

Facility: SONGS 2 & 3		Date of Examination: 10/19/09
Examination Level	RO <input type="checkbox"/>	Operating Test Number: NRC
Administrative Topic (see Note)	Type Code*	Describe Activity to be Performed
Conduct of Operations	N, R	2.1.23 Ability to perform specific system and integrated plant procedures during all modes of plant operation (4.3).  JPM: Perform an RCS Inventory Balance (New).
Conduct of Operations	M, R	2.1.25 Ability to interpret reference materials such as graphs, curves, tables, etc. (3.9).  JPM: Determine Time to Boil (J213A).
Equipment Control	N, R	2.2.12 Knowledge of Surveillance Procedures (3.7).  JPM: Perform Core Exit Thermocouple Channel Checks. (New)
Radiation Control	M, S	2.3.12 Knowledge of radiological safety principles pertaining to licensed operator duties, such as containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc. (3.2).  JPM: Determine Dose for Maintenance Activities (J236A2).
Emergency Plan	-	
<b>NOTE:</b> All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.		
<b>*Type Codes &amp; Criteria:</b> (C)ontrol room, (S)imulator, or Class(R)oom (D)irect from bank ( $\leq 3$ for ROs; $\leq$ for 4 for SROs & RO retakes) (N)ew or (M)odified from bank ( $\geq 1$ ) (P)revious 2 exams ( $\leq 1$ ; randomly selected)		

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## Administrative Topics Outline

### Task Summary

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- RO A.1.a     The candidate will perform a Reactor Coolant System Inventory Balance per SO23-3-3.37, Reactor Coolant System Inventory Balance. The critical steps include correctly documenting parameters and performing calculations within allowable tolerances. This is a new JPM.
- RO A.1.b     The candidate will calculate Time-to-Boil per SO23-5-1.8.1, Shutdown Nuclear Safety, Attachment 9, Calculation of RCS Time-to-Boil Margin. The critical steps include correctly interpreting curves within tolerances and performing the final calculation within given tolerances. This is a modified bank JPM.
- RO A.2        The candidate will be provided with a set of Core Exit Thermocouple data and will determine if the required OPERABILITY is met using SO23-3-3.35, PAMI / Safe Shutdown Monthly Checks, Attachment 2, Core Exit Thermocouples and Heated Junction Thermocouple System Monthly Channel Checks. The critical steps include identifying any out-of-service thermocouples and correctly determining OPERABILITY of the Core Exit Thermocouple System. This is a new JPM.
- RO A.3        The candidate will be required to calculate stay time based on a maintenance activity. The critical steps require determining the optimum total dose using either time, distance or shielding for performing the task. This is a modified bank JPM.
- RO A.4        N/A

Facility: SONGS JPM # NRC RO A.1.a Task #185300 K/A #2.1.23 4.3/4.4

Title: Perform Reactor Coolant System Inventory Balance Calculations

Examinee (Print): \_\_\_\_\_

Testing Method:

Simulated Performance:	_____	Classroom:	<u>X</u>
Actual Performance:	<u>X</u>	Simulator:	_____
		Plant:	_____

**READ TO THE EXAMINEE**

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: Given the following conditions:

- Unit 2 is operating at 100% power.
- The Plant Computer System Water Inventory Balance Program is not available.
- The previous shift started a manual Reactor Coolant System Inventory Balance at 1630 per SO23-3-3.37, Reactor Coolant System Inventory Balance, Attachment 3, Manual Leak Rate Calculation.
- Power change is NOT in progress.

Initiating Cue: The Control Room Supervisor directs you to COMPLETE the Reactor Coolant System Inventory Balance per SO23-3-3.37, Reactor Coolant System Inventory Balance, Attachment 3, Manual Leak Rate Calculation. The following final data was obtained at 1835:

- $T_{AVG}$  is 567.2°F.
- VCT level is 44.3%.
- Pressurizer level is 53.4%.
- Quench Tank Level is 74.4%.
- Safety Injection Tank SIT-007 is 80.1% narrow range.
- Safety Injection Tank SIT-008 is 81.3% narrow range.
- Safety Injection Tank SIT-007 is 80.9% narrow range.
- Safety Injection Tank SIT-010 is 82.0% narrow range.
- There is no known RCS in-leakage.

Task Standard: Locate and correctly perform Critical Steps of SO23-3-3.37, Attachment 3.

Required Materials: SO23-3-3.37, Reactor Coolant System Inventory Balance, Attachment 3, Manual Leak Rate Calculation, Rev. 29.

Validation Time: 20 minutes Time Critical: N/A Completion Time: \_\_\_\_\_ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): \_\_\_\_\_ Date: \_\_\_\_\_

**CLASSROOM SETUP****EXAMINER:**

**PROVIDE the Examinee with a copy of:**

- **SO23-3-3.37, Reactor Coolant System Inventory Balance, Attachment 3, Manual Leak Rate Calculation.**
- **INITIAL through Step 2.6.**
- **COMPLETE Initial Data Column on Table 1.**
- **MARK Step 3.2 with “Stop Here.”**
- **INFORM examinee that any independent review requirements (Procedure Steps 2.8 and 2.9.3) need NOT be completed.**

√ - Check Mark Denotes Critical Step

**START TIME:**

<b>Perform Step: 1</b>	Record all final data and perform calculations on Table 1: <ul style="list-style-type: none"> <li>• Perform and Record time calculations.</li> </ul>
<b>Standard:</b>	RECORD all final data and PERFORM calculations: <ul style="list-style-type: none"> <li>• RECORD 1835 as Final Time then SUBTRACT 1633 -1835 = +122 minutes.</li> <li>• RECORD +125 minutes.</li> </ul>
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Examiner Note:</b>	<b>The Table 1 data recording and calculations can be performed in any order.</b>
<b>Perform Step: 2</b> √	Record all final data and perform calculations on Table 1: <ul style="list-style-type: none"> <li>• Perform and record VCT calculations.</li> </ul>
<b>Standard:</b>	RECORD all final data and PERFORM calculations: <ul style="list-style-type: none"> <li>• RECORD 44.3% as Final VCT Level then SUBTRACT 44.3% - 46.0% and MULTIPLY 1.7% x 38.5 gal/% = +65.45 gallons.</li> <li>• RECORD +65.45 gallons.</li> </ul>
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 3</b> √	Record all final data and perform calculations on Table 1: <ul style="list-style-type: none"> <li>• Perform and record PZR calculations.</li> </ul>
<b>Standard:</b>	RECORD all final data and PERFORM calculations: <ul style="list-style-type: none"> <li>• RECORD 53.4% as Final PZR Level then SUBTRACT 53.4% - 53.5% and MULTIPLY 0.1% x 52.9 gal/% = +5.29 gallons.</li> <li>• RECORD +5.29 gallons.</li> </ul>
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 4</b> √	Record all final data and perform calculations on Table 1: <ul style="list-style-type: none"> <li>• Perform and record <math>T_{AVG}</math> calculations.</li> </ul>
<b>Standard:</b>	RECORD all final data and PERFORM calculations: <ul style="list-style-type: none"> <li>• RECORD 567.2°F as Final <math>T_{AVG}</math> then SUBTRACT 567.2°F - 567.4°F and MULTIPLY 0.2°F x -87.07 gal/degree = -17.4 gallons.</li> <li>• RECORD -17.4 gallons.</li> </ul>
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 5</b>	Record all final data and perform calculations on Table 1: <ul style="list-style-type: none"> <li>Perform and record SIT-008 calculations.</li> </ul>	
<b>Standard:</b>	RECORD all final data and PERFORM calculations: <ul style="list-style-type: none"> <li>RECORD 81.3% as Final SIT-008 level then SUBTRACT 81.3% - 81.3% = 0 % and MULTIPLY 0% x 52.9 gal/% = 0 gallons.</li> <li>RECORD 0.0 gallons.</li> </ul>	
<b>Comment:</b>		<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

  

<b>Perform Step: 6</b>	Record all final data and perform calculations on Table 1: <ul style="list-style-type: none"> <li>Perform and record SIT-007 calculations.</li> </ul>	
<b>Standard:</b>	RECORD all final data and PERFORM calculations: <ul style="list-style-type: none"> <li>RECORD 80.1% as Final SIT-007 level then SUBTRACT 80.1% - 80.1% = 0 % and MULTIPLY 0% x 52.9 gal/% = 0 gallons.</li> <li>RECORD 0.0 gallons.</li> </ul>	
<b>Comment:</b>		<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

  

<b>Perform Step: 7</b>	Record all final data and perform calculations on Table 1: <ul style="list-style-type: none"> <li>Perform and record SIT-009 calculations.</li> </ul>	
<b>Standard:</b>	RECORD all final data and PERFORM calculations: <ul style="list-style-type: none"> <li>RECORD 80.9% as Final SIT-009 level then SUBTRACT 80.9% - 80.9% = 0 % and MULTIPLY 0% x 52.9 gal/% = 0 gallons.</li> <li>RECORD 0.0 gallons.</li> </ul>	
<b>Comment:</b>		<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

  

<b>Perform Step: 8</b>	Record all final data and perform calculations on Table 1: <ul style="list-style-type: none"> <li>Perform and record SIT-010 calculations.</li> </ul>	
<b>Standard:</b>	RECORD all final data and PERFORM calculations: <ul style="list-style-type: none"> <li>RECORD 82.0% as Final SIT-010 level then SUBTRACT 82.0% - 82.0% = 0 % and MULTIPLY 0% x 52.9 gal/% = 0 gallons.</li> <li>RECORD 0.0 gallons.</li> </ul>	
<b>Comment:</b>		<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 9</b>	Record all final data and perform calculations on Table 1: <ul style="list-style-type: none"> <li>Perform and record Quench Tank calculations.</li> </ul>	
<b>Standard:</b>	RECORD all final data and PERFORM calculations: <ul style="list-style-type: none"> <li>RECORD 74.4% as Final Quench Tank level.</li> </ul>	
<b>Examiner Cue:</b>	<b>Table 1 has been Independently Verified.</b>	
<b>Comment:</b>		<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 10</b>	Total Leak Rate Calculation: <ul style="list-style-type: none"> <li>Add volume changes from Table 1: (Algebraic sum) (Circle sign) <math>\Delta</math> gal VCT    (+) (-) ____ gal</li> </ul>	
<b>Standard:</b>	RECORD all final data and PERFORM calculations: <ul style="list-style-type: none"> <li>RECORD VCT change as 65.45 gallons and CIRCLE (+).</li> </ul>	
<b>Comment:</b>		<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 11</b>	Total Leak Rate Calculation: <ul style="list-style-type: none"> <li>Add volume changes from Table 1: (Algebraic sum) (Circle sign) <math>\Delta</math> gal PZR    (+) (-) ____ gal</li> </ul>	
<b>Standard:</b>	RECORD all final data and PERFORM calculations: <ul style="list-style-type: none"> <li>RECORD PZR change as 5.29 gallons and CIRCLE (+).</li> </ul>	
<b>Comment:</b>		<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 12</b>	Total Leak Rate Calculation: <ul style="list-style-type: none"> <li>Add volume changes from Table 1: (Algebraic sum) (Circle sign) <math>\Delta</math> gal T<sub>AVG</sub>    (+) (-) ____ gal</li> </ul>	
<b>Standard:</b>	RECORD all final data and PERFORM calculations: <ul style="list-style-type: none"> <li>RECORD T<sub>AVG</sub> change as 17.4 gallons and CIRCLE (-).</li> </ul>	
<b>Comment:</b>		<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>



<b>Perform Step: 13</b>	<p>Total Leak Rate Calculation:</p> <ul style="list-style-type: none"> <li>Add volume changes from Table 1: (Algebraic sum) (Circle sign)</li> </ul> <div style="margin-left: 40px;"> <math>\Delta \text{ gal VCT} \quad (+) (-) \quad \underline{\hspace{1cm}} \text{ gal}</math>  <math>\Delta \text{ gal PZR} \quad (+) (-) \quad \underline{\hspace{1cm}} \text{ gal}</math>  <math>\Delta \text{ gal } T_{\text{AVG}} \quad (+) (-) \quad \underline{\hspace{1cm}} \text{ gal}</math>  <div style="text-align: right;">Subtotal <math>\underline{\hspace{1cm}} \text{ gal}</math></div> </div>
<b>Standard:</b>	<p>RECORD all final data and PERFORM calculations:</p> <ul style="list-style-type: none"> <li>ADD <math>(+65.45) + (+5.29) + (-17.4) = +53.34</math> gallons.</li> <li>RECORD Total change as 53.34 gallons.</li> </ul>
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 14</b> ✓	<p>Total Leak Rate Calculation:</p> <ul style="list-style-type: none"> <li>Calculate (divide):</li> </ul> <div style="margin-left: 40px;"> Subtotal <span style="float: right;"><math>\underline{\hspace{1cm}} \text{ gal}</math></span>  Test Duration <span style="float: right;"><math>\div \underline{\hspace{1cm}} \text{ min}</math></span>  Calculated Total Leak Rate <span style="float: right;"><math>\underline{\hspace{1cm}} \text{ gpm}</math></span>   Identified In-leakage <span style="float: right;"><math>+ \underline{\hspace{1cm}} \text{ gpm}</math></span>  TOTAL LEAK RATE <span style="float: right;"><math>= \underline{\hspace{1cm}} \text{ gpm}</math></span> </div>
<b>Standard:</b>	<p>RECORD all final data and PERFORM calculations:</p> <ul style="list-style-type: none"> <li>DIVIDE 53.34 gallons by 125 minutes = <b><math>0.43 \pm 0.03 \text{ gpm}</math></b> (to nearest 1/100<sup>th</sup>).</li> <li>RECORD <math>0.43 \pm 0.03 \text{ gpm}</math> for Calculated Total Leak Rate.</li> <li>RECORD zero (0) for Identified In-leakage.</li> <li>RECORD <math>0.43 \pm 0.03 \text{ gpm}</math> for Total Leak Rate.</li> </ul>
<b>Examiner Cue:</b>	<b>Total Leak Rate Calculation has been Independently Verified.</b>
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 15</b>	<p>If Total Leak Rate, Step 2.9.2, is <math>\leq 1 \text{ gpm}</math>, <u>then</u> Mark N/A Sections 2.10 and 2.11, <u>and</u> Circle N/A for Identified Leak Rate and Unidentified Leak Rate in Step 3.1. (Mark N/A if Total Leak Rate <math>&gt; 1 \text{ gpm}</math>.)</p>
<b>Standard:</b>	<p>RECORD final data:</p> <ul style="list-style-type: none"> <li>DETERMINE leakrate to be less than 1 gpm.</li> <li>MARK N/A Sections 2.10 and 2.11.</li> <li>CIRCLE N/A for Identified Leak Rate and Unidentified Leak Rate in Step 3.1.</li> </ul>
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 16</b>	Acceptance Criteria Result.		
<b>Standard:</b>	RECORD total leakrate value, DETERMINE total leakrate $\leq$ 1gpm and CIRCLE YES for ACCEPTANCE CRITERIA.		
<b>Terminating Cue:</b>	<b>This JPM is complete.</b>		
<b>Comment:</b>			<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>STOP TIME:</b>	
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**INITIAL CONDITIONS:**

Given the following conditions:

- Unit 2 is operating at 100% power.
- The Plant Computer System Water Inventory Balance Program is not available.
- The previous shift started a manual Reactor Coolant System Inventory Balance at 1630 per SO23-3-3.37, Reactor Coolant System Inventory Balance, Attachment 3, Manual Leak Rate Calculation.
- Power change is NOT in progress.

**INITIATING CUE:**

The Control Room Supervisor directs you to **COMPLETE** the Reactor Coolant System Inventory Balance per SO23-3-3.37, Reactor Coolant System Inventory Balance, Attachment 3, Manual Leak Rate Calculation. The following final data was obtained at 1835:

- $T_{AVG}$  is 567.2°F.
- VCT level is 44.3%.
- Pressurizer level is 53.4%.
- Quench Tank Level is 74.4%.
- Safety Injection Tank SIT-007 is 80.1% narrow range.
- Safety Injection Tank SIT-008 is 81.3% narrow range.
- Safety Injection Tank SIT-009 is 80.9% narrow range.
- Safety Injection Tank SIT-010 is 82.0% narrow range.
- There is no known RCS in-leakage.

Facility: SONGS JPM # NRC RO A.1.b

Task #188898

K/A #2.1.25

3.9/4.2

Title: Determine Time to Boil

Examinee (Print): \_\_\_\_\_

Testing Method:

Simulated Performance: \_\_\_\_\_

Classroom: XActual Performance: X

Simulator: \_\_\_\_\_

Plant: \_\_\_\_\_

**READ TO THE EXAMINEE**

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: Given the following conditions:

- Unit 3 is in MODE 6 after a 420 day run.
- The core reload is complete with 101 new fuel assemblies.
- Reactor Coolant System level is at Midloop (27 inches) to remove the Nozzle Dams in place on Steam Generators E-088 and E-089.
- Shutdown Cooling Heat Exchanger inlet temperature is 115.5 °F.
- The Reactor has been shut down for 22 days.
- The Pressurizer Manway is removed and is being used as the RCS vent.

Initiating Cue: The Shift Manager directs you to PERFORM the following:

- SO23-5-1.8.1, Shutdown Nuclear Safety, Attachment 9, Calculation of RCS Time-to-Boil Margin.
- Outage specific Time to Boil Data Transmittal has NOT been provided by Reactor Engineering.

Task Standard: Locate and correctly perform Critical Steps of SO23-5-1.8.1, Attachment 9.

Required Materials: SO23-5-1.8.1, Shutdown Nuclear Safety, Attachment 9, Calculation of RCS Time-to-Boil Margin, Rev. 20.

Validation Time: 15 minutes Time Critical: N/A Completion Time: \_\_\_\_\_ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): \_\_\_\_\_ Date: \_\_\_\_\_

**CLASSROOM SETUP****EXAMINER:**

**PROVIDE the examinee with a copy of:**

- **SO23-5-1.8.1, Shutdown Nuclear Safety, Attachment 9, Calculation of the RCS Time-to-Boil Margin.**

√ - Check Mark Denotes Critical Step

START TIME:

<b>Perform Step: 1</b>	Determine Time-to-Boil margin temperature as follows: $BM_{act} = BM_{ref} \times L_{cf} \times T_{cf} \times N_{cf}$ <ul style="list-style-type: none"> <li>Determine <math>BM_{ref}</math></li> </ul>
<b>Standard:</b>	REFERENCE $BM_{ref}$ Table and INTERPOLATE between 20 and 30 days as follows: $[(39.09 - 32.4) \times .2] + 32.4 = \mathbf{33.74 \text{ minutes}}$
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

<b>Perform Step: 2</b> √	Determine Time-to-Boil margin temperature as follows: $BM_{act} = BM_{ref} \times L_{cf} \times T_{cf} \times N_{cf}$ <ul style="list-style-type: none"> <li>Determine <math>L_{cf}</math></li> </ul>
<b>Standard:</b>	REFERENCE $L_{cf}$ Table and DETERMINE $L_{cf}$ to be <b>1.008</b> at 27 inches.
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

<b>Perform Step: 3</b>	Determine Time-to-Boil margin temperature as follows: $BM_{act} = BM_{ref} \times L_{cf} \times T_{cf} \times N_{cf}$ <ul style="list-style-type: none"> <li>Determine <math>T_{cf}</math></li> </ul>
<b>Standard:</b>	SELECT $T_{cf}$ formula of $T_{cf} = (212 - T_{hot}) / 92$ .
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

<b>Perform Step: 4</b> √	Determine Time-to-Boil margin temperature as follows: $BM_{act} = BM_{ref} \times L_{cf} \times T_{cf} \times N_{cf}$ <ul style="list-style-type: none"> <li>Determine <math>T_{cf}</math></li> </ul>
<b>Standard:</b>	CALCULATE $T_{cf} = (212 - 115.5) / 92 = \mathbf{1.049 \pm 0.002}$
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

<b>Perform Step: 5</b>	Determine Time-to-Boil margin temperature as follows: $BM_{act} = BM_{ref} \times L_{cf} \times T_{cf} \times N_{cf}$ <ul style="list-style-type: none"> <li>Determine <math>N_{cf}</math> where <math>N_{cf} = 217 / (217 - \# \text{ new assemblies})</math></li> </ul>	
<b>Standard:</b>	CALCULATE $N_{cf} = 217 / (217 - 101) = 1.87$	
<b>Comment:</b>	<div style="text-align: right;"> <b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/> </div>	

<b>Perform Step: 6√</b>	Determine Time-to-Boil margin temperature as follows: $BM_{act} = BM_{ref} \times L_{cf} \times T_{cf} \times N_{cf}$	
<b>Standard:</b>	$BM_{act} = (33.74 \text{ min}) \times (1.008) \times (1.049) \times (1.87) = 66.7 \pm 2.5 \text{ minutes}$	
<b>Terminating Cue:</b>	<b>This JPM is complete.</b>	
<b>Comment:</b>	<div style="text-align: right;"> <b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/> </div>	

<b>STOP TIME:</b>	
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**INITIAL CONDITIONS:**

Given the following conditions:

- Unit 3 is in MODE 6 after a 420 day run.
- The core reload is complete with 101 new fuel assemblies.
- Reactor Coolant System level is at Midloop (27 inches) to remove the Nozzle Dams in place on Steam Generators E-088 and E-089.
- Shutdown Cooling Heat Exchanger inlet temperature is 115.5 °F.
- The Reactor has been shut down for 22 days.
- The Pressurizer Manway is removed and is being used as the RCS vent.

**INITIATING CUE:**

The Shift Manager directs you to PERFORM the following:

- SO23-5-1.8.1, Shutdown Nuclear Safety, Attachment 9, Calculation of RCS Time-to-Boil Margin.
- Outage specific Time to Boil Data Transmittal has NOT been provided by Reactor Engineering.

Facility: SONGS JPM # NRC RO A.2 Task #185785 K/A #2.2.12 3.7/4.1  
Title: Perform Core Exit Thermocouple Channel Checks

Examinee (Print): \_\_\_\_\_

Testing Method:

Simulated Performance: \_\_\_\_\_ Classroom: X  
Actual Performance: X Simulator: \_\_\_\_\_  
Plant: \_\_\_\_\_

**READ TO THE EXAMINEE**

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: Given the following conditions:

- Unit 2 is in MODE 1 at 100% power.
- The monthly surveillance for the Core Exit Thermocouple and Heated Junction Thermocouple System is due.

Initiating Cue: The Shift Manager directs you to PERFORM the following:

- SO23-3-3.35, PAMI/Safe Shutdown Monthly Checks, Attachment 2, Core Exit Thermocouples and Heated Junction Thermocouple System Monthly Channel Checks.
- Core Exit Thermocouple and Heated Junction Thermocouple data is attached.

Task Standard: Locate and correctly perform Critical Steps SO23-3-3.35, Attachment 2.

Required Materials: SO23-3-3.35, PAMI/Safe Shutdown Monthly Checks, Attachment 2, Rev. 22.

Validation Time: 25 minutes Time Critical: N/A Completion Time: \_\_\_\_\_ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): \_\_\_\_\_ Date: \_\_\_\_\_

**CLASSROOM SETUP****EXAMINER:**

**PROVIDE the examinee with a copy of:**

- **SO23-3-3.35, PAMI/Safe Shutdown Monthly Checks, Attachment 2, Core Exit Thermocouples and Heated Junction Thermocouple System Monthly Channel Checks.**
  - **INITIAL through Step 1.4.**
  - **MARK “Stop Here” at Step 3.1.**
- **Qualified Safety Parameter Display System (QSPDS) pages 611, 622, and 721.**
- **Core Exit Thermocouple Data (part of JPM Cue Sheet).**

√ - Check Mark Denotes Critical Step

**START TIME:**

<b>Perform Step: 1</b>	Record the following: (QSPDS page 611) <ul style="list-style-type: none"> <li>• COLD LEG 1A TEMP.</li> <li>• COLD LEG 1B TEMP.</li> </ul>
<b>Standard:</b>	RECORD 541°F for Cold Leg 1A and Cold Leg 1B temperatures.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 2√</b>	Verify Acceptance Criteria: <ul style="list-style-type: none"> <li>• QSPDS 1A &amp; 1B Cold Leg Temps within 5°F?</li> </ul>
<b>Standard:</b>	CHECK YES box for QSPDS 1A & 1B Cold Leg temperatures within 5°F.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 3</b>	Record the following: (QSPDS page 611) <ul style="list-style-type: none"> <li>• COLD LEG 2A TEMP.</li> <li>• COLD LEG 2B TEMP.</li> </ul>
<b>Standard:</b>	RECORD 540°F for Cold Leg 2A and Cold Leg 2B temperatures.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 4√</b>	Verify Acceptance Criteria: <ul style="list-style-type: none"> <li>• QSPDS 2A &amp; 2B Cold Leg Temps within 5°F?</li> </ul>
<b>Standard:</b>	CHECK YES box for QSPDS 2A & 2B Cold Leg temperatures within 5°F.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 5</b>	Record the following: (QSPDS page 611) <ul style="list-style-type: none"> <li>• REP CET TEMPERATURE (QSPDS A).</li> <li>• REP CET TEMPERATURE (QSPDS B).</li> </ul>
<b>Standard:</b>	RECORD 611°F for REP CET (QSPDS A) and 612°F for REP CET (QSPDS B) temperatures.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 6√</b>	Verify Acceptance Criteria: <ul style="list-style-type: none"> <li>• REP CET Temperatures within 9°F?</li> </ul>
<b>Standard:</b>	CHECK YES box for REP CET temperatures within 9°F.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

  

<b>Perform Step: 7√</b>	Transfer the <u>Highest</u> operable Cold Leg Temperature of Step 2.1.1 into the "Low Limit" of Steps 2.1.6 and 2.1.8.
<b>Standard:</b>	RECORD 541°F in "Low Limit Temp." box for Steps 2.1.6 and 2.1.8.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

  

<b>Perform Step: 8√</b>	Transfer the <u>Lowest</u> operable REP CET temperature of Step 2.1.1 into the "High Limit" of Steps 2.1.6 and 2.1.8.
<b>Standard:</b>	RECORD 611°F in "High Limit Temp." box for Steps 2.1.6 and 2.1.8.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

  

<b>Perform Step: 9</b>	Record CET Temperatures from QSPDS "A" Page 731: <ul style="list-style-type: none"> <li>• Write "INOP" in data spaces for known inoperable CETs.</li> <li>• Write 'N/A' for G-20.</li> </ul>
<b>Standard:</b>	RECORD N/A for CET G-20 and RECORD CET Temperatures from QSPDS A Core Exit Thermocouple Map (JPM Cue Sheet).
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

  

<b>Perform Step: 10√</b>	Record the total number of CETs which are within "In-Range" limits for each column.
<b>Standard:</b>	RECORD the following from QSPDS A Core Exit Thermocouple Map: <ul style="list-style-type: none"> <li>• QUAD 1 = 5; QUAD 2 = 6; QUAD 3 = 8; QUAD 4 = 6.</li> </ul>
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

  

<b>Perform Step: 11√</b>	At least two CETs per Column are "In-Range" for Channel "A" QSPDS: <div style="text-align: center;"> <input type="checkbox"/> YES      <input type="checkbox"/> NO </div>
<b>Standard:</b>	CHECK YES box.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 12</b>	Record CET Temperatures from QSPDS "B" Page 731: <ul style="list-style-type: none"> <li>Write "INOP" in data spaces for known inoperable CETs.</li> </ul>
<b>Standard:</b>	RECORD CET Temperatures from QSPDS B Core Exit Thermocouple Map (JPM Cue Sheet).
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

  

<b>Perform Step: 13√</b>	Record the total number of CETs which are within the "In-Range" limits for each column.
<b>Standard:</b>	RECORD the following from QSPDS B Core Exit Thermocouple Map: <ul style="list-style-type: none"> <li>QUAD 1 = 6; QUAD 2 = 7; QUAD 3 = 1; QUAD 4 = 6.</li> </ul>
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

  

<b>Perform Step: 14√</b>	At least two CETs per Column are "In-Range" for channel "B" QSPDS: <div style="text-align: center;"> <input type="checkbox"/> YES      <input type="checkbox"/> NO         </div>
<b>Standard:</b>	CHECK NO box.
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

  

<b>Perform Step: 15</b>	If any CETs are not "In-Range", then ensure a Notification has been initiated, and record <b>NEW</b> Notification numbers in the comments section.
<b>Standard:</b>	ANNOTATE that a Notification for QSPDS B CET failure has been initiated in the COMMENTS Section.
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

  

<b>Perform Step: 16</b>	Heated Junction Thermocouple System Channel Check <ul style="list-style-type: none"> <li>Record the differential temperatures of the Heated Junction Thermocouples (HJTCs) from QSPDS Page 721 on Table 2.</li> </ul>
<b>Standard:</b>	RECORD the differential temperatures of the Heated Junction Thermocouples from QSPDS Page 721 on Table 2.
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

<b>Perform Step: 17</b> √	At least One Head differential temperature <u>and</u> at least Three Plenum differential temperatures for <b>Channel A</b> fall within the range of 40°F (lower limit) to 200°F (upper limit)?  <input type="checkbox"/> YES <input type="checkbox"/> NO	
<b>Standard:</b>	CHECK YES box.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 18</b> √	At least One Head differential temperature <u>and</u> at least Three Plenum differential temperatures for <b>Channel B</b> fall within the range of 40°F (lower limit) to 200°F (upper limit)?  <input type="checkbox"/> YES <input type="checkbox"/> NO	
<b>Standard:</b>	CHECK YES box.	
<b>Terminating Cue:</b>	This JPM is complete.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>STOP TIME:</b>	
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**INITIAL CONDITIONS:**

Given the following conditions:

- Unit 2 is in MODE 1 at 100% power.
- The monthly surveillance for the Core Exit Thermocouple and Heated Junction Thermocouple System is due.

**INITIATING CUE:**

The Shift Manager directs you to PERFORM the following:

- SO23-3-3.35, PAMI/Safe Shutdown Monthly Checks, Attachment 2, Core Exit Thermocouples and Heated Junction Thermocouple System Monthly Channel Checks.
- Core Exit Thermocouple and Heated Junction Thermocouple data is attached.



CHANNEL A CORE EXIT THERMOCOUPLE MAP DATA (PAGE 731)											
QUADRANT 1			QUADRANT 2			QUADRANT 3			QUADRANT 4		
1	W6	583°F	1	T18	591°F	1	G9	582°F	1	T2	593°F
2	W13	590°F	2	L13	573°F	2	G13	576°F	2	R4	587°F
3	W18	558°F	3	L16	584°F	3	E6	589°F	3	R6	612°F
4	T13	582°F	4	G16	588°F	4	E9	588°F	4	L2	575°F
5	T16	589°F	5	G18	589°F	5	C4	560°F	5	L9	573°F
			6	G20	84°F	6	C9	591°F	6	G2	606°F
			7	E20	553°F	7	C16	590°F	7	E4	589°F
						8	A8	572°F			
						9	A14	540°F			

CHANNEL B CORE EXIT THERMOCOUPLE MAP (PAGE 731)											
QUADRANT 1			QUADRANT 2			QUADRANT 3			QUADRANT 4		
1	Y8	541°F	1	T20	548°F	1	E13	583°F	1	T4	593°F
2	Y14	563°F	2	R16	585°F	2	E16	611°F	2	R2	585°F
3	W4	-	3	R18	584°F	3	C6	-	3	L4	600°F
4	W9	610°F	4	R20	601°F	4	C13	612°F	4	L6	592°F
5	W16	598°F	5	L18	594°F	5	C18	-	5	G4	589°F
6	T6	585°F	6	L20	576°F				6	G6	608°F
7	T9	614°F	7	E18	588°F				7	E2	540°F
8	R9	585°F									
9	R13	588°F									

Facility: SONGS JPM # NRC RO A.3

Task #113888

K/A #2.3.12

3.2/3.7

Title: Determine Dose for Maintenance Activities

Examinee (Print): \_\_\_\_\_

Testing Method:

Simulated Performance: \_\_\_\_\_

Classroom: XActual Performance: X

Simulator: \_\_\_\_\_

Plant: \_\_\_\_\_

**READ TO THE EXAMINEE**

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: A high dose maintenance activity is scheduled in the Unit 3 Penetration Building.

- The general dose rate in the area is 80 mrem/hour but can be reduced to 35 mrem/hour if lead shielding is installed.
- It will take Operators A & B 45 minutes to install the shielding if desired.
- Independent of the shielding, it will take Operator A two and a half (2.5) hours **or** Operators A & B an hour and one half (1.5) hours to perform the maintenance.

Initiating Cue: The Work Process Supervisor directs you to **SELECT** the condition with the lowest total dose to perform the maintenance.

- ANNOTATE the total dose for each option.
  1. Operator A without shielding total dose \_\_\_\_\_.
  2. Operators A & B without shielding total dose \_\_\_\_\_.
  3. Operator A with shielding total dose \_\_\_\_\_.
  4. Operators A & B with shielding total dose \_\_\_\_\_.
- CIRCLE the lowest dose condition.

Task Standard: Choose the methodology that result in keeping total dose As Low As Reasonably Achievable (ALARA).

Required Materials: Calculator

Validation Time: 8 minutes Time Critical: N/A Completion Time: \_\_\_\_\_ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): \_\_\_\_\_ Date: \_\_\_\_\_

**CLASSROOM SETUP****EXAMINER:**

**PROVIDE the examinee with a Calculator.**

√ - Check Mark Denotes Critical Step

START TIME:

<b>Perform Step: 1</b> √	Determine total dose to Operator A <u>without</u> shielding.
<b>Standard:</b>	DETERMINE total dose to Operator A <u>without</u> shielding as follows: <ul style="list-style-type: none"> <li>80 mrem/hr x 2.5 hours = <b>200 mrem total dose.</b></li> </ul>
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

<b>Perform Step: 2</b> √	Determine total dose to Operators A & B <u>without</u> shielding.
<b>Standard:</b>	DETERMINE total dose to Operators A & B <u>without</u> shielding as follows: 80 mrem/hr x 1.5 hours/operator x 2 operators = <b>240 mrem total dose.</b>
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

<b>Perform Step: 3</b>	Determine total dose to <u>install</u> shielding.
<b>Standard:</b>	DETERMINE total dose to <u>install</u> shielding as follows: <ul style="list-style-type: none"> <li>80 mrem/hr x .75 hours/operator x 2 operators = <b>120 mrem to install.</b></li> </ul>
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

<b>Perform Step: 4</b> √	Determine total dose to Operator A <u>with</u> shielding.
<b>Standard:</b>	DETERMINE total dose to Operator A <u>with</u> shielding as follows: <ul style="list-style-type: none"> <li>35 mrem/hr x 2.5 hours + 120 mrem = <b>207.5 mrem total dose.</b></li> </ul>
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

<b>Perform Step: 5</b> √	Determine total dose to Operators A & B <u>with</u> shielding.
<b>Standard:</b>	DETERMINE total dose to Operators A & B <u>with</u> shielding as follows: <ul style="list-style-type: none"> <li>35 mrem/hr x 1.5 hours/operator x 2 operators + 120 mrem = <b>225 mrem total dose.</b></li> </ul>
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

<b>Perform Step: 6</b>	Select the appropriate individual.		
<b>Standard:</b>	DETERMINE total dose to Operator A <u>without</u> shielding at a total dose of <b>200 mrem</b> is the most desirable selection and CIRCLE #1 on the Cue sheet.		
<b>Terminating Cue:</b>	<b>This JPM is complete.</b>		
<b>Comment:</b>			<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>STOP TIME:</b>	
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**INITIAL CONDITIONS:** A high dose maintenance activity is scheduled in the Unit 3 Penetration Building.

- The general dose rate in the area is 80 mrem/hour but can be reduced to 35 mrem/hour if lead shielding is installed.
- It will take Operators A & B 45 minutes to install the shielding if desired.
- Independent of the shielding, it will take Operator A two and a half (2.5) hours or Operators A & B an hour and one half (1.5) hours to perform the maintenance.

**INITIATING CUE:** The Work Process Supervisor directs you to SELECT the condition with the lowest total dose to perform the maintenance.

- ANNOTATE the total dose for each option.
  1. Operator A without shielding total dose \_\_\_\_\_ mrem.
  2. Operators A & B without shielding total dose \_\_\_\_\_ mrem.
  3. Operator A with shielding total dose \_\_\_\_\_ mrem.
  4. Operators A & B with shielding total dose \_\_\_\_\_ mrem.
- CIRCLE the lowest dose condition.

Facility: SONGS 2 & 3		Date of Examination: 10/19/09
Examination Level	SRO <input type="checkbox"/>	Operating Test Number: NRC
Administrative Topic (see Note)	Type Code*	Describe Activity to be Performed
Conduct of Operations	M, R	2.1.23 Ability to perform specific system and integrated plant procedures during all modes of plant operation (4.4).  JPM: Determine Azimuthal Power Tilt (J250A).
		2.1.25 Ability to interpret reference materials such as graphs, curves, tables, etc. (4.2).  JPM: Determine Time to Boil (J213A).
Equipment Control	N, R	2.2.12 Knowledge of Surveillance Procedures (4.1).  JPM: Review Core Exit Thermocouple Channel Check surveillance and verify Technical Specification Compliance. (New)
Radiation Control	N, R	2.3.12 Knowledge of radiological safety principles pertaining to licensed operator duties, such as containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc. (3.7).  JPM: Determine Containment Access Requirements (New).
Emergency Plan	M, R	2.4.44 Knowledge of emergency plan protective action recommendations. (4.4).  JPM: Determine Protective Actions (J126A).
<b>NOTE:</b> All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.		
<b>*Type Codes &amp; Criteria:</b> (C)ontrol room, (S)imulator, or Class(R)oom (D)irect from bank ( $\leq 3$ for ROs; $\leq$ for 4 for SROs & RO retakes) (N)ew or (M)odified from bank ( $\geq 1$ ) (P)revious 2 exams ( $\leq 1$ ; randomly selected)		



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Administrative Topics Outline  
Task Summary

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- SRO A.1.a The candidate will perform an Azimuthal Power Tilt calculation per SO23-3-3.6, COLSS Out of Service Surveillance, attachment 3, Azimuthal Power Tilt Determination. The critical steps include correctly transposing data, accurately performing all calculations, correctly identifying out of tolerance conditions and identifying required actions. Additionally, a determination of actions for out-of-tolerance Azimuthal Tilt is required. This is a modified bank JPM.
- SRO A.1.b The candidate will calculate Time-to-Boil per SO23-5-1.8.1, Shutdown Nuclear Safety, Attachment 9, Calculation of RCS Time-to-Boil Margin. The critical steps include correctly interpreting curves within tolerances and performing the final calculation within given tolerances. This is a modified bank JPM.
- SRO A.2 The candidate will be provided with a set of Core Exit Thermocouple data and will determine if the required OPERABILITY is met using SO23-3-3.35, PAMI / Safe Shutdown Monthly Checks, Attachment 2, Core Exit Thermocouples and Heated Junction Thermocouple System Monthly Channel Checks. The critical steps include identifying any out-of-service thermocouples, correctly determining OPERABILITY, and recording entry into any required Technical Specification LCOs for the Core Exit Thermocouple System. This is a new JPM.
- SRO A.3 The candidate will determine the requirements for Containment access per SO23-3-2.34, Containment Access Control, Inspections and Airlocks Operation. The critical steps include properly identifying all requirements on Attachment 1, Containment Access Requirements. This is a new JPM.
- SRO A.4 The candidate will review given plant conditions and offsite dose information and determine required protective actions per SO123-VIII-10.3, Protective Action Recommendations. The critical steps include determining the affected areas and the recommended protective actions. This is a modified bank JPM.

Facility: SONGS JPM # NRC SRO A.1.a

Task #187652

K/A #2.1.23

4.3/4.4

Title: Determine Azimuthal Power Tilt

Examinee (Print): \_\_\_\_\_

Testing Method:

Simulated Performance: \_\_\_\_\_

Classroom: XActual Performance: X

Simulator: \_\_\_\_\_

Plant: \_\_\_\_\_

**READ TO THE EXAMINEE**

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: Given the following conditions:

- Unit 2 is in Mode 1 at 99.98% power.
- Part-Length Control Element Assemblies (PLCEAs) are at 145 inches.
- Core Protection Calculator Channel B and Core Operating Limits Supervisory System (COLSS) are INOPERABLE.
- COLSS out of service surveillances are in progress.

Initiating Cue: The Shift Manager directs you to PERFORM the following:

- CALCULATE Azimuthal Power Tilt per SO23-3-3.6, COLSS Out of Service Surveillance, Attachment 3, Azimuthal Power Tilt Determination starting at Step 3.2.
- VERIFY Instrument data has been recorded at Steps 3.1 and 3.4.
- DOCUMENT any Technical Specification REQUIRED ACTION(s) in the COMMENTS Section of Attachment 3.
- Another SRO will PERFORM Independent Verification when the surveillance is complete.

Task Standard: Locate and correctly perform Critical Steps of SO23-3-3.6, Attachment 3 and Technical Specification LCO 3.2.3.

Required Materials: SO23-3-3.6, COLSS Out of Service Surveillance, Attachment 3, Azimuthal Power Tilt Determination, Rev. 12-2.

Technical Specification LCO 3.2.3, Azimuthal Power Tilt (Tq), Amendment #127.

Validation Time: 22 minutes Time Critical: N/A Completion Time: \_\_\_\_\_ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): \_\_\_\_\_ Date: \_\_\_\_\_

**CLASSROOM SETUP****EXAMINER:**

**PROVIDE** the examinee with a copy of:

- **SO23-3-3.6, COLSS Out of Service Surveillance, Attachment 3, Azimuthal Power Tilt Determination as follows:**
  - **ENTER** data prior to Section 1.0, Prerequisites:
    - **Unit 2; MODE 1; RX POWER is 99.98%; DATE is Today; Time is Now**
  - **INITIAL** Steps 1.1 and 1.2.
  - **ENTER** the following data at Step 3.1 and **INITIAL**:
    - **1.0299** for Channel A, C and D.
    - **INOP** for Channel B.
  - **ENTER** the following data at Step 3.4.1 and **INITIAL**:
    - **90.51** for Channel A, **92.115** for Channel C and **91.565** for Channel D.
    - **INOP** for Channel B.
  - **ENTER** the following data at Step 3.4.2 and **INITIAL**:
    - **110.89** for Channel A, **112.59** for Channel C and **111.89** for Channel D.
    - **INOP** for Channel B.
  - **ENTER** the following data at Step 3.4.3 and **INITIAL**:
    - **90.10** for Channel A, **91.95** for Channel C and **91.355** for Channel D.
    - **INOP** for Channel B.

√ - Check Mark Denotes Critical Step

START TIME:

<b>Perform Step: 1</b>	Record the CPC AZ Tilt Allowance from each Operable CPC channel (CPC PID 063). (Mark INOP or TRIPPED as applicable for any channel not available.)	
<b>Standard:</b>	VERIFY data is recorded at Step 3.1.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 2√</b>	Subtract 1 from each Azimuthal Tilt Allowance in Step 3.1 and record results. (Mark INOP or TRIPPED as applicable for any channel not available.)	
<b>Standard:</b>	RECORD 0.0299 for Channels A, C, and D. MARK Channel B as INOP.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 3</b>	Determine the applicable equation to be used based on the number of Operable CPC channels. <u>Circle the equation to be used.</u>	
<b>Standard:</b>	CIRCLE equation at Step 3.3.3: <ul style="list-style-type: none"> <li>CPC A, C, &amp; D Operable (perform only if CPC channel B is Inoperable):</li> </ul> $T_{CPC} = \left[ \left[ \frac{C-D}{C+D} \right]^2 + \left[ \frac{C+D-2(A)}{C+D} \right]^2 \right]^{1/2}$	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 4</b>	Record Excore Neutron Flux Detector values from each Operable CPC channel. (Mark INOP or TRIPPED as applicable for any channel not available.) <ul style="list-style-type: none"> <li>Upper detector (PID 010:)</li> <li>Middle detector (PID 011:)</li> <li>Lower detector (PID 012:)</li> </ul>	
<b>Standard:</b>	VERIFY data is recorded at Step 3.4.1.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 5√</b>	Determine the CPC Azimuthal Power Tilt for each level of detectors using the following equation: (Record the selected equation from Step 3.3)
<b>Standard:</b>	RECORD Step 3.3.3 Channel A, C and D detectors where appropriate.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

  

<b>Perform Step: 6</b>	Determine the CPC Azimuthal Power Tilt for each level of detectors using the following equation: <ul style="list-style-type: none"> <li>• Upper Detector</li> </ul>
<b>Standard:</b>	INSERT Upper Detector values into equation and SOLVE with a result of 0.0148.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

  

<b>Perform Step: 7</b>	Determine the CPC Azimuthal Power Tilt for each level of detectors using the following equation: <ul style="list-style-type: none"> <li>• Middle Detector</li> </ul>
<b>Standard:</b>	INSERT Middle Detector values into equation and SOLVE with a result of 0.0124.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

  

<b>Perform Step: 8</b>	Determine the CPC Azimuthal Power Tilt for each level of detectors using the following equation: <ul style="list-style-type: none"> <li>• Lower Detector</li> </ul>
<b>Standard:</b>	INSERT Lower Detector values into equation and SOLVE with a result of 0.0173.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

  

<b>Perform Step: 9</b>	Record the average ( $T_{CPC}$ ) of the tilts calculated in Step 3.5. If one of the values of Steps 3.5.1 through 3.5.3 is significantly different than the other two it may be omitted from the average with permission from the Shift Manager and a Reactor Engineer. (Note in the Comments Section any tilt value not used, and use "0" in the applicable space below.)
<b>Standard:</b>	CALCULATE and RECORD average $T_{CPC}$ : <ul style="list-style-type: none"> <li>• ADD <math>0.0148 + 0.0124 + 0.0173 = 0.0148</math>.</li> </ul>
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 10</b> ✓	Determine Azimuthal Power Tilt (Tq): <ul style="list-style-type: none"> <li>Tq = 2.5 X _____ Tcpc (from Step 3.6)</li> </ul>
<b>Standard:</b>	Determine Azimuthal Power Tilt (Tq): <ul style="list-style-type: none"> <li>MULTIPLY 0.0148 x 2.5 = <b>0.037 ± 0.001 = Tq</b></li> </ul>
<b>Comment:</b>	
SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 11</b>	If Azimuthal Power Tilt (Tq) from Step 3.8 is greater than 0.03, <u>then</u> INITIATE an AR, record the AR number in the Comments Section, <u>then</u> contact Reactor Engineering to evaluate core design and to establish operating restrictions and surveillance requirements within 72 hours.
<b>Standard:</b>	DETERMINE that Azimuthal Power Tilt (Tq) from Step 3.8 is greater than 0.03 and RECORD these actions in the Comments Section: <ul style="list-style-type: none"> <li>INITIATE an AR and RECORD in the Comments Section.</li> <li>CONTACT Reactor Engineering.</li> </ul>
<b>Comment:</b>	
SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 12</b>	The calculated Azimuthal Power Tilt (Tq) (Step 3.8) is less than or equal to the Azimuthal Tilt Allowance used in the Core Protection Calculators (Step 3.2). Yes / No (circle one)
<b>Standard:</b>	CIRCLE No.
<b>Comment:</b>	
SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 13</b> ✓	If NO is circled, <u>then</u> refer to Tech. Spec. LCO 3.2.3, INITIATE required actions and LCOAR/EDMR as applicable, <u>and</u> record actions taken in the Comments Section.
<b>Standard:</b>	RECORD these actions in the COMMENTS Section from TS LCO 3.2.3: <ul style="list-style-type: none"> <li>LCO 3.2.3.B.1 - ADJUST the Tq allowance in the CPCs to greater than or equal to the measured Tq within two hours</li> <li>LCO 3.2.3.B.2 - EVALUATE core design and safety analysis and determine that the core is acceptable for continued operation within 72 hours.</li> <li>LCO 3.2.3.B.3 - ESTABLISH appropriate operating restrictions and SRs within 72 hours.</li> </ul>
<b>Terminating Cue:</b>	<b>This JPM is complete.</b>
<b>Comment:</b>	
SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>STOP TIME:</b>	
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**INITIAL CONDITIONS:**

Given the following conditions:

- Unit 2 is in Mode 1 at 99.98% power.
- Part-Length Control Element Assemblies (PLCEAs) are at 145 inches.
- Core Protection Calculator Channel B and Core Operating Limits Supervisory System (COLSS) are INOPERABLE.
- COLSS out-of service-surveillances are in progress.

**INITIATING CUE:**

The Shift Manager directs you to PERFORM the following:

- CALCULATE Azimuthal Power Tilt per SO23-3-3.6, COLSS Out of Service Surveillance, Attachment 3, Azimuthal Power Tilt Determination starting at Step 3.2.
- VERIFY Instrument data has been recorded at Steps 3.1 and 3.4.
- DOCUMENT any Technical Specification REQUIRED ACTION(s) in the COMMENTS Section of Attachment 3.
- Another SRO will PERFORM Independent Verification when the surveillance is complete.



Facility: SONGS JPM # NRC SRO A.1.b

Task #188898

K/A #2.1.25

3.9/4.2

Title: Determine Time to Boil

Examinee (Print): \_\_\_\_\_

Testing Method:

Simulated Performance: \_\_\_\_\_

Classroom: XActual Performance: X

Simulator: \_\_\_\_\_

Plant: \_\_\_\_\_

**READ TO THE EXAMINEE**

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: Given the following conditions:

- Unit 3 is in MODE 6 after a 420 day run.
- The core reload is complete with 101 new fuel assemblies.
- Reactor Coolant System level is at Midloop (27 inches) to remove the Nozzle Dams in place on Steam Generators E-088 and E-089.
- Shutdown Cooling Heat Exchanger inlet temperature is 115.5 °F.
- The Reactor has been shut down for 22 days.
- The Pressurizer Manway is removed and is being used as the RCS vent.

Initiating Cue: The Shift Manager directs you to PERFORM the following:

- SO23-5-1.8.1, Shutdown Nuclear Safety, Attachment 9, Calculation of RCS Time-to-Boil Margin.
- Outage specific Time to Boil Data Transmittal has NOT been provided by Reactor Engineering.

Task Standard: Locate and correctly perform Critical Steps of SO23-5-1.8.1, Attachment 9.

Required Materials: SO23-5-1.8.1, Shutdown Nuclear Safety, Attachment 9, Calculation of RCS Time-to-Boil Margin, Rev. 20.

Validation Time: 15 minutes Time Critical: N/A Completion Time: \_\_\_\_\_ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): \_\_\_\_\_ Date: \_\_\_\_\_

**CLASSROOM SETUP****EXAMINER:**

**PROVIDE the examinee with a copy of:**

- **SO23-5-1.8.1, Shutdown Nuclear Safety, Attachment 9, Calculation of the RCS Time-to-Boil Margin.**

√ - Check Mark Denotes Critical Step

START TIME:

<b>Perform Step: 1</b>	Determine Time-to-Boil margin temperature as follows: $BM_{act} = BM_{ref} \times L_{cf} \times T_{cf} \times N_{cf}$ <ul style="list-style-type: none"> <li>Determine <math>BM_{ref}</math></li> </ul>
<b>Standard:</b>	REFERENCE $BM_{ref}$ Table and INTERPOLATE between 20 and 30 days as follows: $[(39.09 - 32.4) \times .2] + 32.4 = \mathbf{33.74 \text{ minutes}}$
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

<b>Perform Step: 2√</b>	Determine Time-to-Boil margin temperature as follows: $BM_{act} = BM_{ref} \times L_{cf} \times T_{cf} \times N_{cf}$ <ul style="list-style-type: none"> <li>Determine <math>L_{cf}</math></li> </ul>
<b>Standard:</b>	REFERENCE $L_{cf}$ Table and DETERMINE $L_{cf}$ to be <b>1.008</b> at 27 inches.
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

<b>Perform Step: 3</b>	Determine Time-to-Boil margin temperature as follows: $BM_{act} = BM_{ref} \times L_{cf} \times T_{cf} \times N_{cf}$ <ul style="list-style-type: none"> <li>Determine <math>T_{cf}</math></li> </ul>
<b>Standard:</b>	SELECT $T_{cf}$ formula of $T_{cf} = (212 - T_{hot}) / 92$ .
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

<b>Perform Step: 4√</b>	Determine Time-to-Boil margin temperature as follows: $BM_{act} = BM_{ref} \times L_{cf} \times T_{cf} \times N_{cf}$ <ul style="list-style-type: none"> <li>Determine <math>T_{cf}</math></li> </ul>
<b>Standard:</b>	CALCULATE $T_{cf} = (212 - 115.5) / 92 = \mathbf{1.049 \pm 0.002}$
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

<b>Perform Step: 5</b>	Determine Time-to-Boil margin temperature as follows: $BM_{act} = BM_{ref} \times L_{cf} \times T_{cf} \times N_{cf}$ <ul style="list-style-type: none"> <li>Determine <math>N_{cf}</math> where <math>N_{cf} = 217 / (217 - \# \text{ new assemblies})</math></li> </ul>	
<b>Standard:</b>	CALCULATE $N_{cf} = 217 / (217 - 101) = 1.87$	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 6√</b>	Determine Time-to-Boil margin temperature as follows: $BM_{act} = BM_{ref} \times L_{cf} \times T_{cf} \times N_{cf}$	
<b>Standard:</b>	$BM_{act} = (33.74 \text{ min}) \times (1.008) \times (1.049) \times (1.87) = 66.7 \pm 2.5 \text{ minutes}$	
<b>Terminating Cue:</b>	<b>This JPM is complete.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>STOP TIME:</b>	
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**INITIAL CONDITIONS:**

Given the following conditions:

- Unit 3 is in MODE 6 after a 420 day run.
- The core reload is complete with 101 new fuel assemblies.
- Reactor Coolant System level is at Midloop (27 inches) to remove the Nozzle Dams in place on Steam Generators E-088 and E-089.
- Shutdown Cooling Heat Exchanger inlet temperature is 115.5 °F.
- The Reactor has been shut down for 22 days.
- The Pressurizer Manway is removed and is being used as the RCS vent.

**INITIATING CUE:**

The Shift Manager directs you to PERFORM the following:

- SO23-5-1.8.1, Shutdown Nuclear Safety, Attachment 9, Calculation of RCS Time-to-Boil Margin.
- Outage specific Time to Boil Data Transmittal has NOT been provided by Reactor Engineering.

Facility: SONGS JPM # NRC RO A.2 Task #185785 K/A #2.2.12 3.7/4.1  
Title: Perform Core Exit Thermocouple Channel Checks

Examinee (Print): \_\_\_\_\_

Testing Method:

Simulated Performance: \_\_\_\_\_ Classroom: X  
Actual Performance: X Simulator: \_\_\_\_\_  
Plant: \_\_\_\_\_

**READ TO THE EXAMINEE**

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: Given the following conditions:

- Unit 2 is in MODE 1 at 100% power.
- The monthly surveillance for the Core Exit Thermocouple and Heated Junction Thermocouple System is due.

Initiating Cue: The Shift Manager directs you to PERFORM the following:

- SO23-3-3.35, PAMI/Safe Shutdown Monthly Checks, Attachment 2, Core Exit Thermocouples and Heated Junction Thermocouple System Monthly Channel Checks.
- Core Exit Thermocouple and Heated Junction Thermocouple data is attached.
- RECORD any Technical Specification LCO REQUIRED ACTIONS in the Comments Section of SO23-3-3.35.

Task Standard: Locate and correctly perform Critical Steps SO23-3-3.35, Attachment 2.

Required Materials: SO23-3-3.35, PAMI/Safe Shutdown Monthly Checks, Attachment 2, Rev. 22.  
Unit 2 Technical Specifications.

Validation Time: 25 minutes Time Critical: N/A Completion Time: \_\_\_\_\_ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): \_\_\_\_\_ Date: \_\_\_\_\_

**CLASSROOM SETUP****EXAMINER:**

**PROVIDE the examinee with a copy of:**

- **SO23-3-3.35, PAMI/Safe Shutdown Monthly Checks, Attachment 2, Core Exit Thermocouples and Heated Junction Thermocouple System Monthly Channel Checks.**
  - **INITIAL through Step 1.4.**
  - **MARK “Stop Here” at Step 3.3.**
- **Qualified Safety Parameter Display System (QSPDS) pages 611, 622, and 721.**
- **Core Exit Thermocouple Data (part of JPM Cue Sheet).**
- **Unit 2 Technical Specifications.**



√ - Check Mark Denotes Critical Step

**START TIME:**

<b>Perform Step: 1</b>	Record the following: (QSPDS page 611) <ul style="list-style-type: none"> <li>• COLD LEG 1A TEMP.</li> <li>• COLD LEG 1B TEMP.</li> </ul>
<b>Standard:</b>	RECORD 541°F for Cold Leg 1A and Cold Leg 1B temperatures.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 2√</b>	Verify Acceptance Criteria: <ul style="list-style-type: none"> <li>• QSPDS 1A &amp; 1B Cold Leg Temps within 5°F?</li> </ul>
<b>Standard:</b>	CHECK YES box for QSPDS 1A & 1B Cold Leg temperatures within 5°F.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 3</b>	Record the following: (QSPDS page 611) <ul style="list-style-type: none"> <li>• COLD LEG 2A TEMP.</li> <li>• COLD LEG 2B TEMP.</li> </ul>
<b>Standard:</b>	RECORD 540°F for Cold Leg 2A and Cold Leg 2B temperatures.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 4√</b>	Verify Acceptance Criteria: <ul style="list-style-type: none"> <li>• QSPDS 2A &amp; 2B Cold Leg Temps within 5°F?</li> </ul>
<b>Standard:</b>	CHECK YES box for QSPDS 2A & 2B Cold Leg temperatures within 5°F.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 5</b>	Record the following: (QSPDS page 611) <ul style="list-style-type: none"> <li>• REP CET TEMPERATURE (QSPDS A).</li> <li>• REP CET TEMPERATURE (QSPDS B).</li> </ul>
<b>Standard:</b>	RECORD 611°F for REP CET (QSPDS A) and 612°F for REP CET (QSPDS B) temperatures.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 6√</b>	Verify Acceptance Criteria: <ul style="list-style-type: none"> <li>• REP CET Temperatures within 9°F?</li> </ul>
<b>Standard:</b>	CHECK YES box for REP CET temperatures within 9°F.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

  

<b>Perform Step: 7√</b>	Transfer the <u>Highest</u> operable Cold Leg Temperature of Step 2.1.1 into the "Low Limit" of Steps 2.1.6 and 2.1.8.
<b>Standard:</b>	RECORD 541°F in "Low Limit Temp." box for Steps 2.1.6 and 2.1.8.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

  

<b>Perform Step: 8√</b>	Transfer the <u>Lowest</u> operable REP CET temperature of Step 2.1.1 into the "High Limit" of Steps 2.1.6 and 2.1.8.
<b>Standard:</b>	RECORD 611°F in "High Limit Temp." box for Steps 2.1.6 and 2.1.8.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

  

<b>Perform Step: 9</b>	Record CET Temperatures from QSPDS "A" Page 731: <ul style="list-style-type: none"> <li>• Write "INOP" in data spaces for known inoperable CETs.</li> <li>• Write 'N/A' for G-20.</li> </ul>
<b>Standard:</b>	RECORD N/A for CET G-20 and RECORD CET Temperatures from QSPDS A Core Exit Thermocouple Map (JPM Cue Sheet).
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

  

<b>Perform Step: 10√</b>	Record the total number of CETs which are within "In-Range" limits for each column.
<b>Standard:</b>	RECORD the following from QSPDS A Core Exit Thermocouple Map: <ul style="list-style-type: none"> <li>• QUAD 1 = 5; QUAD 2 = 6; QUAD 3 = 8; QUAD 4 = 6.</li> </ul>
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

  

<b>Perform Step: 11√</b>	At least two CETs per Column are "In-Range" for Channel "A" QSPDS: <div style="text-align: center;"> <input type="checkbox"/> YES      <input type="checkbox"/> NO </div>
<b>Standard:</b>	CHECK YES box.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 12</b>	Record CET Temperatures from QSPDS "B" Page 731: <ul style="list-style-type: none"> <li>Write "INOP" in data spaces for known inoperable CETs.</li> </ul>
<b>Standard:</b>	RECORD CET Temperatures from QSPDS B Core Exit Thermocouple Map (JPM Cue Sheet).
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

  

<b>Perform Step: 13√</b>	Record the total number of CETs which are within the "In-Range" limits for each column.
<b>Standard:</b>	RECORD the following from QSPDS B Core Exit Thermocouple Map: <ul style="list-style-type: none"> <li>QUAD 1 = 6; QUAD 2 = 7; QUAD 3 = 1; QUAD 4 = 6.</li> </ul>
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

  

<b>Perform Step: 14√</b>	At least two CETs per Column are "In-Range" for channel "B" QSPDS: <div style="text-align: center;"> <input type="checkbox"/> YES      <input type="checkbox"/> NO         </div>
<b>Standard:</b>	CHECK NO box.
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

  

<b>Perform Step: 15</b>	If any CETs are not "In-Range", then ensure a Notification has been initiated, and record <b>NEW</b> Notification numbers in the comments section.
<b>Standard:</b>	ANNOTATE that a Notification for QSPDS B CET failure has been initiated in the COMMENTS Section.
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

  

<b>Perform Step: 16</b>	Heated Junction Thermocouple System Channel Check <ul style="list-style-type: none"> <li>Record the differential temperatures of the Heated Junction Thermocouples (HJTCs) from QSPDS Page 721 on Table 2.</li> </ul>
<b>Standard:</b>	RECORD the differential temperatures of the Heated Junction Thermocouples from QSPDS Page 721 on Table 2.
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

<b>Perform Step: 17</b> ✓	At least One Head differential temperature <u>and</u> at least Three Plenum differential temperatures for <b>Channel A</b> fall within the range of 40°F (lower limit) to 200°F (upper limit)?  <input type="checkbox"/> YES <input type="checkbox"/> NO	
<b>Standard:</b>	CHECK YES box.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

  

<b>Perform Step: 18</b> ✓	At least One Head differential temperature <u>and</u> at least Three Plenum differential temperatures for <b>Channel B</b> fall within the range of 40°F (lower limit) to 200°F (upper limit)?  <input type="checkbox"/> YES <input type="checkbox"/> NO	
<b>Standard:</b>	CHECK YES box.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

  

<b>Perform Step: 19</b> ✓	The Core Exit Thermocouple Channel Check is satisfactory by having selected YES in Steps 2.1.7 and 2.1.9.  <input type="checkbox"/> SAT <input type="checkbox"/> UNSAT	
<b>Standard:</b>	CHECK UNSAT box.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

  

<b>Perform Step: 20</b> ✓	The Heated Junction Thermocouple System Channel Check is satisfactory by having selected YES in Steps 2.2.2 and 2.2.3.  <input type="checkbox"/> SAT <input type="checkbox"/> UNSAT	
<b>Standard:</b>	CHECK SAT box.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

  

<b>Perform Step: 21</b>	If either Step 3.1 or 3.2 is UNSAT, <u>then</u> for each equipment deficiency, ensure a separate LCOAR /EDMR and/or Notification exists. Record new LCOAR /EDMR/Notification numbers in the COMMENTS section.	
<b>Standard:</b>	RECORD in the COMMENTS section that a LCOAR must be initiated.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 22√</b>	RECORD any Technical Specification LCO REQUIRED ACTIONS.	
<b>Standard:</b>	DETERMINE Technical Specification LCO 3.3.11 is applicable and record the following in the COMMENTS Section: <ul style="list-style-type: none"><li>• RECORD LCO 3.3.11.A; REQUIRED ACTION A.1 is applicable.</li><li>• One or more Functions with one required channel inoperable; restore required channel to OPERABLE status within 30 days</li></ul>	
<b>Terminating Cue:</b>	<b>This JPM is complete.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>STOP TIME:</b>	
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**INITIAL CONDITIONS:**

Given the following conditions:

- Unit 2 is in MODE 1 at 100% power.
- The monthly surveillance for the Core Exit Thermocouple and Heated Junction Thermocouple System is due.

**INITIATING CUE:**

The Shift Manager directs you to PERFORM the following:

- SO23-3-3.35, PAMI/Safe Shutdown Monthly Checks, Attachment 2, Core Exit Thermocouples and Heated Junction Thermocouple System Monthly Channel Checks.
- Core Exit Thermocouple and Heated Junction Thermocouple data is attached.
- RECORD any Technical Specification LCO REQUIRED ACTIONS in the Comments Section of SO23-3-3.35.

CHANNEL A CORE EXIT THERMOCOUPLE MAP DATA (PAGE 731)											
QUADRANT 1			QUADRANT 2			QUADRANT 3			QUADRANT 4		
1	W6	583°F	1	T18	591°F	1	G9	582°F	1	T2	593°F
2	W13	590°F	2	L13	573°F	2	G13	576°F	2	R4	587°F
3	W18	558°F	3	L16	584°F	3	E6	589°F	3	R6	612°F
4	T13	582°F	4	G16	588°F	4	E9	588°F	4	L2	575°F
5	T16	589°F	5	G18	589°F	5	C4	560°F	5	L9	573°F
			6	G20	84°F	6	C9	591°F	6	G2	606°F
			7	E20	553°F	7	C16	590°F	7	E4	589°F
						8	A8	572°F			
						9	A14	540°F			

CHANNEL B CORE EXIT THERMOCOUPLE MAP (PAGE 731)											
QUADRANT 1			QUADRANT 2			QUADRANT 3			QUADRANT 4		
1	Y8	541°F	1	T20	548°F	1	E13	583°F	1	T4	593°F
2	Y14	563°F	2	R16	585°F	2	E16	611°F	2	R2	585°F
3	W4	-	3	R18	584°F	3	C6	-	3	L4	600°F
4	W9	610°F	4	R20	601°F	4	C13	612°F	4	L6	592°F
5	W16	598°F	5	L18	594°F	5	C18	-	5	G4	589°F
6	T6	585°F	6	L20	576°F				6	G6	608°F
7	T9	614°F	7	E18	588°F				7	E2	540°F
8	R9	585°F									
9	R13	588°F									

Facility: SONGS JPM # NRC SRO A.3 Task #192875 K/A #2.3.12 3.2/3.7  
Title: Determine Containment Access Requirements

Examinee (Print): \_\_\_\_\_

Testing Method:

Simulated Performance: \_\_\_\_\_ Classroom: X  
Actual Performance: X Simulator: \_\_\_\_\_  
Plant: \_\_\_\_\_

**READ TO THE EXAMINEE**

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: Given the following conditions:

- Unit 2 is in MODE 1 at 99.98% power.
- Maintenance is planning a Containment entry to repair a steam leak by tightening the packing on a ME-088 instrument valve on the 63 foot elevation near Safety Injection Tank SIT-010.
- Chemistry has sampled the containment atmosphere with the following results:
  - Oxygen levels are 19.3%.
  - Combustible / Flammable Gas is 0.05%.

Initiating Cue: The Shift Manager directs you to PERFORM the following:

- COMPLETE Attachment 1 of SO23-3-2.34, Containment Access Control, Inspections and Airlocks Operation.
- DETERMINE any ventilation requirements prior to the entry and RECORD in the Comments Section of Attachment 1.
- DETERMINE the proper Containment Closeout Inspection Attachment to be performed when work is complete and RECORD in the COMMENTS Section of Attachment 1.

Task Standard: Locate and correctly perform Critical Steps SO23-3-2.34.

Required Materials: SO23-3-2.34, Containment Access Control, Inspections and Airlocks Operation, Rev 22.

Achieved

Validation Time: 10 minutes Time Critical: N/A Completion Time: \_\_\_\_\_ minutes



Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): \_\_\_\_\_ Date: \_\_\_\_\_

**CLASSROOM SETUP****EXAMINER:**

**PROVIDE the examinee with a copy of:**

- **SO23-3-2.34, Containment Access Control, Inspections and Airlocks Operation.**
  - **INITIAL Attachment 1 through Step 1.1.**
  - **PROVIDE entire procedure.**

√ - Check Mark Denotes Critical Step

START TIME:

<b>Examiner Note:</b>	<b>Examinee uses Section 6.8 as the reference for the following steps in Attachment 1.</b>	
<b>Perform Step: 1</b> √	Check the appropriate conditions in the table per Main Body, Section 6.8.1 for Personnel and Emergency Airlocks <b>or</b> per SO23-5-1.8.1, Attachment for Shutdown Containment Closure Control for the Equipment Hatch. Personnel Airlock Requirement(s): <ul style="list-style-type: none"> <li>Modes 1-4, ONE door and associated equalizing valve shall always remain CLOSED with interlocks installed and Operable. ONE ramp is allowed.</li> </ul>	
<b>Standard:</b>	REFER to 6.8.1 and DETERMINE that the Unit is in Mode 1; the condition applies, and CHECK this condition box.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	
<b>Perform Step: 2</b>	Check the appropriate conditions in the table per Main Body, Section 6.8.1 for Personnel and Emergency Airlocks <b>or</b> per SO23-5-1.8.1, Attachment for Shutdown Containment Closure Control for the Equipment Hatch. Personnel Airlock Requirement: <ul style="list-style-type: none"> <li>Door operation will be: <input type="checkbox"/> Electrical <input type="checkbox"/> Manual <input type="checkbox"/> N/A.</li> </ul>	
<b>Standard:</b>	DETERMINE that Personnel Airlock Door is fully functional and CHECK the ELECTRICAL <b>or</b> MANUAL box.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	
<b>Perform Step: 3</b> √	Check the appropriate conditions in the table per Main Body, Section 6.8.1 for Personnel and Emergency Airlocks <b>or</b> per SO23-5-1.8.1, Attachment for Shutdown Containment Closure Control for the Equipment Hatch. Personnel Airlock Requirement: <ul style="list-style-type: none"> <li>Containment Airlock Operator (Hatch Operator) is required, and posted at outer door.</li> </ul>	
<b>Standard:</b>	REFER to 6.8.1 and DETERMINE that the Unit is in Mode 1; the condition applies, and CHECK this condition box.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 4√</b>	<p>Check the appropriate conditions in the table per Main Body, Section 6.8.1 for Personnel and Emergency Airlocks <u>or</u> per SO23-5-1.8.1, Attachment for Shutdown Containment Closure Control for the Equipment Hatch.</p> <p>Emergency Airlock Requirement:</p> <ul style="list-style-type: none"> <li>Emergency Airlock to remain unlocked and posted by Security. Emergency use only.</li> </ul>
<b>Standard:</b>	REFER to 6.8.1 and DETERMINE that two egress paths are always required and CHECK this condition box.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 5√</b>	<p>Check the appropriate conditions in the table per Main Body, Section 6.8.1 for Personnel and Emergency Airlocks <u>or</u> per SO23-5-1.8.1, Attachment for Shutdown Containment Closure Control for the Equipment Hatch.</p> <p>Equipment Hatch Requirement:</p> <ul style="list-style-type: none"> <li>Equipment Hatch CLOSED</li> </ul>
<b>Standard:</b>	REFER to 6.8.1 and DETERMINE that the Unit is in Mode 1; the condition applies, and CHECK this condition box.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Examiner Note:</b>	<b>The examinee refers to Section 6.2, Containment Entry for the following step.</b>
<b>Perform Step: 6√</b>	Determine any ventilation requirements prior to the entry per Section 6.2, Containment Entry.
<b>Standard:</b>	<p>REFER to Section 6.2, Containment Entry:</p> <ul style="list-style-type: none"> <li>DETERMINE that Chemistry sample results show an oxygen deficient atmosphere and PERFORM one (1) of the following: <ul style="list-style-type: none"> <li>DON Self-contained respiratory protection prior to Containment entry, <u>or</u></li> <li>PERFORM a Containment Mini-Purge.</li> </ul> </li> <li>RECORD this information in the Comments Section of Attachment 1.</li> </ul>
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Examiner Note:</b>	<b>The examinee refers to Section 6.9, Containment Loose Debris Inspections for the following step.</b>	
<b>Perform Step: 7</b>	Determine the proper Containment Closeout Inspection Attachment to be performed when work is complete per Section 6.9, Containment Loose Debris Inspections.	
<b>Standard:</b>	REFER to Section 6.9, Containment Loose Debris Inspections: <ul style="list-style-type: none"><li>• DETERMINE that when in MODE 1 or 2 an Inspection of &lt; 7 work areas during or following a Containment entry and PERFORM Attachment 8, Containment Work Area Loose Debris Inspection.</li><li>• RECORD this information in the Comments Section of Attachment 1.</li></ul>	
<b>Terminating Cue:</b>	<b>This JPM is complete.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>STOP TIME:</b>	
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**INITIAL CONDITIONS:**

Given the following conditions:

- Unit 2 is in **MODE 1** at **99.98%** power.
- Maintenance is planning a Containment entry to repair a steam leak by tightening the packing on a **ME-088** instrument valve on the 63 foot elevation near Safety Injection Tank **SIT-010**.
- Chemistry has sampled the containment atmosphere with the following results:
  - Oxygen levels are **19.3%**.
  - Combustible / Flammable Gas is **0.05%**.

**INITIATING CUE:**

The Shift Manager directs you to **PERFORM** the following:

- **COMPLETE** Attachment 1 of **SO23-3-2.34**, Containment Access Control, Inspections and Airlocks Operation.
- **DETERMINE** any ventilation requirements prior to the entry and **RECORD** in the Comments Section of Attachment 1.
- **DETERMINE** the proper Containment Closeout Inspection Attachment to be performed when work is complete and **RECORD** in the **COMMENTS** Section of Attachment 1.

Facility: SONGS JPM # NRC SRO A.4

Task #192840

K/A #2.4.44

2.4/4.4

Title: Determine Protective Actions

Examinee (Print): \_\_\_\_\_

Testing Method:

Simulated Performance: \_\_\_\_\_

Classroom: XActual Performance: X

Simulator: \_\_\_\_\_

Plant: \_\_\_\_\_

**READ TO THE EXAMINEE**

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: Given the following conditions:

- Unit 3 has experienced a large break Loss of Coolant Accident with resultant fuel failure.
- A GENERAL EMERGENCY (Tab B4-1) was declared and the following Protective Actions were recommended:
  - Evacuate State Beach.
  - Evacuate PAZ 1 and 4.
  - Ingest Potassium Iodide (KI) in PAZ 1 and 4.
- There has been a breach in the Containment Integrity resulting in a large airborne radioactive release.
- The projected dose at the Exclusion Area Boundary is 5200 mR TEDE.
- The current wind direction is from 101 degrees at 20 mph.
- There are no known impediments to evacuation.
- The release duration is unknown.

Initiating Cue: The Shift Manager directs you to EVALUATE conditions and determine if a new Protective Action Recommendation is required per SO123-VIII-10.3, Protective Action Recommendations.

- DOCUMENT the results in the Meteorological Data box on EP(123)10, Event Notification Form.

Task Standard: Locate and correctly perform Critical Steps SO123-VIII-10.3.

Required Materials: SO123-VIII-10.3, Protective Action Recommendations, Rev. 12.

EP(123)10, Event Notification Form, Rev. 12.

Validation Time: 10 minutes Time Critical: N/A Completion Time: \_\_\_\_\_ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): \_\_\_\_\_ Date: \_\_\_\_\_



**CLASSROOM SETUP****EXAMINER:**

**PROVIDE the examinee with a copy of:**

- **SO123-VIII-10.3, Protective Action Recommendations.**
- **EP(123)10, Event Notification Form.**

√ - Check Mark Denotes Critical Step

START TIME:

<b>Perform Step: 1</b>	If a PAR Upgrade is necessary, then obtain: <ul style="list-style-type: none"> <li>• The 15-minute average wind direction (From), if available (Refer to Section 1.1 of this Attachment).</li> <li>• Information concerning KNOWN evacuation impediments (Refer to Section 1.2 of this Attachment).</li> <li>• Radiological release parameters (Refer to Section 1.3 of this Attachment).</li> </ul>	
<b>Standard:</b>	DETERMINE from the initial conditions that the 15 min average wind direction is 101°, no known evacuation impediments exist, and that the projected dose at EAB is 5200 mR TEDE.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Examiner Note:</b>	<b>The next set of steps follows the progression through Attachment 2 of SO123-VIII-10.3.</b>	
<b>Perform Step: 2</b>	Utilize the table (General Emergency PAR Table) found on page 3 of this Attachment and/or Attachment 2 (GE Protective Action Recommendations Flowchart) to make the appropriate GE PAR or GE PAR Upgrade..	
<b>Standard:</b>	ENTER Attachment 2, GE PAR flowchart at the General Emergency box.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 3</b>	Utilize the table (General Emergency PAR Table) found on page 3 of this Attachment and/or Attachment 2 (GE Protective Action Recommendations Flowchart) to make the appropriate GE PAR or GE PAR Upgrade. <ul style="list-style-type: none"> <li>• Are there known evacuation impediments?</li> </ul>	
<b>Standard:</b>	DETERMINE that there are no known evacuation impediments, ANSWER NO, and TAKE the right hand path.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 4</b>	Utilize the table (General Emergency PAR Table) found on page 3 of this Attachment and/or Attachment 2 (GE Protective Action Recommendations Flowchart) to make the appropriate GE PAR or GE PAR Upgrade. <ul style="list-style-type: none"> <li>• Radiological Release less than 1 hour?</li> </ul>	
<b>Standard:</b>	DETERMINE that the release duration is unknown, ANSWER UNKNOWN, and TAKE the straight through path.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 5</b>	Utilize the table (General Emergency PAR Table) found on page 3 of this Attachment and/or Attachment 2 (GE Protective Action Recommendations Flowchart) to make the appropriate GE PAR or GE PAR Upgrade. <ul style="list-style-type: none"> <li>• Dose <math>\geq</math> 5000 mR (measured or projected) TEDE at the EAB and the wind towards PAZ 5?</li> </ul>	
<b>Standard:</b>	DETERMINE that dose is $\geq$ 5000 mR but wind direction at 101° is NOT towards PAZ 5, ANSWER NO, and TAKE the path to the left.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 6</b>	Utilize the table (General Emergency PAR Table) found on page 3 of this Attachment and/or Attachment 2 (GE Protective Action Recommendations Flowchart) to make the appropriate GE PAR or GE PAR Upgrade.	
<b>Standard:</b>	DETERMINE PAR to be: <ul style="list-style-type: none"> <li>• Evacuate the State Beach.</li> <li>• Evacuate PAZ 1, 2, and 4 (affected downwind PAZs).</li> <li>• Ingest Potassium Iodide (KI) for the affected PAZs 1, 2, and 4.</li> </ul>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 7✓</b>	Document PAR results on EP(123)10, Event Notification Form	
<b>Standard:</b>	CHECK the "is" box as there is a need for protective action beyond the Exclusion Area Boundary.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 8√</b>	Document PAR results on EP(123)10, Event Notification Form	
<b>Standard:</b>	CHECK the “Evacuate State Beach” box.	
<b>Comment:</b>	<div style="float: right;"> <b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/> </div>	

<b>Perform Step: 9√</b>	Document PAR results on EP(123)10, Event Notification Form	
<b>Standard:</b>	CHECK the “Evacuate PAZ(s)” box and CHECK boxes 1, 2, and 4.	
<b>Comment:</b>	<div style="float: right;"> <b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/> </div>	

<b>Perform Step: 10√</b>	Document PAR results on EP(123)10, Event Notification Form	
<b>Standard:</b>	CHECK the “Ingest KI PAZ(s)” box and CHECK boxes 1, 2, and 4.	
<b>Terminating Cue:</b>	<b>This JPM is complete.</b>	
<b>Comment:</b>	<div style="float: right;"> <b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/> </div>	

<b>STOP TIME:</b>	
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**INITIAL CONDITIONS:**

Given the following conditions:

- Unit 3 has experienced a large break Loss of Coolant Accident with resultant fuel failure.
- A GENERAL EMERGENCY (Tab B4-1) was declared and the following Protective Actions were recommended:
  - Evacuate State Beach.
  - Evacuate PAZ 1 and 4.
  - Ingest Potassium Iodide (KI) in PAZ 1 and 4.
- There has been a breach in the Containment Integrity resulting in a large airborne radioactive release.
- The projected dose at the Exclusion Area Boundary is 5200 mR TEDE.
- The current wind direction is from 101 degrees at 20 mph.
- There are no known impediments to evacuation.
- The release duration is unknown.

**INITIATING CUE:**

The Shift Manager directs you to EVALUATE conditions and determine if a new Protective Action Recommendation is required per SO123-VIII-10.3, Protective Action Recommendations.

- DOCUMENT the results in the Meteorological Data box on EP(123)10, Event Notification Form.

Facility:		SONGS Units 2 and 3		Date of Examination:		10/19/09	
Exam Level:		RO <input type="checkbox"/> SRO(I) <input type="checkbox"/> <b>SRO (U) <input checked="" type="checkbox"/></b>		Operating Test No.:		NRC	
Control Room Systems <sup>®</sup> (8 for RO; 7 for SRO-I; 2 or 3 for SRO-U, including 1 ESF)							
System / JPM Title				Type Code*		Safety Function	
<b>S-1</b>	<b>001 – Control Rod Drive System (New)</b> <b>Perform Immediate Actions for Control Room Evacuation</b>			<b>A, N, S</b>		<b>1</b>	
S-2	004 – Chemical and Volume Control System (J083S) Secure Charging and Letdown			D, S		2	
<b>S-3</b>	<b>006 – Emergency Core Cooling System (J073S)</b> <b>Align Simultaneous Hot Leg and Cold Leg Injection</b>			<b>A, M, EN, S</b>		<b>3</b>	
<b>S-4</b>	<b>003 – Reactor Coolant Pump System (J027FS)</b> <b>Start a Reactor Coolant Pump</b>			<b>A, D, L, S</b>		<b>4-P</b>	
S-5	022 – Containment Spray System (J049FS) Terminate Containment Spray			A, D, EN, S		5	
S-6	064 – Emergency Diesel Generator System (J054S) Restore 1E Bus 2A06 From Cross-Tie Operations			D, S		6	
C-7	073 – Process Radiation Monitoring System (J120S) (RO only) Reset and Restore Fuel Handling Isolation System			C, D		7	
C-8	029 – Containment Purge System (J147FS) Place Containment Mini-Purge in Service			A, C, D		8	
In-Plant Systems <sup>®</sup> (3 for RO; 3 for SRO-I; 3 or 2 for SRO-U)							
P-1	059 – Main Feedwater System (J109) Locally Operate Main Feedwater Regulating Valve			D		4-S	
<b>P-2</b>	<b>004 – Chemical and Volume Control System (New)</b> <b>Locally Align Charging Pump Suction to RWST</b>			<b>E, N, R</b>		<b>2</b>	
<b>P-3</b>	<b>012 – Reactor Protection System (J021F)</b> <b>Locally Open Reactor Trip Breakers (TIME CRITICAL)</b>			<b>E, M, R</b>		<b>7</b>	

@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.	
* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	$\leq 9 / \leq 8 / \leq 4$
(E)mergency or abnormal in-plant	$\geq 1 / \geq 1 / \geq 1$
(EN)gineered safety feature	- / - / $\geq 1$ (control room system)
(L)ow Power / Shutdown	$\geq 1 / \geq 1 / \geq 1$
(N)ew or (M)odified from bank including 1(A)	$\geq 2 / \geq 2 / \geq 1$
(P)revious 2 exams	$\leq 3 / \leq 3 / \leq 2$ (randomly selected)
(R)CA	$\geq 1 / \geq 1 / \geq 1$
(S)imulator	

**NRC JPM Examination  
Summary Description**

- S-1 The candidate will perform the immediate operator actions for a Control Room Evacuation per Abnormal Operating Instruction SO23-13-02, Shutdown from Outside the Control Room. The alternate path is performed when a Reactor Coolant Pump breaker fails to open. This is a new JPM under the Control Rod Drive System - Reactivity Control safety function. This is a PRA significant action.
- S-2 The candidate will secure Charging and Letdown as part of an RCS leak investigation per SO23-3-2.1.02, Chemical and Volume Control System Outage Evolutions. This is a bank JPM under the Chemical and Volume Control System - Reactor Coolant Inventory Control safety function.
- S-3 The candidate will align simultaneous Hot Leg and Cold Leg Injection during a Loss of Coolant Accident per SO23-12-11, EOI Supporting Attachments, Attachment 11, Simultaneous Hot / Cold Leg Injection. The alternate path requires the operator to perform actions with a High Pressure Safety Injection Pump out-of-service. This is a modified bank JPM under the Emergency Core Cooling System - Reactor Pressure Control safety function. This is a PRA significant action.
- S-4 The candidate will start the fourth Reactor Coolant Pump during a Plant Startup per SO23-3-1.7, Reactor Coolant Pump Operation. The alternate path occurs when Component Cooling Water flow is lost to the RCP and the operator trips the Reactor Coolant Pump per the alarm response procedure. This is a bank JPM

under the Reactor Coolant Pump System - Heat Removal from Reactor Core safety function.

- S-5 The candidate will be required to terminate Containment Spray per SO23-12-11, EOI Supporting Attachments, Attachment 2, Floating Steps. The alternate path occurs when there is only one Containment Emergency Cooling Unit operating and the actions of the RNO path are required. This is a bank JPM under the Containment Spray System - Containment Integrity safety function.
- S-6 The candidate will be required to restore from 1E 4160V unit cross-tie operations per SO23-6-2, Transferring of 4 kV Buses, Section 6.9, Restoring from 1E 4kV Bus 3A06 to 2A06 Cross-Tie Operation. This is a bank JPM under the AC Electrical Distribution System - Electrical safety function.
- C-7 The candidate will reset and re-establish normal Fuel Building Ventilation after isolation due to a high radiation signal per SO23-3-2.22, Engineered Safety Features Actuation Systems Operation, Attachment 23, FHIS Reset and Restoration. This is a bank JPM under the Area Radiation Monitoring System - Instrumentation safety function.
- C-8 The candidate will place the Containment Mini-Purge System in operation to support a Containment entry per SO23-1-4.2, Containment Purge and Recirculation Filtration System. The alternate path occurs when a Containment Radiation High alarm is received and the operator isolates mini-purge per the alarm response. This is a bank JPM under the Containment Purge System - Plant Service Systems safety function.
- P-1 The candidate will perform the local actions to operate a Main Feedwater Regulating Valve per SO23-9-6, Feedwater Control System Operation, Section 6.4, Local-Manual Operation of Main Feedwater Control Valves. This is a bank JPM under the Main Feedwater System - Secondary System Heat Removal from Reactor Core safety function.
- P-2 The candidate will perform the actions to align Charging Pump suction to the Refueling Water Storage Tank per SO23-13-2, Shutdown from Outside the Control Room, Attachments 10 and 11. This is a new JPM under the Chemical and Volume Control System - Reactor Coolant System Inventory Control safety function. This is a PRA significant action.
- P-3 The candidate will log into and enter the Radiation Controlled Area and locally open Reactor Trip breakers per SO23-12-1, Standard Post Trip Actions. This is a time critical, modified bank JPM under the Reactor Protection System – Instrumentation safety function. This is a PRA significant action.



Facility: SONGS JPM # RO/SRO NRC C-7 Task #186190 K/A #073.A4.02 3.7 / 3.7 SF-7  
Title: Reset and Restoration of Fuel Handling Isolation System

Examinee (Print): \_\_\_\_\_

Testing Method:

Simulated Performance: X

Classroom: \_\_\_\_\_

Actual Performance: \_\_\_\_\_

Simulator: \_\_\_\_\_

Plant: X

**READ TO THE EXAMINEE**

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: Given the following conditions:

- An actuation of Unit 2 (Unit 3) Train A Fuel Handling Isolation System (FHIS) has occurred due to radiography in the area.
- Radiography has been stopped.
- Proper actuation of Unit 2 (Unit 3) Train A FHIS has been verified.
- The actuation occurred less than 15 minutes ago and SO23-1-3.1, Emergency Chilled Water System Operation, Section for Prevention of Low Load Recycle was not performed.

Initiating Cue: The Control Room Supervisor directs you to RESTORE the Unit 2 (Unit 3) Train A Fuel Handling Isolation System per SO23-3-2.22, Engineered Safety Features Actuation System Operation, Attachment 23, FHIS Reset and Restoration.

Task Standard: Locate and correctly perform Critical Steps of SO23-3-2.22.

Required Materials: SO23-3-2.22, Engineered Safety Features Actuation System Operation, Rev. 17.

Validation Time: 19 minutes Time Critical: N/A Completion Time: \_\_\_\_\_ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): \_\_\_\_\_ Date: \_\_\_\_\_

**CONTROL ROOM SETUP****EXAMINER:**

**PROVIDE** the examinee with a copy of:

- **SO23-3-2.22, Engineered Safety Features Actuation Systems Operation, Attachment 23, FHIS Reset and Restoration.**
- **INITIAL through Step 2.1.**

**EXAMINER NOTE:**

This JPM can be performed on either Unit. **CIRCLE** the Unit on which the JPM is to be performed on the JPM Worksheet and the JPM Cue Sheet.

Panel 2(3)L-103 is located in the Control Room Hallway and Panel 2(3)L-154 is located in the Control Room Hallway past the Fire Door.

√ - Check Mark Denotes Critical Step

START TIME:

<b>Examiner Cue:</b>	<b>Remind the examinee to simulate all actions.</b>		
<b>Perform Step: 1</b> √	MOMENTARILY DEPRESS RESET/TEST handswitch HS-7822H1 and/or HS-7823H2, as applicable to reset FHIS.		
<b>Standard:</b>	DEPRESS 2(3)HS-7822H1 FHIS TR A RESET/TEST handswitch.		
<b>Comment:</b>			<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 2</b>	Verify handswitch backlight illuminates (L-103).		
<b>Standard:</b>	OBSERVE 2(3)HS-7822H1 FHIS TR A RESET/TEST white light illuminated.		
<b>Examiner Cue:</b>	<b>The RESET/TEST light is illuminated.</b>		
<b>Comment:</b>			<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 3</b>	VERIFY 60A22, FHIS ACTUATION, has reset.		
<b>Standard:</b>	GO to Annunciator Panel 60A and OBSERVE annunciator 60A22 - FHIS ACTUATION is extinguished.		
<b>Examiner Cue:</b>	<b>Annunciator window 60A22 is extinguished.</b>		
<b>Comment:</b>			<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 4</b> √	PERFORM the following alignment to restore FHIS Train A components to normal on CR-60: <ul style="list-style-type: none"> <li>E-370 FHB Post-Accident Cleanup Unit - STOP.</li> </ul>		
<b>Standard:</b>	DEPRESS 2(3)HS-9850-1, FHB Post ACDT Cleanup Unit 2(3)E370 STOP pushbutton and OBSERVE green STOP light illuminated.		
<b>Examiner Cue:</b>	<b>The stop light is illuminated.</b>		
<b>Comment:</b>			<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 5</b>	PERFORM the following alignment to restore FHIS Train A components to normal on CR-60: <ul style="list-style-type: none"> <li>HV-9850 FHB PACU E-370 Isolation Damper [1] - CLOSED</li> </ul>	
<b>Standard:</b>	OBSERVE 2(3)HV-9850, FHB Post ACDT Cleanup Unit 2(3)E370 Isolation Damper green CLOSE light illuminated and red OPEN light extinguished.	
<b>Examiner Cue:</b>	<b>The damper is closed.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Examiner Note:</b>	<b>Heaters operate automatically with the associated cleanup unit.</b>	
<b>Perform Step: 6</b>	PERFORM the following alignment to restore FHIS Train A components to normal on CR-60: <ul style="list-style-type: none"> <li>E-464, FHB PACU E-370 Heaters ZL-9865 - OFF</li> </ul>	
<b>Standard:</b>	VERIFY 2(3)E464, FHB Post ACDT Cleanup Unit 2(3)370 Heater is OFF and OBSERVE green OFF light illuminated on 2(3)ZL-9865.	
<b>Examiner Cue:</b>	<b>The heater is off.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 7</b>	PERFORM the following alignment to restore FHIS Train A components to normal on CR-60: <ul style="list-style-type: none"> <li>E-652, FHB PACU E-370 Heaters ZL-9865B1 - OFF</li> </ul>	
<b>Standard:</b>	VERIFY 2(3)E652, FHB Post ACDT Cleanup Unit 2(3)E370 Heater is OFF by OBSERVE green OFF light illuminated on 2(3)ZL-9865B1.	
<b>Examiner Cue:</b>	<b>The heater is off.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 8√</b>	PERFORM the following alignment to restore FHIS Train A components to normal on CR-60: <ul style="list-style-type: none"> <li>HV-9846 FHB Train A Air Supply Isol Damper - OPEN</li> </ul>	
<b>Standard:</b>	DEPRESS 2(3)HV-9846, FHB Air Supply ISO Damper OPEN pushbutton and OBSERVE red OPEN light illuminated and green CLOSE light extinguished.	
<b>Examiner Cue:</b>	<b>The damper is open.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 9√</b>	PERFORM the following alignment to restore FHIS Train A components to normal on CR-60: <ul style="list-style-type: none"> <li>HV-9847 FHB Train A Air Exhaust Isol Damper - OPEN</li> </ul>	
<b>Standard:</b>	DEPRESS 2(3)HV-9847, FHB Air Exhaust ISO Damper OPEN pushbutton and OBSERVE red OPEN light illuminated and green CLOSE light extinguished.	
<b>Examiner Cue:</b>	<b>The damper is open.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 10√</b>	PERFORM the following alignment to restore FHIS Train A components to normal on CR-60: <ul style="list-style-type: none"> <li>HV-9847B FHB Train A Air Exhaust Isol Damper - OPEN</li> </ul>	
<b>Standard:</b>	DEPRESS 2(3)HV-9847B, FHB Air Exhaust ISO Damper OPEN pushbutton and OBSERVE red OPEN light illuminated and green CLOSE light extinguished.	
<b>Examiner Cue:</b>	<b>The damper is open.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 11√</b>	PERFORM the following alignment to restore FHIS Train A components to normal on CR-60: <ul style="list-style-type: none"> <li>HV-9847C FHB Train A Air Exhaust Isol Damper - OPEN</li> </ul>	
<b>Standard:</b>	DEPRESS 2(3)HV-9847C, FHB Air Exhaust ISO Damper OPEN pushbutton and OBSERVE red OPEN light illuminated and green CLOSE light extinguished.	
<b>Examiner Cue:</b>	<b>The damper is open.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 12√</b>	PERFORM the following alignment to restore FHIS Train A components to normal on CR-60: <ul style="list-style-type: none"> <li>E-441 FHB Pump Room Cooling Unit STOP</li> </ul>	
<b>Standard:</b>	DEPRESS 2(3)HS-9836-1, FHB Pump Room CLG Unit 2(3)E441 STOP pushbutton and OBSERVE green STOP light illuminated.	
<b>Examiner Cue:</b>	<b>The cooling unit is off.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 13</b>	RESTORE Train A loads that were placed in service by SO23-1-3.1, Section for Prevention of Low Load Recycle.	
<b>Standard:</b>	DETERMINE that Train A load restoration is NOT required based on the Initial Conditions.	
<b>Examiner Cue:</b>	<b>Train A load restoration is NOT required.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Examiner Cue:</b>	<b>Chiller is NOT required for plant operation.</b>	
<b>Perform Step: 14√</b>	PERFORM the following alignment to continue restoration of FHIS Train A components to normal on CR-60: <ul style="list-style-type: none"> <li>E-336 Control Building Emergency Chiller [2] - STOP</li> </ul>	
<b>Standard:</b>	DEPRESS 2/3HS-9875-1 or 2/3HS-9875C1, 2/3E336 EMER CHLD Water Chiller STOP pushbutton and OBSERVE green STOP light illuminated.	
<b>Examiner Cue:</b>	<b>The chiller is off.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 15√</b>	PERFORM the following alignment to continue restoration of FHIS Train A components to normal on CR-60: <ul style="list-style-type: none"> <li>P-162 E-336 Chilled Water Pump [2] - STOP</li> </ul>	
<b>Standard:</b>	DEPRESS 2/3HS-9872-1, 2/3P162 EMER CHLD Water Pump STOP pushbutton and OBSERVE green STOP light illuminated.	
<b>Examiner Cue:</b>	<b>The pump is off.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 16√</b>	PERFORM the following alignment to continue restoration of FHIS Train A components to normal on CR-60: <ul style="list-style-type: none"> <li>A-053 Emerg. Chiller Rm A Vent (Supply) [2] - STOP</li> </ul>	
<b>Standard:</b>	DEPRESS 2/3HS-9774-1, EMER Chiller Room A Vent Supply Unit 2/3A053 STOP pushbutton and OBSERVE green STOP light illuminated.	
<b>Examiner Cue:</b>	<b>The supply unit is off.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 17√</b>	PERFORM the following alignment to continue restoration of FHS Train A components to normal on CR-60: <ul style="list-style-type: none"> <li>A-056 Emerg. Chiller Rm A Vent (Exhaust) [2] - STOP</li> </ul>	
<b>Standard:</b>	DEPRESS 2/3HS-9775-1, EMER Chiller Room A Vent Exhaust Unit 2/3A056 STOP pushbutton and OBSERVE green STOP light illuminated.	
<b>Examiner Cue:</b>	<b>The supply unit is off.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Examiner Note:</b>	<b>The examinee may start either supply and exhaust fans and the actions would be reversed. The fans are electrically interlocked so that no more than one of each may run.</b>	
<b>Perform Step: 18√</b>	At HVAC Panel L-154 ENSURE the following alignment: <ul style="list-style-type: none"> <li>A-359 FHB Ventilation Normal Supply Fan [3] - STOP/START</li> </ul>	
<b>Standard:</b>	TURN 2(3)HS-9830A, FHB Ventilation Normal Supply Fan 2(3)A359 START switch and OBSERVE red START light illuminated and CIRCLE START.	
<b>Examiner Cue:</b>	<b>The fan is running.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 19</b>	At HVAC Panel L-154 ENSURE the following alignment: <ul style="list-style-type: none"> <li>A-360 FHB Ventilation Standby Supply Fan [3] - STOP/START</li> </ul>	
<b>Standard:</b>	DETERMINE only one supply fan is required and OBSERVE 2(3)HS-9830B, FHB Ventilation Standby Supply Fan 2(3)A-360 green STOP light illuminated and CIRCLE STOP.	
<b>Examiner Cue:</b>	<b>The fan is off.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 20√</b>	At HVAC Panel L-154 ENSURE the following alignment: <ul style="list-style-type: none"> <li>A-316 FHB Ventilation Standby Exhaust Fan [3] - STOP/START</li> </ul>	
<b>Standard:</b>	DETERMINE only one exhaust fan is required and OBSERVE 2(3)HS-9848, FHB Ventilation Standby Exhaust Fan 2(3)A316 green STOP light illuminated and CIRCLE STOP.	
<b>Examiner Cue:</b>	<b>The fan is off.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 21</b>	At HVAC Panel L-154 ENSURE the following alignment: <ul style="list-style-type: none"> <li>• A-317 FHB Ventilation Normal Exhaust Fan [3] - STOP/START</li> </ul>	
<b>Standard:</b>	TURN OBSERVE 2(3)HS-9849, FHB Ventilation Normal Exhaust Fan 2(3)A317 START switch and OBSERVE red START light illuminated and CIRCLE START.	
<b>Examiner Cue:</b>	<b>The fan is running.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 22</b>	At HVAC Panel L-154 ENSURE the following alignment: <ul style="list-style-type: none"> <li>• E-464 FHB PACU E-370 Heaters HS-9865-1 - AUTO</li> </ul>	
<b>Standard:</b>	VERIFY 2(3)HS-9865-1, FHB CLEANUP 2(3)E370 INLET HEATER 2(3)E464 is selected to AUTO.	
<b>Examiner Cue:</b>	<b>HS-9865-1 is in AUTO.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 23</b>	At HVAC Panel L-154 ENSURE the following alignment: <ul style="list-style-type: none"> <li>• E-652 FHB PACU E-370 Heaters HS-9865B1 - AUTO</li> </ul>	
<b>Standard:</b>	VERIFY 2(3)HS-9865B1, FHB CLEANUP 2(3)E370 INLET HEATER 2(3)E652 selected to AUTO.	
<b>Examiner Cue:</b>	<b>HS-9865B1 is in AUTO.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 24</b>	At HVAC Panel L-154 ENSURE the following alignment: <ul style="list-style-type: none"> <li>• E-465 FHB PACU E-371 Heaters HS-9866-2 - AUTO</li> </ul>	
<b>Standard:</b>	VERIFY 2(3)HS-9866-2, FHB CLEANUP 2(3)E371 INLET HEATER 2(3)E465 selected to AUTO.	
<b>Terminating Cue:</b>	<b>HS-9866-2 is in AUTO. This JPM is complete.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>STOP TIME:</b>	
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**INITIAL CONDITIONS:**

Given the following conditions:

- An actuation of Unit 2 (Unit 3) Train A Fuel Handling Isolation System (FHIS) has occurred due to radiography in the area.
- Radiography has been stopped.
- Proper actuation of Unit 2 (Unit 3) Train A FHIS has been verified.
- The actuation occurred less than 15 minutes ago and SO23-1-3.1, Emergency Chilled Water System Operation, Section for Prevention of Low Load Recycle was not performed.

**INITIATING CUE:**

The Control Room Supervisor directs you to RESTORE the Unit 2 (Unit 3) Train A Fuel Handling Isolation System per SO23-3-2.22, Engineered Safety Features Actuation System Operation, Attachment 23, FHIS Reset and Restoration.

Facility: SONGS JPM # RO/SRO NRC C-8 Task #193205 K/A #029 A3.01 3.8/4.0 SF-8  
Title: Place Containment Mini-Purge in Service

Examinee (Print): \_\_\_\_\_

Testing Method:

Simulated Performance: X

Classroom: \_\_\_\_\_

Actual Performance: \_\_\_\_\_

Simulator: \_\_\_\_\_

Plant: X

**READ TO THE EXAMINEE**

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: Given the following conditions:

- Unit 2 (Unit 3) is operating at full power.
- A Containment entry must be made to investigate an abnormal noise in a Reactor Coolant Pump.
- Prior to the entry, a Containment Mini-Purge is to be performed.
- 2(3)RT-7828, Containment Purge Stack Radiation Monitor is out-of-service.

Initiating Cue: The Control Room Supervisor directs you to INITIATE a Unit 2 (Unit 3) Containment Mini-Purge per SO23-1-4.2, Containment Purge and Recirculation Filtration System.

- Attachment 6, Operation of the Containment Mini-Purge System has been completed through Step 2.4.3.
- 2(3)RT-7865, Plant Vent Stack/Containment Purge Stack Wide Range Gas Monitor is aligned to the Containment Purge Stack.

Task Standard: Locate and correctly perform Critical Steps of SO23-1-4.2 and 57C10.

Required Materials: SO23-1-4.2, Containment Purge and Recirculation Filtration System, Rev. 28.  
SO23-15-57.C, 57C10 - CONTAINMENT RADIATION HI, Rev. 18.

Validation Time: 13 minutes Time Critical: N/A Completion Time: \_\_\_\_\_ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): \_\_\_\_\_ Date: \_\_\_\_\_

### **CONTROL ROOM SETUP**

#### **EXAMINER:**

**PROVIDE** the examinee with a copy of:

- **SO23-1-4.2, Containment Purge and Recirculation Filtration System, Attachment 6.**
- **INITIAL through Step 2.4.3. This will make Section 2.5, Start Mini-Purge, as the next step to be performed.**

#### **EXAMINER NOTE:**

**This JPM can be performed on either Unit. CIRCLE the Unit on which the JPM is to be performed on the JPM Worksheet and the JPM Cue Sheet.**

√ - Check Mark Denotes Critical Step

START TIME:

<b>Examiner Note:</b>	Normally to prevent RT-7828/RT-7865-1 from tripping on low sample flow, Steps 2.5.1 through 2.5.5 must be completed within 60 seconds of the Monitor Process Flow reaching a value of < 900 SCFM and normally two operators are required.		
<b>Examiner Cue:</b>	Remind the examinee to simulate all actions. The examiner will act as Chemistry.		
<b>Perform Step: 1√</b>	ENSURE OPEN HV-9825, Containment Mini-Purge Exhaust 2(3)MA-059 Isolation Valve (Outside Containment).		
<b>Standard:</b>	DEPRESS 2(3)HV-9825, CNTMT MINI PRG EXH 2(3)A059 ISO VALVE red OPEN pushbutton and OBSERVE red OPEN light illuminated and green CLOSE light extinguished.		
<b>Examiner Cue:</b>	HV-9825 is open.		
<b>Comment:</b>			SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>
<b>Perform Step: 2√</b>	ENSURE OPEN HV-9824, Containment Mini-Purge Exhaust 2(3)MA-059 Isolation Valve (Inside Containment).		
<b>Standard:</b>	DEPRESS 2(3)HV-9824, CNTMT MINI PRG EXH 2(3)A059 ISO VALVE red OPEN pushbutton and OBSERVE red OPEN light illuminated and green CLOSE light is extinguished.		
<b>Examiner Cue:</b>	HV-9824 is open.		
<b>Comment:</b>			SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>
<b>Perform Step: 3√</b>	ENSURE OPEN HV-9823, Containment Mini-Purge Supply 2(3)MA-379 Isolation Valve. (Inside Containment)		
<b>Standard:</b>	DEPRESS 2(3)HV-9823, CNTMT MINI PRG SPLY 2(3)A379 ISO VALVE OPEN pushbutton and OBSERVE red OPEN light illuminated and green CLOSE light extinguished.		
<b>Examiner Cue:</b>	HV-9823 is open.		
<b>Comment:</b>			SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

<b>Perform Step: 4√</b>	ENSURE OPEN HV-9821, Containment Mini-Purge Supply 2(3)MA-379 Isolation Valve (Outside Containment).	
<b>Standard:</b>	DEPRESS 2(3)HV-9821, CNTMT MINI PRG SPLY 2(3)A379 ISO VALVE OPEN pushbutton and OBSERVE red OPEN lamp illuminated and green CLOSE light extinguished.	
<b>Examiner Cue:</b>	<b>HV-9821 is open.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Examiner Note:</b>	<b>Fan controls are at Panel 2(3)L-155 in the Control Room hallway.</b>	
<b>Perform Step: 5√</b>	START 2(3)MA-059, Mini-Purge Exhaust Unit, by Positioning 2(3)HS-9804 to START.	
<b>Standard:</b>	TURN 2(3)HS-9804, Cont Mini-Purge Exhaust Unit 2(3)A059 switch to START and OBSERVE red 2(3)ZL-9804 START light illuminated.	
<b>Examiner Cue:</b>	<b>2(3)MA-059 red start light is illuminated.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 6√</b>	START 2(3)MA-379, Mini-Purge Supply Unit, by Positioning 2(3)HS-9803 to START.	
<b>Standard:</b>	TURN 2(3)HS-9803, Cont Mini-Purge Supply Unit 2(3)A379 switch to START and OBSERVE red 2(3)ZLH-9804 START light illuminated.	
<b>Examiner Cue:</b>	<b>2(3)MA-379 red start light is illuminated.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 7</b>	Notify Chemistry Division that Mini-Purge is in progress.	
<b>Standard:</b>	NOTIFY Chemistry Division that Mini-Purge is in progress and RECORD the chemist's name.	
<b>Examiner Cue:</b>	<b>Chemistry Tech Jones acknowledges Containment Mini-Purge in service on Unit 2 (Unit 3).</b>	
<b>Examiner Cue:</b>	<b>The release limit is 1800 SCFM.</b>	
<b>Examiner Cue:</b>	<b>Steps 2.5.8, 2.5.9, and 2.5.10 have been completed by another operator.</b>	
<b>Examiner Cue:</b>	<b>Annunciator 57C10, CONTAINMENT RADIATION HIGH is alarming.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Examiner Note:</b>	<b>The following steps constitute the alternate path for this JPM.</b>	
<b>Perform Step: 8</b>	Acknowledge annunciator 57C10, CONTAINMENT RADIATION HIGH.	
<b>Standard:</b>	DEPRESS Alarm Acknowledge button for Panel 57C and OBSERVE Annunciator 57C10 - CONTAINMENT RADIATION HIGH illuminated.	
<b>Examiner Cue:</b>	<b>Annunciator 57C10 is solidly lit, not flashing.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Examiner Note:</b>	<b>Examinee should refer to SO23-15-57.C, 57C10, CONTAINMENT RADIATION HIGH (provide copy if referenced).</b>	
<b>Examiner Note:</b>	<b>Actuation of the Containment Purge Isolation System (CPIS) will satisfy the critical steps for closing the mini-purge supply and exhaust valves.</b>	
<b>Perform Step: 9</b>	Containment Normal or Mini Purge in progress: If 2(3)RE-7828, or 2(3)RE-7865 (if aligned to the Containment Purge Stack) alarms High radiation, then ensure the following has occurred: <ul style="list-style-type: none"> <li>• 2(3)HV-9948, Containment Normal Purge Isolation - CLOSED.</li> </ul>	
<b>Standard:</b>	OBSERVE 2(3)HV-9948, CNTMT PRG SPLY UNIT 2(3)A060 green CLOSE light illuminated and red OPEN light extinguished.	
<b>Examiner Cue:</b>	<b>HV-9948 is closed.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 10</b>	Containment Normal or Mini Purge in progress: If 2(3)RE-7828, or 2(3)RE-7865 (if aligned to the Containment Purge Stack) alarms High radiation, then ensure the following has occurred: <ul style="list-style-type: none"> <li>• 2(3)HV-9951, Containment Normal Purge Isolation - CLOSED.</li> </ul>	
<b>Standard:</b>	OBSERVE 2(3)HV-9951, CNTMT PRG EXH UNIT 2(3)A060 green CLOSE light illuminated and red OPEN light extinguished.	
<b>Examiner Cue:</b>	<b>HV-9951 is closed.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 11</b>	Containment Normal or Mini Purge in progress: If 2(3)RE-7828, or 2(3)RE-7865 (if aligned to the Containment Purge Stack) alarms High radiation, then ensure the following has occurred: <ul style="list-style-type: none"> <li>2(3)HV-9921, CNTMT MINI PRG SPLY 2(3)A379 ISO VALVE - CLOSED.</li> </ul>	
<b>Standard:</b>	OBSERVE 2(3)HV-9921, CNTMT MINI PRG SPLY 2(3)A379 ISO VALVE green CLOSE light illuminated and red OPEN light extinguished.	
<b>Examiner Cue:</b>	<b>HV-9921 is open.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 12√</b>	Ensure CLOSED 2(3)HV-9921, CNTMT MINI PRG SPLY 2(3)A379 ISO VALVE.	
<b>Standard:</b>	DEPRESS 2(3)HV-9921, CNTMT MINI PRG SPLY 2(3)A379 ISO VALVE CLOSE pushbutton and OBSERVE green CLOSE light illuminated and red OPEN light extinguished.	
<b>Examiner Cue:</b>	<b>HV-9921 is closed.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 13</b>	Containment Normal or Mini Purge in progress: If 2(3)RE-7828, or 2(3)RE-7865 (if aligned to the Containment Purge Stack) alarms High radiation, then ensure the following has occurred: <ul style="list-style-type: none"> <li>2(3)HV-9925, Containment Mini-Purge Exhaust 2(3)MA-059 - CLOSED.</li> </ul>	
<b>Standard:</b>	OBSERVE 2(3)HV-9925, CNTMT MINI PRG EXH 2(3)A059 ISO VALVE green CLOSE light illuminated and red OPEN light extinguished.	
<b>Examiner Cue:</b>	<b>HV-9925 is open.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 14√</b>	Ensure CLOSED 2(3)HV-9925, Containment Mini-Purge Exhaust 2(3)MA-059.	
<b>Standard:</b>	DEPRESS 2(3)HV-9925, CNTMT MINI PRG EXH 2(3)A059 ISO VALVE CLOSE pushbutton and OBSERVE green CLOSE light illuminated and red OPEN light extinguished.	
<b>Examiner Cue:</b>	<b>HV-9925 is closed.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 15a</b>	Containment Normal or Mini Purge in progress: If 2(3)RE-7828, or 2(3)RE-7865 (if aligned to the Containment Purge Stack) alarms High radiation, then ensure the following has occurred: <ul style="list-style-type: none"> <li>2(3)MA-374, 2(3)MA-060, 2(3)MA-379, and 2(3)MA-059, Containment Normal and Mini-Purge Supply and Exhaust Fans are STOPPED.</li> </ul>	
<b>Standard:</b>	At Panel 2(3)L-155, OBSERVE Containment Normal Purge Supply and Exhaust Fans green STOP lights are illuminated: <ul style="list-style-type: none"> <li>CNTMT Purge Supply Fan 2(3)A374.</li> <li>CNTMT Purge Exhaust Fan 2(3)A060.</li> </ul>	
<b>Examiner Cue:</b>	<b>The Normal Purge Supply and Exhaust fans are stopped.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 15b</b>	Containment Normal or Mini Purge in progress: If 2(3)RE-7828, or 2(3)RE-7865 (if aligned to the Containment Purge Stack) alarms High radiation, then ensure the following has occurred: <ul style="list-style-type: none"> <li>2(3)MA-374, 2(3)MA-060, 2(3)MA-379, and 2(3)MA-059, Containment Normal and Mini-Purge Supply and Exhaust Fans are STOPPED.</li> </ul>	
<b>Standard:</b>	At Panel 2(3)L-155, OBSERVE Containment Mini-Purge Supply and Exhaust Fans green STOP lights are illuminated: <ul style="list-style-type: none"> <li>CNTMT Mini-Purge Supply Fan 2(3)A379.</li> <li>CNTMT Mini-Purge Exhaust Fan 2(3)A059.</li> </ul>	
<b>Terminating Cue:</b>	<b>The Mini-Purge Supply and Exhaust fans are stopped. This JPM is complete.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>STOP TIME:</b>	
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**INITIAL CONDITIONS:**

Given the following conditions:

- Unit 2 (Unit 3) is operating at full power.
- A Containment entry must be made to investigate an abnormal noise in a Reactor Coolant Pump.
- Prior to the entry, a Containment Mini-Purge is to be performed.
- 2(3)RT-7828, Containment Purge Stack Radiation Monitor is out-of-service.

**INITIATING CUE:**

The Control Room Supervisor directs you to INITIATE a Unit 2 (Unit 3) Containment Mini-Purge per SO23-1-4.2, Containment Purge and Recirculation Filtration System.

- Attachment 6, Operation of the Containment Mini-Purge System has been completed through Step 2.4.3.
- 2(3)RT-7865, Plant Vent Stack/Containment Purge Stack Wide Range Gas Monitor is aligned to the Containment Purge Stack.

Facility: SONGS JPM # RO/SRO NRC P-1 Task #151078 K/A #059 A2.12 3.1/3.4 SF-4S  
Title: Local-Manual Operation of Main Feedwater Control Valve

Examinee (Print): \_\_\_\_\_

Testing Method:

Simulated Performance: X

Classroom: \_\_\_\_\_

Actual Performance: \_\_\_\_\_

Simulator: \_\_\_\_\_

Plant: X

**READ TO THE EXAMINEE**

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: Given the following conditions:

- Unit 2 (Unit 3) is at 100% power.
- Maintenance is to be performed on the Positioner Controller for the Unit 2 (Unit 3) Main Feedwater Control Valve, 2(3)FV-1111.
- This will require Local-Manual operation of the Unit 2 (Unit 3) Main Feedwater Control Valve, 2(3)FV-1111.

Initiating Cue: The Control Room Supervisor DIRECTS you to take LOCAL-MANUAL Control of the Unit 2 (Unit 3) 2(3)FV-1111, Main Feedwater Control Valve, per SO23-9-6, Feedwater Control System Operation, Section 6.3, Local-Manual Operation of Main Feedwater Control Valves.

Task Standard: Locate and correctly perform Critical Steps of SO23-9-6.

Required Materials: SO23-9-6, Feedwater Control System Operation, Rev. 22

Validation Time: 7 minutes Time Critical: N/A Completion Time: \_\_\_\_\_ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): \_\_\_\_\_ Date: \_\_\_\_\_

**PLANT SETUP****EXAMINER:**

**PROVIDE** the examinee with a copy of:

- **SO23-9-6, Feedwater Control System Operation, Section 6.3, Local-Manual Operation of Main Feedwater Control Valves.**

**EXAMINER NOTE:**

**This JPM can be performed on either Unit. CIRCLE the Unit on which the JPM is to be performed on the JPM Worksheet and the JPM Cue Sheet.**

√ - Check Mark Denotes Critical Step

START TIME:

<b>Examiner Cue:</b>	<b>Remind the examinee to simulate all actions.</b>
<b>Perform Step: 1</b>	Establish communications between CR and Operator at the MFW Control Valve.
<b>Standard:</b>	ESTABLISH communications with the Control Room.
<b>Examiner Cue:</b>	<b>Communications are established.</b>
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

<b>Perform Step: 2</b>	TRANSFER 2(3)FV-1111, MFW Control Valve Controller, to LOCAL. (CR-52)
<b>Standard:</b>	DIRECT the Control Room to TRANSFER 2(3)FV-1111, Main Feedwater Control Valve Controller to LOCAL.
<b>Examiner Cue:</b>	<b>2(3)FV-1111 is in LOCAL.</b>
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

<b>Perform Step: 3√</b>	TURN LARGE HANDWHEEL CLOCKWISE until snug at limit of travel. (At this point, the large lead screw contacts the mechanical actuating device and further movement will cause actual valve movement.)
<b>Standard:</b>	TURN 2(3)FV-1111, MFW Control Valve large handwheel CLOCKWISE until snug at limit of travel.
<b>Examiner Cue:</b>	<b>The large handwheel is snug at the limit of travel.</b>
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

<b>Perform Step: 4√</b>	TURN SMALL HANDWHEEL COUNTERCLOCKWISE until tight against hub of large handwheel.
<b>Standard:</b>	TURN 2(3)FV-1111, MFW Control Valve small handwheel COUNTERCLOCKWISE until tight against hub of large handwheel.
<b>Examiner Cue:</b>	<b>The small handwheel is tight against hub of large handwheel.</b>
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

<b>Perform Step: 5√</b>	OPEN the two (black knob handled) Operating Piston Air Bypass Valves.	
<b>Standard:</b>	TURN 2(3)FV-1111, MFW Control Valve both (black knob handled) Operating Piston Air Bypass Valves COUNTERCLOCKWISE to OPEN.	
<b>Examiner Cue:</b>	<b>Both Operating Piston Air Bypass Valves are open.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 6√</b>	CLOSE ② Air Supply to FY-1111: <input type="checkbox"/> S2(3)2417MR239	
<b>Standard:</b>	TURN S2(3)2417MR239, Air Supply to 2(3)FY-1111, CLOCKWISE to CLOSE.	
<b>Examiner Cue:</b>	<b>The air supply to 2(3)FY-1111 is closed.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 7√</b>	CLOSE ③ Air Supply to FY-1114: <input type="checkbox"/> S2(3)2417MR240	
<b>Standard:</b>	TURN S2(3)2417MR240, Air Supply to I/P Converter 2(3)FY-1114 CLOCKWISE to CLOSE.	
<b>Examiner Cue:</b>	<b>The air supply to 2(3)FY-1114 is closed.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Examiner Cue:</b>	<b>The Control Room directs you to open 2(3)FV-1111 one-half turn.</b>	
<b>Perform Step: 8√</b>	OPERATE the large handwheel to reposition valve as directed by the Control Room or CRS. <ul style="list-style-type: none"> <li>Rotating handwheel <u>clockwise</u> Closes valve.</li> <li>Rotating handwheel <u>counterclockwise</u> Opens valve</li> </ul>	
<b>Standard:</b>	TURN 2(3)FV-1111, Main Feedwater Control Valve Large handwheel one-half (1/2) turn in the COUNTERCLOCKWISE direction.	
<b>Terminating Cue:</b>	<b>2(3)FV-1111 has OPENED one-half turn. This JPM is complete.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>STOP TIME:</b>	
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**INITIAL CONDITIONS:****Given the following conditions:**

- Unit 2 (Unit 3) is at 100% power.
- Maintenance is to be performed on the Positioner Controller for the Unit 2 (Unit 3) Main Feedwater Control Valve, 2(3)FV-1111.
- This will require Local-Manual operation of the Unit 2 (Unit 3) Main Feedwater Control Valve, 2(3)FV-1111.

**INITIATING CUE:**

The Control Room Supervisor DIRECTS you to take LOCAL-MANUAL Control of the Unit 2 (Unit 3) 2(3)FV-1111, Main Feedwater Control Valve, per SO23-9-6, Feedwater Control System Operation, Section 6.3, Local-Manual Operation of Main Feedwater Control Valves.

Facility: SONGS JPM # RO/SRO NRC P-2 Task #191625 K/A #004 A2.14 3.8/3.9 SF-2  
Title: Locally Align Charging Pump Suction to the Refueling Water Storage Tank

Examinee (Print): \_\_\_\_\_

Testing Method:

Simulated Performance: X

Classroom: \_\_\_\_\_

Actual Performance: \_\_\_\_\_

Simulator: \_\_\_\_\_

Plant: X

**READ TO THE EXAMINEE**

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: Given the following conditions:

- The Control Room has been evacuated per SO23-13-2, Shutdown from Outside the Control Room and a cooldown to Cold Shutdown is in progress.
- The Boric Acid Makeup (BAMU) Tanks are aligned for gravity feed on Unit 2 (Unit 3).

Initiating Cue: The Control Room Supervisor directs you to MONITOR BAMU Tank levels and when required, SHIFT Charging Pump suction to the Refueling Water Storage Tank per SO23-13-2, Shutdown From Outside the Control Room:

- Attachment 10, Radwaste Operator Duties for Unit 2.
- Attachment 11, Auxiliary Primary Operator Duties for Unit 3.

Task Standard: Locate and correctly perform Critical Steps of SO23-13-2.

Required Materials: SO23-13-2, Shutdown From Outside the Control Room, Rev 12.

Validation Time: 10 minutes Time Critical: N/A Completion Time: \_\_\_\_\_ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): \_\_\_\_\_ Date: \_\_\_\_\_

**PLANT SETUP****EXAMINER:**

**PROVIDE the examinee with a copy of:**

- **SO23-13-2, Shutdown From Outside the Control Room.**
  - **Attachment 10, Radwaste Operator Duties for Unit 2.**
  - **Attachment 11, Primary Auxiliary Operator Duties for Unit 3.**
  - **MARK UP BAMU Tank levels showing a trend towards 25% for 2(3)TK-072 and 22% for 2(3)TK-071 when the next reading is obtained.**



√ - Check Mark Denotes Critical Step

START TIME:

<b>Examiner Cue:</b>	<b>Remind the examinee to simulate all actions.</b>
<b>Examiner Cue:</b>	<b>Boric Acid Makeup (BAMU) Tank levels were last taken 15 minutes ago.</b>
<b>Perform Step: 1</b>	Determine BAMU tank levels every 15 minutes.
<b>Standard:</b>	DETERMINE that no flow exists past the BAMU Pump suction pressure gauges since Initial Conditions specify gravity feed in progress.
<b>Examiner Cue:</b>	<b>BAMU Pumps, P-174 and P-175 are not running.</b>
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

<b>Perform Step: 2</b>	Determine BAMU tank levels every 15 minutes.
<b>Standard:</b>	OBSERVE 2(3)PI-9273, Boric Acid Makeup Pump 2(3)P175 Inlet Pressure gauge.
<b>Examiner Cue:</b>	<b>PI-9273 indicates 9.2 psi.</b>
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

<b>Perform Step: 3√</b>	Determine BAMU tank levels every 15 minutes.
<b>Standard:</b>	REFER to FIGURE LVL-BAMU and DETERMINE 2(3)T-072, BAMU Tank to be 25% with 9.2 psi suction pressure on 2(3)PI-9273.
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

<b>Perform Step: 4</b>	Determine BAMU tank levels every 15 minutes.
<b>Standard:</b>	OBSERVE 2(3)PI-9279, Boric Acid Makeup Pump 2(3)P174 Inlet Pressure gauge.
<b>Examiner Cue:</b>	<b>PI-9279 indicates 9.0 psi.</b>
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

<b>Perform Step: 5√</b>	Determine BAMU tank levels every 15 minutes.
<b>Standard:</b>	REFER to FIGURE LVL-BAMU and DETERMINE 2(3)T-071, BAMU Tank to be 22% with 9.0 psi suction pressure on 2(3)PI-9279.
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

<b>Perform Step: 6</b>	<u>WHEN</u> the first BAMU Tank approaches 21.8% level, as seen on Figure LVL-BAMU, <u>THEN</u> perform the following:
<b>Standard:</b>	DETERMINE that BAMU Tank, 2(3)T-071, is approaching 21.8%.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 7√</b>	<u>WHEN</u> the first BAMU Tank approaches 21.8% level, as seen on Figure LVL-BAMU, <u>THEN</u> perform the following: <ul style="list-style-type: none"> <li>LOCALLY OPEN LV-0227C, RWST to Charging Pumps Gravity Feed Valve.</li> </ul>
<b>Standard:</b>	ROTATE 2(3)LV-0227C, RWST to Charging Pump Suction Isolation Valve manual handwheel in the COUNTERCLOCKWISE direction and DEPRESS manual clutch lever while turning to engage the handwheel.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 8√</b>	<u>WHEN</u> the first BAMU Tank approaches 21.8% level, as seen on Figure LVL-BAMU, <u>THEN</u> perform the following: <ul style="list-style-type: none"> <li>LOCALLY OPEN LV-0227C, RWST to Charging Pumps Gravity Feed Valve.</li> </ul>
<b>Standard:</b>	OBSERVE 2(3)LV-0227C, RWST to Charging Pump Suction Isolation Valve outward stem motion and RELEASE manual clutch lever when motion is observed.
<b>Examiner Cue:</b>	<b>LV-0227C, RWST to Charging Pumps Gravity Feed Valve is moving in the open direction.</b>
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 9√</b>	<u>WHEN</u> the first BAMU Tank approaches 21.8% level, as seen on Figure LVL-BAMU, <u>THEN</u> perform the following: <ul style="list-style-type: none"> <li>LOCALLY OPEN LV-0227C, RWST to Charging Pumps Gravity Feed Valve.</li> </ul>
<b>Standard:</b>	ROTATE 2(3)LV-0227C, RWST to Charging Pump Suction Isolation Valve manual handwheel in the COUNTERCLOCKWISE direction until local position indication is 100%.
<b>Examiner Cue:</b>	<b>LV-0227C, RWST to Charging Pumps Gravity Feed Valve is full open.</b>
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 10√</b>	<b>WHEN</b> the first BAMU Tank approaches 21.8% level, as seen on Figure LVL-BAMU, <b>THEN</b> perform the following: <ul style="list-style-type: none"> <li>• CLOSE BAMU Tank, 2MT-072, Gravity Feed Valve, 2HV-9235.</li> </ul>	
<b>Standard:</b>	ROTATE 2(3)HV-9235, Boric Acid Makeup Tank 2(3)T072 Gravity Feed to Charging Pump Suction ISO Valve manual handwheel in the CLOCKWISE direction and DEPRESS manual clutch lever while turning to engage the handwheel.	
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>	

<b>Perform Step: 11√</b>	<b>WHEN</b> the first BAMU Tank approaches 21.8% level, as seen on Figure LVL-BAMU, <b>THEN</b> perform the following: <ul style="list-style-type: none"> <li>• CLOSE BAMU Tank, 2MT-072, Gravity Feed Valve, 2HV-9235.</li> </ul>	
<b>Standard:</b>	OBSERVE 2(3)HV-9235, Boric Acid Makeup Tank 2(3)T072 Gravity Feed to Charging Pump Suction ISO Valve for inward stem motion and RELEASE the manual clutch lever when motion is observed.	
<b>Examiner Cue:</b>	<b>HV-9235, BAMU Tank T-072 Gravity Feed Valve is moving in the close direction.</b>	
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>	

<b>Perform Step: 12√</b>	<b>WHEN</b> the first BAMU Tank approaches 21.8% level, as seen on Figure LVL-BAMU, <b>THEN</b> perform the following: <ul style="list-style-type: none"> <li>• CLOSE BAMU Tank, 2MT-072, Gravity Feed Valve, 2HV-9235.</li> </ul>	
<b>Standard:</b>	ROTATE 2(3)HV-9235, Boric Acid Makeup Tank 2(3)T072 Gravity Feed to Charging Pump Suction ISO Valve manual handwheel in the CLOCKWISE direction until local position indication is 0%.	
<b>Examiner Cue:</b>	<b>HV-9235, BAMU Tank T-072 Gravity Feed Valve is closed.</b>	
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>	

<b>Perform Step: 13√</b>	<b>WHEN</b> the first BAMU Tank approaches 21.8% level, as seen on Figure LVL-BAMU, <b>THEN</b> perform the following: <ul style="list-style-type: none"> <li>• CLOSE BAMU Tank, 2MT-071, Gravity Feed Valve, 2HV-9240.</li> </ul>	
<b>Standard:</b>	ROTATE 2(3)HV-9240, Boric Acid Makeup Tank 2(3)T071 Gravity Feed to Charging Pump Suction ISO Valve manual handwheel in the CLOCKWISE direction and DEPRESS manual clutch lever while turning to engage the handwheel.	
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>	

<b>Perform Step: 14√</b>	<u>WHEN</u> the first BAMU Tank approaches 21.8% level, as seen on Figure LVL-BAMU, <u>THEN</u> perform the following: <ul style="list-style-type: none"> <li>• CLOSE BAMU Tank, 2MT-071, Gravity Feed Valve, 2HV-9240.</li> </ul>	
<b>Standard:</b>	OBSERVE 2(3)HV-9240, Boric Acid Makeup Tank 2(3)T071 Gravity Feed to Charging Pump Suction ISO Valve for inward stem motion and RELEASE manual clutch lever when motion is observed.	
<b>Examiner Cue:</b>	<b>HV-9240, BAMU Tank T-071 Gravity Feed Valve is moving in the close direction.</b>	
<b>Comment:</b>	<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/> </div>	

<b>Perform Step: 15√</b>	<u>WHEN</u> the first BAMU Tank approaches 21.8% level, as seen on Figure LVL-BAMU, <u>THEN</u> perform the following: <ul style="list-style-type: none"> <li>• CLOSE BAMU Tank, 2MT-071, Gravity Feed Valve, 2HV-9240.</li> </ul>	
<b>Standard:</b>	ROTATE 2(3)HV-9240, Boric Acid Makeup Tank 2(3)T071 Gravity Feed to Charging Pump Suction ISO Valve manual handwheel in the CLOCKWISE direction until local position indication is 0%.	
<b>Examiner Cue:</b>	<b>BAMU Tank T-071 Gravity Feed Valve is closed.</b>	

<b>Perform Step: 16</b>	Notify the Unit 2 CRS of transfer to RWST	
<b>Standard:</b>	REPORT to the Unit 2 (Unit 3) Control Room Supervisor that Charging Pump suction is aligned to the Refueling Water Storage Tank.	
<b>Terminating Cue:</b>	<b>The Control Room Supervisor acknowledges that Charging Pump suction is aligned to the Refueling Water Storage Tank. This JPM is complete.</b>	

<b>STOP TIME:</b>	
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**INITIAL CONDITIONS:**

Given the following conditions:

- The Control Room has been evacuated per SO23-13-2, Shutdown From Outside the Control Room and a cooldown to Cold Shutdown is in progress.
- The Boric Acid Makeup (BAMU) Tanks are aligned for gravity feed on Unit 2 (Unit 3).

**INITIATING CUE:**

The Control Room Supervisor directs you to MONITOR BAMU Tank levels and when required, SHIFT Charging Pump suction to the Refueling Water Storage Tank per SO23-13-2, Shutdown From Outside the Control Room:

- Attachment 10, Radwaste Operator Duties for Unit 2.
- Attachment 11, Auxiliary Primary Operator Duties for Unit 3.

Facility: SONGS JPM # RO/SRO NRC P-3 Task #190621 K/A #012 A2.06 4.4/4.7 SF-7  
Title: Radiation Control Area Entry and Locally Open the Reactor Trip Breakers

Examinee (Print): \_\_\_\_\_

Testing Method:

Simulated Performance: X

Classroom: \_\_\_\_\_

Actual Performance: \_\_\_\_\_

Simulator: \_\_\_\_\_

Plant: X

**READ TO THE EXAMINEE**

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: Given the following conditions:

- A transient is occurring on Unit 2 (Unit 3).
- Extra assistance is required in the Radiation Control Area at the Radwaste Control Room.

Initiating Cue: The Control Room Supervisor DIRECTS you to:

- LOG onto an appropriate Radiation Exposure Permit and PROCEED to the Radwaste Control Room.

Task Standard: Locate and correctly perform Critical Steps of SO123-VII-20 and SO23-12-1.

Required Materials: SO123-VII-20, Health Physics Program, Rev. 13.  
SO23-12-1, Standard Post Trip Actions, Rev. 21.

Validation Time: 5 minutes Time Critical: 8 minutes Completion Time: \_\_\_\_\_ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): \_\_\_\_\_ Date: \_\_\_\_\_

**PLANT SETUP****EXAMINER:**

**PROVIDE** the examinee with a copy of:

- No procedural guidance is provided for this task.

**EXAMINER NOTE:**

This JPM can be performed on either Unit. **CIRCLE** the Unit on which the JPM is to be performed on the JPM Worksheet and the JPM Cue Sheet.

- This JPM includes an evaluation of entry into the RCA. The examinee will perform the RCA entry and then be cued that local tripping of the Reactor Trip Breakers is required. The JPM is then temporarily suspended after tripping the Reactor Trip Breakers while the second RCA JPM is completed (P-2). Once JPM P-2 is finished, the Examiner will return to JPM P-3 and complete the RCA exit portion of this JPM.
- The **TIME CRITICAL** portion of the JPM starts when the 2<sup>nd</sup> Cue Sheet has been read and understood by the examinee.

√ - Check Mark Denotes Critical Step

START TIME:

<b>Perform Step: 1</b> √	Obtain a Thermo Luminescent Device (TLD).
<b>Standard:</b>	RETRIEVE Thermo Luminescent Detector (TLD) from the storage rack.
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>
<b>Perform Step: 2</b>	Touch the login screen and scan ID badge and TLD.
<b>Standard:</b>	TOUCH the login screen and SCAN ID badge and TLD.
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>
<b>Perform Step: 3</b> √	Sign-in on an appropriate Radiation Exposure Permit.
<b>Standard:</b>	DETERMINE an appropriate Operations Routine Radiation Exposure Permit (REP) to provide assistance in a Low Hazard Radiological Controlled Area (LHRCA) and SCAN the REP.
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>
<b>Perform Step: 4</b>	Log-in through the Routine RCA entry process. <ul style="list-style-type: none"> <li>Obtain a Portable Electronic Dosimeter (PED).</li> </ul>
<b>Standard:</b>	SELECT a Portable Electronic Dosimeter (PED) from the storage rack at the RCA entry.
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>
<b>Perform Step: 5</b> √	Log-in through the Routine RCA entry process. <ul style="list-style-type: none"> <li>Set the PED onto the pad at the log-in station.</li> </ul>
<b>Standard:</b>	SET the PED onto the pad at the log-in station.
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>
<b>Perform Step: 6</b> √	Log-in through the Routine RCA entry process. <ul style="list-style-type: none"> <li>Remove the PED and collect the printout.</li> </ul>
<b>Standard:</b>	When prompted, REMOVE the PED and COLLECT the printout.
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>



<b>Perform Step: 7</b>	Log-in through the Routine RCA entry process. <ul style="list-style-type: none"> <li>Review printout for allowable dose, dose rate, and accessible areas.</li> </ul>	
<b>Standard:</b>	REVIEW printout for allowable dose, dose rate, and accessible areas.	
<b>Examiner Cue:</b>		
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 8</b>	Transition to the HP Checkpoint to access the RCA	
<b>Standard:</b>	TRANSITION to the HP Checkpoint to access the RCA.	
<b>Examiner Cue:</b>	<b>Proceed to the Radwaste Control Room.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Examiner Cue:</b>	<b>Remind the examinee to simulate all actions.</b>
<b>Examiner Note:</b>	<b>The required actions are performed without reference to a procedure and can be performed in any order.</b>
<b>Examiner Cue:</b>	<b>Hand examinee the 2<sup>nd</sup> Cue Sheet and read it to them as follows:</b> <b>The Unit 2 (Unit 3) Reactor has received a trip signal and the Reactor Trip Breakers failed to open.</b> <b>The Control Room Supervisor DIRECTS you to PROCEED to the Reactor Trip Breaker Switchgear and locally OPEN Reactor Trip Circuit Breakers 1 through 8.</b>
<b>Examiner Note:</b>	<b>The TCBs can be opened in pairs using the Emergency Trip pushbuttons or individually using the Manual Trip pushbutton on each breaker. The first sequence of Steps (9-12) addresses use of the Emergency Trip pushbuttons. The second sequence of Steps (13-20) uses the individual Manual Trip pushbuttons.</b>
<b>Examiner Note:</b>	<b>This portion of the JPM is TIME CRITICAL.</b>

<b>CRITICAL START TIME:</b>	
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<b>Perform Step: 9</b> ✓	Open Reactor Trip Circuit Breakers TCB-1 and TCB-5.	
<b>Standard:</b>	DEPRESS Emergency Trip pushbutton TCB-5 and TCB-1 (on TCB-5 cubicle) and OBSERVE green TRIPPED lights illuminate and mechanical indicators rotate to OPEN on TCB-1 and TCB-5.	
<b>Examiner Cue:</b>	<b>TCB-5 and TCB-1 green tripped lights are illuminated and mechanical indicators read open.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 10</b> ✓	Open Reactor Trip Circuit Breakers TCB-2 and TCB-6.	
<b>Standard:</b>	DEPRESS Emergency Trip pushbutton TCB-6 and TCB-2 (on TCB-6 cubicle) and OBSERVE green TRIPPED lights illuminate and mechanical indicators rotate to OPEN on TCB-2 and 6 cubicles.	
<b>Examiner Cue:</b>	<b>TCB-6 and TCB-2 green tripped lights are illuminated and mechanical indicators read open.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 11</b> ✓	Open Reactor Trip Circuit Breakers TCB-3 and TCB-7.	
<b>Standard:</b>	DEPRESS Emergency Trip pushbutton TCB-3 and TCB-7 (on TCB-3 cubicle) and OBSERVE green TRIPPED lights illuminate and mechanical indicators rotate to OPEN on TCB-3 and 7 cubicles.	
<b>Examiner Cue:</b>	<b>TCB-3 and TCB-7 green tripped lights are illuminated and mechanical indicators read open.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 12</b> ✓	Open Reactor Trip Circuit Breakers TCB-4 and TCB-8.	
<b>Standard:</b>	DEPRESS Emergency Trip push button TCB-4 and TCB-8 (on TCB-4 cubicle) and OBSERVE green TRIPPED lights illuminate and mechanical indicators rotate to OPEN on TCB-4 and 8 cubicles.	
<b>Examiner Cue:</b>	<b>TCB-4 and TCB-8 green tripped lights are illuminated and mechanical indicators read open.</b>	
<b>Examiner Note:</b>	<b>This ends the TIME CRITICAL clock if Sequence #1 was used.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>CRITICAL STOP TIME:</b>	
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<b>CRITICAL START TIME:</b>	
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<b>Examiner Note:</b>	<b>This portion of the JPM is TIME CRITICAL.</b>
<b>Examiner Note:</b>	<b>Sequence #2 using the individual trip pushbutton on each breaker.</b>
<b>Perform Step: 13</b> ✓	Open Reactor Trip Circuit Breaker TCB-1.
<b>Standard:</b>	PULL DOWN Plexiglas guard plate and DEPRESS TCB-1 PUSH TO OPEN pushbutton and OBSERVE green TRIPPED light illuminated and mechanical indicator rotates to OPEN on TCB-1.
<b>Examiner Cue:</b>	<b>TCB-1 green tripped light is illuminated and mechanical indicator reads OPEN.</b>
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 14</b> ✓	Open Reactor Trip Circuit Breaker TCB-2.
<b>Standard:</b>	PULL DOWN Plexiglas guard plate and DEPRESS TCB-2 PUSH TO OPEN pushbutton and OBSERVE green TRIPPED light illuminated and mechanical indicator rotates to OPEN on TCB-2.
<b>Examiner Cue:</b>	<b>TCB-2 green tripped light is illuminated and mechanical indicator reads OPEN.</b>
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 15</b> ✓	Open Reactor Trip Circuit Breaker TCB-3.
<b>Standard:</b>	PULL DOWN Plexiglas guard plate and DEPRESS TCB-3 PUSH TO OPEN pushbutton and OBSERVE green TRIPPED light illuminated and mechanical indicator rotates to OPEN on TCB-3.
<b>Examiner Cue:</b>	<b>TCB-3 green tripped light is illuminated and mechanical indicator reads OPEN.</b>
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 16</b> ✓	Open Reactor Trip Circuit Breaker TCB-4.
<b>Standard:</b>	PULL DOWN Plexiglas guard plate and DEPRESS TCB-4 PUSH TO OPEN pushbutton and OBSERVE green TRIPPED light illuminated and mechanical indicator rotates to OPEN on TCB-4.
<b>Examiner Cue:</b>	<b>TCB-4 green tripped light is illuminated and mechanical indicator reads OPEN.</b>
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 17</b> ✓	Open Reactor Trip Circuit Breaker TCB-5.	
<b>Standard:</b>	PULL DOWN Plexiglas guard plate and DEPRESS TCB-5 PUSH TO OPEN pushbutton and OBSERVE green TRIPPED light illuminated and mechanical indicator rotates to OPEN on TCB-5.	
<b>Examiner Cue:</b>	<b>TCB-5 green tripped light is illuminated and mechanical indicator reads OPEN.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 18</b> ✓	Open Reactor Trip Circuit Breaker TCB-6.	
<b>Standard:</b>	PULL DOWN Plexiglas guard plate and DEPRESS TCB-6 PUSH TO OPEN pushbutton and OBSERVE green TRIPPED light illuminated and mechanical indicator rotates to OPEN on TCB-6.	
<b>Examiner Cue:</b>	<b>TCB-6 green tripped light is illuminated and mechanical indicator reads OPEN.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 19</b> ✓	Open Reactor Trip Circuit Breaker TCB-7.	
<b>Standard:</b>	PULL DOWN Plexiglas guard plate and DEPRESS TCB-7 PUSH TO OPEN pushbutton and OBSERVE green TRIPPED light illuminated and mechanical indicator rotates to OPEN on TCB-7.	
<b>Examiner Cue:</b>	<b>TCB-7 green tripped light is illuminated and mechanical indicator reads OPEN.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 20</b> ✓	Open Reactor Trip Circuit Breaker TCB-8.	
<b>Standard:</b>	PULL DOWN Plexiglas guard plate and DEPRESS TCB-8 PUSH TO OPEN pushbutton and OBSERVE green TRIPPED light illuminated and mechanical indicator rotates to OPEN on TCB-8.	
<b>Examiner Cue:</b>	<b>TCB-8 green tripped light is illuminated and mechanical indicator reads OPEN.</b>	
<b>Examiner Note:</b>	<b>This ends the TIME CRITICAL clock if Sequence #2 was used.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>CRITICAL STOP TIME:</b>	
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<b>Perform Step: 21</b> ✓	Exit the RCA: <ul style="list-style-type: none"> <li>Set the PED onto the pad at the exit station.</li> </ul>	
<b>Standard:</b>	SET the PED onto the pad at the exit station.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

  

<b>Perform Step: 22</b> ✓	Exit the RCA: <ul style="list-style-type: none"> <li>Scan ID badge and TLD at the exit station.</li> </ul>	
<b>Standard:</b>	SCAN ID badge and TLD at the exit station.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

  

<b>Perform Step: 23</b>	Exit the RCA: <ul style="list-style-type: none"> <li>Review dose information and remove PED from the exit station pad.</li> </ul>	
<b>Standard:</b>	REVIEW dose information and REMOVE PED from the exit station pad.	
<b>Terminating Cue:</b>	<b>This JPM is complete.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

STOP TIME:

**CUE SHEET #1****INITIAL CONDITIONS:****Given the following conditions:**

- A transient is occurring on Unit 2 (Unit 3).
- Extra assistance is required in the Radiation Control Area at the Radwaste Control Room.

**INITIATING CUE:****The Control Room Supervisor DIRECTS you to:**

- LOG onto an appropriate Radiation Exposure Permit and PROCEED to the Radwaste Control Panel.

**CUE SHEET #2**

**INITIAL CONDITIONS:**     The Unit 2 (Unit 3) Reactor has received a trip signal and the Reactor Trip Breakers failed to open.

**INITIATING CUE:**             The Control Room Supervisor DIRECTS you to:

- PROCEED to the Reactor Trip Breaker Switchgear and locally OPEN Reactor Trip Circuit Breakers 1 through 8.

**THIS IS A TIME CRITICAL JPM**

Facility: SONGS JPM # RO/SRO NRC S-1 Task #187757 K/A #001.A2.11 4.4 / 4.7 SF-1  
Title: Immediate Actions for Control Room Evacuation

Examinee (Print): \_\_\_\_\_

Testing Method:

Simulated Performance: \_\_\_\_\_

Classroom: \_\_\_\_\_

Actual Performance: X

Simulator: X

Plant: \_\_\_\_\_

**READ TO THE EXAMINEE**

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: The following conditions exist in Units 2 and 3:

- A spill of a liquid has occurred resulting in toxic fumes in both Control Rooms.
- The Shift Manager has directed that both Control Rooms be evacuated.

Initiating Cue: The Control Room Supervisor directs you to PERFORM the Unit 2 Immediate Actions for evacuating the Control Room per SO23-13-2, Shutdown from Outside the Control Room.

Task Standard: Locate and correctly perform Critical Steps of SO23-13-2.

Required Materials: SO23-13-2, Shutdown from Outside the Control Room, Rev. 11.

Validation Time: 4 minutes Time Critical: N/A Completion Time: \_\_\_\_\_ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): \_\_\_\_\_ Date: \_\_\_\_\_



**SIMULATOR SETUP****MACHINE OPERATOR:**

**INITIALIZE to IC#231 or any MODE 1 Initial Condition and PERFORM the following:**

- **INSERT Override 2HS-9163A-CR56-S02, STOP pushbutton stuck out on RCP P-002.**

**EXAMINER:**

**When immediate actions are complete, PROVIDE the examinee with a copy of:**

- **SO23-13-2 Shutdown from Outside the Control Room.**

√ - Check Mark Denotes Critical Step

START TIME:

<b>Perform Step: 1</b> √	MANUALLY Trip the Reactor from either set of Manual Trip Pushbuttons.	
<b>Standard:</b>	DEPRESS 2HS-9132-1, Reactor Trip 1 <b>and</b> 2HS-9132-4, Reactor Trip 4 red pushbuttons (CR-52) <b>or</b> DEPRESS 2HS-9132-2, Reactor Trip 2 <b>and</b> 2HS-9132-3, Reactor Trip 3 red pushbuttons (CR-56).	
<b>Comment:</b>		<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 2</b>	VERIFY all CEAs fully inserted and Neutron Power lowering.	
<b>Standard:</b>	VERIFY all CEAs fully inserted by OBSERVING rod bottom lights illuminated on 2ZI-9131, CEA Bottom Indication (Core Mimic) and/or OBSERVING CEAs fully inserted on 2ZI-9133, Secondary Rod Position (CEAC Display CRT).	
<b>Comment:</b>		<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 3</b>	VERIFY all CEAs fully inserted and Neutron Power lowering.	
<b>Standard:</b>	VERIFY Neutron Power lowering by OBSERVING any of the following: <ul style="list-style-type: none"> <li>• 2JI-0006B1 SU Channel 1 Percent Power indication LOWERING</li> <li>• 2JI-0005B2 SU Channel 2 Percent Power indication LOWERING</li> <li>• 2JI-9153-1 Startup Rate Channel 1 NEGATIVE</li> <li>• 2JI-9153-2 Startup Rate Channel 2 NEGATIVE</li> </ul>	
<b>Comment:</b>		<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 4</b> √	MANUALLY Initiate MSIS from either set of Manual Initiation Pushbuttons.	
<b>Standard:</b>	DEPRESS 2HS-9137-1 <b>and</b> 9137-2, MSIS Manual Initiation pushbuttons (CR-56) <b>or</b> DEPRESS 2HS-9137-3 <b>and</b> 9137-4, MSIS Manual Initiation pushbuttons (CR-53) and OBSERVE Annunciators 57A4(B4) - MSIS TRAIN A(B) ACTUATION.	
<b>Comment:</b>		<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Examiner Note:</b>	<b>Charging Pumps may be stopped in any order.</b>	
<b>Perform Step: 5a√</b>	STOP all Charging Pumps and REMOVE FROM AUTO.	
<b>Standard:</b>	DEPRESS 2P190, Charging Pump STOP pushbutton and OBSERVE green STOP light illuminated and white AUTO light extinguished.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 5b√</b>	STOP all Charging Pumps and REMOVE FROM AUTO.	
<b>Standard:</b>	DEPRESS 2P191, Charging Pump STOP pushbutton and OBSERVE green STOP light illuminated and white AUTO light extinguished.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 5c√</b>	STOP all Charging Pumps and REMOVE FROM AUTO.	
<b>Standard:</b>	DEPRESS 2P192, Charging Pump STOP pushbutton and OBSERVE green STOP light illuminated and white AUTO light extinguished.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Examiner Note:</b>	<b>Reactor Coolant Pumps may be stopped in any order.</b>	
<b>Perform Step: 6√</b>	STOP all RCPs from Control Handswitches <u>OR</u> by selecting the 6.9 kV Buses to MANUAL and Opening all Feeder Breakers. <ul style="list-style-type: none"> <li>• RCP P-001</li> </ul>	
<b>Standard:</b>	DEPRESS 2HS-9160A, RCP 2P001 STOP pushbutton and OBSERVE green STOP light illuminated and ammeter at zero (0) amps.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 7√</b>	STOP all RCPs from Control Handswitches <u>OR</u> by selecting the 6.9 kV Buses to MANUAL and Opening all Feeder Breakers. <ul style="list-style-type: none"> <li>• RCP P-003</li> </ul>	
<b>Standard:</b>	DEPRESS 2HS-9161A, RCP 2P003 STOP pushbutton and OBSERVE green STOP light illuminated and ammeter at zero (0) amps.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Examiner Note:</b>	<b>The following steps represent the alternate path for this JPM.</b>	
<b>Perform Step: 8√</b>	STOP all RCPs from Control Handswitches <u>OR</u> by selecting the 6.9 kV Buses to MANUAL and Opening all Feeder Breakers. <ul style="list-style-type: none"> <li>• RCP P-004</li> </ul>	
<b>Standard:</b>	DEPRESS 2HS-9162A, RCP 2P004 STOP pushbutton and OBSERVE green STOP light illuminated and ammeter at zero (0) amps.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 9√</b>	STOP all RCPs from Control Handswitches <u>OR</u> by selecting the 6.9 kV Buses to MANUAL and Opening all Feeder Breakers. <ul style="list-style-type: none"> <li>• RCP P-002</li> </ul>	
<b>Standard:</b>	DEPRESS 2HS-9163A, RCP 2P002 STOP pushbutton and OBSERVE red START light illuminated and DETERMINE 2P002 will NOT trip.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 10√</b>	STOP all RCPs from Control Handswitches <u>OR</u> by selecting the 6.9 kV Buses to MANUAL and Opening all Feeder Breakers. <ul style="list-style-type: none"> <li>• RCP P-002</li> </ul>	
<b>Standard:</b>	DEPRESS 2HS-1610B, RES AUX XFMR 2XR3 FDR BKR 2A0202 MODE SELECTOR MANUAL pushbutton and OBSERVE blue MANUAL light illuminated.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 11√</b>	STOP all RCPs from Control Handswitches <u>OR</u> by selecting the 6.9 kV Buses to MANUAL and Opening all Feeder Breakers. <ul style="list-style-type: none"> <li>• RCP P-002</li> </ul>	
<b>Standard:</b>	DEPRESS 2HS-1610, RES AUX XFMR 2XR3 FDR BKR 2A0202 TRIP pushbutton and OBSERVE green TRIP light illuminated.	
<b>Terminating Cue:</b>	<b>This JPM is complete.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>STOP TIME:</b>	
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**INITIAL CONDITIONS:**

The following conditions exist in Units 2 and 3:

- A spill of a liquid has occurred resulting in toxic fumes in both Control Rooms.
- The Shift Manager has directed that both Control Rooms be evacuated.

**INITIATING CUE:**

The Control Room Supervisor directs you to **PERFORM** the Unit 2 Immediate Actions for evacuating the Control Room per SO23-13-2, Shutdown from Outside the Control Room.

Facility: SONGS JPM # RO/SRO NRC S-2 Task #141241 K/A #004.A4.06 3.6 / 3.1 SF-2  
Title: Secure Charging and Letdown

Examinee (Print): \_\_\_\_\_

Testing Method:

Simulated Performance: \_\_\_\_\_

Classroom: \_\_\_\_\_

Actual Performance:     X    

Simulator:     X    

Plant: \_\_\_\_\_

**READ TO THE EXAMINEE**

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: The following conditions exist on Unit 2:

- Power is stable at 100%.
- The Reactor Coolant System leakrate is elevated but is not evident in the Containment.
- Steam Generator samples are less than Minimum Detectable Activity.
- A walkdown outside the Containment has not identified a leak source.
- The leakage source is suspected to be the Charging Pump.
- Management has given permission to secure Charging and Letdown to perform an RCS Inventory Balance.

Initiating Cue: The Control Room Supervisor directs you to SECURE Charging and Letdown per SO23-3-2.1.2, CVCS Outage Evolutions, Section 6.2, Securing Charging and Letdown.

Task Standard: Locate and correctly perform Critical Steps of SO23-3-2.1.2.

Required Materials: SO23-3-2.1.2, CVCS Outage Evolutions, Rev 4.

Validation Time: 10 minutes Time Critical: N/A Completion Time: \_\_\_\_\_ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): \_\_\_\_\_ Date: \_\_\_\_\_

**SIMULATOR SETUP****MACHINE OPERATOR:**

**INITIALIZE to IC#232 or any 100% power Initial Condition and PERFORM the following:**

- **ENSURE Pressurizer level is normal for 100% power.**
- **ENSURE 2HIC-0110A, Flow Control is in service.**
- **ENSURE 2PIC-0201A, Back Pressure Control is in service.**
- **ENSURE 2P-191, Charging Pump is the operating pump.**

**PERFORM the following after each JPM:**

- **RESET the Simulator to ENSURE proper operation of 2TV-0224B, CVCS IX Bypass Valve.**

**EXAMINER:**

**PROVIDE the examinee with a copy of:**

- **SO23-3-2.1.2, CVCS Outage Evolutions.**
  - **INITIAL Sections 6.1 and 6.3 N/A and remove all Attachments.**

√ - Check Mark Denotes Critical Step

START TIME:

<b>Perform Step: 1</b>	If at power, <u>then</u> ADJUST Pressurizer Level to 41%-54%.	
<b>Standard:</b>	DETERMINE that Pressurizer level is within the band of 41%-54% by OBSERVING 2LI-0110A1 and 2LI-0110A2, Hot Calibrated Pressurizer Level instruments.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 2√</b>	SELECT TV-0224B, CVCS IX Bypass, to MANUAL, then PLACE in BYPASS.	
<b>Standard:</b>	DEPRESS 2TV-0224B, Ion Exchangers Bypass Valve MANUAL pushbutton and OBSERVE blue MANUAL and red BYPASS lights illuminated with green ION EXCH and white AUTO lights extinguished.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 3√</b>	CLOSE TV-0224A, Boronometer Isolation.	
<b>Standard:</b>	DEPRESS 2TV-0224A, Boronometer Iso Valve CLOSE pushbutton and OBSERVE green CLOSE light illuminated and red OPEN light extinguished.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 4√</b>	PLACE the in-service HIC-0110A and/or HIC-0110B Letdown Flow Controller to MANUAL <u>and</u> LOWER output to zero (valves full closed).	
<b>Standard:</b>	DEPRESS 2HIC-0110A, Flow Control Auto-Manual Selector Switch A/M pushbutton ONCE and OBSERVE "M" light illuminated.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 5√</b>	PLACE the in-service HIC-0110A and/or HIC-0110B Letdown Flow Controller to MANUAL and LOWER output to zero (valves full closed).	
<b>Standard:</b>	DEPRESS 2HIC-0110A, Flow Control SEL pushbutton until OUT is displayed.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	



<b>Perform Step: 6√</b>	PLACE the in-service HIC-0110A and/or HIC-0110B Letdown Flow Controller to MANUAL and LOWER output to zero (valves full closed).	
<b>Standard:</b>	DEPRESS 2HIC-0110A, Flow Control LOWER pushbutton (▼) until OUTPUT is zero (0).	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Examiner Note</b>	<b>Only one of the following four sub-steps is considered critical. One Letdown Isolation Valve closed satisfies the required action.</b>	
<b>Perform Step: 7a√</b>	CLOSE the following Letdown valves: <ul style="list-style-type: none"> <li>• TV-0221, Letdown Temperature Isolation.</li> </ul>	
<b>Standard:</b>	DEPRESS 2TV-0221, Regen HX Inlet ISO Valve CLOSE pushbutton and OBSERVE green CLOSE light illuminated and red OPEN light extinguished.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 7b√</b>	CLOSE the following Letdown valves: <ul style="list-style-type: none"> <li>• HV-9204, Letdown to Regen Heat Exchanger Isolation.</li> </ul>	
<b>Standard:</b>	DEPRESS 2HV-9204, Regen HX Inlet ISO Valve CLOSE pushbutton and OBSERVE green CLOSE light illuminated and red OPEN light extinguished.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 7c√</b>	CLOSE the following Letdown valves: <ul style="list-style-type: none"> <li>• TV-9267, Letdown Heat Exchanger Outlet.</li> </ul>	
<b>Standard:</b>	DEPRESS 2TV-9267, Regen HX Outlet ISO Valve CLOSE pushbutton and OBSERVE green CLOSE light illuminated and red OPEN light extinguished.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 7d√</b>	CLOSE the following Letdown valves: <ul style="list-style-type: none"> <li>HV-9205, Letdown Containment Isolation.</li> </ul>	
<b>Standard:</b>	DEPRESS 2HV-9205, Regen HX Outlet ISO Valve CLOSE pushbutton and OBSERVE green CLOSE light illuminated and red OPEN light extinguished.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 8a√</b>	PLACE backup Charging Pump(s) to STOP.	
<b>Standard:</b>	DEPRESS 2P-190, Charging Pump STOP pushbutton and OBSERVE green STOP light illuminated and white AUTO light extinguished.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 8b√</b>	PLACE backup Charging Pump(s) to STOP.	
<b>Standard:</b>	DEPRESS 2P-192, Charging Pump STOP pushbutton and OBSERVE green STOP light illuminated and white AUTO light extinguished.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 8c√</b>	STOP operating Charging Pump(s).	
<b>Standard:</b>	DEPRESS 2P-191, Charging Pump STOP pushbutton and OBSERVE green STOP light illuminated and white AUTO light extinguished.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 9</b>	LOWER PIC-0201A or B Setpoint for the in-service Letdown Backpressure Controller to < 165 psig.	
<b>Standard:</b>	DEPRESS 2PIC-0201B, Backpressure Control SEL pushbutton until OSP is observed then DEPRESS LOWER pushbutton (▼) until setpoint is less than 165 psig as read on 2PIC-0201B.	
<b>Terminating Cue:</b>	<b>This JPM is complete.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>STOP TIME:</b>	
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**INITIAL CONDITIONS:**

The following conditions exist on Unit 2:

- Power is stable at 100%.
- The Reactor Coolant System leakrate is elevated but is not evident in the Containment.
- Steam Generator samples are less than Minimum Detectable Activity.
- A walkdown outside the Containment has not identified a leak source.
- The leakage source is suspected to be the Charging Pump.
- Management has given permission to secure Charging and Letdown to perform an RCS Inventory Balance.

**INITIATING CUE:**

The Control Room Supervisor directs you to SECURE Charging and Letdown per SO23-3-2.1.2, CVCS Outage Evolutions, Section 6.2, Securing Charging and Letdown.

Facility: SONGS JPM # RO/SRO NRC S-3 Task #192218 K/A #006.A4.07 4.4 / 4.4 SF-3  
Title: Simultaneous Hot Leg and Cold Leg Injection

Examinee (Print): \_\_\_\_\_

Testing Method:

Simulated Performance: \_\_\_\_\_

Classroom: \_\_\_\_\_

Actual Performance:     X    

Simulator:     X    

Plant: \_\_\_\_\_

**READ TO THE EXAMINEE**

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: Given the following conditions on Unit 2:

- The plant has experienced a Loss of Coolant Accident.
- Over two hours have elapsed since Safety Injection Actuation Signal (SIAS) initiation.
- Shutdown Cooling System operation is not expected to occur within four (4) hours of SIAS actuation.

Initiating Cue: The Control Room Supervisor directs you to PERFORM SO23-12-11, EOI Supporting Attachments, Attachment 11, Simultaneous Hot/Cold Leg Injection.

Task Standard: Locate and correctly perform Critical Steps of SO23-12-11, EOI Supporting Attachments, Attachment 11.

Required Materials: SO23-12-11, EOI Supporting Attachments, Rev 6.

Validation Time: 20 minutes Time Critical: N/A Completion Time: \_\_\_\_\_ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): \_\_\_\_\_ Date: \_\_\_\_\_

**SIMULATOR SETUP****MACHINE OPERATOR:**

**INITIALIZE to IC#233 or any 100% power Initial Condition and PERFORM the following:**

- **INSERT RC03, RCS Leak at 100%.**
- **INSERT RC01A, RCS Rupture at 20% until RCS pressure is < 500 psia then LOWER to 0.015%.**
- **INSERT malfunctions EC08C and EC08DA, HPSI Pump P-017 and P-018 (Train A) trips.**
- **ENSURE only Train B HPSI is operating.**
- **EXECUTE remote function EC79A, CLOSE 2HV-9434 breaker when directed.**

**EXAMINER:**

**PROVIDE the examinee with a copy of:**

- **SO23-12-11, EOI Supporting Attachments, Attachment 11, Simultaneous Hot / Cold Leg Injection.**

√ - Check Mark Denotes Critical Step

START TIME:

<b>Perform Step: 1</b>	VERIFY Entry Conditions: <ul style="list-style-type: none"> <li>ENSURE time elapsed from SIAS actuation – greater than 2 hours.</li> </ul>	
<b>Standard:</b>	VERIFY greater than 2 hours from SIAS actuation per Initial Conditions.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 2</b>	VERIFY Entry Conditions: <ul style="list-style-type: none"> <li>VERIFY FS-7, VERIFY SI Throttle/Stop Criteria – NOT satisfied</li> </ul>	
<b>Standard:</b>	DETERMINE SI Throttle/Stop Criteria not met due to Pressurizer level.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 3</b>	ENSURE SDC Valves Closed: <ul style="list-style-type: none"> <li>ENSURE SDC To LPSI Pump Suction Isolation valves – closed: HV-9337</li> </ul>	
<b>Standard:</b>	OBSERVE 2HV-9337, SDC to LPSI Pumps Suction ISO Valve green CLOSE light illuminated.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 4</b>	ENSURE SDC Valves Closed: <ul style="list-style-type: none"> <li>ENSURE SDC To LPSI Pump Suction Isolation valves – closed: HV-9377</li> </ul>	
<b>Standard:</b>	OBSERVE 2HV-9377, SDC to LPSI Pumps Suction ISO Valve green CLOSE light illuminated.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 5</b>	ENSURE SDC Valves Closed: <ul style="list-style-type: none"> <li>ENSURE SDC To LPSI Pump Suction Isolation valves – closed: HV-9339</li> </ul>	
<b>Standard:</b>	OBSERVE 2HV-9339, SDC to LPSI Pumps Suction ISO Valve green CLOSE light illuminated.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 6</b>	ENSURE SDC Valves Closed: <ul style="list-style-type: none"> <li>ENSURE SDC To LPSI Pump Suction Isolation valves – closed: HV-9378</li> </ul>	
<b>Standard:</b>	OBSERVE 2HV-9378, SDC to LPSI Pumps Suction ISO Valve green CLOSE light illuminated.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 7</b>	VERIFY HPSI Operability: <ul style="list-style-type: none"> <li>VERIFY both trains of HPSI – operating</li> </ul>	
<b>Standard:</b>	DETERMINE only Train B of HPSI is operating and OBSERVE green STOP lights illuminated for the Train A HPSI Pumps 2P017 and 2P018.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Examiner Note:</b>	<b>The following steps represent the alternate path for this JPM.</b>	
<b>Perform Step: 8</b>	VERIFY PZR pressure – greater than 500 PSIA (Low Range): <ul style="list-style-type: none"> <li>QSPDS page 611</li> <li>CFMS page 311</li> </ul>	
<b>Standard:</b>	REFERENCE QSPDS page 611 and CFMS page 311 and OBSERVE Low Range Pressurizer pressure on both pages read less than 500 psig and ENTERS RNO column.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 9</b>	ENSURE only one HPSI Pump – operating AND GO TO step 15.	
<b>Standard:</b>	OBSERVE 2HS-9394-2, HPSI Pump 2P019 red START light illuminated and ammeter reading ~ 55 amps and TRANSITION to Step 15.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 10</b> ✓	RECORD the HPSI Cold Leg Flow Rates: <ul style="list-style-type: none"> <li>• FI-0321: _____ GPM</li> <li>• FI-0331: _____ GPM</li> <li>• FI-0311: _____ GPM</li> <li>• FI-0341: _____ GPM</li> <li>SUM: _____ GPM (Total flow to cold legs)</li> </ul>
<b>Standard:</b>	OBSERVE HPSI Cold Leg flow instruments and RECORD values: <ul style="list-style-type: none"> <li>• 2FI-0321-1, HPSI Flow to Cold Leg Loop 1B at ~210 gpm.</li> <li>• 2FI-0331-1, HPSI Flow to Cold Leg Loop 2A at ~210 gpm.</li> <li>• 2FI-0311-2, HPSI Flow to Cold Leg Loop 1A at ~210 gpm.</li> <li>• 2FI-0341-2, HPSI Flow to Cold Leg Loop 2B at ~210 gpm.</li> <li>• 230 gpm + 230 gpm + 180 gpm + 230 gpm = 840 gpm</li> </ul>
<b>Comment:</b>	
SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

  

<b>Perform Step: 11</b>	HPSI train in service – identified: Train A      Train B
<b>Standard:</b>	IDENTIFY Train B HPSI as in-service.
<b>Comment:</b>	
SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

  

<b>Perform Step: 12</b>	ENSURE key switches to associated RCS Hot Leg Isolation valves – closed: <u>Train B</u> HV-9434
<b>Standard:</b>	DETERMINE 2HV-9434, HPSI HDR 2 to Loop 1 Hot Leg ISO Valve keyswitch in CLOSE and green CLOSE light illuminated.
<b>Comment:</b>	
SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

  

<b>Perform Step: 13</b>	ENSURE associated breaker – unlocked and closed: BZ-39
<b>Standard:</b>	DIRECT the PEO to unlock and CLOSE breaker 2BZ-39.
<b>M.O. Cue:</b>	<b>EXECUTE remote function EC79A and REPORT breaker 2BZ-39 is closed.</b>
<b>Comment:</b>	
SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	



<b>Examiner Note:</b>	<b>Each of the following four sub-steps may be repeated as each header is throttled.</b>	
<b>Perform Step: 14√</b>	ADJUST the following valves on the associated train to reduce the indicated flow rates to approximately one half of those recorded in step 15: <u>Train B</u> HV-9323	
<b>Standard:</b>	DEPRESS 2HV-9323, HDR 2 to Loop 1A OVERRIDE then JOG CLOSE pushbuttons until flow on 2FI-0321-1 is approximately ½ recorded value.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 15√</b>	ADJUST the following valves on the associated train to reduce the indicated flow rates to approximately one half of those recorded in step 15: <u>Train B</u> HV-9326	
<b>Standard:</b>	DEPRESS 2HV-9326, HDR 2 to Loop 1B OVERRIDE then JOG CLOSE pushbuttons until flow on 2FI-0331-1 is approximately ½ recorded value.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 16√</b>	ADJUST the following valves on the associated train to reduce the indicated flow rates to approximately one half of those recorded in step 15: <u>Train B</u> HV-9329	
<b>Standard:</b>	DEPRESS 2HV-9329, HDR 2 to Loop 2A OVERRIDE then JOG CLOSE pushbuttons until flow on 2FI-0311-2 is approximately ½ recorded value.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 17√</b>	ADJUST the following valves on the associated train to reduce the indicated flow rates to approximately one half of those recorded in step 15: <u>Train B</u> HV-9332	
<b>Standard:</b>	DEPRESS 2HV-9332, HDR 2 to Loop 2B OVERRIDE then JOG CLOSE pushbuttons until flow on 2FI-0341-2 is approximately ½ recorded value.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 18√</b>	ENSURE associated Hot Leg Injection valve – open: <u>Train B</u> HV-9434	
<b>Standard:</b>	PLACE 2HV-9434, HPSI HDR 2 to Loop 1 Hot Leg ISO Valve keyswitch in OPEN and OBSERVE red OPEN light illuminated and valve position indication at 100%.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 19</b> √	ADJUST associated RCS Cold Leg Injection valves on the operating train to values obtained in step 16d: <u>Train B</u> HV-9323
<b>Standard:</b>	DEPRESS 2HV-9323, HDR 2 to Loop 1A JOG OPEN pushbutton until flow on 2FI-0321-1 is approximately the value of JPM Step 14.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

  

<b>Perform Step: 20</b> √	ADJUST associated RCS Cold Leg Injection valves on the operating train to values obtained in step 16d: <u>Train B</u> HV-9326
<b>Standard:</b>	DEPRESS 2HV-9326, HDR 2 to Loop 1B JOG OPEN pushbutton until flow on 2FI-0331-1 is approximately the value of JPM Step 15.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

  

<b>Perform Step: 21</b> √	ADJUST associated RCS Cold Leg Injection valves on the operating train to values obtained in step 16d: <u>Train B</u> HV-9329
<b>Standard:</b>	DEPRESS 2HV-9329, HDR 2 to Loop 2A JOG OPEN pushbutton until flow on 2FI-0311-2 is approximately the value of JPM Step 16.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

  

<b>Perform Step: 22</b> √	ADJUST associated RCS Cold Leg Injection valves on the operating train to values obtained in step 16d: <u>Train B</u> HV-9332
<b>Standard:</b>	DEPRESS 2HV-9332, HDR 2 to Loop 2B JOG OPEN pushbutton until flow on 2FI-0341-2 is approximately the value of JPM Step 17.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 23✓</b>	ESTABLISH the following conditions: <ul style="list-style-type: none"><li>Indicated flow sum of: FI-0321, FI-0331, FI-0311, FI-0341 and FI-9435 – less than or equal to 910 GPM.</li></ul>	
<b>Standard:</b>	OBSERVE HPSI Hot & Cold Leg flow instruments, RECORD values, and DETERMINE flow is less than 910 gpm: <ul style="list-style-type: none"><li>2FI-0321-1, HPSI Flow to Cold Leg Loop 1B at ~105 gpm.</li><li>2FI-0331-1, HPSI Flow to Cold Leg Loop 2A at ~155 gpm.</li><li>2FI-0311-2, HPSI Flow to Cold Leg Loop 1A at ~105 gpm.</li><li>2FI-0341-2, HPSI Flow to Cold Leg Loop 2B at ~105 gpm.</li><li>2FI-9435, HPSI HDR 2 to Loop 1 Flow at ~440 gpm.</li><li>105 gpm + 105 gpm + 105 gpm + 105 gpm + 440 gpm = 860 gpm</li></ul>	
<b>Terminating Cue:</b>	<b>This JPM is complete.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>STOP TIME:</b>	
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**INITIAL CONDITIONS:**

Given the following conditions on Unit 2:

- The plant has experienced a Loss of Coolant Accident.
- Over two hours have elapsed since Safety Injection Actuation Signal (SIAS) initiation.
- Shutdown Cooling System operation is not expected to occur within four (4) hours of SIAS actuation.

**INITIATING CUE:**

The Control Room Supervisor directs you to **PERFORM SO23-12-11, EOI Supporting Attachments, Attachment 11, Simultaneous Hot/ Cold Leg Injection.**

Facility: SONGS JPM # RO/SRO NRC S-4 Task #192368 K/A #003.A4.06 2.9 / 2.9 SF-4P  
Title: Start a Reactor Coolant Pump

Examinee (Print): \_\_\_\_\_

Testing Method:

Simulated Performance: \_\_\_\_\_

Classroom: \_\_\_\_\_

Actual Performance:     X    

Simulator:     X    

Plant: \_\_\_\_\_

**READ TO THE EXAMINEE**

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: Given the following conditions:

- Unit 2 is in MODE 3.
- A heat up is in progress to the point of starting the 4<sup>th</sup> Reactor Coolant Pump P-002.
- All actions of SO23-3-1.7, Reactor Coolant Pump Operation, through Step 6.1.18 are complete.
- An Operator is stationed at the Reactor Coolant Pump (RCP) in Containment.

Initiating Cue: The Control Room Supervisor directs you to START Reactor Coolant Pump P-002 using SO23-3-1.7, Reactor Coolant Pump Operation, starting at Step 6.1.19.

Task Standard: Locate and correctly perform Critical Steps of SO23-3-1.7.

Required Materials: SO23-3-1.7, Reactor Coolant Pump Operation, Rev. 35.  
SO23-15-56.C, 56C40 - RCP P002 CCW FLOW LO, Rev. 17.

Validation Time: 15 minutes Time Critical: N/A Completion Time: \_\_\_\_\_ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): \_\_\_\_\_ Date: \_\_\_\_\_

**SIMULATOR SETUP****MACHINE OPERATOR:**

**INITIALIZE to IC#234 or any MODE 4 Initial Condition with RCS temperature > 400°F and PERFORM the following:**

- **DISPLAY PCS Trend Group Data page for RCP P002 as follows:**
  - **ACCESS MAIN MENU on PCS.**
  - **SELECT MAIN POINTS.**
  - **SELECT POINT 1.**
  - **Point Type Selected to SERVER GROUP.**
  - **SELECT RCP 2 PARMS then SELECT ADD.**
- **INSERT Key #38, CPC A Trip Bypass and TURN to ON.**
- **INSERT Key #42, CPC B Trip Bypass and TURN to ON.**
- **INSERT Key #46, CPC C Trip Bypass and TURN to ON.**
- **INSERT Key #50, CPC D Trip Bypass and TURN to ON.**
- **INSERT malfunction CC02B for Annunciator 56C40 30 seconds minute after starting RCP P002.**

**EXAMINER:**

**PROVIDE the examinee with a copy of:**

- **SO23-3-1.7, Reactor Coolant Pump Operation.**
  - **INITIAL through Step 6.1.18.**

√ - Check Mark Denotes Critical Step

START TIME:

<b>Examiner Note:</b>	<b>Ensure the setup page information for Plant Computer System Trend Group Data is complete.</b>
<b>Perform Step: 1</b> √	START one Oil Lift Pump by selecting the NORMAL mode.
<b>Standard:</b>	DEPRESS the NORMAL pushbutton on either 2HS-9117A, 2P002 Oil Lift Pump 2P262, <b>or</b> 2HS-9118A, 2P002 Oil Lift Pump 2P263 and OBSERVE amber NORMAL and red START lights illuminated.
<b>Examiner Note:</b>	<b>Annunciator alarm 56C39 will come in and reset. This is an expected alarm.</b>
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

<b>Perform Step: 2</b>	ENSURE the second oil lift pump selected to STANDBY.
<b>Standard:</b>	DEPRESS the STANDBY pushbutton on either 2HS-9117A, 2P002 Oil Lift Pump 2P262 <b>or</b> 2HS-9118A, 2P002 Oil Lift Pump 2P263, whichever was not started in the previous step and VERIFY amber STANDBY and green STOP lights illuminated.
<b>Examiner Cue:</b>	<b>Two minutes has elapsed.</b>
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

<b>Perform Step: 3</b> √	<u>After</u> the Oil Lift System has run approximately 2 minutes, <u>then</u> START the ARRD Lube Oil Pump by selecting the NORMAL mode.
<b>Standard:</b>	DEPRESS the NORMAL pushbutton on either 2HS-9196, 2P002 ARRD Pump 2P401 <b>or</b> 2HS-9197, 2P002 ARRD Pump 2P402 and OBSERVE amber NORMAL and red START lights illuminated.
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

<b>Perform Step: 4</b>	ENSURE the second ARRD pump is available by selecting STANDBY mode.
<b>Standard:</b>	DEPRESS the STANDBY pushbutton on either 2HS-9196, 2P002 ARRD Pump 2P401 <b>or</b> 2HS-9197, 2P002 ARRD Pump 2P402, whichever was not started in the previous step and VERIFY amber STANDBY and green STOP lights illuminated.
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

<b>Perform Step: 5</b>	VERIFY the following alarms on Panel CR56 are reset prior to the start of the associated RCP: <ul style="list-style-type: none"> <li>• RCP THRUST BEARINGS TEMP HI (56C03, 05, 07, and 09)</li> <li>• RCP LUBE OIL FLOW LO (56C13, 15, 17, and 19)</li> <li>• RCP REVERSE ROTATION (56C14, 16, 18, and 20)</li> <li>• RCP OIL LIFT FLOW LO (56C23, 25, 27, and 29)</li> <li>• RCP OIL LIFT PRESS LO (56C33, 35, 37, and 39)</li> <li>• RCP CCW FLOW LO (56C34, 36, 38, and 40)</li> <li>• RCP ARRD LUBE OIL FLOW LO (56C43, 45, 47, and 49)</li> </ul>	
<b>Standard:</b>	OBSERVE alarms on Panel CR-56 are RESET prior to starting RCP: <ul style="list-style-type: none"> <li>• 56C09 - RCP P002 THRUST BRG TEMP HI</li> <li>• 56C19 - RCP P002 LUBE OIL FLOW LO</li> <li>• 56C20 - RCP P002 REVERSE ROTATION</li> <li>• 56C29 - RCP P002 OIL LIFT FLOW LO</li> <li>• 56C39 - RCP P002 OIL LIFT PRESS LO</li> <li>• 56C40 - RCP P002 CCW FLOW LO</li> <li>• 56C49 - RCP P002 ARRD LUBE OIL FLOW LO</li> </ul>	
<b>Comment:</b>		<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 6</b>	Verify PCS Points selected in Step 6.1.8 not in alarm.	
<b>Standard:</b>	OBSERVE RCP 2P-002 information on Plant Computer System.	
<b>Examiner Cue:</b>	<b>There are no Plant Computer System points in alarm for the RCPs.</b>	
<b>Comment:</b>		<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 7</b>	Verify RCP CONTROLLED BLEED-OFF FLOW (PCS) is reset or proper RCP CBO flow for the existing RCS pressure.	
<b>Standard:</b>	VERIFY RCP Controlled Bleed-Off Flow on Plant Computer System is RESET (Point ID F-180) or proper RCP CBO flow for the existing RCS pressure (~1.5 gpm).	
<b>Comment:</b>		<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>



<b>Perform Step: 8</b>	Verify CCW SEAL HEAT EXCHANGER TEMPERATURE HI (PCS) alarm is reset.	
<b>Standard:</b>	VERIFY CCW Seal Exchanger temperature high alarm on Plant Computer System is RESET (Point ID TE-9174).	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 9</b>	VERIFY the following final configuration: <ul style="list-style-type: none"> <li>• One Oil Lift Pump selected to NORMAL</li> <li>• One Oil Lift Pump selected to Standby</li> <li>• One ARRD Pump selected to Normal</li> <li>• One ARRD Pump selected to Standby</li> <li>• Vibration Alarm reset</li> </ul>	
<b>Standard:</b>	PERFORM final configuration check: <ul style="list-style-type: none"> <li>• VERIFY Oil Lift Pump, 2P262 <u>or</u> 2P263 amber NORMAL light illuminated.</li> <li>• VERIFY Oil Lift Pump, 2P262 <u>or</u> 2P263 amber STANDBY light illuminated.</li> <li>• VERIFY ARRD Pump, 2P401 <u>or</u> 2P402 amber NORMAL light illuminated.</li> <li>• VERIFY ARRD Pump, 2P401 <u>or</u> 2P402 amber STANDBY light illuminated.</li> <li>• VERIFY Vibration Alarm reset on 2HS-0181, 2P002 Vibration Monitor white RESET light extinguished.</li> </ul>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 10</b>	If Backfeeding Unit Aux Transformer (UAT) when in Modes 4 or 5, <u>and</u> a UAT high temperature alarm is received, <u>then</u> ENSURE only one RCP is running on the associated bus.	
<b>Standard:</b>	DETERMINE Backfeeding via the Unit Auxiliary Transformer is not being performed.	
<b>Examiner Cue:</b>	<b>Backfeeding via the Unit Auxiliary Transformer is not being performed.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 11</b>	VERIFY RCP Zero Speed lamp illuminated.	
<b>Standard:</b>	OBSERVE 2SL-9116, Zero Speed Indication for RCP 2P002 white ZERO SPEED light illuminated.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 12</b>	If another RCP is already running, <u>then</u> ENSURE it has been in service for at least 5 minutes.	
<b>Standard:</b>	DETERMINE that all three running RCPs have been in service for greater than 5 minutes.	
<b>Examiner Cue:</b>	<b>All running RCPs have run for more than 5 minutes.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 13</b>	If this RCP start is associated with an idle loop, <u>then</u> COMMENCE monitoring Nuclear Instrumentation and continue for approximately the first minute of pump operation.	
<b>Standard:</b>	DETERMINE that RCP 2P004 is running and the loop is not idle.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 14</b>	ANNOUNCE pump start using local area page.	
<b>Standard:</b>	DIAL 429 on phone and ANNOUNCE Reactor Coolant Pump 2P002 start.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Examiner Note:</b>	<b>Annunciator 50A51 - VIBRATION AND LOOSE PARTS MONITOR SYSTEM TROUBLE will come in and reset. This is an expected alarm when starting the RCP.</b>	
<b>Perform Step: 15√</b>	START the Reactor Coolant Pump <u>and</u> PERFORM the following: <ul style="list-style-type: none"> <li>• Verify motor amps stabilize between 470 and 800 amps.</li> </ul>	
<b>Standard:</b>	DEPRESS 2HS-9163A, 2P002 START pushbutton and OBSERVE: <ul style="list-style-type: none"> <li>• Red START light illuminated and green STOP light extinguished.</li> <li>• VERIFY motor amps stabilize between 470 and 800 amps on ammeter.</li> </ul>	
<b>Examiner Cue:</b>	<b>If examinee attempts to research cause of alarm, state that another operator is at 2L-194 verifying alarm was due to starting the RCP.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 16</b>	START the Reactor Coolant Pump <u>and</u> PERFORM the following: <ul style="list-style-type: none"> <li>• Closely MONITOR RCS pressure.</li> </ul>	
<b>Standard:</b>	OBSERVE RCS pressure is satisfactory using any combination of Control Board, CFMS, QSPDS or PCS indicators.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 17</b>	Verify the Oil Lift and ARRD Pumps automatically stop and Zero Speed lamp extinguishes.	
<b>Standard:</b>	OBSERVE: <ul style="list-style-type: none"> <li>• Oil Lift Pump indicators for 2P002 Oil Lift Pump 2P262 and 2P263, green STOP lights illuminated.</li> <li>• ARRD Pump Indicators for 2P002 ARRD Pump 2P401 and 2P402, green STOP lights illuminated.</li> <li>• 2SL-9116, 2P002 white ZERO SPEED light extinguished.</li> </ul>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 18</b>	Check RCP Oil Reservoir levels SAT.	
<b>Standard:</b>	DIRECT an Operator to REPORT RCP 2P002 Oil Reservoir levels.	
<b>Examiner Cue:</b>	<b>Operator at the pump reports oil levels are satisfactory.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Examiner Note:</b>	<b>The following steps represent the alternate path for this JPM.</b>	
<b>Perform Step: 19</b>	Acknowledge annunciator 56C40 - RCP P002 CCW FLOW LO.	
<b>Standard:</b>	ACKNOWLEDGE annunciator 56C40 - RCP P002 CCW FLOW LO and REFER to 56C40 Annunciator Response Procedure.	
<b>Examiner Cue:</b>	<b>If the examinee checks Plant Computer System trends for 2P002 CCW FLOW LO, REPORT that CCW flow is 400 gpm and lowering and temperature is as read.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Examiner Note:</b>	<b>The following guidance is provided in Annunciator Response Procedure for 56C40, Step 1.2.</b>	
<b>Perform Step: 20</b>	<u>If</u> in Modes 3-5, <u>then</u> stop 2(3)MP-002, RCP.	
<b>Standard:</b>	RECOGNIZE operation in MODE 3 and DETERMINE RCP 2P002 must be stopped.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 21√</b>	Trip RCP P002.	
<b>Standard:</b>	DEPRESS 2HS-9163A, 2P002 STOP pushbutton and VERIFY green STOP light illuminated, red START light extinguished, and ammeter at zero (0) amps.	
<b>Terminating Cue:</b>	<b>This JPM is complete.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>STOP TIME:</b>	
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**INITIAL CONDITIONS:**

Given the following conditions:

- Unit 2 is in MODE 3.
- A heat up is in progress to the point of starting the 4<sup>th</sup> Reactor Coolant Pump P-002.
- All actions of SO23-3-1.7, Reactor Coolant Pump Operation, through Step 6.1.18 are complete.
- An Operator is stationed at the Reactor Coolant Pump (RCP) in Containment.

**INITIATING CUE:**

The Control Room Supervisor directs you to START Reactor Coolant Pump P-002 using SO23-3-1.7, Reactor Coolant Pump Operation, starting at Step 6.1.19.

Facility: SONGS JPM # RO/SRO NRC S-5 Task #192294 K/A #026.A2.08 3.2 / 3.7 SF-5  
Title: Terminate the Containment Spray System

Examinee (Print): \_\_\_\_\_

Testing Method:

Simulated Performance: \_\_\_\_\_

Classroom: \_\_\_\_\_

Actual Performance: X

Simulator: X

Plant: \_\_\_\_\_

**READ TO THE EXAMINEE**

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: Given the following conditions:

- A Loss of Coolant Accident inside Containment has occurred.
- SO23-12-11, EOI Supporting Attachments, Attachment 2, Floating Steps, is being performed 105 minutes after the accident.

Initiating Cue: The Control Room Supervisor directs you to PERFORM SO23-12-11, EOI Supporting Attachments, Floating Step 14, Terminate Containment Spray Operation.

Task Standard: Locate and correctly perform Critical Steps of SO23-12-11.

Required Materials: SO23-12-11, EOI Supporting Attachments, Rev. 6.

Validation Time: 7 minutes Time Critical: N/A Completion Time: \_\_\_\_\_ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): \_\_\_\_\_ Date: \_\_\_\_\_

**SIMULATOR SETUP****MACHINE OPERATOR:**

**INITIALIZE to IC#235 or any 100% power Initial Condition and PERFORM the following:**

- **INSERT overrides for Containment ECUs E-400, E-401, and E-402 for the red START indicating lights off and the green STOP indicating lights on.**
- **INSERT malfunction RC03 @ 100%.**
- **INSERT malfunction MS03A and MS03B @ 1 to 5% to get Containment pressure to increase above 15 psig and then DELETE malfunctions.**

**NOTE: Do not place the Simulator in RUN until examinee is ready to begin to preserve RWST level.**

**PERFORM the following after each JPM:**

- **ENSURE 2HV-6293B/A, Train A CCW to Letdown Heat Exchanger valve is OPEN.**

**EXAMINER:**

**PROVIDE the examinee with a copy of:**

- **SO23-12-11, EOI Supporting Attachments, Attachment 2, Floating Step 14, Terminate Containment Spray Operation.**

**When Floating Step 14 is complete, PROVIDE the examinee with a copy of:**

- **SO23-12-11, EOI Supporting Attachments, Attachment 2, Floating Step 24, Transfer Charging Pump Suction.**

√ - Check Mark Denotes Critical Step

**START TIME:**

<b>Perform Step: 1</b>	Verify Containment pressure – less than 14 psig, and – stable or lowering.	
<b>Standard:</b>	OBSERVE 2PI-0351-1, 2, 3, & 4, Containment Pressure Narrow Range Indicators on CR-57 <b>or</b> 2PI-0352-1, 2, 3, & 4, Containment Pressure Wide Range Indicators on CR-57 and DETERMINE Containment pressure less than 14 psig, and stable or lowering.	
<b>Examiner Cue:</b>	<b>Containment pressure is lowering.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 2a</b>	Verify at least 2 Containment Emergency Cooling Units operating.	
<b>Standard:</b>	OBSERVE 2HS-9953-1, Containment ECU 2E399 red START light illuminated.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 2b</b>	Verify at least 2 Containment Emergency Cooling Units operating.	
<b>Standard:</b>	OBSERVE 2HS-9947-1, Containment ECU 2E401 green STOP light illuminated.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 2c</b>	Verify at least 2 Containment Emergency Cooling Units operating.	
<b>Standard:</b>	OBSERVE 2HS-9955-2, Containment ECU 2E402 green STOP light illuminated.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 2d</b>	Verify at least 2 Containment Emergency Cooling Units operating.	
<b>Standard:</b>	OBSERVE 2HS-9939-2, Containment ECU 2E400 green STOP light illuminated.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	



<b>Examiner Note:</b>	<b>The following steps represent the alternate path for this JPM.</b>	
<b>Perform Step: 3</b>	With only Containment Emergency Cooling Unit E399 operating the RNO must be entered.	
<b>Standard:</b>	RECOGNIZE that the AER column is not met and ENTER the RNO column due to only one Containment Emergency Cooling Unit operating.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 4a</b>	Ensure CSAS – actuated.	
<b>Standard:</b>	VERIFY that CSAS is actuated and OBSERVE: <ul style="list-style-type: none"> <li>• Annunciator 57A03 - CSAS TRAIN A ACTUATION illuminated.</li> <li>• Annunciator 57B03 - CSAS TRAIN B ACTUATION illuminated.</li> </ul>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 4b</b>	Ensure CSAS – actuated.	
<b>Standard:</b>	VERIFY that Train A CSAS is actuated and OBSERVE: <ul style="list-style-type: none"> <li>• 2HS-9395-1, Containment Spray Pump 2P012 red START light illuminated and ammeter at approximately 45 amps.</li> <li>• 2HV-9367, CNTMT Spray HDR No 1 Control Valve red JOG OPEN illuminated with valve position indication 100% OPEN.</li> </ul>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 4c</b>	Ensure CSAS – actuated.	
<b>Standard:</b>	VERIFY that Train B CSAS is actuated and OBSERVE: <ul style="list-style-type: none"> <li>• 2HS-9396-2, Containment Spray Pump 2P013 red START light illuminated and ammeter at approximately 58 amps.</li> <li>• 2HV-9368, CNTMT Spray HDR No 2 Control Valve red JOG OPEN illuminated with valve position indication 100% OPEN.</li> </ul>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 5√</b>	Close CCW to/from Letdown Heat Exchanger Valves: <ul style="list-style-type: none"> <li>• <u>Train A</u> - HV-6293B/A</li> </ul>
<b>Standard:</b>	DEPRESS 2HV-6293B/A, CCW CLA LTDN HX 2E062 Supply/Return Valves CLOSE pushbutton and OBSERVE green CLOSE light illuminated.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 6</b>	Close CCW to/from Letdown Heat Exchanger Valves: <ul style="list-style-type: none"> <li>• <u>Train B</u> - HV-6522B/A</li> </ul>
<b>Standard:</b>	OBSERVE 2HV-6522B/A, CCW CLB LTDN HX 2E062 Supply/Return Valves green CLOSE light illuminated.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 7</b>	GO TO next applicable floating step.
<b>Standard:</b>	GO TO next applicable floating step.
<b>Examiner Cue:</b>	<b>The Control Room Supervisor directs you to perform Floating Step 24, Transfer Charging Pump Suction.</b>
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Examiner Cue:</b>	<b>PROVIDE copy of Floating Step 24, Transfer Charging Pump Suction.</b>
<b>Perform Step: 8</b>	VERIFY elapsed time from SIAS actuation - greater than 1-1/2 hours.
<b>Standard:</b>	DETERMINE elapsed time from SIAS actuation greater than 1-1/2 hours from Initial Conditions.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 9</b>	VERIFY elapsed time from SIAS actuation - less than 2 hours.
<b>Standard:</b>	DETERMINE elapsed time from SIAS actuation less than 2 hours from Initial Conditions.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 10</b>	VERIFY RWST level - greater than 6%.	
<b>Standard:</b>	OBSERVE 2LI-0305-1 through 4, RWT 2T006 Level, and DETERMINE level greater than 6%.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 11</b>	ENSURE LV-0227C, RWST to Charging Pumps Gravity Feed Valve - open.	
<b>Standard:</b>	OBSERVE 2LV-0227C, RWT 2T006 Gravity Feed Valve red OPEN and blue MANUAL lights illuminated.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 12√</b>	OVERRIDE and STOP BAMU Pumps.	
<b>Standard:</b>	DEPRESS 2P174, BAMU Pump OVERRIDE then STOP pushbuttons and OBSERVE green STOP and white OVERRIDE lights illuminated.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 13√</b>	OVERRIDE and STOP BAMU Pumps.	
<b>Standard:</b>	DEPRESS 2P175, BAMU Pump OVERRIDE then STOP pushbuttons and OBSERVE green STOP and white OVERRIDE lights illuminated.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 14√</b>	OVERRIDE and CLOSE boration valves: <ul style="list-style-type: none"> <li>Gravity Feed: HV-9235</li> </ul>	
<b>Standard:</b>	DEPRESS 2HV-9235, BAMU TK 2T072 Gravity Feed Valve OVERRIDE then CLOSE pushbuttons and OBSERVE green CLOSE and white OVERRIDE lights illuminated.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 15√</b>	OVERRIDE and CLOSE boration valves: <ul style="list-style-type: none"> <li>Gravity Feed: HV-9240</li> </ul>	
<b>Standard:</b>	DEPRESS 2HV-9240, BAMU TK 2T071 Gravity Feed Valve OVERRIDE then CLOSE pushbuttons and OBSERVE green CLOSE and white OVERRIDE lights illuminated.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 16√</b>	OVERRIDE and CLOSE boration valves: <ul style="list-style-type: none"> <li>Emergency Boration Isolation: HV-9247</li> </ul>	
<b>Standard:</b>	DEPRESS 2HV-9247, EMER Boration Block Valve OVERRIDE then CLOSE pushbuttons and OBSERVE green CLOSE and white OVERRIDE lights illuminated.	
<b>Comment:</b>		<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 17</b>	Ensure LV-0227B, Volume Control Tank Outlet valve – closed.	
<b>Standard:</b>	OBSERVE 2LV-0227B, Volume Control Tank Outlet Block Valve green CLOSE and blue MANUAL lights illuminated.	
<b>Terminating Cue:</b>	<b>This JPM is complete.</b>	
<b>Comment:</b>		<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>STOP TIME:</b>	
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**INITIAL CONDITIONS:****Given the following conditions:**

- A Loss of Coolant Accident inside Containment has occurred.
- SO23-12-11, EOI Supporting Attachments, Attachment 2, Floating Steps, is being performed 105 minutes after the accident.

**INITIATING CUE:****The Control Room Supervisor directs you to PERFORM SO23-12-11, EOI Supporting Attachments, Floating Step 14, Terminate Containment Spray Operation.**

Facility: SONGS JPM # RO/SRO NRC S-6 Task #186551 K/A #062.A4.01 3.3 / 3.1 SF-6  
Title: Restore Bus 2A06 From 1E Cross-Tie Operations

Examinee (Print): \_\_\_\_\_

Testing Method:

Simulated Performance: \_\_\_\_\_

Classroom: \_\_\_\_\_

Actual Performance: X

Simulator: X

Plant: \_\_\_\_\_

**READ TO THE EXAMINEE**

I will explain the Initial Conditions, which steps to simulate or discuss, and provide an Initiating Cue. When you complete the task successfully, the objective for this JPM will be satisfied.

Initial Conditions: Bus 2A06 is cross-tied to Bus 3A06 due to planned maintenance.

Initiating Cue: The Control Room Supervisor directs you to RESTORE Bus 2A06 from 1E Cross-Tie operations to the Reserve Auxiliary Transformer 2XR2 per SO23-6-2, Transferring of 4 kV Buses, Section 6.5, Restoring from 1E 4 kV Bus 2A06 to 3A06 Cross-tie Operation.

Task Standard: Locate and correctly perform Critical Steps of SO23-6-2.

Required Materials: SO23-6-2, Transferring of 4 kV Buses, Rev. 14.

Validation Time: 9 minutes Time Critical: N/A Completion Time: \_\_\_\_\_ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): \_\_\_\_\_ Date: \_\_\_\_\_

**SIMULATOR SETUP****MACHINE OPERATOR:**

**INITIALIZE** to IC#236 or any 100% power Initial Condition and **PERFORM** the following:

- **ALIGN** (cross-tie) Bus 2A06 to Bus 3A06 using SO23-6-2, Section 6.4.
- **ENSURE** Bus 2A06 & Bus 3A06 AUTO/MANUAL Bus Tie Selector Switches are in **MANUAL**.

**NOTE:** After each JPM, **PLACE** Sync Switch key in the Non-ESF Sync Master keylock on the vertical section of CR-63.

**EXAMINER:**

**PROVIDE** the examinee with a copy of:

- SO23-6-2, Transferring of 4 kV Buses.

√ - Check Mark Denotes Critical Step

START TIME:

<b>Perform Step: 1</b>	Ensure the affected Switchgear Room is clear of all unnecessary personnel and maintain it clear until after 4kV bus transfer is complete
<b>Standard:</b>	DIRECT a PEO to clear the Switchgear Room and keep personnel clear until the bus transfer is complete.
<b>M.O. Cue:</b>	<b>All personnel are clear of the Switchgear Room.</b>
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

<b>Perform Step: 2a</b> √	Prepare to Close the INCOMING Transformer breaker, as follows: <ul style="list-style-type: none"> <li>• SELECT 2HS-1627-2, ESF B Sync. Master Control, to ON.</li> </ul>
<b>Standard:</b>	INSERT key and TURN 2HS-1627-2, TRAIN B SYNC CKT CONTROL ESF B SYNC MASTER to the ON position.
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

<b>Perform Step: 2b</b> √	Prepare to Close the INCOMING Transformer breaker, as follows: <ul style="list-style-type: none"> <li>• DEPRESS the SYNC pushbutton for the INCOMING Transformer breaker to energize the synchronizing circuit: <ul style="list-style-type: none"> <li>▪ 2A0618, 2XR2 Reserve Aux. Transformer</li> </ul> </li> </ul>
<b>Standard:</b>	DEPRESS 2HS-1637-2, RES AUX XFMR 2XR2 FDR BREAKER 2A0618 SYNC pushbutton.
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>

<b>Perform Step: 2c</b>	Prepare to Close the INCOMING Transformer breaker, as follows: <ul style="list-style-type: none"> <li>• Verify ILLUMINATED the INCOMING Transformer Breaker SYNC pushbutton.</li> </ul>
<b>Standard:</b>	OBSERVE 2HS-1637-2, RES AUX XFMR 2XR2 FDR BREAKER 2A0618 white SYNC light illuminated.
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>



<b>Perform Step: 2d</b>	Prepare to Close the INCOMING Transformer breaker, as follows: <ul style="list-style-type: none"> <li>• VERIFY ILLUMINATED the SYNC IN MODE light.</li> </ul>
<b>Standard:</b>	OBSERVE 2HS-1627-2 ESF B SYNC MASTER white SYNC IN MODE light illuminated on TRAIN B SYNC CKT CONTROL.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 2e</b>	Prepare to Close the INCOMING Transformer breaker, as follows: <ul style="list-style-type: none"> <li>• VERIFY EXTINGUISHED the SYNC RELAYS TROUBLE light.</li> </ul>
<b>Standard:</b>	OBSERVE 2HS-1627-2, ESF B SYNC MASTER red SYNC RELAYS TROUBLE light extinguished on TRAIN B SYNC CKT CONTROL.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 2f</b>	Prepare to Close the INCOMING Transformer breaker, as follows: <ul style="list-style-type: none"> <li>• VERIFY the Synchroscope moves to the straight up (12 o'clock)</li> </ul>
<b>Standard:</b>	VERIFY 2/3SI-1627A, SYNCHROSCOPE moves to straight up (12 o'clock) position.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 2g</b>	Prepare to Close the INCOMING Transformer breaker, as follows: <ul style="list-style-type: none"> <li>• VERIFY matched Incoming and Running voltages.</li> </ul>
<b>Standard:</b>	OBSERVE 2/3EI-1627A, RUNNING VOLTS and 2/3EI-1627B, INCOMING VOLTS voltmeters MATCHED.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 2h</b>	Prepare to Close the INCOMING Transformer breaker, as follows: <ul style="list-style-type: none"> <li>• VERIFY MATCHED Incoming and Running Frequencies.</li> </ul>
<b>Standard:</b>	OBSERVE 2/3SI-1627C, RUNNING HERTZ and 2/3SI-1627D, INCOMING HERTZ frequency meters MATCHED.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 3a√</b>	CLOSE the INCOMING Transformer breaker: <ul style="list-style-type: none"> <li>2A0618, 2XR2 Reserve Aux. Transformer</li> </ul>
<b>Standard:</b>	DEPRESS 2HS-1637-2, RES AUX XFMR 2XR2 FDR BREAKER 2A0618 CLOSE pushbutton and OBSERVE red CLOSE light illuminated and green TRIP light extinguished.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

  

<b>Perform Step: 3b</b>	VERIFY ANNUNCIATED 2UA63C58, 2A06/3A06 PARALLELED.
<b>Standard:</b>	OBSERVE and ACKNOWLEDGE annunciator 2UA63C58 - 2A06/3A06 PARALLELED.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

  

<b>Perform Step: 3c</b>	VERIFY 3UA63C58, 3A06/2A06 PARALLELED, REMAINS ANNUNCIATED.
<b>Standard:</b>	OBSERVE annunciator 3UA63C58 - 3A06/2A06 PARALLELED illuminated.
<b>Examiner Cue:</b>	<b>The annunciator is illuminated.</b>
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

  

<b>Perform Step: 4a</b>	DEPRESS the SYNC pushbutton for the INCOMING Transformer breaker to de-energize the synchronizing circuit: <ul style="list-style-type: none"> <li>2A0618, 2XR2 Reserve Aux. Transformer</li> </ul>
<b>Standard:</b>	DEPRESS 2HS-1637-2, RES AUX XFMR 2XR2 FDR BREAKER 2A0618 SYNC pushbutton.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

  

<b>Perform Step: 4b</b>	VERIFY EXTINGUISHED the INCOMING Transformer breaker SYNC pushbutton.
<b>Standard:</b>	OBSERVE 2HS-1637-2, RES AUX XFMR 2XR2 FDR BREAKER 2A0618 white SYNC light extinguished.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 5a√</b>	OPEN (TRIP) 2A0619, Bus Tie 2A06 to 3A06 Feeder Breaker.	
<b>Standard:</b>	DEPRESS 2HS-1639A2, BUS TIE 2A06 TO 3A06 FDR BKR 2A0619 TRIP pushbutton and OBSERVE green TRIP light illuminated and red CLOSE light extinguished.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

  

<b>Perform Step: 5b</b>	VERIFY RESET 2UA63C58, 2A06/3A06 PARALLELED.	
<b>Standard:</b>	OBSERVE annunciator 2UA63C58 - 2A06/3A06 PARALLELED is slow flashing/reset.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

  

<b>Perform Step: 5c</b>	VERIFY RESET 3UA63C58, 3A06/2A06 PARALLELED.	
<b>Standard:</b>	OBSERVE annunciator 3UA63C58 - 3A06/2A06 PARALLELED is slow flashing/reset.	
<b>Examiner Cue:</b>	<b>The annunciator is reset.</b>	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

  

<b>Perform Step: 6</b>	SELECT 2HS-1627-2, ESF B Sync. Master Control, to OFF.	
<b>Standard:</b>	TURN key 2HS-1627-2, TRAIN B SYNC CKT CONTROL ESF B SYNC MASTER to the OFF position.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

  

<b>Perform Step: 7</b>	Verify bus 2A06 voltage is stable.	
<b>Standard:</b>	OBSERVE 2EI-1641-2, 4.16 KV BUS 2A06 VOLTS voltmeter and VERIFY stable.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

  

<b>Perform Step: 8√</b>	OPEN (TRIP) 3A0603, Bus Tie 3A06 to 2A06 Feeder Breaker.	
<b>Standard:</b>	DEPRESS 3HS-1639A2, BUS TIE 3A06 TO 2A06 FDR BREAKER 3A0603 TRIP pushbutton and OBSERVE green TRIP light illuminated and red CLOSE light extinguished.	
<b>Comment:</b>	SAT <input type="checkbox"/> UNSAT <input type="checkbox"/>	

<b>Perform Step: 9a</b> ✓	Return Bus Tie Breakers transfer controls to automatic, as follows: <ul style="list-style-type: none"> <li>• SELECT 3HS-1639B2, 3A06 to 2A06 Tie Breaker 3A0603 AUTO/MANUAL Transfer Switch, to AUTO.</li> </ul>
<b>Standard:</b>	DEPRESS 3HS-1639B2, BUS TIE 3A06 TO 2A06 FDR BKR 3A0603 SELECTOR AUTO pushbutton and OBSERVE white AUTO light illuminated and blue MANUAL light extinguished.
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>Perform Step: 9b</b> ✓	Return Bus Tie Breakers transfer controls to automatic, as follows: <ul style="list-style-type: none"> <li>• SELECT 2HS-1639B2, 2A06 to 3A06 Tie Breaker 2A0619 AUTO/MANUAL Transfer Switch, to AUTO.</li> </ul>
<b>Standard:</b>	DEPRESS 2HS-1639B2, 2A06 TO 3A06 FDR BKR 2A0619 SELECTOR AUTO pushbutton and OBSERVE white AUTO light illuminated and blue MANUAL light extinguished
<b>Terminating Cue:</b>	<b>This JPM is complete.</b>
<b>Comment:</b>	<b>SAT</b> <input type="checkbox"/> <b>UNSAT</b> <input type="checkbox"/>

<b>STOP TIME:</b>	
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**INITIAL CONDITIONS:**      Bus 2A06 is cross-tied to Bus 3A06 due to planned maintenance.

**INITIATING CUE:**            The Control Room Supervisor directs you to RESTORE Bus 2A06 from 1E Cross-Tie operations to the Reserve Auxiliary Transformer 2XR2 per SO23-6-2, Transferring of 4 kV Buses, Section 6.5, Restoring from 1E 4 kV Bus 2A06 to 3A06 Cross-tie Operation.

Facility:	SONGS 2 and 3	Scenario No.:	1	Op Test No.:	October 2009 NRC
Examiners:	_____	Operators:	_____		
	_____		_____		
	_____		_____		
Initial Conditions:	<ul style="list-style-type: none"> <li>99% power MOC - RCS Boron is 1003 ppm (by sample).</li> <li>Train A Component Cooling Water Pump (P-025) in service.</li> <li>Train A Low Pressure Safety Injection Pump (P-015) OOS for oil change.</li> <li>Train A Emergency Diesel Generator (G-002) OOS for governor repair.</li> <li>Fire Computer is OOS.</li> </ul>				
Turnover:	Maintain steady-state power conditions.				
Critical Tasks:	<ul style="list-style-type: none"> <li>Trip the Reactor following multiple CEA drops.</li> <li>Trip any Reactor Coolant Pump not satisfying operating limits (Loss of CCW).</li> <li>Establish minimum design Safety Injection flow rate (SIAS component failure).</li> </ul>				

Event No.	Malf. No.	Event Type*	Event Description
1 +10 min	CH04D	TS (CRS)	Containment Wide Range Pressure Transmitter (PT-0352-4) fails high.
2 +20 min	FC05B	I (BOP, CRS)	Steam Generator (E-088) Main Feedwater Master Controller setpoint fails to 50% level on 60 second ramp.
3 +30 min	RD4403	C (RO, BOP, CRS) TS (CRS)	Dropped CEA #44.
4 +45 min		R (RO) N (BOP, CRS)	Power reduction for dropped CEA.
5 +45 min	RD0303	C (RO, CRS)	Dropped CEA #3. Manual Reactor trip required.
6 +50 min	RC01A	M (RO, BOP, CRS)	Large Break Loss of Coolant Accident upon Unit trip.
7 +50 min	Bus 2A07 XFR LP	I (BOP)	Non-1E 4160 Volt Bus 2A07 auto transfer failure upon Unit trip.
8 +55 min	RP01E	C (RO)	Low Pressure Safety Injection Pump (P-016) fails to auto start.

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

### **SCENARIO SUMMARY NRC #1**

The crew will assume the watch and maintain steady-state conditions per Operating Instruction (OI) SO23-5-1.7, Power Operations.

The first event is a Containment Wide Range Pressure Transmitter failure. The crew will respond per Abnormal Operating Instruction (AOI) SO23-13-18, Reactor Protection System Failure/Loss of Vital Bus and Operating Instruction (OI) SO23-3-2.12, Reactor Protective System Operation. The CRS will evaluate Technical Specifications.

When Technical Specification actions are complete, Steam Generator E-088 Master Controller Setpoint fails to 50%. Entry into AOI SO23-13-24, Feedwater Control System Malfunction is required. The CRS will analyze the cause of the failure using Attachment 1 of SO23-13-24. Steam Generator level control is restored by placing the Master Controller in Manual. When Steam Generator level control is achieved the controller will be returned to automatic operation.

When level control is regained, Control Element Assembly #44 will drop into the core. Crew actions are per AOI SO23-13-13, Misaligned or Immovable Control Element Assembly and include a power reduction as required per procedure. The crew will restore RCS Cold Leg temperature per OI SO23-5-1.7, Power Operations and block any further load changes and then continue with a power reduction as required per SO23-13-13. The CRS will evaluate Technical Specifications.

When the crew commences recovery of CEA #44, a second Control Element Assembly will drop into the core necessitating a manual Reactor trip.

When the Reactor is tripped, a Large Break Loss of Coolant Accident will occur. The crew will enter Emergency Operating Instruction (EOI) SO23-12-1, Standard Post Trip Actions and then transition to EOI SO23-12-3, Loss of Coolant Accident. Post trip events include a Non-1E 4160 Volt Bus that fails to transfer as well as a Low Pressure Safety Injection Pump start failure. Both of these failures require actions on the part of the Reactor and Balance of Plant Operators.

The scenario is terminated when conditions for reactor coolant system cooldown is reached.

#### **Risk Significance:**

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>• Risk important components out of service:</li> </ul>       | <p>LPSI Pump (P-015)</p> <p>Emergency Diesel Generator (G-002)</p>   |
| <ul style="list-style-type: none"> <li>• Failure of risk important system prior to trip:</li> </ul> | <p>Dropped Control Element Assembly</p>  |
| <ul style="list-style-type: none"> <li>• Risk significant core damage sequence:</li> </ul>          | <p>Large Break LOCA</p>  |
| <ul style="list-style-type: none"> <li>• Risk significant operator actions:</li> </ul>              | <p>Trip Reactor Following Multiple CEA Drop</p> <p>Trip RCPs Due to Loss of CCW</p> <p>Establish Minimum Safety Injection Flowrate</p> |

Scenario Event Description

NRC Scenario #1

SONGS

2009 Facility NRC Initial License Examination  
Simulator Scenario Setup

**Machine Operator:**    **EXECUTE IC #221 and NRC Scenario #1 SETUP file to align components.**  
**HANG Control Board Tags on P-015 and G-002.**  
**CHANGE Operator Aid Tags #029 (CVCS) and #005-4 (CVCS Ion Exchanger) to reflect the scenario boron concentration.**  
**VERIFY both Pressurizer Spray Valves in AUTO.**  
**PLACE 2G002 EDG in MAINTENANCE LOCKOUT.**  
**PLACE procedures in progress on the RO desk:**  
**- Copy of SO32-5-1.7, Power Operations open to Section 6.1, Guidelines for Steady State Operation.**  
**PLACE the MOC copies of OPS Physics Summary Book on RO Desk and SO23-5-1.7, Attachment 8 on Control Board.**

**Control Room Annunciators in Alarm:**

**57A51 – SI / ECW TRAIN A INOPERABLE**  
**57A55 – STANDBY POWER SYS TRAIN A INOPERABLE**  
**63B07 – DIESEL GEN 2G002 LOCKOUT RELAY TRIPPED**



Operating Test :	NRC	Scenario #	1	Event #	1	Page	4	of	18
Event Description: Containment Wide Range Pressure Transmitter Failure									
Time	Position	Applicant's Actions or Behavior							

**Machine Operator:** When directed, EXECUTE Event 1.  
- CH04D, Containment Pressure Transmitter (PT-0352-4) fails high.

**Indications Available:**

**56A08 – CTMT PRESS HI-HI ESFAS CHANNEL TRIP**

**56A18 – CTMT PRESS HI-HI ESFAS PRETRIP**

**56B36 – PPS CHANNEL 4 TROUBLE**

+ 1 min	RO	REFER to Annunciator Response Procedures.
	RO	RECOGNIZE Containment Pressure Channel failure and INFORM the CRS AOI SO23-13-18 entry required.
	CRS	DIRECT performance of AOI SO23-13-18, Reactor Protection System Failure/Loss of Vital Bus.
	RO	DETERMINE failure by observing instrumentation for the affected channel and alternate redundant indications monitoring the same parameter.
	RO	IDENTIFY Containment Pressure Channel PT-0352-4 failure.
	CRS	REFER to Attachment 5 and DETERMINE Functional Unit(s) affected.
	RO	PLACE the affected Functional Unit in BYPASS per SO23-3-2.12, Reactor Protection System.
<p><b><u>M.O. Cue:</u></b> When directed, EXECUTE the following Remote Functions:</p> <p>RP51 = OPEN (PPS Door Open Annunciator 56B46)</p> <p>RP55S = BYPASS (Containment Pressure Channel D)</p> <p>Delete RP51 (PPS Door Open Annunciator 56B46)</p>		
	RO	VERIFY the Trip Channel Bypassed Annunciator alarm.
		<ul style="list-style-type: none"> <li>56A59 - PPS CHANNEL 4 TRIP BYPASSED.</li> </ul>
	RO	LOG the BYPASS and reason in the Control Operator Log.

Operating Test : <u>    NRC    </u> Scenario # <u>    1    </u> Event # <u>    1    </u> Page <u>    5    </u> of <u>    18    </u>		
Event Description: <u>    Containment Wide Range Pressure Transmitter Failure    </u>		
Time	Position	Applicant's Actions or Behavior

	CRS	INITIATE a LCOAR or follow guidelines of SO123-0-A5.
+ 10 min	CRS	EVALUATE Technical Specifications.
		<ul style="list-style-type: none"> <li>LCO 3.3.5.A, ESFAS Instrumentation.</li> </ul>
		<ul style="list-style-type: none"> <li>CONDITION A - One or more Functions with one automatic ESFAS trip channel inoperable.</li> <li>ACTION A.1 - Place Functional Unit in bypass or trip within one (1) hour.</li> </ul>
<b><i>When Technical Specifications have been evaluated, or at Lead Evaluator's discretion, PROCEED to Event 2.</i></b>		

Operating Test :	NRC	Scenario #	1	Event #	2	Page	6	of	18
Event Description: Steam Generator E088 Master Controller Setpoint Failure									
Time	Position	Applicant's Actions or Behavior							

**Machine Operator:** When directed, EXECUTE Event 2.  
 - FC05B, E088 Master Controller Setpoint failure to 50% level on 60 second ramp.

**Indications available:**

52A02 – FWCS SG2 E088 LEVEL DEVIATION

52A13 – FWCS TROUBLE

53B23 – CONDENSATE FLOW BALANCE TROUBLE (possible)

SG E088 Feedwater Control Valve modulating closed then opens as SG level stabilizes at 50%  
 SG E088 level lowering

+30 sec	BOP	REFER to Annunciator Response Procedure.
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	BOP	RECOGNIZE E088 Master Controller Setpoint lowering to 50% and INFORM the CRS AOI SO23-13-24 entry required.
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	CRS	DIRECT performance of AOI SO23-13-24, Feedwater Control System Malfunctions.
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	BOP	DETERMINE that SG E088 level is low.
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	BOP	DETERMINE that SG E088 Master Controller output is lowering.
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+5 min	BOP	PLACE SG E088 Master Controller in PREFERRED MANUAL and raise output.
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**Floor Cue:** If required, REPORT as Shift Manager to maintain SG level at 67%.

	BOP	DETERMINE that SG E088 Feed Control Valve is opening.
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	BOP	DETERMINE that Main Feedwater Pumps K-005 and K-006 speed is rising.
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Operating Test : <u>    NRC    </u> Scenario # <u>    1    </u> Event # <u>    2    </u> Page <u>    7    </u> of <u>   18   </u>		
Event Description:     Steam Generator E088 Master Controller Setpoint Failure		
Time	Position	Applicant's Actions or Behavior

<b><u>M.O. Cue:</u>     DELETE malfunction and CONTACT the Control Room as I&amp;C. REPORT the controller logic is fixed and the Master Controller may be returned to AUTO.</b>		
+10 min	BOP	VERIFY SG E088 level is stable at or near program level with SG E088 Master Controller in MANUAL.
<b><i>When SG level is restored, or at Lead Evaluator's discretion, PROCEED to Events 3 and 4.</i></b>		

Operating Test :	NRC	Scenario #	1	Event #	3 and 4	Page	8	of	18
Event Description: Dropped Control Element Assembly #44 / Downpower Due to Dropped CEA									
Time	Position	Applicant's Actions or Behavior							

**Machine Operator:** When directed, EXECUTE Events 3 and 4.  
- RD4403, Dropped Control Element Assembly #44.

**Indications Available:**

50A02 – COLSS ALARM  
 50A28 – CEA DEVIATION  
 50A36 – POWER DEPENDENT INSERTION LIMIT  
 50A37 – PRE-POWER DEPENDENT INSERTION LIMIT  
 50A38 – CEA GROUP DEVIATION  
 50A10 – CEDMCS CEA WITHDRAWAL PROHIBIT  
 56A03 – LOCAL POWER DENSITY HI CHANNEL TRIP  
 56A04 – DNBR LO CHANNEL TRIP  
 56A13 – LOCAL POWER DENSITY HI PRETRIP  
 56A14 – DNBR LO RPS PRETRIP  
 CEA #44 Rod Bottom indication

+30 sec	RO	RECOGNIZE that Regulating Group 5 CEA #44 has dropped and INFORM the CRS AOI SO23-13-13 entry required.
	CRS	DIRECT performance of AOI SO23-13-13, Misaligned or Immovable Control Element Assembly.
	RO	VERIFY that no more than one CEA is misaligned > 7 inches.
	RO	ENSURE CEDMCS Mode Selector Switch in OFF.
	BOP	REDUCE Turbine load to restore RCS Tcold to the pre-CEA drop value and BLOCK load changes.
<b><u>M.O. Cue:</u></b> If sent as Radwaste or I&C to investigate CEDMCS, WAIT 5 minutes and REPORT that a tripped breaker was located. REQUEST permission to reclose one time.		
	RO	VERIFY Reactor is critical.
	CRS	RECORD initial and stabilized reactor power for subsequent SDM calculation.
	CRS	Within 15 minutes, DIRECT monitoring of DNBR and LPD per SO23-3-3.6, Attachment for DNBR Margin and Linear Heat Rate Limit Monitoring.

Operating Test :	NRC	Scenario #	1	Event #	3 and 4	Page	9	of	18
Event Description: Dropped Control Element Assembly #44 / Downpower Due to Dropped CEA									
Time	Position	Applicant's Actions or Behavior							

<b>Floor Cue:</b> The Work Control Supervisor will complete the DNBR and LPD monitoring in accordance with SO23-3-3.6, Attachment 1.		
	CRS	DIRECT performance of Attachment 3, Misaligned CEA Checklist.
<b>Floor Cue:</b> The Work Control Supervisor will also complete SO23-3-3.6, Attachment 3.		
	CRS	Within 15 minutes of discovery, DIRECT initiation of Reactor power reduction.
		<ul style="list-style-type: none"> <li>For Non Group 6 Full Length CEA, REDUCE power 10% within 60 minutes.</li> </ul>
<b>Examiner Note:</b> CRS should recognize that power reduction due to dropped CEA (~3%) satisfies the 15 minute requirement to initiate a power reduction. The remaining power reduction must be accomplished within 60 minutes.		
	BOP	COMMENCE lowering Turbine Generator load using CVOL while maintaining Tcold per SO23-5-1.7, Power Operations.
	CRS	DIRECT initiation of boration of the RCS per SO23-3-2.2, Makeup Operations to achieve target power level.
	RO	COMMENCE attempting to control ASI near full power ESI.
<b>Floor Cue:</b> If required, DIRECT CRS as the Shift Manager to commence the downpower.		
	CRS	REQUEST Reactor Engineering to report to the Control Room.
	CRS	INITIATE recovery of affected CEA per Attachment 1.
	RO	VERIFY CEA position indications agree:
		<ul style="list-style-type: none"> <li>COMPARE affected CEA PIDs from CEAC No. 1 and 2 at CPC Operator Console.</li> </ul>

Operating Test :	NRC	Scenario #	1	Event #	3 and 4	Page	10	of	18
Event Description: Dropped Control Element Assembly #44 / Downpower Due to Dropped CEA									
Time	Position	Applicant's Actions or Behavior							

		<ul style="list-style-type: none"> <li>COMPARE affected CEA PIDs from CEAC No. 1 and 2 at Secondary Rod Position CRT.</li> </ul>
		<ul style="list-style-type: none"> <li>CHECK UEL and LEL lights.</li> </ul>
	RO/CRS	VERIFY one CEA has not been misaligned >7 inches for an unknown duration.
	CRS	DIRECT performance of SO23-3-2.19, CEDMCS Operation to confirm that the CEA is movable in the Manual Individual Mode.
	RO	WITHDRAW CEA #44 using the Manual Individual Mode per SO23-3-2.19.
	CRS/RO	REALIGN CEA #44 to the group per SO23-3-2.19, CEDMCS Operation.
+20 min	CRS	EVALUATE Technical Specifications.
		<ul style="list-style-type: none"> <li>LCO 3.1.5.A, Control Element Assembly Alignment.</li> </ul>
		<ul style="list-style-type: none"> <li>CONDITION A - One Regulating CEA trippable and misaligned from its group by &gt;7 inches.</li> <li>ACTION A.1 - Initiate THERMAL POWER reduction in accordance with COLR requirements within 15 minutes.</li> <li>ACTION A.2 - Restore the misaligned CEA(s) to within 7 inches of its group within two (2) hours.</li> </ul>
<b><u>Examiner Note:</u> Event 5 can be performed at any time during CEA #44 recovery.</b>		
<b><i>When a 3-5% power reduction is completed, or at Lead Evaluator's discretion, PROCEED to Event 5.</i></b>		

Operating Test : <u>    NRC    </u> Scenario # <u>    1    </u> Event # <u>    5    </u> Page <u>    11    </u> of <u>    18    </u>		
Event Description: <u>    Dropped Control Element Assembly #3 / Manual Reactor Trip Required    </u>		
Time	Position	Applicant's Actions or Behavior

**Machine Operator:**     **When directed, EXECUTE Event 5.**  
                                       **- RD0303, Dropped CEA #3.**

**Indications Available:**

**50A28 – CEA DEVIATION**

**50A38 – CEA GROUP DEVIATION**

**50A10 – CEDMCS CEA WITHDRAWAL PROHIBIT**

**CEA #3 Rod Bottom indication**

+10 secs	RO	RECOGNIZE 2 <sup>nd</sup> dropped CEA #3 and manually INITIATE a Reactor trip.
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**CRITICAL TASK  
STATEMENT**

**Within five (5) minutes of a second CEA dropping into the Core, trip the Reactor.**

**Elapsed Time: \_\_\_\_\_**

**CRITICAL  
TASK**

RO/BOP

MANUALLY TRIP the Reactor.

+1 min	CRS	DIRECT performance of SO23-12-1, Standard Post Trip Actions.
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***When the Reactor is tripped, or at Lead Evaluator's discretion, PROCEED to Events 6, 7, and 8.***



Operating Test :	NRC	Scenario #	1	Event #	6, 7, & 8	Page	12	of	18
Event Description: Large Break LOCA / Bus 2A07 Transfer Failure / LPSI Pump Auto Start Failure									
Time	Position	Applicant's Actions or Behavior							

**Machine Operator:** When directed, EXECUTE Events 6, 7, and 8.  
 - RC01A, Large Break LOCA.  
 - Bus 2A07 LP, Bus 2A07 Transfer Failure.  
 - RP01E, LPSI Pump P016 fails to auto start.

**Indications available:**

Numerous Reactor and Turbine trip related alarms

	CRS	DIRECT performance of SO23-12-1, Standard Post Trip Actions.
	RO	VERIFY Reactor Trip:
		<ul style="list-style-type: none"> <li>VERIFY Reactor Trip Circuit Breakers (8) open.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY Reactor Power lowering and Startup Rate negative.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY maximum of one full length CEA NOT fully inserted.</li> </ul>
	CRS	VERIFY Reactivity Control criteria satisfied.
	BOP	VERIFY Turbine Trip:
		<ul style="list-style-type: none"> <li>VERIFY Main Turbine tripped.</li> </ul>
		<ul style="list-style-type: none"> <li>HP and LP Stop and Governor Valves closed.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY both Unit Output Breakers open.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY Main Turbine speed &lt; 2000 RPM or lowering.</li> </ul>
	CRS	INITIATE Administrative Actions:
		<ul style="list-style-type: none"> <li>ANNOUNCE Reactor trip via PA System.</li> </ul>
		<ul style="list-style-type: none"> <li>INITIATE Attachment 4, Worksheet.</li> </ul>
		<ul style="list-style-type: none"> <li>INITIATE Attachment 5, Administrative Actions.</li> </ul>
	BOP	VERIFY Vital Auxiliaries criteria satisfied:
		<ul style="list-style-type: none"> <li>VERIFY both 1E 4 kV Buses A04 and A06 energized.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY both 1E 480 V Buses B04 and B06 energized.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY all 1E DC Buses energized.</li> </ul>

Operating Test :	NRC	Scenario #	1	Event #	6, 7, & 8	Page	13	of	18
Event Description: Large Break LOCA / Bus 2A07 Transfer Failure / LPSI Pump Auto Start Failure									
Time	Position	Applicant's Actions or Behavior							

	BOP	<ul style="list-style-type: none"> <li>DETERMINE one Non-1E 4 kV Bus deenergized.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] TRANSFER Non-1E 4 kV Bus 2A07 to Reserve Auxiliary Transformer.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>VERIFY both CCW Trains operating and NOT aligned to Non-Critical Loop and Letdown Heat Exchanger.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] If CIAS actuated, ENSURE all RCPs stopped.</li> </ul>
<b>CRITICAL TASK STATEMENT</b> Within 10 minutes of a loss of CCW or low subcooling alarm annunciation, the affected RCP(s) will be stopped. Elapsed Time: _____		
<b>CRITICAL TASK</b>	BOP	STOP all RCPs due to CIAS.
	RO	DETERMINE RCS Inventory Control criteria NOT satisfied:
		<ul style="list-style-type: none"> <li>DETERMINE PZR level NOT between 10% and 70% AND NOT trending to between 30% and 60%.</li> </ul>
		<ul style="list-style-type: none"> <li>DETERMINE Core Exit Saturation Margin &lt; 20°F:</li> </ul>
		<ul style="list-style-type: none"> <li>QSPDS page 611.</li> </ul>
		<ul style="list-style-type: none"> <li>CFMS page 311.</li> </ul>
<b>CRITICAL TASK STATEMENT</b> Within 15 minutes of SFSC Inventory Control completion following RCS pressure falling below 1400 psia, the crew establishes the required SI flow. Elapsed Time: _____		
<b>CRITICAL TASK</b>	RO	ESTABLISH minimum design Safety Injection flowrate; START LPSI Pump P016.
	RO	DETERMINE RCS Pressure Control criteria NOT satisfied:
		<ul style="list-style-type: none"> <li>DETERMINE PZR pressure (WR and NR) NOT between 1740 PSIA and 2380 PSIA AND NOT trending to between 2025 PSIA and 2275 PSIA.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] DETERMINE PZR Pressure Control System is NOT restoring PZR pressure.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] ENSURE Normal and Aux Spray valves closed.</li> </ul>

Operating Test :	NRC	Scenario #	1	Event #	6, 7, & 8	Page	14	of	18
Event Description: Large Break LOCA / Bus 2A07 Transfer Failure / LPSI Pump Auto Start Failure									
Time	Position	Applicant's Actions or Behavior							

		<ul style="list-style-type: none"> <li>[RNO] If PZR pressure (WR) is less than 1740 psia, ENSURE SIAS/CCAS/CRIS actuated.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] If PZR pressure (WR) is less than 1430 psia, ENSURE one RCP and each loop stopped.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] If RCP NPSH requirements of Attachment 3 NOT satisfied, THEN ENSURE all RCPs stopped.</li> </ul>
	RO	DETERMINE Core Heat Removal criteria is NOT satisfied:
		<ul style="list-style-type: none"> <li>DETERMINE no RCPs operating.</li> </ul>
		<ul style="list-style-type: none"> <li>DETERMINE Core Exit Saturation Margin &lt; 20°F.</li> </ul>
		<ul style="list-style-type: none"> <li>QSPDS page 611.</li> </ul>
		<ul style="list-style-type: none"> <li>CFMS page 311.</li> </ul>
	BOP	DETERMINE RCS Heat Removal criteria NOT satisfied:
		<ul style="list-style-type: none"> <li>VERIFY at least one SGs level between 21% and 80% NR AND Feedwater available.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] ENSURE EFAS actuated.</li> </ul>
		<ul style="list-style-type: none"> <li>DETERMINE <math>T_{cold} &lt; 545^{\circ}\text{F}</math> and NOT controlled.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] ENSURE SBSCS valves closed.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] ENSURE ADVs closed.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] ENSURE SG Blowdown valves closed.</li> </ul>
		<ul style="list-style-type: none"> <li><u>E-088</u> - HV-4054      <u>E-089</u> - HV-4053</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] ENSURE Main Steam to Reheater Valves closed.</li> </ul>
		<ul style="list-style-type: none"> <li>HV-2703 or HV-2704; HV-2721; HV-2751</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY SG pressures &gt; 740 PSIA.</li> </ul>
	BOP	DETERMINE MSIVs closed due to CIAS.
	RO	DETERMINE Containment Isolation criteria NOT satisfied:
		<ul style="list-style-type: none"> <li>DETERMINE Containment pressure &gt; 1.5 PSIG.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] DETERMINE Containment pressure &gt; 3.4 PSIG.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] ENSURE SIAS, CIAS, CCAS, and CRIS actuated.</li> </ul>

Operating Test :	NRC	Scenario #	1	Event #	6, 7, & 8	Page	15	of	18
Event Description: Large Break LOCA / Bus 2A07 Transfer Failure / LPSI Pump Auto Start Failure									
Time	Position	Applicant's Actions or Behavior							

	RO/BOP	<ul style="list-style-type: none"> <li>DETERMINE Containment Area Radiation Monitors energized AND alarming or trending to alarm.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY Secondary Plant Radiation Monitors energized AND NOT alarming or trending to alarm.</li> </ul>
	RO	DETERMINE Containment Temperature and Pressure criteria NOT satisfied:
		<ul style="list-style-type: none"> <li>DETERMINE Containment average temperature &gt; 120°F.</li> </ul>
		<ul style="list-style-type: none"> <li>DETERMINE Containment pressure &gt; 1.5 PSIG.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] ENSURE proper functioning of the Normal Containment Cooling.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] ENSURE at least one Containment Dome Air Circulator operating.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] DETERMINE Containment pressure &gt; 3.4 PSIG.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] ENSURE all RCPs stopped.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] ENSURE all available Containment Emergency Cooling Units operating.</li> </ul>
		<ul style="list-style-type: none"> <li>DETERMINE Containment pressure &gt; 14 PSIG.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] ENSURE CSAS actuated.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] ENSURE all available Containment Spray Header flows greater than 1600 gpm.</li> </ul>
+15 min	CRS	DIAGNOSE Event in Progress:
		<ul style="list-style-type: none"> <li>DETERMINE most Safety Function criteria are NOT met per Attachment 4, Worksheet.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] COMPLETE Attachment 1, Recovery Diagnostics.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] DIAGNOSE Loss of Coolant Accident.</li> </ul>
		<ul style="list-style-type: none"> <li>DETERMINE that Reactor Trip Recovery is NOT diagnosed.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] DETERMINE all RCPs stopped.</li> </ul>
		<ul style="list-style-type: none"> <li>DIRECT initiating Steps 12 through 15.</li> </ul>
	BOP	INITIATE Steps 12 through 15.
	CRS	DIRECT performance of SO23-12-3, LOCA.
		<ul style="list-style-type: none"> <li>RECORD time of EOI entry _____.</li> </ul>

Operating Test :	NRC	Scenario #	1	Event #	6, 7, & 8	Page	16	of	18
Event Description: Large Break LOCA / Bus 2A07 Transfer Failure / LPSI Pump Auto Start Failure									
Time	Position	Applicant's Actions or Behavior							

+15 min	CRS	VERIFY LOCA diagnosis:
		<ul style="list-style-type: none"> <li>INITIATE SO23-12-10, Safety Function Status Checks.</li> </ul>
		<ul style="list-style-type: none"> <li>INITIATE Foldout Page.</li> </ul>
		<ul style="list-style-type: none"> <li>DIRECT performance of FS-7, Verify SI Throttle/Stop Criteria.</li> </ul>
		<ul style="list-style-type: none"> <li>DIRECT performance of FS-3, Monitor Natural Circulation.</li> </ul>
		<ul style="list-style-type: none"> <li>DIRECT performance of Attachment 22, Non-Qualified Loads Restoration.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY LOCA diagnosis using Figure 1, Break Identification Chart.</li> </ul>
		<ul style="list-style-type: none"> <li>INITIATE sampling of both Steam Generators for radioactivity and boron.</li> </ul>
<b><u>M.O. Cue:</u></b> If directed to sample SGs, WAIT 5 minutes and then REPORT that E088 and E089 both have activity near background, and normal boron levels. If the SG sample valves are closed, REPORT unable to establish sample flow.		
	CRS	INITIATE Administrative actions:
		<ul style="list-style-type: none"> <li>NOTIFY Shift Manager/Operations Leader of SO23-12-3, Loss of Coolant Accident initiation.</li> </ul>
		<ul style="list-style-type: none"> <li>ENSURE Emergency Plan is initiated.</li> </ul>
		<ul style="list-style-type: none"> <li>IMPLEMENT Placekeeper.</li> </ul>
	RO	VERIFY ESF actuation.
		<ul style="list-style-type: none"> <li>ENSURE the following actuated:</li> </ul>
		<ul style="list-style-type: none"> <li>SIAS / CCAS / CRIS</li> </ul>
	CRS	RECORD time of SIAS.
	BOP	STOP unloaded Train B Diesel Generator (SIAS Override STOP).
	BOP	INITIATE SO23-12-11, Attachment 22, Non-Qualified Load Restoration.
<b><u>M.O. Cue:</u></b> When directed to restore non-qualified loads, WAIT 2 minutes, then EXECUTE ED85, Non-Qualified Loads Restoration. INFORM the Control Room that you have restored Non-Qualified Loads.		

Operating Test :	NRC	Scenario #	1	Event #	6, 7, & 8	Page	17	of	18
Event Description: Large Break LOCA / Bus 2A07 Transfer Failure / LPSI Pump Auto Start Failure									
Time	Position	Applicant's Actions or Behavior							

	RO	ESTABLISH Optimum SI Alignment:
		<ul style="list-style-type: none"> <li>ESTABLISH two train operation.</li> </ul>
		<ul style="list-style-type: none"> <li>All Charging Pumps operating.</li> </ul>
		<ul style="list-style-type: none"> <li>One Train B HPSI and one Train B LPSI operating.</li> </ul>
		<ul style="list-style-type: none"> <li>One Train A HPSI operating.</li> </ul>
		<ul style="list-style-type: none"> <li>All Cold leg flow paths aligned.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY SI flow required:</li> </ul>
		<ul style="list-style-type: none"> <li>SI flow indicated.</li> </ul>
	RO	VERIFY PZR pressure:
		<ul style="list-style-type: none"> <li>DETERMINE RCP NPSH requirements of SO23-12-11, Attachment 29 NOT satisfied.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] VERIFY all RCPs stopped.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] INITIATE FS-3, Monitor Natural Circulation.</li> </ul>
	RO	VERIFY Letdown isolated.
	RO	VERIFY outside Containment radiation alarms - NOT alarming or trending to alarm.
	RO	VERIFY outside Containment sump levels - NOT abnormally rising.
	RO	VERIFY RCS sample valves, RCS and PZR head vents are closed.
	RO	VERIFY CCW parameters are normal.
	CRS/RO	VERIFY PZR Safety Valves are closed.

Operating Test : <u>  NRC  </u> Scenario # <u>  1  </u> Event # <u>  6, 7, &amp; 8  </u> Page <u>  18  </u> of <u>  18  </u>		
Event Description:      Large Break LOCA / Bus 2A07 Transfer Failure / LPSI Pump Auto Start Failure		
Time	Position	Applicant's Actions or Behavior

	CRS/RO	DETERMINE rate of RCS inventory and pressure loss greater than available Charging Pump capacity.
+30 min	CRS	DIRECT initiation of RCS cooldown.
<p><b><i>When the RCS cooldown is initiated, or at Lead Evaluator's discretion, TERMINATE the scenario.</i></b></p>		

Facility:	SONGS 2 and 3	Scenario No.:	2	Op Test No.:	October 2009 NRC
Examiners:	_____	Operators:	_____		
	_____		_____		
	_____		_____		

  

Initial Conditions:	<ul style="list-style-type: none"> <li>74% power BOC - RCS Boron is 1687 ppm (by sample).</li> <li>Train A Component Cooling Water Pump (P-025) in service.</li> <li>Train A Low Pressure Safety Injection Pump (P-015) OOS for oil change.</li> <li>Train A Emergency Diesel Generator (G-002) OOS for governor repair.</li> <li>Condensate Pump (P-050) OOS for coupling alignment.</li> <li>Fire Computer is OOS.</li> </ul>
Turnover:	Maintain steady-state power conditions.
Critical Tasks:	<ul style="list-style-type: none"> <li>Restore Component Cooling Water flow to the Non-Critical Loop.</li> <li>Restore power to at least one 1E 4 kV Bus (Station Blackout).</li> <li>Restore Feedwater flow to at least one Steam Generator (Loss of Feedwater).</li> </ul>

  

Event No.	Malf. No.	Event Type*	Event Description
1 +10 min	ED11	TS (CRS)	Loss of Control Room Annunciators.
2 +15 min	FW08B	C (BOP, CRS)	Main Feedwater Pump Turbine (P-063) loss of oil pressure.
3 +35 min		R (RO) N (BOP, CRS)	Rapid Power Reduction to 70% for loss of one Main Feed Pump.
4 +50 min	ED03A	C (RO, BOP, CRS) TS (CRS)	Loss of 1E 4160 Volt Bus 2A04.
5 +50 min	TU08 PG24	M (RO, BOP, CRS)	Loss of Offsite Power.
6 +50 min	EG08B	M (RO, BOP, CRS)	Emergency Diesel Generator (G-003) fails to start. Station Blackout.
7 +55 min	FW25	C (BOP)	Turbine Driven Auxiliary Feedwater Pump (P-140) trips on overspeed (300 seconds post-trip). Loss of Feedwater.
8 + min	CVCS LP	I (RO)	Boric Acid Makeup Tank Gravity Feed Valves fail to open during boration.

  

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS)Technical Specifications
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**SCENARIO SUMMARY NRC #2**

The crew will assume the watch and maintain steady-state conditions per Operating Instruction (OI) SO23-5-1.7, Power Operations.

The first event is a Loss of Control Room Annunciators. The crew will respond per Abnormal Operating Instruction (AOI) SO23-13-22, Loss of Control Room Annunciators. Actions include aligning an alternate power supply to the Control Room Annunciators. The CRS will evaluate Technical Specifications.

When the annunciators are restored, a loss of oil pressure to Main Feedwater Pump P-063 will occur. The crew will respond per the Annunciator Response Procedures (ARP) and AOI SO23-13-24, Feedwater Control System Malfunction and determine that a Main Feedwater Pump trip is warranted. This will necessitate entry into AOI SO23-13-28, Rapid Power Reduction in order to low power below the threshold for one (1) Main Feedwater Pump operation.

When plant conditions are stable, a loss of 1E 4160 Volt Bus 2A04 will occur. The crew will enter the AOI SO23-13-26, Loss of Power to an AC Bus. Crew actions include placing a Charging Pump in service as well as transferring to the Train B Component Cooling Water System. The CRS will evaluate Technical Specifications.

The major event is a Loss of Offsite Power that requires entry into Emergency Operating Instruction (EOI) SO23-12-1, Standard Post Trip Actions. During performance of the Standard Post Trip Actions, the Train B Emergency Diesel Generator fails to start. Additionally, five (5) minutes post-trip the Turbine Driven Auxiliary Feedwater Pump will trip on overspeed. With a Station Blackout and Loss of Feedwater, the CRS will be required to enter Functional Recovery Procedure (FRP) SO23-12-9, Functional Recovery. Boric Acid Makeup Tank Gravity Feed Valves fail to open during boration and the Reactor Operator will be required to manually align the Refueling Water Storage Tank.

With Switchyard power unavailable, restoration of Unit 2 1E 4160 Volt Bus 2A06 will be via a crosstie with Unit 3 1E 4160 Volt Bus 3A06. Once the crosstie is successful, Auxiliary Feedwater Pump P-504 can be started to restore feedwater flow to Steam Generator E-088.

The scenario is terminated when the 1E Bus is reenergized, feedwater flow is restored, and boration via the RWST is commenced.

**Risk Significance:**

- Risk important components out of service: LPSI Pump (P-015)  
Emergency Diesel Generator (G-002)
- Failure of risk important system prior to trip: Loss of 4160 V Bus 2A04
- Risk significant core damage sequence: Station Blackout with Loss of Feedwater
- Risk significant operator actions: Restore Flow to Non-Critical Loop  
Crosstie Bus 3A06 with Bus 2A06  
Align Feedwater Flow to a Steam Generator

Scenario Event Description

NRC Scenario #2

SONGS

2009 Facility NRC Initial License Examination  
Simulator Scenario Setup

**Machine Operator:** EXECUTE IC #222 and NRC Scenario #2 SETUP file to align components.  
HANG Control Board Tags on P-015, P-050 and G-002.  
CHANGE Operator Aid Tags #029 (CVCS) and #005-4 (CVCS Ion Exchanger) to reflect the scenario born concentration.  
RESET CVCS Batch Counters to zero (0).  
VERIFY both Pressurizer Spray Valves in AUTO.  
PLACE Channel X Pressurizer Pressure and Pressurizer Level in service.  
PLACE procedures in progress on the RO desk:  
- Copy of SO23-5-1.7, Power Operations open to Section 6.1, Guidelines for Steady State Operation.  
PLACE the BOC copies of OPS Physics Summary Book on RO Desk and SO23-5-1.7, Attachment 8 on Control Board.  
If Group Position(s) is (are) not correct, MOVE CEAs and then RETURN CEAs to Shift Turnover Sheet position (Group 6 @ 137 / PLCEAs @ 115).

**Control Room Annunciators in Alarm:**

57A51 – SI / ECW TRAIN A INOPERABLE  
57A55 – STANDBY POWER SYS TRAIN A INOPERABLE  
63B07 – DIESEL GEN 2G002 LOCKOUT RELAY TRIPPED

Operating Test :	NRC	Scenario #	2	Event #	1	Page	4	of	22
Event Description: Loss of Control Room Annunciators									
Time	Position	Applicant's Actions or Behavior							

**Machine Operator:** When directed, EXECUTE Event 1.  
- ED11, Loss of Control Room Annunciators.

**Indications Available:**

**UA20050C – ANNUNCIATOR SYSTEM LOSS OF POWER**

+30 secs	RO	REFER to Annunciator Response Procedures.
	RO	RECOGNIZE Annunciator System Loss of Power alarm and INFORM CRS ARP SO23-15-50.A2, Annunciator UA20050C entry required.
	CRS	DIRECT performance of ARP SO23-15-50.A2, UA20050C - ANNUNCIATOR SYSTEM LOSS OF POWER.
	CRS	DIRECT testing of all Control Room Annunciator panels.
	CRS	DIRECT performance of SO23-13-22, Loss of Control Room Annunciators.
	CRS/RO	DETERMINE loss of all Control Room annunciators has occurred.
	CRS	INITIATE SO23-13-22, Attachment for Guidelines for Monitoring of Plant Parameters.
	CRS	DETERMINE activities in progress which could potentially disrupt plant stability.
	CRS	RECOGNIZE that if annunciators are lost for 15 minutes, an Unusual Event must be declared per Tab D1-2.
	CRS	INITIATE SO23-13-22, Attachment for Power Loss Determination and Recovery.

**Examiner Cue:** As long as the Plant Computer System (PCS) is OPERABLE, then Technical Specification LCOs 3.2.1, 3.2.3, 3.2.4, and SR 3.3.7.1 are Not Applicable (N/A).

Operating Test :	NRC	Scenario #	2	Event #	1	Page	5	of	22
Event Description: Loss of Control Room Annunciators									
Time	Position	Applicant's Actions or Behavior							

+5 min	CRS	EVALUATE Technical Specifications.
		<ul style="list-style-type: none"> <li>LCO 3.1.7.E, Regulating CEA Insertion Limits.</li> </ul>
		<ul style="list-style-type: none"> <li>CONDITION E - PDIL Alarm Circuit INOPERABLE.</li> <li>ACTION E.1 - Within one (1) hour, PERFORM SO23-3-3.6, Attachment for PDIL Alarm Circuit INOPERABLE.</li> </ul>
	CRS	REVIEW additional Technical Specifications as time permits.
	CRS	VERIFY Bus D5 energized.
	CRS	DISPATCH an Operator to Panel D5 and VERIFY Breaker 6, Panel D5P4 Supply Breaker, is closed.
<b><u>M.O. Cue:</u> If directed to check breaker 2D5-06, WAIT 1 minute then REPORT Breaker 2D5-06 is closed.</b>		
	CRS	DIRECT an Operator to CHECK Panel D5P4 Breaker 74, Panel L-040 supply breaker.
<b><u>M.O. Cue:</u> If directed to check Panel 2D5P4 breaker 74, REPORT 2D5P4 Breaker 74 is in a tripped condition, and no visible signs of distress.</b>		
	CRS	DIRECT Electrical Maintenance to assist in troubleshooting and restoration of loss of annunciators.
<b><u>M.O. Cue:</u> If Maintenance is directed to investigate Panel 2D5P4, WAIT 1 minute then REPORT no apparent reason for tripped Breaker 74.</b>		
<b><u>Floor Cue:</u> If operator is directed to inspect Panel 2L-040, REPORT no power indicated (all lights extinguished), and no visible sign of distress.</b>		
	CRS	DIRECT a PEO to PERFORM a RECLOSE attempt on D5P4 Breaker 74.

Operating Test : <u>    NRC    </u> Scenario # <u>    2    </u> Event # <u>    1    </u> Page <u>    6    </u> of <u>    22    </u>		
Event Description: <u>Loss of Control Room Annunciators</u>		
Time	Position	Applicant's Actions or Behavior

<b><u>M.O. Cue:</u>     If directed to close 2D5P4 Breaker 74, WAIT 1 minute, then DELETE ED11 and REPORT closure to Control Room.</b>		
	CRS/RO	RECOGNIZE that annunciator power is restored.
	CRS	DIRECT testing of all Control Room annunciators.
+10 min	RO/BOP	TEST all Control Room annunciators and INFORM CRS they are operational.
<b><i>When annunciator power is restored, or at Lead Evaluator's discretion, PROCEED to Events 2 and 3.</i></b>		

Operating Test :	NRC	Scenario #	2	Event #	2 & 3	Page	7	of	22
Event Description: Main Feedwater Pump Trip / Rapid Power Reduction									
Time	Position	Applicant's Actions or Behavior							

**Machine Operator:** When directed, EXECUTE Event 2.  
- FW08B, Main Feedwater Pump (K005/P063) loss of lube oil.

**Indications Available:**

53B11 – MFWP TURBINE K005 OIL PRESS LO PRETRIP

53B32 – MFWP TURBINE K005 DC OIL PUMP RUNNING

53B33 – MFWP TURBINE K005 OIL PUMP OOS / OC (after standby pump start)

53B41 – MFWP TURBINE K005 OIL LEVEL HI / LO (~15 seconds later)

+30 secs	BOP	REFER to Annunciator Response Procedures.
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	BOP	RECOGNIZE Main Feedwater Pump loss of lube oil and INFORM the CRS ARP SO23-15-53.B.11 entry required.
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	CRS	DIRECT performance of SO23-15-53.B.11, MFWP TURBINE K005 OIL PRESS LO PRETRIP.
--	-----	--

	CRS/BOP	DISPATCH a PEO to investigate cause of low lube oil pressure.
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**M.O.Cue:** After one (1) minute, REPORT an oil line pipe rupture on Main Feedwater Pump P-063.

	BOP	VERIFY START of the standby AC Lube Oil Pump.
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	BOP	VERIFY the DC lube oil pump is running.
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	CRS/BOP	DETERMINE Main Feedwater Pump will eventually be tripped due to a loss of lube oil.
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	CRS	DIRECT tripping Main Feedwater Pump P063.
--	-----	---

	BOP	TRIP Main Feedwater Pump P063 trip and INFORM the CRS AOI SO23-13-28 entry required.
--	-----	--

	CRS	DIRECT a Rapid Power Reduction using CEAs and/or boration per SO23-13-28, Rapid Power Reduction.
--	-----	--

Operating Test :	NRC	Scenario #	2	Event #	2 & 3	Page	8	of	22
Event Description: Main Feedwater Pump Trip / Rapid Power Reduction									
Time	Position	Applicant's Actions or Behavior							

**Examiner Note:** The following steps are from SO23-13-28, Rapid Power Reduction.

	CRS	DIRECT EFAS initiation to restore SG level.
+5 min	RO/BOP	INITIATE EFAS by depressing all EFAS Actuation pushbuttons once.
	RO	BORATE as required using the Alternate Boration Flowpath through HV-9247.
	BOP	ENSURE all available Condensate Pumps running.
	RO	INSERT CEAs as required.
	BOP	INITIATE a Manual Runback for Turbine load change.
	BOP	ENSURE Feedwater Control Valves < 100% open and controlling level.
	BOP	ENSURE Steam Generator level(s) stable or rising.
	BOP	ENSURE Low Level Alarm(s) reset.
	RO/BOP	DEPRESS all EFAS Actuation Pushbuttons a second time to reset the cycling relays.
	CRS	CONTACT Chemistry and the GOC and inform them of the Rapid Power Reduction.
	RO	IMPLEMENT Attachment 8 to determine the amount of boration and CEAs to be used to achieve the target power level.

Operating Test : <u>    NRC    </u> Scenario # <u>    2    </u> Event # <u>    2 &amp; 3    </u> Page <u>    9    </u> of <u>    22    </u>		
Event Description: <u>    Main Feedwater Pump Trip / Rapid Power Reduction    </u>		
Time	Position	Applicant's Actions or Behavior

+ 20 min	RO	FORCE Pressurizer normal spray flow.
<p><b><i>When power level is stable at approximately 70%, or at Lead Evaluator's discretion, PROCEED to Event 4.</i></b></p>		



Operating Test :	NRC	Scenario #	2	Event #	4	Page	10	of	22
Event Description: Loss of Bus 2A04									
Time	Position	Applicant's Actions or Behavior							

**Machine Operator:** When directed, EXECUTE Event 4.  
- ED03A, Bus 2A04 overcurrent trip and lockout.

**Indications Available:**

63B05 – 2A04 VOLTAGE LO

63B06 – 2B04 VOLTAGE LO

63B25 – 2A04 SUPPLY BREAKER 2A0418 OC

+30 sec	RO/BOP	REFER to Annunciator Response Procedures.
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	RO/BOP	RECOGNIZE low Bus 2A04 voltage and INFORM the CRS AOI SO23-13-26 entry required.
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	CRS	DIRECT performance of AOI SO23-13-26, Loss of Power to an AC Bus, Attachment 1, Loss of 1E 4 kV Bus.
--	-----	--

	CRS	DIRECT starting of Train B CCW.
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	BOP	PLACE Train B CCW in service.
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<b>CRITICAL TASK STATEMENT</b>	<b>With loss of flow to the CCW Non-Critical Loop and prior to exceeding RCP operating limits, restore flow to the NCL from any available CCW train.</b>	
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<b>CRITICAL TASK</b>	BOP	TRANSFER the CCW Non-Critical Loop to Train B.
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	BOP	TRANSFER Letdown Heat Exchanger to Train B CCW.
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	CRS	DETERMINE that loss of 2A04 is NOT due to fire.
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**M.O. Cue:** When directed to investigate 2A0418 overcurrent, WAIT 3 minutes and REPORT an overcurrent flag on Phase B.

	CRS	DIRECT performance of SO23-6-9, 6.9 kV, 4 kV and 480 V Bus Feeder Faults.
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Operating Test :	NRC	Scenario #	2	Event #	4	Page	11	of	22
Event Description: Loss of Bus 2A04									
Time	Position	Applicant's Actions or Behavior							

	CRS	DIRECT performance of AOI SO23-13-26, Loss of Power to an AC Bus, Attachment 3, Equipment Actions for Loss of Bus A04.
	BOP	ENSURE Train B SWC Pump running.
	BOP	VERIFY 2G002 Maintenance Lockout Switch in LOCKOUT.
	CRS	Within 1 hour, DIRECT performance of SO23-3-3.23, Attachment for AC Sources Verification for both Units.
	RO	PLACE HS-0210, Makeup Mode Selector Switch to MANUAL and PLACE a Caution Tag at the switch to prevent inadvertent dilution.
+5 min	CRS	EVALUATE Technical Specifications.
		<ul style="list-style-type: none"> <li>LCO 3.8.4.A, DC Sources - Operating.</li> </ul>
		<ul style="list-style-type: none"> <li>CONDITION A - One battery or associated control equipment or cabling inoperable.</li> <li>ACTION A.1 - Restore DC electrical power subsystem to OPERABLE status within two (2) hours.</li> </ul>
<b><u>Examiner Note:</u> DNBR may or may not be bypassed.</b>		
	CRS	DIRECT Bypassing Channel A DNBR and LPD trips.
<b><u>M.O. Cue:</u></b> When directed, EXECUTE the following remote functions: RP51 = OPEN (PPS Door Open Annunciator 56B46) RP52C = BYPASS (Channel A Hi Local Power) RP52D = BYPASS (Channel A Low DNBR) Delete RP51 (PPS Door Open Annunciator 56B46)		
	RO	VERIFY the Trip Channel Bypassed Annunciator alarms.
		<ul style="list-style-type: none"> <li>56A29 - PPS CHANNEL 1 TRIP BYPASSED</li> </ul>
	CRS	DIRECT setting CEAC 2 INOP Flags in all CPCs by changing each CPC Addressable Constant Point ID 062 to 2.

Operating Test : <u>    NRC    </u> Scenario # <u>    2    </u> Event # <u>    4    </u> Page <u>  12  </u> of <u>  22  </u>		
Event Description: Loss of Bus 2A04		
Time	Position	Applicant's Actions or Behavior

	CRS	DIRECT aligning Charging Pump P191 to Train B.
<b><u>M.O. Cue:</u> If asked, REPORT Unit 3 Train B Component Cooling Water is operating.</b>		
	CRS	DIRECT initiating Train B CRIS.
	BOP	INITIATE Train B CRIS.
+15 min	BOP	ENSURE A-072 or A-073 Dome Air Circulating Fan running.
<b><i>When Technical Specifications and major Attachment 3 actions have been addressed, or at Lead Evaluator's discretion, PROCEED to Events 5, 6, 7, and 8.</i></b>		

Operating Test :	NRC	Scenario #	2	Event #	5, 6, 7, & 8	Page	13	of	22
Event Description: Loss of Offsite Power / EDG Fails to Start / TDAFW Pump Trip / Gravity Feed Valves Fail to Open									
Time	Position	Applicant's Actions or Behavior							

<b><u>Machine Operator:</u></b>			<b>When directed, EXECUTE Events 5, 6, 7, and 8.</b>		
			<b>- TU08, Main Turbine trip.</b>		
			<b>- PG24, Loss of Offsite Power.</b>		
			<b>- EG08B, Emergency Diesel Generator G-003 fails to start.</b>		
			<b>- FW25, TDAFW Pump overspeed trip (300 seconds post-trip).</b>		
			<b>- CVCS LP, Boric Acid Makeup Tank Gravity Feed Valves fail to open.</b>		
<b><u>Indications Available:</u></b>					
<b>Numerous Loss of Offsite Power related alarms</b>					
+ 10 secs	CRS	DIRECT performance of SO23-12-1, Standard Post Trip Actions.			
	RO	VERIFY Reactor Trip:			
		<ul style="list-style-type: none"><li>• VERIFY Reactor Trip Circuit Breakers (8) open.</li></ul>			
		<ul style="list-style-type: none"><li>• VERIFY Reactor Power lowering and Startup Rate negative.</li></ul>			
		<ul style="list-style-type: none"><li>• VERIFY maximum of one full length CEA NOT fully inserted.</li></ul>			
	CRS	VERIFY Reactivity Control criteria satisfied.			
	BOP	VERIFY Turbine Trip:			
		<ul style="list-style-type: none"><li>• VERIFY Main Turbine tripped.</li></ul>			
		<ul style="list-style-type: none"><li>• HP and LP Stop and Governor Valves closed.</li></ul>			
		<ul style="list-style-type: none"><li>• VERIFY both Unit Output Breakers open.</li></ul>			
		<ul style="list-style-type: none"><li>• VERIFY Main Turbine speed &lt; 2000 RPM or lowering.</li></ul>			
	CRS	INITIATE Administrative Actions:			
		<ul style="list-style-type: none"><li>• ANNOUNCE Reactor trip via PA System.</li></ul>			
		<ul style="list-style-type: none"><li>• INITIATE Attachment 4, Worksheet.</li></ul>			
		<ul style="list-style-type: none"><li>• INITIATE Attachment 5, Administrative Actions.</li></ul>			
	BOP	DETERMINE Vital Auxiliaries criteria NOT satisfied:			
		<ul style="list-style-type: none"><li>• DETERMINE both 1E 4 kV Buses A04 and A06 deenergized.</li></ul>			
		<ul style="list-style-type: none"><li>• [RNO] PLACE Train B EDG in Maintenance Lockout.</li></ul>			
		<ul style="list-style-type: none"><li>• [RNO] INITIATE Attachment 2, Diesel Generator Failure Follow-Up Actions for Bus 2A06.</li></ul>			

Operating Test : <u>NRC</u>		Scenario # <u>2</u>	Event # <u>5, 6, 7, &amp; 8</u>	Page <u>14</u> of <u>22</u>
Event Description: <u>Loss of Offsite Power / EDG Fails to Start / TDAFW Pump Trip / Gravity Feed Valves Fail to Open</u>				
Time	Position	Applicant's Actions or Behavior		
		<ul style="list-style-type: none"> <li>• DETERMINE both 1E 480 V Buses B04 and B06 deenergized.</li> </ul>		
		<ul style="list-style-type: none"> <li>• VERIFY all 1E DC Buses energized.</li> </ul>		
		<ul style="list-style-type: none"> <li>• DETERMINE all Non-1E 4 kV Buses deenergized.</li> </ul>		
		<ul style="list-style-type: none"> <li>• [RNO] ENSURE MSIVs closed.</li> </ul>		
		<ul style="list-style-type: none"> <li>• [RNO] OPERATE ADVs to maintain 1000 psia.</li> </ul>		
		<ul style="list-style-type: none"> <li>• DETERMINE CCW Train NOT operating and NOT aligned to Non-Critical Loop and Letdown Heat Exchanger.</li> </ul>		
<b><u>M.O. Cue:</u></b> If directed to investigate 2G003, WAIT 3 minutes then REPORT EDG governor is disconnected.				
<b><u>Examiner Note:</u></b> Depending on the speed at which SPTAs are performed and initial conditions at the time of trip, RCS Inventory and RCS Pressure Control may or may not be satisfied.				
	RO	VERIFY RCS Inventory Control criteria satisfied:		
		<ul style="list-style-type: none"> <li>• VERIFY PZR level between 10% and 70% and trending to between 30% and 60%.</li> </ul>		
		<ul style="list-style-type: none"> <li>• VERIFY Core Exit Saturation Margin <math>\geq 20^{\circ}\text{F}</math>:</li> </ul>		
		<ul style="list-style-type: none"> <li>• QSPDS page 611.</li> </ul>		
		<ul style="list-style-type: none"> <li>• CFMS page 311.</li> </ul>		
	RO	VERIFY RCS Pressure Control criteria satisfied:		
		<ul style="list-style-type: none"> <li>• VERIFY PZR pressure (WR and NR) between 1740 PSIA and 2380 PSIA and controlled AND trending between 2025 PSIA and 2275 PSIA.</li> </ul>		
	RO	DETERMINE Core Heat Removal criteria is NOT satisfied:		
		<ul style="list-style-type: none"> <li>• DETERMINE no RCPs are operating.</li> </ul>		
		<ul style="list-style-type: none"> <li>• VERIFY Core Exit Saturation Margin <math>\geq 20^{\circ}\text{F}</math>.</li> </ul>		
		<ul style="list-style-type: none"> <li>• QSPDS page 611.</li> </ul>		
		<ul style="list-style-type: none"> <li>• CFMS page 311.</li> </ul>		

Operating Test :	NRC	Scenario #	2	Event #	5, 6, 7, & 8	Page	15	of	22
Event Description: Loss of Offsite Power / EDG Fails to Start / TDAFW Pump Trip / Gravity Feed Valves Fail to Open									
Time	Position	Applicant's Actions or Behavior							

	BOP	DETERMINE RCS Heat Removal criteria NOT satisfied:
		<ul style="list-style-type: none"> <li>• VERIFY both SGs level &gt; 21% NR.</li> </ul>
		<ul style="list-style-type: none"> <li>• VERIFY both SGs level &lt; 80% NR.</li> </ul>
		<ul style="list-style-type: none"> <li>• DETERMINE Auxiliary feedwater NOT available to restore both SGs level between 40% NR and 80% NR.</li> </ul>
		<ul style="list-style-type: none"> <li>• [RNO] ENSURE EFAS actuated.</li> </ul>
		<ul style="list-style-type: none"> <li>• VERIFY heat removal adequate:</li> </ul>
		<ul style="list-style-type: none"> <li>• T<sub>cold</sub> trending to between 545°F and 555°F.</li> </ul>
		<ul style="list-style-type: none"> <li>• SG pressures approximately 1000 PSIA.</li> </ul>
<b><u>Examiner Note:</u> Steam Driven Auxiliary Feedwater Pump P140 will trip on overspeed 300 seconds after start.</b>		
	BOP	RECOGNIZE Aux Feedwater Pump P-140 has tripped by observing alarm 52A53 - TURBINE AUX FW PUMP GOVERNOR OVERSPEED / OOS.
<b><u>M.O. Cue:</u> When contacted to investigate the status of 2P140, WAIT 3 minutes then REPORT that the linkage is in the trip position.</b>		
<b><u>M.O. Cue:</u> When directed to reset the trip linkage for 2P140, WAIT 3 minutes and REPORT that a linkage pin is broken.</b>		
	RO	VERIFY Containment Isolation criteria satisfied:
		<ul style="list-style-type: none"> <li>• VERIFY Containment pressure &lt; 1.5 PSIG.</li> </ul>
		<ul style="list-style-type: none"> <li>• DETERMINE some Containment Area Radiation Monitors energized and NOT alarming or trending to alarm.</li> </ul>
		<ul style="list-style-type: none"> <li>• DETERMINE some Secondary Plant Radiation Monitors energized and NOT alarming or trending to alarm.</li> </ul>
	RO	VERIFY Containment Temperature and Pressure criteria satisfied:
		<ul style="list-style-type: none"> <li>• VERIFY Containment average temperature &lt; 120°F.</li> </ul>
		<ul style="list-style-type: none"> <li>• VERIFY Containment pressure &lt; 1.5 PSIG.</li> </ul>

Operating Test :	NRC	Scenario #	2	Event #	5, 6, 7, & 8	Page	16	of	22
Event Description: Loss of Offsite Power / EDG Fails to Start / TDAFW Pump Trip / Gravity Feed Valves Fail to Open									
Time	Position	Applicant's Actions or Behavior							

+15 min	CRS	DIAGNOSE Event in Progress:
		<ul style="list-style-type: none"> <li>DETERMINE some Safety Function criteria are NOT met per Attachment 4, Worksheet.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] COMPLETE Attachment 1, Recovery Diagnostics.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] DIAGNOSE Loss of Feedwater and Station Blackout.</li> </ul>
		<ul style="list-style-type: none"> <li>DETERMINE that Reactor Trip Recovery is NOT diagnosed.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] DETERMINE all RCPs stopped.</li> </ul>
		<ul style="list-style-type: none"> <li>DIRECT initiating Steps 12 through 15.</li> </ul>
	BOP	INITIATE Steps 12 through 15.
<b><u>M.O. Cue:</u> If SCE GCC is contacted for grid status, REPORT that cause of grid loss is unknown and field crews are investigating. 8 hour estimate on time to restore.</b>		
<b><u>M.O. Cue:</u> If Unit 3 status is requested, REPORT that Bus 3A06 is energized from EDG 3G003 and Bus 3A04 is energized from EDG 3G002.</b>		
	CRS	DIRECT performance of SO23-12-9, Functional Recovery.
		<ul style="list-style-type: none"> <li>RECORD time of EOI entry _____.</li> </ul>
<b><u>M.O. Cue:</u> When SO23-12-9 is initiated, CALL as SDG&amp;E GCC and REPORT that SONGS Switchyard appears to have several faults and will not be available until a crew can be dispatched to determine the problem. 8 hour estimate on time to restore.</b>		
<b><u>M.O. Cue:</u> If asked, EXECUTE remote function ED81 and transfer Q0612 Instrument Bus #2 to Emergency.</b>		
	CRS	VERIFY Functional Recovery diagnosis:
		<ul style="list-style-type: none"> <li>INITIATE SO23-12-10, Safety Function Status Checks.</li> </ul>
		<ul style="list-style-type: none"> <li>INITIATE Foldout Page.</li> </ul>
		<ul style="list-style-type: none"> <li>DIRECT performance of FS-3, Monitor Natural Circulation.</li> </ul>
		<ul style="list-style-type: none"> <li>DIRECT performance of SO23-12-11, Attachment 19, Non-1E DC Load Reduction.</li> </ul>

Operating Test :	NRC	Scenario #	2	Event #	5, 6, 7, & 8	Page	17	of	22
Event Description: Loss of Offsite Power / EDG Fails to Start / TDAFW Pump Trip / Gravity Feed Valves Fail to Open									
Time	Position	Applicant's Actions or Behavior							

		<ul style="list-style-type: none"> <li>DIRECT performance of SO23-12-11, Attachment 20, Class 1E Battery Load Reduction.</li> </ul>
		<ul style="list-style-type: none"> <li>DIRECT performance of FS-18, Secondary Plant Protection.</li> </ul>
		<ul style="list-style-type: none"> <li>DIRECT performance of SO23-12-11, Attachment 24, Supply 1E 4 kV Bus with Opposite Unit Diesel.</li> </ul>
		<ul style="list-style-type: none"> <li>DIRECT performance of SO23-12-11, Attachment 6, Diesel Generator Failure Follow-up Actions.</li> </ul>
		<ul style="list-style-type: none"> <li>DIRECT performance of SO23-12-11, Attachment 8, Restoration of Offsite Power.</li> </ul>
		<ul style="list-style-type: none"> <li>DIRECT performance of SO23-12-11, FS-11, Reset P140 Overspeed Trip.</li> </ul>
		<ul style="list-style-type: none"> <li>DIRECT Chemistry to sample both SGs for radioactivity and boron.</li> </ul>
<b><u>M.O. Cue:</u></b> If directed to sample SGs, WAIT 5 minutes and REPORT that E088 and E089 sample lines were frisked, and both have activity near background. If the SG sample valves are closed, REPORT that you are unable to establish sample flow.		
<b><u>M.O. Cue:</u></b> When directed to initiate Non-1E DC Load Reduction, ACKNOWLEDGE and STATE you will report when complete.		
<b><u>M.O. Cue:</u></b> When directed to initiate Class 1E Battery Load Reduction, ACKNOWLEDGE and STATE you will report when complete.		
<b><u>Examiner Note:</u></b> The following steps are from SO23-12-9, Functional Recovery.		
	CRS	INITIATE Administrative Actions.
	CRS	DETERMINE ESF actuation not required.
	CRS	EVALUATE Immediate Safety Function Recovery Actions.
	CRS	INITIATE Attachment FR-5, Recovery-Heat Removal Success Path HR-1, Step 4.



Operating Test :	NRC	Scenario #	2	Event #	5, 6, 7, & 8	Page	18	of	22
Event Description: Loss of Offsite Power / EDG Fails to Start / TDAFW Pump Trip / Gravity Feed Valves Fail to Open									
Time	Position	Applicant's Actions or Behavior							

**Examiner Note:** The following steps are from Attachment 24, Supplying 1E 4 kV Bus with Opposite Unit Diesel. Attachment FR-5, Recovery-Heat Removal Success steps are addressed later in the scenario.

	CRS	DIRECT performance of SO23-12-11, Attachment 24, Supplying 1E 4 kV Bus with Opposite Unit Diesel.
	CRS	DETERMINE Train B is available.
	CRS	OBTAIN approval of Shift Manager to cross connect Train B using 10 CFR 50.54(x) on both Units to supply 1E 4 kV Bus 2A06 with the opposite unit Diesel Generator.
	CRS/BOP	REQUEST SM initiates NRC notification within one hour regarding actions per this attachment.
	CRS/BOP	NOTIFY opposite Unit SRO that automatic sequencing of ESF loads onto opposite Unit 1E 4 kV Bus 3A06 will be blocked.
	BOP	VERIFY Bus 3A06 energized by 3G003 Diesel Generator.
	BOP	ENSURE 1E 4 kV Bus Tie breaker AUTO/MANUAL transfer switches selected to MANUAL.
		<ul style="list-style-type: none"> <li>2A0619 (2HS-1639B2) and 3A0603 (3HS-1639B2).</li> </ul>
	BOP	ENSURE 1E 4 kV Bus Tie breakers open.
		<ul style="list-style-type: none"> <li>2A0619 and 3A0603.</li> </ul>
	BOP	ENSURE 2G003 Diesel Generator selected to MAINTENANCE LOCKOUT.
	CRS	DIRECT performance of Train B Diesel Generator Cross-Tie Permissive switch alignment on 50' Elevation.
	BOP	CONTACT the PPEO and INITIATE Unit 2 Train B Diesel Generator Cross-Tie Permissive switch alignment on 50' Elevation.

Operating Test : <u>NRC</u>		Scenario # <u>2</u>	Event # <u>5, 6, 7, &amp; 8</u>	Page <u>19</u> of <u>22</u>
Event Description: <u>Loss of Offsite Power / EDG Fails to Start / TDAFW Pump Trip / Gravity Feed Valves Fail to Open</u>				
Time	Position	Applicant's Actions or Behavior		
		<ul style="list-style-type: none"> <li>• VERIFY feeder faults NOT indicated by relay flags on:</li> </ul>		
		<ul style="list-style-type: none"> <li>• 2A0616 – Unit Aux Transformer</li> </ul>		
		<ul style="list-style-type: none"> <li>• 2A0618 – Reserve Aux Transformer</li> </ul>		
		<ul style="list-style-type: none"> <li>• 2A0619 – 2A06 Bus Tie</li> </ul>		
		<ul style="list-style-type: none"> <li>• 2A0613 – 2G003 EDG</li> </ul>		
<b>M.O. Cue: When asked, REPORT no feeder faults on breakers.</b>				
	BOP	DIRECT the PPEO to SELECT both Unit 2 Train B Diesel Generator Cross-Tie Permissive switches on Fire Isolation Panel 2L-413 to 50.54X.		
		<ul style="list-style-type: none"> <li>• 2HS-5054XA2 and 2HS-5054XB2</li> </ul>		
<b>M.O. Cue: When directed, PERFORM remote functions EG62A and EG62B and REPORT that the Unit 2 50.54X switches have been aligned.</b>				
	BOP	CONTACT the PPEO and INITIATE Unit 3 Train B Diesel Generator Cross-Tie Permissive switch alignment on 50' Elevation.		
		<ul style="list-style-type: none"> <li>• VERIFY feeder faults NOT indicated by relay flags on:</li> </ul>		
		<ul style="list-style-type: none"> <li>• 3A0603 – 3A06 Bus Tie</li> </ul>		
<b>M.O. Cue: When asked, REPORT no feeder faults on breaker.</b>				
	BOP	DIRECT the PPEO to SELECT both Unit 3 Train B Diesel Generator Cross-Tie Permissive switches on Fire Isolation Panel 3L-413 to 50.54X.		
		<ul style="list-style-type: none"> <li>• 3HS-5054XA2 and 3HS-5054XB2</li> </ul>		
<b>M.O. Cue: When directed, PERFORM remote functions EG62C and EG62D and REPORT that the Unit 3 50.54X switches have been aligned.</b>				
	BOP	VERIFY 3G003 Diesel Generator loading less than 3.4 MW.		
	BOP	VERIFY Bus 2A06 NOT energized.		
	BOP	VERIFY Unit 2 overcurrent/ground alarms reset.		

Operating Test : <u>      NRC      </u>		Scenario # <u>      2      </u>	Event # <u>      5, 6, 7, &amp; 8      </u>	Page <u>      20      </u> of <u>      22      </u>
Event Description: <u>      Loss of Offsite Power / EDG Fails to Start / TDAFW Pump Trip / Gravity Feed Valves Fail to Open      </u>				
Time	Position	Applicant's Actions or Behavior		
		<ul style="list-style-type: none"> <li>63C15 - 2A06 SUPPLY BKR 2A0616 OC</li> </ul>		
		<ul style="list-style-type: none"> <li>63C25 - 2A06 SUPPLY BKR 2A0618 OC</li> </ul>		
	BOP	VERIFY 1E DC Bus voltages 2D2 and 3D2 greater than 108 VDC.		
<b><u>M.O. Cue:</u>    When asked, REPORT 3D2 voltage at 129 VDC.</b>				
	BOP	ESTABLISH final Train B configuration.		
	BOP	ENSURE 1E 4 kV Bus 2A06 supply breakers open.		
		<ul style="list-style-type: none"> <li>2A0616 – Unit Aux Transformer</li> </ul>		
		<ul style="list-style-type: none"> <li>2A0618 – Reserve Aux Transformer</li> </ul>		
		<ul style="list-style-type: none"> <li>2A0613 – 2G003 EDG</li> </ul>		
	BOP	ENSURE 1E 4 kV Bus A06 tie breakers open.		
		<ul style="list-style-type: none"> <li>2A0619 – 2A06 Bus Tie</li> </ul>		
		<ul style="list-style-type: none"> <li>3A0603 – 3A06 Bus Tie</li> </ul>		
	BOP	ENSURE 1E 4 kV Bus 2A06 load breakers open.		
		<ul style="list-style-type: none"> <li>Emergency Chillers</li> </ul>		
		<ul style="list-style-type: none"> <li>Containment Spray Pumps</li> </ul>		
		<ul style="list-style-type: none"> <li>HPSI Pumps</li> </ul>		
		<ul style="list-style-type: none"> <li>LPSI Pumps</li> </ul>		
		<ul style="list-style-type: none"> <li>AFW Pump</li> </ul>		
		<ul style="list-style-type: none"> <li>CCW Pumps</li> </ul>		
		<ul style="list-style-type: none"> <li>SWC Pumps</li> </ul>		
	BOP	VERIFY Train B Diesel Generator Cross-Tie Permissive Switches on both Units are in the 50.54X position.		
	BOP	CLOSE Unit 3 Bus Tie breaker 3A0603.		

Operating Test : <u>NRC</u>		Scenario # <u>2</u>	Event # <u>5, 6, 7, &amp; 8</u>	Page <u>21</u> of <u>22</u>
Event Description: <u>Loss of Offsite Power / EDG Fails to Start / TDAFW Pump Trip / Gravity Feed Valves Fail to Open</u>				
Time	Position	Applicant's Actions or Behavior		
	BOP	VERIFY Unit 3 Diesel Generator 3G003 output breaker remains closed.		
CRITICAL TASK STATEMENT		With a loss of 1E power, energize at least one 4 kV and the associated 480 VAC 1E Bus before DC Bus D2 voltage drops to 107.3 VDC and DC Bus D4 drops to 106.5 VDC.		
CRITICAL TASK	BOP	CLOSE Unit 2 Bus Tie breaker 2A0619.		
	BOP	VERIFY Unit 2 1E buses 2A06 and 2B06 energized.		
	BOP	START CCW Pump P026 on Train B.		
	RO	VERIFY Charging Pump P192 starts on Train B.		
	RO	VERIFY Saltwater Cooling Pump starts on Train B.		
<b><u>Examiner Note:</u> The following steps are from SO23-12-9, Functional Recovery, Attachment FR-5, Recovery-Heat Removal Success.</b>				
	BOP	DETERMINE AFW NOT operating.		
	BOP	DETERMINE TDAFW Pump tripped on overspeed.		
	BOP	VERIFY AFW Pump P504 available.		
	BOP	CLOSE AFW Pump P504 Discharge Valves.		
		<ul style="list-style-type: none"> <li>HV-4712 and HV-4762.</li> </ul>		
	BOP	START AFW Pump P504.		
<b><u>Examiner Note:</u> Throttling of Auxiliary Feedwater flow may or may not be required depending upon Steam Generator level.</b>				

Appendix D		Operator Action	Form ES-D-2
Operating Test : <u>NRC</u> Scenario # <u>2</u> Event # <u>5, 6, 7, &amp; 8</u> Page <u>22</u> of <u>22</u>			
Event Description: <u>Loss of Offsite Power / EDG Fails to Start / TDAFW Pump Trip / Gravity Feed Valves Fail to Open</u>			
Time	Position	Applicant's Actions or Behavior	
	BOP	OVERRIDE and OPEN AFW Pump P504 Discharge Bypass Valve HV-4762 to 35% open.	
		<ul style="list-style-type: none"> <li>[RNO] THROTTLE AFW Pump P-504 Discharge Valve HV-4712 to maintain flow between 130 GPM and 150 GPM.</li> </ul>	
<b><u>M.O. Cue:</u></b> If necessary, EXECUTE the following remote functions as directed by the Control Room: - FW86, P504 Manual Valve HV-4712. - FW104, P140 Discharge Valve MU122. - FW105A, P141 Discharge Valve MU127. - FW102, P504 Discharge Valve MU533.			
<b>CRITICAL TASK STATEMENT</b>		Restore feedwater flow to at least one Steam Generator prior to complete loss of secondary inventory in both Steam Generators.	
<b>CRITICAL TASK</b>	BOP	THROTTLE HV-4712 to maintain AFW flow between 130 and 150 GPM and MAINTAIN reduced AFW flow for 5 minutes.	
	BOP	RAISE total AFW flow to greater than 400 gpm.	
<b><u>Floor Cue:</u></b> if necessary, REPORT as Shift Manager to continue actions in SO23-12-9, Functional Recovery.			
<b><u>Examiner Note:</u></b> The following steps are from SO23-12-9, Functional Recovery, Step 6c.			
	CRS	DIRECT initiation of boration greater than 40 GPM.	
	RO	COMMENCE boration of the RCS using BAMU Tank Gravity Feed Valves.	
+30 min	RO	DETERMINE BAMU Tank Gravity Feed Valves will NOT open and INITIATE boration of the RCS using LV-0227C, Refueling Water Storage Tank to Charging Pump Gravity Feed Valve.	
<b><i>When power is restored to Bus 2A06, feedwater flow is restored, and a boration is commenced, or at Lead Evaluator's discretion, TERMINATE the scenario.</i></b>			

Facility:	SONGS 2 and 3	Scenario No.:	3	Op Test No.:	October 2009 NRC
Examiners:	_____	Operators:	_____		
	_____		_____		
	_____		_____		
Initial Conditions: <ul style="list-style-type: none"> <li>31% power MOC - RCS Boron is 1243 ppm (by sample).</li> <li>Train A Component Cooling Water Pump (P-025) in service.</li> <li>Train A Low Pressure Safety Injection Pump (P-015) OOS for oil change.</li> <li>Fire Computer is OOS.</li> </ul>					
Turnover: Dilution and power ascension in progress at 10% per hour.					
Critical Tasks: <ul style="list-style-type: none"> <li>Establish Reactivity Control (Two Full Length CEAs Not Fully Inserted &amp; No SIAS).</li> <li>Manually Initiate Main Steam Isolation Signal (Auto Actuation failure).</li> </ul>					
Event No.	Malf. No.	Event Type*	Event Description		
1 +15 min		R (RO) N (BOP, CRS)	Dilution and power ascension at 10% per hour.		
2 +25 min	RC09A	TS (CRS)	Reactor Coolant Pump (P-002) Speed Sensor (SE-0143-1) failure.		
3 +35 min	CV16B	I (RO, CRS)	Volume Control Tank Level Transmitter (LT-0227) fails low.		
4 +50 min	ED06D	C (RO, BOP, CRS) TS (CRS)	Overcurrent trip of Feeder Breaker to 1E 480 Volt Bus 2B04.		
5 +55 min	FW LP RX LP	C (BOP, CRS)	Main Feedwater Pump trip. Primary Side Reactor Trip pushbuttons disabled.		
6 +60 min	MS04B	M (RO, BOP, CRS)	Excess Steam Demand Event downstream of Main Steam Isolation Valves (300 second ramp).		
7 +60 min	RD1402 RD1502	C (RO)	Two CEAs fail to insert on the trip. Emergency boration via gravity feed due to loss of 1E Bus 2B04.		
8 +65 min	MSIS LP	I (BOP)	Main Steam Isolation Signal fails to actuate; manual actuation required.		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS)Technical Specifications					

### **SCENARIO SUMMARY NRC #3**

The crew will assume the watch and resume a dilution and power ascension per Operating Instruction (OI) SO23-5-1.7, Power Operations at 10% per hour.

The next event is a Reactor Coolant Pump speed sensor failure. The crew will respond per the Annunciator Response Procedures (ARP) and place the appropriate Reactor Protection System trips in Bypass per Abnormal Operating Instruction (AOI) SO23-13-18, Reactor Protection System Failure/Loss of Vital Bus and Operating Instruction (OI) SO23-3-2.12, Reactor Protective System Operation. The CRS will evaluate Technical Specifications.

When Technical Specifications have been addressed, a Volume Control Tank (VCT) level transmitter fails low and transfers Charging Pump suction to the Refueling Water Storage Tank. The crew will align LV-0227B, VCT Outlet Valve and refer to Operating Instruction (OI) SO23-3-2.1, CVCS Operations and/or SO23-3-2.2, Makeup Operations.

The next event is the overcurrent trip of the feeder breaker to 1E 480 Volt Bus 2B04. The crew will respond per AOI SO23-13-26, Loss of Power to an AC Bus. Crew actions include restoring Charging flow as required and placing the Train A Emergency Diesel Generator in Maintenance Lockout. The CRS will evaluate Technical Specifications.

During the next event, the running of Main Feedwater Pump will trip. The crew will determine that a Reactor and Turbine trip are required. The Primary Side Reactor Trip pushbuttons are disabled and the BOP will trip the Reactor.

When the Reactor and Turbine are tripped, an Excess Steam Demand Event (ESDE) downstream of the Main Steam Isolation Valves will occur. The crew should determine that an ESDE is occurring and manually trip the Reactor and Turbine. Entry into Emergency Operating Instruction (EOI) SO23-12-1, Standard Post Trip Actions is required. A transition will then be made to EOI SO23-12-5, Excess Steam Demand Event. Two (2) Control Element Assemblies will fail to insert on the trip and an emergency boration using the Gravity Feed Valves is required. Additionally, a manual Main Steam Isolation Signal must be generated.

This scenario is terminated when the Main Steam Isolation Valves are closed and Reactor Coolant System temperature control is restored using the Atmospheric Dump Valves.

#### **Risk Significance:**

- |   |  |
|---|--|
| • Risk important components out of service:       | Low Pressure Safety Injection Pump (P-015) |
| • Failure of risk important system prior to trip: | Loss of 1E 480 V Bus 2B04                  |
| • Risk significant core damage sequence:          | ESDE with MSIS failure                     |
| • Risk significant operator actions:              | Initiate Emergency Boration                |
|   | Manually Initiate MSIS                     |
|   | Establish RCS Temperature Control          |

Scenario Event Description

NRC Scenario #3

SONGS

2009 Facility NRC Initial License Examination  
Simulator Scenario Setup

**Machine Operator:** EXECUTE IC #223 and NRC Scenario #3 SETUP file to align components.  
HANG Control Board Tags on P-015.  
CHANGE Operator Aid Tags #029 (CVCS) and #005-4 (CVCS Ion Exchanger) to reflect the scenario born concentration.  
VERIFY CVCS PMW Batch Counter indicates ~990 gallons.  
VERIFY both Pressurizer Spray Valves in AUTO.  
ENSURE Main Turbine Load is set for 1.9 MWe/min.  
VERIFY 2FV-9253 is in AUTO / CLOSE when stopping the dilution for turnover.  
PLACE procedures in progress on the RO desk:

- Copy of SO32-5-1.7, Power Operations open to Section 6.3, Turbine Load Change Using Setpoint Adjustment.
- MARKED UP copy of SO23-5-1.7, Attachment 9.
- MARKED UP copy of SO23-3-2.2 with Steps 6.5.1 through 6.5.8 checked off.
- Copy of SO23-3-1.10 open to Section 6.3, Forcing Pressurizer Sprays.
- Copy of SO23-10-1, Turbine Startup and Normal Operation, Attachment 6, MSR Warmup.

VERIFY MOC copies of OPS Physics Summary Book on RO Desk and SO23-5-1.7, Attachment 8 on Control Board.  
If Group Position(s) is (are) not correct, MOVE CEAs and then RETURN CEAs to Shift Turnover Sheet position (Group 6 @ 125 / PLCEAs @ 115).

**Significant Control Room Annunciators in Alarm:**

57A51 – SI / ECW TRAIN A INOPERABLE  
56A30/40/50/60 – LOSS OF LOAD CHANNEL 1/2/3/4 TRIP DISABLED  
53A03 – MFWP TURBINE K006 TRIP  
53B23 – CONDENSATE FLOW BALANCE TROUBLE



Operating Test : <u>    NRC    </u> Scenario # <u>    3    </u> Event # <u>    1    </u> Page <u>    4    </u> of <u>    17    </u>		
Event Description: <u>Dilution and Power Ascension at 10% per hour</u>		
Time	Position	Applicant's Actions or Behavior

**Machine Operator: When Shift Turnover is complete, PLACE Simulator in RUN.**

+1 min	CRS	DIRECT performance of SO23-5-1.7, Power Operations, SO23-3-2.2, Makeup Operations, and SO23-10-1, Turbine Startup and Normal Operation.
	RO	VERIFY Batch Counter and Makeup Integrator settings.
	RO	PERFORM dilution valve alignment.
		<ul style="list-style-type: none"> <li>PLACE FV-9253 in OPEN.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY FIC-0210X in AUTO at ~16.5 gpm.</li> </ul>
		<ul style="list-style-type: none"> <li>PLACE HS-0210 in DILUTE.</li> </ul>
	RO	VERIFY Tcold changing as dilution progresses.
	RO	ADJUST CEAs as required for ASI control.
+15 min	BOP	MAINTAIN Tcold within required band by raising Main Generator load using HS-2210, Main Turbine Speed Load Control to RAISE or as outlined in SO23-5-1.7, Section 6.3.
<b><u>Floor Cue:</u> If asked, REPORT as Shift Manager that the 2<sup>nd</sup> Main Feedwater Pump will be started prior to transferring power to the Unit Auxiliary Transformer.</b>		
<b><i>When power has been raised 3 to 5%, or at Lead Evaluator's discretion, PROCEED to Event 2.</i></b>		

Operating Test :	NRC	Scenario #	3	Event #	2	Page	5	of	17
Event Description: Reactor Coolant Pump Speed Sensor Failure									
Time	Position	Applicant's Actions or Behavior							

**Machine Operator:** When directed, EXECUTE Event 2.  
 - RC09A, Reactor Coolant Pump (P-002) Speed Sensor (SE-0143-1) failure.

**Indications Available:**

56A04 – DNBR LO CHANNEL TRIP  
 56A14 – DNBR LO RPS PRETRIP  
 56B06 – PPS CHANNEL 1 TROUBLE  
 56C01 – CPC CHANNEL 1 SENSOR FAILURE

+30 sec	RO/BOP	REFER to Annunciator Response Procedures.
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	RO	RECOGNIZE CPC Channel 1 sensor failure and INFORM the CRS SO23-13-18, Reactor Protection System Failure entry required.
--	----	---

	CRS	DIRECT performance of SO23-13-18, Reactor Protection System Failure / Loss of Vital Bus.
--	-----	--

	RO	REFER to SO23-3-2.13, Core Protection / Control Element Assembly Calculator Operation and DETERMINE Reactor Coolant Pump P-002 has a failed speed sensor.
--	----	---

	CRS	REFER to Attachment 5 and DETERMINE Functional Unit affected is Reactor Coolant Pump P-002 Speed.
--	-----	---

	RO	PLACE the affected Functional Unit in BYPASS per SO23-3-2.12, Section for Bypass Operation of Trip Channels.
--	----	--

	RO	VERIFY that the same bistable is not in BYPASS on any other Channel.
--	----	--

**M.O. Cue:** When directed, EXECUTE the following Remote Functions:  
 RP51 = OPEN (PPS Door Open Annunciator 56B46)  
 RP52C = BYPASS (High LPD Channel A)  
 RP52D = BYPASS (Low DNBR Channel A)  
 Delete RP51 (PPS Door Open Annunciator 56B46)

	RO	VERIFY the Trip Channel Bypassed Annunciator alarm.
--	----	---

		<ul style="list-style-type: none"> <li>56A29 - PPS CHANNEL 1 TRIP BYPASSED.</li> </ul>
--	--	--

Operating Test : <u>    NRC    </u> Scenario # <u>    3    </u> Event # <u>    2    </u> Page <u>    6    </u> of <u>    17    </u>		
Event Description: Reactor Coolant Pump Speed Sensor Failure		
Time	Position	Applicant's Actions or Behavior

	CRS	CONFIRM failure does NOT affect RPS/ESFAS Matrix Logic, RPS/ESFAS Initiation Logic, RTCBs, RPS/ESFAS Manual Trip, or ESFAS Actuation Logic.
	CRS	CONFIRM failure does NOT affect the Feedwater Digital Control System.
+10 min	CRS	EVALUATE Technical Specifications.
		<ul style="list-style-type: none"> <li>3.3.1.A, Reactor Protection System Instrumentation - Operating.</li> </ul>
		<ul style="list-style-type: none"> <li>CONDITION A - One or more Functions with one automatic RPS trip channel inoperable.</li> <li>ACTION A.1 - Place Channel in bypass or trip within one (1) hour.</li> </ul>
<b><i>When the RPS Channel 1 is bypassed, or at Lead Evaluator's discretion, PROCEED to Event 3.</i></b>		

Operating Test :	NRC	Scenario #	3	Event #	3	Page	7	of	17
Event Description: VCT Level Transmitter Fails Low									
Time	Position	Applicant's Actions or Behavior							

**Machine Operator:** When directed, EXECUTE Event 3.  
CV16B, LT-0227, VCT Level Transmitter fails low.

**Indications Available:**

**58A05 – VCT LEVEL LO/LO**

**VCT Level Indicator LI-0227A lowering (on Plant Computer System)**

**VCT Outlet Valve LC-0227B closes**

**RWST to Charging Pump Suction Valve LV-0227C opens**

+1 min	RO	REFER to Annunciator Response Procedures.
	RO	DETERMINE that VCT suction has shifted from VCT to RWST and INFORM CRS that ARP SO23-15.58.A05 entry required.
	CRS	DIRECT performance of CRS that ARP SO23-15.58.A, Annunciator 58A05 - VCT LEVEL LO / LO.
	RO	CHECK VCT Level indicator LI-0226 and determine that level is normal.
	RO	RECOGNIZE that VCT level indicator LI-0227 has failed low.
	RO	PLACE LV-0227B, VCT Outlet Valve in MANUAL and OPEN.
	BOP	ADJUST Turbine load as necessary to restore T <sub>COLD</sub> per SO23-5-1.7.
	CRS	DIRECT performance of SO23-3-2.2, Makeup Operations to ensure proper CVCS alignment is achieved.
+10 min	CRS	REQUEST I&C assistance.
<b><i>When plant conditions are stable, or at Lead Evaluator's discretion, PROCEED to Event 4.</i></b>		

Operating Test :	NRC	Scenario #	3	Event #	4	Page	8	of	17
Event Description: Loss of Bus 2B04									
Time	Position	Applicant's Actions or Behavior							

**Machine Operator:** When directed, EXECUTE Event 4.  
- ED06D, Loss of Bus 2B04.

**Indications Available:**

63B06 – 2B04 VOLTAGE LO  
63B55 – LOAD CENTER XFMR FDR 2A0420 OC  
63A52 – 2D1 CHARGER TROUBLE  
63A54 – 2D3 CHARGER TROUBLE  
Numerous Train A ECCS INOPERABLE alarms

+30 secs	RO/BOP	REFER to Annunciator Response Procedures.
	RO/BOP	RECOGNIZE low 2B04 Bus voltage and INFORM the CRS AOI SO23-13-26 entry required.
	CRS	DIRECT performance of AOI SO23-13-26, Loss of Power to an AC Bus.
	RO	START Charging Pump P-192 as required.
	CRS	DISPATCH an operator to VERIFY loss of the 1E 480 V Bus is NOT due to a fire in the 1E Switchgear Room.
	RO/BOP	DETERMINE overcurrent annunciators are alarming on Bus 2B04.
	CRS	DIRECT initiation of SO23-6-9, 6.9 kV, 4 kV and 480V Bus and Feeder Faults to return Bus 2B04 to service.
	CRS	DIRECT initiation of Equipment Actions for Loss of the 1E 4 kV Bus 2B04.
+5 min	BOP	PLACE G002 Diesel Generator in MAINTENANCE LOCKOUT.
	CRS	Within 1 hour, DIRECT performance of SO23-3-3.23, Attachment for AC Sources Verification for both Units.
	RO	SELECT HS-0210, Makeup Mode Selector Switch to MANUAL and PLACE a Caution Tag at the switch to prevent inadvertent dilution.

Operating Test :	NRC	Scenario #	3	Event #	4	Page	9	of	17
Event Description: Loss of Bus 2B04									
Time	Position	Applicant's Actions or Behavior							

	CRS	EVALUATE Technical Specifications.
		<ul style="list-style-type: none"> <li>LCO 3.8.4.A, DC Sources - Operating.</li> </ul>
		<ul style="list-style-type: none"> <li>CONDITION A - One battery or associated control equipment or cabling INOPERABLE.</li> <li>ACTION A.1 - Restore DC electrical power subsystem to OPERABLE status within two hours.</li> </ul>
	CRS	VERIFY Channel A DNBR and LPD trips bypassed.
	RO	VERIFY the Trip Channel Bypassed Annunciator alarms.
		<ul style="list-style-type: none"> <li>56A29 - PPS CHANNEL 1 TRIP BYPASSED</li> </ul>
	CRS	DIRECT setting CEAC 2 INOP Flags in all CPCs by changing each CPC Addressable Constant Point ID 062 to 2.
	CRS	DIRECT aligning Charging Pump P191 to Train B.
<b><u>M.O. Cue:</u>    If asked, REPORT Unit 3 Train B Component Cooling Water is operating.</b>		
	RO/BOP	START a Train B Containment Air Dome Circulator.
	CRS	DIRECT initiating Train B CRIS.
+15 min	BOP	INITIATE Train B CRIS.
<b><i>When Technical Specifications have been addressed, or at Lead Evaluator's discretion, PROCEED to Event 5.</i></b>		

Operating Test : <u>    NRC    </u> Scenario # <u>    3    </u> Event # <u>    5    </u> Page <u>  10  </u> of <u>  17  </u>		
Event Description: Main Feedwater Pump Trip		
Time	Position	Applicant's Actions or Behavior

<b><u>Machine Operator:</u> When directed, EXECUTE Event 5. - FW LP, Main Feedwater Pump trip.</b>		
<b><u>Indications Available:</u></b>		
<b>53B03 – MFWP TURBINE K005 TRIP</b>		
+10 sec	BOP	REFER to Annunciator Response Procedures.
	BOP	DETERMINE only available Main Feedwater Pump has tripped.
	CRS	DIRECT a Reactor and Turbine trip.
<b><u>Examiner Note:</u> The Primary Side Reactor Trip pushbuttons have been disabled and the Reactor will be tripped by the BOP.</b>		
+1 min	BOP	Manually TRIP the Reactor and Turbine.
<b><i>When Reactor has been tripped, or at Lead Evaluator's discretion, PROCEED to Events 6, 7, and 8.</i></b>		

Operating Test :	NRC	Scenario #	3	Event #	6, 7, & 8	Page	11	of	17
Event Description: Excess Steam Demand Event / Two CEAs Fail to Insert / MSIS Fails to Actuate									
Time	Position	Applicant's Actions or Behavior							

**Machine Operator:** When directed, EXECUTE Events 6, 7, and 8.

- MS04B, ESDE on SG E089 downstream of MSIV @ 30% on 300 second ramp.
- MSIS LP, Main Steam Isolation Signal fails to actuate.
- RD1402 & RD1502, Control Element Assemblies #14 & #15 fail to insert.

**Indications Available:**

Normal post-trip alarms  
 Steam Generator E089 pressure lowering  
 RCS temperature lowering

	CRS	DIRECT performance of SO23-12-1, Standard Post Trip Actions.
	RO	VERIFY Reactor Trip:
		<ul style="list-style-type: none"> <li>• VERIFY Reactor Trip Circuit Breakers (8) open.</li> </ul>
		<ul style="list-style-type: none"> <li>• VERIFY Reactor Power lowering and Startup Rate negative.</li> </ul>
		<ul style="list-style-type: none"> <li>• DETERMINE two (2) full length CEAs NOT fully inserted.</li> </ul>
<b>CRITICAL TASK STATEMENT</b>		<b>With failure of 2 or more Full Length CEAs to fully insert, perform an emergency boration (or some other alignment which adds boric acid from either the BAMU Tanks or RWST at 40 gpm or more).</b>
<b>CRITICAL TASK</b>	RO	<ul style="list-style-type: none"> <li>• [RNO] COMMENCE emergency boration at greater than 40 gpm.</li> </ul>
	CRS	VERIFY Reactivity Control criteria satisfied.
	BOP	VERIFY Turbine Trip:
		<ul style="list-style-type: none"> <li>• VERIFY Main Turbine tripped.</li> </ul>
		<ul style="list-style-type: none"> <li>• HP and LP Stop and Governor Valves closed.</li> </ul>
		<ul style="list-style-type: none"> <li>• VERIFY both Unit Output Breakers open.</li> </ul>
		<ul style="list-style-type: none"> <li>• VERIFY Main Turbine speed &lt; 2000 RPM or lowering.</li> </ul>
	CRS	INITIATE Administrative Actions:
		<ul style="list-style-type: none"> <li>• ANNOUNCE Reactor trip via PA system.</li> </ul>
		<ul style="list-style-type: none"> <li>• INITIATE Attachment 4, Worksheet.</li> </ul>



Operating Test :	NRC	Scenario #	3	Event #	6, 7, & 8	Page	12	of	17
Event Description: Excess Steam Demand Event / Two CEAs Fail to Insert / MSIS Fails to Actuate									
Time	Position	Applicant's Actions or Behavior							

		<ul style="list-style-type: none"> <li>INITIATE Attachment 5, Administrative Actions.</li> </ul>
	BOP	<p>VERIFY Vital Auxiliaries criteria satisfied:</p> <ul style="list-style-type: none"> <li>VERIFY both 1E 4 kV Buses A04 and A06 energized.</li> <li>DETERMINE one 1E 480 V Bus B04 deenergized.</li> <li>[RNO] INITIATE Attachment 2, Diesel Generator Failure Follow-Up Actions for Bus 2B04.</li> <li>VERIFY all 1E DC Buses energized.</li> <li>VERIFY all Non-1E 4 kV Buses energized.</li> <li>VERIFY one CCW Train operating AND aligned to Non-Critical Loop and Letdown Heat Exchanger.</li> </ul>
<p><b><u>M.O. Cue:</u></b> If directed to check Main Steam Safety Valve status, REPORT that all Safety Valves appear to be seated, with no steam coming from the MSIV roof, however, the Turbine Building is filling with steam.</p>		
	RO	<p>DETERMINE RCS Inventory Control criteria NOT satisfied:</p> <ul style="list-style-type: none"> <li>DETERMINE PZR level NOT between 10% and 70% AND NOT trending to between 30% and 60%.</li> <li>[RNO] DETERMINE PZR Level Control System is NOT restoring PZR level.</li> <li>VERIFY Core Exit Saturation Margin <math>\geq 20^{\circ}\text{F}</math>:</li> <li>QSPDS page 611.</li> <li>CFMS page 311.</li> </ul>
	RO	<p>DETERMINE RCS Pressure Control criteria is NOT satisfied:</p> <ul style="list-style-type: none"> <li>DETERMINE Pressurizer pressure is less than 1740 PSIA and lowering.</li> <li>[RNO] DETERMINE PZR Pressure Control System is NOT restoring PZR pressure.</li> <li>[RNO] ENSURE Normal and Aux Spray valves closed.</li> <li>[RNO] ENSURE SIAS, CCAS, and CRIS actuated.</li> <li>[RNO] If PZR pressure is <math>&lt; 1430</math> PSIA, then ENSURE at least one RCP in each loop stopped.</li> </ul>
	RO	<ul style="list-style-type: none"> <li>[RNO] STOP one RCP in each loop.</li> </ul>

Operating Test :	NRC	Scenario #	3	Event #	6, 7, & 8	Page	13	of	17
Event Description: Excess Steam Demand Event / Two CEAs Fail to Insert / MSIS Fails to Actuate									
Time	Position	Applicant's Actions or Behavior							

		<ul style="list-style-type: none"> <li>[RNO] If RCP NPSH requirements NOT satisfied, then ENSURE all RCPs stopped.</li> </ul>
	RO	<p>VERIFY Core Heat Removal criteria satisfied:</p> <ul style="list-style-type: none"> <li>VERIFY at least one RCP operating.</li> <li>VERIFY core loop <math>\Delta T</math> is less than 10°F.</li> <li>VERIFY Core Exit Saturation Margin <math>\geq 20^\circ\text{F}</math>.</li> <li>QSPDS page 611.</li> <li>CFMS page 311.</li> </ul>
	BOP	<p>DETERMINE RCS Heat Removal criteria NOT satisfied:</p> <ul style="list-style-type: none"> <li>VERIFY at least one SGs level between 21% and 80% NR and Auxiliary Feedwater available.</li> <li>DETERMINE <math>T_C</math> less than 545°F and NOT controlled.</li> <li>DETERMINE heat removal NOT adequate: <ul style="list-style-type: none"> <li>[RNO] <math>T_{\text{cold}}</math> less than 545°F.</li> <li>[RNO] ENSURE SBSCS valves closed.</li> <li>[RNO] ENSURE ADVs closed.</li> <li>[RNO] ENSURE SG Blowdown valves closed.</li> </ul> </li> <li><u>E-088</u> - HV-4054      <u>E-089</u> - HV-4053</li> <li>[RNO] ENSURE Main Steam to Reheater Valves closed: HV-2703 or HV-2704, HV-2721, HV-2751.</li> <li>DETERMINE SG pressures &lt; 740 PSIA.</li> <li>DETERMINE MSIS NOT actuated.</li> </ul>
<b>CRITICAL TASK STATEMENT</b>		<b>Actions are taken to isolate the SGs prior to either SG blowing dry. These actions may include either manual actuation of the MSIS signal, or manual closure of MSIS actuated components.</b>
<b>CRITICAL TASK</b>	BOP	Manually INITIATE MSIS.

Operating Test :	NRC	Scenario #	3	Event #	6, 7, & 8	Page	14	of	17
Event Description: Excess Steam Demand Event / Two CEAs Fail to Insert / MSIS Fails to Actuate									
Time	Position	Applicant's Actions or Behavior							

	RO	VERIFY Containment Isolation criteria satisfied:
		<ul style="list-style-type: none"> <li>VERIFY Containment pressure &lt;1.5 PSIG.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY Containment Area Radiation Monitors energized AND NOT alarming or trending to alarm.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY Secondary Plant Radiation Monitors energized AND NOT alarming or trending to alarm.</li> </ul>
	RO	VERIFY Containment Temperature and Pressure criteria satisfied:
		<ul style="list-style-type: none"> <li>VERIFY Containment average temperature &lt; 120°F.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY Containment pressure &lt; 1.5 PSIG.</li> </ul>
+15 min	CRS	DIAGNOSE event in progress:
		<ul style="list-style-type: none"> <li>DETERMINE some Safety Function criteria are NOT met per Attachment 4, Worksheet.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] COMPLETE Attachment 1, Recovery Diagnostics.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] DIAGNOSE event as ESDE outside Containment.</li> </ul>
		<ul style="list-style-type: none"> <li>DETERMINE that Reactor Trip Recovery is NOT diagnosed.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] ENSURE at least one RCP stopped in each loop.</li> </ul>
		<ul style="list-style-type: none"> <li>DIRECT initiating Steps 12 through 15.</li> </ul>
	BOP	INITIATE Steps 12 through 15.
	CRS	DIRECT performance of EOI SO23-12-5, Excess Steam Demand Event.
		<ul style="list-style-type: none"> <li>RECORD time of EOI entry _____.</li> </ul>
	CRS	VERIFY ESDE diagnosis:
		<ul style="list-style-type: none"> <li>INITIATE SO23-12-10, Safety Function Status Checks.</li> </ul>
		<ul style="list-style-type: none"> <li>INITIATE Foldout Page.</li> </ul>
		<ul style="list-style-type: none"> <li>DIRECT performance of FS-7, Verify SI Throttle/Stop Criteria.</li> </ul>
		<ul style="list-style-type: none"> <li>DIRECT performance of Attachment 22, Non-Qualified Loads Restoration.</li> </ul>
		<ul style="list-style-type: none"> <li>DIRECT performance of FS-30, Stabilize RCS Temperature.</li> </ul>

Operating Test : <u>NRC</u>		Scenario # <u>3</u>	Event # <u>6, 7, &amp; 8</u>	Page <u>15</u> of <u>17</u>
Event Description: <u>Excess Steam Demand Event / Two CEAs Fail to Insert / MSIS Fails to Actuate</u>				
Time	Position	Applicant's Actions or Behavior		
		<ul style="list-style-type: none"> <li>DIRECT performance of Attachment 28, Isolation of SG with ESDE.</li> </ul>		
		<ul style="list-style-type: none"> <li>VERIFY ESDE diagnosis using Figure 1, Break Identification Chart.</li> </ul>		
		<ul style="list-style-type: none"> <li>INITIATE sampling of both Steam Generators for radioactivity and boron.</li> </ul>		
<b>M.O. Cue:</b> If directed to sample SGs, WAIT 10 minutes and then REPORT that E088 and E089 both have activity near background, and normal boron levels. If the SG sample valves are closed, REPORT that you are unable to establish sample flow.				
	CRS	INITIATE Administrative Actions:		
		<ul style="list-style-type: none"> <li>NOTIFY Shift Manger/Operations Leader of entry into SO23-12-5, Excess Steam Demand Event.</li> </ul>		
		<ul style="list-style-type: none"> <li>ENSURE Emergency Plan is initiated.</li> </ul>		
		<ul style="list-style-type: none"> <li>IMPLEMENT Placekeeper.</li> </ul>		
	RO	VERIFY ESF actuation.		
		<ul style="list-style-type: none"> <li>VERIFY SIAS actuation required.</li> </ul>		
		<ul style="list-style-type: none"> <li>PZR pressure less than SIAS setpoint.</li> </ul>		
		<ul style="list-style-type: none"> <li>ENSURE the following actuated:</li> </ul>		
		<ul style="list-style-type: none"> <li>SIAS / CCAS / CRIS /MSIS</li> </ul>		
	CRS	RECORD time of SIAS _____.		
	BOP	STOP Train B EDG (SIAS Override STOP).		
	BOP	PERFORM EOI SO23-12-11, Attachment 22, Non-Qualified Load Restoration.		
<b>M.O. Cue:</b> When directed to restore non-qualified loads, WAIT 2 minutes, then EXECUTE ED85, Non-Qualified Loads Restoration. INFORM the Control Room that you have restored non-qualified loads.				

Operating Test :	NRC	Scenario #	3	Event #	6, 7, & 8	Page	16	of	17
Event Description: Excess Steam Demand Event / Two CEAs Fail to Insert / MSIS Fails to Actuate									
Time	Position	Applicant's Actions or Behavior							

	BOP	VERIFY MSIS actuation required and ENSURE MSIS actuated.
		<ul style="list-style-type: none"> <li>SG pressure &lt; 740 PSIA.</li> </ul>
	RO	DETERMINE CIAS actuation NOT required.
	RO	VERIFY SIAS actuated.
	RO	ESTABLISH Optimum SI Alignment:
		<ul style="list-style-type: none"> <li>ESTABLISH two train operation: <ul style="list-style-type: none"> <li>All available Charging Pumps operating (P192).</li> <li>One HPSI and one LPSI per Train B operating.</li> <li>Train B Cold Leg flow paths aligned.</li> <li>VERIFY SI flow required: <ul style="list-style-type: none"> <li>SI flow indicated OR RCS pressure &gt;1250 psia.</li> </ul> </li> </ul> </li> </ul>
		OR
		<ul style="list-style-type: none"> <li>VERIFY FS-7, Verify SI Throttle/Stop criteria satisfied.</li> </ul>
	BOP	DETERMINE MSIVs and MSIV Bypasses CLOSED.
	CRS	PREVENT Pressurize Thermal Shock.
		<ul style="list-style-type: none"> <li>DIRECT performance of FS-30, Stabilize RCS Temperature.</li> <li>DIRECT performance of VERIFY FS-7, Verify SI Throttle/Stop Criteria.</li> </ul>
	RO	VERIFY RCP NPSH requirements of EOI SO23-12-11, Attachment 29.
	CRS	VERIFY ESDE isolated.
	BOP	<ul style="list-style-type: none"> <li>VERIFY both Steam Generator WR levels &gt; 10%.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>VERIFY both Steam Generator pressures rising.</li> </ul>
	RO	<ul style="list-style-type: none"> <li>VERIFY RCS Tcold in each loop rising.</li> </ul>

Operating Test : <u>    NRC    </u> Scenario # <u>    3    </u> Event # <u>    6, 7, &amp; 8    </u> Page <u>    17    </u> of <u>    17    </u>		
Event Description: <u>Excess Steam Demand Event / Two CEAs Fail to Insert / MSIS Fails to Actuate</u>		
Time	Position	Applicant's Actions or Behavior

	BOP	VERIFY least affected SG level > 22% narrow range.
+30 min	BOP	OPERATE ADV to stabilize RCS temperature.
<b><i>When ESDE is verified isolated, TERMINATE the scenario.</i></b>		

Facility:	SONGS 2 and 3	Scenario No.:	4	Op Test No.:	October 2009 NRC
Examiners:	_____	Operators:	_____		
	_____		_____		
	_____		_____		
Initial Conditions: <ul style="list-style-type: none"> <li>Reactor Critical at <math>2 \times 10^{-3}\%</math> power MOC - RCS Boron is 1466 ppm (by sample).</li> <li>Train B Component Cooling Water Pump (P-026) in service.</li> <li>Channel X Pressurizer Level and Pressure Control in service.</li> <li>Fire Computer is OOS.</li> </ul>					
Turnover: Power increase in progress to ~ 2% power.					
Critical Tasks: <ul style="list-style-type: none"> <li>Restore Component Cooling Water flow due to Train B leakage.</li> <li>Reduce Reactor Coolant System Thot to less than 530°F (SGTR).</li> <li>Isolate the most affected Steam Generator (SGTR).</li> </ul>					
Event No.	Malf. No.	Event Type*	Event Description		
1 +15 min		R (RO) N (BOP, CRS)	Rod withdrawal and power increase in progress to ~2% power.		
2 +25 min	CVCS LP	I (RO, CRS)	Letdown Heat Exchanger Outlet Temperature Instrument (TI-0224) fails high. TV-0224A and TV-0224B fail to reposition.		
3 +35 min	CC05B	C (BOP, CRS) TS (CRS)	Train B Component Cooling Water Heat Exchanger (E-002) tube leak.		
4 +45 min	RX08	C (BOP, CRS)	Steam Bypass Control Valves close. Transfer SBSCS Master Controller (PIC-8431) to Local-Manual to open valves.		
5 +50 min	SG06B	C (RO, CRS) TS (CRS)	Steam Generator Tube Leak (E-089) at 50 gpm.		
6 +50 min	SG06B	M (RO, BOP, CRS)	Steam Generator Tube Rupture (E-089) at 300 gpm upon Unit trip.		
7 +60 min	CCAS LP	I (RO)	Containment Cooling Actuation Signal fails to actuate.		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS) Technical Specifications					

### **SCENARIO SUMMARY NRC #4**

The crew will assume the watch with the Reactor critical at  $\sim 2 \times 10^{-3}\%$  power. The crew will raise power using CEA withdrawal per Operating Instruction (OI) SO23-5-1.3.1, Plant Startup from Hot Standby to Minimum Load.

The next event is a high failure of a Letdown temperature instrument. The crew will respond per the Annunciator Response Procedures (ARP) and perform actions to isolate the Boronometer and bypass the Ion Exchanger Demineralizers.

When Letdown conditions are normal, a tube leak will develop on the Train B Component Cooling Water Heat Exchanger. The crew will respond per Abnormal Operating Instruction (AOI) SO23-13-7, Loss of Component Cooling Water/Salt Water Cooling. Crew actions include transferring to the Train A Component Cooling Water System as well as attempting to isolate Train B leakage. The CRS will evaluate Technical Specifications.

When CCW flow is restored, the Steam Bypass Control System (SBCS) Valves will close. Crew actions are per OI SO23-3-2.18, Steam Bypass System Operation and include transferring the SBCS Master Controller to Local-Manual control or operating individual SBCS Valves and restoring Reactor Coolant System temperature and Reactor power level to normal.

When plant conditions are stable, a Steam Generator tube leak will occur. The crew will enter AOI SO23-13-4, RCS Leak and take actions to minimize tube leakage. The size of the leak will require an immediate plant trip and at that time the leak will escalate to a rupture. The crew will enter Emergency Operating Instruction (EOI) SO23-12-1, Standard Post Trip Actions and transition to EOI SO23-12-5, Steam Generator Tube Rupture.

Following the Safety Injection Actuation Signal, the Containment Cooling Actuation Signal fails to actuate requiring manual actions by the crew.

The event is terminated when the affected Steam Generator is cooled down and the Reactor Coolant System is depressurized.

#### **Risk Significance:**

- |   |   |
|---|---|
| • Risk important components out of service:       | None                                    |
| • Failure of risk important system prior to trip: | Loss of Train B Component Cooling Water |
| • Risk significant core damage sequence:          | SGTR with MSIV failure                  |
| • Risk significant operator actions:              | Restore Non-Critical CCW Loop flow      |
|   | Isolate Ruptured Steam Generator        |
|   | Cooldown and Depressurize RCS           |



Scenario Event Description

NRC Scenario #4

SONGS

2009 Facility NRC Initial License Examination  
Simulator Scenario Setup

**Machine Operator:** EXECUTE IC #224 and NRC Scenario #4 SETUP file to align components.  
VERIFY Control Board Tags removed on P-050, P-015, and G-002.  
CHANGE Operator Aid Tags #029 (CVCS) and #005-4 (CVCS Ion Exchanger) to reflect the scenario born concentration.  
CHANGE Operator Aid Tag #005-9 (AFW T-120/121 alignment) to AUTO MAKEUP for both T-120 and T-121.  
VERIFY both Pressurizer Spray Valves in AUTO.  
ENSURE two (2) Charging Pumps running.  
ENSURE Train B Component Cooling Water in service.  
MOVE Component Cooling Water OOS Tags to Train A components.  
ENSURE Steam Generator level is controlled at 50% to 55%.  
PLACE Channel X Pressurizer Pressure and Pressurizer Level in service.  
PLACE procedures in progress on the RO desk:  
- Copy of SO23-5-1.3.1, Plant Startup from Hot Standby to Minimum Load INITIALED through Step 6.5.1.  
- MARKED UP copy of SO23-5-1.7, Attachment 9.  
- MARKED UP copy of SO23-2-4, Auxiliary Feedwater System Operation Section 6.2.  
PLACE the MOC copies of OPS Physics Summary Book on RO Desk and SO23-5-1.7, Attachment 8 on Control Board.  
If Group Position(s) is (are) not correct, MOVE CEAs and then RETURN CEAs to Shift Turnover Sheet position (Group 6 @ 80; PLCEAs @ 75).

**Significant Control Room Annunciators in Alarm:**

50A02 – COLSS ALARM  
53A(B)03 – MFWP TURBINE K006 (K005) TRIP  
56A30/40/50/60 – LOSS OF LOAD CHANNEL 1/2/3/4 TRIP DISABLED  
63E10 – SCE CB TRIP  
99A24 – TURBINE TRIP RELAY TRIPPED  
99B01 – GENERATOR TRIP  
99B19 – VACUUM PROTECTION PLC TROUBLE

Operating Test :	NRC	Scenario #	4	Event #	1	Page	4	of	17
Event Description: Rod Withdrawal and Power Increase to ~2% Power									
Time	Position	Applicant's Actions or Behavior							

**Machine Operator: ENSURE all Simulator Scenario Setup actions are complete.**

+1 min

CRS

DIRECT performance of SO23-5-1.3.1, Plant Startup from Hot Standup to Minimum Load.

**Floor Cue: The startup rate based on Attachment 9 data will be 0.3 to 0.5 DPM. In order to facilitate time requirements, REPORT as the Shift Manager to maintain this rate.**

RO

DISPLAY the PCS page for Regulating Group 6 per SO23-3-2.20.

RO

VERIFY all CEA Regulating Group bottom lamps on the Core Mimic Panel are EXTINGUISHED.

RO

POSITION Mode Select Switch to MS (Manual Sequential).

RO

POSITION Group Select Switch to CEA Group 6.

RO/CRS

When directed by CRS, WITHDRAW Control Rods as required.

RO

ESTABLISH a Startup Rate of  $\leq 0.5$  DPM.

BOP

RAISE Auxiliary Feedwater flow as required to maintain Steam Generator levels between 50% and 55%.

RO

When CEA positioning is complete, PLACE Mode Select Switch to OFF.

BOP

VERIFY proper operation of Steam Bypass Control System when the Point of Adding Heat is reached ( $\sim 2E^{-1}\%$ ).

+15 min

BOP

MAINTAIN Tcold within band by monitoring SBSCS operation.

***When power has been raised to ~2%, or at Lead Evaluator's discretion, PROCEED to Event 2.***

Operating Test :	NRC	Scenario #	4	Event #	2	Page	5	of	17
Event Description: Letdown Heat Exchanger Temperature Control Valve Failure									
Time	Position	Applicant's Actions or Behavior							

**Machine Operator:** When directed, EXECUTE Event 2.  
 - CVCS LP, Temperature Control Valves (TV-0224A and TV-0224B) fail to divert (BYPASS) on high temperature.

**Indications Available:**

**58A32 – LETDOWN HX OUTLET TEMP HI**

+30 secs	RO	REFER to Annunciator Response Procedures.
	RO	RECOGNIZE Letdown Heat Exchanger outlet high temperature alarm and INFORM CRS ARP SO23-15-58.A, Annunciator 58A32 entry required.
	CRS	DIRECT performance of ARP SO23-15-58.A, 58A32 - LETDOWN HX OUTLET TEMP HI.
	RO	DETERMINE that Demineralizer Temperature Control Valve failed to divert on high temperature and Manually POSITION TV-0224B to BYPASS.
	RO	DETERMINE that Boronometer Isolation Valve failed to Auto Close on high temperature and Manually POSITION TV-0224A to CLOSE.
	RO	If Letdown Heat Exchanger is > 130°F take MANUAL control of TIC-0223 per SO23-2-17, CCW Operation.
	CRS	CONTACT I&C to investigate cause of problem.

**M.O. Cue:** If contacted as I&C to investigate problem, REMOVE override on the valve, WAIT one minute and REQUEST the RO PLACE TIC-0223 back in AUTO. REPORT that the valve has been sticking causing miscues in the temperature controller and that I&C is working on a repair.

+5 min	RO	MONITOR Letdown Heat Exchanger outlet temperature at least twice per shift.
--------	----	---

***When plant control is restored, or at Lead Evaluator's discretion, PROCEED to Event 3.***

Operating Test :	NRC	Scenario #	4	Event #	3	Page	6	of	17
Event Description: Train B Component Cooling Water Heat Exchanger Tube Leak									
Time	Position	Applicant's Actions or Behavior							

**Machine Operator:** When directed, EXECUTE Event 3.  
- CC05B, Train B CCW Heat Exchanger tube leak @ 100% severity.

**Indications Available:**

**64A29 – CCW SURGE TANK TRAIN B LEVEL HI/LO (time delay of ~ 2 to 5 min)**

+2 min	BOP	REFER to Annunciator Response Procedures.
<b><u>M.O. Cue:</u></b> When the CCW Surge Tank level low alarms, LOWER malfunction CC05B to 50% severity to facilitate diagnosis of the event.		
	BOP	RECOGNIZE lowering Surge Tank level and INFORM the CRS AOI SO23-13-7 entry required.
	CRS	DIRECT performance of AOI SO23-13-7, Loss of CCW/SWC.
	BOP	ISOLATE Radwaste by closing 2HV-6465, 3HV-6465, 2HV-6217, and 3HV-6217.
	CRS/BOP	DETERMINE that the leak is not isolated.
	CRS	DIRECT placing Train A CCW/SWC in service.
	BOP	START CCW Pump P024 <u>or</u> P025 and VERIFY that SWC P112 automatically starts.
+5 min	CRS	DIRECT transfer of the CCW Non-Critical Loop to Train A.
<b>CRITICAL TASK STATEMENT</b>		<b>With loss of flow to the CCW Non-Critical Loop and prior to exceeding RCP operating limits, restore flow to the NCL from any available CCW train.</b>
<b>CRITICAL TASK</b>	BOP	TRANSFER the CCW Non-Critical Loop to Train A.
	CRS	DIRECT transfer of Letdown Heat Exchanger to Train A.

Appendix D		Operator Action	Form ES-D-2
Operating Test : <u>      NRC      </u> Scenario # <u>      4      </u> Event # <u>      3      </u> Page <u>      7      </u> of <u>      17      </u>			
Event Description: <u>      Train B Component Cooling Water Heat Exchanger Tube Leak      </u>			
Time	Position	Applicant's Actions or Behavior	
	BOP	TRANSFER Letdown Heat Exchanger to Train A.	
	CRS	DIRECT securing CCW Pump P026.	
	BOP	STOP CCW Pump P026 and SWC Pump P114.	
<b><u>M.O. Cue:</u>      If directed to rack out breaker for CCW Pump P026, REPORT that it is in progress.</b>			
	CRS	ENSURE ECCS is not required.	
		<ul style="list-style-type: none"> <li>HPSI, LPSI, CS pumps are stopped.</li> </ul>	
	CRS/BOP	DISPATCH PEO to CLOSE Loop B CCW Surge Tank Outlet, HV-6505.	
<b><u>M.O. Cue:</u>      If directed to close 2HV-6505, Train B CCW Surge Tank Outlet Valve, WAIT 3 minutes and EXECUTE remote function CC61.</b>			
<b><u>M.O. Cue:</u>      If contacted to report status of Unit 3 CCW Surge Tank Level, REPORT that Train A CCW Surge Tank level is stable and unchanged.</b>			
+10 min	CRS	EVALUATE Technical Specifications.	
		<ul style="list-style-type: none"> <li>LCO 3.7.7.A, Component Cooling Water System.</li> </ul>	
		<ul style="list-style-type: none"> <li>CONDITION A - One CCW Train inoperable.</li> <li>ACTION A.1 - Restore CCW Train to OPERABLE status within 72 hours.</li> </ul>	
<b><i>When Technical Specifications are addressed, or at Lead Evaluator's discretion, PROCEED to Event 4.</i></b>			

Operating Test :	NRC	Scenario #	4	Event #	4	Page	8	of	17
Event Description: Steam Bypass Control Valves Close									
Time	Position	Applicant's Actions or Behavior							

**Machine Operator:** When directed, EXECUTE Event 4.  
- RX08, Steam Bypass Control Valves HV-8423 and HV-8425 close.

**Indications Available:**

50A07 – SDCS DEMAND PRESENT (possible reflash)  
Reactor Coolant System temperature rising  
Reactor power slowly lowering

+ 1 min	RO/BOP	RECOGNIZE Reactor Coolant System temperature rising and power level lowering.
	BOP	DETERMINE both Steam Bypass Control Valves have closed.
	CRS	VERIFY proper operation of the SBCS System per SO23-3-2.18, Steam Bypass System Operation.
<b><u>Examiner Note:</u> Any one of the methods listed is acceptable to regain control of the Steam Bypass Control Valves.</b>		
	BOP	PERFORM one of the following to regain control of the Steam Bypass Control Valves:
		• TRANSFER Master Controller PIC-8431 to LOCAL MANUAL to open valves.
		• PLACE SBCS Valve Controllers HV-8423 and HV-8425 in LOCAL to open valves.
	BOP	RESTORE Reactor Coolant System temperature and Reactor power to program.
	CRS	REFER to SO23-3-2.18, Steam Bypass System Operation as required.
<b><i>When RCS pressure and temperature control are restored, or at Lead Evaluator's discretion, PROCEED to Event 5.</i></b>		

Operating Test :	NRC	Scenario #	4	Event #	5	Page	9	of	17
Event Description: Steam Generator Tube Leak on E089									
Time	Position	Applicant's Actions or Behavior							

**Machine Operator:** When directed, EXECUTE Event 4.  
- SG06B @ 0.15%, Steam Generator Tube Leak on E089 of ~50 gpm.

**Indications Available:**

**60A46 – SECONDARY RADIATION HI**  
**Auto Start of standby Charging Pump**

	RO/BOP	REFER to Annunciator Response Procedures.
	BOP	RECOGNIZE increasing radiation levels and INFORM the CRS AOI SO23-13-14 entry required.
+1 min	CRS	DIRECT performance of SO23-13-14, RCS Leak, Section for Primary to Secondary leakage.
<b><u>M.O. Cue:</u></b> When contacted as Chemistry, WAIT 5 minutes and REPORT that a frisk of the SG sample indicates high activity in SG E089. WAIT another 5 minutes, and then REPORT that high activity in SG E089 is verified.		
	CRS/RO	DETERMINE PZR level is lowering.
	RO	START Charging Pumps to maintain Pressurizer level.
	CRS/RO	DETERMINE VCT level is lowering.
	RO	OPERATE Makeup System to maintain VCT level as needed.
	CRS/RO	DETERMINE Steam Generator tube leak is greater than 75 gpd and rising at greater than 30 gpd/hr.
	CRS	DIRECT a Reactor Trip and ENTRY into SO23-12-1, Standard Post Trip Actions.

Operating Test : <u>    NRC    </u> Scenario # <u>    4    </u> Event # <u>    5    </u> Page <u>  10  </u> of <u>  17  </u>		
Event Description: <u>    Steam Generator Tube Leak on E089    </u>		
Time	Position	Applicant's Actions or Behavior

+10 min	CRS	EVALUATE Technical Specifications.
		<ul style="list-style-type: none"> <li>LCO 3.4.13.B, RCS Operational Leakage.</li> </ul>
		<ul style="list-style-type: none"> <li>CONDITION B - Primary to secondary LEAKAGE not within limits.</li> <li>ACTION B.1 - Be in MODE 3 in 6 hours.</li> <li>ACTION B.2 - Be in MODE 5 in 36 hours.</li> </ul>
<b><i>When Technical Specifications are addressed, or at Lead Evaluator's discretion, PROCEED to Events 6 and 7.</i></b>		



Operating Test :	NRC	Scenario #	4	Event #	6 & 7	Page	11	of	17
Event Description: Steam Generator Tube Rupture on E089 / CCAS Fails to Actuate									
Time	Position	Applicant's Actions or Behavior							

**Machine Operator:** When directed, EXECUTE Events 6 and 7.  
 - SG06B @ 0.9%, Steam Generator E089 Tube Rupture @ ~300 gpm.  
 - CCAS LP, Containment Cooling Actuation Signal fails to actuate.

**Indications Available:**

60A46 – SECONDARY RADIATION HI (reflash)  
 63B02 – UNIT 2 CRITICAL PARAMETER PROBLEM

	RO/BOP	TRIP the Reactor and ENTER SO23-12-1, Standard Post Trip Actions.
	RO	VERIFY Reactor Trip:
		<ul style="list-style-type: none"> <li>VERIFY Reactor Trip Circuit Breakers (8) open.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY Reactor Power lowering and Startup Rate negative.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY maximum of one full length CEA NOT fully inserted.</li> </ul>
	CRS	VERIFY Reactivity Control criteria satisfied.
	BOP	VERIFY Turbine Trip:
		<ul style="list-style-type: none"> <li>VERIFY Main Turbine tripped.</li> </ul>
		<ul style="list-style-type: none"> <li>HP and LP Stop and Governor Valves closed.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY both Unit Output Breakers open.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY Main Turbine speed &lt; 2000 RPM or lowering.</li> </ul>
	CRS	INITIATE Administrative Actions:
		<ul style="list-style-type: none"> <li>ANNOUNCE Reactor trip via PA System.</li> </ul>
		<ul style="list-style-type: none"> <li>INITIATE Attachment 4, Worksheet.</li> </ul>
		<ul style="list-style-type: none"> <li>INITIATE Attachment 5, Administrative Actions.</li> </ul>
	BOP	VERIFY Vital Auxiliaries criteria satisfied:
		<ul style="list-style-type: none"> <li>VERIFY both 1E 4 kV Buses A04 and A06 energized.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY both 1E 480 V Buses B04 and B06 energized.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY all 1E DC Buses energized.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY all Non-1E 4 kV Buses energized.</li> </ul>

Operating Test : <u>NRC</u>		Scenario # <u>4</u>	Event # <u>6 &amp; 7</u>	Page <u>12</u> of <u>17</u>
Event Description: <u>Steam Generator Tube Rupture on E089 / CCAS Fails to Actuate</u>				
Time	Position	Applicant's Actions or Behavior		
		<ul style="list-style-type: none"> <li>• VERIFY one CCW Train operating AND aligned to Non-Critical Loop and Letdown Heat Exchanger.</li> </ul>		
	RO	DETERMINE RCS Inventory Control criteria NOT satisfied:		
		<ul style="list-style-type: none"> <li>• DETERMINE PZR level between 10% and 70% and NOT trending to between 30% and 60%.</li> </ul>		
		<ul style="list-style-type: none"> <li>• [RNO] DETERMINE PZR Level Control System is NOT restoring PZR level.</li> </ul>		
		<ul style="list-style-type: none"> <li>• VERIFY Core Exit Saturation Margin <math>\geq 20^{\circ}\text{F}</math>:</li> </ul>		
		<ul style="list-style-type: none"> <li>• QSPDS page 611.</li> </ul>		
		<ul style="list-style-type: none"> <li>• CFMS page 311.</li> </ul>		
	RO	DETERMINE RCS Pressure Control criteria NOT satisfied:		
		<ul style="list-style-type: none"> <li>• DETERMINE PZR pressure (WR and NR) between 1740 PSIA and 2380 PSIA and NOT controlled AND NOT trending to 2025 PSIA and 2275 PSIA.</li> </ul>		
		<ul style="list-style-type: none"> <li>• [RNO] DETERMINE PZR Pressure Control System is NOT restoring PZR pressure.</li> </ul>		
		<ul style="list-style-type: none"> <li>• [RNO] ENSURE Normal and Aux Spray valves closed.</li> </ul>		
		<ul style="list-style-type: none"> <li>• [RNO] ENSURE SIAS, CCAS, and CRIS actuated.</li> </ul>		
		<ul style="list-style-type: none"> <li>• [RNO] If PZR pressure is <math>&lt; 1430</math> PSIA, then ENSURE at least one RCP in each loop stopped.</li> </ul>		
	RO	VERIFY Core Heat Removal criteria satisfied:		
		<ul style="list-style-type: none"> <li>• VERIFY at least one RCP operating.</li> </ul>		
		<ul style="list-style-type: none"> <li>• VERIFY Core Loop <math>\Delta T &lt; 10^{\circ}\text{F}</math>.</li> </ul>		
		<ul style="list-style-type: none"> <li>• VERIFY Core Exit Saturation Margin <math>\geq 20^{\circ}\text{F}</math>.</li> </ul>		
		<ul style="list-style-type: none"> <li>• QSPDS page 611.</li> </ul>		
		<ul style="list-style-type: none"> <li>• CFMS page 311.</li> </ul>		
<b>Examiner Note:</b> RCS Heat Removal may or may not be satisfied depending upon RCS temperature as the Steam Bypass Control System may be in MANUAL.				

Operating Test :	NRC	Scenario #	4	Event #	6 & 7	Page	13	of	17
Event Description: Steam Generator Tube Rupture on E089 / CCAS Fails to Actuate									
Time	Position	Applicant's Actions or Behavior							

	BOP	DETERMINE RCS Heat Removal criteria NOT satisfied:
		<ul style="list-style-type: none"> <li>VERIFY both SGs level &gt; 21% NR.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY both SGs level &lt; 80% NR.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY Auxiliary Feedwater available to restore both SGs level between 40% NR and 80% NR.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] If required, manually INITIATE EFAS.</li> </ul>
		<ul style="list-style-type: none"> <li>DETERMINE <math>T_{cold} &lt; 545^{\circ}\text{F}</math> and NOT controlled.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] ENSURE SBSCS valves closed.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] ENSURE ADVs closed.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] ENSURE SG Blowdown valves closed.</li> </ul>
		<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li><u>E-088</u> - HV-4054      <u>E-089</u> - HV-4053</li> </ul> </li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] ENSURE Main Steam to Reheater Valves closed.</li> </ul>
		<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>HV-2703 or HV-2704; HV-2721; HV-2751</li> </ul> </li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY SG pressures greater than 740 PSIA.</li> </ul>
	RO	DETERMINE Containment Isolation criteria NOT satisfied:
		<ul style="list-style-type: none"> <li>VERIFY Containment pressure &lt; 1.5 PSIG.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY Containment Area Radiation Monitors energized and NOT alarming or trending to alarm.</li> </ul>
		<ul style="list-style-type: none"> <li>DETERMINE Secondary Plant Radiation Monitors energized AND alarming or trending to alarm.</li> </ul>
	RO	VERIFY Containment Temperature and Pressure criteria satisfied:
		<ul style="list-style-type: none"> <li>VERIFY Containment average temperature &lt; 120°F.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY Containment pressure &lt; 1.5 PSIG.</li> </ul>
+15 min	CRS	DIAGNOSE event in progress:
		<ul style="list-style-type: none"> <li>DETERMINE some Safety Function criteria are NOT met per Attachment 4, Worksheet.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] COMPLETE Attachment 1, Recovery Diagnostics.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] DIAGNOSE event as SGTR on SG E089.</li> </ul>
		<ul style="list-style-type: none"> <li>DETERMINE that Reactor Trip Recovery is NOT diagnosed.</li> </ul>

Operating Test : <u>NRC</u>		Scenario # <u>4</u>	Event # <u>6 &amp; 7</u>	Page <u>14</u> of <u>17</u>
Event Description: <u>Steam Generator Tube Rupture on E089 / CCAS Fails to Actuate</u>				
Time	Position	Applicant's Actions or Behavior		
	RO	<ul style="list-style-type: none"> <li>[RNO] ENSURE one RCP in each loop stopped.</li> </ul>		
		<ul style="list-style-type: none"> <li>DIRECT initiating Steps 12 through 15.</li> </ul>		
	BOP	INITIATE Steps 12 through 15.		
	CRS	DIRECT performance of SO23-12-4, Steam Generator Tube Rupture.		
	CRS	RECORD time of EOI entry _____.		
	CRS	VERIFY SGTR Diagnosis:		
		<ul style="list-style-type: none"> <li>INITIATE SO23-12-10, Safety Function Status Checks.</li> </ul>		
		<ul style="list-style-type: none"> <li>INITIATE Foldout Page.</li> </ul>		
		<ul style="list-style-type: none"> <li>DIRECT performance of FS-7, SI Throttle/Stop Criteria.</li> </ul>		
		<ul style="list-style-type: none"> <li>DIRECT performance of SO23-12-11, Attachment 22, Non-Qualified Load Restoration.</li> </ul>		
		<ul style="list-style-type: none"> <li>VERIFY SGTR diagnosis using Figure 1, Break Identification Chart.</li> </ul>		
		<ul style="list-style-type: none"> <li>INITIATE sampling of both Steam Generators for radioactivity and boron.</li> </ul>		
<b><u>M.O. Cue:</u></b> If directed to sample SGs, WAIT 5 minutes and then REPORT that E089 has elevated radiation levels and boron levels. If the SG sample valves are closed, REPORT that you are unable to establish sample flow.				
	CRS	INITIATE Administrative actions:		
		<ul style="list-style-type: none"> <li>NOTIFY Shift Manager/Operations Leader of SO23-12-4, Steam Generator Tube Rupture initiation.</li> </ul>		
		<ul style="list-style-type: none"> <li>ENSURE Emergency Plan is initiated.</li> </ul>		
		<ul style="list-style-type: none"> <li>IMPLEMENT Placekeeper.</li> </ul>		
<b>CRITICAL TASK STATEMENT</b>		<b>Reduce Reactor Coolant System Thot to less than 530°F within 30 minutes of optimal EOI entry.</b> <b>Elapsed Time: _____</b>		
<b>CRITICAL TASK</b>	CRS	DIRECT lowering RCS T <sub>HOT</sub> to less than 530°F:		

Operating Test :	NRC	Scenario #	4	Event #	6 & 7	Page	15	of	17
Event Description: Steam Generator Tube Rupture on E089 / CCAS Fails to Actuate									
Time	Position	Applicant's Actions or Behavior							

	BOP	<ul style="list-style-type: none"> <li>• VERIFY both SGs available for cooldown.</li> </ul>
		<ul style="list-style-type: none"> <li>• ENSURE one RCP in each loop stopped.</li> </ul>
		<ul style="list-style-type: none"> <li>• INITIATE lowering T<sub>HOT</sub> to less than 530°F using SBCS.</li> </ul>
	RO	<ul style="list-style-type: none"> <li>• RESET SG Low Pressure Setpoints during controlled cooldown.</li> </ul>
	RO	VERIFY ESF Actuation:
		<ul style="list-style-type: none"> <li>• DETERMINE SIAS actuation required.</li> </ul>
		<ul style="list-style-type: none"> <li>• DETERMINE PZR pressure trending to SIAS setpoint.</li> </ul>
	RO	ENSURE the following actuated:
		<ul style="list-style-type: none"> <li>• SIAS / CCAS / CRIS.</li> </ul>
		<ul style="list-style-type: none"> <li>• DETERMINE CCAS did NOT actuate and manually INITIATE CCAS.</li> </ul>
	CRS	RECORD time of SIAS entry _____.
	BOP	STOP unloaded Diesel Generators (SIAS Override STOP).
	BOP	INITIATE SO23-12-11, Attachment 22, Non-Qualified Load Restoration.
<b><u>M.O. Cue:</u></b> When directed to restore non-qualified loads, WAIT 2 minutes, then EXECUTE ED85, Non-Qualified Loads Restoration. INFORM the Control Room that you have restored non-qualified loads.		
	RO	ATTEMPT to OVERRIDE and OPEN Instrument Air to Containment.
<b><u>M.O. Cue:</u></b> When directed to isolate IA to Containment, REPORT as the ARO that you will restore IA. EXECUTE remote function IA52, to CLOSE MU060, RESET Excess Flow Check Valve, then EXECUTE remote function IA52 to OPEN MU060. REPORT to the Control Room that Instrument Air to Containment is restored.		
<b><u>Examiner Note:</u></b> The CRS may elect to secure Train B ECCS components due to loss of Train B Component Cooling Water.		

Operating Test :	NRC	Scenario #	4	Event #	6 & 7	Page	16	of	17
Event Description: Steam Generator Tube Rupture on E089 / CCAS Fails to Actuate									
Time	Position	Applicant's Actions or Behavior							

	RO	ESTABLISH Optimum SI Alignment:
		<ul style="list-style-type: none"> <li>ESTABLISH two train operation.</li> </ul>
		<ul style="list-style-type: none"> <li>All Charging Pumps operating.</li> </ul>
		<ul style="list-style-type: none"> <li>One HPSI and one LPSI per train operating.</li> </ul>
		<ul style="list-style-type: none"> <li>All Cold leg flow paths aligned.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY SI flow required:</li> </ul>
		<ul style="list-style-type: none"> <li>SI flow indicated.</li> </ul>
	RO	<ul style="list-style-type: none"> <li>DETERMINE FS-7, VERIFY SI Throttle/Stop Criteria NOT satisfied.</li> </ul>
	CREW	IDENTIFY E089 as affected SG:
		<ul style="list-style-type: none"> <li>EVALUATE SG radioactive release indications - rising.</li> </ul>
		<ul style="list-style-type: none"> <li>SG Blowdown monitors.</li> </ul>
		<ul style="list-style-type: none"> <li>SG sample results.</li> </ul>
		<ul style="list-style-type: none"> <li>Steam line monitors.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>EVALUATE indications on E089</li> </ul>
		<ul style="list-style-type: none"> <li>SG level rising when not feeding.</li> </ul>
		<ul style="list-style-type: none"> <li>SG feedwater flowrate - significantly mismatched between SGs.</li> </ul>
		<ul style="list-style-type: none"> <li>Steam/feed flow prior to trip NOT normal.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>OPERATE AFW to maintain Steam Generator E089 level &gt; 40% AND RCS cooldown less than 100°F.</li> </ul>
	CRS	<ul style="list-style-type: none"> <li>NOTIFY Shift Manager/Operations Leader that E089 is affected SG.</li> </ul>
	BOP	VERIFY Heat Removal by SG E088:
		<ul style="list-style-type: none"> <li>VERIFY AFW Pump P504 available and operating.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY SG E088 available for continued heat removal.</li> </ul>
	CREW	ISOLATE the most affected Steam Generator (SGTR).
	RO	<ul style="list-style-type: none"> <li>ENSURE RCS T<sub>hot</sub> less than 530°F.</li> </ul>

Operating Test :	NRC	Scenario #	4	Event #	6 & 7	Page	17	of	17
Event Description: Steam Generator Tube Rupture on E089 / CCAS Fails to Actuate									
Time	Position	Applicant's Actions or Behavior							

<b>CRITICAL TASK STATEMENT</b>		<b>Isolate the Most Affected Steam Generator (E089) within 30 minutes of optimal EOI entry.</b> <b>Elapsed Time:</b> _____	
<b>CRITICAL TASK</b>	<b>BOP</b>	ISOLATE SG E089, CLOSE / STOP the following components:	
		MSIV	HV-8204
		MSIV Bypass	HV-8202
		ADV	HV-8421
		MFIV	HV-4052
		AFW Valves	HV-4731 and HV-4715
		Steam to AFW P-140	HV-8200
		SG Blowdown Isolation	HV-4053
		SG Water Sample Isolation	HV-4057
		Electric AFW Pump	P-141
	<b>CRS</b>	• RECORD time of SG isolation _____.	
	<b>BOP</b>	• ENSURE ADV on SG E089 - selected to MANUAL.	
+30 min	<b>BOP</b>	• CONTACT outside operator to CLOSE Main Steam Drain Isolation valves.	
<b>When SG E089 is isolated, or at the Lead Evaluator's discretion, TERMINATE the scenario.</b>			

Facility:	SONGS 2 and 3	Scenario No.:	5	Op Test No.:	October 2009 NRC
Examiners:	_____	Operators:	_____		
	_____		_____		
	_____		_____		
Initial Conditions:	<ul style="list-style-type: none"> <li>74% power BOC - RCS Boron is 1687 ppm (by sample).</li> <li>Train B Component Cooling Water Pump (P-026) in service.</li> <li>Channel Y Pressurizer Pressure and Level Control in service.</li> <li>Control Element Assembly Calculator #2 in service.</li> <li>Vacuum Pump (P-054) OOS for hogging valve repair.</li> <li>Fire Computer is OOS.</li> </ul>				
Turnover:	Maintain steady-state plant conditions.				
Critical Tasks:	<ul style="list-style-type: none"> <li>Manually Trip the Reactor (Reactor Protection System failure).</li> <li>Perform High Pressure Safety Injection Throttle/Stop actions (LOCA).</li> </ul>				
Event No.	Malf. No.	Event Type*	Event Description		
1 +10 min	SC01D	C (BOP, CRS) TS (CRS)	Salt Water Cooling Pump (P-114) trips on seized shaft.		
2 +20 min	RC15B	I (RO, CRS)	Pressurizer Pressure Control Channel (PT-0100Y) fails low.		
3 +30 min	RP18	I (RO, CRS) TS (CRS)	Control Element Assembly Calculator #2 failure.		
4 +35 min	TU08	M (RO, BOP, CRS)	Inadvertent Main Turbine trip.		
5 +35 min	RP15	I (RO)	Reactor fails to automatically trip.		
6 +35 min	TC02E	C (BOP)	High Pressure Turbine Stop Valve (HV-2200E) fails to close.		
7 +45 min	RC18A	M (RO, BOP, CRS)	Pressurizer Safety Valve (PSV-0200) fails open on the trip and reseats after Safety Injection is actuated.		
8 +45 min	FW23	C (BOP)	Loss of Condenser vacuum.		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS) Technical Specifications					



**SCENARIO SUMMARY NRC #5**

The crew will assume the watch and maintain steady-state conditions per Operating Instruction (OI) SO23-5-1.7, Power Operations.

The first event is a loss of Saltwater Cooling Pump P-114. The crew will respond per Abnormal Operating Instruction (AOI) SO23-13-7, Loss of Component Cooling Water/Saltwater Cooling System by starting Train A Component Cooling Water System. Additionally, the Non-Critical Loop and Letdown Heat Exchanger must also be transferred to Train A. The CRS will evaluate Technical Specifications.

The next event is a low failure of Pressurizer Pressure Channel Y. Operator actions are per AOI SO23-13-27, Pressurizer Pressure and Level Malfunction. The crew will transfer to Channel X and restore Pressurizer pressure and heater functions.

Once plant conditions are stable, Control Element Assembly Calculator (CEAC) #2 will fail. The crew will respond per the Annunciator Response Procedures (ARP) and OI SO23-3-2.13, Core Protection / Control Element Assembly Calculator Operation and transfer to CEAC #1 to restore Rod Position Indication. The CRS will evaluate Technical Specifications.

The major event is initiated by an inadvertent Main Turbine trip. Upon Main Turbine trip, a Pressurizer Safety Valve will open and remain open until Safety Injection actuates and close when the Safety Injection Actuation Signal is received. The crew will enter Emergency Operating Instruction (EOI) SO23-12-1, Standard Post Trip Actions. The CRS will determine that entry into EOI SO23-12-2, Reactor Trip Recovery is warranted because Pressurizer pressure and level are rising with no indications of radiation or leakage into Containment. In the event the opening and closing of the Pressurizer Safety Valve is not observed, the crew may enter EOI SO23-12-3, Loss of Coolant Accident.

The inadvertent Main Turbine trip is complicated by the Reactor failing to trip and a High Pressure Turbine Stop Valve remaining open. Additionally, a loss of Condenser vacuum occurs necessitating Reactor Coolant System temperature control using the Atmospheric Dump Valves.

The event is terminated when actions for High Pressure Safety Injection Throttle/Stop are performed per EOI SO23-12-2 or EOI SO23-12-11, EOI Supporting Attachments in order to prevent overfilling of the Pressurizer.

**Risk Significance:**

- |   |   |
|---|---|
| • Risk important components out of service:       | None  |
| • Failure of risk important system prior to trip: | Loss of Train B Component Cooling Water       |
| • Risk significant core damage sequence:          | Inadvertent Turbine trip without Reactor trip |
| • Risk significant operator actions:              | Transfer CCW Non-Critical Loop                |
|   | Manually Trip the Reactor                     |
|   | Perform HPSI Throttle/Stop                    |

Scenario Event Description

NRC Scenario 5

SONGS

2009 Facility NRC Initial License Examination  
Simulator Scenario Setup

**Machine Operator:**    **EXECUTE IC #225 and NRC Scenario #5 SETUP file to align components.**  
**HANG Control Board Tags on P-054.**  
**CHANGE Operator Aid Tags #029 (CVCS) and #005-4 (CVCS Ion Exchanger) to reflect the scenario born concentration.**  
**RESET CVCS Batch Counters to zero (0).**  
**VERIFY both Pressurizer Spray Valves in AUTO.**  
**ENSURE Train B Component Cooling Water Pump (P-026) in service.**  
**ENSURE CEAC #2 in service.**  
**ENSURE Channel Y Pressurizer Pressure and Pressurizer Level in service.**  
**PLACE procedures in progress on the RO desk:**  
**- Copy of SO23-5-1.7, Power Operations open to Section 6.1, Guidelines for Steady State Operation.**  
**PLACE the BOC copies of OPS Physics Summary Book on RO Desk and SO23-5-1.7, Attachment 8 on Control Board.**  
**If Group Position(s) is (are) not correct, MOVE CEAs and then RETURN CEAs to Shift Turnover Sheet position (Group 6 @ 137 / PLCEAs @ 115).**

**Control Room Annunciators in Alarm:**

**None**

Operating Test :	NRC	Scenario #	5	Event #	1	Page	4	of	17
Event Description: Train B Salt Water Cooling Pump Seized Shaft									
Time	Position	Applicant's Actions or Behavior							

**Machine Operator:** When directed, EXECUTE Event 1.  
- SC01D, Salt Water Cooling Pump P-114 seized shaft.

**Indications Available:**

64A24 – SWC PUMP MOTOR BRG TEMP HI  
64A43 – SWC PUMP TRAIN B OC  
64A20 – SWC TRAIN B FLOW HI/LO  
64A60 – SWC TRAIN B FLOW TROUBLE  
Salt Water Cooling Pump P-114 tripped indication

+30 secs	BOP	REFER to Annunciator Response Procedures.
	BOP	DETERMINE that SWC P114 has tripped and INFORM the CRS that entry into SO23-13-7 is required.
	CRS	DIRECT performance of AOI SO23-13-7, Loss of CCW/SWC.
	CRS	DIRECT transfer of CCW to Train A.
	BOP	START CCW Pump P024 or P025 and VERIFY that SWC Pump P112 automatically starts.
	BOP	ALIGN Train A CCW to Non-Critical Loop and Letdown Heat Exchanger.
	CRS	DISPATCH operators to CHECK SWC Pump P114 and associated breaker.
	BOP	STOP CCW Pump P026.
<b><u>M.O. Cue:</u></b> When directed to investigate P114 trip, WAIT 3 minutes and then REPORT that SWC Pump P114 motor has an odor of burnt insulation.		
<b><u>M.O. Cue:</u></b> When directed to investigate P114 breaker, WAIT 3 minutes and then REPORT that SWC Pump P114 breaker has overcurrent flags on Phases B and C.		

Operating Test :	NRC	Scenario #	5	Event #	1	Page	5	of	17
Event Description: Train B Salt Water Cooling Pump Seized Shaft									
Time	Position	Applicant's Actions or Behavior							

	CRS	EVALUATE Technical Specifications.
		<ul style="list-style-type: none"> <li>LCO 3.7.8.A - Saltwater Cooling System.</li> </ul>
		<ul style="list-style-type: none"> <li>CONDITION A - One SWC train INOPERABLE.</li> <li>ACTION A - Restore SWC Train to OPERABLE status within 72 hours.</li> </ul>
<b><u>Examiner Note:</u></b> The crew may decide to place CCW Pump P026 OOS, swap CCW Pump P025 to Train B, and/or place Train B HPSI and CS Pumps OOS. Crew may remove DC Control Power for Train B HPSI and CS pumps to avoid damage due to lack of cooling water.		
<b><u>M.O. Cue:</u></b> Due to time restrictions, ACKNOWLEDGE, but do NOT perform, the following system alignments: <ul style="list-style-type: none"> <li>If directed to open the DC power supply breaker for CCW Pumps P026, ACKNOWLEDGE the order but do not perform.</li> <li>If directed to transfer Emergency Chiller E-336 to Unit 3, ACKNOWLEDGE the order but do not perform.</li> <li>If directed to transfer CCW Pump P025 or transfer HPSI Pump P018 from Train A to Train B, ACKNOWLEDGE the order but do not perform.</li> </ul>		
+10 min	CRS	ENSURE ECCS is not required.
		<ul style="list-style-type: none"> <li>HPSI, LPSI, CS pumps are stopped.</li> </ul>
<b><i>When Train A CCW is aligned to the NCL and the Letdown Heat Exchanger, and Technical Specifications have been addressed, or at Lead Evaluator's discretion, PROCEED to Event 2.</i></b>		

Operating Test :	NRC	Scenario #	5	Event #	2	Page	6	of	17
Event Description: Pressurizer Pressure Controlling Channel Fails Low									
Time	Position	Applicant's Actions or Behavior							

**Machine Operator:** When directed, EXECUTE Event 2.  
- RC15B, Pressurizer Pressure Controlling Channel PT-0100Y fails low.

**Indications Available:**

50A04 – PZR PRESS DEVIATION HI / LO

50A14 – PZR PRESS HI / LO

+30 secs	RO	REFER to Annunciator Response Procedures.
	RO	DETERMINE which channel initiated the alarm using PR-100.
		<ul style="list-style-type: none"> <li>RECOGNIZE Channel Y (PR-0100B) has failed low and INFORM CRS that AOI SO23-13-27 entry required.</li> </ul>
	RO	If desired, SELECT PIC-100 to MANUAL and return pressure to the normal band and ENSURE heaters energized and PZR pressure trending to normal.
	CRS	DIRECT performance of AOI SO23-13-27, Pressurizer Pressure and Level Malfunction.
	RO	VERIFY PI-0100X is OPERABLE.
	RO	POSITION HS-0100A, Pressurizer Pressure Channel Select Switch to Channel X per ARP or AOI.
	RO	RESTORE PZR heaters to normal configuration as required.
		<ul style="list-style-type: none"> <li>PLACE heater control switches to OFF, then AUTO.</li> </ul>
	RO	VERIFY normal Charging and Letdown in service.

Operating Test : <u>  NRC  </u> Scenario # <u>  5  </u> Event # <u>  2  </u> Page <u>  7  </u> of <u>  17  </u>		
Event Description: <u>  Pressurizer Pressure Controlling Channel Fails Low  </u>		
Time	Position	Applicant's Actions or Behavior

**Examiner Note: RCS Pressure must rise above 2275 psia to make this Technical Specification call.**

+10 min	CRS	EVALUATE Technical Specifications.
		<ul style="list-style-type: none"> <li>LCO 3.4.1.A, RCS DNB Limits.</li> </ul>
		<ul style="list-style-type: none"> <li>CONDITION A - Pressurizer pressure or RCS flow rate not within limits.</li> <li>ACTION A.1 - Restore parameter(s) to within limit within 2 hours.</li> </ul>

***When Technical Specifications are addressed, or at Lead Evaluator's discretion, PROCEED to Event 3.***

Operating Test :	NRC	Scenario #	5	Event #	3	Page	8	of	17
Event Description: Control Element Assembly Calculator Failure									
Time	Position	Applicant's Actions or Behavior							

**Machine Operator:** When directed, EXECUTE Event 3.  
- RP18, Control Element Assembly Calculator #2 failure.

**Indications Available:**

**56C42 – CEAC 2 FAILURE**

+30 secs	RO	REFER to Annunciator Response Procedures.
	RO	SELECT CEAC #1 to display on the CEA-CRT to verify failure.
	RO	DETERMINE CEAC #2 failure and INFORM the CRS SO23-3-2.13, Core Protection / Control Element Assembly Calculator Operation entry required.
	CRS	DIRECT performance of SO23-3-2.13, Section for CEAC/RSPT Erratic or INOP.
	RO	DETERMINE failure has NOT reset by DEPRESSING the CEAC Fail Indicator Pushbutton on the ROM Channel C.
<b><u>Floor Cue:</u></b> Once the actions of the ARP are complete, DIRECT the CRS to evaluate Technical Specifications. Do <u>not</u> allow the CRS to change the addressable constants for the INOP CEAC due to time constraints.		
	RO	PERFORM CEA Verification once per 4 hours per SO23-3-3.25 Section for Reactivity Control Systems.
	RO	NOTIFY the Computer Technician to investigate the CEAC Channel failure.
	RO	ENSURE the CEA-CRT is displaying CEAC #1.

Operating Test : <u>    NRC    </u> Scenario # <u>    5    </u> Event # <u>    3    </u> Page <u>    9    </u> of <u>    17    </u>		
Event Description: <u>Control Element Assembly Calculator Failure</u>		
Time	Position	Applicant's Actions or Behavior

+10 min	CRS	EVALUATE Technical Specifications.
		<ul style="list-style-type: none"> <li>LCO 3.3.3.A, Control Element Assembly Calculator (CEAC).</li> </ul>
		<ul style="list-style-type: none"> <li>CONDITION A - One CEAC inoperable.</li> <li>ACTION A.1 - Perform CEA Verification once per 4 hours, and</li> <li>ACTION A.2 - Restore CEAC to OPERABLE status within 7 days.</li> </ul>
<b><i>When Technical Specifications are addressed, or at Lead Evaluator's discretion, PROCEED to Events 4, 5, 6, 7, and 8.</i></b>		



Operating Test :	NRC	Scenario #	5	Event #	4, 5, 6, 7, & 8	Page	10	of	17
Event Description: Inadvertent Turbine Trip / Automatic Reactor Trip Failure / HP Turbine Stop Valve Failure / Pressurizer Safety Valve Fails Open / Loss of Condenser Vacuum									
Time	Position	Applicant's Actions or Behavior							

**Machine Operator:** When directed, EXECUTE Events 4, 5, 6, 7, and 8.

- FW09B, Inadvertent Turbine trip.
- RP15, Automatic Reactor trip failure.
- TC02E, HP Turbine Stop Valve fails to close.
- RC18A, Pressurizer Safety Valve fails open upon Reactor trip.
- FW23, Loss of Condenser Vacuum.

**Indications Available:**

99A24 – TURBINE TRIP RELAY TRIPPED

99B01 – GENERATOR TRIP

+10 secs	RO/BOP	RECOGNIZE inadvertent Turbine trip without a corresponding Reactor trip.
<p><b>CRITICAL TASK STATEMENT</b></p> <p>Manually trip the Reactor due to Reactor Protection System failure, within one (1) minute of Reactor Trip criteria being exceeded.</p> <p>Elapsed Time: _____</p>		
<b>CRITICAL TASK</b>	RO/BOP	MANUALLY TRIP the Reactor.
	CRS	VERIFY Reactor trip and DIRECT crew to perform actions of SO23-12-1, Standard Post Trip Actions.
	RO	VERIFY Reactor Trip:
		<ul style="list-style-type: none"> <li>• DETERMINE only 4 Reactor Trip Circuit Breakers open.</li> </ul>
		<ul style="list-style-type: none"> <li>• VERIFY Reactor Power lowering and Startup Rate negative.</li> </ul>
		<ul style="list-style-type: none"> <li>• VERIFY maximum of one full length CEA NOT fully inserted.</li> </ul>
	CRS	VERIFY Reactivity Control criteria satisfied.
<p><b><u>M.O. Cue:</u></b> VERIFY malfunction TC02E deleted when manual Turbine trip is performed.</p>		
	BOP	DETERMINE Turbine tripped with HV-2200E, Governor OPEN.
	BOP	<ul style="list-style-type: none"> <li>• MANUALLY TRIP Main Turbine.</li> </ul>
		<ul style="list-style-type: none"> <li>• DETERMINE HP Turbine Stop Valve HV-2200E NOT closed.</li> </ul>
		<ul style="list-style-type: none"> <li>• VERIFY both Unit Output Breakers open.</li> </ul>

Operating Test :	NRC	Scenario #	5	Event #	4, 5, 6, 7, & 8	Page	11	of	17
Event Description: Inadvertent Turbine Trip / Automatic Reactor Trip Failure / HP Turbine Stop Valve Failure / Pressurizer Safety Valve Fails Open / Loss of Condenser Vacuum									
Time	Position	Applicant's Actions or Behavior							

		<ul style="list-style-type: none"> <li>VERIFY Main Turbine speed &lt; 2000 RPM or lowering.</li> </ul>
	CRS	INITIATE Administrative Actions:
		<ul style="list-style-type: none"> <li>ANNOUNCE Reactor trip via PA System.</li> </ul>
		<ul style="list-style-type: none"> <li>INITIATE Attachment 4, Worksheet.</li> </ul>
		<ul style="list-style-type: none"> <li>INITIATE Attachment 5, Administrative Actions.</li> </ul>
	BOP	VERIFY Vital Auxiliaries criteria satisfied:
		<ul style="list-style-type: none"> <li>VERIFY both 1E 4 kV Buses A04 and A06 energized.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY both 1E 480 V Buses B04 and B06 energized.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY all 1E DC Buses energized.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY all Non-1E 4 kV Buses energized.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY CCW Train operating AND aligned to Non-Critical Loop and Letdown Heat Exchanger.</li> </ul>
	RO	VERIFY RCS Inventory Control criteria satisfied:
		<ul style="list-style-type: none"> <li>VERIFY PZR level between 10% and 70% AND trending to between 30% and 60%.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY Core Exit Saturation Margin &gt; 20°F:</li> </ul>
		<ul style="list-style-type: none"> <li>QSPDS page 611.</li> </ul>
		<ul style="list-style-type: none"> <li>CFMS page 311.</li> </ul>
<p><b>Examiner Note:</b> Depending upon the time that RCS Pressure Control criteria is verified, this Safety Function <u>may</u> or <u>may not</u> be met. RCS pressure will drop to the SIAS setpoint and then the Pressurizer Safety Valve will close. RCS pressure will then rise due to three Charging Pumps in operation. This could also dictate whether the CRS enters SO23-12-3, LOCA or SO23-12-2, Reactor Trip Recovery.</p>		
	RO	VERIFY RCS Pressure Control criteria satisfied:
		<ul style="list-style-type: none"> <li>VERIFY PZR pressure between 1740 PSIA and 2380 PSIA AND trending to between 2025 PSIA and 2275 PSIA.</li> </ul>

Operating Test :	NRC	Scenario #	5	Event #	4, 5, 6, 7, & 8	Page	12	of	17
Event Description: Inadvertent Turbine Trip / Automatic Reactor Trip Failure / HP Turbine Stop Valve Failure / Pressurizer Safety Valve Fails Open / Loss of Condenser Vacuum									
Time	Position	Applicant's Actions or Behavior							

	RO	VERIFY Core Heat Removal criteria is satisfied:
		<ul style="list-style-type: none"> <li>VERIFY at least one RCP operating.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY core loop <math>\Delta T</math> less than 10°F.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY Core Exit Saturation Margin &gt; 20°F.</li> </ul>
		<ul style="list-style-type: none"> <li>QSPDS page 611.</li> </ul>
		<ul style="list-style-type: none"> <li>CFMS page 311.</li> </ul>
	BOP	VERIFY RCS Heat Removal criteria satisfied:
		<ul style="list-style-type: none"> <li>VERIFY at least one SGs level between 21% and 80% NR and Auxiliary Feedwater available.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] ENSURE EFAS actuated.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY heat removal is adequate.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY T<sub>cold</sub> trending to between 545°F and 555°F.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY SG pressures approximately 1000 PSIA.</li> </ul>
	BOP	RECOGNIZE loss of Condenser vacuum and place Atmospheric Dump Valves in service.
	RO	VERIFY Containment Isolation criteria satisfied:
		<ul style="list-style-type: none"> <li>VERIFY Containment pressure &lt; 1.5 PSIG.</li> </ul>
	RO	<ul style="list-style-type: none"> <li>VERIFY Containment Area Radiation Monitors energized AND NOT alarming or trending to alarm.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY Secondary Plant Radiation Monitors energized AND NOT alarming or trending to alarm.</li> </ul>
	RO	VERIFY Containment Temperature and Pressure criteria satisfied:
		<ul style="list-style-type: none"> <li>VERIFY Containment average temperature &lt; 120°F.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY Containment pressure &lt; 1.5 PSIG.</li> </ul>

Operating Test :	NRC	Scenario #	5	Event #	4, 5, 6, 7, & 8	Page	13	of	17
Event Description: Inadvertent Turbine Trip / Automatic Reactor Trip Failure / HP Turbine Stop Valve Failure / Pressurizer Safety Valve Fails Open / Loss of Condenser Vacuum									
Time	Position	Applicant's Actions or Behavior							

**Examiner Note:** The CRS will either diagnose a LOCA inside Containment and enter SO23-12-3, LOCA or recognize that all Safety Function Criteria have been met and enter SO23-12-2, Reactor Trip Recovery. Either procedure entry is acceptable because both will yield Safety Injection Throttle / Stop actions.

	CRS	DIAGNOSE event in progress:
		<ul style="list-style-type: none"> <li>DETERMINE some Safety Function criteria are NOT met per Attachment 4, Worksheet.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] COMPLETE Attachment 1, Recovery Diagnostics.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] DIAGNOSE event as LOCA inside Containment <b>or</b> Reactor Trip Recovery.</li> </ul>
		<ul style="list-style-type: none"> <li>[RNO] If LOCA inside Containment is diagnosed, ENSURE at least one RCP in the each loop stopped.</li> </ul>
		<ul style="list-style-type: none"> <li>DIRECT initiating Steps 12 through 15.</li> </ul>

	BOP	INITIATE Steps 12 through 15.
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**Examiner Note:** The following steps are from SO23-12-3, Loss of Coolant Accident. If SO23-12-2, Reactor Trip Recovery is selected it is addressed later in this scenario.

	CRS	DIRECT performance of SO23-12-3, LOCA.
		<ul style="list-style-type: none"> <li>RECORD time of EOI entry _____.</li> </ul>

+15 min	CRS	VERIFY LOCA diagnosis:
		<ul style="list-style-type: none"> <li>INITIATE SO23-12-10, Safety Function Status Checks.</li> </ul>
		<ul style="list-style-type: none"> <li>INITIATE Foldout Page.</li> </ul>
		<ul style="list-style-type: none"> <li>DIRECT performance of FS-7, Verify SI Throttle/Stop Criteria.</li> </ul>
		<ul style="list-style-type: none"> <li>DIRECT performance of Attachment 22, Non-Qualified Load Restoration.</li> </ul>
		<ul style="list-style-type: none"> <li>VERIFY LOCA diagnosis, using Figure 1, Break Identification Chart.</li> </ul>
		<ul style="list-style-type: none"> <li>INITIATE sampling of both Steam Generators for radioactivity and boron.</li> </ul>

Operating Test :	NRC	Scenario #	5	Event #	4, 5, 6, 7, & 8	Page	14	of	17
Event Description: Inadvertent Turbine Trip / Automatic Reactor Trip Failure / HP Turbine Stop Valve Failure / Pressurizer Safety Valve Fails Open / Loss of Condenser Vacuum									
Time	Position	Applicant's Actions or Behavior							

**M.O. Cue:** If directed to sample SGs, WAIT 5 minutes and then REPORT that E088 and E089 both have activity near background, and normal boron levels. If the SG sample valves are closed, REPORT unable to establish sample flow.

**M.O. Cue:** When directed to restore non-qualified loads, WAIT 2 minutes, then EXECUTE ED85, Non-Qualified Loads Restoration. INFORM the Control Room that you have restored Non-Qualified Loads.

	CRS	INITIATE Administrative actions:
		<ul style="list-style-type: none"> <li>NOTIFY Shift Manager/Operations Leader of SO23-12-3, Loss of Coolant Accident initiation.</li> </ul>
		<ul style="list-style-type: none"> <li>ENSURE Emergency Plan is initiated.</li> </ul>
		<ul style="list-style-type: none"> <li>IMPLEMENT Placekeeper.</li> </ul>
	RO	DETERMINE ESF actuation NOT required.
		<ul style="list-style-type: none"> <li>DETERMINE Pressurizer pressure is greater than SIAS setpoint and Containment pressure is less than 3.4 psig.</li> </ul>
	CRS	TRANSITION to Step 7.
	CRS	INITIATE applicable actions of SO23-12-11, Attachment 2, Floating Steps.
	RO	DETERMINE FS-7, VERIFY SI Throttle/Stop Criteria satisfied.
	BOP	<ul style="list-style-type: none"> <li>VERIFY at least one SG operating with ADVs and feedwater available.</li> </ul>
	RO	<ul style="list-style-type: none"> <li>VERIFY Pressurizer level greater than 30% and not lowering.</li> </ul>
	RO	<ul style="list-style-type: none"> <li>VERIFY Core Exit Saturation Margin <math>\geq 20^{\circ}\text{F}</math>.</li> </ul>
	RO	<ul style="list-style-type: none"> <li>VERIFY Reactor Vessel level <math>\geq 100\%</math> (Plenum).</li> </ul>
	CRS/RO	<ul style="list-style-type: none"> <li>VERIFY RCS cooldown not in progress.</li> </ul>
	RO	<ul style="list-style-type: none"> <li>VERIFY SI Pumps NOT operating to meet RC-3 Success Path.</li> </ul>
<b>CRITICAL TASK STATEMENT</b>		<b>Actions are taken to control Safety Injection flow rate to maintain or recover SI Throttle / Stop criteria. Pressurizer level increase and RCS repressurization is stopped / controlled.</b>

Operating Test :	NRC	Scenario #	5	Event #	4, 5, 6, 7, & 8	Page	15	of	17
Event Description: Inadvertent Turbine Trip / Automatic Reactor Trip Failure / HP Turbine Stop Valve Failure / Pressurizer Safety Valve Fails Open / Loss of Condenser Vacuum									
Time	Position	Applicant's Actions or Behavior							

<b>CRITICAL TASK</b>	RO	PERFORM SI Throttle/Stop actions.
	RO	<ul style="list-style-type: none"> <li>• THROTTLE or STOP SI Pumps as required, one train at a time.</li> </ul>
	RO	<ul style="list-style-type: none"> <li>• VERIFY Pressurizer level less than 80%.</li> </ul>
	RO	<ul style="list-style-type: none"> <li>• VERIFY Charging Pumps NOT operating to meet RC-2 Success Path.</li> </ul>
	RO	<ul style="list-style-type: none"> <li>• STOP Charging Pumps as required, one at a time.</li> </ul>
	RO	<ul style="list-style-type: none"> <li>• MAINTAIN Throttle Stop criteria satisfied.</li> </ul>
	RO	<ul style="list-style-type: none"> <li>• VERIFY Containment pressure &lt; 3.4 psig.</li> </ul>
	RO/BOP	<ul style="list-style-type: none"> <li>• RESET SIAS per SO23-3-2.22, ESFAS Operation.</li> </ul>
<b>Examiner Note:</b> The following steps are from SO23-12-2, Reactor Trip Recovery.		
	CRS	DIRECT performance of SO23-12-2, Reactor Trip Recovery.
		<ul style="list-style-type: none"> <li>• ENSURE SO23-12-1, Standard Post Trip Actions Steps 1 through 11 complete.</li> </ul>
		<ul style="list-style-type: none"> <li>• RECORD time of EOI entry _____.</li> </ul>
+15 min	CRS	VERIFY Reactor Trip Recovery diagnosis:
		<ul style="list-style-type: none"> <li>• INITIATE SO23-12-10, LOCA Safety Function Status Checks.</li> </ul>
	CRS	INITIATE Administrative Actions:
		<ul style="list-style-type: none"> <li>• NOTIFY Shift Manager/Operations Leader of SO23-12-2, Reactor Trip Recovery initiation.</li> </ul>
		<ul style="list-style-type: none"> <li>• ENSURE Emergency Plan is initiated.</li> </ul>
		<ul style="list-style-type: none"> <li>• IMPLEMENT Placekeeper.</li> </ul>
	RO	VERIFY Reactivity Control.
		<ul style="list-style-type: none"> <li>• VERIFY a maximum of one full length CEA NOT fully inserted.</li> </ul>

Operating Test :	NRC	Scenario #	5	Event #	4, 5, 6, 7, & 8	Page	16	of	17
Event Description: Inadvertent Turbine Trip / Automatic Reactor Trip Failure / HP Turbine Stop Valve Failure / Pressurizer Safety Valve Fails Open / Loss of Condenser Vacuum									
Time	Position	Applicant's Actions or Behavior							

	RO	ESTABLISH Pressurizer Level Control:
		<ul style="list-style-type: none"> <li>VERIFY Pressurizer level between 10% and 70% and trending to between 30% and 60%.</li> </ul>
	RO	ESTABLISH Pressurizer Pressure Control:
		<ul style="list-style-type: none"> <li>VERIFY Pressurizer pressure between 1740 PSIA and 2380 PSIA and trending to between 2025 PSIA and 2275 PSIA.</li> </ul>
	RO	DETERMINE SIAS actuated:
		<ul style="list-style-type: none"> <li>INITIATE Attachment 2, SI Throttle/Stop actions.</li> </ul>
	RO	DETERMINE FS-7, VERIFY SI Throttle/Stop Criteria satisfied.
	BOP	<ul style="list-style-type: none"> <li>VERIFY at least one SG operating with ADVs and feedwater available.</li> </ul>
	RO	<ul style="list-style-type: none"> <li>VERIFY Pressurizer level greater than 30% and not lowering.</li> </ul>
	RO	<ul style="list-style-type: none"> <li>VERIFY Core Exit Saturation Margin <math>\geq 20^{\circ}\text{F}</math>.</li> </ul>
	RO	<ul style="list-style-type: none"> <li>VERIFY Reactor Vessel level <math>\geq 100\%</math> (Plenum).</li> </ul>
	CRS/RO	<ul style="list-style-type: none"> <li>VERIFY RCS cooldown not in progress.</li> </ul>
	RO	<ul style="list-style-type: none"> <li>VERIFY SI Pumps NOT operating to meet RC-3 Success Path.</li> </ul>
<b>CRITICAL TASK STATEMENT</b>		<b>Actions are taken to control Safety Injection flow rate to maintain or recover SI Throttle / Stop criteria. Pressurizer level increase and RCS re-pressurization is stopped / controlled.</b>
<b>CRITICAL TASK</b>	RO	PERFORM SI Throttle/Stop actions.
	RO	<ul style="list-style-type: none"> <li>THROTTLE or STOP SI Pumps as required, one train at a time.</li> </ul>
	RO	<ul style="list-style-type: none"> <li>VERIFY Pressurizer level less than 80%.</li> </ul>
	RO	<ul style="list-style-type: none"> <li>VERIFY Charging Pumps NOT operating to meet RC-2 Success Path.</li> </ul>
	RO	<ul style="list-style-type: none"> <li>STOP Charging Pumps as required, one at a time.</li> </ul>
	RO	<ul style="list-style-type: none"> <li>MAINTAIN Throttle Stop criteria satisfied.</li> </ul>
	RO	<ul style="list-style-type: none"> <li>VERIFY Containment pressure <math>&lt; 3.4</math> psig.</li> </ul>

Operating Test :	NRC	Scenario #	5	Event #	4, 5, 6, 7, & 8	Page	17	of	17
Event Description: Inadvertent Turbine Trip / Automatic Reactor Trip Failure / HP Turbine Stop Valve Failure / Pressurizer Safety Valve Fails Open / Loss of Condenser Vacuum									
Time	Position	Applicant's Actions or Behavior							

	RO/BOP	• RESET SIAS per SO23-3-2.22, ESFAS Operation.
	BOP	STOP unloaded Diesel Generators.
	BOP	INITIATE Attachment 3, Non-Qualified Load Restoration.
<b><u>M.O. Cue:</u> When directed to restore non-qualified loads, WAIT 2 minutes, then EXECUTE ED85, Non-Qualified Loads Restoration. INFORM the Control Room that you have restored Non-Qualified Loads.</b>		
	RO	VERIFY PZR pressure above RCP NPSH requirements of SO23-12-11, Attachment 29.
	CRS/RO	VERIFY Core Exit Saturation Margin above 160°F.
+30 min	CRS/RO	VERIFY Core Exit Saturation Margin above 80°F.
<b><i>When Core Exit Saturation Margin is verified, or at Lead Evaluator's discretion, TERMINATE the scenario.</i></b>		



Facility: SONGS 2 and 3				Date of Exam: 10/19/09				Operating Test No.: NRC									
A P P L I C A N T	E V E N T  T Y P E	SCENARIOS															
		SONGS #1			SONGS #2			SONGS #3			SONGS #4			T O T A L	MINIMUM(*)		
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
		S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P				
<b>SROU 1,2</b>	RX	-			-			-			-			0	1	1	0
	NOR	4			3			1			1			2	1	1	1
	I/C	1,2,3,5			1,2,4			2,3,4,5			2,3,4,5			7	4	4	2
	MAJ	6			5,6			6			6			3	2	2	1
	TS	1,3			1,4			2,4			3,5			4	0	2	2
<b>SROI 1,2,3</b>	RX	-	4		-	3		-	1		-	1		1	1	1	0
	NOR	4	-		3	-		1	-		1	-		1	1	1	1
	I/C	1,2,3,5	3,5,8		1,2,4	4,8		2,3,4,5	3,4,7		2,3,4,5	2,7		6	4	4	2
	MAJ	6	6		5,6	5,6		6	6		6	6		3	2	2	1
	TS	1,3	-		1,4	-		2,4	-		3,5	-		2	0	2	2
<b>RO 2</b>	RX		4	-		3	-		1	-		1	-	1	1	1	0
	NOR		-	4		-	3		-	1		-	1	1	1	1	1
	I/C		3,5,8	2,3,7		4,8	2,4,7		3,4,7	4,5,8		2,7	3,4	5	4	4	2
	MAJ		6	6		5,6	5,6		6	6		6	6	3	2	2	1
	TS		-	-		-	-		-	-		-	-	0	0	2	2

Instructions:	
1.	Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls (ATC)" and "balance-of-plant (BOP)" positions; Instant SROs must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an Instant SRO <i>additionally</i> serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.
2.	Reactivity manipulations may be conducted under normal or <i>controlled</i> abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.
3.	Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

Facility: SONGS 2 and 3		Date of Exam: 10/19/09									Operating Test No.: NRC						
A P P L I C A N T	E V E N T  T Y P E	SCENARIOS															
		SONGS #1			SONGS #2			SONGS #3			SONGS #4			T O T A L	MINIMUM(*)		
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
		S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P		R	I	U
SROU 3	RX	-			-			-			-			0	1	1	0
	NOR	4			3			1			1			2	1	1	1
	I/C	1,2,3,5			1,2,4			2,3,4,5			2,3,4,5			7	4	4	2
	MAJ	6			5,6			6			6			3	2	2	1
	TS	1,3			1,4			2,4			3,5			4	0	2	2
SROI 4,5	RX	-	4		-	3		-	1		-	1		1	1	1	0
	NOR	4	-		3	-		1	-		1	-		2	1	1	1
	I/C	1,2,3,5	3,5,8		1,2,4	4,8		2,3,4,5	3,4,7		2,3,4,5	2,7		10	4	4	2
	MAJ	6	6		5,6	5,6		6	6		6	6		4	2	2	1
	TS	1,3	-		1,4	-		2,4	-		3,5	-		4	0	2	2
RO 5,7	RX		4	-		3	-		1	-		1	-	1	1	1	0
	NOR		-	4		-	3		-	1		-	1	2	1	1	1
	I/C		3,5,8	2,3,7		4,8	2,4,7		3,4,7	4,5,8		2,7	3,4	9	4	4	2
	MAJ		6	6		5,6	5,6		6	6		6	6	4	2	2	1
	TS		-	-		-	-		-	-		-	-	0	0	2	2

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2.	Reactivity manipulations may be conducted under normal or <i>controlled</i> abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.
3.	Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

Facility: SONGS 2 and 3		Date of Exam: 10/19/09		Operating Test No.: NRC													
A P P L I C A N T	E V E N T  T Y P E	SCENARIOS															
		SONGS #1			SONGS #2			SONGS #3			SONGS #4			T O T A L	MINIMUM(*)		
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
		S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P		R	I	U
RO 1,3	RX		4	-		3	-		1	-		1	-	1	1	1	0
	NOR		-	4		-	3		-	1		-	1	2	1	1	1
	I/C		3,5,8	2,3,7		4,8	2,4,7		3,4,7	4,5,8		2,7	3,4	8	4	4	2
	MAJ		6	6		5,6	5,6		6	6		6	6	4	2	2	1
	TS		-	-		-	-		-	-		-	-	0	0	2	2
RO 4	RX		4	-		3	-		1	-		1	-	1	1	1	0
	NOR		-	4		-	3		-	1		-	1	1	1	1	1
	I/C		3,5,8	2,3,7		4,8	2,4,7		3,4,7	4,5,8		2,7	3,4	6	4	4	2
	MAJ		6	6		5,6	5,6		6	6		6	6	3	2	2	1
	TS		-	-		-	-		-	-		-	-	0	0	2	2
RO 6	RX		4	-		3	-		1	-		1	-	1	1	1	0
	NOR		-	4		-	3		-	1		-	1	2	1	1	1
	I/C		3,5,8	2,3,7		4,8	2,4,7		3,4,7	4,5,8		2,7	3,4	9	4	4	2
	MAJ		6	6		5,6	5,6		6	6		6	6	4	2	2	1
	TS		-	-		-	-		-	-		-	-	0	0	2	2
RO 8	RX		4	-		3	-		1	-		1	-	1	1	1	0
	NOR		-	4		-	3		-	1		-	1	1	1	1	1
	I/C		3,5,8	2,3,7		4,8	2,4,7		3,4,7	4,5,8		2,7	3,4	6	4	4	2
	MAJ		6	6		5,6	5,6		6	6		6	6	3	2	2	1
	TS		-	-		-	-		-	-		-	-	0	0	2	2

## Instructions:

1. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls (ATC)" and "balance-of-plant (BOP)" positions; Instant SROs must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an Instant SRO *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.
2. Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (\*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.
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Facility: SONGS		Date of Examination: 10/19/09		Operating Test No. NRC 1-4								
Competencies	SRO				RO (ATC)				BOP			
	SCENARIO				SCENARIO				SCENARIO			
	1	2	3	4	1	2	3	4	1	2	3	4
Interpret/Diagnose Events and Conditions	1,2,3,4,5,6	1,2,4,5,6,7	1,2,3,4,5	2,3,4,5,6	1,3,5,6,8	1,4,5,6,8	1,2,3,6,7	2,5,6,7	2,3,6,7	2,4,5,6,7	4,5,6,8	3,4,6
Comply With and Use Procedures (1)	ALL	ALL	ALL	ALL	1,3,4,5,6,8	1,3,4,5,6,8	1,2,3,4,6,7	1,2,5,6,7	2,3,4,6,7	2,3,4,5,6,7	1,4,5,6,8	1,3,4,6
Operate Control Boards (2)	N/A	N/A	N/A	N/A	3,4,5,6,8	1,3,4,5,6,8	1,2,3,4,6,7	1,2,5,6,7	2,3,4,6,7	1,2,3,4,5,6,7	1,4,5,6,8	1,3,4,6
Communicate and Interact	ALL	ALL	ALL	ALL	1,3,4,5,6,8	1,3,4,5,6,8	1,2,3,4,6,7	1,2,5,6,7	2,3,4,6,7	1,2,3,4,5,6,7	1,4,5,6,8	1,3,4,6
Demonstrate Supervisory Ability (3)	ALL	ALL	ALL	ALL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Comply With and Use Tech. Specs. (3)	1,3	1,4	2,4	3,5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Notes: (1) Includes Technical Specification compliance for an RO. (2) Optional for an SRO-U. (3) Only applicable to SROs.												

*Instructions:*

*Circle the applicants' license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.*