><i>The STA will evaluate TRM 3.3.5. No report back will be required as next event will occur before analysis is complete.</i></p>
	SRO	<p>14. CHECK FAILED INSTRUMENT - IS A REGULATORY GUIDE 1.97 VARIABLE (Go to Step 16 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-1494 is a Reg. Guide 1.97 component.</i></p>
	SRO	<p>15. 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>

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 2

Page 15 of 80

Event Description: 1-FW-FT-1494 - "C" S/G Selected Steam Flow Chan Fails High (AP-53.00)

Cue: By Examiner.

	SRO	<p>0-AP-53.00</p> <p>16. 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 - OA #20) <p><i>SRO directs STA to review VPAP-2802 and TRM Section 3.3. The STA acknowledges the request.</i></p>
	SRO	<p>17. CHECK ADDITIONAL INSTRUMENT / CONTROLLER MALFUNCTION - EXISTS</p> <p>The team will identify that no new additional failures exist (i.e., all failures have already been addressed), proceed to the RNO section, and this will direct the team to Step 19.</p>
	SRO	<p>19. PROVIDE NOTIFICATIONS AS NECESSARY:</p> <ul style="list-style-type: none"> • Shift Supervision • OMOG • STA (PRA determination) • I&C <p>END EVENT 2</p>

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 3

Page 16 of 80

Event Description: Dropped Control Rod, G-7, SB B, GP 2 (AP-1.00)

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
	RO	<p>Diagnoses the dropped rod with the following indications/alarms:</p> <p>Alarms:</p> <ul style="list-style-type: none"> • 1C-B8 – PRZR LO PRESS • 1G-H1 - NIS DROPPED ROD FLUX DECREASE \geq 5% PER 2 SEC • 1G-H2 – RPI ROD BOTTOM <20 STEPS <p>Indications:</p> <ul style="list-style-type: none"> • Outward Rod Motion. • RCS Temperature and Pressure decrease. • Flux Variations (radial). • CERPI indication that Control Rod G-7 is at 0 steps. <p>In accordance with the immediate actions of 1-AP-1.00 (Rod Control System Malfunction) the RO will place Control Rods in MANUAL to stop the outward rod motion.</p> <p>RCS pressure <2205 psig places the unit in a 2 hour clock iaw TS. 3.12.F.1 (and COLR) – it is expected that the SRO will track this clock (entry/exit times).</p>
	SRO	<p>0-AP-1.00</p> <p>Enters 0-AP-1.00 (Rod Control System Malfunction).</p>
	SRO	<p>CAUTION prior to Step 1:</p> <ul style="list-style-type: none"> • If Tave decreases below 530 °F, 1-E-0, Reactor Trip or Safety Injection, must be implemented.
	RO	<p>[1] CHECK FOR EITHER OF THE FOLLOWING:</p> <ul style="list-style-type: none"> • Continuous rod withdrawal • Continuous rod insertion <p>RO will note that there was a continuous rod withdrawal.</p>
	RO	<p>[2] STOP ROD MOTION</p> <ol style="list-style-type: none"> a. Put ROD CONT MODE SEL switch in MANUAL b. Verify rod motion – STOPPED <p>RO will place control rods in MANUAL and note that Rods stopped moving.</p>

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 3

Page 17 of 80

Event Description: Dropped Control Rod, G-7, SB B, GP 2 (AP-1.00)

Cue: By Examiner.

	SRO	<p>0-AP-1.00</p> <p>The team will hold a transient brief. During the brief the dropped rod will be discussed.</p> <p>The RO and BOP will report out critical parameters, as per placard on Main Control Room Bench Board.</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. CHECK ROD MOTION - DUE TO INSTRUMENTATION FAILURE</p> <ul style="list-style-type: none"> • First Stage Impulse Pressure • Tave/Tref • Nuclear Instrumentation <p>RO will note that an instrumentation failure did not exist. The team will transition to the RNO for Step 3.</p>
	RO	<p>3. RNO</p> <p>If rod motion due to a dropped rod, THEN GO TO Step 6.</p> <p>RO will note that dropped rod caused the rod motion.</p>
	RO	<p>6. CHECK IF ANY ROD DROPPED:</p> <ul style="list-style-type: none"> • Annunciator ()G-H2, RPI ROD BOTTOM \leq 20 STEPS - LIT OR • Annunciator ()G-H1, NIS DROPPED ROD FLUX DECREASE \geq 5% PER 2 SEC - LIT OR • Rod Bottom Lights - ANY LIT OR • Any Rod On Bottom light - LIT OR • Indication of a partially dropped rod in the core <p>The RO will note that they have multiple indications of a dropped rod in the core.</p>
	RO	<p>7. CHECK REACTOR STATUS PRIOR TO FAILURE – CRITICAL</p>

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 3

Page 18 of 80

Event Description: Dropped Control Rod, G-7, SB B, GP 2 (AP-1.00)

Cue: By Examiner.

		0-AP-1.00
	RO	8. CHECK ONLY ONE ROD AFFECTED
	RO	9. CHECK REACTOR POWER – GREATER THAN 25%
	BOP/RO	10. CHECK UNIT CONDITIONS – STABLE
	RO	11. PLACE ROD CONTROL IN MANUAL
	RO/BOP	12. CHECK POWER RANGE NIs – ANY DROPPED ROD SIGNAL PRESENT
	BOP	13. RESET NIS DROPPED ROD SIGNAL IAW ATTACHMENT 4 Attachment 4 of AP-1.00 is located towards the end of this event (page 21).
	RO	14. CHECK ANNUNCIATOR 1G-F8, ROD BANK D WITHDRAWAL – NOT LIT If alarm is LIT, then the RNO will direct the team to initiate Attachment 5 – This attachment follows attachment 4 at the end of this event (page 22). This may not be lit if the RO quickly placed rods in MANUAL when withdrawing.
	SRO	Note prior to Step 15: <ul style="list-style-type: none"> • Quadrant power tilt may cause unit ramp requirements to be more restrictive.
	SRO	15. VERIFY QUADRANT POWER TILT RATIO <ul style="list-style-type: none"> • Initiate Attachment 6, QUADRANT POWER TILT CALCULATION • Review Technical Specification 3.12.B.6 <p>SRO will direct the STA to perform the QPTR in accordance with Attachment 6 and review TS 3.12.</p> <p><i>Summary of applicable Tech Specs are found on page 20</i></p>

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 3

Page 19 of 80

Event Description: Dropped Control Rod, G-7, SB B, GP 2 (AP-1.00)

Cue: By Examiner.

	SRO	<p>0-AP-1.00</p> <p>Notes prior to Step 16:</p> <ul style="list-style-type: none"> • Checking that the unit is operating between Hot Zero Power and Hot Full Power, that there is only one fully dropped (less than 10 steps) control rod, and that all other rods are above the rod insertion limit, checks that adequate SDM exists. • SDM must be re-verified using 1-OP-RX-001 every 12 hours after the control rod was dropped until the Reactor is shutdown or the rod is declared operable.
	SRO	<p>16. VERIFY SHUTDOWN MARGIN (WITHIN ONE HOUR)</p> <ul style="list-style-type: none"> • The fully dropped rod (less than 10 steps) is the only inoperable rod <u>AND</u> • All other rods are greater than the Rod Insertion Limit
	SRO	<p>17. MAKE NARRATIVE LOG ENTRY THAT SDM IS MET</p>
	SRO	<p>Caution prior to Step 18:</p> <ul style="list-style-type: none"> • Loop ΔT is the most accurate measure of Reactor power with a mis-aligned rod, and must be monitored during the ramp and used as a basis for stabilizing power.
	RO	<p>18. CHECK REACTOR POWER – LESS THAN OR EQUAL TO 75%</p> <p>Step 18 RNO actions:</p> <p>Do the following:</p> <ol style="list-style-type: none"> Reduce Reactor Power to between 70% - 74% within one hour. Reduce NIS High Flux trip setpoints to less than or equal to 85% within the following four hours. WHEN Reactor Power has been reduced, THEN GO TO Step 19. <p>The team will enter AP-23.00 to reduce reactor power.</p> <p>GO TO EVENT 4 – Page 23</p>

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 3

Page 20 of 80

Event Description: Dropped Control Rod, G-7, SB B, GP 2 (AP-1.00)

Cue: By Examiner.

	SRO	<p>Applicable Tech Specs for Dropped Rod:</p> <p>3.12.B.6:</p> <ul style="list-style-type: none"> • If, except for operation at THERMAL POWER < 50% or for physics and control rod assembly surveillance testing, the QUADRANT POWER TILT exceeds 2%, then: <ol style="list-style-type: none"> a. Within 2 hours, either the hot channel factors shall be determined and the power level adjusted to meet the requirement of Specification 3.12.B.1, or b. The power level shall be reduced from RATED POWER 2% for each percent of QUADRANT POWER TILT. The high neutron flux trip setpoint shall be similarly reduced within the following 4 hours. c. If the QUADRANT POWER TILT exceeds 10%, the power level shall be reduced from RATED POWER 2% for each percent of QUADRANT POWER TILT within the next 30 minutes. The high neutron flux trip setpoint shall be similarly reduced within the following 4 hours. <p>3.12.C.3:</p> <p>Startup and POWER OPERATION may continue with one control rod assembly inoperable provided that within one hour either:</p> <ol style="list-style-type: none"> a. The control rod assembly is restored to OPERABLE status, as defined in Specification 3.12.C.1 and 2, or b. the shutdown margin requirement of Specification 3.12.A.3.c is satisfied. c. POWER OPERATION may then continue provided that: <ol style="list-style-type: none"> 1) either: <ol style="list-style-type: none"> a) power shall be reduced to less than 75% of RATED POWER within one (1) hour, and the High Neutron Flux trip setpoint shall be reduced to less than or equal to 85% of RATED POWER within the next four (4) hours, or b) the remainder of the control rod assemblies in the group with the inoperable control rod assembly are aligned to within 12 steps of the inoperable rod within one (1) hour while maintaining the control rod assembly sequence and insertion limits specified in the CORE OPERATING LIMITS REPORT; the THERMAL POWER level shall be restricted pursuant to Specification 3.12.A during subsequent operation. 2) the shutdown margin requirement of Specification 3.12.A.3.c is determined to be met within one hour and at least once per 12 hours thereafter.
--	-----	--

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 3

Page 21 of 80

Event Description: Dropped Control Rod, G-7, SB B, GP 2 (AP-1.00)

Cue: By Examiner.

BOP	<p data-bbox="488 417 1349 447">ATTACHMENT 4 of AP-1.00 – RESETTING NIS DROPPED ROD SIGNALS</p> <p data-bbox="488 478 1222 508">Perform the following for each NI with a dropped rod status light lit.</p> <ol data-bbox="488 539 1417 1696" style="list-style-type: none"><li data-bbox="488 539 678 569">1. N41 RESET<ol data-bbox="537 600 1206 751" style="list-style-type: none"><li data-bbox="537 600 1092 630">a) Place the Power Range Test Switch in RESET.<li data-bbox="537 661 1206 690">b) Verify the Dropped Rod Status Light on N41 - NOT LIT.<li data-bbox="537 722 1133 751">c) Return the Power Range Test Switch to NORMAL.<li data-bbox="488 783 675 812">2. N42 RESET<ol data-bbox="537 844 1206 995" style="list-style-type: none"><li data-bbox="537 844 1092 873">a) Place the Power Range Test Switch in RESET.<li data-bbox="537 905 1206 934">b) Verify the Dropped Rod Status Light on N42 - NOT LIT.<li data-bbox="537 966 1133 995">c) Return the Power Range Test Switch to NORMAL.<li data-bbox="488 1026 678 1056">3. N43 RESET<ol data-bbox="537 1087 1206 1239" style="list-style-type: none"><li data-bbox="537 1087 1092 1117">a) Place the Power Range Test Switch in RESET.<li data-bbox="537 1148 1206 1178">b) Verify the Dropped Rod Status Light on N43 - NOT LIT.<li data-bbox="537 1209 1133 1239">c) Return the Power Range Test Switch to NORMAL.<li data-bbox="488 1270 675 1299">4. N44 RESET<ol data-bbox="537 1331 1206 1482" style="list-style-type: none"><li data-bbox="537 1331 1092 1360">a) Place the Power Range Test Switch in RESET.<li data-bbox="537 1392 1206 1421">b) Verify the Dropped Rod Status Light on N44- NOT LIT.<li data-bbox="537 1453 1133 1482">c) Return the Power Range Test Switch to NORMAL.<li data-bbox="488 1514 1417 1577">5. Verify annunciator ()G-H1, NIS DROPPED ROD FLUX DECREASE >5% PER SEC - NOT LIT<li data-bbox="488 1608 1325 1638">6. Check annunciator ()G-F8, ROD BANK D WITHDRAWAL - NOT LIT<li data-bbox="488 1669 1417 1698">7. IF ()G-F8, ROD BANK D WITHDRAWAL is LIT, THEN initiate Attachment 5.
-----	---

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 3

Page 22 of 80

Event Description: Dropped Control Rod, G-7, SB B, GP 2 (AP-1.00)

Cue: By Examiner.

	BOP	ATTACHMENT 5 of AP-1.00 – RESPONSE TO ROD BANK D WITHDRAWAL
--	-----	---

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

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 4

Page 23 of 80

Event Description: Ramp Down to <75% Power

Cue: When initiated by Team

Time	Position	Applicant's Action or Behavior
	TEAM	<p>0-AP-23.00</p> <p>0-AP-23.00 (RAPID LOAD REDUCTION) Actions</p>
	SRO	<p>The team will hold a transient brief. During the brief the upcoming ramp will be discussed.</p> <p>The RO and BOP will report out critical parameters, as per placard on Main Control Room Bench Board. It is expected that the RO will discuss reactivity parameters associated with the ramp from the pre-planned ramp plans taking in account the conditions presented by the dropped rod.</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>The following reactivity plan will be discussed for a ramp to 75%:</p> <ul style="list-style-type: none"> • Gallons of boric acid required as per plan – 151 gallons • “D” control bank end at 197 steps • Subtracted from the boration will be the equivalent boron added from the dropped rod – 9.9 gallons for each degree of Tave decrease – this should be about 49.5 gallons based on a 5° temp decrease. This will be subtracted from the initial 151 gallons – therefore, approximately 101.5 gallons of boric acid are required.
	SRO	<p>Caution Prior to Step 1:</p> <ul style="list-style-type: none"> • Conservative decision-making must be maintained during rapid load reductions. Refer to Attachment 1 for trip criteria. <p>Notes Prior to Step 1:</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. • For ramp rates greater than or equal to 1%/minute, Rod Control should remain in Automatic if available.

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 4

Page 24 of 80

Event Description: Ramp Down to <75% Power

Cue: When initiated by Team

	RO	0-AP-23.00 1. TURN ON ALL PRZR HEATERS
	BOP	2. INITIATE PLANT LOAD REDUCTION AT 2%/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.
	SRO/BOP	c) Verify or place turbine in IMP IN or IMP OUT as determined by Shift Supervision The SRO can choose IMP IN or IMP OUT.
	BOP	d) Adjust SETTER to desired power level e) Adjust LOAD RATE %/MIN thumbwheel to desired ramp rate (1%/minute) f) Initiate Turbine load reduction using OPERATOR AUTO (pushes the GO button) g) Reduce Turbine Valve Position Limiter as load decreases The BOP will periodically reduce the limiter setpoint during the ramp.
	SRO	3. CHECK EMERGENCY BORATION – REQUIRED The team may decide to emergency borate after the ramp has progressed to the point that Tave and Tref are matched (or close).
	SRO	Note Prior to Step 4: <ul style="list-style-type: none"> Step 4 or Step 5 may be performed repeatedly to maintain Tave and Tref matched, ΔFlux in band, and control rod position above the LO-LO insertion limit.

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 4

Page 25 of 80

Event Description: Ramp Down to <75% Power

Cue: When initiated by Team

	RO	<p>0-AP-23.00</p> <p>4. PERFORM AN EMERGENCY BORATION IAW THE FOLLOWING:</p> <ol 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: <ol 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) and 5 (Manual Makeups) are at the end of this section.</p>
	SRO	<p>Notes Prior to Step 6:</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>
	RO	<p>*7. CHECK LETDOWN ORIFICES – TWO IN SERVICE</p> <p><i>Evaluator note: two orifices will already be in service.</i></p>
	BOP	<p>8. MONITOR STEAM DUMPS FOR PROPER OPERATION</p>

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 4

Page 26 of 80

Event Description: Ramp Down to <75% Power

Cue: When initiated by Team

	SRO	<p>0-AP-23.00</p> <p>9. NOTIFY THE FOLLOWING:</p> <ul style="list-style-type: none"> • Energy Supply (MOC) • Polishing Building • Chemistry • OMOC
	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> <p><i>No further actions are required for this event.</i></p>
	SRO	<p>11. CHECK REACTOR POWER – HAS DECREASED MORE THAN 15% IN ONE HOUR</p> <p>When reactor power has decreased >15%, then chemistry will be notified.</p>
		END EVENT #4

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 4

Page 27 of 80

Event Description: Ramp Down to <75% Power

Cue: When initiated by Team

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

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 4

Page 28 of 80

Event Description: Ramp Down to <75% Power

Cue: When initiated by Team

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

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 5

Page 29 of 80

Event Description: "C" SG Tube Leak ~70 gpm (AP-16.00)

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"> • 1A-A3 - N-16 Alert • 1A-B3 - N-16 High • Air Ejector RM Alert / Failure (~5 minute delay) • SG Blowdown Radiation Monitor Alert/Failure alarm (~2 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	<p>1-AP-16.00</p> <p>Direct initiation of 1-AP-16.00, EXCESSIVE RCS LEAKAGE</p>
	SRO	<p>Notes Prior to Step 1:</p> <ul style="list-style-type: none"> • If SI Accumulators are isolated, 1-AP-16.01, Shutdown LOCA, should be used for guidance. • RCS average temperature has a direct impact on pressurizer level.
	RO	<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 to isolate letdown. The RO will take manual control of 1-CH-FCV-1122 to stabilize pressurizer level.</p>
	SRO	<p>The team will hold a short transient brief which may simply be stated as "A Primary to Secondary Leak is in progress, are there any other higher priorities?" (words to the effect). Team may decide to stop ramp at this time.</p>

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 5

Page 30 of 80

Event Description: "C" SG Tube Leak ~70 gpm (AP-16.00)

Cue: By Examiner.

	RO	<p>1-AP-16.00</p> <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 under the control of the operator. Team should identify RCS leak rate greater than 50 gpm, but less than charging pump capacity. Note: Due to ramp previously in progress and Tave trend, the RCS leakrate will be more difficult to calculate.</p>
	RO	<p>3. PLACE THE FOLLOWING COMPONENTS IN OFF:</p> <ul style="list-style-type: none"> • CTMT sump pumps • CTMT vacuum pumps <p>RO will place the Containment Sump and Vacuum Pumps in OFF.</p>
	SRO	<p>Note Prior to Step 4:</p> <ul style="list-style-type: none"> • Shift Supervision and STA must remain informed of RCS leak rate for EPIP applicability.
	RO	<p>*4. CHECK REACTOR TRIP - REQUIRED</p> <ul style="list-style-type: none"> • Leak rate - GREATER THAN 50 GPM OR • Adequate makeup not being provided by blender <p>RO will identify that the leak rate is greater than 50 gpm. Note: this can be complicated by temperature trend associated with ramp (may take more time).</p>
	RO	<p>5. ALIGN CHG PUMP SUCTION TO RWST</p> <p>a) Open 1-CH-MOV-1115B and 1-CH-MOV-1115D</p> <p>b) Close 1-CH-MOV-1115C and 1-CH-MOV-1115E</p>
	SRO	<p>6. GO TO 1-E-0, REACTOR TRIP OR SAFETY INJECTION</p>
		<p><u>END EVENT #5</u></p>

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 6

Page 31 of 80

Event Description: Entry into 1-E-0 and Generator Output Breaker Failure

Cue: When initiated by Team.

Time	Position	Applicant's Action or Behavior
	RO	<p><u>1-E-0 – Reactor Trip or Safety Injection</u></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 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>d) Verify generator output breakers – OPEN (Time Delayed)</p> <p>Identifies that Output Breakers did NOT open and performs RNO actions...</p> <p>d) RNO - IF Generator Output Breakers do NOT open within 30 seconds, THEN manually open output breakers AND place the EXCITATION control switch in OFF.</p> <p>RO opens both output breakers and places generator excitation switch to OFF then releases.</p>
	RO	[3] VERIFY BOTH AC EMERGENCY BUSES - ENERGIZED

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 7

Page 32 of 80

Event Description: SG Tube Leak increases to SG Tube Rupture

Cue: When initiated by Team.

	<p>RO</p> <p>RO</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>RO will determine that SI has not occurred and perform step 4a RNO actions:</p> <p>4a 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 • High CTMT pressure • High steamline differential pressure • High steam flow with low Tave or low line pressure <p>IF SI is required, THEN GO TO Step 4b.</p> <p>Determines that SI is imminent due to excessive RCS leakage and goes to step 4b.</p> <p>4b) Manually initiate SI</p> <p>The RO will manually initiate SI at step 4 by pushing both SI pushbuttons.</p> <p>After the immediate actions of 1-E-0 are reported as complete, the SRO will check off immediate action steps in his copy of 1-E-0. After the immediate actions are verified, the team will conduct a brief.</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 alarms already received. He will also state that containment conditions and the electrical conditions are as you see them (or as reported by the RO/BOP).</i></p>
--	---------------------	--

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 7

Page 33 of 80

Event Description: SG Tube Leak increases to SG Tube Rupture

Cue: When initiated by Team.

	RO	<p>Diagnose failure of SI-MOV-1867C and D to open based on no Safety Injection flow to the core.</p> <p>Manually open SI-MOV-1867C and D.</p> <p>Critical Task 3: Manually actuate at least one train of SI before RCS subcooling is less than 30 °F. [WOG E-0 –D]</p> <p>NOTE – Diagnosis and actions may occur at anytime after Safety Injection is initiated but must be completed before completion of Attachment 2 of E-0. The team may elect to open 1-SI-MOV-1867C and D at this time or may utilize Attachment 2 (contained in EVENT 8 section).</p>
	SRO	<p>The team will hold a transition brief. During the brief it will be identified that SI was initiated and the SCTL has degraded into a SGTR.</p> <p>If the team has not aligned SI flow, it is expected that the SRO will give attachment 2 to the RO and attachments 1 and 3 to the BOP to perform.</p>
	SRO/BOP	<p>5. Initiate Attachment 1 (<i>Attachment 1, 2, and 3 actions contained under Event 8</i>).</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 at the end of this section.</p>
	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 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

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 7

Page 34 of 80

Event Description: SG Tube Leak increases to SG Tube Rupture

Cue: When initiated by Team.

	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
	SRO RO	<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>
	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>RO will observe a slightly decreasing trend on SG pressures. This will be attributed to the RCS cooldown. The team will not transition to 1-E-2.</p>

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 7

Page 35 of 80

Event Description: SG Tube Leak increases to SG Tube Rupture

Cue: When initiated by Team.

	<p>RO</p> <p>SRO</p>	<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>RO should observe 'C' SG NR level going up uncontrollably.</p> <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 'C' 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>
	RO	<p>BEGIN 1-E-3:</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>

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 7

Page 36 of 80

Event Description: SG Tube Leak increases to SG Tube Rupture

Cue: When initiated by Team.

	SRO	<p>2. IDENTIFY RUPTURED SG(s):</p> <ul style="list-style-type: none">• Unexpected rise in any SG narrow range levelOR• High radiation from any SG MS line monitorOR• High radiation from any SG blowdown lineOR• High radiation from any SG sample <p>Crew should observe 'C' SG NR level going up unexpectedly.</p>
--	-----	--

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 7

Page 37 of 80

Event Description: SG Tube Leak increases to SG Tube Rupture

Cue: When initiated by Team.

	<p>SRO</p> <p>RO/BOP</p>	<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. <p>3. ISOLATE RUPTURED SG(s):</p> <ol style="list-style-type: none"> a) Adjust ruptured SG PORV controller setpoint to 1035 psig b) Check ruptured SG(s) PORV – CLOSED c) Verify blowdown TVs from ruptured SG(s) – CLOSED d) Locally close steam supply valve(s) to TD AFW pump: <ul style="list-style-type: none"> • 1-MS-158 for ‘C’ SG <p><i>If 1-MS-158 not closed iaw attachment 10 of 1-E-0, then a field operator will be dispatched to close it at this time.</i></p> <ol style="list-style-type: none"> e) Close ruptured SG(s) MSTV (C) <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> <p>When the “C” MSTV is CLOSED, the “C” Steam Generator will FAULT. This will be observed by increasing steam flow, steam generator level, and decreasing steam generator pressure. The team will review the CAP for 1-E-3 and perform item #3...</p> <p>CAP ITEM 3 → SECONDARY INTEGRITY CRITERIA</p> <p>GO TO 1-E-2, FAULTED STEAM GENERATOR ISOLATION, if any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, unless needed for RCS cooldown.</p> <p>The team is expected to transition to 1-E-2 to isolate the “C” steam generator</p> <p>1-E-2 actions commence under EVENT #9</p>
--	--------------------------	---

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 7

Page 38 of 80

Event Description: SG Tube Leak increases to SG Tube Rupture

Cue: When initiated by Team.

	RO	<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. If SI is not in progress, then return to procedure step in effect.</p> <p>RO identifies that SI is in progress.</p>
	RO	<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 'C' SG as the ruptured SG</p>
	RO	<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
	RO	<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 C, 1-FW-MOV-151A and 1-FW-MOV-151B <p>RO closes 1-FW-MOV-151A/B when SG level is greater than 12% Narrow Range.</p>
	RO	<p>ATTACHMENT 10 of 1-E-0</p> <p>5. Defeat the auto open signal for the ruptured SG AFW MOVs using the following switches:</p> <ul style="list-style-type: none"> • 1-FW-43-3-AFW-S, H TRAIN DISABLE SELECTOR SWITCH • 1-FW-43-4-AFW-S, J TRAIN DISABLE SELECTOR SWITCH

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 7

Page 39 of 80

Event Description: SG Tube Leak increases to SG Tube Rupture

Cue: When initiated by Team.

	RO	<p>ATTACHMENT 10 of 1-E-0</p> <p>6. Place both of the following key switches in the DISABLE SELECTED position:</p> <ul style="list-style-type: none"> • 1-FW-43-1-AFW-E, H TRAIN AUTO OPEN ENABLE SWITCH • 1-FW-43-2-AFW-E, J TRAIN AUTO OPEN ENABLE SWITCH
	RO	<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-158 <p>RO directs field operator to close 1-MS-158.</p> <p><i>The field operator will acknowledge the requirement to close 1-MS-158. The field operator will later report that 1-MS-158 is closed.</i></p>
	RO	<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 B, 1-FW-MOV-151C and 1-FW-MOV-151D
		End EVENT #7

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 8

Page 40 of 80

Event Description: Failures during 1-E-0 Verification (Attachments 2, 1, and 3)

Cue: Pre-Event Failures.

Time	Position	Applicant's Action or Behavior
	SRO	<p>ATTACHMENT 2 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>NOTE: Components previously aligned by SI termination steps, must not be realigned by this Attachment.</p>
	RO/BOP	<p>ATTACHMENT 2 of 1-E-0</p> <p>1. Verify opened or open CHG pump suction from RWST MOVs.</p> <ul style="list-style-type: none"> • 1-CH-MOV-1115B • 1-CH-MOV-1115D
	RO/BOP	<p>ATTACHMENT 2 of 1-E-0</p> <p>2. Verify closed or close CHG pump suction from VCT MOVs.</p> <ul style="list-style-type: none"> • 1-CH-MOV-1115C • 1-CH-MOV-1115E
	RO/BOP	<p>ATTACHMENT 2 of 1-E-0</p> <p>3. Verify running or start at least two CHG pumps. (listed in preferred order)</p> <ul style="list-style-type: none"> • 1-CH-P-1C • 1-CH-P-1B • 1-CH-P-1A
	RO/BOP	<p>ATTACHMENT 2 of 1-E-0</p> <p>4. Verify opened or open HHSI to cold legs MOVs.</p> <ul style="list-style-type: none"> • 1-SI-MOV-1867C • 1-SI-MOV-1867D <p>RO opens 1-SI-MOV-1867C/D if not previously opened.</p> <p>Critical Task 3: Manually actuate at least one train of SI before RCS subcooling is less than 30 °F. [WOG E-0 –D]</p>
	RO/BOP	<p>ATTACHMENT 2 of 1-E-0</p> <p>5. Verify closed or close CHG line isolation MOVs.</p> <ul style="list-style-type: none"> • 1-CH-MOV-1289A • 1-CH-MOV-1289B

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 8

Page 41 of 80

Event Description: Failures during 1-E-0 Verification (Attachments 2, 1, and 3)

Cue: Pre-Event Failures.

	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 <p>RO/BOP will CLOSE 1-CH-HCV-1200A and 1-CH-HCV-1200B</p>
	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>RO/BOP may START 1-SI-P-1B as part of attachment 2</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

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 8

Page 42 of 80

Event Description: Failures during 1-E-0 Verification (Attachments 2, 1, and 3)

Cue: Pre-Event Failures.

	RO/BOP	ATTACHMENT 2 of 1-E-0 11. IF flow not indicated, THEN manually start pumps and align valves. IF flow NOT established, THEN consult with Shift Supervision to establish another high pressure injection flow path while continuing with this procedure. <ul style="list-style-type: none">• Alternate SI to Cold legs• Hot leg injection
--	--------	---

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 8

Page 43 of 80

Event Description: Failures during 1-E-0 Verification (Attachments 2, 1, and 3)

Cue: Pre-Event Failures.

	BOP	<p>ATTACHMENT 1 OF E-0</p> <p>1. CHECK 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
	BOP	<p>2. CHECK 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>BOP will identify 1-CC-TV-109B, 1-DA-TV-100A/B, and 1-MS-TV-109 OPEN and CLOSE them.</p>
	BOP	<p>3. CHECK AFW PUMPS RUNNING:</p> <ul style="list-style-type: none"> a) MD AFW pumps – RUNNING (Time Delayed) b) TD AFW pump - RUNNING IF NECESSARY

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 8

Page 44 of 80

Event Description: Failures during 1-E-0 Verification (Attachments 2, 1, and 3)

Cue: Pre-Event Failures.

	BOP	<p>Attachment 1 of E-0</p> <p>4. CHECK SI PUMPS RUNNING:</p> <ul style="list-style-type: none"> • CHG pumps – RUNNING • LHSI pumps – RUNNING <p>BOP starts 1-CH-P-1B and 1-SI-P-1B</p> <p>1-SI-P-1B START TIME: _____ (for critical task verification)</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 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>

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 8

Page 45 of 80

Event Description: Failures during 1-E-0 Verification (Attachments 2, 1, and 3)

Cue: Pre-Event Failures.

	BOP	<p>Attachment 1 of E-0</p> <p>*10. BLOCK LOW PRZR PRESS SI SIGNAL:</p> <ol style="list-style-type: none"> a) Check PRZR pressure – LESS THAN 2000 psig b) Turn both LO PRZR PRESS & STM HDR/LINE ΔP switches to block c) Verify Permissive Status light C-2 - LIT <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>Step may not be performed at this time (if Tave is greater than 543°F).</p> <ol style="list-style-type: none"> a) Check RCS Tave - LESS THAN 543°F b) Turn both HI STM FLOW & LO TAVG OR LP switches to block c) Verify Permissive Status light F-1 - LIT
	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 re-performing Step 12. <p>12. CHECK SI FLOW:</p> <ol style="list-style-type: none"> a) HHSI to cold legs - FLOW INDICATED <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 b) Check CHG pumps - THREE RUNNING c) Reset SI. d) Stop one CHG pump and out in AUTO

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 8

Page 46 of 80

Event Description: Failures during 1-E-0 Verification (Attachments 2, 1, and 3)

Cue: Pre-Event Failures.

		<p>Attachment 1 of E-0</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. <p>1-SI-P-1B STOP TIME: _____</p> <ol style="list-style-type: none"> 3) GO TO Step 13. <p>Critical Task: Secure one LHSI pump within 30 minutes of two LHSI pumps in service. [SPS E-1—G]</p>
	BOP	13. CHECK TOTAL AFW FLOW - GREATER THAN 350 GPM [450 GPM]
	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>See attached copy of Attachment 2. (Page 40 of this guide)</p> <p>Depending on timing, this attachment may have already been completed.</p>
	BOP	<p>16. INITIATE VENTILATION, AC POWER, AND SFP STATUS CHECKS IAW ATTACHMENT 3</p> <p><i>Attachment 3 follows on next page</i></p> <p>Identify failure of 1-VS-MOD-103A and 1-VS-MOD-103B to CLOSE and manually CLOSES them.</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>

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 8

Page 47 of 80

Event Description: Failures during 1-E-0 Verification (Attachments 2, 1, and 3)

Cue: Pre-Event Failures.

NUMBER 1-E-0	ATTACHMENT TITLE AUXILIARY VENTILATION, AC POWER, AND SFP STATUS CHECKS	ATTACHMENT 3
REVISION 65		PAGE 1 of 6

1. ___ Check or place REFUEL SFTY MODE switches in NORMAL.
2. ___ Check ventilation alignment IAW Tables 1 and 2.

TABLE 1
UNIT #1 VENTILATION PANEL

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

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 8

Page 48 of 80

Event Description: Failures during 1-E-0 Verification (Attachments 2, 1, and 3)

Cue: Pre-Event Failures.

NUMBER 1-E-0	ATTACHMENT TITLE AUXILIARY VENTILATION, AC POWER, AND SFP STATUS CHECKS	ATTACHMENT 3
REVISION 65		PAGE 2 of 6

TABLE 2
YNTX 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. <u> </u> Check filtered exhaust flow: (as read on FI-VS-117A and FI-VS-117B)		
<input type="checkbox"/> • Total flow - GREATER THAN 32400 cfm		
<u>AND</u>		
<input type="checkbox"/> • Flow through each filter bank - LESS THAN 39600 cfm		

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 8

Page 49 of 80

Event Description: Failures during 1-E-0 Verification (Attachments 2, 1, and 3)

Cue: Pre-Event Failures.

NUMBER 1-E-0	ATTACHMENT TITLE	ATTACHMENT 3
REVISION 65	AUXILIARY VENTILATION, AC POWER, AND SFP STATUS CHECKS	PAGE 3 of 3

4. ___ Check all Station Service Buses - ENERGIZED. IF NOT, THEN initiate 1-AP-10.07, LOSS OF UNIT 1 POWER.
5. ___ Check annunciator VSP-J2 - LIT.
6. ___ Check Unit 1 RSST LTC time delay bypass light - LIT.
7. ___ Check stopped or stop 1-VS-AC-4.
8. ___ Place 1-VS-43-VS103X, MCR ISCLATION switch to the OFF position.
9. ___ Check closed or close MCR isolation dampers.
 - 1-VS-MOD-103A
 - 1-VS-MOD-103B
 - 1-VS-MOD-103C
 - 1-VS-MOD-103D

BOP Operator will CLOSE 1-VS-MOD-103A and 1-VS-MOD-103B

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 8

Page 50 of 80

Event Description: Failures during 1-E-0 Verification (Attachments 2, 1, and 3)

Cue: Pre-Event Failures.

NUMBER 1-E-0	ATTACHMENT TITLE AUXILIARY VENTILATION, AC POWER, AND SFP STATUS CHECKS	ATTACHMENT 3
REVISION 65		PAGE 4 of 6

***** :

CAUTION: • Only one Emergency Supply Fan must be started in the following step.

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

***** :

10. Immediately start ONE Emergency Supply Fan IAW the following: (1-VS-F-41 or 2-VS-F-41 preferred)
 - a. IF 1-VS-F-41, CONT RM EMERG SUP FAN, will be used, THEN perform the following substeps.
 - ___ 1. Open 1-VS-MOD-104A, CONT RM EMERG SUP MOD.
 - ___ 2. Start 1-VS-F-41.
 - b. IF 2-VS-F-41, CONT RM EMERG SUP FAN, will be used, THEN perform the following substeps.
 - ___ 1. Open 2-VS-MOD-204A, CONT RM EMERG SUP MOD.
 - ___ 2. Start 2-VS-F-41.
 - c. IF 1-VS-F-42, CONT RM EMERG SUP FAN, will be used, THEN perform the following substeps.
 - ___ 1. Open 1-VS-MOD-104B, CONT RM EMERG SUP MOD.
 - ___ 2. Start 1-VS-F-42.
 - d. IF 2-VS-F-42, CONT RM EMERG SUP FAN, will be used, THEN perform the following substeps.
 - ___ 1. Open 2-VS-MOD-204B, CONT RM EMERG SUP MOD.
 - ___ 2. Start 2-VS-F-42.
 - e. ___ Adjust Chilled Water flow to MCR AHUs IAW Step 10 Caution.

Unit Two prompt - BOP will be prompted that chilled water flows are as required.

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 8

Page 51 of 80

Event Description: Failures during 1-E-0 Verification (Attachments 2, 1, and 3)

Cue: Pre-Event Failures.

NUMBER 1-E-0	ATTACHMENT TITLE	ATTACHMENT 3
REVISION 65	AUXILIARY VENTILATION, AC POWER, AND SFP STATUS CHECKS	PAGE 5 of 6

11. ___ Check readings on the following Differential Pressure Indicators - POSITIVE PRESSURE INDICATED.
- PDI-VS-100, D.P.-U1CR/U1TB (Unit 2 Turbine Ventilation Panel)
 - PDI-VS-101, D.P.-U1RR/U1TB (Unit 2 Turbine Ventilation Panel)
 - PDI-VS-200, D.P.-U2CR/U2TB (Unit 2 Turbine Ventilation Panel)
 - PDI-VS-201, D.P.-U2RR/U2TB (Unit 2 Turbine Ventilation Panel)
 - 1-VS-PDI-118 (Unit 1 Computer Room)
 - 1-VS-PDI-116 (Near Unit 1 Semi-Vital Bus)
 - 2-VS-PDI-215 (Unit 2 AC Room)
 - 2-VS-PDI-206 (Near Unit 2 Semi-Vital Bus)
12. ___ IF any reading NOT positive, THEN initiate Attachment 6 to secure MCR boundary fans.
13. ___ Check initiated or initiate 0-AP-50.00, OPPOSITE UNIT EMERGENCY.
14. ___ Check the following MCR and ESGR air conditioning equipment operating. IF NOT, THEN start equipment within 1 hour IAW the appropriate subsection of 0-OP-VS-006, CONTROL ROOM AND RELAY ROOM VENTILATION SYSTEM.
- One Control Room chiller
 - One Unit 1 Control Room AHU
 - One Unit 2 Control Room AHU
 - One Unit 1 ESGR AHU
 - One Unit 2 ESGR AHU
15. ___ IF both of the following conditions exist, THEN check that Load Shed is activated.
- Unit 2 - SUPPLIED BY RSST
 - Unit 2 RCPs - RUNNING
16. ___ IF Load Shed is required and not activated, THEN initiate 0-AP-10.10, LOSS OF AUTO LOAD SHED.

Unit Two prompt – BOP will be prompted that DP indicators in step 11 indicate a positive pressure
Unit Two prompt – 0-AP-50.00 has been initiated

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 8

Page 52 of 80

Event Description: Failures during 1-E-0 Verification (Attachments 2, 1, and 3)

Cue: Pre-Event Failures.

NUMBER 1-E-0	ATTACHMENT TITLE	ATTACHMENT 3
REVISION 65	AUXILIARY VENTILATION, AC POWER, AND SFP STATUS CHECKS	PAGE 6 of 6

NOTE: • SFP checks should be initiated WITHIN ONE TO TWO HOURS of EOP entry.

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

17. ___ Initiate monitoring SFP parameters:

- SFP level - Greater than Cooling Pump suction AND Stable
- SFP temperature - Stable or Decreasing
- SFP Cooling Pumps - Either Running
- Component Cooling - Normal

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

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

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

If requested – Unit Two will assume SFP monitoring responsibilities

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 9

Page 55 of 80

Event Description: "C" S/G Fault Response

Cue: When "C" MSTV Closed.

	BOP	<p>1-E-2 Actions</p> <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>Team identifies that 1-MS-158 was previously closed.</p> <p>BOP</p> <ul style="list-style-type: none"> • Close or verify closed SG PORV(s) • Close or verify closed SG blowdown TVs
	BOP	<p>1-E-2 Actions</p> <p>5. CHECK ECST LEVEL - GREATER THAN 20%</p> <p>Observes ECST indicator on vertical board is greater than 20%.</p>
	SRO	<p>1-E-2 Actions</p> <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 evaluate sampling the faulted/ruptured SG.</i></p> <p>b) Initiate periodic activity sampling of INTACT SGs IAW Attachment 1</p>

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 9

Page 56 of 80

Event Description: "C" S/G Fault Response

Cue: When "C" MSTV Closed.

	BOP	<p>1-E-2 Actions</p> <p>6. CHECK SECONDARY RADIATION: (Continued)</p> <p>c) Check unisolated secondary radiation monitors:</p> <ul style="list-style-type: none"> • Main steamline • TD AFW pump exhaust • Condenser air ejector <p>Indications are available on the NRC MS RM for the 'C' SG.</p> <p>d) Secondary Radiation - NORMAL</p> <p>The BOP will report that conditions are NOT NORMAL.</p> <p>d) RNO – GO TO 1-E-3, STEAM GENERATOR TUBE RUPTURE</p> <p>The team will transition to 1-E-3</p>
	SRO	<p>The team will hold a transition brief. During the brief it will be identified that 'C' SG is faulted and ruptured, current isolation status of the faulted/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>
	SRO	Initiate E-3, Ruptured Steam Generator Isolation.
	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>

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 9

Page 57 of 80

Event Description: "C" S/G Fault Response

Cue: When "C" MSTV Closed.

	SRO	<p>1-E-3 Actions</p> <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 'C' as being ruptured and faulted.</p>
	SRO BOP	<p>1-E-3 Actions</p> <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. <p>3. ISOLATE RUPTURED SG(s):</p> <ol style="list-style-type: none"> a) Adjust ruptured SG PORV controller setpoint to 1035 psig b) Check ruptured SG(s) PORV – CLOSED c) Verify blowdown TVs from ruptured SG(s) – CLOSED d) Locally close steam supply valve(s) to TD AFW pump: <ul style="list-style-type: none"> • 1-MS-158 for 'C' SG <p><i>BOP identifies that 1-MS-158 was previously closed.</i></p> e) Close ruptured SG(s) MSTV <p>1-MS-TV-101C was previously closed</p>

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 9

Page 58 of 80

Event Description: "C" S/G Fault Response

Cue: When "C" MSTV Closed.

	BOP	<p>1-E-3 Actions</p> <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> <ul style="list-style-type: none"> a) Narrow range level - GREATER THAN 12% [18%] b) Stop feed flow to ruptured SG(s) c) Verify ruptured SG AFW MOVs auto-open signal – DEFEATED <p><i>Team will maintain AFW flow isolated iaw CAUTION</i></p>
	BOP	<p>1-E-3 Actions</p> <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> <p>The BOP will identify that the ruptured SG pressure is less than 350 psig.</p> <p>5. RNO – GO TO 1-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT – SUBCOOLED RECOVERY DESIRED.</p>
	SRO	<p>The team will hold a transition brief. During the brief it will be identified that 'C' SG is faulted and ruptured, current isolation status of the faulted/ruptured SG and that the team is transitioning to 1-ECA-3.1.</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, containment conditions and the electrical conditions are as you see them.</i></p>
	SRO	Initiate ECA-3.1, SGTR with Loss of Reactor Coolant – Subcooled Recovery.

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 9

Page 59 of 80

Event Description: "C" S/G Fault Response

Cue: When "C" MSTV Closed.

	RO	1-ECA-3.1 Actions 1. RESET BOTH TRAINS OF SI
	RO	1-ECA-3.1 Actions 2. RESET CLS: a) Check CTMT pressure – HAS EXCEEDED 17.7 psia a) RNO – GO TO Step 3
	RO	1-ECA-3.1 Actions 3. VERIFY INSTRUMENT AIR AVAILABLE: 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
	BOP	1-ECA-3.1 Actions *4. VERIFY ALL AC BUSES – ENERGIZED BY OFFSITE POWER
	RO	1-ECA-3.1 Actions Caution: PRZR heaters should not be energized until PRZR level indicates greater than the minimum recommended by STA to verify heaters are covered. 5. DEENERGIZE PRZR HEATERS a) Put all PRZR heater switches in LOCKOUT (Group C in PTL) b) Have STA review Attachment 2 to determine minimum indicated PRZR level that will verify heaters are covered.
		1-ECA-3.1 Actions *6. CHECK IF CS SHOULD BE STOPPED: a) Spray pumps – ANY RUNNING a) RNO – GO TO Step 8

Op-Test No.: Surry 2012-1

Scenario No.: 1

Event No.: 9

Page 60 of 80

Event Description: "C" S/G Fault Response

Cue: When "C" MSTV Closed.

		<p>1-ECA-3.1 Actions</p> <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>*8. CHECK RUPTURED SG LEVEL:</p> <p>a) Narrow range level – GREATER THAN 12% [18%]</p> <p>a) RNO - Maintain feed flow to ruptured SG until level greater than 12% [18%]. GO TO Step 9. WHEN ruptured SG level greater than 12% [18%], THEN stop feed flow to ruptured SG(s).</p> <p>Recalls from the Note above that feed flow to the faulted ruptured SG will remain isolated. Goes to Step 9.</p>
		<p>1-ECA-3.1 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>*9. CHECK IF LHSI PUMPS SHOULD BE STOPPED:</p> <p>a) Check LHSI pumps – ANY RUNNING WITH SUCTION ALIGNED TO RWST.</p> <p>b) Check RCS Pressure:</p> <ul style="list-style-type: none"> • Pressure – GREATER THAN 250 PSIG [400PSIG] • Pressure – STABLE OR INCREASING <p>c) Stop LHSI pumps and place in AUTO</p>
		<p>End of Event 8 – Ends upon ENTERING 1-ECA-3.1 or lead evaluator's cue.</p> <p>End of Scenario 1</p>

FOLDOUT PAGES FOR REFERENCED PROCEDURES

NUMBER 1-E-0	CONTINUOUS ACTIONS PAGE	REVISION 65
-----------------	-------------------------	----------------

1. RCP TRIP CRITERIA

Trip all RCPs if BOTH conditions listed below occur:

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

2. MINIFLOW RECIRC CRITERIA

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

3. ADVERSE CONTAINMENT CRITERIA

Use Adverse Containment setpoints if EITHER condition listed below occurs:

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

4. COLD LEG RECIRCULATION SWITCHOVER CRITERIA

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

1. AMSAC RESET CRITERIA

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

2. TD AFW PUMP SHUTDOWN CRITERIA

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

3. MANUAL SI ALIGNMENT

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

4. * TRANSIENT AFW FLOW CONTROL (IF SI in progress)

Attachment 8 may be used for guidance on transient AFW flow control.

5. * FAULTED SG ISOLATION AND AFW FLOW CONTROL (IF SI in progress)

Attachment 9 may be used for guidance on faulted SG(s) isolation and AFW flow control.

6. * RUPTURED SG ISOLATION AND AFW FLOW CONTROL (IF SI in progress)

Attachment 10 may be used for guidance on ruptured SG(s) isolation and AFW flow control.

7. * LOSS OF RCP SUPPORT CONDITIONS

Trip RCPs if a loss of a support condition occurs. (for example, loss of CC)

* Preemptive Actions

FOLDOUT PAGES FOR REFERENCED PROCEDURES

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

Manually operate SI pumps and align valves as necessary if EITHER condition listed below occurs:

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

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

2. ADVERSE CONTAINMENT CRITERIA

Use Adverse Containment setpoints if EITHER condition listed below occurs:

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

3. SECONDARY INTEGRITY CRITERIA

GO TO 1-E-2, FAULTED STEAM GENERATOR ISOLATION, if any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, unless needed for RCS cooldown.

4. AFW SUPPLY SWITCHOVER CRITERIA (Refer to Attachment 9)

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

- a. 1-CN-TK-2, using 1-CN-150.
- b. 1-CN-TK-3, using AFW Booster Pumps.
- c. AFW Crosstie.
- d. Firemain.

5. MULTIPLE TUBE RUPTURE CRITERIA

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

6. AMSAC RESET CRITERIA

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

7. TD AFW PUMP SHUTDOWN CRITERIA

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

FOLDOUT PAGES FOR REFERENCED PROCEDURES

CONTINUOUS ACTIONS PAGE FOR 1-ECA-3.11. SI REINITIATION CRITERIA

Following SI termination or SI flow reduction, manually start SI pumps as necessary if EITHER condition listed below occurs:

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

2. ADVERSE CONTAINMENT CRITERIA

Use Adverse Containment setpoints if EITHER condition listed below occurs:

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

3. SECONDARY INTEGRITY CRITERIA

GO TO 1-E-2, FAULTED STEAM GENERATOR ISOLATION, if any SG pressure is decreasing in an uncontrolled manner or has completely depressurized, and has not been isolated, unless needed for RCS cooldown.

4. COLD LEG RECIRCULATION SWITCHOVER CRITERIA

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

5. AFW SUPPLY SWITCHOVER CRITERIA (Refer to Attachment 13)

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

- a. 1-CN-TK-2, using 1-CN-150.
- b. 1-CN-TK-3, using AFW Booster Pumps.
- c. AFW Crosstie.
- d. Firemain.

6. RCP START CRITERIA

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

Op-Test No.: Surry 2012-1

Scenario No.: 1

Page 64 of 80

SIMULATOR OPERATOR'S GUIDE

Simulator Setup

Initial Conditions:

Recall IC -261 and implement TRIGGER #30 to activate all passive malfunctions and verify Trigger #30 implemented.

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

- asp_ao_off
- MS_158
- FW_88
- cp_local_reset

Enter the following MALFUNCTIONS:

Malfunction	Delay	Ramp	Trigger	Value	Final	Trigger Type (Auto or Manual)
MS0805 - SG C STM FLOW TRNSMTR MS-FT-494 FAILURE	10	0	1	N/A	1	MAN
RD1213 - DROPPED RCCA, G-7	10		3	N/A	N/A	MAN
RC2403 - STEAM GENERATOR C TUBE RUPTURE	10	60	5	0	8	MAN
GM0701 - MAIN GENERATOR BKR OCB-G102 AUTOTRIPS DEFEATED	0	N/A	5	N/A	N/A	MAN
GM0702 - MAIN GENERATOR BKR OCB-G1T240 AUTOTRIPS DEFEATED	0	N/A	5	N/A	N/A	MAN
SI34 - DISABLE SI-MOV-867C AUTO OPEN	0	N/A	5	N/A	N/A	MAN
SI35 - DISABLE SI-MOV-867D AUTO OPEN	0	N/A	5	N/A	N/A	MAN
MS0403 - 'C' MAIN STM LINE RUPTURE BEFORE TRIP VV	10	60	7	0	50	AUTO
SI2409 - SI RELAY CI1A FAILS TO ACTUATE	0	0	30	N/A	N/A	PREEVENT
SI2504 - SI RELAY SI4B FAILS TO ACTUATE	0	0	30	N/A	N/A	PREEVENT
SI2505 - SI RELAY SI5B FAILS TO ACTUATE	0	0	30	N/A	N/A	PREEVENT

Op-Test No.: Surry 2012-1

Scenario No.: 1

Page 65 of 80

SIMULATOR OPERATOR'S GUIDE

Enter the following EVENT TRIGGERS:

Event #	EVENT	Command
7	MS3	N/A
12	RD3	set mrc24_deg(3) = 0.5

Enter the following Remote Functions:

Override	Set Condition	Trigger
ED15H3_BKRPOS	RACK_OUT	30
EDG1_ECC_ALS	LOCAL	30

Enter the following Lamp Override:

Override	Set Condition	Trigger
EDG1_SPD_ADJ_R	OFF	30

TRIGGER	TYPE	DESCRIPTION
1	MAN	Fails 1-MS-FT-1494 HIGH
3	MAN	Drop control rod G-7 (SBB)
5	MAN	SGTL "C" S/G
7	AUTO	Fault "C" S/G when "C" MSTV closed
12	AUTO	Increase "C" SGTL to SGTR when reactor tripped

Op-Test No.: Surry 2012-1

Scenario No.: 1

Page 66 of 80

SIMULATOR OPERATOR'S GUIDE

Verify the following control room setup:

- Place the simulator in RUN and verify normal 97.3% power operation indications.
- Reset the ROD CONTROL SYSTEM
- Place 15H3 in PTL and place #1 EDG AUTO/EXERCISE switch to EXERCISE**
- Verify Red Magnets on the following components:

#1 EDG	Protected Magnet on #3 EDG	
--------	----------------------------	--

- Verify 1-RM-RI-112 aligned to A/B SG and 1-RM-RI-113 aligned to C SG (magnets).
- Verify Ovation System operating.
- Reset ICCMs.
- Verify Component Switch Flags.
- Verify Brass Caps properly placed.
- Verify SG PORVs set for 1035 psig.
- Remove U9105R from scan**
- Verify Rod Control Group Step Counters indicate properly.
- Verify Ovation CRT display.
- Advance Charts
- Verify Turbine Thumb Wheel Settings @120 rpm/min and Position 6
- Verify Containment Instrument Air Compressors are on Inside Suction (all RMs reset)
- Verify all ARPs have been cleaned
- Verify CLEAN copies of the following procedures are in place:

<input type="checkbox"/> AP-53.00	<input type="checkbox"/> AP-1.00	<input type="checkbox"/> AP-23.00	<input type="checkbox"/> AP-16.00
<input type="checkbox"/> E-0	<input type="checkbox"/> E-2	<input type="checkbox"/> E-3 (2)	<input type="checkbox"/> ECA-3.1
<input type="checkbox"/> OP-CH-007		<input type="checkbox"/> Reactivity Sheet	
<input type="checkbox"/> OP-ZZ-002		<input type="checkbox"/> 1-OP-CN-001	

- Verify Reactivity Placard is current.**
- Verify ALL PINK MAGNETS are accounted for.

SIMULATOR OPERATOR'S GUIDE**Brief**

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

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

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

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

Assign operating positions.

Ask for and answer questions.

SIMULATOR OPERATOR'S GUIDE

Conduct shift turnover:

The initial conditions have Unit 1 is at 99.7% power with RCS boron concentration of 740 ppm.

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

All systems and crossties are operable with the following exception:

- #1 EDG is tagged out for a major overhaul. Four days remain in the seven-day Technical Specification 3.16 clock. The EDG is expected to be returned to service in approximately two days. Two independent off-site power sources were verified 2 hours ago as per Tech Spec 3.16.B.1.a., and 11 days remain on the AFW crosstie clock iaw Tech Spec 3.6.I.3.

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

Shift orders are to maintain 100% power on Unit #1 and upon relieving the watch, place 1-CN-P-1A in service and secure 1-CN-P-1B in accordance with 1-OP-CN-001 (Condensate System Operations) to support tagout later this shift. Performance of 1-OP-CN-001 has been authorized and has been PSA analyzed for current plant conditions.

The last shift performed one 30 gallon dilution and allowed power to drift to below 99.8% to support condensate pump swap. Previous to this, shifts had been performing three 30 gallon dilutions.

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

SIMULATOR OPERATOR'S GUIDE

Session Conduct:

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

EVENT 1 Swap Condensate Pumps

BOOTH:

30 minutes prior to the beginning of the scenario, provide the team with a copy of 1-OP-CN-001, Condensate System Operations. The team will pre-brief the OP prior to entering the simulator.

If annunciator 1H-F3 (CN POLISHING SYS TRBL) alarms and MCR calls to clear, then set cp_local_reset to TRUE on monitor screen.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the completion of the evolution.

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

- 5.4.1 (TB1) Seal Water is aligned, BC flow is indicated to pump and motor, and oil levels are mid-range in sightglasses.
- 5.4.3
 - (TB1) All personnel are clear of the pump
 - (SBI) all personnel clear of switchgear room
- 5.4.4 (TB1) Pump discharge pressure is 600 psig, and LI-CN-103 level is stable
- 5.4.7 (TB1) Report 1-CN-34 CLOSED after 90 seconds (NO simulator actions required)
- 5.4.8 (TB1) Report 1-CN-46 OPEN after 90 seconds (NO simulator actions required)
- 5.4.9 (TB1) Report 1-CN-41 CLOSED after 90 seconds (NO simulator actions required)
- 5.4.10 (TB1) Report 1-CN-29 OPEN after 90 seconds (NO simulator actions required)
- TB1 will report no abnormal indications with either 1-CN-P-1A or 1-CN-P-1B.
- TB1 will report FWH levels as indicated utilizing booth PCS

Role play as other individuals as needed.

Op-Test No.: Surry 2012-1

Scenario No.: 1

Page 70 of 80

SIMULATOR OPERATOR'S GUIDE

EVENT 2 **Selected Steam Flow Channel Fails High on 'C' SG**When cued by examiner, implement Trigger #1.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the failure of 1-MS-FT-1494. The individual(s) contacted will also acknowledge any TS LCOs and entry into AP-53.00.
- **If contacted**, will recommend to the team that channels remain as they are for now (i.e., do not perform 1-OP-RP-001 at this time).
- **If contacted**, will take responsibility for writing the CR.

STA:

- **If contacted**, will acknowledge the failure of 1-MS-FT-1494. The individual(s) contacted will also acknowledge (but not confirm/deny) any TS LCOs.
- **If asked**, the STA will report that 1-MS-FT-1494 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 feed 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 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 no issues at the MFRVs.

Maintenance/Work Week Coordinator:

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

SIMULATOR OPERATOR'S GUIDE

Unit 2 Operator:

- If it appears that the SRO/RO will take action to perform 1-OPT-RX-007, the Unit 2 Operator will state that he will have the fourth RO perform 1-OPT-RX-007.

Role play as other individuals as needed.

SIMULATOR OPERATOR'S GUIDE

EVENT 3 **Control Rod G-7 drops into the core.****Get Unit Two to call BOP prior to initiating TRIGGER for a peer check.**

When cued by examiner, implement Trigger #3.

Operations Supervisor/Management:

- **If contacted**, will acknowledge that Control Rod G-7 dropped into the core. The individual(s) contacted will also acknowledge any TS LCOs.
- **If contacted**, will take responsibility for writing the CR.
- **If contacted**, will acknowledge entry into AP-1.00 and subsequent entry into AP-23.00 to ramp the unit to less than 75% power.

STA:

- **If contacted**, will acknowledge that Control Rod G-7 dropped into the core. The individual(s) contacted will also acknowledge any TS LCOs. The STA will not confirm or deny any TS decisions.
- **If contacted**, will take responsibility for writing the CR.
- **If asked**, the STA will perform a shutdown margin calculation.
- **If asked**, the STA will perform a QPTR.
- **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 failed AE RM. He will also state that containment conditions and the electrical conditions are as you see them.

Field Operators:

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

I&C:

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

Op-Test No.: Surry 2012-1**Scenario No.: 1****Page 73 of 80****SIMULATOR OPERATOR'S GUIDE**

Maintenance/ Work Week Coordinator:

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

Unit 2:

- **If contacted**, will acknowledge that Control Rod G-7 dropped into the core.

Role-play as other individuals as needed.

SIMULATOR OPERATOR'S GUIDE

EVENT 4 **Unit Ramp due to Technical Specification Requirement.**

Operations Supervisor/Management:

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

STA:

- **If contacted**, will acknowledge the dropped rod and the need to ramp at 1%/minute to 70 - 74% power.
- **If asked**, the STA will acknowledge the need to borate and use rods (will acknowledge the team review of pre-planned reactivity plans and OP-RX-010, if performed). If asked to perform the OP-RX-010 review, the STA will state that he is not able to at this time.
- **After directed**, the STA will report that he has reviewed VPAP-2802 and no notifications were required.
- **If contacted**, will take responsibility for writing the CR.
- **If the team has a transient brief:** The STA will 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 AE RM. He will also state that containment conditions and the electrical conditions are as you see them.

Maintenance/ Work Week Coordinator:

- **If contacted**, will acknowledge the failure and commence investigations.
- **If contacted**, will acknowledge the requirements to reduce reactor power.

Op-Test No.: Surry 2012-1**Scenario No.: 1****Page 75 of 80****SIMULATOR OPERATOR'S GUIDE**

Field Operators:

- **If contacted**, the condensate polishing building operator will acknowledge the need to ramp the unit.
- **If asked**, the condensate polishing building operator will report current polishing building DP (read from simulator screen).

Unit 2:

- **If contacted**, will acknowledge the dropped rod and the need to ramp at 1%/minute to 70 - 74% power.

Role-play as other individuals as needed.

SIMULATOR OPERATOR'S GUIDE

EVENT 5 **AP-16.00, Primary to Secondary leakage 70 gpm.**

Note: It would be preferable to wait until power is <80% to implement this failure to allow for ramp stabilization prior to creating RCS leak to allow the team to assess leakrate with more precision.

When cued by examiner, implement Trigger #5.

Operations Supervisor/Management:

- **If contacted**, will acknowledge RCS leakage into the 'C' SG. Will also acknowledge any TS information (time permitting) and information related to radiation monitors alarming.
- **If contacted**, will take responsibility for writing the CR.
- **If contacted**, will acknowledge entry into AP-16.00.

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.

Op-Test No.: Surry 2012-1

Scenario No.: 1

Page 77 of 80

SIMULATOR OPERATOR'S GUIDE

STA:

- **If contacted**, will acknowledge the RCS leakage into the 'C' SG.
- **If asked** to calculate the RCS leak rate, state that it is difficult to ascertain at this time, but you will continue to monitor as time permits.
- **If contacted**, will take responsibility for writing the WR and CR.
- **If the team has a transient brief:** The STA will state that 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.

Health Physics:

- **If contacted**, will acknowledge "C" SGTL.

Role play as other individuals as needed.

SIMULATOR OPERATOR'S GUIDE

EVENTS 6 & 7 **Reactor Trip and SGTR.****When the reactor trip breakers open, the SGTL will grow into a SGTR by AUTO TRIGGER**

Operations Supervisor/Management:

- **If contacted**, will take responsibility for writing the WR and CR.
- **If contacted**, will acknowledge entry into 1-E-0, 1-E-3.
- **If contacted**, will acknowledge the SGTR on "C" SG.
- **If contacted**, will acknowledge the isolation of 'C' SG (if informed).

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 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.

Unit Two:

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

Field Operators:

- **If contacted**, field operators will perform valve manipulations as required:
 - 1-MS-158 – set ms_158 to zero upon request
 - 1-FW-88 – set fw_88 to zero upon request

Op-Test No.: Surry 2012-1

Scenario No.: 1

Page 79 of 80

SIMULATOR OPERATOR'S GUIDE

Maintenance/Work Week Coordinator:

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

HP:

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

STA:

- **If asked**, will report that he will calculate the time to 'C' 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").
- **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. Radiological conditions are as indicated. He will also state that containment conditions and the electrical conditions are as you see them.

Maintenance/Work Week Coordinator:

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

Health Physics:

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

Role play as other individuals as needed.

SIMULATOR OPERATOR'S GUIDE

EVENT 8/9 E-0 Failures and Ruptured SG Becomes Faulted

When the team closes the "C" MSTV in 1-E-3, the "C" steam generator will FAULT by AUTO TRIGGER.

NOTE: 3 minutes after the steam fault – call as security and report steam coming from the louvers for unit 1 safeguards.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the reactor trip and failure of 1-SI-MOV-1867C/D to OPEN automatically.
- **If contacted**, will acknowledge the subsequent fault on the previously identified ruptured SG. Will also acknowledge any TS information (time permitting) and information related to radiation monitors alarming.
- **If contacted**, will take responsibility for writing the WR and CR.
- **If asked**, the TSC will evaluate sampling of the faulted/ruptured SG.

Unit 2 Operator:

- **When** radiation alarms sound on the radiation alarm panel, silence the alarms when directed and report the alarm to the Unit 1 SRO.
- **If directed** perform the associated RM ARP without leaving the confines of the Unit 2 control area. If actions or verifications are required on the Unit 1 side, inform the Unit 1 SRO of the need for an operator to complete the ARP.

Field Operators:

- **If directed**, field operators will perform local manipulations (1-FW-88).

Role play as other individuals as needed.

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

Facility: SPS Scenario No.: 4 Op-Test No.: 2012-001Examiners: _____ Operators: _____

Initial Conditions: Time in Core Life – Middle of Life; Core Cycle – Cycle 25

Unit 1 is at 5% power and the team has been directed to place the turbine on line and stabilize power at 30%. The control room instrumentation channels are selected to channel III. All systems and crossties are operable.

Turnover: Upon relieving the watch, utilize 1-GOP-1.5 (Unit Startup, 2% Reactor Power to Max Allowable Power) and 1-OP-TM-001 (Turbine – Generator Startup to 20% - 25% Turbine Power) to place the turbine on line and stabilize power at 30%. The team will enter 1-GOP-1.5 at Step 5.3.15 and 1-OP-TM-001 at section 5.7. The performance of this procedure has been analyzed based on the current plant configurations and the PSA indicates green.

Event No.	Malf. No.	Event Type*	Event Description
1	CV0102	TS – SRO	1-LM-PT-100B (Containment Pressure Protection) fails HIGH
2	N/A	R – SRO/RO N-BOP/SRO	Raise reactor power/place Unit on-line/ramp-up (GOP-1.5/OP-TM-001)
3	CH2102	I – RO/SRO	1-CH-LT-1115 (VCT Level Transmitter) fails low (AP-53.00)
4	EL0801	C -BOP/SRO	1G Screenwell Transformer Fails (AP-12.01)
5	FW1303	I-BOP/SRO TS-SRO	1-FW-LT-1476 - “A” SG NR Chan III fails low (AP-53.00)
6	PG0101 PG0202	C – RO/SRO	1-PG-P-1A (‘A’ Primary Grade Water Pump) will trip and 1-PG-P-1B will not automatically start.
7	MS02 MS0401/ 0402/0403 O/R TVMS101 B_Close OFF	M-ALL C-RO/SRO	Small steam leak 1-FW-P-2 steam line/reactor trip/steam break escalates (E-0/E-2) [CT –1/2] “B” MSTV will not close
8	CH59/60/ 61	C-BOP/SRO	Various Phase I TVs fail to CLOSE: <ul style="list-style-type: none"> • 1-CH-MOV-1381 • 1-CH-TV-1204A/B

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

Event 1: 1-LM-PT-100B (Containment Pressure Protection) fails HIGH (TS – SRO)

Containment Pressure Protection Channel II fails high (1-LM-PT-100B). The SRO should enter 0-AP-53.00 (Loss of Vital Instrumentation / Controls) and review technical specifications for the failed channel.

Technical Specifications:

- Table 3.7-2, 1.b and 2.b – Operator action 17
- Table 3.7-3, 1.b, 1.c, and 2.b – Operator action 17

Event 2: Raise reactor power/place Unit on-line/ramp-up (R- SRO & RO / N-BOP/SRO)

The team will be directed to raise power, place the turbine on line and stabilize power at 30%. Team will brief on the evolution prior to turnover. The RO will manipulate rods and boron concentration in order to raise reactor power while the BOP operator adjusts steam demand and places the unit on line (i.e., connect the generator to the grid).

Verifiable Actions: (RO) Manipulation of controls for dilution and control rods to control Tave and delta flux.
(BOP) Manipulation of controls for generator exciter, generator output breakers, and turbine for power increase.

Event 3: 1-CH-LT-1115 (VCT Level Transmitter) fails low (AP-53.00) (I-RO/SRO)

VCT level channel 1-CH-LT-1115 fails LOW causing a VCT low level alarm and causing the blender control system to commence an automatic makeup. Actual VCT level will increase until the blender is secured. The SRO should also refer to Attachment 6 of 0-AP-53.00 (Loss of Vital Instrumentation / Controls) and inform the RO that Manual control of the blender will be required.

Verifiable Actions: (RO) Manipulation of blender control to stop makeup.

CEP-99-0029 (RG 1.97 variables):

- STA will identify CH-LT-1115A as D-29 variable, CH-LT-1112 monitoring available, no further actions required.

Event 4: 1G Screenwell Transformer Fails (AP-12.01) C – BOP/SRO

The 1G Transformer will experience a fault which will cause the 1G 4160 Volt bus to de-energize. Since 1G bus will not be faulted, the crosstie breaker connecting the 1G and 2G busses will automatically close. The SRO should enter 0-AP-12.01 (Loss of Intake Canal Level) and direct the RO to reduce Circulating Water (CW) flow through the main condenser to conserve intake canal level. The SRO will also direct the BOP to start the CW pumps that tripped due to the failure of the 2G transformer

Verifiable Actions: (RO) Manipulation of controls for condenser outlet CW valves to affect canal level.
(BOP) Manipulation of PCS control to remotely start tripped CW pumps.

Event 5: 1-FW-LT-1476 - "A" SG NR Chan III fails low (AP-53.00) (I-BOP/SRO & TS-SRO)

The 'A' SG controlling level channel (1-FW-LI-1476) fails low, causing actual SG level to increase. 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.

Verifiable Actions: (BOP) Manual control of "A" FRV.

Technical Specifications:

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

Event 6 Loss of operating PG pump and failure of backup pump to start (C-RO/SRO)

1-PG-P-1A will trip and 1-PG-P-1B will not automatically start. This will result in low PG pressure and a loss of make-up to the containment instrument air compressors. The RO will start 1-PG-P-1B in accordance with an ARP.

Verifiable Actions: (RO) Starts 1-PG-P-1B.

Event 7: Small steam leak 1-FW-P-2 steam line/reactor trip/steam break escalates [CT -1/2] (M-ALL)

The steam supply line to 1-FW-P-2 (Turbine Driven Auxiliary Feedwater Pump) will fail resulting in an increase in steam flow from all three steam generators. The SRO should direct a reactor trip and the performance of 1-E-0 immediate actions.

The team will transition from 1-E-0 to 1-E-2 to 1-ECA-2.1 (incidental entry and subsequent exit from FR-H.1 is a procedurally controlled transition, but there are no actions associated with this transition). During 1-E-2 (step 2), the "B" MSTV will not close from the benchboard and the team will perform RNO actions and close the "B" Main Steam NRV.

Verifiable Actions: (RO) Immediate Action Steps of E-0.
(BOP) Throttle of AFW to a minimum of 60 gpm to each SG.

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

Actions required to accomplish the critical task:

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

Critical Task: Maintain a minimum of 60 gpm AFW flow to each steam generator with a narrow range less than 12% PRIOR to wide range steam generator level reaching 7%.

Actions required to accomplish the critical task:

- Throttle AFW to each SG to a minimum of 60 gpm and maintain >60 gpm while narrow range level is <12%.

Event 8: **Various Phase I TVs fail to re-position** (C – BOP/SRO)

During performance of E-0, Attachments 1 through 3, The BOP will identify and positions various valves.

- Verifiable Actions: (BOP) Close:
- 1-CH-MOV-1381
 - 1-CH-TV-1204A/B

Scenario will end after the team has reduced AFW flow iaw ECA-2.1, or upon lead evaluator's cue

Facility: SPS Scenario No.: 4 Op-Test No.: 2012-001

Examiners: _____ Operators: _____

Initial Conditions: Time in Core Life – Middle of Life; Core Cycle – Cycle 25

Unit 1 is at 5% power and the team has been directed to place the turbine on line and stabilize power at 30%. The control room instrumentation channels are selected to channel III. All systems and crossties are operable.

Turnover: Upon relieving the watch, utilize 1-GOP-1.5 (Unit Startup, 2% Reactor Power to Max Allowable Power) and 1-OP-TM-001 (Turbine – Generator Startup to 20% - 25% Turbine Power) to place the turbine on line and stabilize power at 30%. The team will enter 1-GOP-1.5 at Step 5.3.15 and 1-OP-TM-001 at section 5.7. The performance of this procedure has been analyzed based on the current plant configurations and the PSA indicates green.

Event No.	Malf. No.	Event Type*	Event Description
1	CV0102	TS – SRO	1-LM-PT-100B (Containment Pressure Protection) fails HIGH
2	N/A	R – SRO/RO N-BOP/SRO	Raise reactor power/place Unit on-line/ramp-up (GOP-1.5/OP-TM-001)
3	CH2102	I – RO/SRO	1-CH-LT-1115 (VCT Level Transmitter) fails low (AP-53.00)
4	EL0801	C -BOP/SRO	1G Screenwell Transformer Fails (AP-12.01)
5	FW1303	I-BOP/SRO TS-SRO	1-FW-LT-1476 - "A" SG NR Chan III fails low (AP-53.00)
6	PG0101 PG0202	C – RO/SRO	1-PG-P-1A ('A' Primary Grade Water Pump) will trip and 1-PG-P-1B will not automatically start.
7	MS02 MS0401/ 0402/0403 O/R TVMS101 B_Close OFF	M-ALL C-RO/SRO	Small steam leak 1-FW-P-2 steam line/reactor trip/steam break escalates (E-0/E-2) [CT –1/2] "B" MSTV will not close
8	CH59/60/ 61	C-BOP/SRO	Various Phase I TVs fail to CLOSE: <ul style="list-style-type: none"> • 1-CH-MOV-1381 • 1-CH-TV-1204A/B

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

Event 1: 1-LM-PT-100B (Containment Pressure Protection) fails HIGH (TS - SRO)

Containment Pressure Protection Channel II fails high (1-LM-PT-100B). The SRO should enter 0-AP-53.00 (Loss of Vital Instrumentation / Controls) and review technical specifications for the failed channel.

Technical Specifications:

- Table 3.7-2, 1.b and 2.b – Operator action 17
- Table 3.7-3, 1.b, 1.c, and 2.b – Operator action 17

Event 2: Raise reactor power/place Unit on-line/ramp-up (R- SRO & RO / N-BOP/SRO)

The team will be directed to raise power, place the turbine on line and stabilize power at 30%. Team will brief on the evolution prior to turnover. The RO will manipulate rods and boron concentration in order to raise reactor power while the BOP operator adjusts steam demand and places the unit on line (i.e., connect the generator to the grid).

Verifiable Actions: (RO) Manipulation of controls for dilution and control rods to control Tave and delta flux.
(BOP) Manipulation of controls for generator exciter, generator output breakers, and turbine for power increase.

Event 3: 1-CH-LT-1115 (VCT Level Transmitter) fails low (AP-53.00) (I-RO/SRO)

VCT level channel 1-CH-LT-1115 fails LOW causing a VCT low level alarm and causing the blender control system to commence an automatic makeup. Actual VCT level will increase until the blender is secured. The SRO should also refer to Attachment 6 of 0-AP-53.00 (Loss of Vital Instrumentation / Controls) and inform the RO that Manual control of the blender will be required.

Verifiable Actions: (RO) Manipulation of blender control to stop makeup.

CEP-99-0029 (RG 1.97 variables):

- STA will identify CH-LT-1115A as D-29 variable, CH-LT-1112 monitoring available, no further actions required.

Event 4: 1G Screenwell Transformer Fails (AP-12.01) C - BOP/SRO

The 1G Transformer will experience a fault which will cause the 1G 4160 Volt bus to de-energize. Since 1G bus will not be faulted, the crosstie breaker connecting the 1G and 2G busses will automatically close. The SRO should enter 0-AP-12.01 (Loss of Intake Canal Level) and direct the RO to reduce Circulating Water (CW) flow through the main condenser to conserve intake canal level. The SRO will also direct the BOP to start the CW pumps that tripped due to the failure of the 2G transformer

Verifiable Actions: (RO) Manipulation of controls for condenser outlet CW valves to affect canal level.
(BOP) Manipulation of PCS control to remotely start tripped CW pumps.

Event 5: 1-FW-LT-1476 - "A" SG NR Chan III fails low (AP-53.00) (I-BOP/SRO & TS-SRO)

The 'A' SG controlling level channel (1-FW-LI-1476) fails low, causing actual SG level to increase. 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.

Verifiable Actions: (BOP) Manual control of "A" FRV.

Technical Specifications:

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

Event 6 Loss of operating PG pump and failure of backup pump to start (C-RO/SRO)

1-PG-P-1A will trip and 1-PG-P-1B will not automatically start. This will result in low PG pressure and a loss of make-up to the containment instrument air compressors. The RO will start 1-PG-P-1B in accordance with an ARP.

Verifiable Actions: (RO) Starts 1-PG-P-1B.

Event 7: Small steam leak 1-FW-P-2 steam line/reactor trip/steam break escalates [CT -1/2] (M-ALL)

The steam supply line to 1-FW-P-2 (Turbine Driven Auxiliary Feedwater Pump) will fail resulting in an increase in steam flow from all three steam generators. The SRO should direct a reactor trip and the performance of 1-E-0 immediate actions.

The team will transition from 1-E-0 to 1-E-2 to 1-ECA-2.1 (incidental entry and subsequent exit from FR-H.1 is a procedurally controlled transition, but there are no actions associated with this transition). During 1-E-2 (step 2), the "B" MSTV will not close from the benchboard and the team will perform RNO actions and close the "B" Main Steam NRV.

Verifiable Actions: (RO) Immediate Action Steps of E-0.
(BOP) Throttle of AFW to a minimum of 60 gpm to each SG.

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

Actions required to accomplish the critical task:

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

Critical Task: Maintain a minimum of 60 gpm AFW flow to each steam generator with a narrow range less than 12% PRIOR to wide range steam generator level reaching 7%.

Actions required to accomplish the critical task:

- Throttle AFW to each SG to a minimum of 60 gpm and maintain >60 gpm while narrow range level is <12%.

Event 8: Various Phase I TVs fail to re-position (C – BOP/SRO)

During performance of E-0, Attachments 1 through 3, The BOP will identify and positions various valves.

Verifiable Actions: (BOP) Close:

- 1-CH-MOV-1381
- 1-CH-TV-1204A/B

Scenario will end after the team has reduced AFW flow iaw ECA-2.1, or upon lead evaluator's cue

Initial Conditions: 5%, MOL – Cycle 25. A reactor start-up is in progress from an extended (>30 day) forced outage.

Pre-load malfunctions:

- Auto close failure of 1-CH-MOV-1381 & 1-CH-TV-1204A/B

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

- Unit is stable at 5% with start-up in progress
- 1-GOP-1.5 is complete up to step 5.3.15 and 1-OP-TM-001 up to section 5.7

Turnover: After relieving the watch, continue unit 1 start-up to place unit 1 on line and increase power to 30% and stabilize.

Event	Malf. #'s	Severity	Instructor Notes and Required Feedback
1	CV0102	1 (high)	1-LM-PT-100B (Containment Pressure Protection) fails HIGH
2	N/A	N/A	Raise reactor power/place Unit on-line/ramp-up (GOP-2.5/OP-TM-001)
3	CH2102	-1 (Low)	1-CH-LT-1115 (VCT Level Transmitter) fails low (AP-53.00)
4	EL0801	N/A	1G Screenwell Transformer Fails (AP-12.01)
5	FW1303	-1 (Low)	1-FW-LT-1476 - "A" SG NR Chan III fails low (AP-53.00)
6	PG0101 PG0202	N/A	1-PG-P-1A ('A' Primary Grade Water Pump) will trip and 1-PG-P-1B will not automatically start.
7	MS02 MS0401/ 0402/0403 O/R TVMS101 B_close Off	True 1%	Small steam leak 1-FW-P-2 steam line/reactor trip/steam break escalates (E-0/E-2) [CT -1/2] "B" MSTV will not close
8	CH59/60/ 61	N/A	Various Phase I TVs fail to CLOSE: <ul style="list-style-type: none"> • 1-CH-MOV-1381 • 1-CH-TV-1204A/B

SHIFT TURNOVER INFORMATION

OPERATING PLAN:

The initial conditions have a reactor start-up in progress on Unit #1.

Current conditions have reactor power at 5% with the turbine rolling at 1800 rpm with field established on the main generator. Current boron concentration is 1195 ppm. Control Bank D at 141 Steps.

1-GOP-1.5 is complete up to step 5.3.15 and 1-OP-TM-001 is complete to section 5.7.

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

Shift orders: Upon relieving the watch, utilize 1-GOP-1.5 (Unit Startup, 2% Reactor Power to Max Allowable Power) and 1-OP-TM-001 (Turbine – Generator Startup to 20% - 25% Turbine Power) to place the turbine on line and stabilize power at 30%.

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

The last shift diluted as required to establish critical conditions and raise power to 5% in accordance with the reactivity plan.

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 1

Page 7 of 91

Event Description: 1-LM-PT-100B (Containment Pressure Protection) fails HIGH

Cue: Lead Evaluator Cue

Time	Position	Applicant's Action or Behavior
	SRO/RO	<p>Diagnose the failure with the following indications:</p> <p>Alarms:</p> <ul style="list-style-type: none"> • 1E-B1 – HI-HI CTMT PRESS CLS CH 2 • 1E-F1 – HI CTMT PRESS CLS CH 2 <p>Indications:</p> <ul style="list-style-type: none"> • 1-LM-PT-100B failed HIGH <p>SRO enters 0-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>RO identifies Channels I, III, & IV containment pressure are NORMAL</p>
	RO	<p>[2] PLACE AFFECTED CONTROL(S)/COMPONENT(S) IN MANUAL CONTROL AND STABILIZE PARAMETER USING REDUNDANT INDICATION</p> <p>Step 2 RNO actions: a) Do the following: IF no control function affected, THEN GO TO Step 4.</p> <p>RO will report NO control functions affected and the SRO will go to step 4</p>
	SRO	<p>The team will hold a transient brief. During the brief the failure of 1-LM-PT-100B will be discussed.</p> <p>The RO and BOP will report out critical parameters, as per placard on Main Control Room Bench Board.</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 2012-1

Scenario No.: 4

Event No.: 1

Page 8 of 91

Event Description: 1-LM-PT-100B (Containment Pressure Protection) fails HIGH

Cue: Lead Evaluator Cue

	SRO	<p>0-AP-53.00 LOSS OF VITAL INSTRUMENTATION / CONTROLS</p> <p>Notes Prior to Step 4:</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 13.
	SRO	<p>*4 DETERMINE THE FAILED INSTRUMENT / CONTROL AND GO TO APPROPRIATE STEP.</p> <p>CTMT Pressure, Step 12c</p>
	RO	<p>The RO will identify that 1-LM-PT-100B has failed HIGH</p>
		<p>12. CHECK PROPER OPERATION OF THE FOLLOWING INSTRUMENTS:</p> <p>c) CTMT pressure instrumentation - NORMAL</p> <p>Step 12c RNO actions:</p> <p>c) Refer to the following Tech Spec 3.7 items:</p> <p style="margin-left: 40px;">1) Protection Channels:</p> <ul style="list-style-type: none"> • Table 3.7-2, 1.b and 2.b • Table 3.7-3, 1.b, 1.c, and 2.b <p style="margin-left: 40px;">2) Accident Monitoring (CTMT Wide Range Pressure)</p> <ul style="list-style-type: none"> • Table 3.7-6, Item 3 • Tech Spec 3.7.E <p>SRO determines that TS Table 3.7-2, 1.b and 2.b; 3.7-3, 1.b, 1.c, and 2.b all apply and all list Operator Action 17 as applicable and a 72 hour clock exists to place the channel in TRIP.</p> <p>In accordance with the NOTE prior to step 4, the SRO should now transition to step 13.</p>
	SRO	<p>13. CHECK CALORIMETRIC – FUNCTIONAL IAW ()-OPT-RX-001</p> <p>SRO/RO determines that OPT-RX-001 is NOT impacted.</p>

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 1

Page 9 of 91

Event Description: 1-LM-PT-100B (Containment Pressure Protection) fails HIGH

Cue: Lead Evaluator Cue

	SRO	<p>0-AP-53.00 LOSS OF VITAL INSTRUMENTATION / CONTROLS</p> <p>14. CHECK FAILED INSTRUMENT - IS A REGULATORY GUIDE 1.97 VARIABLE (Go to Step 16 if not Reg. Guide 1.97)</p> <p><i>SRO directs STA to review Reg. Guide 1.97. The STA will report that 1-LM-PT-100B is a Reg. Guide 1.97 component.</i></p>
	SRO	<p>15. 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 CEP 99-0029 states no actions are required since adequate redundant channels are operable.</i></p>
	SRO	<p>16. 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"> • SRO determines that TS Table 3.7-2, 1.b and 2.b; 3.7-3, 1.b, 1.c, and 2.b all apply and all list Operator Action 17 as applicable and a 72 hour clock exists to place the channel in TRIP. <p><i>SRO directs STA to review VPAP-2802 and TRM Section 3.3. The STA acknowledges the request.</i></p>
	SRO	<p>17. CHECK ADDITIONAL INSTRUMENT / CONTROLLER MALFUNCTION – EXISTS</p> <p>Step 17 RNO actions: GO TO Step 19.</p>
	SRO	<p>19. PROVIDE NOTIFICATIONS AS NECESSARY:</p> <ul style="list-style-type: none"> • Shift Supervision • OMO • STA (PRA determination) • I&C
		END EVENT 1

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 2

Page 10 of 91

Event Description: Raise reactor power/place Unit on-line/ramp-up (GOP-1.5/OP-TM-001)

Cue: When Team Ready

Time	Position	Applicant's Action or Behavior
	SRO	<p><i>This evolution will be pre-briefed by the team prior to entering the simulator</i></p> <p>1-GOP-1.5 – Unit Startup, 2% Reactor Power to Max Allowable Power</p> <p>3.0 Initial Conditions</p> <p>3.1 Unit 1 is stable at 1 – 2% Reactor Power</p>
	SRO	<p>4.0 Precautions and Limitations</p> <p>4.1 Control Rods shall be maintained greater than the programmed insertion limits at all times.</p> <p>4.2 During the power escalation, particular attention should be focused on the following items to reduce the potential for a unit trip.</p> <ul style="list-style-type: none"> • SG level control • CNDSR vacuum • Polishing BLDG ΔP • Makeup blend (CB) to the RCS • FW heater levels (6th point Hi) • HP HTR DRN TK LVL CONT • Tave and Δ Ø • GEN voltage control • Hotwell level <p>4.3 Questions concerning the Criteria for Power Escalations and Control Rod Movement Limitations will be directed to Reactor Engineering.</p> <p>4.4 With one of the generator hydrogen coolers isolated, the generator output must be reduced to 2/3 of rated load at rated power factor. Normal Bearing Cooling flow must be maintained through the remaining coolers to ensure that the generator H2 cold gas temperature does not exceed 125°F.</p> <p>4.5 Chemistry should be notified of power escalations or reductions greater than or equal to 15 percent power.</p> <p>4.6 Nuclear Power Range instruments will be calibrated against a heat balance daily when greater than 15 percent power. (Reference 2.4.9)</p> <p>4.7 During Turbine startup, shutdown, and operation at less than 10% electrical load, Condenser vacuum, as read on MCR Condenser Vacuum Recorders CN-PR-101A and CN-PR-101B, should be maintained as high as possible and greater than 26.5 in. Hg to prevent Turbine blade flutter. During shutdown, Condenser vacuum should be maintained as high as possible, and greater than 26.5 in. Hg until the Turbine rotor is on the Turning Gear. If vacuum can NOT be maintained greater than 26.5 in. Hg, the Turbine should be tripped. Since the low vacuum alarm setpoint is below the 26.5 in. Hg trip value, the operator must closely monitor Condenser vacuum during operation at less than 10% electrical load. (Reference 2.4.10)</p>

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 2

Page 11 of 91

Event Description: Raise reactor power/place Unit on-line/ramp-up (GOP-1.5/OP-TM-001)

Cue: When Team Ready

Time	Position	Applicant's Action or Behavior
	SRO	<p>1-GOP-1.5 - UNIT STARTUP, 2% REACTOR POWER TO MAX ALLOWABLE POWER</p> <p>4.0 Precautions and Limitations (Continued)</p> <p>4.8 Observe the following concerning turbine vibration:</p> <ul style="list-style-type: none"> • If a fast increase in relative shaft vibration occurs, and the relative shaft vibration level may exceed the following limits, the turbine should be tripped immediately. <ul style="list-style-type: none"> ○ Bearings 1 through 6 - 11.6 mils ○ Bearings 7 through 9 - 14 mils • Significant changes from the normal vibration magnitudes for the operating condition should be investigated. • If a progressive increase or decrease in vibration magnitude exceeds 2 mils, a diagnostic investigation should be immediately initiated to determine the reason for the change. • Any instantaneous step change increase or decrease in vibration magnitude should be immediately investigated. • If excessive vibration is encountered below the turbine trip setpoint, turbine load or speed should be held or progressively reduced and the effect on vibration level monitored. <p>NOTE: The Grayland Avenue Fault Analysis Group must be contacted to evaluate the Digital Fault Recorder.</p> <p>4.9 If a transient occurs and it is suspected that Generator frequency was less than 57.6 Hz OR greater than 61.2 Hz, observe the following due to possible rotor blade stresses:</p> <ul style="list-style-type: none"> • The Switchyard Digital Fault Recorder should be reviewed to determine the total cumulative time at each frequency outside of the operation range. • Alstom should be contacted for additional guidance. • Operation at less than 56.4 Hz or greater than 62.4 Hz is NOT permitted. <p>4.10 The maximum allowable ΔP between condensers is 2.5 inches Hg. The ΔP between condensers should be maintained less than 2 inches Hg.</p> <p>4.11 At Reactor Power levels between 15% - 70%, the most conservative calorimetric (Steam Flow or Feed Flow) shall be used for determination of Reactor Power.</p> <p>4.12 At Reactor Power levels greater than 70%, UFM (preferred) or the most conservative calorimetric (Steam Flow or Feed Flow) shall be used for determination of Reactor Power.</p>

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 2

Page 12 of 91

Event Description: Raise reactor power/place Unit on-line/ramp-up (GOP-1.5/OP-TM-001)

Cue: When Team Ready

Time	Position	Applicant's Action or Behavior
		<p>1-GOP-1.5 - UNIT STARTUP, 2% REACTOR POWER TO MAX ALLOWABLE POWER</p> <p>4.13 The Turbine should be operated in IMP IN while ramping is in progress. If desired, the turbine may be placed in IMP OUT at approximately 90 to 91 percent power. If the power increase is stopped during the ramp to 100%, IMP OUT may be used to assist in stabilizing the Turbine.</p> <p>4.14 The Turbine will momentarily (1.5 seconds) shift to MANUAL when transferring from IMP OUT to IMP IN or from IMP IN to IMP OUT. To minimize Governor valve oscillations, the GV Tracking Meter should read as close to 0 as possible before a transfer is performed.</p> <p>4.15 The following Reactivity Management principles must be adhered to while Turbine ramping is in progress.</p> <ul style="list-style-type: none"> • Reactivity control systems designed to provide alarms, rod stops, and Turbine runback functions should not be bypassed except when allowed by an approved procedure specifically intended for the evolution. • Shift Supervision shall ensure that unexplained or abnormal reactivity changes or neutron flux distributions are investigated immediately and if necessary direct a unit shutdown or trip to terminate the problem. Shift Supervision shall promptly notify the STA and the Reactor Engineer to investigate the situation. • Duties assigned to Control Room Operators shall not interfere with their ability to monitor core reactivity. The administrative workload of Control Room Operators responsible for monitoring and operating the control board should be minimized. • Control of reactivity and those parameters that affect reactivity is essential to the safe operation of the plant. In order to maintain control of reactivity conservative decision making shall be practiced at all times. • Activities that may detract from positive control of reactivity shall be minimized. This includes minimizing other Station activities that may affect Unit operation, such as removing equipment or instrumentation from service, and avoiding shift turnovers during significant reactivity changes.

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 2

Page 13 of 91

Event Description: Raise reactor power/place Unit on-line/ramp-up (GOP-1.5/OP-TM-001)

Cue: When Team Ready

	SRO	<p>1-GOP-1.5 - UNIT STARTUP, 2% REACTOR POWER TO MAX ALLOWABLE POWER</p> <p>4.0 Precautions and Limitations (Continued)</p> <p>4.16 CY-AP-PRI-100, Primary System Chemistry and CY-AP-SEC-200, Secondary System Chemistry, provide information and recommendations for Action Levels on various chemical parameters. Exceeding these Action Levels requires a formal notification of an out-of-specification condition and may require corrective measures such as power reduction and/or plant shutdown. The Chemistry Department will provide guidance IAW CY-AP-PRI-100 or CY-AP-SEC-200 if Action Levels are exceeded.</p> <p>4.17 Operations Management must be consulted before the second Main Feed Pump is placed in service.</p> <p>4.18 If the Turbine is being operated in Turbine Manual, or Turbine Manual control becomes necessary, N/A must be entered for steps addressing operation in Operator Auto, and Attachment 12 used for operation in Turbine Manual.</p> <p>4.19 When the Turbine is not being actively ramped, the REFERENCE and SETTER values must remain matched to prevent inadvertent ramp. (Ref. 2.4.18)</p> <p>4.20 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> <p>4.21 Energy Supply (MOC) must be notified within 30 minutes of any Voltage Regulator or Power System Stabilizer status change, or any condition that prevents the unit from operating at full reactive power capability as defined by the Main Generator capability curve.</p>
	SRO	Sections 5.1 and 5.2 will be signed off as completed.

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 2

Page 14 of 91

Event Description: Raise reactor power/place Unit on-line/ramp-up (GOP-1.5/OP-TM-001)

Cue: When Team Ready

	SRO	<p>1-GOP-1.5 - UNIT STARTUP, 2% REACTOR POWER TO MAX ALLOWABLE POWER</p> <p>Section 5.3 Increasing Power to Between 25% and 30%</p> <p>Cautions prior to Step 5.3.1:</p> <ul style="list-style-type: none"> • To prevent a Reactor trip, SG level must be maintained greater than 20% if at least one channel (1F-C7, C8, C9 or 1F-D7, D8, D9) of the associated SG FF/SF mismatch annunciator is LIT. (Ref 2.4.12) • To prevent an uncontrolled reactivity addition, control rods shall be moved in a deliberate, carefully controlled manner while closely monitoring the response of the Reactor. <p>Note prior to Step 5.3.1:</p> <ul style="list-style-type: none"> • Alternate indications of reactor power, such as Core ΔT, 1st Stage Pressure, Condensate and Feedwater performance parameters, and Electrical output, should be reviewed and compared during power escalation. (Ref 2.4.4)
	SRO	<p>5.3.1 Check that the Pre-Job Briefing has been completed.</p> <p>5.3.2 Notify the following of the impending power increase and subsequent placing unit on line.</p> <ul style="list-style-type: none"> • Energy Supply (MOC) • Chemistry • Polishing Building <p>5.3.3 Initiate Attachment 9, Reactivity Control and Monitoring During Startup. (Reference 2.4.15)</p> <p>5.3.4 IF the Steam Dumps are in Auto in Steam Pressure Mode, THEN do the following. Otherwise, enter N/A.</p> <ol style="list-style-type: none"> a. Increase Reactor power to approximately 4% - 6% by withdrawing the Control Rods and/or using chemical shim. b. Verify the Steam Dumps come open to maintain Steam Header pressure at approximately 1005 psig. <p>5.3.5 IF the Steam Dumps are in Manual in Steam Pressure Mode, THEN increase Reactor Power to approximately 4% - 6% by opening the Steam Dumps. Otherwise, enter N/A.</p> <p>Steps 5.3.1 through 5.3.5 will be signed off as required.</p>

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 2

Page 15 of 91

Event Description: Raise reactor power/place Unit on-line/ramp-up (GOP-1.5/OP-TM-001)

Cue: When Team Ready

		1-GOP-1.5 - UNIT STARTUP, 2% REACTOR POWER TO MAX ALLOWABLE POWER
	SRO	Note prior to Step 5.3.6: <ul style="list-style-type: none"> Maintaining SG level at approximately 40% will allow for an easier transition when placing the MFRVs in Auto.
	SRO	5.3.6 Maintain SG Narrow Range level at approximately 40% using the MFRV Bypass HCVs. Step 5.3.6 will be signed off as required.
	SRO	5.3.7 Perform the following to latch the Turbine and to roll the Turbine to 1800 rpm IAW 1-OP-TM-001, Turbine - Generator Startup to 20% - 25% Turbine Power: <ol style="list-style-type: none"> Perform Subsection 5.3, Latching the Turbine. Perform Subsection 5.4, Turbine Roll to 1800 RPM. Check ΔP on the Air Side and Hydrogen Side Seal Oil Filters less than 10.0 psid. Swap filter(s) as necessary. Perform Subsection 5.5, Turbine Trip Tests (Front End Checks). Check that 1-FW-P-2, AFW Pump, is operable. IF required, THEN perform Turbine overspeed IAW 1-OP-TM-003, Turbine Overspeed Test. Otherwise, enter N/A. Perform Subsection 5.6, Preparations for Synchronization. Step 5.3.7 will be signed off as required.
	SRO	Note prior to Step 5.3.8: <ul style="list-style-type: none"> Lifting 1-CN-RV-101A, B, or C is dependent on available condensate flow paths (MFP recirc or CN long-cycle clean-up) and whether CP is bypassed.

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 2

Page 16 of 91

Event Description: Raise reactor power/place Unit on-line/ramp-up (GOP-1.5/OP-TM-001)

Cue: When Team Ready

	SRO	<p>1-GOP-1.5 - UNIT STARTUP, 2% REACTOR POWER TO MAX ALLOWABLE POWER</p> <p>5.3.8 IF SG Blowdown Cooler shell-side pressure indication (1-CN-120A, B, or C) is greater than 650 psig, THEN increase flow setpoint on 1-CN-FIC-107 to decrease condensate pressure. Otherwise, enter N/A</p> <p>5.3.9 Start a second condensate pump by placing the hand selector switch of one of the non-running pumps from PTL to START. Indicate the second condensate pump that was started below. (✓)</p> <p>() 1-CN-P-1A () 1-CN-P-1B () 1-CN-P-1C</p> <p>5.3.10 Place the third condensate pump in AUTO. Indicate the condensate pump placed in AUTO below. (✓)</p> <p>() 1-CN-P-1A () 1-CN-P-1B () 1-CN-P-1C</p> <p>Steps 5.3.8 through 5.3.10 will be signed off as required.</p>
	SRO	<p>5.3.11 Close the CN Pump High Pressure Balance Line Isolation valve associated with the CN pump started in Step 5.3.9:</p> <ul style="list-style-type: none"> • 1-CN-34 for 1-CN-P-1A • 1-CN-46 for 1-CN-P-1B • 1-CN-58 for 1-CN-P-1C <p>5.3.12 Notify the Polishing Building to verify or place a minimum of five Polishing Beds in service to support placing unit on line. (Reference 2.4.16).</p> <p>Steps 5.3.11 through 5.3.12 will be signed off as required.</p>
	SRO	<p>5.3.13 Check or place the Recirc Flow Control Valve for the running Main Feed Pump in AUTO.</p> <ul style="list-style-type: none"> • 1-FW-FCV-150A • 1-FW-FCV-150B <p>Step 5.3.13 will be signed off as required.</p>
		<p>Caution prior to Step 5.3.14: Reactor power must be maintained less than 10% until the Main Turbine is latched and Voltage Regulator is in service IAW 1-OP-TM-001.</p>

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 2

Page 17 of 91

Event Description: Raise reactor power/place Unit on-line/ramp-up (GOP-1.5/OP-TM-001)

Cue: When Team Ready

		1-GOP-1.5 - UNIT STARTUP, 2% REACTOR POWER TO MAX ALLOWABLE POWER
	SRO	5.3.14 IF the Steam Dumps are in Manual in Steam Pressure Mode, THEN do the following. Otherwise, enter N/A. <ol style="list-style-type: none"> a. Increase Reactor power to approximately 14% -16% by opening the Steam Dumps. b. When Reactor power greater than or equal to 10%, THEN perform 5.2.23.
		Team actions start here
	RO	5.3.15 IF the Steam Dumps are in Auto in Steam Pressure Mode, THEN do the following. Otherwise, enter N/A. <ol style="list-style-type: none"> a. Increase Reactor power to approximately 6% -10% by withdrawing the Control Rods and/or using chemical shim.
		<i>1-OP-CH-007 (Blender Operation) procedure steps are contained in this guide starting at page 27.</i>
	BOP	<ol style="list-style-type: none"> b. Verify the Steam Dumps come open to maintain Steam Header pressure at approximately 1005 psig.
	SRO	5.3.16 Verify that condenser pressure will be equal to or less than 3.5 inches of Hg pressure (or greater than 26.5 inches of Hg vacuum) before synchronization.
	BOP	5.3.17 Notify the System Operator and Energy Supply (MOC) that the unit is coming on line.
		5.3.18 Verify that at least five Polishing beds are in service. <i>CP operator will report 6 polishers in service.</i>
	SRO	Note prior to Step 5.3.19: <ul style="list-style-type: none"> • Hotwell temperature should be greater than 70°F before synchronization. This recommended temperature is based on a North Anna Reactor trip caused by low feedwater temperature.

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 2

Page 18 of 91

Event Description: Raise reactor power/place Unit on-line/ramp-up (GOP-1.5/OP-TM-001)

Cue: When Team Ready

		1-GOP-1.5 - UNIT STARTUP, 2% REACTOR POWER TO MAX ALLOWABLE POWER
	SRO	<p>5.3.19 Synchronize the Generator with the bus in accordance with 1-OP-TM-001, Subsection 5.7, Synchronizing and Loading the Turbine to 5 percent Rated Load in the OPER AUTO Mode.</p> <p>The team will now go to 1-OP-TM-001 (Subsection 5.7). All previous subsections will be completed. 1-OP-TM-001 actions start on page 22.</p>
	RO	5.3.20 AFTER the generator breakers are closed, THEN verify annunciator 1K-B1, GEN BKR AUX REL FAIL TURB TRIP CKT, is NOT LIT.
	SRO	5.3.21 Notify the System Operator and Energy Supply (MOC) that the unit is on the line and log the on-line time in the Unit 1 Narrative Log.
	SRO	5.3.22 Check that the VOLTAGE REGULATOR is in automatic control. IF the VOLTAGE REGULATOR is NOT in automatic control, THEN notify Supervisor - System Operations at 8-730-3345 (Innsbrook).
	SRO	<p>Caution prior to Step 5.23:</p> <ul style="list-style-type: none"> To provide for a positive channel check indication, steam flow must be verified on all six channels of SG STEAM FLOW PROTECT before 23 percent reactor power is exceeded.
	SRO	<p>Notes prior to Step 5.23:</p> <ul style="list-style-type: none"> Power level increases should be monitored closely and rods adjusted to maintain Tave close to Tref. Ramp rate will be a function of Steam Generator Level Control. Chemistry should be notified when power level changes are equal to or greater than 15 percent/hr. The Turbine should be operated in IMP IN while ramping is in progress. If desired, the turbine may be placed in IMP OUT at approximately 90 to 91 percent power. If the power increase is stopped during the ramp to 100%, IMP OUT may be used to assist in stabilizing the Turbine.
	SRO	5.3.23 Continue in 1-OP-TM-001, Subsection 5.8, Power Escalation to 20% - 25% Turbine Power, while continuing to perform this procedure.

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 2

Page 19 of 91

Event Description: Raise reactor power/place Unit on-line/ramp-up (GOP-1.5/OP-TM-001)

Cue: When Team Ready

1-GOP-1.5	
SRO	<p>Caution prior to Step 5.3.24:</p> <ul style="list-style-type: none"> • To prevent a Reactor Trip, Step 5.3.24 must be repeated if Reactor Power has decreased below 10 percent and PERM STATUS LIGHTs B1 and C1 are NOT LIT.
RO	<p>5.3.24 WHEN reactor power increases above 10 percent power, THEN perform the following.</p> <ol style="list-style-type: none"> a. Check that the following Trip Status Lights are LIT. <ol style="list-style-type: none"> _____ 1. Trip Status Light E1, NIS PWR RGE P-10 CH-1 _____ 2. Trip Status Light F1, NIS PWR RGE P-10 CH-2 _____ 3. Trip Status Light G1, NIS PWR RGE P-10 CH-3 _____ 4. Trip Status Light H1, NIS PWR RGE P-10 CH-4 b. Check that the Perm Status Light A3, P-10 NIS PWR RGE > 10%, is LIT. c. Check that the Perm Status Light B2, P-7 NIS PWR RGE AND TURB PWR < 10%, is NOT LIT.
RO	<ol style="list-style-type: none"> d. Block the Intermediate Range Trip by performing the following. <ol style="list-style-type: none"> 1. Depress 1/N 38A TRA, INT RNG TRIP - BLOCK, pushbutton. 2. Depress 1/N 38B TRB, INT RNG TRIP - BLOCK, pushbutton. 3. Check Perm Status Light B1, NIS INT RNG RX TRIP AND ROD STOP BLOCKED, is LIT. e. Block the Power Range Low Trip by performing the following. <ol style="list-style-type: none"> 1. Depress 1/N 47A TRA, PWR RNG (LO SETPT) TRIP - BLOCK, pushbutton. 2. Depress 1/N 47B TRB, PWR RNG (LO SETPT) TRIP - BLOCK, pushbutton. 3. Check Perm Status Light C1, NIS PWR RNG LO SP TRIP - BLOCKED, is LIT
BOP	<p>5.3.25 Perform the following substeps at the described Turbine Power.</p> <ol style="list-style-type: none"> a. WHEN turbine power increases through 10 percent, THEN check that the following Trip Status Lights are LIT. <ol style="list-style-type: none"> _____ 1. Trip Status Light E3, TURB PWR > 10% CH-3 _____ 2. Trip Status Light F3, TURB PWR > 10% CH-4 b. WHEN turbine power increases through 15 percent, THEN check Perm Status Light K1, P-2 AUTO ROD CONTROL BLOCKED TURB PWR < 15%, is NOT LIT.

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 2

Page 20 of 91

Event Description: Raise reactor power/place Unit on-line/ramp-up (GOP-1.5/OP-TM-001)

Cue: When Team Ready

		1-GOP-1.5
	SRO	Note prior to Step 5.26: <ul style="list-style-type: none"> When Steam Dumps close, a decrease in RCS temperature should be anticipated and compensatory actions taken.
	RO/BOP	5.3.26 IF Steam Dumps in Auto, THEN verify the Steam Dumps modulate closed as Turbine Power is increased.
		5.3.27 IF the Steam Header Pressure controller in Manual, THEN as Turbine power level continues to increase, reduce the STM DUMP VVS DEMAND signal to zero while maintaining Reactor power constant. Enter N/A if controller in Auto.
	BOP	5.3.28 Maintain Turbine Valve Position Limiter approximately 5% above Governor Valve demand.
		NOTE: Steam Flow / Feed Flow indications do not have to be matched to be considered stable.
		All three MFRVs should be placed in Auto at the same time to ease the transition to Auto feed control.
	TEAM SURROGATE	5.3.29 WHEN Feedwater temperature is greater than 260°F (PCS points T0418A, T0438A, T0458A) with stable Steam Flow / Feed Flow, THEN perform the following: <ol style="list-style-type: none"> Check that the MFRVs are closed. Place the MFRVs in Auto. WHEN MFRV demand exceeds approximately 9%, THEN slowly close the MFRV Bypass HCVs as the MFRVs come open.
		NOTE: When the Steam Dumps are fully closed, Tave will decrease as Turbine power is increased.
	RO/BOP	5.3.30 IF the Steam Header Pressure controller is in Auto, THEN as Turbine power level is increased, perform the following. Enter N/A if controller in Manual. <ol style="list-style-type: none"> Check that the Steam Dumps modulate closed. WHEN the Steam Dumps are closed, THEN place the Steam Header Pressure controller in Manual.
	SRO	5.3.31 IF the Steam Header Pressure controller is in Manual, THEN as Turbine power level continues to increase, reduce the STM DUMP VVS DEMAND signal to zero while maintaining Reactor power constant. Enter N/A if controller was operated in Auto.

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 2

Page 21 of 91

Event Description: Raise reactor power/place Unit on-line/ramp-up (GOP-1.5/OP-TM-001)

Cue: When Team Ready

	RO/BOP	<p>1-GOP-1.5</p> <p>5.3.32 Place the STM DUMP MODE SEL switch in the TAVG position as follows.</p> <ul style="list-style-type: none">a. Check STM HDR pressure controller demand at zero.b. Place STM DUMP CNTRL switch to OFF/RESET.c. Place STM DUMP MODE SEL switch to RESET and spring return to TAVG.d. Check annunciator 1H-D7, STM DUMP PERM, is NOT LIT.e. Place STM DUMP CNTRL switch to ON. <p>END OF GOP ACTIONS – 1-OP-TM-001 ACTIONS BEGIN ON THE NEXT PAGE</p>
--	--------	--

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 2

Page 22 of 91

Event Description: Raise reactor power/place Unit on-line/ramp-up (GOP-1.5/OP-TM-001)

Cue: When Team Ready

Time	Position	Applicant's Action or Behavior
		1-OP-TM-001
		5.7 Synchronizing and Loading the Turbine to 5% Rated Load in the OPER AUTO Mode
	SRO	Notes prior to Step 5.7.1: <ul style="list-style-type: none"> Shift Supervision may authorize entry or exit from this subsection at any step or substep based upon existing plant conditions. N/A must be entered for the specific steps or substeps in the subsection that were not performed as a result of the authorized exit or entry. Hotwell temperature should be greater than 70°F before synchronization. This recommended temperature is based on a North Anna Reactor trip caused by low feedwater temperature.
	BOP	5.7.1 Verify that the Hotwell temperature is greater than 70°F. IF Hotwell temperature is NOT greater than 70°F, THEN evaluate the effects of synchronization with temperature less than 70°F
	SRO	Caution prior to Step 5.7.2: <ul style="list-style-type: none"> During Turbine startup and operation at less than 10% electrical load, Condenser vacuum, as read on MCR Condenser Vacuum Recorders CN-PR-101A and CN-PR-101B, should be maintained as high as possible and greater than 26.5 in. Hg to prevent Turbine blade flutter. During shutdown, Condenser vacuum should be maintained as high as possible, and greater than 26.5 in. Hg until the Turbine rotor is on the Turning Gear.
	BOP	5.7.2 Check that the Turbine vacuum indicated on MCR Condenser Vacuum Recorders CN-PR-101A and CN-PR-101B is greater than 26.5 inches of Hg Vacuum.
	BOP	5.7.3 Check that the pumps and fans for the three Main Transformers are in operation. <i>Field operator will report pumps and fans in service</i>
	BOP	5.7.4 Check that UNIT NO. 1 LOAD MEGAWATTS chart recorder is ON.
	BOP	5.7.5 Check or depress the VV POSTN LIMITER raise button until the VV POSTN LIMIT indicator registers 10% VALVE POSITION.
	SRO	5.7.6 Check that the applicable GOP has been completed up to synchronization, and that the Startup Team is ready to synchronize the generator with the bus.

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 2

Page 23 of 91

Event Description: Raise reactor power/place Unit on-line/ramp-up (GOP-1.5/OP-TM-001)

Cue: When Team Ready

		1-OP-TM-001
	SRO	Note prior to Step 5.7.7: <ul style="list-style-type: none"> Shift Supervision may adjust the ramp rate to aid in unit stabilization.
	BOP	5.7.7 Verify or place the LOAD RATE % PER MIN thumbwheel to position 1. (1%/MIN)
	SRO	Caution prior to step 5.7.8 <ul style="list-style-type: none"> The Sync Switch should not be turned to the AUTO position as the AUTO SYNC function is inoperative. To prevent breaker disagreement, the Generator output breaker control switch should be held in CLOSE until the red light is LIT or the breaker indicates tripped.
	BOP	5.7.8 Synchronize the Generator with the bus using OCB-G102, GEN OUTPUT BKR, by performing the following substeps. IF the Generator will be synchronized using OCB-G1T240, THEN enter N/A AND GO TO Step 5.7.9. <ol style="list-style-type: none"> Insert the Sync Key into CS-G102, GEN OUTPUT BKR SYNC SWITCH. Turn CS-G102 to MAN. Increase the SETTER to 1805 rpm and press the GO button. Check that voltage is indicated on the INCOMING and RUNNING voltmeters. <p>NOTE: Slow in the fast direction is one clockwise rotation in 20 or more seconds.</p> <ol style="list-style-type: none"> Check a slow rotation of the synchroscope in the fast direction. (clockwise) IF NOT, THEN increase or decrease the SETTER as required and press the GO Button.

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 2

Page 24 of 91

Event Description: Raise reactor power/place Unit on-line/ramp-up (GOP-1.5/OP-TM-001)

Cue: When Team Ready

	BOP	<p>1-OP-TM-001</p> <p>5.7.8 (Continued)</p> <p>NOTE: INCOMING and RUNNING voltages should be within 2 volts.</p> <p>f. Equalize the INCOMING voltage with the RUNNING voltage using the EXCITATION LEVEL control switch.</p> <p>CAUTION: If Generator output is not indicated at the time of synchronization and no operator action is taken, an anti-motoring trip will occur</p> <p>NOTE: With the Synchroscope running as close to a 20-second cycle as possible, very little load will be placed on the generator.</p> <p>NOTE: Reflexes should be mentally checked with respect to the Synchroscope needle speed so that the Generator Breaker is closed at 12:00 o'clock.</p> <p>g. WHEN the Synchroscope is at (approximately) 2 minutes to 12:00 o'clock, THEN close OCB-G102, Generator Output Breaker.</p> <p>NOTE: Approximately 15 to 20 seconds may elapse before the Setter indication increases above zero.</p> <p>h. Check that the following indications are NOT LIT.</p> <ul style="list-style-type: none"> • Permissive Status Light E-3 GEN NO. 1 MOTORING INITIATED • Annunciator 1J-D7, GEN MOTORING TURB LO ΔP <p>i. IF the Generator is motoring, THEN immediately increase the setter to 5% and depress the GO pushbutton. Otherwise, enter N/A. (The ramp rate may be increased as necessary to clear the motoring alarms. When the alarms are clear, the Turbine ramp rate may be decreased or halted as desired.)</p> <p>j. Turn CS-G102, GEN OUTPUT BKR SYNC SWITCH, to OFF.</p> <p>k. Insert the Sync Key into CS-G1T240, GEN OUTPUT BKR SYNC SWITCH.</p> <p>l. Turn CS-G1T240 to MAN.</p> <p>m. Check that the synchroscope needle stopped at approximately the 12:00 o'clock position.</p> <p>n. Check that the INCOMING and RUNNING voltages are within 2 volts.</p> <p>o. Close OCB-G1T240.</p> <p>p. Turn CS-G1T240 to OFF and remove the Sync Key.</p>
--	-----	---

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 2

Page 25 of 91

Event Description: Raise reactor power/place Unit on-line/ramp-up (GOP-1.5/OP-TM-001)

Cue: When Team Ready

	SRO/BOP	<p>1-OP-TM-001</p> <p>5.7.9 Synchronize the Generator with the bus using OCB-G1T240, GEN OUTPUT BKR, by performing the following substeps. IF the Generator was synchronized using OCB-G102, THEN enter N/A AND GO TO Step 5.7.10</p>
	SRO/BOP	<p>Notes prior to Step 5.7.10:</p> <ul style="list-style-type: none"> • The VV POSTN LIMIT setpoint should be increased proportionally as the Turbine load is increased. The Turbine Governor Valves should not be run up against the Limiter. • The Turbine should not be continuously operated on the VV POSTN LIMIT. • During Power Escalation, the VV POSTN LIMIT should be maintained as close as reasonably possible just above the actual governor valve position for the desired power level. This method of operation will prevent a Turbine Governor Valve(s) from failing to an open position due to an electronic or hydraulic failure thereby causing an excessive load on the Unit or causing the Unit to exceed licensed power limits.
	BOP/SRO	<p>5.7.10 IF the VALVE POS LIMIT light is LIT, THEN slowly increase the VV POS LIMIT setpoint until the light is NOT LIT, OR decrease Unit load until the VALVE POS LIMIT light is NOT LIT AND adjust the VV POS LIMIT setpoint as required.</p>
	BOP	<p>5.7.11 Verify that the SPEED light is NOT LIT and the LOAD light is LIT.</p>
	BOP	<p>5.7.12 RETURN TO appropriate startup GOP to continue the Unit Startup.</p> <p>THE team will return to GOP-1.5 (momentarily).</p>
	SRO	<p>Cautions prior to Step 5.8.1:</p> <ul style="list-style-type: none"> • Constant communication between the Reactor Operators on the S/G Level Controls, the Control Rods, Steam Dumps, and the Turbine must be maintained to prevent temperature or level transients. • Rapid Loading of the Turbine - Generator may cause a Steam Generator High Level Trip. (Reference 2.4.1)

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 2

Page 26 of 91

Event Description: Raise reactor power/place Unit on-line/ramp-up (GOP-1.5/OP-TM-001)

Cue: When Team Ready

	SRO/BOP	<p>1-OP-TM-001</p> <p>Notes prior to Step 5.8:</p> <ul style="list-style-type: none"> • Shift Supervision may authorize entry or exit from this subsection at any step or substep based upon existing plant conditions. N/A must be entered for the specific steps or substeps in the subsection that were not performed as a result of the authorized exit or entry. • Ramping the Turbine at 1%/min until the Steam Dumps are closed will aid in the transition to auto feed control. Once the Steam Dumps are closed the normal ramp rate is Position 6. • In the OPER AUTO mode, Turbine loading may be stopped by depressing the HOLD pushbutton and may be restarted by depressing the GO pushbutton. <p>5.8.1 With the OPER AUTO mode selected, set the desired load in the SETTER and depress the GO pushbutton.</p> <p>5.8.2 Maintain the System Voltage on the 230 KV BUS VOLT meter as requested by the System Operator.</p> <p>5.8.3 WHEN Turbine power increases above 10%, THEN check PCS alarm Y2060D, Exh Hood Sprays OFF, is received.</p> <p>5.8.4 WHEN IMPULSE CHAMBER PRESSURE (Turbine Power) passes through 30 percent OR when the startup has stabilized, THEN check or depress the IMP IN pushbutton AND check that the IMP IN light is LIT and the IMP OUT light is NOT LIT. Enter N/A if Turbine control will remain in IMP OUT.</p> <p><i>Evaluator's Note: No further actions are expected for this event.</i></p>
--	---------	--

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 2

Page 27 of 91

Event Description: Raise reactor power/place Unit on-line/ramp-up (GOP-1.5/OP-TM-001)

Cue: When Team Ready

	RO	<p>1-OP-CH-007 – Blender Operations</p> <p>3.0 Initial Conditions</p> <p>3.1 Check Primary Grade water is available to the Blender.</p> <p>RO verifies one PG pump in service</p> <p>3.2 Check at least one Boric Acid Transfer Pump is in Automatic and aligned to the Blender. IF the boric acid flow path to the blender is unavailable, THEN enter N/A.</p> <p>RO verifies that 1-CH-P-2A is in service.</p>
	RO	<p>1-OP-CH-007 – Blender Operations</p> <p>4.0 Precautions and Limitations</p> <p>4.1 Control rod position, Tavg, and/or power level should be observed when making up to the RCS.</p> <p>4.2 Operation of pressurizer heaters and spray valves should be used to equalize Boron concentration (CB) when changing CB.</p> <p>4.3 The blender must be frequently monitored for proper operation during the entire duration of the makeup. (Reference 2.4.1)</p> <p>4.4 The Reactor Operator shall notify Shift Supervision before performing any Blender evolution. (Reference 2.4.1)</p> <p>4.5 Rapidly changing VCT level and pressure may affect RCP Seal leakoff, which should be monitored for normal response.</p> <p>4.6 Calculations involving reactivity must be independently verified. (Ref. 2.4.4)</p> <p>4.7 Operation of the Blender must be Peer checked.</p> <p>4.8 Due to system configuration, PG flow will continue after reaching the integrator endpoint. Depending on the total flow rate, 0-5 gallons of additional flow should be anticipated. At 100 gpm, four gallons of additional flow is expected. At 60 gpm, two gallons of additional flow is expected.</p> <p>4.9 Due to system configuration, BA flow will continue after reaching the integrator endpoint. Depending on the total flow rate, 0 to 0.5 gallons additional flow should be anticipated. At 8 gpm, 0.2 - 0.3 gallons of additional flow is expected.</p> <p>4.10 The Blender may lock up if the RATE function is in use at the end of make up. (Integrator lock up does NOT affect the Blender AUTO function). (Ref. 2.4.2)</p> <p>4.11 Attachment 8 may be used to monitor PG and Boric Acid flow rates and total amounts added on the respective integrator.</p> <p>4.12 Due to no flow occurring through the VCT while on Excess Letdown, all dilutions, borations, or manual makeups should be made to the Charging Pump Suction through 1-CH-FCV-1113B, unless makeup is being made to raise RCS hydrogen concentration.</p>

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 2

Page 28 of 91

Event Description: Raise reactor power/place Unit on-line/ramp-up (GOP-1.5/OP-TM-001)

Cue: When Team Ready

	RO	<p>1-OP-CH-007 – Blender Operations</p> <p>5.4 Alternate Dilution</p> <p>NOTE: This subsection will be used for the first alternate dilution of the shift. Attachment 3 will be used as a guide for further alternate dilutions for the remainder of the shift, unless Excess Letdown is in service.</p> <p>5.4.1 Notify Shift Supervision of impending Alternate Dilution. (Reference 2.4.1)</p> <p>5.4.2 Notify STA of impending Alternate Dilution.</p> <p>5.4.3 Place the MAKE-UP MODE CNTRL switch in the STOP position.</p> <p>5.4.4 Adjust both of the following controllers for the flow rate and total gallons of Primary Grade water for the dilution. IF the PG FLOW CNTRL controller setpoint has previously been set, THEN enter N/A for that substep.</p> <p>a. 1-CH-FC-1114A, PG FLOW CNTRL _____ GPM (IAW Attachment 10)</p> <p>b. Determine the required integrator setpoint by performing the following:</p> $\frac{\text{_____ gal (-)}}{\text{(Desired Dilution)}} = \text{_____ Integrator setpoint}$ <p style="text-align: center;">(anticipated additional flow, dependent on flowrate)</p> <p>c. Record number of gallons of PG to be added from Step 5.4.4.b and enter into 1-CH-YIC-1114A, PRI WATER SUP BATCH INTEGRATOR (GAL) as follows: _____ GAL</p> <ol style="list-style-type: none"> 1. Depress PRESET A Button (Controller will read the last value entered into the controller; reads in gallons.) 2. To clear PRESET A, depress the CLR Button. Enter N/A if not required. 3. Enter desired PRESET A value. Enter N/A if not required. 4. Depress ENT Button.
--	----	---

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 2

Page 29 of 91

Event Description: Raise reactor power/place Unit on-line/ramp-up (GOP-1.5/OP-TM-001)

Cue: When Team Ready

	RO	<p>1-OP-CH-007 – Blender Operations</p> <p>5.4.5 Place the MAKE-UP MODE SEL switch in the ALT DIL position.</p> <p>NOTE: While on Excess Letdown, all dilutions should be made to the Charging Pump Suction through 1-CH-FCV-1113B, due to no flow occurring through the VCT.</p> <p>5.4.6 IF it is desired to direct the dilution water to the charging pump suction only, THEN place 1-CH-FCV-1114B, BLENDER TO VCT, in the CLOSE position. Otherwise, enter N/A.</p> <p>5.4.7 Place the MAKE-UP MODE CNTRL switch in the START position.</p> <p>5.4.8 Check all of the following conditions.</p> <ol style="list-style-type: none"> a. 1-CH-FCV-1113A, BORIC ACID TO BLENDER, is closed. b. 1-CH-FCV-1113B, BLENDER TO CHG PUMP, is open. c. 1-CH-FCV-1114A, PGW TO BLENDER, is controlling in AUTO. <p>5.4.9 IF unit is on Excess Letdown AND divert of flow is necessary for inventory control OR Reactivity Management, THEN perform the following substeps. Otherwise, enter N/A. (Reference 2.4.3)</p> <ol style="list-style-type: none"> a. Check closed or slowly close 1-CH-HCV-1137, EXCESS LETDOWN FLOW. b. Place 1-CH-HCV-1389, EXCESS LETDOWN DIVERT, to the PDTT position. c. Slowly open 1-CH-HCV-1137 until approximately 15 gpm flow is established to the PDTT. d. Check 1-CC-TI-108, EXCESS LETDOWN HX CC OUTLET TEMP, indicates less than 150° F. e. Check 1-CH-TI-1139, EXCESS LETDOWN HX OUTLET TEMP, is less than 195° F. f. Adjust RCP Seal Injection and/or Charging Flow as necessary to control inventory. g. WHEN VCT and/or PRZR level have been adjusted, THEN return Excess letdown to the VCT by placing 1-CH-HCV-1389 to the VCT position.
--	----	---

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 2

Page 30 of 91

Event Description: Raise reactor power/place Unit on-line/ramp-up (GOP-1.5/OP-TM-001)

Cue: When Team Ready

	RO	<p>1-OP-CH-007 – Blender Operations</p> <p>5.4.10 IF it is desired to stop the Dilution before the selected amount, THEN place the MAKE-UP MODE CNTRL switch in the STOP position. IF the PRI WATER SUP BATCH INTEGRATOR (GAL) is used to stop the flow, THEN enter N/A for this step.</p> <p>5.4.11 WHEN the desired amount of makeup has been reached, THEN check both of the following.</p> <ul style="list-style-type: none"> • 1-CH-FCV-1113B closes. • IF Step 5.4.6 was NOT performed, THEN check that 1-CH-FCV-1114B is closed. Otherwise, enter N/A. <p>5.4.12 IF Step 5.4.6 was performed, THEN place 1-CH-FCV-1114B in AUTO. Otherwise, enter N/A.</p> <p>5.4.13 IF a manual makeup is desired, THEN enter N/A for Steps 5.4.14 through 5.4.16 AND GO TO Subsection 5.5.</p> <p>5.4.14 Place the MAKE-UP MODE SEL switch in the AUTO position.</p> <p>5.4.15 Place the MAKE-UP MODE CNTRL switch in the START position.</p> <p>5.4.16 Notify Shift Supervision of Blender status. (Reference 2.4.1)</p>
	RO	<p>1-OP-CH-007 – Blender Operations</p> <p>5.5 Manual</p> <p>NOTE: This subsection will be used for the first manual makeup of the shift. Attachment 4 will be used as a guide for further manual makeups for the remainder of the shift, unless Excess Letdown is in service.</p> <p>5.5.1 Notify Shift Supervision of impending Manual Makeup. (Reference 2.4.1)</p> <p>5.5.2 Place the MAKE-UP MODE CNTRL switch in the STOP position.</p> <p>5.5.3 Adjust both of the following controllers for the flow rate of Boric Acid and Primary Grade water. IF flow controller setpoints have previously been set, THEN enter N/A for this step.</p> <ul style="list-style-type: none"> • 1-CH-FC-1113A, BA FLOW CNTRL (IAW Attachment 9) • 1-CH-HFC-1114, PG FLOW STPT

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 2

Page 31 of 91

Event Description: Raise reactor power/place Unit on-line/ramp-up (GOP-1.5/OP-TM-001)

Cue: When Team Ready

	RO	<p>1-OP-CH-007 – Blender Operations</p> <p>5.5.4 Adjust both of the following integrators for greater than the total gallons of Boric Acid and Primary Grade water desired to be added. Enter N/A if previously set.</p> <p>a. Record number of gallons of Boric Acid to be added and enter into 1-CH-YIC-1113, BA SUPPLY BATCH INTEGRATOR (GAL) as follows:</p> <p>_____ GAL</p> <ol style="list-style-type: none"> 1. Depress PRESET A Button (Controller will read the last value entered into the controller; reads in tenths of gallons.) 2. To clear PRESET A, depress the CLR Button. Enter N/A if not required. 3. Enter desired PRESET A value. Enter N/A if not required. 4. Depress ENT Button. <p>b. Record number of gallons of PG to be added and enter into 1-CH-YIC-1114A, PRI WATER SUP BATCH INTEGRATOR (GAL) as follows:</p> <p>_____ GAL</p> <ol style="list-style-type: none"> 1. Depress PRESET A Button (Controller will read the last value entered into the controller, reads in gallons.) 2. To clear PRESET A, depress the CLR Button. Enter N/A if not required. 3. Enter desired PRESET A value. Enter N/A if not required. 4. Depress ENT Button. <p>5.5.5 Place the MAKE-UP MODE SEL switch in the MANUAL position.</p> <p>5.5.6 Place the MAKE-UP MODE CNTRL switch in the START position.</p> <p>5.5.7 Open 1-CH-FCV-1113B, BLENDER TO CHG PUMP.</p>
--	----	---

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 2

Page 32 of 91

Event Description: Raise reactor power/place Unit on-line/ramp-up (GOP-1.5/OP-TM-001)

Cue: When Team Ready

	RO	<p>1-OP-CH-007 – Blender Operations</p> <p>5.5.8 Check all of the following conditions.</p> <ul style="list-style-type: none"> a. 1-CH-FCV-1113A, BORIC ACID TO BLENDER, is controlling in AUTO. b. 1-CH-FCV-1113B, BLENDER TO CHG PUMP, is open. c. 1-CH-FCV-1114A, PGW TO BLENDER, is controlling in AUTO. d. 1-CH-FCV-1114B, BLENDER TO VCT, is closed. <p>5.5.9 IF unit is on Excess Letdown AND divert of flow is necessary for inventory control or Reactivity Management, THEN perform the following substeps. Otherwise, enter N/A. (Reference 2.4.3)</p> <ul style="list-style-type: none"> a. Check closed or slowly close 1-CH-HCV-1137, EXCESS LETDOWN FLOW. b. Place 1-CH-HCV-1389, EXCESS LETDOWN DIVERT, to the PDTT position. c. Slowly open 1-CH-HCV-1137 until approximately 15 gpm flow is established to the PDTT. d. Check 1-CC-TI-108, EXCESS LETDOWN HX CC OUTLET TEMP, indicates less than 150° F. e. Check 1-CH-TI-1139, EXCESS LETDOWN HX OUTLET TEMP, is less than 195° F. f. Adjust RCP Seal Injection and/or Charging Flow as necessary to control inventory. g. WHEN VCT and/or PRZR level have been adjusted, THEN return Excess letdown to the VCT by placing 1-CH-HCV-1389 to the VCT position. <p>5.5.10 WHEN the manual makeup operation is complete, THEN place 1-CH-FCV-1113B in the AUTO position.</p> <p>5.5.11 Place the MAKE-UP MODE CNTRL switch in the STOP position.</p>
--	----	--

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 2

Page 33 of 91

Event Description: Raise reactor power/place Unit on-line/ramp-up (GOP-1.5/OP-TM-001)

Cue: When Team Ready

	RO	<p>1-OP-CH-007 – Blender Operations</p> <p>5.5.12 Check or place the following controllers in Automatic and adjust to the desired blended flow CB.</p> <ul style="list-style-type: none">• 1-CH-FC-1113A, BA FLOW CNTRL (IAW Attachment 9)• 1-CH-HFC-1114, PG FLOW STPT <p>5.5.13 Place the MAKE-UP MODE SEL switch in the AUTO position.</p> <p>5.5.14 Place the MAKE-UP MODE CNTRL switch in the START position.</p> <p>5.5.15 Notify Shift Supervision of Blender status. (Reference 2.4.1)</p> <p>END BLENDER OPERATION PROCEDURE</p>
--	----	--

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 3

Page 34 of 91

Event Description: 1-CH-LT-1115 (VCT Level Transmitter) fails low (AP-53.00)

Cue: Evaluator's Cue

Time	Position	Applicant's Action or Behavior
	RO	<p>Diagnoses failure of 1-CH-LT-1115 with the following indications/alarms:</p> <p>Alarms:</p> <ul style="list-style-type: none"> • 1D-G1 - VCT HI-LO LVL • 1D-H1 - VCT LO-LO LVL <p>Indications:</p> <ul style="list-style-type: none"> • Step change in 1-CH-LI-1115 with no change in redundant level instrument 1-CH-LI-1112 • Automatic makeup to the VCT started
	RO	<p>0-AP-53.00</p> <p>[1] CHECK REDUNDANT INSTRUMENT CHANNEL(S) INDICATION – NORMAL</p> <ul style="list-style-type: none"> • Step change in 1-CH-LI-1115 with no change in redundant level instrument 1-CH-LI-1112
	RO	<p>[2] PLACE AFFECTED CONTROL(S)/COMPONENT(S) IN MANUAL CONTROL AND STABILIZE PARAMETER USING REDUNDANT INDICATION</p> <p><i>Turns the blender control switch to STOP</i></p>
	SRO	<p>The team will hold a transient brief. During the brief the failure of 1-CH-LI-1115 will be discussed.</p> <p>The RO and BOP will report out critical parameters, as per placard on Main Control Room Bench Board.</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 2012-1

Scenario No.: 4

Event No.: 3

Page 35 of 91

Event Description: 1-CH-LT-1115 (VCT Level Transmitter) fails low (AP-53.00)

Cue: Evaluator's Cue

	RO	<p>0-AP-53.00</p> <p>*3. VERIFY REACTOR POWER – LESS THAN OR EQUAL TO 100%.</p> <p>RO will identify that reactor power is less than 100%.</p>
	SRO	<p>Notes Prior to Step 4:</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 13.
	SRO	<p>*4 DETERMINE THE FAILED INSTRUMENT / CONTROL AND GO TO APPROPRIATE STEP OR PROCEDURE:</p> <ul style="list-style-type: none"> • VCT Level, Step 12e
	RO	<p>The RO will identify that 1-CH-LI-1115 has failed low</p>
	SRO/RO	<p>12. CHECK PROPER OPERATION OF THE FOLLOWING INSTRUMENTS:</p> <p>e) VCT level instrumentation – NORMAL</p> <p>Step 12 RNO actions: Refer to Attachment 6.</p> <p><i>Attachment 6 is at the end of this section (page 37).</i></p> <p><i>After reviewing attachment 6, the SRO should transition to step 13 iaw the note prior to step 4.</i></p>
	SRO	<p>13. CHECK CALORIMETRIC – FUNCTIONAL IAW ()-OPT-RX-001</p> <p>Step 13 RNO Actions:</p> <p>a) Initiate ()-OPT-RX-007, SHIFT AVERAGE POWER CALCULATION, as necessary.</p> <p><i>Team determines that 1-OPT-RX-007 is not required due to low power level</i></p> <p>b) Immediately check or initiate power reduction to less than or equal to 100% IAW Attachment 7 by monitoring alternate power indications.</p> <p>c) Refer to TRM 3.3.5, Feedwater Ultrasonic Flow Meter Calorimetric, for required actions.</p> <p>SRO/RO determines that OPT-RX-001 is NOT impacted – however, since power level is low, the calorimetric is not functional at this time and the team could perform RNO actions. TRM actions not applicable at this power level (<98.4%)</p>

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 3

Page 36 of 91

Event Description: 1-CH-LT-1115 (VCT Level Transmitter) fails low (AP-53.00)

Cue: Evaluator's Cue

	SRO	<p>0-AP-53.00</p> <p>14. CHECK FAILED INSTRUMENT - IS A REGULATORY GUIDE 1.97 VARIABLE (Go to Step 16 if not Reg. Guide 1.97)</p> <p><i>SRO directs STA to review Reg. Guide 1.97. The STA will report that 1-CH-LT-1115 is a Reg. Guide 1.97 component.</i></p>
	SRO	<p>15. 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 VCT level indication and no actions are required.</i></p>
	SRO	<p>0-AP-53.00</p> <p>16. Review the following:</p> <ul style="list-style-type: none"> • TS 3.7 • VPAP-2802 • TRM Section 3.3, Instrumentation <p>No T.S. LCOs exist for this malfunction</p> <p><i>SRO directs STA to review VPAP-2802 and TRM Section 3.3. The STA acknowledges the request.</i></p>
	SRO	<p>17. CHECK ADDITIONAL INSTRUMENT / CONTROLLER MALFUNCTION – EXISTS</p> <p>Step 17 RNO actions: GO TO Step 19</p> <p>The team will identify that no new additional failures exist (i.e., all failures have already been addressed), proceed to the RNO section, and this will direct the team to Step 19.</p>
	SRO	<p>19. PROVIDE NOTIFICATIONS AS NECESSARY:</p> <ul style="list-style-type: none"> • Shift Supervision • OMOG • STA (PRA determination) • I&C

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 3

Page 37 of 91

Event Description: 1-CH-LT-1115 (VCT Level Transmitter) fails low (AP-53.00)

Cue: Evaluator's Cue

		<p>0-AP-53.00 - Attachment 6</p> <p>()-CH-LT-()112</p> <ul style="list-style-type: none"> • If ()-CH-LT-()112 fails high, ()-CH-LCV-()115A will open. Automatic swap-over of the CHG pump suction from the VCT to the RWST will not function. • If ()-CH-LT-()112 fails low, ()-CH-LCV-()115A will only automatically open from a high level signal from ()-CH-LT-()115. Automatic swap-over of the CHG pump suction from the VCT to the RWST will still function. <p>()-CH-LT-()112 provides input to the following:</p> <ol style="list-style-type: none"> a. Controller ()-CH-LC-()115 for modulating ()-CH-LCV-()115A open at the setpoint set on the controller b. CHG pump suction swap over to the RWST at 13% (2/2) <p>()-CH-LT-()115</p> <ul style="list-style-type: none"> • If ()-CH-LT-()115 fails high, ()-CH-LCV-()115A will open. Manual control of the blender will be required. Automatic swap-over of the CHG pump suction from the VCT to the RWST will not function. • If ()-CH-LT-()115 fails low, ()-CH-LCV-()115A will only automatically open from a high level signal from ()-CH-LT-()112. Automatic swap-over of the CHG pump suction from the VCT to the RWST will still function. <p>()-CH-LT-()115 provides input to the following:</p> <ol style="list-style-type: none"> a. VCT High level divert of ()-CH-LCV-()115A to PDT at 85% b. VCT High level alarm at 82% c. Auto makeup to VCT stop at 34% d. Auto makeup to VCT start at 27% e. VCT Low level alarm at 24% f. CHG pump suction swap over to the RWST at 13% (2/2)
		<p>END EVENT #3</p>

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 4

Page 38 of 91

Event Description: 1G Screenwell Transformer Fails (AP-12.01)

Cue: Evaluator's Cue

Time	Position	Applicant's Action or Behavior
	BOP	<p>Diagnoses failure using the following indications/alarms:</p> <ul style="list-style-type: none"> • VSP-J6 – 230 KV HSE TRBL • VSP L7 - LLIS TROUBLE <ul style="list-style-type: none"> • PCS Alarms: <ul style="list-style-type: none"> • IS-C8 – S/W NO.1 OR NO. 2 XFMR TRBL • IS-D9 - XFMR NO. 1 DIFF OPER • PCS screens indicating a loss of Unit 1 CW pumps <p><i>ARP VSP L-7 directs you to PCS, IS-C8 dispatches personnel to inspect transformer at low levels, and IS-D9 verifies proper crosstie of the 1G & 2G busses then initiates 0-AP-12.01.</i></p>
	SRO RO	<p>Enters 0-AP-12.01, LOSS OF INTAKE CANAL LEVEL</p> <p>NOTE: EIPs may be applicable.</p> <p>1. CHECK ENTRY INTO THIS PROCEDURE-FROM AN EOP OR AN AP TO RESTORE SW FLOW TO THE CCHXs</p> <p>Step 1 RNO actions: GO TO Step 3.</p> <p>Determines entry is not from an EOP or an AP to restore SW flow to the CCHXs and goes to step 3.</p>
	SRO RO BOP	<p>Caution and Note prior to step 3</p> <p>CAUTION:</p> <ul style="list-style-type: none"> • To prevent turbine damage from turbine stall flutter, Main Condenser vacuum must be maintained greater than 26.5 in-Hg when turbine power is less than or equal to 10%. • Abnormal Procedure ()-AP-14.00, LOSS OF CONDENSER VACUUM, should be reviewed if turbine vacuum can NOT be maintained. <p>NOTE: If both units are at power, it may be necessary to trip one unit to reduce the rate of Intake Canal inventory loss.</p> <p>*3. TRY TO MAINTAIN INTAKE CANAL LEVEL:</p> <ul style="list-style-type: none"> • Throttle Waterboxes • Reduce Unit load as necessary to maintain Condenser vacuum

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 4

Page 39 of 91

Event Description: 1G Screenwell Transformer Fails (AP-12.01)

Cue: Evaluator's Cue

		AP-12.01
	SRO	4. CHECK INTAKE CANAL LEVEL – DECREASING
	RO/BOP	<i>RO/BOP reports canal level trending down</i>
	BOP	5. START CIRC WATER PUMPS AS REQUIRED FROM THE MCR IAW ATTACHMENT 3
	SRO	Directs BOP to perform attachment 3.
	BOP	<p>1. <u>STARTING CIRCULATING WATER PUMPS FROM THE MCR OR LLIS</u></p> <p>NOTE: If starting circ water pumps that have just tripped, 5 minutes must be allowed for coastdown before starting.</p> <ol style="list-style-type: none"> Check 4160 VAC G bus energized by Normal Supply or X-Tie. Check the LOCAL CONTROL indication for the pump to be started is NOT LIT. IF remote start is inoperable, THEN verify CW pumps to be started are in LOCAL. Select Soft Control for the pump to be started. N/A if local start to occur. Enable Soft Control and verify red border. N/A if local start to occur. Start the selected Circulating Water Pump by pushing the START button. IF local start to occur due to inoperable PCS, THEN start CW pumps locally. Check amps indicated for pump started. Direct Outside Operator to perform local operational checks IAW OP-48.1.1. <p>BOP will wait 5 minutes before REMOTELY starting all CW pumps that had previously tripped.</p>

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 4

Page 40 of 91

Event Description: 1G Screenwell Transformer Fails (AP-12.01)

Cue: Evaluator's Cue

	SRO	<p>AP-12.01</p> <p>Note prior to step 6</p> <p>NOTE:</p> <ul style="list-style-type: none"> • A PIN Number and a Key are required for entry into the ESW Pump house. • A Key is required for entry into the ESW Pump house and the Low Level Switchgear Room. • There are no restrictions on the number of CW pumps which may be started with the 1G and 2G buses crosstied.
	BOP	<p>6. SEND OPERATOR TO LOW LEVEL INTAKE TO PERFORM THE FOLLOWING PROCEDURES:</p> <ul style="list-style-type: none"> • Attachment 2, LOW LEVEL INTAKE RESPONSES • 0-OP-SW-002, EMERGENCY SERVICE WATER PUMP OPERATION • OP-48.1.1, STARTING ANY CW PUMP
	SRO/RO	<p>7. CHECK INTAKE CANAL LEVEL – GREATER THAN TRIP SETPOINT</p> <ul style="list-style-type: none"> • Annunciator ()F-G1, INTK CANAL LO LVL TRIP - NOT LIT • Intake Canal level – GREATER THAN 23.5 FEET
	SRO/RO	<p>8. CHECK CW LOSS - SUSTAINED WITH NO EXPECTATION OF RECOVERY</p> <p>Step 8 RNO actions: GO TO Step 10.</p>
	SRO	<p>10. CONTINUE TO REDUCE UNIT LOAD AS NECESSARY TO MAINTAIN VACUUM</p> <p>Team will determine not necessary to reduce turbine load.</p> <p>11. CHECK INTAKE CANAL LEVEL – STABLE OR INCREASING</p> <p>12. GO TO STEP 27</p>

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 4

Page 41 of 91

Event Description: 1G Screenwell Transformer Fails (AP-12.01)

Cue: Evaluator's Cue

	SRO	<p>AP-12.01</p> <p>27. NOTIFY THE FOLLOWING:</p> <ul style="list-style-type: none"> • OM on call • Manager Nuclear Operations • STA
	SRO	<p>Note prior to step 28</p> <p>NOTE: Intake canal level must be maintained above 17.2 FT for adequate RS HX inventory.</p>
	RO	28. VERIFY INTAKE CANAL LEVEL - INCREASING
	RO	29. CHECK INTAKE CANAL LEVEL - GREATER THAN 17.2 FT
	SRO	<p>Note prior to step 30</p> <p>NOTE: If SW flow to the CC HXs is increased, intake canal level should be monitored. The valves must be returned to their original position if canal level decreases.</p>
	RO	<p>30. THROTTLE OPEN CC HX SW OUTLET VALVES AS NECESSARY TO LOWER CC TEMPERATURE</p> <p>Team will determine that this is not necessary.</p> <p>31. VERIFY CAUSE OF LEVEL DECREASE - CORRECTED</p> <p>32. RESTORE CW AND SW COMPONENTS (INCLUDING CW CHEMICAL INJECTION BY OPENING 1-SA-285 AND 2-SA-274) TO SUPPORT PLANT CONDITIONS</p> <p>- END AP-12.01 actions -</p>
		End Event #4

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 5

Page 42 of 91

Event Description: 1-FW-LT-1476 - "A" SG NR Chan III fails low (AP-53.00)

Cue: Evaluator's Cue

Time	Position	Applicant's Action or Behavior
	BOP	Diagnoses channel failure with the following indications/alarms: Alarms: <ul style="list-style-type: none"> • 1F-G7 – STM GEN 1A LO-LO LVL CH 3 • 1H-C5 - STM GEN 1A LO-LO LVL • 1H-G5 – STM GEN 1A LVL ERROR Indications: <ul style="list-style-type: none"> • 1-FW-FCV-1478 respond to level channel failure by opening in automatic
	SRO	Enters 0-AP-53.00, Loss of Vital Instrumentation / Controls.
	RO	[1] CHECK REDUNDANT INSTRUMENT CHANNEL(S) INDICATION - NORMAL Verifies Channel I and II are NORMAL.
	BOP	[2] PLACE AFFECTED CONTROL(S)/COMPONENT(S) IN MANUAL CONTROL AND STABILIZE PARAMETER USING REDUNDANT INDICATION BOP takes manual control of 'A' SG feed reg valve and reduces demand (FF < SF) to restore level to program.
	SRO	The team will hold a transient brief. During the brief the failure of 1-FW-LI-1476 will be discussed. <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>
	RO	*3. VERIFY REACTOR POWER – LESS THAN OR EQUAL TO 100%. RO will identify that reactor power, by ΔT , is less than 100%.

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 5

Page 43 of 91

Event Description: 1-FW-LT-1476 - "A" SG NR Chan III fails low (AP-53.00)

Cue: Evaluator's Cue

	<p>SRO</p> <p>RO</p>	<p>0-AP-53.00, Loss of Vital Instrumentation / Controls</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 13. <p>*4 DETERMINE THE FAILED INSTRUMENT / CONTROL AND GO TO APPROPRIATE STEP OR PROCEDURE:.</p> <ul style="list-style-type: none"> • SG NR Level, Step 7 <p>The RO will identify that 1-FW-LT-1476 has failed low.</p>
	BOP	<p>Caution prior to step 7:</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>
	BOP	<p>7. CHECK STEAM GENERATOR LEVEL CONTROL INSTRUMENTS – NORMAL</p> <ul style="list-style-type: none"> • Steam Pressure • Steam Flow • Feed Flow • Steam Generator Level <p><i>Determines CH III Steam Generator Level instrumentation for 'A' SG is NOT normal.</i></p>

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 5

Page 44 of 91

Event Description: 1-FW-LT-1476 - "A" SG NR Chan III fails low (AP-53.00)

Cue: Evaluator's Cue

		0-AP-53.00, Loss of Vital Instrumentation / Controls
		Step 7. RNO
	SRO	IF the selected steam flow, steam pressure, or feed flow input to the SG Water Level Control system has failed, THEN do the following: <i>Determines that none of the listed instruments are affected and continues in the RNO column.</i>
	SRO	IF SG Level Channel III has failed, THEN do the following:
	BOP	a) Place the associated Feed Reg Valve in MANUAL.
		b) IF manual control of Feedwater is inoperable, THEN do the following:
		1) Control SG level with Feedwater Isolation MOVs.
		2) Consult with the Shift Manager concerning the need to place the MFRV on the jack.
	BOP	c) Control SG level at program level.
	BOP	d) Main Feed Reg Valve Bypass Valves may be used for fine control of SG level.
		Perform follow-up actions:
	SRO	a) Consult with Shift Manager on need to initiate ()-OP-RP-001, ALIGNING CONTROL SYSTEM FOR PERFORMANCE OF CHANNEL I, II, III, AND IV PROCESS AND PROTECTION TESTING.
	SRO	b) Refer to the following Tech Spec 3.7 items:
		<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 • Table 3.7-6 items 15 & 16

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 5

Page 45 of 91

Event Description: 1-FW-LT-1476 - "A" SG NR Chan III fails low (AP-53.00)

Cue: Evaluator's Cue

		<p>0-AP-53.00, Loss of Vital Instrumentation / Controls</p> <p>Step 7. RNO (Continued)</p> <p>SRO SRO should determine the follow Technical Specification implications for this failure:</p> <p>SRO 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 c) Refer to Attachment 1.</p> <p>SRO d) IF no other instrumentation failure exists, THEN GO TO Step 13.</p>
	SRO	<p>13. CHECK CALORIMETRIC – FUNCTIONAL IAW ()-OPT-RX-001</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>
	SRO	<p>14. 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-FW-LT-1476 is a Reg. Guide 1.97 component.</i></p>
	SRO	<p>15. 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>

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 5

Page 46 of 91

Event Description: 1-FW-LT-1476 - "A" SG NR Chan III fails low (AP-53.00)

Cue: Evaluator's Cue

	SRO	<p>0-AP-53.00, Loss of Vital Instrumentation / Controls</p> <p>16. 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 acknowledges the request.</i></p>
	SRO	<p>17. CHECK ADDITIONAL INSTRUMENT / CONTROLLER MALFUNCTION - EXISTS</p> <p>Step 17 RNO actions: GO TO Step 19</p> <p>The team will identify that no additional failures exist, proceed to the RNO section, and this will direct the team to Step 19</p>
	SRO	<p>19. PROVIDE NOTIFICATIONS AS NECESSARY:</p> <ul style="list-style-type: none"> • Shift Supervision • OMOG • STA (PRA determination) • I&C
		END EVENT 5

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 6

Page 47 of 91

Event Description: 1-PG-P-1A ('A' Primary Grade Water Pump) will trip and 1-PG-P-1B will not auto start.

Cue: Evaluator's Cue

Time	Position	Applicant's Action or Behavior
	BOP	<p>Diagnoses failure of 1-PG-P-1A and 1-PG-P-1B with the following indications/alarms:</p> <p>Alarms:</p> <ul style="list-style-type: none"> • BR-D10 - PRI GRADE WTR LO HDR PRESS • 1D-B4 - PRI WTR TO BLEND LO PRESS <p>Indications:</p> <ul style="list-style-type: none"> • 1-PG-P-1A and 1B not running. • No flow or pressure indicated for primary grade water. <p><i>SRO/RO may elect to place the BLENDER in OFF at this time.</i></p>
	SRO	<p>SRO may direct RO to start 1-PG-P-1B (as it should have automatically started) or may direct the RO/BOP to perform 1D-B4 or 1-BR-D10.</p> <p>The guide assumes performance of 1-BR-D10 (Primary Grade Water Low Header Pressure) and/or 1D-B4 (Primary Water to Blend Low Pressure).</p>
	BOP	<p>1-BR-D10 (Primary Grade Water Low Header Pressure)</p> <p>Note prior to Step 1:</p> <ul style="list-style-type: none"> • The standby PG Pump should automatically start when system pressure decreases to less than or equal to 50 psig.
	BOP	<p>1. VERIFY PG SYSTEM PRESSURE LESS THAN OR EQUAL TO 75 PSIG:</p> <ul style="list-style-type: none"> • PI-BR-121, Pri Wtr Sup Press
	RO	<p>2. VERIFY PG PUMPS – RUNNING AS NECESSARY:</p> <ul style="list-style-type: none"> • One in Hand • One in Auto
	RO	<p>Step 2 RNO actions:</p> <p>Do the following:</p> <p>a) Align switches as necessary.</p> <p>RO will place 1-PG-P-1B in Hand</p> <p>b) If PG Pumps off for planned evolution, THEN return to procedure in effect.</p>

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 6

Page 48 of 91

Event Description: 1-PG-P-1A ('A' Primary Grade Water Pump) will trip and 1-PG-P-1B will not auto start.

Cue: Evaluator's Cue

	BOP	<p>1-BR-D10 (Primary Grade Water Low Header Pressure)</p> <p>3. CHECK EXCESSIVE USE OF PG WATER AS INDICATED ON FI-BR-126, PRI WTR SUP PPS FLOW</p> <p>Step 3 RNO actions:</p> <p>Do the following:</p> <ul style="list-style-type: none"> a) Locally check PG Pump for proper operation. b) Locally check for system integrity. c) IF system leakage or rupture exists, THEN isolate as necessary AND GOT TO Step 6. d) GO TO Step 5.
	BOP	<p>5. VERIFY PROPER OPERATION OF PUMP RECIRCULATION VALVE:</p> <ul style="list-style-type: none"> • 1-PG-PCV-114, PRI SUP WATER PUMPS 1A/1B RECIRC HDR
	BOP	<p>6. SUBMIT WORK REQUEST AS NECESSARY.</p>
	BOP	<p>7. PROVIDE NOTIFICATION AS NECESSARY</p> <ul style="list-style-type: none"> • Shift Supervision
		END ARP BR-D10

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 6

Page 49 of 91

Event Description: 1-PG-P-1A ('A' Primary Grade Water Pump) will trip and 1-PG-P-1B will not auto start.

Cue: Evaluator's Cue

		<p>1D-B4 (Primary Water to Blend Low Pressure)</p> <p>1. CHECK PG HDR PRESS – LESS THAN OR EQUAL TO 65 PSIG ON 1-BR-PI-121 AT THE BORON RECOVERY PANEL.</p>
		<p>2. CHECK PRIMARY GRADE WATER PUMPSs – ONE RUNNING</p> <ul style="list-style-type: none"> • 1-PG-P-1A • 1-PG-P-1B <p>Step 2 RNO actions: Start a pump.</p> <p>RO will start 1-PG-P-1B.</p>
		3. CHECK 1-BR-PCV-114 – THROTTLING TO RAISE HDR PRESS
		4. CHECK VALVE LINEUP – CORRECT
		5. CHECK PG HDR PRESS – GREATER THAN 65 PSIG
		6. NOTIFY SHIFT SUPERVISION
	SRO	<p>The team will hold a transient brief. During the brief the failure of 1-PG-P-1A/1B will be discussed.</p> <p>The RO and BOP will report out critical parameters, as per placard on Main Control Room Bench Board.</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 failed Containment Gas Radiation Monitor. He will also state that containment conditions and the electrical conditions are as you see them.</i></p>
		End EVENT #6

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 7

Page 50 of 91

Event Description: Small steam leak 1-FW-P-2 steam line/reactor trip/steam break escalates

Cue: Evaluator's Cue

Time	Position	Applicant's Action or Behavior
	RO	<p>Diagnoses failure of 1-FW-P-2 Steam Line with the following indications/alarms:</p> <p>Alarms:</p> <ul style="list-style-type: none"> • 1C-B8 - PRZR LO PRESS • 1H-A3 – HI-LO TAVE LOOP 1A • 1H-B3 – HI-LO TAVE LOOP 1B • 1H-C3 – HI-LO TAVE LOOP 1C <p>Indications:</p> <ul style="list-style-type: none"> • Loop Taves decreasing • MWe decreasing • RCS Pressure decreasing • Steam Flow increasing on all steam generators <p><i>After 2 minutes, security will contact the Main Control Room and report that steam is issuing from Unit 1 Safeguards.</i></p>
	SRO	Based on degrading plant conditions the SRO will direct a reactor trip and safety injection.
	SRO	GO TO 1-E-0, REACTOR TRIP OR SAFETY INJECTION
	RO	<p>[1] CHECK 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 2012-1

Scenario No.: 4

Event No.: 7

Page 51 of 91

Event Description: Small steam leak 1-FW-P-2 steam line/reactor trip/steam break escalates

Cue: Evaluator's Cue

	RO	1-E-0
	RO	[2] CHECK TURBINE TRIP:
	RO	<ul style="list-style-type: none"> a) Manually trip the turbine 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 d) Verify generator output breakers – OPEN (Time Delayed)
	RO	[3] CHECK BOTH AC EMERGENCY BUSES – ENERGIZED
	RO	[4] CHECK IF SI INITIATED:
	RO	<ul style="list-style-type: none"> a) Check if SI is actuated: <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
	RO	<ul style="list-style-type: none"> b) Manually Initiate SI <p><i>Evaluator's Note: If RCS pressure is not at the low pressure SI setpoint, the RO may inform the team that a safety injection is imminent and initiate SI.</i></p> <p>Step 4 RNO actions:</p> <ul style="list-style-type: none"> a) Check if SI is required or imminent as indicated by any of the following: <ul style="list-style-type: none"> • Low PRZR pressure • High CTMT pressure • High steamline differential pressure • High steam flow with low Tave or low line pressure <p><u>IF</u> SI is required, <u>THEN</u> GO TO Step 4b.</p> <p><u>IF</u> SI is NOT required, <u>THEN</u> GO TO 1-ES-0.1, REACTOR TRIP RESPONSE</p> <p>The team should identify that a Safety Injection is imminent (low pressure) and return to Step 4.b and manually initiate a safety injection.</p>

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 7

Page 52 of 91

Event Description: Small steam leak 1-FW-P-2 steam line/reactor trip/steam break escalates

Cue: Evaluator's Cue

	SRO	<p>1-E-0</p> <p>The team will hold a transition brief. During the brief it will be identified that the team will remain in E-0 and that the Steam Generators are all faulted (by evidence of steam flow on each steam generator).</p> <p>A full transient brief may not occur at this time.</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 (or as reported by the RO/BOP).</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 under Event 8).</p>
	BOP	<p>SRO may provide the BOP with Attachment 8 of 1-E-0 for guidance on AFW control.</p> <p>Actions are summarized below:</p> <ol style="list-style-type: none"> 1. Verify SI is in progress. 2. Verify running or start 1-FW-P-2, 1-FW-P-3A, and 1-FW-P-3B. 3. Maintain minimum AFW flow of 350 gpm [450 gpm] until one SG Narrow Range level is greater than 12% 4. When minimum heat sink has been verified, AFW MOVs should be controlled to maintain intact SG Narrow Range levels between 22% and 50% by throttling AFW Isolation MOVs.

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 7

Page 53 of 91

Event Description: Small steam leak 1-FW-P-2 steam line/reactor trip/steam break escalates

Cue: Evaluator's Cue

	RO	<p>1-E-0</p> <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 due to the faulted SGs and SI flow. 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 <p>Team should close the MSTVs at this time. Since the "B" MSTV will not close, the team may close the associated NRV or utilize the Appendix "R" isolation switch, which will result in the "B" MSTV going closed.</p>
	RO	<p>1-E-0</p> <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
	SRO	<p>Note Prior to Step 8:</p> <ul style="list-style-type: none"> • Seal Injection flow should be maintained to all RCPs.

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 7

Page 54 of 91

Event Description: Small steam leak 1-FW-P-2 steam line/reactor trip/steam break escalates

Cue: Evaluator's Cue

	RO	<p>1-E-0</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 be greater than 30 °F</p> <p>b) RNO – 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 <p>a) STABLE OR INCREASING AND</p> <p>b) GREATER THAN 100 PSIG</p> <p>BOP will observe a decreasing trend on all SG pressures. The Team will transition to 1-E-2.</p>

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 7

Page 55 of 91

Event Description: Small steam leak 1-FW-P-2 steam line/reactor trip/steam break escalates

Cue: Evaluator's Cue

		1-E-2 (Faulted Steam Generator Isolation) Actions
	SRO	<p>The team will hold a transition brief for entering 1-E-2. The team will discuss entering 1-E-2 and transitioning to 1-ECA-2.1.</p> <p>A full transient brief may not occur at this time.</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 (or as reported by the RO/BOP).</i></p> <p><i>Evaluator's Note: If the team throttles AFW flow to at least 60 gpm early, FR-H.1 will be applicable at that time (no actions, just entry and subsequent exit).</i></p>
	SRO	Initiate E-2, Faulted Steam Generator Isolation.
	SRO	<p>Cautions prior to Step 1</p> <ul style="list-style-type: none"> • At least one SG must be maintained available for RCS cooldown. • Any faulted SG or secondary break should remain isolated during subsequent recovery actions unless needed for RCS cooldown.
	RO	<p>1. CHECK MSTV AND BYPASS VALVE ON AFFECTED SG(s) - CLOSED</p> <p>Step 1 RNO actions:</p> <ul style="list-style-type: none"> • Manually close MSTVs and locally close bypass valves. • IF MSTV can NOT be closed, THEN close MS NRV. <p>If the MSTV were closed in 1-E-0, the RO will report that the MSTV and Bypass Valves are closed. Otherwise, the team will enter the RNO of this step and attempt to close all three MSTVs.</p> <p>The RO will identify that the "B" MSTV will not close and perform RNO actions to close the "B" MS NRV. Team may also utilize the appendix 'R' emergency close switch, which will result in the "B" MSTV closing. (Note: this may already have been completed in 1-E-0)</p>

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 7

Page 56 of 91

Event Description: Small steam leak 1-FW-P-2 steam line/reactor trip/steam break escalates

Cue: Evaluator's Cue

	RO	2. CHECK IF ANY SG SECONDARY SIDE IS INTACT: <ul style="list-style-type: none">• Check pressures in all SGs – ANY STABLE OR INCREASING RO will report that all three steam generator pressures are decreasing and that all three steam generators are faulted.
	SRO	Step 2 RNO actions: <ul style="list-style-type: none">• IF all SG pressures decreasing in an uncontrolled manner, THEN GO TO 1-ECA-2.1, UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS. <i>The team will transition to 1-ECA-2.1.</i>

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 7

Page 57 of 91

Event Description: Small steam leak 1-FW-P-2 steam line/reactor trip/steam break escalates

Cue: Evaluator's Cue

		1-ECA-2.1 (Uncontrolled Depressurization of All Steam Generators) Actions
	SRO	<p>Caution prior to Step 1:</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/RO	<p>1. CHECK SECONDARY PRESSURE BOUNDARY:</p> <ul style="list-style-type: none"> MSTVs and bypass valves – CLOSED SG PORVs – CLOSED Main Steam line NRVs – CLOSED TD AFW pump steam supply valves – CLOSED <p>Closing the TD AFW supply valves is not possible with auto-start signal present (Lo-Lo S/G levels)</p> <ul style="list-style-type: none"> Feed REG valves – CLOSED SG FW bypass flow valves – CLOSED SG FW isolation MOVs – CLOSED SG blowdown TVs – CLOSED
	BOP/RO	
	BOP	
	BOP	
	BOP	
	BOP	
	BOP	
	BOP/RO	
	SRO	<p>Caution prior to Step 2:</p> <ul style="list-style-type: none"> A minimum of 60 gpm [100 gpm] feed flow must be maintained to each SG with a narrow range level less than 12% [18%]. <p>Note prior to Step 2:</p> <ul style="list-style-type: none"> Shutdown Margin should be monitored during RCS cooldown.

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 7

Page 58 of 91

Event Description: Small steam leak 1-FW-P-2 steam line/reactor trip/steam break escalates

Cue: Evaluator's Cue

		1-ECA-2.1 (Uncontrolled Depressurization of All Steam Generators) Actions
RO		<p>2. CONTROL FEED FLOW TO MINIMIZE RCS COOLDOWN:</p> <p>a) Check cooldown rate in RCS cold legs - LESS THAN 100°F/hr</p> <p>The team will identify that the RCS cooldown rate is exceeding 100 °F/hr.</p> <p><i>Evaluator's Note: The team may request the STA to determine the RCS cooldown rate. If this is the case the STA will obtain the RCS cooldown rate from the PCS and report it to the Unit Supervisor.</i></p> <p>Step 2a RNO actions:</p>
BOP		<p>a) Lower feed flow to 60 gpm [100 gpm] to each SG. GO TO Step 2c.</p> <p>The BOP will lower AFW flow to each SG to approximately 60 gpm.</p> <p>Critical Task: Maintain a minimum of 60 gpm AFW flow to each steam generator with a narrow range less than 12% PRIOR to wide range steam generator level reaching 7%.</p>
RO		<p>c) Check RCS hot leg temperatures - STABLE OR DECREASING</p> <p>The RO will report that RCS hot leg temperatures are decreasing.</p>
STA		<p>The STA will report to the Unit Supervisor that based on current plant conditions the team has met entry criteria for FR-H.1 (red path).</p>
		<p>1-FR-H.1 (Response to Loss of Secondary Heat Sink)</p> <p>Cautions prior to Step 1:</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. <p>Based on the first caution the team will exit FR-H.1 and return to 1-ECA-2.1.</p>

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 7

Page 59 of 91

Event Description: Small steam leak 1-FW-P-2 steam line/reactor trip/steam break escalates

Cue: Evaluator's Cue

		1-ECA-2.1 (Uncontrolled Depressurization of All Steam Generators) Actions
	SRO	Note Prior to Step 3: <ul style="list-style-type: none"> Seal Injection flow should be maintained to all RCPs.
	RO	*3. CHECK RCP TRIP AND MINIFLOW RECIRC CRITERIA: <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 be greater than 30 °F</p> <p>b) RNO – GO TO Step 4.</p>
	SRO	Caution prior to Step 4: <ul style="list-style-type: none"> 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.
	RO	*4 CHECK PRZR PORVs AND BLOCK VALVES <p>a) Power to PRZR PORV block valves - AVAILABLE</p> <p>b) PRZR PORVs – CLOSED</p> <p>c) PRZR PORV block valves – AT LEAST ONE OPEN</p>
	RO/BOP	5. CHECK SECONDARY RADIATION: <p>a) Initiate periodic activity sampling of all SGs IAW Attachment 1</p> <p>b) Check unisolated secondary radiation monitors: <ul style="list-style-type: none"> Main steamline TD AFW pump exhaust Condenser air ejector </p> <p>c) Secondary Radiation – NORMAL</p>

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 7

Page 60 of 91

Event Description: Small steam leak 1-FW-P-2 steam line/reactor trip/steam break escalates

Cue: Evaluator's Cue

		1-ECA-2.1 (Uncontrolled Depressurization of All Steam Generators) Actions
	RO	<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>*6. CHECK IF LHSI PUMPS SHOULD BE STOPPED:</p> <p>a) Check LHSI pumps - ANY RUNNING WITH SUCTION ALIGNED TO RWST</p> <p>b) Check RCS pressure:</p> <p>1) Pressure – GREATER THAN 250 PSIG [400 PSIG]</p> <p>2) Pressure - STABLE OR INCREASING</p> <p>c) Reset both trains of SI if necessary c)</p> <p>d) Stop LHSI pumps and put in AUTO</p>
	RO	<p>*7. CHECK IF CS SHOULD BE STOPPED:</p> <p>a) Spray pumps – RUNNING</p> <p>Step 7a RNO actions: GO TO Step 9.</p>
	RO	<p>9. CHECK RWST LEVEL – GREATER THAN 20%</p>
		<p>10. CHECK IF SI ACCUMULATORS SHOULD BE ISOLATED:</p> <p>a) At least two RCS hot leg temperatures - LESS THAN 435°F</p> <p>Step 10a RNO actions: WHEN at least two RCS hot leg temperatures less than 435°F, THEN GO TO Step 10.b. GO TO Step 12.</p> <p>b) Check power to Accumulator discharge isolation valves - AVAILABLE</p> <p>Step 10b RNO actions: Locally close the following breakers (key required):</p> <ul style="list-style-type: none"> • 1H1-2N 5B • 1J1-2E 1B • 1J1-2E 1C
		No further actions are expected in 1-ECA-2.1

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 7

Page 61 of 91

Event Description: Small steam leak 1-FW-P-2 steam line/reactor trip/steam break escalates

Cue: Evaluator's Cue

		END SCENARIO #4
--	--	------------------------

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 8

Page 62 of 91

Event Description: Various Phase I TVs fail to CLOSE

Cue: Evaluator's Cue

Time	Position	Applicant's Action or Behavior
	BOP	<p>ATTACHMENT 1 OF E-0</p> <p>1. CHECK 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
	BOP	<p>ATTACHMENT 1 OF E-0</p> <p>2. CHECK CTMT ISOLATION PHASE I:</p> <ul style="list-style-type: none"> • Phase I TVs – CLOSED <p><i>BOP will close 1-CH-TV-1204A and 1-CH-TV-1204B as part of phase 1 isolation</i></p> <ul style="list-style-type: none"> • 1-CH-MOV-1381 – CLOSED <p><i>The BOP will close 1-CH-MOV-1381.</i></p> <ul style="list-style-type: none"> • 1-SV-TV-102A – CLOSED • PAM isolation valves – CLOSED <ul style="list-style-type: none"> • 1-DA-TV-103A • 1-DA-TV-103B
	BOP	<p>ATTACHMENT 1 OF E-0</p> <p>3. CHECK AFW PUMPS RUNNING:</p> <ol style="list-style-type: none"> a) MD AFW pumps – RUNNING (Time Delayed) b) TD AFW pump - RUNNING IF NECESSARY
	BOP	<p>ATTACHMENT 1 OF E-0</p> <p>4. CHECK SI PUMPS RUNNING:</p> <ul style="list-style-type: none"> • CHG pumps – RUNNING • LHSI pumps - RUNNING
	BOP	<p>ATTACHMENT 1 OF E-0</p> <p>5. CHECK CHG PUMP AUXILIARIES:</p> <ul style="list-style-type: none"> • CHG pump CC pump – RUNNING • CHG pump SW pump - RUNNING

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 8

Page 63 of 91

Event Description: Various Phase I TVs fail to CLOSE

Cue: Evaluator's Cue

	BOP	<p>ATTACHMENT 1 OF E-0</p> <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>ATTACHMENT 1 OF E-0</p> <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 step 8.</p>
	BOP	<p>ATTACHMENT 1 OF E-0</p> <p>*8. CHECK IF CS REQUIRED:</p> <p>a) CTMT pressure – HAS EXCEEDED 23 PSIA</p> <p>Step 8 RNO actions:</p> <p>a) Do the following:</p> <ol style="list-style-type: none"> 1) IF CTMT pressure has exceeded 17.7 psia, THEN check or align the following valves: <ul style="list-style-type: none"> • 1-RM-TV-100A - CLOSED • 1-RM-TV-100B - CLOSED • 1-RM-TV-100C - CLOSED • 1-SV-TV-102 - CLOSED • 1-IA-TV-101A - CLOSED • 1-IA-TV-101B - CLOSED • 1-IA-AOV-103 - OPEN 2) GO TO Step 10. <p>Identifies pressure has not exceeded 23 or 17.7 psia and goes to step 10.</p>
	BOP	<p>ATTACHMENT 1 OF E-0</p> <p>*10. BLOCK LOW PRZR PRESS SI SIGNAL:</p> <ol style="list-style-type: none"> a) Check PRZR pressure – LESS THAN 2000 psig b) Turn both LO PRZR PRESS & STM HDR/LINE ΔP switches to block c) Verify Permissive Status light C-2 - LIT <p>BOP may block the low pressurizer pressure SI signal depending on current RCS pressure.</p>

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 8

Page 64 of 91

Event Description: Various Phase I TVs fail to CLOSE

Cue: Evaluator's Cue

	BOP	<p>ATTACHMENT 1 OF E-0</p> <p>*11. BLOCK LOW TAVE SI SIGNAL:</p> <p>Step may not be performed at this time (if Tave is greater than 543°F).</p> <ol style="list-style-type: none"> a) Check RCS Tave - LESS THAN 543°F b) Turn both HI STM FLOW & LO TAVG OR LP switches to block c) Verify Permissive Status light F-1 - LIT
	BOP	<p>ATTACHMENT 1 OF E-0</p> <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 re-performing Step 12. <p>12. CHECK SI FLOW:</p> <ol style="list-style-type: none"> a) HHSI to cold legs - FLOW INDICATED <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 b) Check CHG pumps - THREE RUNNING c) Reset SI. d) Stop one CHG pump and out in AUTO e) RCS pressure - LESS THAN 185 PSIG <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. <p>Critical Task: Secure one LHSI pump within 30 minutes of initiation of SI. [SPS E-1 -- G]</p>

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 8

Page 65 of 91

Event Description: Various Phase I TVs fail to CLOSE

Cue: Evaluator's Cue

	BOP	<p>ATTACHMENT 1 OF E-0</p> <p>13. CHECK TOTAL AFW FLOW - GREATER THAN 350 GPM [450 GPM]</p>
	BOP	<p>ATTACHMENT 1 OF E-0</p> <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>ATTACHMENT 1 OF E-0</p> <p>15. INITIATE SI VALVE ALIGNMENT IAW ATTACHMENT 2</p> <p>Attachment 2 actions start on the next page.</p>
	BOP	<p>ATTACHMENT 1 OF E-0</p> <p>16. INITIATE VENTILATION, AC POWER, AND SFP STATUS CHECKS IAW ATTACHMENT 3</p> <p><i>Attachment 3 actions start on page 69.</i></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>

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 8

Page 66 of 91

Event Description: Various Phase I TVs fail to CLOSE

Cue: Evaluator's Cue

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

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 8

Page 67 of 91

Event Description: Various Phase I TVs fail to CLOSE

Cue: Evaluator's Cue

	RO/BOP	<p>ATTACHMENT 2 of 1-E-0</p> <p>5. Verify closed or close CHG line isolation MOVs.</p> <ul style="list-style-type: none"> • 1-CH-MOV-1289A • 1-CH-MOV-1289B
	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

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 8

Page 68 of 91

Event Description: Various Phase I TVs fail to CLOSE

Cue: Evaluator's Cue

		ATTACHMENT 2 of 1-E-0
	RO/BOP	11. IF flow not indicated, THEN manually start pumps and align valves. IF flow NOT established, THEN consult with Shift Supervision to establish another high pressure injection flow path while continuing with this procedure. <ul style="list-style-type: none">• Alternate SI to Cold legs• Hot leg injection

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 8

Page 69 of 91

Event Description: Various Phase I TVs fail to CLOSE

Cue: Evaluator's Cue

NUMBER 1-E-0	ATTACHMENT TITLE	ATTACHMENT 3
REVISION 65	AUXILIARY VENTILATION, AC POWER, AND SFP STATUS CHECKS	PAGE 1 of 6

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

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

TABLE 1
UNIT #1 VENTILATION PANEL

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

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 8

Page 70 of 91

Event Description: Various Phase I TVs fail to CLOSE

Cue: Evaluator's Cue

NUMBER 1-E-0	ATTACHMENT TITLE AUXILIARY VENTILATION, AC POWER, AND SFP STATUS CHECKS	ATTACHMENT 3
REVISION 65		PAGE 2 of 6

TABLE 2
VNTX PANEL

<u>MARK NUMBER</u>	<u>EXPECTED EQUIPMENT STATUS</u>	<u>RESPONSE NOT OBTAINED</u>
<input type="checkbox"/> a. AOD-VS-107A & B AOD-VS-108	RED GREEN	<input type="checkbox"/> a. Place AUX BLDG CENTRAL AREA MODE switch to FILTER.
<input type="checkbox"/> b. MOD-VS-100A & B AOD-VS-106	RED GREEN	<input type="checkbox"/> b. • Place MOD-VS-100A to FILTER. • Place MOD-VS-100B to FILTER.
<input type="checkbox"/> c. MOD-VS-200A & B AOD-VS-206	GREEN RED	<input type="checkbox"/> c. • Place MOD-VS-200A to UNFILTER. • Place MOD-VS-200B to UNFILTER.
<input type="checkbox"/> d. AOD-VS-103A & B AOD-VS-104	GREEN GREEN	<input type="checkbox"/> d. • Place AOD-VS-103A in UNFILTER. • Place AOD-VS-103B in UNFILTER. • Place AOD-VS-104 in FILTER.
<input type="checkbox"/> e. AOD-VS-101A & B AOD-VS-102	GREEN GREEN	<input type="checkbox"/> e. Place AOD-VS-101A and 101B in UNFILTER.
<input type="checkbox"/> f. AOD-VS-111A & B	GREEN	<input type="checkbox"/> f. Place COMBINE CONTAINMENT EXHAUST in ISOLATE.
<input type="checkbox"/> g. AOD-VS-110	GREEN	<input type="checkbox"/> g. Place AOD-VS-109A and 109B in FILTER.
<input type="checkbox"/> h. AOD-VS-112A & B	GREEN	<input type="checkbox"/> h. • Place AOD-VS-112A in CLOSE. • Place AOD-VS-112B in CLOSE.
<input type="checkbox"/> i. MOD-VS-58A & B 1-VS-F-58A & B	RED RED	<input type="checkbox"/> i. Start 1-VS-F-58A and 1-VS-F-58B.
3. <u> </u> Check filtered exhaust flow: (as read on FI-VS-117A and FI-VS-117B)		
<input type="checkbox"/> • Total flow - GREATER THAN 32400 cfm		
<u>AND</u>		
<input type="checkbox"/> • Flow through each filter bank - LESS THAN 39600 cfm		

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 8

Page 71 of 91

Event Description: Various Phase I TVs fail to CLOSE

Cue: Evaluator's Cue

NUMBER 1-E-0	ATTACHMENT TITLE	ATTACHMENT 3
REVISION 65	AUXILIARY VENTILATION, AC POWER, AND SFP STATUS CHECKS	PAGE 3 of 6

4. ___ Check all Station Service Buses - ENERGIZED. IF NOT, THEN initiate 1-AP-10.07, LOSS OF UNIT 1 POWER.
5. ___ Check annunciator VSP-J2 - LIT.
6. ___ Check Unit 1 RSST LTC time delay bypass light - LIT.
7. ___ Check stopped or stop 1-VS-AC-4.
8. ___ Place 1-VS-43-VS103X, MCR ISOLATION switch to the OFF position.
9. ___ Check closed or close MCR isolation dampers.
 - 1-VS-MOD-103A
 - 1-VS-MOD-103B
 - 1-VS-MOD-103C
 - 1-VS-MOD-103D

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 8

Page 72 of 91

Event Description: Various Phase I TVs fail to CLOSE

Cue: Evaluator's Cue

NUMBER 1-E-0	ATTACHMENT TITLE AUXILIARY VENTILATION, AC POWER, AND SFP STATUS CHECKS	ATTACHMENT 3
REVISION 65		PAGE 4 of 6

***** :

CAUTION: • Only one Emergency Supply Fan must be started in the following step.

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

***** :

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

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

- ___ 1. Open 1-VS-MOD-104A, CONT RM EMERG SUP MOD.
- ___ 2. Start 1-VS-F-41.

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

- ___ 1. Open 2-VS-MOD-204A, CONT RM EMERG SUP MOD.
- ___ 2. Start 2-VS-F-41.

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

- ___ 1. Open 1-VS-MOD-104B, CONT RM EMERG SUP MOD.
- ___ 2. Start 1-VS-F-42.

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

- ___ 1. Open 2-VS-MOD-204B, CONT RM EMERG SUP MOD.
- ___ 2. Start 2-VS-F-42.

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

Unit Two operator will prompt that all chilled water flows are in accordance with step 10 caution.

Op-Test No.: Surry 2012-1 Scenario No.: 4

Event No.: 8

Page 73 of 91

Event Description: Various Phase I TVs fail to CLOSE

Cue: Evaluator's Cue

NUMBER 1-E-0	ATTACHMENT TITLE	ATTACHMENT 3
REVISION 65	AUXILIARY VENTILATION, AC POWER, AND SFP STATUS CHECKS	PAGE 5 of 6

11. ___ Check readings on the following Differential Pressure Indicators - POSITIVE PRESSURE INDICATED.
- PDI-VS-100, D.P.-U1CR/U1TB (Unit 2 Turbine Ventilation Panel)
 - PDI-VS-101, D.P.-U1RR/U1TB (Unit 2 Turbine Ventilation Panel)
 - PDI-VS-200, D.P.-U2CR/U2TB (Unit 2 Turbine Ventilation Panel)
 - PDI-VS-201, D.P.-U2RR/U2TB (Unit 2 Turbine Ventilation Panel)
 - 1-VS-PDI-118 (Unit 1 Computer Room)
 - 1-VS-PDI-118 (Near Unit 1 Semi-Vital Bus)
 - 2-VS-PDI-215 (Unit 2 AC Room)
 - 2-VS-PDI-206 (Near Unit 2 Semi-Vital Bus)
12. ___ IF any reading NOT positive, THEN initiate Attachment 6 to secure MCR boundary fans.
13. ___ Check initiated or initiate 0-AP-50.00, OPPOSITE UNIT EMERGENCY.
14. ___ Check the following MCR and ESGR air conditioning equipment operating. IF NOT, THEN start equipment within 1 hour IAW the appropriate subsection of 0-OP-VS-006, CONTROL ROOM AND RELAY ROOM VENTILATION SYSTEM.
- One Control Room chiller
 - One Unit 1 Control Room AHU
 - One Unit 2 Control Room AHU
 - One Unit 1 ESGR AHU
 - One Unit 2 ESGR AHU
15. ___ IF both of the following conditions exist, THEN check that Load Shed is activated.
- Unit 2 - SUPPLIED BY RSST
 - Unit 2 RCPs - RUNNING
16. ___ IF Load Shed is required and not activated, THEN initiate 0-AP-10.10, LOSS OF AUTO LOAD SHED.

Unit two operator will report all outside DP indicators indicate positive pressure & AP-50 has been initiated

Op-Test No.: Surry 2012-1

Scenario No.: 4

Event No.: 8

Page 74 of 91

Event Description: Various Phase I TVs fail to CLOSE

Cue: Evaluator's Cue

NUMBER 1-E-0	ATTACHMENT TITLE AUXILIARY VENTILATION, AC POWER, AND SFP STATUS CHECKS	ATTACHMENT 3
REVISION 65		PAGE 6 of 6

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

17. ___ Initiate monitoring SFP parameters:

- SFP level - Greater than Cooling Pump suction AND Stable
- SFP temperature - Stable or Decreasing
- SFP Cooling Pumps - Either Running
- Component Cooling - Normal

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

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

20. ___ IF any abnormality or adverse trend is identified, THEN initiate 0-AP-22.02, MALFUNCTION OF SPENT FUEL PIT SYSTEMS.*If requested, Unit Two will assume SFP monitoring*

Op-Test No.: Surry 2012-1

Scenario No.: 4

SIMULATOR OPERATOR'S GUIDE

Simulator Setup

Initial Conditions:

Recall 5% IC and enter the following malfunctions or recall IC 264

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

- ASP_AO_OFF = True

Enter the following MALFUNCTIONS:

Malfunction	Delay	Ramp	Trigger	Value	Final	Trigger Type
CV0102 - CNTMNT PRESS XMTR PT-LM-100B FAILURE	10	0	1		1	MAN
CH2102 - VCT LEVEL TRANSMITTER LT-1115 FAILS	10	0	3		-1	MAN
EL0801 - LOSS OF SCREENWELL TRANSFORMER 1	10		5			MAN
FW1303 - A S/G NAR RNG LVL XMTR LT-476 CH-3 FAILS	10		7		-1	MAN
PG0101 - THERMAL OVERLOAD PG-P-1A	10		9			MAN
PG0202 - DISABLE PG-P-1B AUTO START	0		9			MAN
MS02 - STM SUP LINE TO STM HDR AFW PP RUPTURES	10		11			MAN
MS0401 - 'A' MAIN STM LINE RUPTURE BEFORE TRIP VV	10		11		1	MAN
MS0402- 'B' MAIN STM LINE RUPTURE BEFORE TRIP VV	10		11		1	MAN
MS0403- 'C' MAIN STM LINE RUPTURE BEFORE TRIP VV	10		11		1	MAN
CH59- Disable CH-MOV-381 AUTO Closure	0		30			MAN
CH60- DISABLE CH-TV-1204A AUTO CLOSURE	0		30			MAN
CH61- DISABLE CH-TV-1204B AUTO CLOSURE	0		30			MAN

Enter the following SWITCH OVERRIDE:

Override	Set Condition	Trigger
TVMS101B_CLOSE TV-MS- 101B MAIN STM TRIP VV CLOSE	OFF	30

Op-Test No.: Surry 2012-1

Scenario No.: 4

SIMULATOR OPERATOR'S GUIDE

TRIGGER	TYPE	DESCRIPTION
1	MAN	Fails 1-LM-PT-100B HIGH
3	MAN	1-CH-LT-1115 fails LOW
5	MAN	1G transformer lockout
7	MAN	"A" S/G NR Channel III fails LOW
9	MAN	Running PG pump trips, no autostart of standby pump
11	MAN	1-FW-P-2 piping failure
30	PREEVENT	1-CH-MOV-1381 and 1-CH-TV-1204A/B failure to auto-close 1-MS-TV-101B switch failure (will not close from switch)

Op-Test No.: Surry 2012-1

Scenario No.: 4

SIMULATOR OPERATOR'S GUIDE

Verify the following control room setup:

- Place the simulator in RUN and verify normal 5% power operation indications.
- Verify Red Magnets on the following components: None
- Verify 1-RM-RI-112 aligned to A/B SG and 1-RM-RI-113 aligned to C SG (magnets).
- Verify Ovation System operating.
- Reset ICCMs.
- Verify Component Switch Flags.
- Verify Brass Caps properly placed.
- Verify SG PORVs set for 1035 psig.
- Verify Rod Control Group Step Counters indicate properly.
- Verify Ovation CRT display.
- Advance Charts
- Verify Turbine Thumb Wheel Settings @120 rpm/min and Position 6
- Verify Containment Instrument Air Compressors are on Inside Suction (all RMs reset)
- Verify all ARPs have been cleaned
- Verify CLEAN copies of the following procedures are in place:

<input type="checkbox"/> AP-53.00 (3)	<input type="checkbox"/> AP-12.01	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> E-0	<input type="checkbox"/> E-2	<input type="checkbox"/> ECA-2.1	<input type="checkbox"/>
<input type="checkbox"/> OP-CH-007		<input type="checkbox"/> Reactivity Sheet	
<input type="checkbox"/> OP-ZZ-002		<input type="checkbox"/> 1-OP-CN-001	

- Marked-up copy of 1-GOP-1.5 and 1-OP-TM-001 for PRE-BRIEFING**
- Verify Reactivity Placard is current.
- Verify ALL PINK MAGNETS are accounted for.

Op-Test No.: Surry 2012-1**Scenario No.: 4****SIMULATOR OPERATOR'S GUIDE****Brief**

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

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

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

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

Assign operating positions.

Op-Test No.: Surry 2012-1

Scenario No.: 4

SIMULATOR OPERATOR'S GUIDE

Conduct shift turnover:

The initial conditions have a reactor start-up in progress on Unit #1.

Current conditions have reactor power at 5% with the turbine rolling at 1800 rpm with field established on the main generator. Current boron concentration is 1195 ppm. Control Bank D at 141 Steps.

1-GOP-1.5 is complete up to step 5.3.15 and 1-OP-TM-001 is complete to section 5.7.

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

Shift orders: Upon relieving the watch, utilize 1-GOP-1.5 (Unit Startup, 2% Reactor Power to Max Allowable Power) and 1-OP-TM-001 (Turbine – Generator Startup to 20% - 25% Turbine Power) to place the turbine on line and stabilize power at 30%.

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

The last shift diluted as required to establish critical conditions and raise power to 5% in accordance with the reactivity plan.

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

Op-Test No.: Surry 2012-1

Scenario No.: 4

SIMULATOR OPERATOR'S GUIDE

Session Conduct:

Ensure conditions in Simulator Set-up are established.

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

Verify Exam Security has been established and ASP_AO_OFF = True.

Verify reactivity plan and marked up procedure provided to candidates.

EVENT 1 **1-LM-PT-100B**

When cued by examiner, implement Trigger #1.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the failure of Channel 2 Containment Pressure. The individual(s) contacted will also acknowledge any TS LCOs and entry into AP-53.00.
- **If contacted**, will take responsibility for writing the CR.

STA:

- **If contacted**, will acknowledge the failure of Channel 2 Containment Pressure. The individual(s) contacted will also acknowledge any TS LCOs and entry into AP-53.00.
- **If contacted**, will take responsibility for writing the CR.
- **If 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.

Op-Test No.: Surry 2012-1

Scenario No.: 4

SIMULATOR OPERATOR'S GUIDE

EVENT 2 **Place Unit 1 On-Line**

Operations Supervisor/Management:

- **If contacted**, will authorize continuation of placing the unit on line. If the team delays, contact the SRO and direct placing the unit on line (*after NRC approves this communication*).
- **If contacted**, will acknowledge placing Unit 1 on line.
- **If contacted, will provide notifications to offsite and onsite personnel** (SOC/MOC, Chemistry, HP, Polisher and management).

STA:

- **If contacted**, will state that the PRA has been updated to reflect the previous failure and the ramp is still authorized (PRA is green).
- **If asked**, will review the ramp plan and concur with the team's decision on ramp (rod and boron) and not provide additional information.
- **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 asked**, there are no issues in the field.
- **If asked**, will report 6 polishers are currently in service. If asked for system pressure difference, refer to simulator for ΔP .
- **If asked**, will report that main transformer cooling fans are in service.

Role-play as other personnel as needed.

Op-Test No.: Surry 2012-1

Scenario No.: 4

SIMULATOR OPERATOR'S GUIDE

EVENT 3 VCT LEVEL TRANSMITTER FAILS HIGH (1-CH-LT-1115)

WAIT FOR FRVs TO BE IN AUTO THEN, when cued by examiner, implement Trigger #3.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the failure of 1-CH-LT-1115. The individual(s) contacted will also acknowledge entry into AP-53.00.
- **If contacted**, will take responsibility for writing the CR.

STA:

- **If contacted**, will acknowledge the failure of 1-CH-LT-1115. The individual(s) contacted will also acknowledge (but not confirm/deny) any TS LCOs.
- **If asked**, the STA will report that 1-CH-LT-1115 is a Reg. Guide 1.97 component. No actions are required as 1-CH-LT-1112 is operable.
- **If asked**, the STA will review VPAP-2802 and TRM Section 3.3 and report that he has completed his review and this failure does not impact these documents.
- **If contacted**, will take responsibility for writing the CR.
- **If the team has a transient brief:** The STA will 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.

Op-Test No.: Surry 2012-1

Scenario No.: 4

SIMULATOR OPERATOR'S GUIDE

Maintenance:

- **If contacted**, will acknowledge instrumentation failure and commence investigations to determine the cause of the failure.

Field Operators:

- **If contacted**, field operators will report no issues locally at the level transmitters.

Role play as other individuals as needed.

Op-Test No.: Surry 2012-1

Scenario No.: 4

SIMULATOR OPERATOR'S GUIDE

EVENT 4 **Loss of 1G transformer**

When cued by examiner, implement Trigger #5.

U2 Operator will acknowledge that they need to implement AP-12.01 if directed by U1 and will acknowledge they need to throttle waterboxes if directed by U1.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the loss of 1G transformer and entry into AP-12.01.
- **If contacted**, will take responsibility for writing the CR.

STA:

- **If contacted**, will acknowledge the loss of 1G transformer..
- **If asked**, the STA will evaluate the PSA.
- **After directed**, the STA will report that he has reviewed VPAP-2802 and no notifications were required.
- **If contacted**, will take responsibility for writing the CR.
- **If the team has a transient brief:** The STA will 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 loss of 1G transformer and will commence investigations and/or efforts to repair.

Op-Test No.: Surry 2012-1**Scenario No.: 4****SIMULATOR OPERATOR'S GUIDE**

Field Operators:

- **If contacted**, field operators will report to the low levels and/or switchyard as directed.
The outside operator will report a large bird dead on top of 1G transformer.

Role play as other individuals as needed.

Op-Test No.: Surry 2012-1

Scenario No.: 4

SIMULATOR OPERATOR'S GUIDE

EVENT 5 1-FW-LT-1476 (Channel III SG Level Transmitter) Fails Low

When cued by examiner, implement Trigger #7.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the failure of 1-FW-LT-1476. The individual(s) contacted will also acknowledge any TS LCOs and entry into AP-53.00.
- **If contacted**, will take responsibility for writing the CR.
- **If contacted**, will recommend waiting for I&C to be ready to perform 0-OP-RP-001

STA:

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

Op-Test No.: Surry 2012-1**Scenario No.: 4****SIMULATOR OPERATOR'S GUIDE****Maintenance:**

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

Field Operators:

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

Unit 2:

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

Role play as other individuals as needed.

Op-Test No.: Surry 2012-1

Scenario No.: 4

SIMULATOR OPERATOR'S GUIDE

EVENT 6 **Overcurrent Trip of 1-PG-P-1A with 1-PG-P-1B not Starting**

When cued by examiner, implement Trigger #9. Consider implementing during dilution.

Operations Supervisor/Management:

- **If contacted**, that 1-PG-P-1A tripped and 1-PG-P-1B did not automatically start.
- **If contacted**, will take responsibility for writing the CR.

STA:

- **If contacted**, that 1-PG-P-1A tripped and 1-PG-P-1B did not automatically start.
- **If contacted**, will take responsibility for writing the CR.

Field Operators:

- **If dispatched**, field operators will report that an acrid odor is coming from 1-PG-P-1A's motor and that 1-PG-P-1B is ready to be started.
- **If contacted**, field operators will perform satisfactory pre and post start checks for 1-PG-P-1B.
- **If contacted**, field operators report that the supply breaker for 1-PG-P-1A (1-EP-BKR-1B1-1A-1C) is tripped.

Maintenance/Work Week Coordinator:

- **If contacted**, that 1-PG-P-1A tripped and 1-PG-P-1B did not automatically start.

Unit 2 Operator:

- **If contacted**, that 1-PG-P-1A tripped and 1-PG-P-1B did not automatically start.
- **If asked**, will report that Unit 2 has annunciator 2D-B4 (Primary Water to Blend Low Pressure) alarm in too.

Role-play as other individuals as needed.

Op-Test No.: Surry 2012-1

Scenario No.: 4

SIMULATOR OPERATOR'S GUIDE

EVENT 7 **Fatigue Failure of 1-FW-P-2 Supply Line**

When cued by examiner, implement Trigger #11.

Security will contact the MCR approximately 2 minutes after this trigger is fully inserted and report that they see steam coming out of Unit 1 Safeguards Louvers.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the fact that all three steam generators are faulted in Unit 1 Safeguards and that SI was initiated.
- **If asked** will take responsibility for performing EPIP actions (declarations and notifications).

STA:

- **If asked**, will utilize the PCS to determine RCS cooldown rate.
- **When AFW Flow is reduced to 60 gpm per SG**, report to the Unit Supervisor that a red path exists on Heat Sink.
- **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.
- **If asked** the STA will confer with the shift manager on EPIP actions (declarations and notifications).

Maintenance/Work Week Coordinator:

- **If contacted**, will acknowledge the failure and take actions to restore failed equipment.

Field Operators:

- **If contacted**, field operators will report that they cannot access Unit 1 Safeguards.

Op-Test No.: Surry 2012-1

Scenario No.: 4

SIMULATOR OPERATOR'S GUIDE

Unit 2 Operator:

- **Upon initiation of the Unit 1 Reactor Trip**, the Unit 2 SRO will initiate AP-50.00.

Role play as other individuals as needed.

Op-Test No.: Surry 2012-1

Scenario No.: 4

SIMULATOR OPERATOR'S GUIDE

EVENT 8 **Failures during E-0 Verifications**

Operations Supervisor/Management:

- **If contacted**, will acknowledge that 1-CH-MOV-1381 and 1-CH-TV-1204A/B did not automatically close on SI.

STA:

- **If contacted**, will acknowledge that 1-CH-MOV-1381 and 1-CH-TV-1204A/B did not automatically close on SI.

Maintenance/ Work Week Coordinator:

- **If contacted**, will acknowledge that 1-CH-MOV-1381 and 1-CH-TV-1204A/B did not automatically close on SI.

Role-play as other individuals as needed.

Scenario will end after the team has reduced AFW flow iaw 2-ECA-2.1, or upon lead evaluator's cue

Facility: <u>Surry Power Station</u>	Scenario No.: <u>3</u>	Op-Test No.: <u>2012-001</u>	
Examiners: _____	Operators: _____	_____	
Initial Conditions: Time in Core Life – Middle of Life; Core Cycle – Cycle 25			
<p>Unit 1 is at 90% power following 1-OSP-TM-001. All systems and crossties are operable with the following exception:</p> <ul style="list-style-type: none"> #1 EDG is tagged out for a major overhaul. Four days remain in the seven-day Technical Specification 3.16 clock. The EDG is expected to be returned to service in approximately two days. Two independent off-site power sources were verified 2 hours ago as per Tech Spec 3.16.B.1.a., and 11 days remain on the AFW crosstie clock iaw Tech Spec 3.6.1.3. 			
Turnover:	Return Unit 1 to 100% power. Upon relieving the watch, utilize 1-OP-TM-005 (Unit Ramping Operations) to return Unit 1 to 100% power. The PSA indicates green for both units under the current configuration.		
Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R - SRO/RO N- BOP	Ramp Unit 1 to 100% IAW OP-TM-005
2	CN0103/ CN1501	C-BOP/SRO	1-CN-P-1C trips, 1-CN-P-1A does not auto start (AP-21.00)
3	NI1004	I-RO/SRO N-BOP/SRO TS-SRO	N-44 fails high (AP-53.00/AP-1.00/AP-4.00)
4	RC4802	I - RO/SRO TS-SRO	1-RC-PT-1445 fails high opening 1-RC-PCV-1456 (AP-31.00)
5	CH1002 RC1402	C-RO/SRO	#3 Seal Failure on 1-RC-P-1B (AP-9.00)
6	RD2027 MS16 O/R MSSOV 104_OPEN	M-(ALL) C-RO/SRO	Reactor Trip (E-0) One rod remains stuck out on reactor trip (E-0, Step 1) MSR FCVs remain open – close MSR MOVs
7	RC0103 SI4101/ SI4102	M-All C-RO/SRO	SBLOCA in ES-0.1 w/ no auto SI [CT-1]
8	CS13 CS2002 SW1303 SI2402 SI0901	C-BOP/SRO	Failures on Safety Injection <ul style="list-style-type: none"> 1-CS-MOV-101B not auto open 1-CS-MOV-102B not auto open 1-SW-P-5C not auto start 1-CH-MOV-1115B not open, 1-CH-MOV-1115C not close, 1-CH-MOV-1289A not close 1-SI-P-1A trips on start
9	O/R V1AH3 ON & SI0902	M - (ALL)	1-SI-P-1B trips (ECA-1.1) [CT - 2]
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Event 5: #3 Seal Failure on 1-RC-P-1B (AP-9.00) (C-RO/SRO)

Identify 1-RC-P-1B low seal leakoff flow, low inlet pressure to seal #2, and corresponding alarms. SRO initiates AP-9.00. 1-AP-9.00 will direct the team to trip the reactor and secure the RCP.

Verifiable Actions: (RO/BOP) Stop “B” RCP.

Event 6: Reactor Trip (E-0) / One rod remains stuck out on reactor trip (E-0, Step 1) / MSR FCVs remain open – close MSR MOVs (E-0, Step 2) (M-All – C-RO/SRO)

SRO directs reactor trip due to Event 5. RO performs Immediate Actions of E-0. Identifies Rod K-12 stuck full out, and MSR steam supply valves failing to close (both automatically and manually). RO manually isolates steam supply to the MSRs by closing the steam supply MOVs manually.

Verifiable Actions: (RO) E-0 Immediate Actions. Closure of MSR steam supply valves when MS-SOV-104 fails to close.

Event 7: SBLOCA in ES-0.1 w/ no auto SI [CT- 1] (C-RO/SRO – M-ALL)

After transition to ES-0.1 and after 1-RC-P-1B is secured, a SBLOCA is initiated. The RO will identify RCS leakage based on alarms and indications received. AP-16.00 is initiated. RO quantifies leakage greater than the capacity of a single CH pump. SRO directs re-performance of E-0 IA steps, and SI on Step 4.

Verifiable Actions: (RO) Manually initiate safety injection
Operation of CH/LD valves for AP-16.00 actions. Stopping “A” and “C” RCPs for RCP trip criteria.
(BOP) Perform E-0, Attachments 1,2, and 3 (See Event 8 for further description).

Critical Task: Trip all RCPs within 5 minutes of reaching RCP Trip and Mini-flow recirc criteria. [WOG E-1 -- C]

Actions required to accomplish the critical task:

- Trip 1-RC-P-1A and 1-RC-P-1C

Event 8: Failures on Safety Injection (C-BOP/SRO)

1-SI-P-1A will trip on start and the following component failures will be identified and corrected during performance of E-0 Attachments.

Verifiable Actions: (BOP)

- Open 1-CH-MOV-1115B
- Close 1-CH-MOV-1115C
- Close 1-CH-MOV-1289A
- Open 1-CS-MOV-101B
- Open 1-CS-MOV-102B
- Start 1-SW-P-5C

Event 9: Only running LHSI pump trips (ECA-1.1) [CT – 2] (M-All)

Upon transition to 1-E-1, the seal head tank low level alarm will be received for 1-SI-P-1B and 30 seconds later the pump will trip. This will result in no operable LHSI pumps and a corresponding loss of containment sump suction capability. The SRO will transition to 1-ECA-1.1 (Loss of Emergency Coolant Recirculation) upon reaching step 18 of 1-E-1.

Critical Task: Initiate actions to makeup to the RWST before beginning RCS cooldown to cold shutdown AND take actions to minimize RWST outflow before the end of the scenario. [WOG ECA-1.1 – B]

Actions required to accomplish the critical task:

- Direct Unit 2 to establish makeup flow to the RWST.
- Minimize outflow from the RWST (stopping of SI pumps per ECA-1.1.)

The Scenario should continue until Step 11 of ECA 1.1 (Verify Instrument Air Available) or Lead Evaluator Cue.

Facility: Surry Power StationScenario No.: 3Op-Test No.: 2012-001Examiners: _____ Operators: _____

Initial Conditions: Time in Core Life – Middle of Life; Core Cycle – Cycle 25

Unit 1 is at 90% power following 1-OSP-TM-001. All systems and crossies are operable with the following exception:

- #1 EDG is tagged out for a major overhaul. Four days remain in the seven-day Technical Specification 3.16 clock. The EDG is expected to be returned to service in approximately two days. Two independent off-site power sources were verified 2 hours ago as per Tech Spec 3.16.B.1.a., and 11 days remain on the AFW crosstie clock iaw Tech Spec 3.6.1.3.

Turnover: Return Unit 1 to 100% power. Upon relieving the watch, utilize 1-OP-TM-005 (Unit Ramping Operations) to return Unit 1 to 100% power. The PSA indicates green for both units under the current configuration.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R - SRO/RO N- BOP	Ramp Unit 1 to 100% IAW OP-TM-005
2	CN0103/ CN1501	C-BOP/SRO	1-CN-P-1C trips, 1-CN-P-1A does not auto start (AP-21.00)
3	NI1004	I-RO/SRO N-BOP/SRO TS-SRO	N-44 fails high (AP-53.00/AP-1.00/AP-4.00)
4	RC4802	I - RO/SRO TS-SRO	1-RC-PT-1445 fails high opening 1-RC-PCV-1456 (AP-31.00)
5	CH1002 RC1402	C-RO/SRO	#3 Seal Failure on 1-RC-P-1B (AP-9.00)
6	RD2027 MS16 O/R MSSOV 104 OPEN	M-(ALL) C-RO/SRO	Reactor Trip (E-0) One rod remains stuck out on reactor trip (E-0, Step 1) MSR FCVs remain open – close MSR MOVs
7	RC0103 SI4101/ SI4102	M-All C-RO/SRO	SBLOCA in ES-0.1 w/ no auto SI [CT-1]
8	CS13 CS2002 SW1303 SI2402 SI0901	C-BOP/SRO	Failures on Safety Injection <ul style="list-style-type: none"> • 1-CS-MOV-101B not auto open • 1-CS-MOV-102B not auto open • 1-SW-P-5C not auto start • 1-CH-MOV-1115B not open, 1-CH-MOV-1115C not close, 1-CH-MOV-1289A not close • 1-SI-P-1A trips on start
9	O/R V1AH3 ON & SI0902	M - (ALL)	1-SI-P-1B trips (ECA-1.1) [CT - 2]

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

Event 1: Ramp Unit 1 to 100% IAW OP-TM-005 (R-SRO & RO/N-BOP).

The operating team will return Unit 1 to full power operations in accordance with 1-OP-TM-005 (Unit Ramping Operations) after assuming the watch. This evolution will be briefed prior to turnover. The SRO will direct actions required to increase reactor power in accordance with 1-OP-TM-005.

Verifiable Actions: (RO) Manipulation of blender controls for dilution, and control rods for Tave and delta flux control.
(BOP) Manipulation of Turbine controls for turbine load increase.

Event 2: 1-CN-P-1C trips, 1-CN-P-1A does not auto start (AP-21.00) (C-BOP/SRO)

BOP will identify the event based on alarms and indications received. Note that "A" CN pump did not auto start and perform the Immediate Action steps of AP-21.00 to start the "A" CN pump and verify feed flow increases. ARP guidance could also be used to start the stand-by pump (both are contained in this guide).

Verifiable Actions: (BOP) Operation of control switch for 1-CN-P-1A

Event 3: N-44 fails high (AP-53.00/AP-1.00/AP-4.00) (I-RO/SRO – N-BOP/SRO – TS-SRO)

Power Range Nuclear Instrument N-44 will fail high causing rods to insert at 72 steps per minute. The RO will place rod control in manual upon identification of the failure. The SRO should enter 0-AP-53.00 (Loss of Vital Instrumentation / Controls) to verify rod control is in manual and then transition to 1-AP-4.00 (Nuclear Instrumentation Malfunction). The SRO will review Technical Specifications and direct the BOP to place the failed channel (N-44) in trip.

Verifiable Actions: (RO) Placing Rod control in manual to stop rod motion.
(BOP) Manipulation of controls to place N44 in trip.

Technical Specifications:

- TS Table 3.7-1, item 2, Operator Action 2.
- TS 3.12.D.1

Event 4: 1-RC-PT-1445 fails high opening 1-RC-PCV-1456 (AP-31.00) (I-RO/SRO – TS-SRO)

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). *The SRO may also enter 1-AP-31.00 directly.* RO/SRO identify PRZR low pressure and verifies TS clock applicable while RCS pressure <2205 psig.

Verifiable Actions: (RO) Place control switch for 1-RC-PCV-1456 in close and verify PORV closed. Close 1-RC-MOV-1535 when directed.

Technical Specifications:

- TS 3.12.F.1 (DNB Parameters)
- TS 3.1.A.6 (INOPERABLE but capable of Cycling PORV)

Event 5: #3 Seal Failure on 1-RC-P-1B (AP-9.00) (C-RO/SRO)

Identify 1-RC-P-1B low seal leakoff flow, low inlet pressure to seal #2, and corresponding alarms. SRO initiates AP-9.00. 1-AP-9.00 will direct the team to trip the reactor and secure the RCP.

Verifiable Actions: (RO/BOP) Stop "B" RCP.

Event 6: Reactor Trip (E-0) / One rod remains stuck out on reactor trip (E-0, Step 1) / MSR FCVs remain open – close MSR MOVs (E-0, Step 2) (M-All – C-RO/SRO)

SRO directs reactor trip due to Event 5. RO performs Immediate Actions of E-0. Identifies Rod K-12 stuck full out, and MSR steam supply valves failing to close (both automatically and manually). RO manually isolates steam supply to the MSRs by closing the steam supply MOVs manually.

Verifiable Actions: (RO) E-0 Immediate Actions. Closure of MSR steam supply valves when MS-SOV-104 fails to close.

Event 7: SBLOCA in ES-0.1 w/ no auto SI [CT- 1] (C-RO/SRO – M-ALL)

After transition to ES-0.1 and after 1-RC-P-1B is secured, a SBLOCA is initiated. The RO will identify RCS leakage based on alarms and indications received. AP-16.00 is initiated. RO quantifies leakage greater than the capacity of a single CH pump. SRO directs re-performance of E-0 IA steps, and SI on Step 4.

Verifiable Actions: (RO) Manually initiate safety injection
Operation of CH/LD valves for AP-16.00 actions. Stopping "A" and "C" RCPs for RCP trip criteria.
(BOP) Perform E-0, Attachments 1,2, and 3 (See Event 8 for further description).

Critical Task: Trip all RCPs within 5 minutes of reaching RCP Trip and Mini-flow recirc criteria. [WOG E-1 -- C]

Actions required to accomplish the critical task:

- Trip 1-RC-P-1A and 1-RC-P-1C

Event 8: Failures on Safety Injection (C-BOP/SRO)

1-SI-P-1A will trip on start and the following component failures will be identified and corrected during performance of E-0 Attachments.

Verifiable Actions: (BOP)

- Open 1-CH-MOV-1115B
- Close 1-CH-MOV-1115C
- Close 1-CH-MOV-1289A
- Open 1-CS-MOV-101B
- Open 1-CS-MOV-102B
- Start 1-SW-P-5C

Event 9: Only running LHSI pump trips (ECA-1.1) [CT – 2] (M-All)

Upon transition to 1-E-1, the seal head tank low level alarm will be received for 1-SI-P-1B and 30 seconds later the pump will trip. This will result in no operable LHSI pumps and a corresponding loss of containment sump suction capability. The SRO will transition to 1-ECA-1.1 (Loss of Emergency Coolant Recirculation) upon reaching step 18 of 1-E-1.

Critical Task: Initiate actions to makeup to the RWST before beginning RCS cooldown to cold shutdown AND take actions to minimize RWST outflow before the end of the scenario. [WOG ECA-1.1 – B]

Actions required to accomplish the critical task:

- Direct Unit 2 to establish makeup flow to the RWST.
- Minimize outflow from the RWST (stopping of SI pumps per ECA-1.1.)

The Scenario should continue until Step 11 of ECA 1.1 (Verify Instrument Air Available) or Lead Evaluator Cue.

Initial Conditions: 90 %, MOL – Cycle 25. The unit has been at 90% power for approximately 30 minutes.

Pre-load malfunctions:

- Control rod K-12 is stuck
- MSRs will not automatically or manually isolate from the MCR
- SI will not automatically initiate (either train)
- Various component failures:
 - a) 1-CH-MOV-1115B will not auto open
 - b) 1-CH-MOV-1115C and 1-CH-MOV-1289A will not auto close
 - c) 1-CS-MOV-101B and 1-CS-MOV-102B will not auto open
 - d) 1-SW-P-5C will not auto start
 - e) 1-SI-P-1A will trip on start

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

- #1 EDG is tagged out for a major overhaul. Four days remain in the seven-day Technical Specification 3.16 clock. The EDG is expected to be returned to service in approximately two days.
- Unit at 90% following 1-OSP-TM-001

Turnover: Unit 1 is at 90% power following 1-OSP-TM-001. All systems and crossties are operable with the following exception:

- #1 EDG is tagged out for a major overhaul. Four days remain in the seven-day Technical Specification 3.16 clock. The EDG is expected to be returned to service in approximately two days. Two independent off-site power sources were verified 2 hours ago as per Tech Spec 3.16.B.1.a., and 11 days remain on the AFW crosstie clock iaw Tech Spec 3.6.I.3.

Shift Orders are to return Unit 1 to 100% power. Upon relieving the watch, utilize 1-OP-TM-005 (Unit Ramping Operations) to return Unit 1 to 100% power. The PSA indicates green for both units under the current configuration.

Event	Malf. #'s	Severity	Instructor Notes and Required Feedback
1	N/A	N/A	Ramp Unit 1 to 100% IAW 1-OP-TM-005
2	CN0103/ CN1501	N/A	1-CN-P-1C trips, 1-CN-P-1A does not auto start (AP-21.00)
3	NI1004	1 (high)	N-44 fails high (AP-53.00/AP-1.00/AP-4.00)
4	RC4802	1 (high)	1-RC-PT-1445 fails high opening 1-RC-PCV-1456 (AP-31.00)
5	CH1002 RC1402	90% 100%	#3 Seal Failure on 1-RC-P-1B (AP-9.00)
6	RD2027 MS16 O/R MSSOV 104_OPEN	N/A	Reactor Trip (E-0) One rod remains stuck out on reactor trip (E-0, Step 1) MSR FCVs remain open – close MSR MOVs
7	RC0103 SI4101/ SI4102	0.5%	SBLOCA in ES-0.1 w/ no auto SI [CT-1]
8	CH50 CH51 CH57 CS13 CS2002 SW1303 SI0901	N/A	Failures on Safety Injection <ul style="list-style-type: none"> • CS-MOV-101B not auto open • CS-MOV-102B not auto open • SW-P-5C not auto start • 1-CH-MOV-1115B not open, 1-CH-MOV-1115C not close, 1-CH-MOV-1289A not close • 1-SI-P-1A will trip on start

90	O/R V1AH3 ON & SI0902	N/A	1-SI-P-1B trips (ECA-1.1) [CT - 2]
----	-----------------------------	-----	------------------------------------

SHIFT TURNOVER INFORMATION

OPERATING PLAN:

Unit 1 is at 90% power following 1-OSP-TM-001. The unit has been at this power level for approximately 30 minutes.

All systems and crossties are operable with the following exception:

- #1 EDG is tagged out for a major overhaul. Four days remain in the seven-day Technical Specification 3.16 clock. The EDG is expected to be returned to service in approximately two days. Two independent off-site power sources were verified 2 hours ago as per Tech Spec 3.16.B.1.a., and 11 days remain on the AFW crosstie clock iaw Tech Spec 3.6.I.3.

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

Shift orders are to utilize 1-OP-TM-005 (Unit Ramping Operations) to return Unit 1 to 100% power. The performance of this evolution has been authorized and has been PSA analyzed for current plant conditions.

The off-going shift just performed 1-OPT-RX-001 for the power increase to >98.4%

The last shift borated and diluted as required to reduce power to 90% in accordance with the reactivity plan.

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 1

Page 8 of 104

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

Cue: When team ready.

Time	Position	Applicant's Action or Behavior
	<i>Evaluator reference</i>	Reactivity summary: <ul style="list-style-type: none"> • Ramp from 90% to 95% - 632 gallons PG – “D” bank to 218 steps • Ramp from 95% to 99% - 548 gallons PG – “D” bank to 224 steps Note that these are estimations.
	SRO	<p><u>Team will pre-brief Initial Conditions, Precautions and Limitations, and procedure prior to entering simulator.</u></p> <p><u>Prior to entering the simulator the team will be provided with a copy of 1-OP-TM-005 that is completed up to Section 5.3.</u></p> <p>Initial Conditions of 1-OP-TM-005 (Unit Ramping Operations):</p> <p>3.1 Check startup or shutdown General Operating Procedure is not in effect.</p> <p>Will be initialed as complete.</p> <p>3.2 Verify unit ramp is required for either of the following reasons:</p> <ul style="list-style-type: none"> • A Turbine load reduction is required for maintenance (e.g. Waterbox cleaning or scraping, removal from service of a Main Feed Pump, HP Heater Drain Pump, or a FW Heater train) or due to Shift Supervision direction • A Turbine load increase is required following maintenance or due to Shift Supervision direction <p>Will be initialed as complete.</p> <p>3.3 IF a Turbine load increase will be performed, THEN verify the current Reactor Power level is at least 50%. Otherwise, enter N/A.</p> <p>Will be initialed as complete.</p> <p>3.4 IF a Turbine load reduction will be performed, THEN verify the planned Reactor Power level after the ramp down is at least 50% power. Otherwise, enter N/A.</p> <p>Will be marked N/A.</p> <p>3.5 IF Reheat Stop Valve or Intercept Valve Maintenance is to be performed, THEN have Engineering determine Target Power level to prevent lifting Crossunder Safety valves. (Reference 2.4.8)</p> <p>Will be marked N/A.</p>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 1

Page 9 of 104

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

Cue: When team ready.

	SRO	<p>Precautions and Limitations of I-OP-TM-005:</p> <p>4.1 Chemistry must be notified of power escalations or reductions equal to or greater than 15% power within one hour. Chemistry must also be notified as early as possible before any power reduction of greater than 20% in order for preparations to be made to run cesium samples on the RCS 30 minutes after power stabilization.</p> <p>4.2 This procedure should NOT be used if the planned power reduction will be to a Reactor power level of less than 50%. 1-GOP-2.1, Unit Shutdown, Power Decrease From Max Allowable Power to Less Than 30% Reactor Power, should be used in this case.</p> <p>4.3 During power changes, particular attention should be focused on the following items to reduce the potential for a unit trip.</p> <ul style="list-style-type: none"> • Steam Generator level control • Condenser vacuum • Hotwell level • Generator voltage control • Tave and $\Delta \emptyset$ • Pressurizer Level • Turbine Lube Oil Temperature • Gland Steam Header Pressure • Makeup blend (CB) to the RCS • Feedwater heater levels (6th point Hi) • Polishing building ΔP • HP heater drain tank level control • Rod Position • Auxiliary Steam Header Pressure • Generator Hydrogen Temperature • PCS Alarms <p>4.4 If the power decrease is stopped during the ramp down, IMP OUT may be used to assist in stabilizing the Turbine.</p> <p>4.5 The Turbine will momentarily (1.5 seconds) shift to MANUAL when transferring from IMP OUT to IMP IN or from IMP IN to IMP OUT. To minimize Governor valve oscillations, the GV Tracking Meter should read as close to 0 as possible before a transfer is performed.</p> <p>4.6 The differential pressure between Condensers must be maintained less than 2 in-Hg.</p> <p>4.7 At Reactor power levels between 15% - 70%, the most conservative calorimetric (Steam Flow or Feed Flow) shall be used for determination of Reactor Power.</p> <p>4.8 At Reactor power levels greater than 70%, UFM (preferred) or the most conservative calorimetric (Steam Flow or Feed Flow) shall be used for determination of Reactor Power.</p>
--	-----	---

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 1

Page 10 of 104

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

Cue: When team ready.

	SRO	<p>4.9 The following Reactivity Management principles must be adhered to while Turbine ramping is in progress.</p> <ul style="list-style-type: none"> • Reactivity control systems designed to provide alarms, rod stops, and Turbine runback functions should not be bypassed except when allowed by an approved procedure specifically intended for the evolution. • Shift Supervision shall ensure that unexplained or abnormal reactivity changes or neutron flux distributions are investigated immediately and if necessary direct a unit shutdown or trip to terminate the problem. Shift Supervision shall promptly notify the STA and the Reactor Engineer to investigate the situation. • Duties assigned to Control Room Operators shall not interfere with their ability to monitor core reactivity. The administrative workload of Control Room Operators responsible for monitoring and operating the control board should be minimized. • Control of reactivity and those parameters that affect reactivity is essential to the safe operation of the plant. In order to maintain control of reactivity conservative decision making shall be practiced at all times. • Activities that may detract from positive control of reactivity shall be minimized. This includes minimizing other Station activities that may affect Unit operation, such as removing equipment or instrumentation from service, and avoiding shift turnovers during significant reactivity changes. <p>4.10 A Condensate Pump will automatically start, unless the idle pump(s) are in PTL, when either of the following conditions exist:</p> <ul style="list-style-type: none"> • Condensate discharge header pressure is less than 350 psig • Less than 2 condensate pumps are running <p>4.11 If the Turbine is being operated in Turbine Manual, or Turbine Manual control becomes necessary, N/A must be entered for steps addressing operation in Operator Auto, and Attachment 3 used for operation in Turbine Manual.</p> <p>4.12 If maintenance will be performed on the Intercept Valves or Reheat Stop Valves during the performance of this procedure, Engineering must provide a target power level which will prevent possible lifting of Crossunder Safety Valves. (Reference 2.4.8)</p> <p>4.13 When the Turbine is not being actively ramped, the REFERENCE and SETTER values must remain matched to prevent an inadvertent ramp. (Reference 2.4.9)</p> <p>4.14 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>
--	-----	--

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 1

Page 11 of 104

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

Cue: When team ready.

		<p>4.15 . If the basis for the calorimetric of record has not been changed for the entirety of the ramp AND no adjustments have been made to the Nuclear Instruments, then a calorimetric at approximately 70% power is not required. If adjustments have been made to the NIs or the basis for calorimetric was changed (including a failure of the program), then a calorimetric must be performed at approximately 70% power.</p> <p>4.16 The MWe equivalent of power level may be used to determine if the Reactor has reached the desired power level for stopping the ramp if Tave and Tref are not matched.</p>
	SRO	<p>Section 5.0 Instructions:</p> <p>Section 5.1 and 5.2 will be marked "N/A"</p>
	SRO	<p>Section 5.3 will be completed (signed off), but will be reviewed by the team prior to entering the simulator.</p>
	SRO	<p>5.3 Preparations for Turbine Ramp Up</p> <p>5.3.1 Review all lighted annunciator windows for adverse conditions that could impact the performance of this procedure.</p> <p>Will be initialed as complete. – No annunciators Lit.</p> <p>5.3.2 Review the Tagout File for tagouts that could impact this procedure.</p> <p>Will be initialed as complete. – Only #1 EDG is tagged out.</p> <p>5.3.3 Review the Plant Status Log for conditions that could impact this procedure.</p> <p>Will be initialed as complete. – No items in the plant status log.</p> <p>NOTE: Rod height adjustments should be used to maintain Delta Flux as recommended by Reactor Engineering. Boration or dilution should be used to account for power defect and Xenon changes to maintain reference temperature.</p>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 1

Page 12 of 104

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

Cue: When team ready.

SRO	<p>5.3.4 For scheduled power level changes greater than 10%, verify that a reactivity plan has been provided by Reactor Engineering. Otherwise, direct the STA to notify Reactor Engineering and request recommendations for control of core parameters.</p> <ul style="list-style-type: none"> • Delta Flux control • Recommendations for Rod height and/or RCS Boron adjustments • Expected Xenon transient <p>Will be initialed as complete. The team will be given a reactivity plan.</p> <p>5.3.5 Record the Target Power Level, the Current Power Level, and the Percent Power Change below. Target Power Level <u>90%</u> Minus Current Power Level - <u>100%</u> Equals Percent Power Change = <u>10%</u></p> <p>Will be initialed as complete</p> <p>5.3.6 Obtain a current copy of 1-DRP-003, Curve Book, Reactor Power and Rod Movement Limitations, and attach to this procedure. (Reference 2.3.9)</p> <p>Will be initialed as complete.</p> <p>5.3.7 Review 1-DRP-003, Curve Book, Reactor Power and Rod Movement Limitations.</p> <p>Will be initialed as complete.</p> <p>Note prior to Step 5.3.8: If a shift turnover is required while Subsection 5.4 is in progress, Steps 5.3.8, 5.3.9, and 5.3.10 must be performed for the relieving shift. Multiple signoffs are provided for this purpose.</p> <p>5.3.8 Check that the Shift Manager (who is the designated Test Coordinator) or his designee has reviewed the Detailed Pre-Job Briefing Checklist and Responsibilities in Attachment 1 (page 3 of 5) and conducted a Detailed Pre-Job Briefing with all the personnel performing the unit ramp.</p> <p>Will be initialed as complete. Team will re-perform these steps prior to entering simulator.</p> <p>5.3.9 Verify that the Senior Operations Manager or Operations Manager on Call has reviewed the Management Expectations Briefing Checklist in Attachment 1 (page 2 of 5) and briefed the Operations Department and support personnel on management expectations.</p> <p>Will be initialed as complete. Team will re-perform these steps prior to entering simulator.</p>
-----	--

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 1

Page 13 of 104

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

Cue: When team ready.

	SRO	<p>5.3.10 The pre-job brief shall include the items in Attachment 2, Pre-job Brief Expectations for Reactivity Control.</p> <p>Will be initialed as complete. Team will re-perform these steps prior to entering simulator.</p> <p>5.3.11 Determine the specific rate of Reactor power change and the methods which will be used to achieve this rate of change. Rate of Power Change <u>0.33%/hr</u> Reactor Power Change Methods <u>Turbine, rod control, and chemical shim.</u></p> <p>Will be initialed as complete.</p> <p>5.3.12 Notify Energy Supply (MOC), Chemistry, and the Polishing Building that the power change is imminent</p> <p>Will be initialed as complete.</p> <p>The Team will commence with Section 5.4. Several steps may be completed prior to entering the simulator (i.e., marked N/A).</p>
	SRO/RO	<p>5.4 Power Increase Between 50% and 100% Reactor Power</p> <p>Caution prior to Step 5.4.1:</p> <ul style="list-style-type: none"> • Energizing additional PRZR heaters may cause a change in RCS average temperature due to a difference in boron concentration between the PRZR and the RCS. <p>5.4.1 Check or place PRZR Backup Heaters in the MANUAL ON position IAW 1-OP-RC-019, Pressurizer Heater Operation.</p>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 1

Page 14 of 104

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

Cue: When team ready.

	SRO	<p>Notes prior to Step 5.4.2:</p> <ul style="list-style-type: none"> • The second MFP should be started at approximately 6.0×10^6 lbm/hr ($5.6 - 6.4 \times 10^6$ lbm/hr) total Feedwater flow. • When a Main Feed Pump Recirc Valve opens, a decrease in FW temperature will occur that can add positive reactivity to the core. The magnitude of the reactivity change is dependent on the time in core life and the value of the Moderator Temperature Coefficient. <p>5.4.2 WHEN reactor power level reaches the point where additional Feedwater flow is desired, THEN perform the following substeps. Enter N/A if a Main Feed Pump will not be started.</p> <ol style="list-style-type: none"> a. Notify Chemistry and the Polishing Building of the imminent start of the idle Main Feedwater Pump. b. Place the idle Main Feedwater pump in service in accordance with 1-OP-FW-004, Main Feedwater System Operation. <p>Both sub-steps will be marked "N/A"</p>
	SRO	<p>Note prior to Step 5.4.3:</p> <ul style="list-style-type: none"> • The turbine control valves should not run up against the Turbine Load Limiter.
	SRO/BOP	<p>5.4.3 Increase the Turbine Load Limiter and maintain the limiter <u>as close as reasonably possible</u> above the actual turbine load during power escalation (Reference 2.4.2).</p>
	SRO/RO BOP	<p>Cautions prior to Step 5.4.4:</p> <ul style="list-style-type: none"> • Control rods shall be moved in a deliberate, carefully controlled manner while closely monitoring the Reactor's response. • The Turbine will momentarily (1.5 seconds) shift to MANUAL when placed in IMP IN. To minimize Governor valve oscillations, the GV Tracking Meter should read as close to 0 as possible before transferring to IMP IN
	SRO/BOP	<p>5.4.4 Check initiated or initiate Attachment 4, Reactivity Control and Monitoring During Ramp. (Reference 2.4.6).</p>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 1

Page 15 of 104

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

Cue: When team ready.

	SRO/BOP	<p>Notes prior to Step 5.4.5:</p> <ul style="list-style-type: none"> The Turbine should be operated in IMP IN while ramping is in progress. If the power increase is stopped during the ramp up, IMP OUT may be used to assist in stabilizing the Turbine. This procedure is normally entered at greater than 50% power. If power is less than 50%, procedure 1-GOP-1.5, Unit Startup, 2% Reactor Power to Max Allowable Power, must be used.
	SRO/RO BOP	<p>5.4.5 Commence the power increase at the ramp rate specified by Shift Supervision, using the LOAD RATE % PER MIN thumbwheel.</p>
	SRO	<p>Note prior to Step 5.4.6:</p> <ul style="list-style-type: none"> Alternate indications of Reactor Power, such as Core ΔT, 1st Stage Pressure, Condensate and Feedwater performance parameters, and Electrical output, should be reviewed and compared during power escalation. (Reference 2.4.3)
	RO	<p>5.4.6 Borate, dilute, or use control rods as required to maintain Δ flux in band. Observe the expected response on FR-1-113, BA-PRI WTR FLOW and Y1C-114A, PRI WTR SUP BATCH INTEGRATOR.</p> <p>1-OP-CH-007 – Blender Operations actions are contained on page 19</p>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 1

Page 16 of 104

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

Cue: When team ready.

	SRO/RO	<p>5.4.7 IF either annunciator 1G-C4, UPPER ION CHAMBER DEVIATION OR AUTO DEFEAT <50%, or 1G-D4, LOWER ION CHAMBER DEVIATION OR AUTO DEFEAT <50%, are LIT, THEN perform the following substeps. Otherwise, enter N/A.</p> <ol style="list-style-type: none"> a. Notify the OMOC. b. Initiate an excore quadrant power tilt calculation and perform a calculation at 8 hour intervals until both annunciators are NOT LIT. c. Review Tech Spec 3.12.B.5 and 3.12.B.6. d. Notify Reactor Engineering or STA to determine new High Flux trip and rod stop setpoints. e. Have I & C adjust High Flux trip and rod stop setpoints as necessary based on tilt calculation. f. Review Tech Spec 3.12.B.7 for additional actions required if tilt is not reduced to less than 2 percent after a period of 24 hours. g. Stop ramp at least 5 percent less than High Flux Trip setpoint. <p>This step will be marked "N/A"</p>
	SRO/RO	<p>5.4.8 WHEN both annunciators 1G-C4 and 1G-D4 are NOT LIT, THEN verify or adjust High Flux Trip and Rod Stop setpoints to the full power values.</p>
	SRO/BOP	<p>Caution prior to Step 5.4.9:</p> <ul style="list-style-type: none"> • The following parameters must be closely monitored prior to exceeding 60% power: CP Bldg ΔP, MFP suction pressure, MFP recirc status, and HP Heater Drain status. Adequate margin must be maintained on MFP suction pressure and CP Bldg ΔP to prevent bypassing the CP Bldg and subsequent secondary transient. Reactor power should be held at approximately 60% while an HP Heater Drain Pump is started if adequate margin does not exist.

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 1

Page 17 of 104

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

Cue: When team ready.

	SRO/BOP	<p>Notes prior to Step 5.4.9:</p> <ul style="list-style-type: none"> • Steps 5.4.9 through 5.4.16 may be marked with N/A depending on the power level at which the procedure was entered. • Ramping should be stopped at least 5 percent less than High Flux trip setpoint. • The following PCS points may be used to monitor duct temperature trend: <ul style="list-style-type: none"> ○ T2545A, Isolated Phase Bus Duct A Phase Air Temperature ○ T2546A, Isolated Phase Bus Duct B Phase Air Temperature ○ T2547A, Isolated Phase Bus Duct C Phase Air Temperature
	SRO/BOP	<p>5.4.9 Notify Chemistry and the Polishing Building of the imminent start of 1-SD-P-1A or 1-SD-P-1B. HP FW HTR DRN PP. Enter N/A for Steps 5.4.9 and 5.4.10 if pump is already running.</p> <p><i>Pump is already in service</i></p> <p>5.4.10 WHEN there is sufficient flow to the HP Heater Drain Tank, THEN start 1-SD-P-1A or 1-SD-P-1B IAW 1-OP-SD-002, HP Heater Drain Pump Operation.</p> <p>NOTE: If calorimetric basis has not been changed during the ramp, and no adjustments have been made to the NIs during the ramp, then a calorimetric is not required. (Reference 4.15)</p> <p>5.4.11 Continue the power escalation and evaluate the calorimetric. IF a calorimetric is required, THEN notify Energy Supply (MOC) that there will be a 70 percent (approximate) power hold to perform a calorimetric. Otherwise, enter N/A. (Reference 4.15)</p> <p>5.4.12 WHEN power level is stable at approximately 70 percent, THEN stop the power escalation AND initiate a calorimetric. Enter N/A if calorimetric is not required. (Reference 4.15)</p> <p>5.4.13 IF a flux map is needed, as desired by Reactor Engineering, THEN direct Reactor Engineering to perform flux map at this time. Otherwise, enter N/A.</p> <p>5.4.14 WHEN the calorimetric (if needed), initiated in Step 5.4.11, and the flux map (if needed), initiated in Step 5.4.12, have been satisfactorily completed, THEN notify Energy Supply (MOC), Chemistry, and the Polishing Building that the power escalation will continue, as required.</p> <p>All steps will be marked "N/A"</p>
	SRO	5.4.15 Continue the power escalation to 90 to 91 percent (approximate) power.

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 1

Page 18 of 104

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

Cue: When team ready.

		<p>CAUTION: The Turbine will momentarily (1.5 seconds) shift to MANUAL when placed in IMP OUT. To minimize Governor Valve oscillations, the GV Tracking Meter should read as close to 0 as possible before transferring to IMP OUT.</p>
SRO/BOP	5.4.16	WHEN power level is stable at approximately 90 to 91 percent, THEN place the Turbine in IMP OUT. Enter N/A if turbine operation above 90 to 91 percent will be in IMP IN.
SRO	5.4.17	Record time when power level is stable at approximately 90 to 91%.
SRO/RO	5.4.18	<p>Prior to Reactor power exceeding 98.4% perform the following. (Reference 2.3.13)</p> <p>a. Check or select UFM as the calorimetric basis.</p> <p>b. Perform 1-OPT-RX-001, Reactor Power Calorimetric Using PCS Computer Program.</p> <p><i>Team will be informed that 1-OPT-RX-001 was performed by the off-going shift.</i></p>
		<p>CAUTION: To prevent exceeding Max Allowable Power, calorimetrics will be required to adjust NIs, as power approaches Max Allowable Power.</p>
SRO	5.4.19	WHEN a minimum of four hours has elapsed from the time recorded in Step 5.4.17, THEN continue the power escalation. Enter N/A if fuel has been conditioned.
SRO/RO BOP	5.4.20	WHEN the Maximum Allowable Power level is reached, THEN stabilize the plant AND notify Energy Supply (MOC), Chemistry, and the Polishing Building.
		<p><i>Evaluator's Note: No further actions are expected for this event.</i></p> <p>END EVENT #1</p>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 1

Page 19 of 104

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

Cue: When team ready.

	RO	<p>1-OP-CH-007 – Blender Operations</p> <p>3.0 Initial Conditions</p> <p>3.1 Check Primary Grade water is available to the Blender.</p> <p>RO verifies one PG pump in service</p> <p>3.2 Check at least one Boric Acid Transfer Pump is in Automatic and aligned to the Blender. IF the boric acid flow path to the blender is unavailable, THEN enter N/A.</p> <p>RO verifies that 1-CH-P-2A is in service.</p>
	RO	<p>1-OP-CH-007 – Blender Operations</p> <p>4.0 Precautions and Limitations</p> <p>4.1 Control rod position, Tav_g, and/or power level should be observed when making up to the RCS.</p> <p>4.2 Operation of pressurizer heaters and spray valves should be used to equalize Boron concentration (CB) when changing CB.</p> <p>4.3 The blender must be frequently monitored for proper operation during the entire duration of the makeup. (Reference 2.4.1)</p> <p>4.4 The Reactor Operator shall notify Shift Supervision before performing any Blender evolution. (Reference 2.4.1)</p> <p>4.5 Rapidly changing VCT level and pressure may affect RCP Seal leakoff, which should be monitored for normal response.</p> <p>4.6 Calculations involving reactivity must be independently verified. (Ref. 2.4.4)</p> <p>4.7 Operation of the Blender must be Peer checked.</p> <p>4.8 Due to system configuration, PG flow will continue after reaching the integrator endpoint. Depending on the total flow rate, 0-5 gallons of additional flow should be anticipated. At 100 gpm, four gallons of additional flow is expected. At 60 gpm, two gallons of additional flow is expected.</p> <p>4.9 Due to system configuration, BA flow will continue after reaching the integrator endpoint. Depending on the total flow rate, 0 to 0.5 gallons additional flow should be anticipated. At 8 gpm, 0.2 - 0.3 gallons of additional flow is expected.</p> <p>4.10 The Blender may lock up if the RATE function is in use at the end of make up. (Integrator lock up does NOT affect the Blender AUTO function). (Ref. 2.4.2)</p> <p>4.11 Attachment 8 may be used to monitor PG and Boric Acid flow rates and total amounts added on the respective integrator.</p> <p>4.12 Due to no flow occurring through the VCT while on Excess Letdown, all dilutions, borations, or manual makeups should be made to the Charging Pump Suction through 1-CH-FCV-1113B, unless makeup is being made to raise RCS hydrogen concentration.</p>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 1

Page 20 of 104

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

Cue: When team ready.

	RO	<p>1-OP-CH-007 – Blender Operations</p> <p>5.4 Alternate Dilution</p> <p>NOTE: This subsection will be used for the first alternate dilution of the shift. Attachment 3 will be used as a guide for further alternate dilutions for the remainder of the shift, unless Excess Letdown is in service.</p> <p>5.4.1 Notify Shift Supervision of impending Alternate Dilution. (Reference 2.4.1)</p> <p>5.4.2 Notify STA of impending Alternate Dilution.</p> <p>5.4.3 Place the MAKE-UP MODE CNTRL switch in the STOP position.</p> <p>5.4.4 Adjust both of the following controllers for the flow rate and total gallons of Primary Grade water for the dilution. IF the PG FLOW CNTRL controller setpoint has previously been set, THEN enter N/A for that substep.</p> <p>a. 1-CH-FC-1114A, PG FLOW CNTRL _____ GPM (IAW Attachment 10)</p> <p>b. Determine the required integrator setpoint by performing the following:</p> $\frac{\text{_____ gal (-)}}{\text{(Desired Dilution)}} = \frac{\text{_____}}{\text{(anticipated additional flow, dependent on flowrate)}} \text{ Integrator setpoint}$ <p>c. Record number of gallons of PG to be added from Step 5.4.4.b and enter into 1-CH-YIC-1114A, PRI WATER SUP BATCH INTEGRATOR (GAL) as follows: _____ GAL</p> <ol style="list-style-type: none"> 1. Depress PRESET A Button (Controller will read the last value entered into the controller; reads in gallons.) 2. To clear PRESET A, depress the CLR Button. Enter N/A if not required. 3. Enter desired PRESET A value. Enter N/A if not required. 4. Depress ENT Button.
--	----	---

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 1

Page 21 of 104

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

Cue: When team ready.

	RO	<p>1-OP-CH-007 – Blender Operations</p> <p>5.4.5 Place the MAKE-UP MODE SEL switch in the ALT DIL position.</p> <p>NOTE: While on Excess Letdown, all dilutions should be made to the Charging Pump Suction through 1-CH-FCV-1113B, due to no flow occurring through the VCT.</p> <p>5.4.6 IF it is desired to direct the dilution water to the charging pump suction only, THEN place 1-CH-FCV-1114B, BLENDER TO VCT, in the CLOSE position. Otherwise, enter N/A.</p> <p>5.4.7 Place the MAKE-UP MODE CNTRL switch in the START position.</p> <p>5.4.8 Check all of the following conditions.</p> <ul style="list-style-type: none"> a. 1-CH-FCV-1113A, BORIC ACID TO BLENDER, is closed. b. 1-CH-FCV-1113B, BLENDER TO CHG PUMP, is open. c. 1-CH-FCV-1114A, PGW TO BLENDER, is controlling in AUTO. <p>5.4.9 IF unit is on Excess Letdown AND divert of flow is necessary for inventory control OR Reactivity Management, THEN perform the following substeps. Otherwise, enter N/A. (Reference 2.4.3)</p> <ul style="list-style-type: none"> a. Check closed or slowly close 1-CH-HCV-1137, EXCESS LETDOWN FLOW. b. Place 1-CH-HCV-1389, EXCESS LETDOWN DIVERT, to the PDTT position. c. Slowly open 1-CH-HCV-1137 until approximately 15 gpm flow is established to the PDTT. d. Check 1-CC-TI-108, EXCESS LETDOWN HX CC OUTLET TEMP, indicates less than 150° F. e. Check 1-CH-TI-1139, EXCESS LETDOWN HX OUTLET TEMP, is less than 195° F. f. Adjust RCP Seal Injection and/or Charging Flow as necessary to control inventory. g. WHEN VCT and/or PRZR level have been adjusted, THEN return Excess letdown to the VCT by placing 1-CH-HCV-1389 to the VCT position.
--	----	---

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 1

Page 22 of 104

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

Cue: When team ready.

	RO	<p>1-OP-CH-007 – Blender Operations</p> <p>5.4.10 IF it is desired to stop the Dilution before the selected amount, THEN place the MAKE-UP MODE CNTRL switch in the STOP position. IF the PRI WATER SUP BATCH INTEGRATOR (GAL) is used to stop the flow, THEN enter N/A for this step.</p> <p>5.4.11 WHEN the desired amount of makeup has been reached, THEN check both of the following.</p> <ul style="list-style-type: none"> • 1-CH-FCV-1113B closes. • IF Step 5.4.6 was NOT performed, THEN check that 1-CH-FCV-1114B is closed. Otherwise, enter N/A. <p>5.4.12 IF Step 5.4.6 was performed, THEN place 1-CH-FCV-1114B in AUTO. Otherwise, enter N/A.</p> <p>5.4.13 IF a manual makeup is desired, THEN enter N/A for Steps 5.4.14 through 5.4.16 AND GO TO Subsection 5.5.</p> <p>5.4.14 Place the MAKE-UP MODE SEL switch in the AUTO position.</p> <p>5.4.15 Place the MAKE-UP MODE CNTRL switch in the START position.</p> <p>5.4.16 Notify Shift Supervision of Blender status. (Reference 2.4.1)</p>
	RO	<p>1-OP-CH-007 – Blender Operations</p> <p>5.5 Manual</p> <p>NOTE: This subsection will be used for the first manual makeup of the shift. Attachment 4 will be used as a guide for further manual makeups for the remainder of the shift, unless Excess Letdown is in service.</p> <p>5.5.1 Notify Shift Supervision of impending Manual Makeup. (Reference 2.4.1)</p> <p>5.5.2 Place the MAKE-UP MODE CNTRL switch in the STOP position.</p> <p>5.5.3 Adjust both of the following controllers for the flow rate of Boric Acid and Primary Grade water. IF flow controller setpoints have previously been set, THEN enter N/A for this step.</p> <ul style="list-style-type: none"> • 1-CH-FC-1113A, BA FLOW CNTRL (IAW Attachment 9) • 1-CH-HFC-1114, PG FLOW STPT

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 1

Page 23 of 104

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

Cue: When team ready.

	RO	<p>1-OP-CH-007 – Blender Operations</p> <p>5.5.4 Adjust both of the following integrators for greater than the total gallons of Boric Acid and Primary Grade water desired to be added. Enter N/A if previously set.</p> <p>a. Record number of gallons of Boric Acid to be added and enter into 1-CH-YIC-1113, BA SUPPLY BATCH INTEGRATOR (GAL) as follows:</p> <p>_____ GAL</p> <ol style="list-style-type: none"> 1. Depress PRESET A Button (Controller will read the last value entered into the controller; reads in tenths of gallons.) 2. To clear PRESET A, depress the CLR Button. Enter N/A if not required. 3. Enter desired PRESET A value. Enter N/A if not required. 4. Depress ENT Button. <p>b. Record number of gallons of PG to be added and enter into 1-CH-YIC-1114A, PRI WATER SUP BATCH INTEGRATOR (GAL) as follows:</p> <p>_____ GAL</p> <ol style="list-style-type: none"> 1. Depress PRESET A Button (Controller will read the last value entered into the controller, reads in gallons.) 2. To clear PRESET A, depress the CLR Button. Enter N/A if not required. 3. Enter desired PRESET A value. Enter N/A if not required. 4. Depress ENT Button. <p>5.5.5 Place the MAKE-UP MODE SEL switch in the MANUAL position.</p> <p>5.5.6 Place the MAKE-UP MODE CNTRL switch in the START position.</p> <p>5.5.7 Open 1-CH-FCV-1113B, BLENDER TO CHG PUMP.</p>
--	----	---

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 1

Page 24 of 104

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

Cue: When team ready.

	RO	<p>1-OP-CH-007 – Blender Operations</p> <p>5.5.8 Check all of the following conditions.</p> <ul style="list-style-type: none"> a. 1-CH-FCV-1113A, BORIC ACID TO BLENDER, is controlling in AUTO. b. 1-CH-FCV-1113B, BLENDER TO CHG PUMP, is open. c. 1-CH-FCV-1114A, PGW TO BLENDER, is controlling in AUTO. d. 1-CH-FCV-1114B, BLENDER TO VCT, is closed. <p>5.5.9 IF unit is on Excess Letdown AND divert of flow is necessary for inventory control or Reactivity Management, THEN perform the following substeps. Otherwise, enter N/A. (Reference 2.4.3)</p> <ul style="list-style-type: none"> a. Check closed or slowly close 1-CH-HCV-1137, EXCESS LETDOWN FLOW. b. Place 1-CH-HCV-1389, EXCESS LETDOWN DIVERT, to the PDTT position. c. Slowly open 1-CH-HCV-1137 until approximately 15 gpm flow is established to the PDTT. d. Check 1-CC-TI-108, EXCESS LETDOWN HX CC OUTLET TEMP, indicates less than 150° F. e. Check 1-CH-TI-1139, EXCESS LETDOWN HX OUTLET TEMP, is less than 195° F. f. Adjust RCP Seal Injection and/or Charging Flow as necessary to control inventory. g. WHEN VCT and/or PRZR level have been adjusted, THEN return Excess letdown to the VCT by placing 1-CH-HCV-1389 to the VCT position. <p>5.5.10 WHEN the manual makeup operation is complete, THEN place 1-CH-FCV-1113B in the AUTO position.</p> <p>5.5.11 Place the MAKE-UP MODE CNTRL switch in the STOP position.</p>
--	----	--

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 1

Page 25 of 104

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

Cue: When team ready.

	RO	<p>I-OP-CH-007 – Blender Operations</p> <p>5.5.12 Check or place the following controllers in Automatic and adjust to the desired blended flow CB.</p> <ul style="list-style-type: none">• 1-CH-FC-1113A, BA FLOW CNTRL (IAW Attachment 9)• 1-CH-HFC-1114, PG FLOW STPT <p>5.5.13 Place the MAKE-UP MODE SEL switch in the AUTO position.</p> <p>5.5.14 Place the MAKE-UP MODE CNTRL switch in the START position.</p> <p>5.5.15 Notify Shift Supervision of Blender status. (Reference 2.4.1)</p> <p>END BLENDER OPERATION PROCEDURE</p>
--	----	--

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 2

Page 26 of 104

Event Description: 1-CN-P-1C trips, 1-CN-P-1A does not auto start (AP-21.00)

Cue: Evaluator's Cue

Time	Position	Applicant's Action or Behavior
	BOP	<p>Diagnose the failure with the following indications:</p> <p>Alarms:</p> <ul style="list-style-type: none"> • 1H-F3 – CN POLISHING SYS TRBL • 1H-G5/6/7 - STM GEN 1A(B)(C) LVL ERROR • 1K-D4 – 4KV BKR AUTO TRIP <p>Indications:</p> <ul style="list-style-type: none"> • Abnormal MCB light indications for 'C' CN pump • Zero amps for 'C' CN pump <p>BOP may independently start 'A' CN pump after checking for no CN or FW rupture (per 1J-G4, performing the automatic start of the pump, or per AP-21.00).</p> <p>Informs SRO that standby CN pump did not auto start.</p> <p>NOTE: The Main Feed Pumps will trip if suction pressure drops to 55 psig after a 15 second time delay.</p>
	SRO	Direct actions of 1J-G4 or AP-21.00
		AP-21.00, Loss of Main Feedwater Flow
	BOP	<p><i>Evaluator Note: IF the team uses ARP 1J-G4, refer to the last three pages of this event.</i></p> <p>[1] CHECK MAIN FEED PUMP STATUS</p> <p>a) Check Reactor Power – GREATER THAN 85%</p> <p><i>Reactor power will be >85%</i></p> <p>b) Check Main Feed Pumps – TWO RUNNING</p> <p>BOP will identify that two main feed pumps are running.</p>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 2

Page 27 of 104

Event Description: 1-CN-P-1C trips, 1-CN-P-1A does not auto start (AP-21.00)

Cue: Evaluator's Cue

		AP-21.00, Loss of Main Feedwater Flow
	BOP	<p>[2] START AN ADDITIONAL CONDENSATE PUMP</p> <p>The BOP should start the stand-by condensate pump (1-CN-P-1A).</p>
	BOP	<p>[3] REDUCE TURBINE LOAD TO MATCH STEAM FLOW WITH FEED FLOW</p> <ul style="list-style-type: none"> • Use Valve Position Limiter <p style="text-align: center;"><u>OR</u></p> <ul style="list-style-type: none"> • Reduce Turbine load using Turbine Manual <p>The BOP may reduce turbine load. This may or may not be required, depending on the speed at which the standby condensate pump was started.</p>
	SRO	<p>The team will hold a transient brief. During the brief the failure of the condensate system will be discussed.</p> <p>The RO and BOP will report out critical parameters, as per placard on Main Control Room Bench Board.</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>
	BOP	<p>4. CHECK CONDENSATE POLISHING BLDG BYPASS - REQUIRED</p> <ul style="list-style-type: none"> • Main Feed Pump Suction Pressure – LESS THAN 400 PSIG <p>4. RNO – GO TO STEP 6</p> <p>Depending on timing, suction pressure may or may not be less than 400 psig. If so, the team will proceed to Step 5 and then 6.</p>
	BOP	<p>5. OPEN MOV-CP-100</p> <p>Checks 1-CP-MOV-100 open</p> <p>If team starts the stand-by pump quickly, the CP Bypass MOV may not open.</p>
	RO	<p>6. ENERGIZE ALL PRZR HEATERS</p>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 2

Page 28 of 104

Event Description: 1-CN-P-1C trips, 1-CN-P-1A does not auto start (AP-21.00)

Cue: Evaluator's Cue

		AP-21.00, Loss of Main Feedwater Flow
	BOP	7. VERIFY STEAM DUMP OPERATION – REDUCING TAVE/TREF MISMATCH BASED ON DEMAND SIGNAL Checks no Tave/Tref Deviation exists
	SRO	Note prior to Step 8: <ul style="list-style-type: none"> Depending on initial plant conditions, rod insertion or boration may be used to stabilize RCS temperature and maintain Δflux in band.
	RO	8. CHECKS CONTROL RODS – INSERTING AS NECESSARY
	RO	9. VERIFY ANNUNCIATOR 1E-E3 Δ FLUX DEVIATION – NOT LIT Verifies no delta flux alarm exists. May insert or withdraw rods to control flux.
	BOP	10. VERIFY ALL SG FLOWS – STEAM FLOW IS LESS THAN OR EQUAL TO FEED FLOW. Verifies steam flow is less than feed flow.
	BOP	11. VERIFY ALL SG LEVELS – AT OR TRENDING TO PROGRAMMED LEVEL Verifies SG levels are at program level (or trending to program)
	RO	12. VERIFY TAVE – MATCHED WITH TREF Step 12 RNO Actions: Do the following: a) Adjust Control Rods b) Dilute or borate the RCS as necessary
	BOP	13. VERIFY FEED HEADER TO STEAM HEADER Δ P – AT LEAST 50 PSID. Verifies SG pressures are within 50 psid of header pressure.

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 2

Page 29 of 104

Event Description: 1-CN-P-1C trips, 1-CN-P-1A does not auto start (AP-21.00)

Cue: Evaluator's Cue

		AP-21.00, Loss of Main Feedwater Flow
	BOP	<p>14. VERIFIES AMPS ON EACH MOTOR OF THE RUNNING MAIN FEED PUMPS – LESS THAN 420 AMPS</p> <p>Checks MFP amps less than 420</p>
	BOP	<p>15. CHECK OPERATION OF MAIN FEED PUMPS</p> <ul style="list-style-type: none"> • Recirc valve position • Discharge MOV position • Pump Amps <p>Verifies normal MFP parameters and alignment.</p>
	RO	<p>16. VERIFY REACTOR POWER CHANGE – LESS THAN 15% IN ONE HOUR</p> <p>Verifies power change is greater than 15% and notifies chemistry per the RNO.</p> <p><i>If contacted, Chemistry will acknowledge the power change. This call may not be made, if contact was made during AP-23.00.</i></p>
	SRO	<p>17. NOTIFY THE FOLLOWING:</p> <ul style="list-style-type: none"> • OMOC • Maintenance Foreman <p>- END AP-21.00 -</p>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 2

Page 30 of 104

Event Description: 1-CN-P-1C trips, 1-CN-P-1A does not auto start (AP-21.00)

Cue: Evaluator's Cue

Time	Position	Applicant's Action or Behavior
		NOTE: These pages are only applicable if the applicant uses annunciator 1J-G4 to start the Main Condensate Pump.
	SRO	Direct actions of 1J-G4 (Condensate Pump Discharge Header Low Pressure)
	SRO	Notes prior to Step 1: <ul style="list-style-type: none"> The Main Feed Pumps will trip on low suction pressure if pressure as indicated on 1-CN-PI-150A or 1-CN-PI-150B decreases to 55 psig for 15 seconds. The standby Main Condensate Pump should auto-start when this alarm is received.
	BOP	1. CHECK MAIN CONDENSATE SYSTEM - BEING SECURED BY OPERATOR ACTION 1. RNO: GO TO Step 3.
	BOP	3. CHECK MAIN CONDENSATE OR MAIN FEED RUPTURE - INDICATED <ul style="list-style-type: none"> Amps on CN and MFW pumps – OSCILLATING Hotwell level – DECREASING Local report or audible indication 3. RNO: GO TO Step 6.
	BOP	6. CHECK STANDBY MAIN CONDENSATE PUMP - RUNNING 6. RNO: <p>Check the following parameters:</p> <ul style="list-style-type: none"> FW Header pressure FW Pump Suction pressure MFW flow <p>IF standby CN pump required, THEN do the following:</p> <p>a) Start standby pump.</p> <p>b) GO TO Step 7.</p>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 2

Page 31 of 104

Event Description: 1-CN-P-1C trips, 1-CN-P-1A does not auto start (AP-21.00)

Cue: Evaluator's Cue

		1J-G4, Condensate Pump Discharge Header Low Pressure
	BOP	<p>7. LOCALLY CHECK BREAKER AND PUMP FOR ANY CN PUMP WHICH HAS TRIPPED</p> <p><i>If dispatched, the field operator will report that the breaker for 1-CN-P-1C is open, but cannot determine why.</i></p>
	SRO	<p>The team will hold a transient brief. During the brief the failure of the condensate system will be discussed.</p> <p>The RO and BOP will report out critical parameters, as per placard on Main Control Room Bench Board.</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>
		*8. CHECK MAIN FEED FLOW - GREATER THAN OR EQUAL TO MAIN STEAM FLOW
	BOP	<p>9. CHECK CONDENSER HOTWELL LEVEL - GREATER THAN OR EQUAL TO 26%</p> <ul style="list-style-type: none"> • LI-CN-103
	BOP	<p>Notes prior to Step 10:</p> <ul style="list-style-type: none"> • Condensate recirculation valve flow greater than 3600 gpm could cause serious piping erosion/corrosion and valve damage. • The Condensate Recirc valve will fail closed when Instrument Air is lost. • If the Semi-Vital Bus is lost, the Condensate Recirc valve will fail open after thirty minutes due to loss of power to 1-CN-FT-107.
	BOP	<p>10. CHECK CONDENSATE RECIRC VALVE - CORRECT FOR CURRENT POWER LEVEL</p> <p><i>If dispatched, the field operator will report that the condensate recirc valve is closed and correctly set.</i></p>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 2

Page 32 of 104

Event Description: 1-CN-P-1C trips, 1-CN-P-1A does not auto start (AP-21.00)

Cue: Evaluator's Cue

		1J-G4, Condensate Pump Discharge Header Low Pressure
	BOP	<p>11. LOCALLY CHECK CN PUMP SUCTION STRAINERS</p> <ul style="list-style-type: none"> • Strainer DP - ALL LESS THAN OR EQUAL TO NORMAL <p><i>If dispatched, the field operator will report that the suction strainers are normal ZERO (just like he saw them on operator rounds).</i></p>
	BOP	<p>12. CHECK CP BUILDING DP – NORMAL</p> <p><i>If contacted, the field operator will report that CP building differential pressure is normal (value to be taken from simulator during event) (ΔP is zero if CP Building is bypassed).</i></p> <p>If CP building is bypassed, team should take actions to restore CP building flow. ARP 1H-D3 contains these steps and can be utilized (this alarm was received and cleared during transient). ARP actions follow in this section.</p>
	BOP	13. CHECK CAUSE OF LOW HEADER PRESSURE - CORRECTED
	SRO	<p>14. PLACE ONE CN PUMP IN STANDBY IAW SHIFT SUPERVISOR DIRECTION</p> <p><i>Team may elect to place 1-CN-P-1C in PTL.</i></p>
	SRO	<p>15. PROVIDE NOTIFICATIONS AS NECESSARY</p> <ul style="list-style-type: none"> • OMO • STA • System Engineering

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 2

Page 33 of 104

Event Description: 1-CN-P-1C trips, 1-CN-P-1A does not auto start (AP-21.00)

Cue: Evaluator's Cue

	BOP	<p>ARP 1H-D3 (CN POLISHING BYPASS AOV OPEN)</p> <p>1. VERIFY PLANT CONDITIONS:</p> <ul style="list-style-type: none"> • 1-CP-MOV-100 - NOT FULLY OPEN AND • One of the following has occurred: <ul style="list-style-type: none"> ○ Feedwater Suction Pressure – LESS THAN 300 PSIG ○ Sudden loss of load – GREATER THAN 10% IN 2 MINUTES
	BOP	<p>ARP 1H-D3 (CN POLISHING BYPASS AOV OPEN)</p> <p>2. VERIFY 1-CP-MOV-100 – OPENING</p>
	BOP	<p>ARP 1H-D3 (CN POLISHING BYPASS AOV OPEN)</p> <p>3. NOTIFY CP OPERATOR THAT 1-CP-MOV-100 IS OPEN</p>
	BOP	<p>ARP 1H-D3 (CN POLISHING BYPASS AOV OPEN)</p> <p>4. CHECK CONDITION CAUSING BYPASS - CLEAR</p> <ul style="list-style-type: none"> • Feed Pump Suction – GREATER THAN 425 psig • Load Stable
	BOP	<p>ARP 1H-D3 (CN POLISHING BYPASS AOV OPEN)</p> <p>5. RESTORE CN POLISHING FLOW</p> <ol style="list-style-type: none"> a) Verify or place 1-CP-AOV-122 in Manual b) Open or verify open 1-CP-AOV-122 c) Close 1-CP-MOV-100 d) WHILE monitoring CP Bldg DP, THEN slowly close 1-CP-AOV-122 e) Place 1-CP-AOV-122 in Auto
	BOP	<p>ARP 1H-D3 (CN POLISHING BYPASS AOV OPEN)</p> <p>6. PROVIDE NOTIFICATIONS AS NECESSARY:</p> <ul style="list-style-type: none"> • OMO • STA • Shift Supervision • Chemistry <p>End ARP Actions</p>
		END EVENT #2

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 3

Page 34 of 104

Event Description: N-44 fails high (AP-53.00/AP-1.00/AP-4.00)

Cue: Evaluator's Cue

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-H5 NIS PWR RNG HI STPT CH 4 • 1G-G1 NIS PWR RNG HI FLUX ROD STOP • 1G-E4 NIS PWR RNG CH AVG FLUX DEVIATION <p>Indications:</p> <ul style="list-style-type: none"> • PR average flux reads high • Control Rods are stepping in. <p>May place control rods in MANUAL in accordance with 0-AP-53.00 and then transition to AP-4.00. The team may also elect to perform the actions of 1-AP-1.00. AP-1.00 actions are at the end of this section.</p>
	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, 43 are indicating normal.</p>
	RO	<p>[2] PLACE AFFECTED CONTROL(S)/COMPONENT(S) IN MANUAL CONTROL AND STABILIZE PARAMETER USING REDUNDANT INDICATION</p> <p>RO will place Rod Control in Manual to stop the automatic insertion.</p>
	SRO	<p>The team will hold a transient brief. During the brief the failure of N-44 will be discussed.</p> <p>The RO and BOP will report out critical parameters, as per placard on Main Control Room Bench Board.</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 2012-1

Scenario No.: 3

Event No.: 3

Page 35 of 104

Event Description: N-44 fails high (AP-53.00/AP-1.00/AP-4.00)

Cue: Evaluator's Cue

	RO	<p>0-AP-53.00</p> <p>*3. VERIFY REACTOR POWER – LESS THAN OR EQUAL TO 100%.</p> <p>RO will identify that reactor power is approximately 95%, which is less than 100%.</p>
	SRO	<p>Notes Prior to Step 4:</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 13.
	SRO	<p>*4 DETERMINE THE FAILED INSTRUMENT / CONTROL AND GO TO APPROPRIATE STEP.</p> <ul style="list-style-type: none"> • NI Malfunction, 1-AP-4.00
	RO	<p>The RO will identify that NI-44 has failed and the team will transition to 1-AP-4.00</p>
	TEAM	<p>Transition to 1-AP-4.00.</p>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 3

Page 36 of 104

Event Description: N-44 fails high (AP-53.00/AP-1.00/AP-4.00)

Cue: Evaluator's Cue

		1-AP-4.00 (Nuclear Instrumentation Malfunction) Actions
	SRO	Enters 1-AP-4.00, NUCLEAR INSTRUMENTATION MALFUNCTION
	SRO	<p>The team will hold a transient brief. During the brief the failure of N-44 will be discussed.</p> <p>The RO and BOP will report out critical parameters, as per placard on Main Control Room Bench Board.</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>
	SRO	<p>Note prior to Step 1:</p> <ul style="list-style-type: none"> Attachments 6, 7, and 8 show one-line diagrams of Nuclear Instrumentation.
	RO	1. CHECK NI MALFUNCTION – POWER RANGE FAILURE
	RO/BOP	2. STABILIZE UNIT CONDITIONS
	RO	3. CHECK N-44 - FAILED
	RO	4. VERIFY ROD CONTROL - IN MANUAL
		<p>CAUTION prior to step 5:</p> <ul style="list-style-type: none"> To prevent operation with delta flux outside of target band, delta flux must be monitored and maintained within band if rods have moved.
	BOP	5. PLACE 1-MS-43-N16, REACTOR POWER SOURCE, IN THE N43 POSITION (SWITCH LOCATED ON NI PROTECTION CHNL III CABINET)

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 3

Page 37 of 104

Event Description: N-44 fails high (AP-53.00/AP-1.00/AP-4.00)

Cue: Evaluator's Cue

		1-AP-4.00 (Nuclear Instrumentation Malfunction) Actions
	RO	6. CHECK N-43 - FAILED 6. RNO - GO TO Step 8.
	RO	8. CHECK POWER RANGE CHANNELS - ONLY ONE FAILED
	SRO	Note prior to Step 9: <ul style="list-style-type: none"> Performance of Attachment 1 to place the failed Power Range Channel in trip requires I&Cs assistance for N-41, N-42, or N-43.
	SRO	9. INITIATE ATTACHMENT 1 TO PLACE FAILED CHANNEL IN TRIP WITHIN 72 HOURS Note: Applicable actions from Attachment 1 begin on the following page.
	RO	10. CHECK NI MALFUNCTION – INTERMEDIATE RANGE FAILURE 10. RNO - GO TO Step 19.
	RO	19. CHECK NI MALFUNCTION – SOURCE RANGE FAILURE 19. RNO - GO TO Step 38.
	SRO	38. NOTIFY THE FOLLOWING <ul style="list-style-type: none"> Instrument Shop OM on call

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 3

Page 38 of 104

Event Description: N-44 fails high (AP-53.00/AP-1.00/AP-4.00)

Cue: Evaluator's Cue

		1-AP-4.00 - ATTACHMENT 1 (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 check annunciator 1G-C4, UPPER ION CHAMBER DEVIATION OR AUTO DEFEAT < 50% NOT LIT. (annunciator will remain LIT if any Power Range channel less than 50%) e. Select the failed channel on the LOWER SECTION defeat switch. f. IF Reactor power greater than 50%, THEN check annunciator 1G-D4, LOWER ION CHAMBER DEVIATION OR AUTO DEFEAT < 50% - NOT LIT. (annunciator will remain LIT if any Power Range channel less than 50%).
	BOP	<p>Notes prior to Step 2:</p> <ul style="list-style-type: none"> • Annunciator NIS PWR RNG HI STPT (1E-E5, 1E-F5, 1E-G5, or 1E-H5) for the channel being placed in trip, NIS PWR RNG LOSS OF DET VOLT (1G-C3), and NIS DROPPED ROD FLUX DECREASE > 5% PER 2 SEC (1G-H1) will alarm when the instrument power fuses are pulled. • If Reactor power is less than 10%, annunciator NIS PWR RNG LO STPT HI FLUX (1E-D5) will alarm when the instrument power fuses are pulled.

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 3

Page 39 of 104

Event Description: N-44 fails high (AP-53.00/AP-1.00/AP-4.00)

Cue: Evaluator's Cue

	BOP	<p>2. Place the failed Power Range channel in trip IAW the following:</p> <ol style="list-style-type: none"> a. At the Power Range drawer, remove the INSTRUMENT POWER fuses. b. At the Power Range drawer, put the POWER RANGE TEST switch in the TEST position. c. Verify annunciator 1G-H1, NIS DROPPED ROD FLUX DECREASE > 5% PER 2 SEC - LIT. d. Verify annunciator 1G-C3, NIS PWR RNG LOSS OF DET VOLT – LIT. e. IF Reactor power less than 10%, THEN verify annunciator 1E-D5, NIS PWR RNG LO STPT HI FLUX – LIT.
	BOP	<p>3. Remove the following PCS points for the failed channel from scan:</p> <ul style="list-style-type: none"> • N-44, N0047A and N0048A <p>The team may opt to have I&C remove these points from scan.</p>
	SRO	Step 4 is not applicable for N-44.
	SRO	<p>5. IF reactor power is greater than 75%, THEN do either a OR b below:</p> <ol style="list-style-type: none"> a) Determine the core quadrant balance using the incore movable detectors when any of the following occur. <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) 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.

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 3

Page 40 of 104

Event Description: N-44 fails high (AP-53.00/AP-1.00/AP-4.00)

Cue: Evaluator's Cue

	SRO	<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><i>Reactor power is >75%.</i></p>
	SRO	<p>7. Refer to Tech Spec Table 3.7-1, Item 2, 5, 6, and 20.</p> <p>Determines 3.7-1 item 2 (OA #2) is applicable (trip channel w/in 72 hr; restrict power to 75% and reduce trip setpoints to 85% or 12 hr QPTR)</p> <p>Note: 3.7-1 item 20 (OA #13) is not applicable (channels not less than minimum)</p> <p>Note: Tech spec table 3.7-6 item 7 is not applicable (this spec is regarding gamma-metric detectors)</p>
	SRO	<p>8. Refer to Tech Spec 3.12.D.</p> <p>3.12.D. QUADRANT POWER TILT</p> <p>1. If the reactor is operating above 75% of RATED POWER with one excore nuclear channel out of service, the QUADRANT POWER TILT shall be determined:</p> <ol style="list-style-type: none"> a. Once per day, and b. After a change in power level greater than 10% or more than 30 inches of control rod motion.

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 3

Page 41 of 104

Event Description: N-44 fails high (AP-53.00/AP-1.00/AP-4.00)

Cue: Evaluator's Cue

		1-AP-1.00 (Nuclear Instrumentation Malfunction) Actions
	SRO	Enters 1-AP-1.00, ROD CONTROL SYSTEM MALFUNCTION
	SRO	<p>The team will hold a transient brief. During the brief the failure of N-44 will be discussed.</p> <p>The RO and BOP will report out critical parameters, as per placard on Main Control Room Bench Board.</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>
	SRO	<p>Caution prior to step 1</p> <p>CAUTION: If Tave decreases below 530°F, ()-E-0, Reactor Trip or Safety Injection, must be implemented.</p>
	RO	<p>[1] CHECK FOR EITHER OF THE FOLLOWING:</p> <ul style="list-style-type: none"> • Continuous rod withdrawal • Continuous rod insertion
	RO	<p>[2] STOP ROD MOTION:</p> <p>a) Put ROD CONT MODE SEL switch in MANUAL</p> <p>b) Check rod motion – STOPPED</p> <p>Rod motion will stop</p>
	RO	<p>3. CHECK ROD MOTION - DUE TO INSTRUMENTATION FAILURE</p> <ul style="list-style-type: none"> • First Stage Impulse Pressure • Tave/Tref • Nuclear Instrumentation <p><i>RO will report that NI-44 has failed</i></p>
	RO	<p>4. CHECK ROD MOTION - DUE TO NUCLEAR INSTRUMENTATION FAILURE</p> <p><i>RO will report that NI-44 has failed</i></p>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 3

Page 42 of 104

Event Description: N-44 fails high (AP-53.00/AP-1.00/AP-4.00)

Cue: Evaluator's Cue

1-AP-1.00 (Nuclear Instrumentation Malfunction) Actions	
SRO	5. GO TO ()-AP-4.00, NUCLEAR INSTRUMENTATION FAILURE <i>SRO will transition to 1-AP-4.00</i>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 4

Page 43 of 104

Event Description: 1-RC-PT-1445 fails high opening 1-RC-PCV-1456 (AP-31.00)

Cue: Evaluator's Cue

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	<p>Enters 0-AP-53.00, Loss of Vital Instrumentation / Controls.</p> <p>Team may elect to go directly to 1-AP-31.00. AP-31 actions immediately follow AP-53.00 actions.</p>
	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>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 4

Page 44 of 104

Event Description: 1-RC-PT-1445 fails high opening 1-RC-PCV-1456 (AP-31.00)

Cue: Evaluator's Cue

		0-AP-53.00 - LOSS OF VITAL INSTRUMENTATION / CONTROLS
	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>
	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 13.
	RO	<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>
	SRO	<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>5. CHECK PRZR SPRAY VALVE CONTROLLERS – NORMAL.</p> <p>Spray Controllers are operating normally.</p>
	SRO/RO	<p>6. GO TO ()-AP-31.00, INCREASING OR DECREASING RCS PRESSURE</p> <p>Team transitions to AP-31.00, Increasing or Decreasing RCS Pressure.</p>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 4

Page 45 of 104

Event Description: 1-RC-PT-1445 fails high opening 1-RC-PCV-1456 (AP-31.00)

Cue: Evaluator's Cue

	SRO	Enters 1-AP-31.00, INCREASING OR DECREASING RCS PRESSURE
	SRO	<p>[1] CHECK PRZR PORVS – CLOSED</p> <p>Step 1 RNO:</p> <p>IF RCS pressure less than 2335 psig, THEN do the following:</p> <p>a) Close any open PORV.</p> <p>b) IF any valve can NOT be closed, THEN manually close associated block valve.</p> <p>c) IF any open PORV can NOT be isolated, THEN GO TO 1-E-0, REACTOR TRIP OR SAFETY INJECTION.</p> <p>IF RCS pressure greater than 2335 psig, THEN GO TO Step 12.</p> <p><i>If team directly entered AP-31.00, then it is expected that the RNO path would be taken.</i></p>
	RO	<p>CAUTION: A Safety Injection may occur if the unit is not tripped prior to RCS pressure decreasing below 2100 psig.</p> <p>2. CHECK RCS PRESSURE - DECREASING.</p> <p><i>Pressure is expected to be increasing at this time.</i></p> <p><i>Step 2 RNO Actions:</i></p> <p>IF procedure was entered due to increasing RCS pressure, THEN GO TO Step 12.</p> <p>IF RCS pressure is stable or increasing following PORV closure, THEN GO TO Step 10.</p> <p>The team will transition to step 10</p>
	SRO/RO	10. CHECK RCS PRESSURE - STABILIZING AT OR TRENDING TO 2235 PSIG
	SRO/RO	11. GO TO STEP 17

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 4

Page 46 of 104

Event Description: 1-RC-PT-1445 fails high opening 1-RC-PCV-1456 (AP-31.00)

Cue: Evaluator's Cue

		1-AP-31.00, INCREASING OR DECREASING RCS PRESSURE
	SRO/RO	<p>17. CHECK MASTER CONTROLLER – IN MANUAL</p> <p><i>Reports that MPC is in AUTO</i></p> <p>Step 17 RNO Actions - GO TO Step 19.</p>
	SRO/RO	<p>19. CHECK PRZR PORVS – EITHER INOPERABLE</p> <ul style="list-style-type: none"> • 1-RC-PCV-1455C • 1-RC-PCV-1456 <p><i>Reports that 1-RC-PCV-1456 is inoperable</i></p>
	RO	<p>20. CLOSE BLOCK VALVE FOR INOPERABLE PORV</p> <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 <p>Closes 1-RC-MOV-1535.</p>
	SRO	<p>SRO Exits 1-hour TS clock to close the associated block valve for an inoperable PORV (i.e., PORV is in manual)</p>
	SRO/RO	<p>21. CHECK PRZR PORVS – EITHER INCAPABLE OF BEING MANUALLY CYCLED</p> <ul style="list-style-type: none"> • 1-RC-PCV-1455C • 1-RC-PCV-1456 <p>Step 21 RNO Actions: GO TO Step 23.</p> <p><i>Reports that NEITHER is incapable of being manually cycled</i></p>
	SRO/RO	<p>23. NOTIFY THE FOLLOWING:</p> <ul style="list-style-type: none"> • OM on call • STA • I&C

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 4

Page 47 of 104

Event Description: 1-RC-PT-1445 fails high opening 1-RC-PCV-1456 (AP-31.00)

Cue: Evaluator's Cue

		1-AP-31.00, INCREASING OR DECREASING RCS PRESSURE
	SRO	<p>24. REFER TO TECH SPECS:</p> <ul style="list-style-type: none"> • 3.1.A.5 • 3.1.A.6 • 3.1.C • 3.12.F <p>SRO determines the following LCO actions are(were) applicable</p> <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.a for PORV 1456 (close block valve w/in 1 hour).
	SRO	<p>25. REVIEW APPLICABILITY:</p> <ul style="list-style-type: none"> • VPAP-2802 • EAL Matrix SU6.1 <p><i>SRO directs the SM or STA to review listed documents.</i></p> <p><i>SRO could identify that an EAL classification existed during the time that the PORV was open (SU6.1) and that a 1 hour report exists iaw VPAP-2802 since EAL condition cleared prior to being called.</i></p>
	SRO	<p>26. RESTORE PRESSURE CONTROL SYSTEM(S) TO NORMAL</p> <p><i>SRO contacts maintenance support to restore inoperable instruments</i></p>
		End EVENT 4

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 5

Page 48 of 104

Event Description: #3 Seal Failure on 1-RC-P-1B (AP-9.00)

Cue: Team initiated

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-B5 – RCP 1B SEAL 2 LO INLET PRESS • 1C-E4 – RCP 1B SEAL LEAKOFF LO FLOW <p>Indications:</p> <ul style="list-style-type: none"> • Decreased seal leakoff flow from “B” RCP • Decreased seal pressure on 1-CH-PI-1155A <p>The SRO will direct the BOP to review the ARPs for 1C-B5 & 1C-E4. The SRO can also directly implement 1-AP-9.00 (RCP Abnormal Condition).</p>
	BOP	<p>ARP 1C-B5</p> <p>1. VERIFY ALARM - PRESSURE LESS THAN OR EQUAL TO 1335 PSIG</p> <ul style="list-style-type: none"> • 1-CH-PI-1155 <p>Pressure will indicate <1335 psig</p>
	BOP	<p>2. GO TO 1-AP-9.00, REACTOR COOLANT PUMP ABNORMAL CONDITIONS</p> <p>BOP will inform SRO of ARP guidance to implement 1-AP-9.00</p>
	BOP	<p>ARP 1C-E4</p> <p>NOTE: This alarm is expected to be in when RCS pressure is less than approximately 900 psig.</p> <p>1. CHECK RCS PRESSURE - GREATER THAN APPROXIMATELY 900 PSIG</p> <p>RCS Pressure is approximately 2235 psig</p>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 5

Page 49 of 104

Event Description: #3 Seal Failure on 1-RC-P-1B (AP-9.00)

Cue: Team initiated

	BOP	<p>ARP 1C-E4</p> <p>2. CHECK SEAL LEAKOFF - LESS THAN OR EQUAL TO 1.5 GPM</p> <ul style="list-style-type: none"> • 1-CH-FR-1190 (Pen 2 Green) <p>Leakoff flow will be <0.2 gpm</p>
	BOP	<p>3. GO TO 1-AP-9.00, RCP ABNORMAL CONDITIONS</p> <p>BOP will inform SRO of ARP guidance to implement 1-AP-9.00</p>
	SRO/RO	<p>1-AP-9.00</p> <p>CAUTION: If RCP seal injection flow is lost, RCP seal or bearing temperatures can be expected to reach maximum operating limits within one to two hours, even with normal Thermal Barrier CC flow.</p> <p>NOTE:</p> <ul style="list-style-type: none"> • If an RCP needs to be tripped with the Reactor critical, a Reactor trip must be performed before securing the RCP. • Attachment 1 and Attachment 6 list PCS points which may be used to monitor RCP performance. <p>*1. VERIFY SEAL INJECTION – FLOW INDICATED</p> <p>RO will report seal injection flow NORMAL</p>
	SRO/RO	<p>2. CHECK RCS PRESSURE – LESS THAN 2100 PSIG</p> <p>Step 2 RNO Actions: GO TO Step 4.</p> <p>RO will report RCS Pressure normal at 2235 psig and the SRO will go to step 4</p>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 5

Page 50 of 104

Event Description: #3 Seal Failure on 1-RC-P-1B (AP-9.00)

Cue: Team initiated

		1-AP-9.00, RCP ABNORMAL CONDITIONS
	SRO/RO	<p>*4. CHECK RCP B SEAL WATER OUTLET TEMPERATURE - LESS THAN 190°F</p> <ul style="list-style-type: none"> • PCS Point T0182A - RCP B <p>RO will report normal seal water outlet temperature (<190°F)</p>
	SRO/RO BOP	<p>NOTE:</p> <ul style="list-style-type: none"> • First, Second, and Third Stage Seal ΔP is indicated on the PCS, or may be determined using Notes on Attachment1, page 2. • Differential pressure of greater than 1440 psid is an indication that one seal stage has failed and that a second seal stage is degrading. Unit operation with only one failed seal stage is acceptable. <p>*5. CHECK RCP SEAL STAGE PARAMETERS - NORMAL</p> <ul style="list-style-type: none"> • ΔP across each seal stage – LESS THAN 1440 PSID <p><i>RO/BOP will report all DPs < 1440 utilizing attachment 1, page 2.</i></p>
	SRO	<p>CAUTION: RCPs may be operated without seal water return flow for up to 30 minutes.</p> <p>NOTE:</p> <ul style="list-style-type: none"> • Attachment 3 may be used to check suspect Seal Leakoff flow instrumentation. • If Seal Leakoff flow decreases to less than or equal to 0.2 gpm, the PCS points listed below, will display zero and turn gray. An actual low flow condition can be diagnosed/confirmed by changes in other parameters, including CTMT Sump and PDTT level / influent rate, P2 pressure, and Seal Leakoff temperature. <ul style="list-style-type: none"> ○ P1CH002C, Loop A #2 Seal ΔP ○ P1CH003C, Loop A #3 Seal ΔP ○ P1CH005C, Loop B #2 Seal ΔP ○ P1CH006C, Loop B #3 Seal ΔP ○ P1CH008C, Loop C #2 Seal ΔP ○ P1CH009C, Loop C #3 Seal ΔP

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 5

Page 51 of 104

Event Description: #3 Seal Failure on 1-RC-P-1B (AP-9.00)

Cue: Team initiated

1-AP-9.00, RCP ABNORMAL CONDITIONS	
SRO/RO	<p>*6. CHECK RCP SEAL LEAKOFF - BETWEEN 1.2 - 3.3 GPM</p> <p>RO will report seal leakoff flow <0.2 gpm</p> <p>Step 6 RNO Actions:</p> <p>Do the following:</p> <p>a) CHECK open or open RCP SEAL LKOFF ISOL VV, on affected RCP(s):</p> <ul style="list-style-type: none"> • 1-CH-HCV-1303A • 1-CH-HCV-1303B • 1-CH-HCV-1303C <p>b) IF RCP SEAL LKOFF ISOL VV closed and can NOT be opened within 30 minutes, OR flow is less than 0.2 gpm or greater than 4.2 gpm, THEN do the following:</p> <ol style="list-style-type: none"> 1) Trip the Reactor. 2) Initiate 1-E-0, Reactor Trip or Safety Injection. 3) WHEN approximately five minutes have elapsed since Reactor Trip, THEN do the following: <ol style="list-style-type: none"> a. IF RCP A affected, THEN close 1-RC-PCV-1455A, Pressurizer Spray Valve From Loop A. b. IF RCP C affected, THEN close 1-RC-PCV-1455B, Pressurizer Spray Valve From Loop C. c. Stop the affected RCPs <ul style="list-style-type: none"> • 1-RC-P-1A • 1-RC-P-1B • 1-RC-P-1C <p>c) Initiate orderly shutdown IAW applicable GOP to remove the unit from line.</p> <p>d) Continue to monitor RCP IAW Attachment 1.</p> <p>e) WHEN the unit is off line, THEN do the following:</p> <ol style="list-style-type: none"> 1) Check stable unit conditions. <ol style="list-style-type: none"> a. IF RCP A affected, THEN close 1-RC-PCV-1455A, Pressurizer Spray Valve From Loop A. b. IF RCP C affected, THEN close 1-RC-PCV-1455B, Pressurizer Spray Valve From Loop C. c. Stop the affected RCPs IAW Shift Supervision direction. <p>At this point the team will enter 1-E-0 and following the reactor trip, the team will return to this procedure (<i>expect to be completed by BOP</i>), secure 1-RC-P-1B, and continue in this procedure. It would be expected that when the SBLOCA occurs, that further actions in this procedure will cease.</p> <p>END EVENT 5</p>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 6

Page 52 of 104

Event Description: Reactor Trip (E-0) with complications

Cue: Team initiated

Time	Position	Applicant's Action or Behavior
	RO	<p><u>1-E-0 – Reactor Trip or Safety Injection</u></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 <p>RO identifies All Rods On Bottom Light – NOT LIT and control rod K-12 still withdrawn</p>
	RO 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>c) RNO actions: IF reheat FCVs will NOT close, THEN close MSR steam supply MOVs.</p> <p>d) Verify generator output breakers – OPEN (Time Delayed)</p> <p>RO identifies 1-MS-SOV-104 (and associated FCVs) remain OPEN and performs RNO actions to close the reheat supply MOVs. (1-MS-MOV-100A/B/C/D)</p>
	RO	<p>[3] VERIFY BOTH AC EMERGENCY BUSES – ENERGIZED</p>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 6

Page 53 of 104

Event Description: Reactor Trip (E-0) with complications

Cue: Team initiated

		1-E-0 – Reactor Trip or Safety Injection
		[4] CHECK IF SI INITIATED:
	RO	a) Check if SI is actuated: <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
	RO	<p>RO will determine that SI has not occurred and perform step 4a RNO actions:</p> <p>4a 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 • High CTMT pressure • High steamline differential pressure • High steam flow with low Tave or low line pressure <p>IF SI is required, THEN GO TO Step 4b.</p> <p>IF SI is NOT required, THEN GO TO 1-ES-0.1, REACTOR TRIP RESPONSE.</p> <p>RO will determine that SI is not required and recommend transition to 1-ES-0.1 (Reactor Trip Response)</p> <p>After the immediate actions of 1-E-0 are reported as complete, the SRO will check off immediate action steps in his copy of 1-E-0. After the immediate actions are verified, the team will conduct a brief.</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 alarms already received. He will also state that containment conditions and the electrical conditions are as you see them (or as reported by the RO/BOP).</i></p>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 6

Page 54 of 104

Event Description: Reactor Trip (E-0) with complications

Cue: Team initiated

	SRO	<p>1-ES-0.1 – Note prior to step 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>
	SRO/RO	<p>*1. MONITOR RCS AVERAGE TEMPERATURE</p> <p>a) STABLE AT 547°F</p> <p style="text-align: center;"><u>OR</u></p> <p>b) TRENDING TO 547°F</p> <p>Step 1 RNO actions:</p> <p>1) RNO IF temperature less than 547°F AND decreasing, THEN do the following:</p> <p>a) Stop dumping steam.</p> <p>b) Check closed or close SG Blowdown TVs.</p> <p>c) IF cooldown continues, THEN control total feed flow. Maintain total AFW flow greater than 540 gpm (350 gpm w/o RCPs) until narrow range level in at least one SG greater than 12%.</p> <p>d) IF cooldown continues, THEN close MSTVs.</p> <p>IF temperature greater than 547°F and increasing, THEN do the following:</p> <p>c) Dump steam to condenser.</p> <p style="text-align: center;"><u>OR</u></p> <p>d) Dump steam with SG PORVs.</p> <p><i>Depending on amount of time required to perform this step, AFW flow could be cooling down the RCS. It would be expected that the team will perform RNO actions to reduce AFW flow.</i></p> <p>Also, the SRO may give the BOP operator ATTACHMENT 5 – Transient AFW flow control. This attachment is given on page 56</p>
	SRO/RO	<p>2. CHECK FW STATUS:</p> <p>a) Check RCS Average temperatures - LESS THAN 554°F</p> <p>b) Check Feed REG valves - CLOSED</p> <p>c) Close SG FW isolation MOVs</p> <ul style="list-style-type: none"> o 1-FW-MOV-154A o 1-FW-MOV-154B o 1-FW-MOV-154C <p>d) Check AFW pumps - RUNNING</p> <ul style="list-style-type: none"> • Motor Driven AFW pumps • TD AFW pump <p>e) Check total AFW flow – GREATER THAN 540 GPM (350 GPM 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>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 6

Page 55 of 104

Event Description: Reactor Trip (E-0) with complications

Cue: Team initiated

		END EVENT #6
--	--	---------------------

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 6

Page 56 of 104

Event Description: Reactor Trip (E-0) with complications

Cue: Team initiated

1-ES-0.1 – Attachment 5 – TRANSIENT AFW FLOW CONTROL

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%.

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

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

___ Emergency Bus H deenergized:	<input type="checkbox"/>	1-FW-141	<input type="checkbox"/>	1-FW-156	<input type="checkbox"/>	1-FW-171
___ Emergency Bus J deenergized:	<input type="checkbox"/>	1-FW-140	<input type="checkbox"/>	1-FW-155	<input type="checkbox"/>	1-FW-170

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 7

Page 57 of 104

Event Description: SBLOCA in ES-0.1 w/ no auto SI

Cue: Evaluator 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 2012-1

Scenario No.: 3

Event No.: 7

Page 59 of 104

Event Description: SBLOCA in ES-0.1 w/ no auto SI

Cue: Evaluator Cue.

	<p>SRO</p> <p>RO</p> <p>RO</p> <p>RO</p> <p>RO</p> <p>RO</p> <p>RO</p>	<p>BEGIN 1-E-0</p> <p>Directs Hi-Level Steps of 1-E-0, REACTOR TRIP OR SAFETY INJECTION be performed and the need for safety injection be performed at step 4.</p> <p>[1] VERIFY REACTOR TRIP</p> <p>[2] VERIFY TURBINE TRIP</p> <p>[3] VERIFY BOTH AC EMERGENCY BUSES - ENERGIZED</p> <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 is SI is required or imminent as indicated by any of the following:</p> <ul style="list-style-type: none"> • Low PRZR Pressure <p>IF SI is required, THEN GO TO Step 4b.</p> <p>Determines that SI is imminent due to excessive RCS leakage and goes to step 4b.</p> <p>b) Manually initiate SI</p> <p>The RO will manually initiate SI at step 4 by pushing both SI pushbuttons. The RO should note that SI did NOT automatically initiate.</p>
	<p>SRO</p>	<p>The team will hold a transition brief. During the brief it will be identified that SI was initiated there is currently a SBLOCA in progress.</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 alarms already received. He will also state that containment conditions and the electrical conditions are as you see them (or as reported by the RO/BOP).</i></p>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 7

Page 60 of 104

Event Description: SBLOCA in ES-0.1 w/ no auto SI

Cue: Evaluator Cue.

	SRO/BOP	1-E-0 – Reactor Trip or Safety Injection 5. Initiate Attachment 1 (<i>Attachments 1, 2, 3, & 4 actions contained under Event 8</i>).
	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>6) RNO IF temperature less than 547°F AND decreasing, THEN do the following:</p> <ol style="list-style-type: none"> a) Stop dumping steam. b) IF cooldown continues, THEN control total feed flow. Maintain total AFW flow greater than 540 gpm (350 gpm w/o RCPs) until narrow range level in at least one SG greater than 12%. c) IF cooldown continues, THEN close MSTVs. <p>IF temperature greater than 547°F and increasing, THEN do the following:</p> <ul style="list-style-type: none"> • Dump steam to condenser. <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • Dump steam with SG PORVs. <p><i>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 reduce AFW flow.</i></p>
	RO	<p>7. CHECK PRZR PORVs AND SPRAY VALVES:</p> <ol 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

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 7

Page 61 of 104

Event Description: SBLOCA in ES-0.1 w/ no auto SI

Cue: Evaluator Cue.

	<p>SRO</p> <p>RO</p>	<p>1-E-0 – Reactor Trip or Safety Injection</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><i>RCS subcooling may NOT be less than 30 °F - RNO for the step is to go to step 9.</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><i>Evaluator's note: RCP trip criteria will be met later in this scenario and RCPs will subsequently be secured. Conditions that satisfy RCP criteria are listed below:</i></p> <p>[WOG E-1—C] Trip all RCPs within 5 minutes of reaching RCP Trip and Miniflow recirc criteria.</p> <p><i>Indications that starts 5 minute countdown (RCP Trip Criteria):</i> <i>Trip all RCPs if BOTH conditions listed below occur:</i></p> <ul style="list-style-type: none"> • <i>Charging Pumps - AT LEAST ONE RUNNING AND FLOWING TO RCS (indicated by HHSI flow on 1-SI-FI-1961/1962/1963)</i> • <i>RCS Subcooling - LESS THAN 30°F [85°F] – indicated by annunciator 1G-B1 (APPROACH TO SATURATION TEMP ALARM)- <u>Since Safety injection has already actuated – this will be the cue to start the time.</u></i> <p><i>If RCP trip criteria are not met while in 1-E-0, 1-E-1 contains the same actions as step 1, and on the continuous action page.</i></p> <p>Time annunciator 1G-B1 received: _____</p> <p>Time RCPs secured: _____</p>
--	----------------------	--

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 7

Page 62 of 104

Event Description: SBLOCA in ES-0.1 w/ no auto SI

Cue: Evaluator Cue.

	BOP	<p>1-E-0 – Reactor Trip or Safety Injection</p> <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>
	BOP TEAM	<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>
	RO SRO	<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>
	SRO	<p>1-E-1, Loss of Reactor or Secondary Coolant</p> <p>Evaluator note – on transition to 1-E-1, 1-SI-P-1B will trip.</p>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 7

Page 63 of 104

Event Description: SBLOCA in ES-0.1 w/ no auto SI

Cue: Evaluator Cue.

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] <p>b) RNO actions: GO TO Step 2</p> <ul style="list-style-type: none"> c) Stop all RCPs d) RCS pressure - LESS THAN 1275 PSIG [1475 PSIG] <p>d) RNO actions: GO TO Step 2</p> <ul style="list-style-type: none"> 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 <p><i>At this time 1-SI-P-1B will trip. First the team will receive a seal head tank low level alarm, followed shortly by the trip of the pump. It is expected that the team will dispatch personnel to inspect the breaker and pump.</i></p>
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 <p style="text-align: center;">AND</p> <ul style="list-style-type: none"> • GREATER THAN 100 PSIG

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 7

Page 64 of 104

Event Description: SBLOCA in ES-0.1 w/ no auto SI

Cue: Evaluator Cue.

	BOP	<p>1-E-1 Actions</p> <p>*3. CHECK INTACT SG LEVELS:</p> <p>a) Narrow range level – GREATER THAN 12% [18%]</p> <p>b) Check emergency buses – BOTH ENERGIZED</p> <p>c) Control feed flow to maintain narrow range level between 22% and 50%</p>
	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
	SRO RO	<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> <p>a) Power to PRZR PORV block valves - AVAILABLE</p> <p>b) PRZR PORVs - CLOSED</p> <p>c) PRZR PORV block valves - AT LEAST ONE OPEN</p>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 7

Page 65 of 104

Event Description: SBLOCA in ES-0.1 w/ no auto SI

Cue: Evaluator Cue.

	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 style="text-align: center;">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.
	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 style="text-align: center;">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>If HI-Hi CLS has actuated, the team will go to step 9</p>
	RO	<p>1-E-1 Actions</p> <p>8. VERIFY SERVICE WATER AVAILABLE:</p> <ul style="list-style-type: none"> a) Check Intake Canal level – BEING MAINTAINED BY CW PUMPS b) GO TO Step 12 <p>The team will go to step 12</p>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 7

Page 66 of 104

Event Description: SBLOCA in ES-0.1 w/ no auto SI

Cue: Evaluator Cue.

	RO	<p>1-E-1 Actions</p> <p>*12. CHECK IF CS PUMPS CAN BE STOPPED:</p> <p>a) Check the following:</p> <p style="padding-left: 40px;">RWST level - LESS THAN 3% AND CS Pump amps – FLUCTUATING</p> <p>RNO actions are to GO TO Step 14 and return when conditions listed above exist</p>
	SRO RO	<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> <p style="padding-left: 40px;">1) Pressure – GREATER THAN 250 PSIG [400 PSIG] 2) Pressure - STABLE OR INCREASING 2) RNO – GO TO Step 15</p>
	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 <p>Team may observe decreasing trend on S/G pressures due to RCS cooldown, the team is expected to discuss this and determine that no faulted S/G exists and continue to step 16.</p>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 7

Page 67 of 104

Event Description: SBLOCA in ES-0.1 w/ no auto SI

Cue: Evaluator Cue.

	BOP	<p>I-E-1 Actions</p> <p>16. CHECK IF EDGs CAN BE STOPPED:</p> <ul style="list-style-type: none"> a) Verify AC emergency buses – ENERGIZED BY OFFSITE POWER b) Reset both trains of SI if necessary c) Check CTMT pressure – LESS THAN 14 PSIA <ul style="list-style-type: none"> c) RNO - GO TO Step 17. WHEN pressure less than 14 psia, THEN do steps 16d and 16e. <p>It is expected that the team will GO TO step 17</p>
	RO	<p>I-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 c) RNO Actions - Manually open 1-IA-TV-100. <p><i>Team will be unable to open 1-IA-TV-100 due to containment pressure and will perform later.</i></p>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 7

Page 68 of 104

Event Description: SBLOCA in ES-0.1 w/ no auto SI

Cue: Evaluator Cue.

	RO	<p>1-E-1 Actions</p> <p>18. INITIATE EVALUATION OF PLANT STATUS:</p> <p>a) Verify at least one train of cold leg recirculation capability:</p> <p>1) Train A - AVAILABLE</p> <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 <p>2) Train B - AVAILABLE</p> <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 <p>a) RNO - IF cold leg recirculation capability can NOT be verified, THEN GO TO 1-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION.</p> <p>The team will transition to 1-ECA-1.1 at this point.</p>
		<p>END EVENT #7 – GO TO EVENT #9</p>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 8

Page 69 of 104

Event Description: Failures on Safety Injection

Cue: Pre-existing failures

Time	Position	Applicant's Action or Behavior
	BOP	<p>ATTACHMENT 1 OF E-0</p> <p>1. CHECK 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
	BOP	<p>ATTACHMENT 1 OF E-0</p> <p>2. CHECK 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
	BOP	<p>ATTACHMENT 1 OF E-0</p> <p>3. CHECK AFW PUMPS RUNNING:</p> <ul style="list-style-type: none"> a) MD AFW pumps – RUNNING (Time Delayed) b) TD AFW pump - RUNNING IF NECESSARY

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 8

Page 70 of 104

Event Description: Failures on Safety Injection

Cue: Pre-existing failures

	BOP	<p>ATTACHMENT 1 OF E-0</p> <p>4. CHECK SI PUMPS RUNNING:</p> <ul style="list-style-type: none"> • CHG pumps – RUNNING • LHSI pumps – RUNNING <p><i>BOP Identifies 1-SI-P-1A tripped with lockout alarm present (1A-G4)</i></p>
	BOP	<p>ATTACHMENT 1 OF E-0</p> <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>ATTACHMENT 1 OF E-0</p> <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>ATTACHMENT 1 OF E-0</p> <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 step 8.</p>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 8

Page 71 of 104

Event Description: Failures on Safety Injection

Cue: Pre-existing failures

BOP	<p>ATTACHMENT 1 OF E-0</p> <p>*8. CHECK IF CS REQUIRED:</p> <p>a) CTMT pressure – HAS EXCEEDED 23 PSIA</p> <p>a) RNO actions:</p> <p>1) IF CTMT pressure has exceeded 17.7 psia, THEN check or align the following valves:</p> <ul style="list-style-type: none"> • 1-RM-TV-100A - CLOSED • 1-RM-TV-100B - CLOSED • 1-RM-TV-100C - CLOSED • 1-SV-TV-102 - CLOSED • 1-IA-TV-101A - CLOSED • 1-IA-TV-101B - CLOSED • 1-IA-AOV-103 - OPEN <p>2) GO TO Step 10.</p> <p>b) Manually initiate HI HI CLS</p> <p>c) Trip all RCPs</p> <p>d) Check CS pumps - RUNNING</p> <p>e) Initiate Attachment 4</p> <p><i>This step performance will depend on containment pressure at the time it is encountered.</i></p> <p>Since this is a continuous action step, it is expected that conditions will be met to perform Attachment 4. Attachment 4 is included at the end of this section.</p>
	<p>ATTACHMENT 1 OF E-0</p> <p>*9. CHECK IF RS REQUIRED:</p> <p>a) Check RWST level - LESS THAN OR EQUAL TO 60%</p> <p>Step a) RNO Actions:</p> <p>Do the following:</p> <p>1) Continue to monitor RWST level.</p> <p>2) GO TO Step 10. IF RWST level decreases to less than or equal to 60%, THEN perform Step 9b through Step 9d.</p> <p>b) Check ISRS pumps - RUNNING</p> <p>c) Check OSRS pumps – RUNNING (Time Delayed)</p> <p>d) Check OSRS pumps - NOT CAVITATING</p>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 8

Page 72 of 104

Event Description: Failures on Safety Injection

Cue: Pre-existing failures

	BOP	<p>ATTACHMENT 1 OF E-0</p> <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>ATTACHMENT 1 OF E-0</p> <p>*11. BLOCK LOW TAVE SI SIGNAL:</p> <p>Step may not be performed at this time (if Tave is greater than 543°F).</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

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 8

Page 73 of 104

Event Description: Failures on Safety Injection

Cue: Pre-existing failures

	BOP	<p>ATTACHMENT 1 OF E-0</p> <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 re-performing Step 12. <p>12. CHECK 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>ATTACHMENT 1 OF E-0</p> <p>13. CHECK TOTAL AFW FLOW - GREATER THAN 350 GPM [450 GPM]</p>
	BOP	<p>ATTACHMENT 1 OF E-0</p> <p>14. CHECK AFW MOVs - OPEN</p> <p>BOP could identify that all AFW MOVs are not open and will read the RNO portion of this step and manually align valves as necessary.</p>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 8

Page 74 of 104

Event Description: Failures on Safety Injection

Cue: Pre-existing failures

	BOP	ATTACHMENT 1 OF E-0 15. INITIATE SI VALVE ALIGNMENT IAW ATTACHMENT 2 See attached copy of Attachment 2. Depending on timing, this attachment may have already been completed.
	BOP	ATTACHMENT 1 OF E-0 16. INITIATE VENTILATION, AC POWER, AND SFP STATUS CHECKS IAW ATTACHMENT 3 <i>Attachment 3 is contained in the Event 8 section</i> <i>Unit 2 Operator will state that Unit 2 is at 100% power (if asked)</i> <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>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 8

Page 75 of 104

Event Description: Failures on Safety Injection

Cue: Pre-existing failures

	SRO	<p>ATTACHMENT 2 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>NOTE: Components previously aligned by SI termination steps, must not be realigned by this Attachment.</p>
	BOP	<p>ATTACHMENT 2 of 1-E-0</p> <p>1. Verify opened or open CHG pump suction from RWST MOVs.</p> <ul style="list-style-type: none"> • 1-CH-MOV-1115B • 1-CH-MOV-1115D <p><i>The BOP will open 1-CH-MOV-1115B</i></p>
	BOP	<p>ATTACHMENT 2 of 1-E-0</p> <p>2. Verify closed or close CHG pump suction from VCT MOVs.</p> <ul style="list-style-type: none"> • 1-CH-MOV-1115C • 1-CH-MOV-1115E <p><i>The BOP will close 1-CH-MOV-1115C</i></p>
	BOP	<p>ATTACHMENT 2 of 1-E-0</p> <p>3. Verify running or start at least two CHG pumps. (listed in preferred order)</p> <ul style="list-style-type: none"> • 1-CH-P-1C • 1-CH-P-1B • 1-CH-P-1A

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 8

Page 76 of 104

Event Description: Failures on Safety Injection

Cue: Pre-existing failures

	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
	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 <i>The BOP will close 1-CH-MOV-1289A</i>
	BOP	ATTACHMENT 2 of 1-E-0 6. Verify closed or close Letdown orifice isolation valves. <ul style="list-style-type: none">• 1-CH-HCV-1200A• 1-CH-HCV-1200B• 1-CH-HCV-1200C
	BOP	ATTACHMENT 2 of 1-E-0 7. Verify opened or open LHSI suction from RWST MOVs. <ul style="list-style-type: none">• 1-SI-MOV-1862A• 1-SI-MOV-1862B
	BOP	ATTACHMENT 2 of 1-E-0 8. Verify opened or open LHSI to cold legs MOVs. <ul style="list-style-type: none">• 1-SI-MOV-1864A• 1-SI-MOV-1864B

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 8

Page 77 of 104

Event Description: Failures on Safety Injection

Cue: Pre-existing failures

	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>If lockout alarm is LIT – candidate should NOT attempt to start associated pump. 1A-G4 – LHSI PP 1A LOCKOUT OR OL TRIP 1A-H4 - LHSI PP 1B LOCKOUT OR OL TRIP</p>
	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
	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

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 8

Page 78 of 104

Event Description: Failures on Safety Injection

Cue: Pre-existing failures

NUMBER 1-E-0	ATTACHMENT TITLE	ATTACHMENT 3
REVISION 65	AUXILIARY VENTILATION, AC POWER, AND SFP STATUS CHECKS	PAGE 1 of 6

1. ___ Check or place REFUEL SFTY MODE switches in NORMAL.
2. ___ Check ventilation alignment IAW Tables 1 and 2.

TABLE 1
UNIT #1 VENTILATION PANEL

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

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 8

Page 79 of 104

Event Description: Failures on Safety Injection

Cue: Pre-existing failures

NUMBER 1-E-0	ATTACHMENT TITLE AUXILIARY VENTILATION, AC POWER, AND SFP STATUS CHECKS	ATTACHMENT 3
REVISION 66		PAGE 2 of 6

TABLE 2
VNTX PANEL

MARK NUMBER	EXPECTED EQUIPMENT STATUS	RESPONSE NOT OBTAINED
<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 & E	RED RED	<input type="checkbox"/> i. Start 1-VS-F-58A and 1-VS-F-58B.
3. <u> </u> Check filtered exhaust flow: (as read on FI-VS-117A and FI-VS-117B)		
<input type="checkbox"/> • Total flow - GREATER THAN 32400 cfm		
<u>AND</u>		
<input type="checkbox"/> • Flow through each filter bank - LESS THAN 39600 cfm		

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 8

Page 80 of 104

Event Description: Failures on Safety Injection

Cue: Pre-existing failures

NUMBER	ATTACHMENT TITLE	ATTACHMENT
1-E-0	AUXILIARY VENTILATION, AC POWER, AND SFP STATUS CHECKS	3
REVISION 65		PAGE 3 of 6

4. ___ Check all Station Service Buses - ENERGIZED. IF NOT, THEN initiate 1-AP-10.07, LOSS OF UNIT 1 POWER.
5. ___ Check annunciator VSP-J2 - LIT.
6. ___ Check Unit 1 RSST LTC time delay bypass light - LIT.
7. ___ Check stopped or stop 1-VS-AC-4.
8. ___ Place 1-VS-43-VS103X, MCR ISOLATION switch to the OFF position.
9. ___ Check closed or close MCR isolation dampers.
 - 1-VS-MOD-103A
 - 1-VS-MOD-103B
 - 1-VS-MOD-103C
 - 1-VS-MOD-103D

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 8

Page 81 of 104

Event Description: Failures on Safety Injection

Cue: Pre-existing failures

NUMBER 1-E-0	ATTACHMENT TITLE	ATTACHMENT 3
REVISION 65	AUXILIARY VENTILATION, AC POWER, AND SFP STATUS CHECKS	PAGE 4 of 6

***** :

CAUTION: • Only one Emergency Supply Fan must be started in the following step.

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

***** :

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

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

- ___ 1. Open 1-VS-MOD-104A, CONT RM EMERG SUP MOD.
- ___ 2. Start 1-VS-F-41.

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

- ___ 1. Open 2-VS-MOD-204A, CONT RM EMERG SUP MOD.
- ___ 2. Start 2-VS-F-41.

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

- ___ 1. Open 1-VS-MOD-104B, CONT RM EMERG SUP MOD.
- ___ 2. Start 1-VS-F-42.

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

- ___ 1. Open 2-VS-MOD-204B, CONT RM EMERG SUP MOD.
- ___ 2. Start 2-VS-F-42.

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

Unit Two operator will prompt that all chilled water flows are in accordance with step 10 caution.

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 8

Page 82 of 104

Event Description: Failures on Safety Injection

Cue: Pre-existing failures

NUMBER 1-E-0	ATTACHMENT TITLE	ATTACHMENT 3
REVISION 65	AUXILIARY VENTILATION, AC POWER, AND SFP STATUS CHECKS	PAGE 5 of 6

11. ___ Check readings on the following Differential Pressure Indicators - POSITIVE PRESSURE INDICATED.
- PDI-VS-100, D.P.-U1CR/U1TB (Unit 2 Turbine Ventilation Panel)
 - PDI-VS-101, D.P.-U1RR/U1TB (Unit 2 Turbine Ventilation Panel)
 - PDI-VS-200, D.P.-U2CR/U2TB (Unit 2 Turbine Ventilation Panel)
 - PDI-VS-201, D.P.-U2RR/U2TB (Unit 2 Turbine Ventilation Panel)
 - 1-VS-PDI-118 (Unit 1 Computer Room)
 - 1-VS-PDI-118 (Near Unit 1 Semi-Vital Bus)
 - 2-VS-PDI-215 (Unit 2 AC Room)
 - 2-VS-PDI-206 (Near Unit 2 Semi-Vital Bus)
12. ___ IF any reading NOT positive, THEN initiate Attachment 6 to secure MCR boundary fans.
13. ___ Check initiated or initiate 0-AP-50.00, OPPOSITE UNIT EMERGENCY.
14. ___ Check the following MCR and ESGR air conditioning equipment operating. IF NOT, THEN start equipment within 1 hour IAW the appropriate subsection of 0-OP-VS-006, CONTROL ROOM AND RELAY ROOM VENTILATION SYSTEM.
- One Control Room chiller
 - One Unit 1 Control Room AHU
 - One Unit 2 Control Room AHU
 - One Unit 1 ESGR AHU
 - One Unit 2 ESGR AHU
15. ___ IF both of the following conditions exist, THEN check that Load Shed is activated.
- Unit 2 - SUPPLIED BY RSST
 - Unit 2 RCPs - RUNNING
16. ___ IF Load Shed is required and not activated, THEN initiate 0-AP-10.10, LOSS OF AUTO LOAD SHED.

Unit two operator will report all outside DP indicators indicate positive pressure and AP-50.00 is Initiated

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 8

Page 83 of 104

Event Description: Failures on Safety Injection

Cue: Pre-existing failures

NUMBER 1-E-0	ATTACHMENT TITLE	ATTACHMENT 3
REVISION 65	AUXILIARY VENTILATION, AC POWER, AND SFP STATUS CHECKS	PAGE 6 of 6

NOTE: • SFP checks should be initiated WITHIN ONE TO TWO HOURS of EOP entry.

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

17. ___ Initiate monitoring SFP parameters:

- SFP level - Greater than Cooling Pump suction AND Stable
- SFP temperature - Stable or Decreasing
- SFP Cooling Pumps - Either Running
- Component Cooling - Normal

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

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

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

If requested, Unit Two will assume SFP monitoring

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 8

Page 84 of 104

Event Description: Failures on Safety Injection

Cue: Pre-existing failures

NUMBER	ATTACHMENT TITLE	ATTACHMENT
1-E-0	CLS COMPONENT VERIFICATION	4
REVISION 65		PAGE 1 of 2

LOCATION: Vertical BoardVALVE POSITION: CLOSED
LIGHTS: GREEN 1-RM-TV-100C 1-RM-TV-100B 1-RM-TV-100A 1-CC-TV-105A 1-CC-TV-105B 1-CC-TV-140A 1-CC-TV-110A 1-CC-TV-105C 1-CC-TV-140B 1-CC-TV-110B 1-CC-TV-110C 1-IA-TV-100 1-SV-TV-102 1-IA-TV-101A 1-IA-TV-101BLOCATION: Unit 1 Vent PanelRECIRC FAN STATUS: OFF
LIGHTS: AMBER 1-VS-F-1A 1-VS-F-1BLOCATION: Bench BoardVALVE POSITION: OPEN
LIGHTS: RED 1-SW-MOV-105A 1-SW-MOV-105B 1-SW-MOV-105C 1-SW-MOV-105D 1-SW-MOV-104A 1-SW-MOV-104B 1-SW-MOV-104C 1-SW-MOV-104D 1-SW-MOV-103A 1-SW-MOV-103B 1-SW-MOV-103C 1-SW-MOV-103D

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

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

LOCATION: Radiation Monitoring PanelPUMPS: RUNNING (Time delayed) 1-SW-P-5A 1-SW-P-5B 1-SW-P-5C 1-SW-P-5D***BOP starts 1-SW-P-5C***

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 8

Page 85 of 104

Event Description: Failures on Safety Injection

Cue: Pre-existing failures

NUMBER 1-E-0	ATTACHMENT TITLE CLS COMPONENT VERIFICATION	ATTACHMENT 4
REVISION 65		PAGE 2 of 2

LOCATION: Annunciator Panel AALARMS: CLEAR

- A-D-6 RS HX 1A RAD MON PP NO FLOW
 A-E-6 RS HX 1B RAD MON PP NO FLOW
 A-F-6 RS HX 1C RAD MON PP NO FLOW
 A-G-6 RS HX 1D RAD MON PP NO FLOW

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

LOCATION: Bench BoardVALVE POSITION: OPEN
LIGHTS: RED

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

 1-CS-MOV-101B 1-CS-MOV-101D
 1-CS-MOV-101A 1-CS-MOV-101C
 1-RS-MOV-155A 1-RS-MOV-155B 1-CS-MOV-100A 1-CS-MOV-100B

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

LOCATION: Bench BoardVALVE POSITION: CLOSED
LIGHTS: GREEN

- 1-CW-MOV-100A 1-CW-MOV-100B 1-CW-MOV-100C 1-CW-MOV-100D
 1-CW-MOV-106A 1-CW-MOV-106B 1-CW-MOV-106C 1-CW-MOV-106D
 1-SW-MOV-101A 1-SW-MOV-101B 1-SW-MOV-102A 1-SW-MOV-102B

BOP opens 1-CS-MOV-101B, 1-CS-MOV-102B***Last portion (If Event - CLS HI HI and LOSS OF RSS) not applicable***

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 9

Page 86 of 104

Event Description: Only running LHSI pump trips (ECA-1.1)

Cue: Evaluator 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. <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>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 9

Page 87 of 104

Event Description: Only running LHSI pump trips (ECA-1.1)

Cue: Evaluator Cue.

		1-ECA-1.1 - Loss of Emergency Coolant Recirculation
	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>

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 9

Page 88 of 104

Event Description: Only running LHSI pump trips (ECA-1.1)

Cue: Evaluator Cue.

		1-ECA-1.1 - Loss of Emergency Coolant Recirculation
	RO	<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] c) RNO – Do the following: <ul style="list-style-type: none"> 1) Stop both LHSI pumps. 2) GO TO Step 8
	RO	<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 <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • RWST level - LESS THAN 20% b) Check CTMT sump level – GREATER THAN 4.0 ft <ul style="list-style-type: none"> b) RNO actions: <ul style="list-style-type: none"> Do the following: <ul style="list-style-type: none"> 1) Check CLS reset. IF NOT, THEN reset both trains of CLS. 2) Stop RS pumps. 3) WHEN sump level greater than 4.0 ft, THEN do Steps 8c and 8d. 4) GO TO Step 9. <p><i>Depending on time to reach this step, sump level could be less than 4' and it would be expected that the RS pumps would not yet be running. Under these conditions, the team would transition to step 9.</i></p> c) Check SW aligned to at least two RS HXs d) Start RS pumps associated with aligned RS HXs

Op-Test No.: Surry 2012-1

Scenario No.: 3

Event No.: 9

Page 89 of 104

Event Description: Only running LHSI pump trips (ECA-1.1)

Cue: Evaluator Cue.

		<p>1-ECA-1.1 - Loss of Emergency Coolant Recirculation</p> <p>CAUTION: CHG and LHSI pumps taking suction from the RWST must be stopped when level decreases to 6%.</p> <p>CS pumps taking suction from the RWST must be stopped when level decreases to 3%.</p> <p>9. DETERMINE CS REQUIREMENTS:</p> <p>a) Determine number of CS pumps required:</p> <table border="1" data-bbox="500 787 1089 1054"> <thead> <tr> <th>CONTAINMENT PRESSURE</th> <th>RS PUMPS RUNNING</th> <th>CS PUMPS REQUIRED</th> </tr> </thead> <tbody> <tr> <td>GREATER THAN 60 PSIA</td> <td>-----</td> <td>2</td> </tr> <tr> <td rowspan="2">BETWEEN 14 PSIA AND 60 PSIA</td> <td>FEWER THAN 2</td> <td>2</td> </tr> <tr> <td>2 OR MORE</td> <td>1</td> </tr> <tr> <td>LESS THAN 14 PSIA</td> <td>-----</td> <td>0</td> </tr> </tbody> </table> <p>b) CS pumps running - EQUAL TO NUMBER REQUIRED</p> <p>Step b) RNO actions: Do the following: 1) Manually operate CS pump(s). 2) Close associated CS pump discharge MOVs for stopped pump(s): • 1-CS-P-1A, 1-CS-MOV-101A and 1-CS-MOV-101B • 1-CS-P-1B, 1-CS-MOV-101C and 1-CS-MOV-101D</p> <p>This step will be performed as conditions exist at this time. The team could elect to wait for CLS reset permissive PRIOR to taking actions. It is expected that containment pressure will be close to reset at this time.</p>	CONTAINMENT PRESSURE	RS PUMPS RUNNING	CS PUMPS REQUIRED	GREATER THAN 60 PSIA	-----	2	BETWEEN 14 PSIA AND 60 PSIA	FEWER THAN 2	2	2 OR MORE	1	LESS THAN 14 PSIA	-----	0
CONTAINMENT PRESSURE	RS PUMPS RUNNING	CS PUMPS REQUIRED														
GREATER THAN 60 PSIA	-----	2														
BETWEEN 14 PSIA AND 60 PSIA	FEWER THAN 2	2														
	2 OR MORE	1														
LESS THAN 14 PSIA	-----	0														
		<p>10. MAKE UP TO RWST USING 1-OP-CS-004, REFUELING WATER STORAGE TANK MAKEUP, WHILE CONTINUING WITH THIS PROCEDURE</p> <p>Critical Task: Initiate actions to makeup to the RWST before beginning RCS cooldown to cold shutdown. [WOG ECA-1.1 – B]</p> <p><i>When plant personnel are dispatched to perform this task, this critical task is complete.</i></p>														
<p>END</p>		<p>END SCENARIO #3</p>														

Op-Test No.: Surry 2012-1

Scenario No.: 3

SIMULATOR OPERATOR'S GUIDE

Simulator Setup

Initial Conditions:

Recall IC -263 and implement TRIGGER #30 to activate all passive malfunctions and verify Trigger #30 implemented.

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

- cp_local_reset
- cpaov122_auto
- cpaov122

Enter the following MALFUNCTIONS:

Malfunction	Delay	Ramp	Trigger	Value	Final	Trigger Type (Auto or Manual)
CN0103 - MAIN CN PUMP CN-P-1C TRIPS: OVR-CURRENT	10		1			MAN
CN1501- Disable CN-P-1A Autostart	10		1			MAN
NI1004 - POWER RANGE CHNL N44 FAILURE	10		3		1	MAN
RC4802 - PRZR PRESS CONT XMTR FAILURE (445)	10	15	5		1	MAN
RC1402 - FAILURE OF RCP-B SEAL #3	10		7		100	MAN
CH1002 - RCP B SEAL LEAKOFF LINE CLOGGING	10	5	7		90	MAN
RC0103 - RCS COLD LEG C PIPE RUPTURE	10	60	9		.5	MAN
SI0902 - LHSP PUMP SI-P-1B OVERCURRENT TRIP	30		11			MAN
SI0901 - LHSP PUMP SI-P-1A OVERCURRENT TRIP	0		28			AUTO
RD2027 STUCK RCCA, K-12, CONTROL BANK B	0		30			PREEVENT
MS16 FAILURE OF RELAY MS-RLY-104	0		30			PREEVENT
SI4101 DISABLE AUTO SI SIGNAL TRAIN A	0		30			PREEVENT
SI4102 DISABLE AUTO SI SIGNAL TRAIN B	0		30			PREEVENT
CH50 - DISABLE CH-MOV-115B AUTO OPEN	0		30			PREEVENT

Op-Test No.: Surry 2012-1

Scenario No.: 3

SIMULATOR OPERATOR'S GUIDE

Malfunction	Delay	Ramp	Trigger	Value	Final	Trigger Type (Auto or Manual)
CH51 - DISABLE CH-MOV-115C AUTO CLOSE	0		30			PREEVENT
CH57 DISABLE CH-MOV-1289A AUTO CLOSURE	0		30			PREEVENT
CS13 DISABLE CSMOV101B AUTO OPEN	0		30			PREEVENT
CS2002 DISABLE AUTO OPEN MOV-CS-102B	0		30			PREEVENT
SW1303 DISABLE SW-P-5C AUTO START	0		30			PREEVENT

Enter the following ANNUNCIATOR CONTROLS:

Malfunction	Delay	Trigger	Value
V1AH3 LHSI PP 1B SEAL HD TK LO LVL	10	11	ON

Enter the following SWITCH OVERRIDES:

Malfunction	Delay	Trigger	Value
MSSOV104_OPEN - STEAM TO MSR 1-MS-SOV-104 OPEN	0	30	ON

Enter the following EVENT TRIGGER:

Event	Event #
SI4 - SI TRAIN 'A' Actuated	28

Enter the following Remote Functions:

Override	Set Condition	Trigger
ED15H3_BKRPOS	RACK_OUT	30
EDG1_ECC_ALS	LOCAL	30

Enter the following Lamp Override:

Override	Set Condition	Trigger
EDG1_SPD_ADJ_R	OFF	30

Op-Test No.: Surry 2012-1

Scenario No.: 3

SIMULATOR OPERATOR'S GUIDE

TRIGGER	TYPE	DESCRIPTION
1	MANUAL	Trip 1-CN-P-1C and 1-CN-P-1A autostart disable
3	MANUAL	NI-44 Failure
5	MANUAL	1-RC-PT-1445 FAILS HIGH
7	MANUAL	1-RC-P-1B #3 Seal Failure
9	MANUAL	SBLOCA
11	MANUAL	Trip of 1-SI-P-1B (preceeded by head tank low level)
28	AUTO	Trip of 1-SI-P-1A
30	PREEVENT	PREEVENT FAILURES

Op-Test No.: Surry 2012-1

Scenario No.: 3

SIMULATOR OPERATOR'S GUIDE

Verify the following control room setup:

- Place the simulator in RUN and verify normal 90% power operation indications.
- Place 15H3 in PTL and place #1 EDG AUTO/EXERCISE switch to EXERCISE
- Verify Red Magnets on the following components:

#1 EDG	Protected Magnet on #3 EDG	
--------	----------------------------	--

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

<input type="checkbox"/> AP-4.00	<input type="checkbox"/> AP-9.00	<input type="checkbox"/> AP-16.00	<input type="checkbox"/>
<input type="checkbox"/> AP-21.00	<input type="checkbox"/> AP-53.00 (2)	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> E-0	<input type="checkbox"/> ES-0.1	<input type="checkbox"/> E-1	<input type="checkbox"/> ECA-1.1
<input type="checkbox"/> OP-CH-007		<input type="checkbox"/> Reactivity Sheet	
<input type="checkbox"/> OP-ZZ-002		<input type="checkbox"/>	

- Copy of 1-OP-TM-005.
- Verify Reactivity Placard is current.
- Verify ALL PINK MAGNETS are accounted for.

Op-Test No.: Surry 2012-1

Scenario No.: 3

SIMULATOR OPERATOR'S GUIDE

Brief

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

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

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

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

Assign operating positions.

Ask for and answer questions.

Op-Test No.: Surry 2012-1

Scenario No.: 3

SIMULATOR OPERATOR'S GUIDE

Conduct shift turnover:

Unit 1 is at 90% power following 1-OSP-TM-001. The unit has been at this power level for approximately 30 minutes.

All systems and crossties are operable with the following exception:

- #1 EDG is tagged out for a major overhaul. Four days remain in the seven-day Technical Specification 3.16 clock. The EDG is expected to be returned to service in approximately two days. Two independent off-site power sources were verified 2 hours ago as per Tech Spec 3.16.B.1.a., and 11 days remain on the AFW crosstie clock iaw Tech Spec 3.6.I.3.

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

Shift orders are to utilize 1-OP-TM-005 (Unit Ramping Operations) to return Unit 1 to 100% power. The performance of this evolution has been authorized and has been PSA analyzed for current plant conditions.

The off-going shift just performed 1-OPT-RX-001 for the power increase to >98.4%

The last shift borated and diluted as required to reduce power to 90% in accordance with the reactivity plan.

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

Op-Test No.: Surry 2012-1

Scenario No.: 3

SIMULATOR OPERATOR'S GUIDE

Session Conduct:

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

EVENT 1 Ramp Unit to 100% IAW 1-OP-TM-005

Booth – if requested to reset CP trouble alarm – set cp_local_reset to “T” on monitor screen

Operations Supervisor/Management:

- **If contacted**, will acknowledge the impending ramp and commencement of the ramp.

STA:

- **If contacted**, will review the reactivity plan and concur with the team's recommendation for ramping.
- **If directed**, will monitor parameters.

Maintenance/ Work Week Coordinator:

- **If contacted**, will acknowledge the impending ramp and commencement of the ramp.

Field Operators:

- **If dispatched**, will report not problems in the field and the unit is ready to be ramped.

Unit 2:

- **If contacted**, will acknowledge the impending ramp and commencement of the ramp.
- **If asked**, will contact the MOC for Unit 1.

Role-play as other individuals as needed.

Op-Test No.: Surry 2012-1

Scenario No.: 3

SIMULATOR OPERATOR'S GUIDE

EVENT 2 Operating CN Pump Trips and Standby Does NOT Automatically Start

When cued by examiner, implement Trigger #1.

BOOTH NOTE – if CP building bypasses and the control room team requests the bypass AOV to manual and OPEN, then use cpaov122_auto and cpaov122 on monitor screen to perform requested operations.

ARP 1H-D3 actions as follows:

5. RESTORE CN POLISHING FLOW
 - a) Verify or place 1-CP-AOV-122 in Manual (*set cpaov122_auto=F*)
 - b) Open or verify open 1-CP-AOV-122 (*set cpaov122=1*)
 - c) Close 1-CP-MOV-100
 - d) WHILE monitoring CP Bldg DP, THEN slowly close 1-CP-AOV-122
(*set cpaov122=0 in 0.2 increments*)
 - e) Place 1-CP-AOV-122 in Auto (*set cpaov122_auto=T*)

Operations Supervisor/Management:

- **If contacted**, will acknowledge the failures.
- **If contacted**, will take responsibility for writing the CR.
- **If contacted**, will request that 1-CN-P-1C remain as is (i.e., quarantined).
- **If contacted, desk SRO will take lead in restoring LP heater drain pumps (if tripped)**

STA:

- **If contacted**, will acknowledge the failure of 1-CN-P-1C and the failure of 1-CN-P-1A to automatically start.
- **If contacted**, will take responsibility for writing the CR.

Op-Test No.: Surry 2012-1

Scenario No.: 3

SIMULATOR OPERATOR'S GUIDE

Field Operators:

- **If contacted**, field operators will report that the breaker for 1-CN-P-1C indicates a ground over-current trip.
- **If contacted**, field operators will report that nothing is abnormal locally at 1-CN-P-1C
- **If contacted**, field operators will report that 1-CN-P-1A is operating normally.
- **If contacted**, field operators will perform 1-OP-CN-001 to align balance lines on manipulated CN pumps.
- **If contacted**, the operator will report that the condensate recirc valve is closed and correctly set. The operator may also report that the suction strainers for the CN pumps are normal (like he saw them during operator rounds).
- **If contacted**, the CP building operator will report that the CP building differential pressure is normal (ΔP is zero if CP building is bypassed). DP can be found on drawing CN2

Maintenance/Work Week Coordinator:

- **If contacted**, will acknowledge failures associated with the CN Pumps on Unit 1 and will coordinate with maintenance to commence troubleshooting.

Role-play as other individuals as needed.

Op-Test No.: Surry 2012-1

Scenario No.: 3

SIMULATOR OPERATOR'S GUIDE

EVENT 3 **Power Range Channel 4 failure (N-44 fails high)****Ensure RODS are in AUTO prior to initiating this EVENT**

When cued by examiner, implement Trigger #3.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the failure of N-44. 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 CR.

STA:

- **If contacted**, will acknowledge the failure of N-44. The individual(s) contacted will also acknowledge (but not confirm/deny) any TS LCOs.
- **If contacted**, will take responsibility for writing the 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.

Maintenance:

- **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.

Op-Test No.: Surry 2012-1

Scenario No.: 3

SIMULATOR OPERATOR'S GUIDE

EVENT 4 **1-RC-PT-1445 fails high**

When cued by examiner, implement Trigger #5.

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 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 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.

Op-Test No.: Surry 2012-1

Scenario No.: 3

SIMULATOR OPERATOR'S GUIDE

EVENT 5 #3 Seal Failure on 1-RC-P-1B

When cued by examiner, implement Trigger #7.

Operations Supervisor/Management:

- **If contacted**, will acknowledge the abnormal seal indication on 1-RC-P-1B.
- **If contacted**, will take responsibility for writing the WR and CR.
- **If contacted**, will acknowledge entry into AP-9.00

STA:

- **If contacted**, will acknowledge abnormal seal indication on 1-RC-P-1B.
- **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 abnormal seal indication on 1-RC-P-1B.

Role play as other individuals as needed.

Op-Test No.: Surry 2012-1

Scenario No.: 3

SIMULATOR OPERATOR'S GUIDE

EVENT 6 Reactor Trip.

Operations Supervisor/Management:

- **If contacted**, will take responsibility for writing the WR and CR.
- **If contacted**, will acknowledge entry into 1-E-0, 1-ES-0.1 and stuck rod indication and that 1-MS-SOV-104 did not function to isolate reheat steam.
- **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 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.

Role play as other individuals as needed.

Op-Test No.: Surry 2012-1

Scenario No.: 3

SIMULATOR OPERATOR'S GUIDE

EVENTS 7, 9 Small Break LOCA and Loss of Recirc Capability**Back up floor team with RCP trip criteria times:****Time that 1G-B1 was received: _____ Time that RCPs were secured: _____ =
Time to complete: _____ minutes (≤ 5 minutes is critical task)**

When cued by examiner or team has completed step 2 of ES-0.1 implement trigger 9.

Instructor will report to SRO that they will acknowledge FP alarms until all alarms are silent.**BOOTH NOTE: When team enters 1-E-1, then trip 1-SI-P-1B by implementing trigger 11**

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 acknowledge trip of 1-SI-P-1A and coordinate maintenance response.
- **If contacted**, will take actions to make-up to Unit 1 RWST.
- **If contacted**, will direct maintenance personnel to investigate loss of LHSI pumps.

Field Operators:

- SBI - Report that the breaker for 1-SI-P-1A (14H3) has a bell lockout locally.
- SBI - Report that the breaker for 1-SI-P-1B (14J3) has a bell lockout locally.
- North Yard – Report no abnormalities noted locally at 1-SI-P-1A
- North Yard - Report that 1-SI-P-1B seal and motor are wet. No active leakage noted currently.
- Will make preparations to make-up to Unit 1 RWST when directed.
- Will secure EDGs upon request – no actions required.
- If directed to locally open CS pumps breaker(s) then do the following:
 - Malfunctions—CS – CS0601 CS-P-1A breaker 14H5 spurious trip
 - Malfunctions—CS – CS0602 CS-P-1A breaker 14J5 spurious trip

Op-Test No.: Surry 2012-1

Scenario No.: 3

SIMULATOR OPERATOR'S GUIDE

Maintenance:

- **If contacted**, will make preparations to investigate problems with LHSI pump(s).

The scenario will end upon direction to make-up to Unit 1 RWST or lead evaluator's CUE.