Facility: SONGS JPM # NRC JPM RA1 Task #141258 K/A #2.1.23 4.3 / 4.4

Title: Manually Calculate Salt Water Cooling Flow

Examinee (Print): _____

Testing Method:

Simulated Performance:		Classroom:	X
Actual Performance:	X	Simulator:	
Alternate Path:		Plant:	
Time Critical:			

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 Salt Water Cooling Pump 3P-112, is being returned to service.
- 3PI-6230, 3P-112, Saltwater Cooling Pump, local discharge pressure gauge is reading 16 PSIG.
- There are 12 chain links visible at the Fish Elevator Screen Well.

Initiating Cue: The Control Room Supervisor directs you to PERFORM the following:

- CALCULATE Unit 3 Saltwater Cooling (SWC) Pump 3P-112 flow per SO23-2-8, Saltwater Cooling System Operation, Attachment 6, SWC Flow Calculation.
- START at Step 2.1.

Task Standard: Utilizing SO23-2-8, calculated 3P-112 Salt Water Cooling Pump flow.

Required Materials: SO23-2-8, Salt Water Cooling System Operation, Rev. 37.

Validation Time: 15 minutes Completion Time: _____ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): _____ Date: _____

CLASSROOM SETUP

EXAMINER:

PROVIDE the examinee with a copy of:

- **SO23-2-8, Salt Water Cooling System Operation.**
  - **Attachment 4, Saltwater Injection Temperature vs Minimum Saltwater Flow.**
  - **Attachment 6, SWC Flow Calculation.**
    - **CONTACT the Cognizant Engineer for SWC System to obtain $E_{MONITOR}$ Data.**
    - **INITIAL through Step 1.3 and ENTER Data.**
  - **Attachment 10, SWC Operation Limitations and Specifics.**

√ - Check Mark Denotes Critical Step | **START TIME:** |

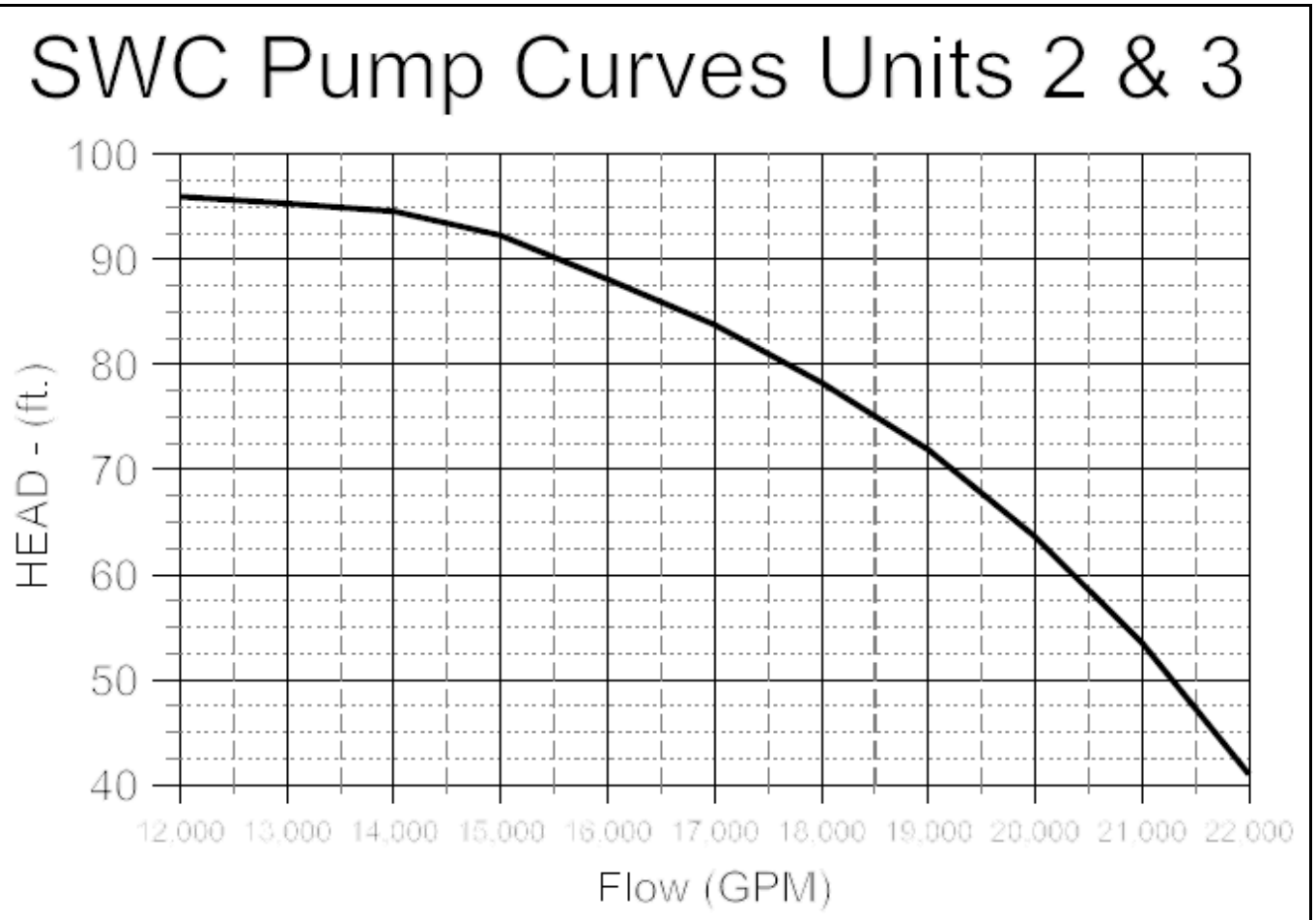
Examiner Note:	**The following steps are from SO23-2-8, Attachment 6.**
Perform Step: 1 2.1	Record Local Pump Discharge Pressure (P_a) for the affected train Operating Pump: • MP-112 3PI-6230
Standard:	RECORDED 3PI-6230, 3P112 Discharge Pressure (P_a) at Step 2.1.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 2 2.2	At the Fish Elevator Screen Well on the Unit that the affected SWC Train operating pump is housed in, COUNT the number of Chain Links between the water surface and the Deck (El. 16'). • Number of Chain Links (CL):_____
Standard:	ENTERED number of Chain Links between water surface and Deck.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 3√ 2.3	Convert Chain Links (CL) to Length (L): • CL X 2 feet = Length (L) ft. • L= _____ X 2 = _____ft. Step 2.2
Standard:	CONVERTED Chain Links (CL) to Length (L) at Step 2.3.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4√ 2.4	CALCULATE Actual Pump delta pressure (ΔP_a): • ΔP_a = 2.25 X (P_a) + (L) - 5 • = 2.25 X _____ + _____ - 5 = _____ ft. Step 2.1 Step 2.3
Standard:	CALCULATED Actual Pump ΔP_a at Step 2.4.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 5√ 2.5	CALCULATE Pump ΔP (ΔP_C): • (ΔP_c) = (ΔP_a) + [83 - (ΔP_t)] + 5 • = _____ + [83 - (_____)] + 5 = _____ ft. Step 2.4 Step 1.3
Standard:	CALCULATED Pump ΔP_C at Step 2.5.
Comment:	**SAT ☐ UNSAT ☐**



Perform Step: 6√ 2.6	Determine calculated flow by using Saltwater Cooling Pump Curve in Step 2.7.1. Use ΔP_C (Step 2.5) to find the corresponding flow. • Calculated Flow _____ GPM
Standard:	DETERMINED Saltwater Cooling Pump calculated flow at Step 2.6.
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

INITIAL CONDITIONS: **Given the following conditions:**

- **Unit 3 Salt Water Cooling Pump 3P-112, is being returned to service.**
- **3PI-6230, 3P-112, Saltwater Cooling Pump, local discharge pressure gauge is reading 16 PSIG.**
- **There are 12 chain links visible at the Fish Elevator Screen Well.**

INITIATING CUE: **The Control Room Supervisor directs you to PERFORM the following:**

- **CALCULATE Unit 3 Salt Water Cooling Pump 3P-112 flow to support OPERABILITY evaluation per SO23-2-8, Salt Water Cooling System Operation, Attachment 6, SWC Flow Calculation.**
- **START at Step 2.1.**

Facility: SONGS JPM # NRC JPM RA2 Task #192221 K/A #2.1.25 3.9 / 4.2

Title: Determine Time Until Shutdown Cooling Required

Examinee (Print): _____

Testing Method:

Simulated Performance:		Classroom:	X
Actual Performance:	X	Simulator:	
Alternate Path:		Plant:	
Time Critical:			

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 information:

- Unit 3 is performing SO23-12-7, Loss of Forced Circulation / Loss of Offsite Power following a Reactor trip four (4) hours ago.
- SO23-12-11, EOI Supporting Attachments, Attachment 3, Cooldown and Depressurization have been started.
- 3LI-4357B, T-120 Condensate Storage Tank level is 54%.
- 3LI-3204-1, T-121 Condensate Storage Tank level is 32%.
- Representative Core Exit Thermocouple (REP CET) temperature is 470ºF.
- T-120 and T-121 are the only feedwater sources to the Steam Generators.

Initiating Cue: The Control Room Supervisor directs you to PERFORM the following:

- COMPLETE SO23-12-11, EOI Supporting Attachments, Attachment 16, Determine Time Until Shutdown Cooling Required for Unit 3.
  - DETERMINE time remaining until Shutdown Cooling is required for decay heat removal per Steps 1 through 7.
  - DETERMINE minimum cooldown rate required to establish Shutdown Cooling entry conditions before feedwater source inventory is depleted per Step 8.

Task Standard: Utilizing SO23-12-11 for Unit 3, determined time until Shutdown Cooling is required and calculated minimum cooldown rate required to establish Shutdown Cooling entry conditions before Feedwater Source Inventory is depleted.

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

Validation Time: 20 minutes Completion Time: _____ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): _____ Date: _____

CLASSROOM SETUP

EXAMINER:

PROVIDE the examinee with a copy of:

- **SO23-12-11, EOI Supporting Attachments.**
  - **Attachment 16, Determine Time Until Shutdown Cooling Required.**

√ - Check Mark Denotes Critical Step | **START TIME:** |

Examiner Note:	**The following steps are from SO23-12-11, Attachment 16.**
Perform Step: 1 1 & 1a	**VERIFY Feedwater Source:** • Verify T120 / T121 the only current feedwater source to S/Gs.
Standard:	DETERMINED T120 / T121 are the only feedwater sources to the Steam Generators per the Initial Conditions.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 2√ 2 & 2a	**DETERMINE T-120 inventory:** • DETERMINE T-120 inventory from Table 1, CONDENSATE STORAGE TANK INVENTORY: • Gallons in T-120 = _____
Standard:	DETERMINED T-120 inventory from Table 1, Condensate Storage Tank Inventory: • T-120 @ 54% = 241,141 = **241,141 gallons**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 3√ 3 & 3a	**DETERMINE T-121 inventory:** • DETERMINE T-121 inventory from Table 2, CONDENSATE STORAGE TANK INVENTORY: • Gallons in T-121 = _____
Standard:	DETERMINED Unit 3 T-121 inventory from Table 1, Condensate Storage Tank Inventory by interpolating between levels of 84% and 86%. • T-121 @ 32% = 47,562 = **47,562 gallons**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4√ 4	**DETERMINE Combined inventory from both Condensate Storage Tanks:** • _____ = (Gallons in T-120) • + _____ = (Gallons in T-121) • _____ = (TOTAL T-120 / T-121)
Standard:	DETERMINED Combined inventory from both Condensate Storage Tanks: • 241,141 gallons = in T-120 • 47,562 gallons = in T-121 • **288,703 gallons = in T-120 & T-121**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 5 5 & 5a	**DETERMINE additional Feedwater Source Inventory:** • ENTER additional Feedwater Source Inventory (provided by Shift Manager / Operations Leader): • Feedwater Source(s): _____ • TOTAL (Gallons): _____
Standard:	DETERMINED additional feedwater source inventory = **0 gallons**.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 6√
6 & 6a
	DETERMINE total Feedwater Source Inventory:
	• ENTER combined volume of all sources:
	  • TOTAL T-120/T-121 (step 4): _____ Gallons
	  • TOTAL additional (step 5): + _____ Gallons
	  • TOTAL Combined = _____ Gallons

Standard:	DETERMINED total Feedwater Source Inventory = **288,703 gallons.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 7√
7, 7a, 7b, & 7b.1) thru 7b.3)
	DETERMINE time remaining until Shutdown Cooling required for decay heat removal:
	• DETERMINE number of hours reactor has been shutdown.
	  • _____ Hours
	• Using Figure 3, REMAINING TIME S/Gs AVAILABLE AS HEAT SINK:
	  • PLOT Total Feedwater Source Inventory from step 6 on the left axis.
	  • PLOT across to the appropriate TIME REACTOR HAS BEEN SHUTDOWN curve (refer to step 7a - values may be interpolated between curves).
	  • PLOT down to determine the Time (hours) S/Gs remain available as a heat sink and SDC will be required.
	  _____ HR (from lower axis)

Standard:	DETERMINED Reactor has been shutdown **four (4) hours** and then DETERMINED **27 ± 1 hours** is time remaining until Shutdown Cooling is required.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 8√
8 & 8a
	DETERMINE minimum cooldown rate required to establish SDC entry conditions before Feedwater Source Inventory is depleted:
	• CALCULATE ΔT:
	  • Present REP CET: _____ ºF
	  • SDC entry: minus ___375 ºF
	  • ΔT = _____ ºF

Standard:	DETERMINED ΔT = 470ºF - 375ºF **= 95ºF ΔT**.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 9√ 8 & 8b	**DETERMINE minimum cooldown rate required to establish SDC entry conditions before Feedwater Source Inventory is depleted:** • CALCULATE minimum cooldown rate: • ΔT (step 8a) = _____ ºF • Time (step 7b.3) _____ HR • = _____ ºF/HR
Standard:	DETERMINED minimum cooldown rate = **95ºF / 27 ± 1 hour = 3.6 ± 0.2ºF / hour**.
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

INITIAL CONDITIONS: **Given the following information:**

- **Unit 3 is performing SO23-12-7, Loss of Forced Circulation / Loss of Offsite Power following a Reactor trip four (4) hours ago.**
- **SO23-12-11, EOI Supporting Attachments, Attachment 3, Cooldown and Depressurization have been started.**
- **3LI-4357B, T-120 Condensate Storage Tank level is 54%.**
- **3LI-3204-1, T-121 Condensate Storage Tank level is 32%.**
- **Representative Core Exit Thermocouple (REP CET) temperature is 470ºF.**
- **T-120 and T-121 are the only feedwater sources to the Steam Generators.**

INITIATING CUE: **The Control Room Supervisor directs you to PERFORM the following:**

- **COMPLETE SO23-12-11, EOI Supporting Attachments, Attachment 16, Determine Time Until Shutdown Cooling Required for Unit 3.**
  - **DETERMINE time remaining until Shutdown Cooling is required for decay heat removal per Steps 1 through 7.**
  - **DETERMINE minimum cooldown rate required to establish Shutdown Cooling entry conditions before Feedwater Source Inventory is depleted per Step 8.**

Facility: SONGS JPM # NRC JPM RA3 Task #179879 K/A #2.2.12 3.7 / 4.1

Title: Perform Reactor Coolant System Flow Rate Determination

Examinee (Print): _____

Testing Method:

Simulated Performance:		Classroom:	X
Actual Performance:	X	Simulator:	
Alternate Path:		Plant:	
Time Critical:			

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.
- Reactor Coolant System Flow Rate must be determined to comply with Technical Specifications.
- The Plant Computer System (PCS) is NOT available.
- Data was collected on the previous shift during steady state conditions.

Initiating Cue: The Control Room Supervisor directs you to PERFORM the following:

- PERFORM SO23-3-3.3, RCS Flow Rate Determination, Attachment 2, RCP ΔP Flow Calculation for Unit 2.
- START at Step 3.1.3.
- DETERMINE if Acceptance Criteria is met at Step 4.1.

Task Standard: Utilizing SO23-3-3.3, performed RCP ΔP Flow Calculation, calculated total core flow, and determined Acceptance Criteria was met.

Required Materials: SO23-3-3.3, RCS Flow Rate Determination, Rev. 6-3.

Validation Time: 20 minutes Completion Time: _____ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): _____ Date: _____

CLASSROOM SETUP

EXAMINER:

PROVIDE the examinee with a copy of:

- **SO23-3-3.3, RCS Flow Rate Determination.**
  - **INITIAL Section 1.0 of Attachment 2, RCP ΔP Flow Calculation.**
  - **COMPLETE Steps in Attachment 2 with the following data:**

Step 3.1.1:

- **Ch. A TC1 RAW Avg. – 543ºF**
  TC2 RAW Avg. – 542ºF
- **Ch. B TC1 RAW Avg. – 541ºF**
  TC2 RAW Avg. – 541ºF
- **Ch. C TC1 RAW Avg. – 542ºF**
  TC2 RAW Avg. – 542ºF
- **Ch. D TC1 RAW Avg. – 542ºF**
  TC2 RAW Avg. – 543ºF

Step 3.1.2:

- **P001 ΔP AVG – 124 psid**
- **P002 ΔP AVG – 119 psid**
- **P003 ΔP AVG – 126 psid**
- **P004 ΔP AVG – 121 psid**

ENSURE examinee has a calculator and a ruler.

√ - Check Mark Denotes Critical Step | **START TIME:** |

Examiner Note:	**The following steps are from SO23-3-3.3, Attachment 2.**
Perform Step: 1 3.1.3 & 3.1.3.1	Calculate the average RCS cold leg temperatures (TC_1 and TC_2) using data from Step 3.1.1, as follows: • TC_1 = Sum of all CPC Channels TC1RAW / 4
Standard:	CALCULATED TC_1 using the data from Attachment 2, Step 3.1.1. • **TC_1 = 542ºF**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 2 3.1.3 & 3.1.3.2	Calculate the average RCS cold leg temperatures (TC_1 and TC_2) using data from Step 3.1.1, as follows: • TC_2= Sum of all CPC Channels TC2RAW / 4
Standard:	CALCULATED TC_2 using the data from Attachment 2, Step 3.1.1. • **TC_2 = 542ºF**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 3 3.1.4	Determine the density (ρTC_1) of the RCS cold leg temperature TC_1 using Attachment 12: • ρTC_1 =_____ lbm/ft^3
Standard:	DETERMINED ρTC_1, using TC_1 and Attachment 12. • **ρTC_1 = 47.3687**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4 3.1.5	Determine the density (ρTC_2) of the RCS cold leg temperature TC_2 from Attachment 12: • ρTC_2 =_____ lbm/ft^3
Standard:	DETERMINED ρTC_2, using TC_2 and Attachment 12. • **ρTC_2 = 47. 3687**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 5 3.1.6	Calculate the Compensated Pump Average $\Delta P(\Delta P_c)$ for RCP P-001 using the following formula: $\Delta P_c = \frac{\Delta P_{avg}$ (*Step 3.1.2*) X (46.654 lbm/ft^3)}{ρTC_1(*Step 3.1.4*)}
Standard:	CALCULATED ΔPc for RCP P001 using ρTC_1 and data from Steps 3.1.2 & 3.1.4. • **ΔPc = 122 ± 0.2 PSID**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 6 3.1.7	Calculate the Compensated Pump Average $\Delta P(\Delta P_c)$ for RCP P-002 using the following formula: $\Delta P_c = \frac{\Delta P_{avg}$ (*Step 3.1.2*) X (46.654 lbm/ft^3)}{ρTC_2(*Step 3.1.5*)}
Standard:	CALCULATED ΔPc for RCP P002 using ρTC_2 and data from Steps 3.1.2 & 3.1.5. • **ΔPc = 117 ± 0.2 PSID**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 7 3.1.8	Calculate the Compensated Pump Average $\Delta P(\Delta P_c)$ for RCP P-003 using the following formula: $\Delta P_c = \frac{\Delta P_{avg}$ (*Step 3.1.2*) X (46.654 lbm/ft^3)}{ρTC_1(*Step 3.1.4*)}
Standard:	CALCULATED ΔPc for RCP P003 using ρTC_1 and data from Steps 3.1.2 & 3.1.4. • **ΔPc = 124 ± 0.2 PSID**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 8 3.1.9	Calculate the Compensated Pump Average $\Delta P(\Delta P_c)$ for RCP P-004 using the following formula: $\Delta P_c = \frac{\Delta P_{avg}$ (*Step 3.1.2*) X (46.654 lbm/ft^3)}{ρTC_2(*Step 3.1.5*)}
Standard:	CALCULATED ΔP_c for RCP P004 using ρTC_2 and data from Steps 3.1.2 & 3.1.5. • **ΔPc = 119 ± 0.2 PSID**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 9√ 3.1.10	Calculate the total RCS volumetric flow rate (Qt) by summing the flow for each RCP. Use ΔP_c to determine the flow from the appropriate RCP ΔP vs. Capacity Curves, and indicate attachment used: Unit 2 • P-001 _____ gpm Att 3 + • P-002 _____ gpm Att 4 + • P-003 _____ gpm Att 5 + • P-004 _____ gpm Att 6 • Q_t = _____ gpm
Standard:	DETERMINED the flow for each pump as follows: • P001 flow = 99,000 ± 1000 GPM using Attachment 3. • P002 flow = 101,000 ± 1000 GPM using Attachment 4. • P003 flow = 100,000 ± 1000 GPM using Attachment 5. • P004 flow = 102,000 ± 1000 GPM using Attachment 6. • Q_t = **401,500 ± 4000 GPM.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 10√ 4.1	This test is considered satisfactory if the RCS Total Volumetric Flow rate in Step 3.1.10 is > 396,000 gpm. • YES • NO
Standard:	DETERMINED flow = **401,500 GPM ± 4000 GPM** and Acceptance Criteria is **YES**.
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

INITIAL CONDITIONS: **Given the following conditions:**

- **Unit 2 is in MODE 1.**
- **Reactor Coolant System Flow Rate must be determined to comply with Technical Specifications.**
- **The Plant Computer System (PCS) is NOT available.**
- **Data was collected on the previous shift during steady state conditions.**

INITIATING CUE: **The Control Room Supervisor directs you to PERFORM the following:**

- **PERFORM SO23-3-3.3, RCS Flow Rate Determination, Attachment 2, RCP ΔP Flow Calculation for Unit 2.**
- **START at Step 3.1.3.**
- **DETERMINE if Acceptance Criteria is met at Step 4.1.**

Facility: SONGS JPM # NRC JPM RA4 Task #186280 K/A #2.4.39 3.9 / 3.8

Title: Activate Emergency Response Data System (ERDS)

Examinee (Print): _____

Testing Method:

Simulated Performance:	X	Classroom:	
Actual Performance:		Simulator:	X
Alternate Path:		Plant:	X
Time Critical:			

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 SITE AREA EMERGENCY has been declared at Unit 2 due to a Steam Generator Tube Rupture on Steam Generator E-088.

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

- ACTIVATE the Emergency Response Data System (ERDS) per SO23-VIII-30, Units 2 / 3 Operations Leader Duties.

Task Standard: Referred to SO23-VIII-30 to activate the Emergency Response Data System (ERDS) then utilizing SO23-3-2.32, Attachment 1, activated the Emergency Response Data System using both methods described.

Required Materials: SO23-VIII-30, Units 2/3 Operations Leader Duties, Rev. 17.

SO23-3-2.32, Critical Functions Monitoring System, Rev. 13.

Validation Time: 5 minutes Completion Time: _____ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): _____ Date: _____

SIMULATOR / PLANT SETUP

EXAMINER:

PROVIDE the examinee with a copy of:

- **SO23-VIII-30, Units 2/3 Operations Leader Duties.**

When identified, PROVIDE the examinee with a copy of:

- **SO23-3-2.32, Critical Functions Monitoring System.**

EXAMINER NOTE:

- **This JPM can be done in the Simulator or the Plant.**
- **The actual step to CONNECT the NRC ERDS link must be simulated in either case.**

√ - Check Mark Denotes Critical Step | **START TIME:** |

Examiner Note:	**The following step is from SO23-VIII-30, Step 6.1.1.12.**
Perform Step: 1 6.1 & 6.1.1.12	Activation • Within one (1) hour of an Alert or higher classification, activate Emergency Response Data System (ERDS) to NRC Operations Center in accordance with SO23-3-2.32.
Standard:	REFERRED to SO23-VIII-30, Units 2 / 3 Operations Leader Duties, Step 6.1.1.12 and DETERMINED Emergency Response Data System (ERDS) activated per SO23-3-2.22, Critical Functions Monitoring System.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The following steps are from SO23-3-2.32, Attachment 1, Section 2.14.**
Examiner Note:	**There are two methods to activate the Emergency Response Data System. JPM Steps 2, 3 and 4 describe one method and JPM Steps 5 and 6 the other method. Both methods must be demonstrated.**

NOTES

1. The ERDS will normally be established within one hour of an Alert, Site Area or General Emergency declaration.
2. The ERDS Computer has an Automatic Power Transfer capability using an 83 relay. Normal Power Supply is 2Q071-06 and the Alternate Supply is 3Q083-24. This Circuit is Normal Seeking.

Perform Step: 2√ 2.14.1.1	From the Main Menu, select REMOTE DISPLAYS, then SELECT ERDS.
Standard:	CLICKED on the REMOTE DISPLAYS icon and OBSERVED the REMOTE DISPLAYS page open.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 3√ 2.14.1.1	From the Main Menu, select REMOTE DISPLAYS, then SELECT ERDS.
Standard:	CLICKED on ERDS and OBSERVED the ERDS CONTROL page opens.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Cue:	**Simulate the NRC Connection.**
Perform Step: 4√ 2.14.1.3	Select either NRC Connection or NRC Disconnection.
Standard:	CLICKED on NRC REQUEST CONNECT.
Examiner Cue:	**The NRC Connection has been selected.**
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**Both methods must be demonstrated to activate the ERDS.**
Perform Step: 5√ 2.14.1.2	From the Main Menu, select the NRC icon in the upper right corner of the screen.
Standard:	CLICKED on the NRC Icon on the upper right corner of the Main Menu page and OBSERVED the ERDS CONTROL page opens.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Cue:	**Simulate the NRC Connection.**
Perform Step: 6√ 2.14.1.3	Select either NRC Connection or NRC Disconnection.
Standard:	CLICKED on NRC REQUEST CONNECT.
Terminating Cue:	**The NRC Connection has been selected. This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

INITIAL CONDITIONS: **Given the following conditions:**

- **A SITE AREA EMERGENCY has been declared at Unit 2 due to a Steam Generator Tube Rupture on Steam Generator E088.**

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

- **ACTIVATE the Emergency Response Data System (ERDS) per SO23-VIII-30, Units 2 / 3 Operations Leader Duties.**

Facility: SONGS JPM # NRC JPM SA1 Task #337743 K/A #2.1.23 4.3 / 4.4

Title: Manually Calculate Salt Water Cooling Flow and Determine OPERABILITY

Examinee (Print): _____

Testing Method:

Simulated Performance:		Classroom:	X
Actual Performance:	X	Simulator:	
Alternate Path:		Plant:	
Time Critical:			

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: JPM Cue Sheet #1

Given the following conditions:

- Unit 3 Salt Water Cooling Pump 3P-112, is being returned to service.
- 3PI-6230, 3P-112, Saltwater Cooling Pump, local discharge pressure gauge is reading 16 PSIG.
- There are 12 chain links visible at the Fish Elevator Screen Well.

Initiating Cue:

The Shift Manager directs you to PERFORM the following:

- CALCULATE Unit 3 Salt Water Cooling Pump 3P-112 flow to support OPERABILITY evaluation per SO23-2-8, Salt Water Cooling System Operation, Attachment 6, SWC Flow Calculation.
- START at Step 2.1.

Initial Conditions: JPM Cue Sheet #2

Given the following conditions:

- Unit 3 is in MODE 3.
- Spent level is greater than 26 feet.
- Spent Fuel Pool temperature is 80ºF.
- The last Refueling Outage was 180 days ago.
- Saltwater Cooling System injection temperature is 69ºF.
- Train A Component Cooling Water Heat Exchanger Saltwater differential pressure is 10 PSID.

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

- VERIFY Unit 3 Salt Water Cooling Pump 3P-112 OPERABILITY per SO23-2-8, Salt Water Cooling System Operation, Attachment 4, Saltwater Injection Temperature vs. Minimum Saltwater Flow.
- Based on calculated SWC flow from Cue Sheet #1, DETERMINE OPERABILITY.
- If applicable, RECORD any required Technical Specification CONDITION, REQUIRED ACTION, and COMPLETION TIME in the Comments Section of Attachment 6.

Task Standard: Utilizing SO23-2-8, calculated 3P-112 Salt Water Cooling Pump flow and determined OPERABILITY of Saltwater Cooling System.

Required Materials: SO23-2-8, Salt Water Cooling System Operation, Rev. 37.

Validation Time: 20 minutes Completion Time: _____ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): _____ Date: _____

CLASSROOM SETUP

EXAMINER:

PROVIDE the examinee with a copy of:

- **SO23-2-8, Salt Water Cooling System Operation.**
  - **Attachment 4, Saltwater Injection Temperature vs Minimum Saltwater Flow.**
  - **Attachment 6, SWC Flow Calculation.**
    - **CONTACT the Cognizant Engineer for SWC System to obtain $E_{MONITOR}$ Data.**
    - **INITIAL through Step 1.3 and ENTER Data.**
  - **Attachment 10, SWC Operation Limitations and Specifics.**

√ - Check Mark Denotes Critical Step | **START TIME:** |

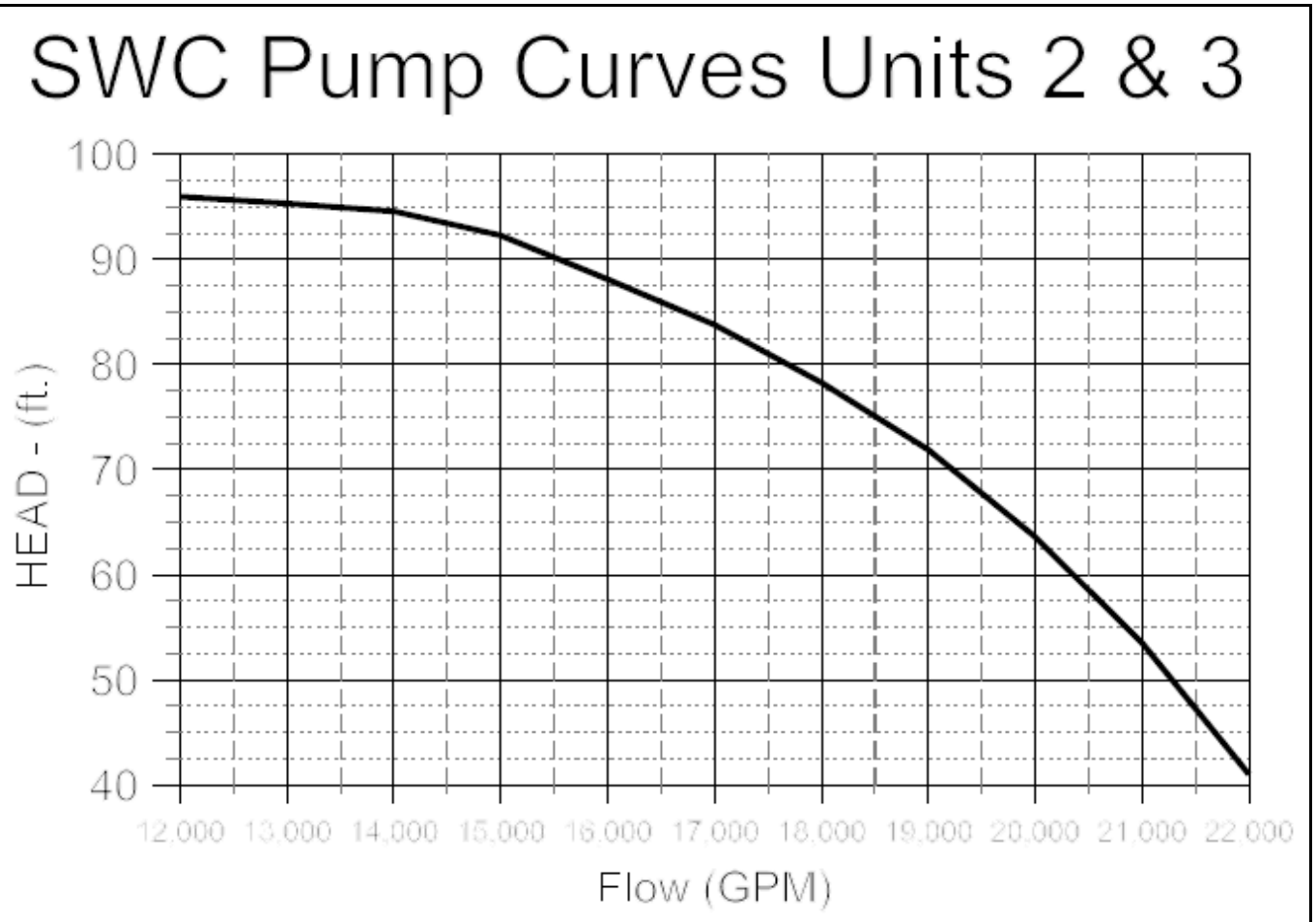
Examiner Note:	**Provide the examinee with copy of JPM Cue Sheet #1.**
Examiner Note:	**The following steps are from SO23-2-8, Attachment 6.**
Perform Step: 1 2.1	Record Local Pump Discharge Pressure (P_a) for the affected train Operating Pump: • MP-112 3PI-6230
Standard:	RECORDED 3PI-6230, 3P112 Discharge Pressure (P_a) at Step 2.1.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 2 2.2	At the Fish Elevator Screen Well on the Unit that the affected SWC Train operating pump is housed in, COUNT the number of Chain Links between the water surface and the Deck (El. 16'). • Number of Chain Links (CL):_____
Standard:	ENTERED number of Chain Links between water surface and Deck.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 3√ 2.3	Convert Chain Links (CL) to Length (L): • CL X 2 feet = Length (L) ft. • L= _____ X 2 = _____ft. Step 2.2
Standard:	CONVERTED Chain Links (CL) to Length (L) at Step 2.3.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4√ 2.4	CALCULATE Actual Pump delta pressure (ΔP_a): • ΔP_a = 2.25 X (P_a) + (L) - 5 • = 2.25 X _____ + _____ - 5 = _____ ft. Step 2.1 Step 2.3
Standard:	CALCULATED Actual Pump ΔP_a at Step 2.4.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 5√ 2.5	CALCULATE Pump ΔP (ΔP_C): • (ΔP_c) = (ΔP_a) + [83 - (ΔP_t)] + 5 • = _____ + [83 - (_____)] + 5 = _____ ft. Step 2.4 Step 1.3
Standard:	CALCULATED Pump ΔP_C at Step 2.5.
Comment:	**SAT ☐ UNSAT ☐**



Perform Step: 6√ 2.6	Determine calculated flow by using Saltwater Cooling Pump Curve in Step 2.7.1. Use ΔP_C (Step 2.5) to find the corresponding flow. • Calculated Flow _____ GPM
Standard:	DETERMINED Saltwater Cooling Pump calculated flow at Step 2.6.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 7 2.7	Calculations and Flow value determined in Sections 2.3 through 2.6 **Independently Verified** by: • _____
Standard:	DETERMINED independently verified calculations already N/A.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 8 2.8	Ensure the SWC System is Operable per Attachment 4.
Standard:	REFERRED to Attachment 4 to verify SWC System OPERABILITY.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**Provide the examinee with copy of JPM Cue Sheet #2.**
Examiner Note:	**The following steps are from SO23-2-8, Attachment 4.**
Perform Step: 9 2.1.1	Monitor SWC flow using 2(3)FI-6398/2(3)FI-6399 and the following "Normal Operations" or "Reverse Flow Operations" chart.
Standard:	DETERMINED Saltwater Cooling System differential pressure from Initial Conditions.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 10 2.1.2	Monitor SWC Injection Temperature using the Circ. Water Data Logger associated with the Operating SWC Pump Intake.
Standard:	DETERMINED SWC Injection Temperature from Initial Conditions and ADDED 1ºF to 69ºF.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 11
2.2.1
	Determine which curve to use in Modes 1-4
	• If *all* of the following are true, then use the applicable Normal Curve:
	  • Spent Fuel Pool level is ≥ 26'
	  • Spent Fuel Pool Temperature is ≤ 95ºF
	  • Time elapsed since the start of the last refueling outage is ≥45 days

Standard:	DETERMINED Unit was in MODE 3 and conditions for use of Normal Curve were met.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 12√
2.2.1
	Determine which curve to use in Modes 1-4
	• If *all* of the following are true, then use the applicable Normal Curve:
	  • Spent Fuel Pool level is ≥ 26'
	  • Spent Fuel Pool Temperature is ≤ 95ºF
	  • Time elapsed since the start of the last refueling outage is ≥45 days

Standard:	REFERRED to Saltwater Injection Temperature versus Minimum Saltwater Flow Normal Curve and determined minimum flow is **17,000 ± 100 GPM**.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The following step is from SO23-2-8, Attachment 6.**
Perform Step: 13 2.8	Ensure the SWC System is Operable per Attachment 4.
Standard:	VERIFIED SWC System OPERABILITY.
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

INITIAL CONDITIONS: **Given the following conditions:**

- **Unit 3 Salt Water Cooling Pump 3P-112, is being returned to service.**
- **3PI-6230, 3P-112, Saltwater Cooling Pump, local discharge pressure gauge is reading 16 PSIG.**
- **There are 12 chain links visible at the Fish Elevator Screen Well.**

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

- **CALCULATE Unit 3 Salt Water Cooling Pump 3P-112 flow to support OPERABILITY evaluation per SO23-2-8, Salt Water Cooling System Operation, Attachment 6, SWC Flow Calculation.**
- **START at Step 2.1.**

INITIAL CONDITIONS: **Given the following conditions:**

- **Unit 3 is in MODE 3.**
- **Spent level is greater than 26 feet.**
- **Spent Fuel Pool temperature is 80ºF.**
- **The last Refueling Outage was 180 days ago.**
- **Saltwater Cooling System injection temperature is 69ºF.**
- **Train A Component Cooling Water Heat Exchanger Saltwater differential pressure is 10 PSID.**

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

- **VERIFY Unit 3 Salt Water Cooling Pump 3P-112 OPERABILITY per SO23-2-8, Salt Water Cooling System Operation, Attachment 4, Saltwater Injection Temperature vs. Minimum Saltwater Flow.**
- **Based on calculated SWC flow from Cue Sheet #1, DETERMINE OPERABILITY.**
- **If applicable, RECORD any required Technical Specification CONDITION, REQUIRED ACTION, and COMPLETION TIME in the Comments Section of Attachment 6.**

Facility: SONGS JPM # NRC JPM SA2 Task #192973 K/A #2.1.25 3.9 / 4.2

Title: Determine Time Until Shutdown Cooling Required and Event Reportability

Examinee (Print): _____

Testing Method:

Simulated Performance:		Classroom:	X
Actual Performance:	X	Simulator:	
Alternate Path:		Plant:	
Time Critical:			

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: JPM Cue Sheet #1

Given the following information:

- Unit 3 is in MODE 1.
- At 1307, Unit 3 recognized a common cause failure of BOTH Train A and Train B HPSI Pumps.

Initiating Cue:

The Shift Manager directs you to PERFORM the following:

- DETERMINE the latest time the Resident NRC Inspector can be notified per SO123-0-A7, Notification and Reporting of Significant Events.

Initial Conditions: JPM Cue Sheet #2

Given the following information:

- Unit 3 is performing SO23-12-7, Loss of Forced Circulation / Loss of Offsite Power following a Reactor trip four (4) hours ago.
- SO23-12-11, EOI Supporting Attachments, Attachment 3, Cooldown and Depressurization have been started.
- 3LI-4357B, T-120 Condensate Storage Tank level is 54%.
- 3LI-3204-1, T-121 Condensate Storage Tank level is 32%.
- Representative Core Exit Thermocouple (REP CET) temperature is 470ºF.
- T-120 and T-121 are the only feedwater sources to the Steam Generators.

Initiating Cue:

The SRO Operations Supervisor directs you to PERFORM the following:

- COMPLETE SO23-12-11, EOI Supporting Attachments, Attachment 16, Determine Time Until Shutdown Cooling Required for Unit 3.
  - DETERMINE time remaining until Shutdown Cooling required for decay heat removal per Steps 1 through 7.
  - DETERMINE minimum cooldown rate required to establish Shutdown Cooling entry conditions before feedwater source inventory is depleted per Step 8.

Task Standard:

Utilizing SO123-0-A7, determined time for notification to the NRC. Utilizing SO23-12-11 for Unit 3, determined time until Shutdown Cooling is required, calculated minimum cooldown rate required to establish Shutdown Cooling entry conditions before Feedwater Source Inventory is depleted.

Required Materials: SO23-12-11, EOI Supporting Attachments, Rev. 12.
SO123-0-A7, Notification and Reporting of Significant Events, Rev. 15.

Validation Time: 25 minutes Completion Time: _____ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): _____ Date: _____

CLASSROOM SETUP

EXAMINER:

PROVIDE the examinee with JPM Cue Sheet #1 and MAKE the following available in the classroom:

- **SO123-0-A7, Notification and Reporting of Significant Events.**

When JPM Cue Sheet #1 is completed, PROVIDE JPM Cue Sheet #2.

PROVIDE the examinee with JPM Cue Sheet #2 and a copy of:

- **SO23-12-11, EOI Supporting Attachments.**
  - **Attachment 16, Determine Time Until Shutdown Cooling Required.**

ENSURE examinee has a calculator.

√ - Check Mark Denotes Critical Step | **START TIME:** |

Examiner Note:	**Provide the examinee with copy of JPM Cue Sheet #1.**
Examiner Note:	**The following step is from SO123-0-A7, Attachment 1.**

EVENT INDEX

EVENT	ATT/STEP(S)/ DOCUMENT	TIME
ONE HOUR REPORTS		
Tech. Spec. Required Shutdown	Att 2, Step 1.2 Att 2, Step 2.1.6 Att 3, Step 2.1	1 HR 1 HR 4 HR
Entry into LCO 3.0.3 or Immediate Shutdown Action	Att 2, Step 1.1 Att 2, Step 2.1.5 Att 2, Step 2.1.6 Att 2, Step 1.2	1 HR 1 HR 1 HR 1 HR 1 HR

Perform Step: 1√	DETERMINE event notification requirements per SO123-0-A7, Notification and Reporting of Significant Events.
Standard:	DETERMINED Entry into LCO 3.0.3 or Immediate Shutdown Action requires a **one (1) hour report to the NRC**.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**Provide the examinee with copy of JPM Cue Sheet #2.**
Examiner Note:	**The following steps are from SO23-12-11, Attachment 16.**
Perform Step: 2 1 & 1a	**VERIFY Feedwater Source:** • Verify T120 / T121 the only current feedwater source to S/Gs.
Standard:	DETERMINED T120 / T121 are the only feedwater sources to the Steam Generators per the Initial Conditions.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 3√ 2 & 2a	**DETERMINE T-120 inventory:** • DETERMINE T-120 inventory from Table 1, CONDENSATE STORAGE TANK INVENTORY: • Gallons in T-120 = _____
Standard:	DETERMINED T-120 inventory from Table 1, Condensate Storage Tank Inventory: • T-120 @ 54% = 241,141 = **241,141 gallons**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4√ 3 & 3a	**DETERMINE T-121 inventory:** • DETERMINE T-121 inventory from Table 2, CONDENSATE STORAGE TANK INVENTORY: • Gallons in T-121 = _____
Standard:	DETERMINED Unit 3 T-121 inventory from Table 1, Condensate Storage Tank Inventory by interpolating between levels of 84% and 86%. • T-121 @ 32% = 47,562 = **47,562 gallons**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 5√ 4	**DETERMINE Combined inventory from both Condensate Storage Tanks:** • _____ = (Gallons in T-120) • + _____ = (Gallons in T-121) • _____ = (TOTAL T-120 / T-121)
Standard:	DETERMINED Combined inventory from both Condensate Storage Tanks: • 241,141 gallons = in T-120 • 47,562 gallons = in T-121 • **288,703 gallons = in T-120 & T-121**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 6 5 & 5a	**DETERMINE additional Feedwater Source Inventory:** • ENTER additional Feedwater Source Inventory (provided by Shift Manager / Operations Leader): • Feedwater Source(s): _____ • TOTAL (Gallons): _____
Standard:	DETERMINED additional feedwater source inventory = **0 gallons**.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 7√ 6 & 6a	**DETERMINE total Feedwater Source Inventory:** • ENTER combined volume of all sources: • TOTAL T-120/T-121 (step 4): _____ Gallons • TOTAL additional (step 5): + _____ Gallons • TOTAL Combined = _____ Gallons
Standard:	DETERMINED total Feedwater Source Inventory = **288,703 gallons.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 8√ 7, 7a, 7b, & 7b.1) thru 7b.3)	**DETERMINE time remaining until Shutdown Cooling required for decay heat removal:** • DETERMINE number of hours reactor has been shutdown. • _____ Hours • Using Figure 3, REMAINING TIME S/Gs AVAILABLE AS HEAT SINK: • PLOT Total Feedwater Source Inventory from step 6 on the left axis. • PLOT across to the appropriate TIME REACTOR HAS BEEN SHUTDOWN curve (refer to step 7a - values may be interpolated between curves). • PLOT down to determine the Time (hours) S/Gs remain available as a heat sink and SDC will be required. _____ HR (from lower axis)
Standard:	DETERMINED Reactor has been shutdown **four (4) hours** and then DETERMINED **27 ± 1 hours** is time remaining until Shutdown Cooling is required.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 9√
8 & 8a
	DETERMINE minimum cooldown rate required to establish SDC entry conditions before Feedwater Source Inventory is depleted:
	• CALCULATE ΔT:
	  • Present REP CET: _____ ºF
	  • SDC entry: minus 375 ºF
	  • ΔT = _____ ºF

Standard:	DETERMINED ΔT = 470ºF - 375ºF **= 95ºF ΔT**.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 10√
8 & 8b
	DETERMINE minimum cooldown rate required to establish SDC entry conditions before Feedwater Source Inventory is depleted:
	• CALCULATE minimum cooldown rate:
	  • ΔT (step 8a) = _____ ºF
	  • Time (step 7b.3) _____ HR
	  • = _____ ºF/HR

Standard:	DETERMINED minimum cooldown rate = **95ºF / 27 ± 1 hour = 3.6 ± 0.2ºF / hour**.
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

INITIAL CONDITIONS: **Given the following information:**

- **Unit 3 is in MODE 1.**
- **At 1307, Unit 3 recognized a common cause failure of BOTH Train A and Train B HPSI Pumps.**

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

- **DETERMINE the latest time the Resident NRC Inspector can be notified per SO123-0-A7, Notification and Reporting of Significant Events.**

INITIAL CONDITIONS: **Given the following information:**

- **Unit 3 is performing SO23-12-7, Loss of Forced Circulation / Loss of Offsite Power following a Reactor trip four (4) hours ago.**
- **SO23-12-11, EOI Supporting Attachments, Attachment 3, Cooldown and Depressurization have been started.**
- **3LI-4357B, T-120 Condensate Storage Tank level is 54%.**
- **3LI-3204-1, T-121 Condensate Storage Tank level is 32%.**
- **Representative Core Exit Thermocouple (REP CET) temperature is 470ºF.**
- **T-120 and T-121 are the only feedwater sources to the Steam Generators.**

INITIATING CUE: **The SRO Operations Supervisor directs you to PERFORM the following:**

- **COMPLETE SO23-12-11, EOI Supporting Attachments, Attachment 16, Determine Time Until Shutdown Cooling Required for Unit 3.**
  - **DETERMINE time remaining until Shutdown Cooling is required for decay heat removal per Steps 1 through 7.**
  - **DETERMINE minimum cooldown rate required to establish Shutdown Cooling entry conditions before Feedwater Source Inventory is depleted per Step 8.**

Facility: SONGS JPM # NRC JPM SA3 Task #189963 K/A #2.2.12 3.7 / 4.1

Title: Perform RCS Flow Rate Determination And Evaluate Technical Specifications

Examinee (Print): _____

Testing Method:

Simulated Performance:		Classroom:	X
Actual Performance:	X	Simulator:	
Alternate Path:		Plant:	
Time Critical:			

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 1.
- Reactor Coolant System Flow Rate must be determined to comply with Technical Specifications.
- The Plant Computer System (PCS) is NOT available.
- Data was collected on the previous shift during steady state conditions.

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

- PERFORM SO23-3-3.3, RCS Flow Rate Determination, Attachment 2, RCP ΔP Flow Calculation for Unit 3.
- START at Step 3.1.3.
- DETERMINE if Acceptance Criteria is met at Step 4.1.
- If applicable, RECORD any required Technical Specification CONDITION, REQUIRED ACTION, and COMPLETION TIME in the Comments Section of the Surveillance.

Task Standard: Utilizing SO23-3-3.3, performed RCP ΔP Flow Calculation, calculated total core flow, determined Acceptance Criteria was NOT met, and identify Technical Specification Limiting Conditions for Operation.

Required Materials: SO23-3-3.3, RCS Flow Rate Determination, Rev. 6-3.
Unit 3 Technical Specification LCO 3.4.1, Amendment 212.
Unit 3 Licensee Controlled Specifications (Core Operating Limits Report), Rev. 0.

Validation Time: 25 minutes Completion Time: _____ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): _____ Date: _____

CLASSROOM SETUP

EXAMINER:

PROVIDE the examinee with a copy of:

- **SO23-3-3.3, RCS Flow Rate Determination.**
  - **INITIAL Section 1.0 of Attachment 2, RCP ΔP Flow Calculation.**
  - **COMPLETE Steps in Attachment 2 with the following data:**

Step 3.1.1:

- **Ch. A TC1 RAW Avg. – 543ºF**
  TC2 RAW Avg. – 542ºF
- **Ch. B TC1 RAW Avg. – 541ºF**
  TC2 RAW Avg. – 541ºF
- **Ch. C TC1 RAW Avg. – 542ºF**
  TC2 RAW Avg. – 542ºF
- **Ch. D TC1 RAW Avg. – 542ºF**
  TC2 RAW Avg. – 543ºF

Step 3.1.2:

- **P001 ΔP AVG – 126 psid**
- **P002 ΔP AVG – 125 psid**
- **P003 ΔP AVG – 128 psid**
- **P004 ΔP AVG – 124 psid**

MAKE the following available in the classroom:

- **Unit 3 Technical Specifications.**
- **Unit 3 Core Operating Limits Report.**

ENSURE examinee has a calculator and a ruler.

√ - Check Mark Denotes Critical Step | **START TIME:** |

Examiner Note:	**Provide the examinee with copy of JPM Cue Sheet #1.**
Examiner Note:	**The following steps are from SO23-3-3.3, Attachment 2.**
Perform Step: 1 3.1.3 & 3.1.3.1	Calculate the average RCS cold leg temperatures (TC_1 and TC_2) using data from Step 3.1.1, as follows: • $TC_1 = \frac{\text{Sum of all CPC Channels TC1RAW}}{4}$
Standard:	CALCULATED TC_1 using the data from Attachment 2, Step 3.1.1. • **TC_1 = 542ºF**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 2 3.1.3 & 3.1.3.2	Calculate the average RCS cold leg temperatures (TC_1 and TC_2) using data from Step 3.1.1, as follows: • $TC_2 = \frac{\text{Sum of all CPC Channels TC2RAW}}{4}$
Standard:	CALCULATED TC_2 using the data from Attachment 2, Step 3.1.1. • **TC_2 = 542ºF**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 3 3.1.4	Determine the density (ρTC_1) of the RCS cold leg temperature TC_1 using Attachment 12: • ρTC_1 =_____ lbm/ft^3
Standard:	DETERMINED ρTC_1, using TC_1 and Attachment 12. • **ρTC_1 = 47.3687**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4 3.1.5	Determine the density (ρTC_2) of the RCS cold leg temperature TC_2 from Attachment 12: • ρTC_2 =_____ lbm/ft^3
Standard:	DETERMINED ρTC_2, using TC_2 and Attachment 12. • **ρTC_2 = 47. 3687**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 5 3.1.6	Calculate the Compensated Pump Average $\Delta P(\Delta P_c)$ for RCP P-001 using the following formula: $\Delta P_c = \frac{\Delta P_{avg}$ (*Step 3.1.2*) X (46.654 lbm/ft^3)}{ρTC_1(*Step 3.1.4*)}
Standard:	CALCULATED ΔPc for RCP P001 using ρTC_1 and data from Steps 3.1.2 & 3.1.4. • **ΔPc = 124 ± 0.2 PSID**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 6 3.1.7	Calculate the Compensated Pump Average $\Delta P(\Delta P_c)$ for RCP P-002 using the following formula: $\Delta P_c = \frac{\Delta P_{avg}$ (*Step 3.1.2*) X (46.654 lbm/ft^3)}{ρTC_2(*Step 3.1.5*)}
Standard:	CALCULATED ΔPc for RCP P002 using ρTC_2 and data from Steps 3.1.2 & 3.1.5. • **ΔPc = 123 ± 0.2 PSID**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 7 3.1.8	Calculate the Compensated Pump Average $\Delta P(\Delta P_c)$ for RCP P-003 using the following formula: $\Delta P_c = \frac{\Delta P_{avg}$ (*Step 3.1.2*) X (46.654 lbm/ft^3)}{ρTC_1(*Step 3.1.4*)}
Standard:	CALCULATED ΔPc for RCP P003 using ρTC_1 and data from Steps 3.1.2 & 3.1.4. • **ΔPc = 126 ± 0.2 PSID**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 8 3.1.9	Calculate the Compensated Pump Average $\Delta P(\Delta P_c)$ for RCP P-004 using the following formula: $\Delta P_c = \frac{\Delta P_{avg}$ (*Step 3.1.2*) X (46.654 lbm/ft^3)}{ρTC_2(*Step 3.1.5*)}
Standard:	CALCULATED ΔP_c for RCP P004 using ρTC_2 and data from Steps 3.1.2 & 3.1.5. • **ΔPc = 122 ± 0.2 PSID**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 9√ 3.1.10	Calculate the total RCS volumetric flow rate (Qt) by summing the flow for each RCP. Use ΔP_c to determine the flow from the appropriate RCP ΔP vs. Capacity Curves, and indicate attachment used: Unit 3 • P-001 _____ gpm Att 7 + • P-002 _____ gpm Att 8 + • P-003 _____ gpm Att 9 + • P-004 _____ gpm Att 10 • Q_t = _____ gpm
Standard:	DETERMINED the flow for each pump as follows: • P001 flow = **95,000 ± 1000 GPM** using Attachment 7. • P002 flow = **97,000 ± 1000 GPM** using Attachment 8. • P003 flow = **92,500 ± 1000 GPM** using Attachment 9. • P004 flow = **97,000 ± 1000 GPM** using Attachment 10. • Q_t = **381,500 ± 4000 GPM.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 10√ 4.1	This test is considered satisfactory if the RCS Total Volumetric Flow rate in Step 3.1.10 is > 396,000 gpm. • YES • NO
Standard:	DETERMINED flow = **381,500 GPM ± 4000 GPM** and Acceptance Criteria is **NO**.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 11√	RECORD any required Technical Specification CONDITION, REQUIRED ACTION, and COMPLETION TIME in the Comments Section of the Surveillance.
Standard:	DETERMINED entry into Technical Specification **LCO 3.4.1, CONDITION A, RCS flow rate not within limits; REQUIRED ACTION A.1, Restore parameters to within limit; COMPLETION TIME, 2 hours** and RECORDED in Comments Section of SO23-3-3.3.
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

INITIAL CONDITIONS: **Given the following conditions:**

- **Unit 3 is in MODE 1.**
- **Reactor Coolant System Flow Rate must be determined to comply with Technical Specifications.**
- **The Plant Computer System (PCS) is NOT available.**
- **Data was collected on the previous shift during steady state conditions.**

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

- **PERFORM SO23-3-3.3, RCS Flow Rate Determination, Attachment 2, RCP ΔP Flow Calculation for Unit 3.**
- **START at Step 3.1.3.**
- **DETERMINE if Acceptance Criteria is met at Step 4.1.**
- **If applicable, RECORD any required Technical Specification CONDITION, REQUIRED ACTION, and COMPLETION TIME in the Comments Section of the Surveillance.**

Facility: SONGS JPM # NRC JPM SA4 Task #187721 K/A #2.3.6 2.0 / 3.8

Title: Calculate Dispersion Factor for Gaseous Release

Examinee (Print): _____

Testing Method:

Simulated Performance:		Classroom:	X
Actual Performance:	X	Simulator:	
Alternate Path:		Plant:	
Time Critical:			

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:

- Wind direction is 200º at 10 meters.
- Temperature difference between 10 and 40 meters is minus (-) 0.30ºC.
- Wind speed is 10 miles per hour at 10 meters.

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

- CALCULATE the Dispersion Factor for Gaseous Release and determine if release is desirable per SO23-8-15, Radwaste Gas Discharge, Attachment 4, Determination of Current Weather Conditions.
- START at Step 2.2.1.

Task Standard: Utilizing SO23-8-15, calculated the dispersion factor for a gaseous release and determined that release at this time was desirable.

Required Materials: SO23-8-15, Radwaste Gas Discharge, Rev. 19.

Validation Time: 15 minutes Completion Time: _____ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): _____ Date: _____

CLASSROOM SETUP

EXAMINER:

PROVIDE the examinee with a copy of:

- **SO23-8-15, Radwaste Gas Discharge.**
  - **Attachment 4, Determination of Current Weather Conditions.**
  - **Attachment 8, Radwaste Gas Discharge Limitations and Specifics.**

√ - Check Mark Denotes Critical Step | **START TIME:** |

Examiner Note:	**The following steps are from SO23-8-15, Attachment 4.**

NOTES

1. Wind direction provided by Meteorological Tower is direction wind is ***blowing FROM***.
2. The Backup Meteorological Tower is located at 10 meters and may be used to obtain 10 meter wind speed.

Perform Step: 1√
2.2.1

Determine desirability of release based solely on wind direction.

✔	DESIRABILITY	PERFORM THE FOLLOWING
	DESIRABLE - Wind Direction NOT WITHIN the 105° to 325° range (i.e., wind is blowing toward ocean).	On the Gaseous Effluent Release Permit, Mark Release Condition **DESIRABLE** and Mark N/A the current χ/Q value. Mark N/A the remaining Steps of this Attachment.
	UNDESIRABLE - Wind Direction WITHIN the 105° to 325° range (i.e., wind is blowing toward land).	Determine χ/Q by completing remaining Steps of this Attachment.

Standard: DETERMINED wind direction is **UNDESIRABLE;** COMPLETED remaining steps of this Attachment.

Comment: **SAT ☐ UNSAT ☐**

Perform Step: 2
2.2.2

Record the following information EITHER from the CR Meteorological Recorders OR from CFMS **(PAGE 256)** AND Enter in the appropriate spaces:

(A) _____ °C	Temperature difference between 10 and 40 meters
(B) _____ MPH	Wind speed at 10 meters
(C) _____ °	Wind direction at 10 meters

Standard: RECORDED Temperature difference as **-0.30ºC**; Wind speed as **10 MPH**; Wind direction as **200º**.

Comment: **SAT ☐ UNSAT ☐**

NOTE

Wind Speed (B) from Step 2.2.2 must be higher than mph listing for (A) in chart to have χ/Q< 4.8E-6

Perform Step: 3√ 2.2.3 & 2.2.3.1

Determine the χ/Q value:

- Compare the value (A) from Step 2.2 to the following chart, Determine **and** Check the applicable value (D), and Enter on Step 2.2.3.2.

✔	TEMP. DIFFERENCE (A)	VALUE 'D'	FOR χ/Q < 4.8E-6
	A ≤ -0.57	3.7E-5	7.8 mph
	-0.57 < A ≤ -0.51	3.6E-5	7.5 mph
	-0.51 < A ≤ -0.45	3.7E-5	7.7 mph
	-0.45 < A ≤ -0.15	3.4E-5	7.0 mph
	-0.15 < A ≤ 0.45	2.9E-5	6.0 mph
	0.45 < A ≤ 1.20	2.8E-5	5.9 mph
	1.20 < A	4.2E-5	8.8 mph

Standard: SELECTED Line 4 **-0.45 < A < -0.15** with A = -0.30.

Comment: **SAT ☐ UNSAT ☐**

Perform Step: 4√ 2.2.3.2

Calculate current χ/Q value:

Current χ/Q = [VALUE 'D'] / WIND SPEED

$$\text{Current } \chi/Q = \frac{\overline{\text{(Step 2.2.3.1)}}}{\overline{\text{(Step 2.2.2)}}}$$

Current χ/Q = _____ (χ/Q)

Standard: CALCULATED Current χ/Q value as **3.4E-6**.

Comment: **SAT ☐ UNSAT ☐**

Perform Step: 5 2.2.4	Compare the current (χ/Q) to the ODCM value of 4.8E-6.
Standard:	COMPARED Current χ/Q of 3.4E-6 to ODCM χ/Q of 4.8E-6.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 6√ 2.2.5	Determine the desirability of release based on the current χ/Q values.

✔	χ/Q VALUE	PERFORM THE FOLLOWING	MARK N/A
	χ/Q ≤ 4.8E-6 - Conditions are DESIRABLE	Proceed to Step 2.2.6.	NONE
	χ/Q > 4.8E-6 - Conditions are UNDESIRABLE at this time	Reperform ATT 4 when weather conditions improve	Remainder of Attachment
	χ/Q > 4.8E-6 - Conditions are UNDESIRABLE but the Shift Manager has determined the release cannot be delayed due to plant conditions (LS-3.2)	Proceed to Step 2.2.6 **AND** State reason on Release Permit.	NONE

Standard:	DETERMINED Current χ/Q of 3.4E-6 is ≤ 4.8E-6 and Conditions are **DESIRABLE**.
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

INITIAL CONDITIONS: **Given the following conditions:**

- **Wind direction is 200º at 10 meters.**
- **Temperature difference between 10 and 40 meters is minus (-) 0.30ºC.**
- **Wind speed is 10 miles per hour at 10 meters.**

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

- **CALCULATE the Dispersion Factor for Gaseous Release and DETERMINE if release is desirable per SO23-8-15, Radwaste Gas Discharge, Attachment 4, Determination of Current Weather Conditions.**
- **START at Step 2.2.1.**

Facility: SONGS JPM # NRC JPM SA5 Task #193840 K/A #2.4.41 2.9 / 4.6
Title: Classify an Emergency Plan Event

Examinee (Print): _____

Testing Method:

Simulated Performance:		Classroom:	X
Actual Performance:	X	Simulator:	
Alternate Path:		Plant:	
Time Critical:			

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:

- Both Units are in MODE 1.
- An earthquake was felt at the plant and confirmed by the National Earthquake Information Center.
- Piping within the cubicles for the Waste Gas Decay Tanks has ruptured.
- 2RE-7865, Unit 2 Plant Ventilation Stack Airborne Radiation Monitor is reading 8.5E+05 µci/sec.
- 3RE-7865, Unit 3 Plant Ventilation Stack Airborne Radiation Monitor is reading 3.6E+05 µci/sec.
- The duration of the release is unknown at this time.

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

- DETERMINE the Recognition Category, Emergency Class, and Emergency Action Level per SO123-VIII-1, Recognition and Classification of Emergencies.

Task Standard: Utilizing SO123-VIII-1, determined the Recognition Category, Emergency Class, and Emergency Action Level using the SONGS Emergency Action Level Hot & Cold Classification Charts.

Required Materials: SO123-VIII-1, Recognition and Classification of Emergencies, Rev. 34.
EPP 123-1, SONGS Emergency Classification and Event Code Charts, Rev. 0.

Validation Time: 20 minutes Completion Time: _____ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): _____ Date: _____

CLASSROOM SETUP

EXAMINER:

PROVIDE the examinee with a copy of:

- **SO123-VIII-1, Recognition and Classification of Emergencies.**
- **EPP 123-1, SONGS Emergency Classification and Event Code Charts.**

EVENT CODES / MODE APPLICABILITY ATTACHMENT 1

NOTE: Event Codes are comprised of four (or five for certain ISFSI events) characters which designate the Recognition Category, Emergency Class and Emergency Action Level.

Example: **A U 1.1**

- 1.1 — Emergency Action Level
- U — Emergency Class
- A — Recognition Category

1. DETERMINE Recognition Category designator from list below:

DESIGNATOR	RECOGNITION CATEGORY
A	Abnormal Rad Levels / Radiological Effluent
C	Cold Shutdown / Refueling System Malfunction
E-H	Events Related to Independent Spent Fuel Storage Installations
F	Fission Product Barrier Degradation
H	Hazards and Other Conditions Affecting Plant Safety
S	System Malfunction

2. DETERMINE Emergency Class designator from list below:

DESIGNATOR	EMERGENCY CLASS (Lowest to highest)
U	Notification of Unusual Event
A	Alert
S	Site Area Emergency
G	General Emergency

3. DETERMINE Emergency Action Level numerical designator as follows:

a. MATCH event conditions with Emergency Action Levels listed in selected Recognition Categories and subcategories;

b. Based on Emergency Class, FIND highest Emergency Action Level that is applicable **AND** NOTE two-digit Emergency Action Level designator.

√ - Check Mark Denotes Critical Step | **START TIME:** |

Examiner Note:	**The following steps are from SO123-VIII-1, Attachment 1.**

NOTE: Event Codes are comprised of four (or five for certain ISFSI events) characters which designate the Recognition Category, Emergency Class and Emergency Action Level.

Example: **A U 1.1**

- 1.1 — Emergency Action Level
- U — Emergency Class
- A — Recognition Category

Perform Step: 1√ 1.	DETERMINE Recognition Category designator from list below: • A Abnormal Rad Levels / Radiological Effluent • C Cold Shutdown / Refueling System Malfunction • E-H Events Related to Independent Spent Fuel Storage • F Fission Product Barrier Degradation • H Hazards and Other Conditions Affecting Plant Safety • S System Malfunction
Standard:	REFERRED to SONGS Emergency Action Levels Hot and Cold and DETERMINED the following Recognition Category is applicable: • **SONGS EAL Hot Conditions Recognition Category A, Abnormal Radiation Levels / Radiological Effluent.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 2√ 2.	DETERMINE Emergency Class designator from list below: • U Notification of Unusual Event • A Alert • S Site Area Emergency • G General Emergency
Standard:	IDENTIFIED Emergency Class designator as **ALERT based on combined 2RE-7865 & 3RE-7865 Radiation Monitor readings.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 3√ 3.	DETERMINE Emergency Action Level numerical designator as follows: • MATCH event conditions with Emergency Action Levels listed in selected Recognition Categories and subcategories; • Based on Emergency Class, FIND highest Emergency Action Level that is applicable **AND** NOTE two-digit Emergency Action Level designator.
Standard:	DETERMINE Emergency Action Level numerical designator as **AA1.1.**
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

INITIAL CONDITIONS: **Given the following conditions:**

- **Both Units are in MODE 1.**
- **An earthquake was felt at the plant and confirmed by the National Earthquake Information Center.**
- **Piping within the cubicles for the Waste Gas Decay Tanks has ruptured.**
- **2RE-7865, Unit 2 Plant Ventilation Stack Airborne Radiation Monitor is reading 8.5E+05 µci/sec.**
- **3RE-7865, Unit 3 Plant Ventilation Stack Airborne Radiation Monitor is reading 3.6E+05 µci/sec.**
- **The duration of the release is unknown at this time.**

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

- **DETERMINE the Recognition Category, Emergency Class, and Emergency Action Level per SO123-VIII-1, Recognition and Classification of Emergencies.**

Facility: SONGS JPM # NRC JPM S-1 Task #141244 K/A #004.A2.14 3.8 / 3.9 SF-1

Title: Perform an Emergency Boration Restoration

Examinee (Print): _____

Testing Method:

Simulated Performance:		Classroom:	
Actual Performance:	X	Simulator:	X
Alternate Path:		Plant:	
Time Critical:			

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 a MODE 3 post-trip condition.
- An Emergency Boration was initiated for two stuck Control Element Assemblies.
- SHUTDOWN MARGIN has been verified by Reactor Engineering.

Initiating Cue: The Control Room Supervisor directs you to PERFORM the following:

- PERFORM an Emergency Boration Restoration per SO23-13-11, Emergency Boration of the RCS / Inadvertent Dilution or Boration.
- START at Step 4, Emergency Boration Restoration.

Task Standard: Utilizing SO23-13-11, restored the Emergency Boration portion of the Chemical and Volume Control System to a normal alignment. Stopped BAMU Pump P-174, closed and placed in AUTO 2HV-9247, Emergency Boration Block Valve, restored BAMU Pump recirculation capability, and closed and placed in AUTO 2FV-9253, Blended Makeup to VCT Block Valve.

Required Materials: SO23-13-11, Emergency Boration of the RCS / Inadvertent Dilution or Boration, Rev. 18-1.

Validation Time: 10 minutes Completion Time: _____ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): _____ Date: _____

SIMULATOR SETUP

MACHINE OPERATOR:

INITIALIZE to IC-243 or any MODE 3 Initial Condition and PERFORM the following:

- **VERIFY an Emergency Boration in progress and ALIGNED as follows:**
  - **BAMU Pump P-174 - RUNNING.**
  - **BAMU Pump P-175 - RUNNING.**
  - **2HV-9247, Emergency Boration Block Valve - OPEN.**
  - **2HV-9240, BAMU Tank T-071 to Charging Pump Gravity Feed Valve - OPEN.**
  - **2HV-9235, BAMU Tank T-072 to Charging Pump Gravity Feed Valve - OPEN.**
- **EXECUTE the following malfunctions for two stuck CEAs:**
  - **RD2102, CEA #21 Stuck in Full-Out position.**
  - **RD5502, CEA #55 Stuck in Full-Out position.**

EXAMINER:

PROVIDE the examinee with a copy of:

- **SO23-13-11, Emergency Boration of the RCS / Inadvertent Dilution or Boration.**
  - **Step 4, Emergency Boration Restoration.**

√ - Check Mark Denotes Critical Step | **START TIME:** |

Examiner Note:	**The following steps are from SO23-13-11, Step 4.**
Perform Step: 1 4.a & 4.a.1)	ENSURE Emergency Boration terminated, as follows: • ENSURE OPEN and in AUTO 2(3)LV-0227B, VCT MT-077 Outlet Valve.
Standard:	VERIFIED 2LV-0227B, Volume Control Tank Outlet Block Valve red OPEN and amber AUTO lights lit.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 2√ 4.a & 4.a.2)	ENSURE Emergency Boration terminated, as follows: • ENSURE STOPPED 2(3)MP-174, BAMU Pump.
Standard:	DEPRESSED 2P174 (E) BAMU Pump STOP pushbutton and OBSERVED green STOP light lit.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 3 4.a & 4.a.3)	ENSURE Emergency Boration terminated, as follows: • ENSURE STOPPED 2(3)MP-175, BAMU Pump.
Standard:	VERIFIED 2P175 (W) BAMU Pump in STOP and OBSERVED green STOP light lit.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4√ 4.a & 4.a.4)	ENSURE Emergency Boration terminated, as follows: • ENSURE CLOSED 2(3)HV-9247, Emergency Boration Block Valve.
Standard:	DEPRESSED 2HV-9247, Emergency Boration Block Valve CLOSE pushbutton and OBSERVED green CLOSE light lit.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 5√ 4.a & 4.a.5)	ENSURE Emergency Boration terminated, as follows: • ENSURE 2(3)HV-9247, Emergency Boration Block Valve, in AUTO.
Standard:	DEPRESSED 2HV-9247, Emergency Boration Block Valve AUTO pushbutton and OBSERVED amber AUTO light lit.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 6 4.a & 4.a.6)	ENSURE Emergency Boration terminated, as follows: • ENSURE CLOSED and in AUTO 2(3)LV-0227C, RWST Gravity Feed to Charging Pump Suction Valve.
Standard:	VERIFIED 2LV-0227C, RWT 2T006 Gravity Feed Valve green CLOSE and amber AUTO lights lit.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 7 4.a & 4.a.7)	ENSURE Emergency Boration terminated, as follows: • ENSURE CLOSED 2(3)HV-9240, BAMU Tank MT-071 to Charging Pump Gravity Feed Valve
Standard:	VERIFIED 2HV-9240, BAMU Tank 2T071 Gravity Feed Valve green CLOSE light lit.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 8 4.a & 4.a.8)	ENSURE Emergency Boration terminated, as follows: • ENSURE CLOSED 2(3)HV-9235, BAMU Tank MT-072 to Charging Pump Gravity Feed Valve.
Standard:	VERIFIED 2HV-9235, BAMU Tank 2T072 Gravity Feed Valve green CLOSE light lit.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 9√ 4.a & 4.a.9)	ENSURE Emergency Boration terminated, as follows: • ENSURE OPEN 2(3)HV-9236, BAMU Pump 2(3)MP-174 Recirculation Valve.
Standard:	DEPRESSED 2HV-9236, 2P174 RECIRC to 2T071 OPEN pushbutton and OBSERVED red OPEN light lit.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 10√ 4.a & 4.a.10)	ENSURE Emergency Boration terminated, as follows: • ENSURE OPEN 2(3)HV-9231, BAMU Pump 2(3)MP-175 Recirculation Valve.
Standard:	DEPRESSED 2HV-9231, 2P175 RECIRC to 2T072 OPEN pushbutton and OBSERVED red OPEN light lit.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 11√ 4.a & 4.a.11)	ENSURE Emergency Boration terminated, as follows: • ENSURE CLOSED and in AUTO 2(3)FV-9253, Blended Makeup to VCT Isolation.
Standard:	DEPRESSED 2FV-9253, Blended Makeup to VCT Block Valve AUTO pushbutton and OBSERVED green CLOSE and white AUTO lights lit.
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

INITIAL CONDITIONS: **Given the following conditions:**

- **Unit 2 is in a MODE 3 post-trip condition.**
- **An Emergency Boration was initiated for two stuck Control Element Assemblies.**
- **SHUTDOWN MARGIN has been verified by Reactor Engineering.**

INITIATING CUE: **The Control Room Supervisor directs you to PERFORM the following:**

- **PERFORM an Emergency Boration Restoration per SO23-13-11, Emergency Boration of the RCS / Inadvertent Dilution or Boration.**
- **START at Step 4, Emergency Boration Restoration.**

Facility: SONGS JPM # NRC JPM S-2 Task #186190 K/A #013.A4.02 4.3 / 4.4 SF-2

Title: Reset a Control Room Isolation Signal

Examinee (Print): _____

Testing Method:

Simulated Performance:		Classroom:	
Actual Performance:	X	Simulator:	X
Alternate Path:		Plant:	
Time Critical:			

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 2/3 Train A and B Control Room Isolation Signals (CRIS) have been actuated for testing.

Initiating Cue: The Control Room Supervisor directs you to PERFORM the following:

- RESET and RESTORE the Unit 2/3 Train A and B Control Room Isolation Signals (CRIS) per SO23-3-2.22, Engineered Safety Features Actuation Systems Operation, Attachment 18, CRIS / TGIS Reset and Restoration.
- START at Step 2.1.

Task Standard: Utilizing SO23-3-2.22, Attachment 18, reset the Train A and B Control Room Isolation Signal (CRIS) and restored the Control Room Ventilation System at 2CR-60 to a normal pre-CRIS alignment.

Required Materials: SO23-3-2.22, ESFAS Operation, Attachment 18, Rev. 23.

Validation Time: 15 minutes Completion Time: _____ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): _____ Date: _____

SIMULATOR SETUP

MACHINE OPERATOR:

INITIALIZE to IC-242 or any at power Initial Condition and PERFORM the following:

- **EXECUTE both Channels of Control Room Isolation Signal (CRIS).**
- **ENSURE sufficient time has elapsed to allow all components to reposition.**

EXAMINER:

PROVIDE the examinee with a copy of:

- **SO23-3-2.22, Engineered Safety Features Actuation Systems Operation.**
  - **Attachment 18, CRIS / TGIS Reset and Restoration.**
    - **INITIALED and N/A as appropriate up to Step 2.0.**
      - **INITIAL Steps 1.1 through 1.6.**
      - **CHECK 1st box for Step 1.3.**
      - **N/A Steps 2.2, 2.2.1, 2.2.2, 2.2.3 & 2.2.3.1.**

√ - Check Mark Denotes Critical Step | **START TIME:** |

Examiner Note:	**The following steps are from SO23-3-2.22, Attachment 18.**
Examiner Note:	**The following steps are from SO23-3-2.22, Step 2.1 and 2.4**
Perform Step: 1√ 2.1 & 2.1.1	RESET CRIS actuation, as follows: • MOMENTARILY DEPRESS Train A CRIS 2/3HS-7824J1 on panel L-104 and VERIFY Reset/Test light backlights.
Standard:	MOMENTARILY DEPRESSED 2/3HS-7824J1, CRIS TR A RESET / TEST on Panel 2L-104, Radiation Monitoring Panel and VERIFIED white RESET / TEST light backlights.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 2√ 2.1 & 2.1.2	RESET CRIS actuation, as follows: • MOMENTARILY DEPRESS Train B CRIS 2/3HS-7825J2 on panel L-104 and VERIFY Reset/Test light backlights.
Standard:	MOMENTARILY DEPRESSED 2/3HS-7825J2, CRIS TR B RESET / TEST on Panel 2L-104, Radiation Monitoring Panel and VERIFIED white RESET / TEST light backlights.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 3 2.1 & 2.1.3	RESET CRIS actuation, as follows: • VERIFY that K-9 (K-11) Train A(B) CRIS ESFAS Actuation Relays are not chattering, buzzing or humming (noises of distress will be very noticeable outside 2/3L104).
Standard:	VERIFIED that K-9 and K-11 Train A and B CRIS ESFAS Actuation Relays are not chattering, buzzing or humming.
Examiner Cue:	**The relays are not chattering, buzzing or humming.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4 2.1 & 2.1.4	RESET CRIS actuation, as follows: • VERIFY applicable annunciators on panel 60B and DAS (as applicable) have reset.
Standard:	DEPRESSED RESET pushbutton and OBSERVED Annunciator 60B07 - CRIS ACTUATION has RESET on Control Room Panel 60B.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 5 2.4 & 2.4.1	RESTORE Train A Control Room Emergency HVAC to normal, as follows: • 3E-427 CR Cabinet Area ECU STOP
Standard:	VERIFIED 3E-427, CR Cabinet Area ECU in STOP and DETERMINED green STOP light lit.
Examiner Cue:	**Unit 3 has stopped 3E-427, CR Cabinet Area ECU.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 6 2.4 & 2.4.2	RESTORE Train A Control Room Emergency HVAC to normal, as follows: • 3HV-9738 CR Cabinet Area ECU E-427 Suction Damper CLOSED
Standard:	VERIFIED 3HV-9738, CR Cabinet Area ECU E427 Suction Damper in CLOSE and DETERMINED green CLOSE light lit.
Examiner Cue:	**Unit 3 has closed 3HV-9738, ECU E427 Suction Damper.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 7√ 2.4 & 2.4.3	RESTORE Train A Control Room Emergency HVAC to normal, as follows: • 2E-424 CR Cabinet Area ECU STOP
Standard:	DEPRESSED 2HS-9738-1, CR Cabinet Area ECU E424 (N) STOP pushbutton and OBSERVED green STOP light lit.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 8 2.4 & 2.4.4	RESTORE Train A Control Room Emergency HVAC to normal, as follows: • 2HV-9738 CR Cabinet Area ECU E-424 Suction Damper CLOSED
Standard:	VERIFIED 2HV-9738, CR Cabinet Area ECU E424 Suction Damper green CLOSE light lit.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 9√ 2.4 & 2.4.5	RESTORE Train A Control Room Emergency HVAC to normal, as follows: • A-207 CR Emer Ventilation Supply Unit STOP
Standard:	DEPRESSED 2/3HS-9760-1 CR Emergency Vent Supply Unit A207 (S) STOP pushbutton and OBSERVED green STOP light lit.
Comment:	**SAT** ☐ **UNSAT** ☐

Perform Step: 10 2.4 & 2.4.6	RESTORE Train A Control Room Emergency HVAC to normal, as follows: • FV-9761 CR Emer Vent Unit A-207 Damper CLOSED
Standard:	VERIFIED 2/3FV-9761, CR Emergency Vent Unit A Damper green CLOSE light lit when A207 STOPPED.
Comment:	**SAT** ☐ **UNSAT** ☐

Perform Step: 11√ 2.4 & 2.4.7	RESTORE Train A Control Room Emergency HVAC to normal, as follows: • E-418 CR Emergency A/C Unit STOP
Standard:	DEPRESSED 2/3HS-9749-1 Unit 2 CR Emergency A/C Unit A E418 (S) STOP pushbutton and OBSERVED green STOP light lit.
Comment:	**SAT** ☐ **UNSAT** ☐

Perform Step: 12√ 2.4 & 2.4.8	RESTORE Train A Control Room Emergency HVAC to normal, as follows: • HV-9756 CR Outside Air Isolation Damper OPEN
Standard:	DEPRESSED 2/3HV-9756, Control Room Outside Air ISO Damper OPEN pushbutton and OBSERVED red OPEN light lit.
Comment:	**SAT** ☐ **UNSAT** ☐

Perform Step: 13√ 2.4 & 2.4.9	RESTORE Train A Control Room Emergency HVAC to normal, as follows: • HV-9702 CR Air E-295 Discharge Damper OPEN
Standard:	DEPRESSED 2/3HV-9702, Control Room Air E295 DISCH Damper OPEN pushbutton and OBSERVED red OPEN light lit.
Comment:	**SAT** ☐ **UNSAT** ☐

Perform Step: 14√ 2.4 & 2.4.10	RESTORE Train A Control Room Emergency HVAC to normal, as follows: • HV-9712 CR Air Recirc E-295 Suction Damper OPEN
Standard:	DEPRESSED 2/3HV-9712, Control Room Air Recirc E295 Suction Damper OPEN pushbutton and OBSERVED red OPEN light lit.
Comment:	**SAT** ☐ **UNSAT** ☐

Perform Step: 15√ 2.4 & 2.4.11	RESTORE Train A Control Room Emergency HVAC to normal, as follows: • HV-9717 CR Outside Air Isolation Damper OPEN
Standard:	DEPRESSED 2/3HV-9717, Control Room Outside Air Isolation Damper OPEN pushbutton and OBSERVED red OPEN light lit.
Comment:	**SAT** ☐ **UNSAT** ☐

Perform Step: 16√ 2.4 & 2.4.12	RESTORE Train A Control Room Emergency HVAC to normal, as follows: • HV-9769 CR Outside Air Isolation Damper OPEN
Standard:	DEPRESSED 2/3HV-9769, Control Room Outside Air ISO Damper OPEN pushbutton and OBSERVED red OPEN light lit.
Terminating Cue:	**Another operator will finish alignments. This JPM is complete.**
Comment:	**SAT** ☐ **UNSAT** ☐

STOP TIME:	

INITIAL CONDITIONS: **Given the following conditions:**

- **Unit 2/3 Train A and B Control Room Isolation Signals (CRIS) have been actuated for testing.**

INITIATING CUE: **The Control Room Supervisor directs you to PERFORM the following:**

- **RESET and RESTORE the Unit 2/3 Train A and B Control Room Isolation Signals (CRIS) per SO23-3-2.22, Engineered Safety Features Actuation Systems Operation, Attachment 18, CRIS / TGIS Reset and Restoration.**
- **START at Step 2.1.**

Facility: SONGS JPM # NRC JPM S-3 Task #141245 K/A #006.A1.13 3.5 / 3.7 SF-3

Title: Pressurize a Safety Injection Tank

Examinee (Print): _____

Testing Method:

Simulated Performance:		Classroom:	
Actual Performance:	X	Simulator:	X
Alternate Path:		Plant:	
Time Critical:			

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.
- Safety Injection Tank (SIT) 2T-008 pressure is below the low pressure alarm setpoint.

Initiating Cue: The Control Room Supervisor directs you to PERFORM the following:

- RAISE pressure in SIT 2T-008 to 630 ± 5 PSIA per SO23-3-2.7.1, Safety Injection Tank Operation.
- START at Step 6.1.

Task Standard: Utilizing SO23-3-2.7.1, raised 2T-008, Safety Injection Tank pressure from 620 PSIA to 630 PSIA ± 5 PSIA without exceeding 655 PSIA.

Required Materials: SO23-3-2.7.1 Safety Injection Tank Operation, Rev. 19-1.

Validation Time: 12 minutes Completion Time: _____ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): _____ Date: _____

SIMULATOR SETUP

MACHINE OPERATOR:

INITIALIZE to IC-244 or any at power Initial Condition and PERFORM the following:

- **REDUCE SIT 2T-008 pressure to about 620 psig.**

EXAMINER:

PROVIDE the examinee with a copy of:

- **SO23-3-2.7.1 Safety Injection Tank Operation.**
  - **Section 6.1, Increasing SIT Pressure.**

√ - Check Mark Denotes Critical Step | **START TIME:** |

Examiner Note:	**The following steps are from SO23-3-2.7.1, Section 6.1.**
NOTE Increasing SIT pressure will lower SIT level.	
Perform Step: 1 6.1.1 & 6.1.1.1	Ensure SIT pressure is ≥ 300 psia. • If SIT pressure is < 300 psia, then go to Section 6.2.
Standard:	OBSERVED 2PI-0312 **and/or** 2PI-0313, SIT Narrow Range Pressure 2T008 (Loop 1A) and DETERMINED pressure is greater than 300 PSIA.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 2 6.1.2	VERIFY SIT level is between 79.2% and 82.9% (NR). (Mark N/A if already performing SO23-3-3.25, Attachment for SIT Level Change Log-Six Hour Monitoring.)
Standard:	OBSERVED 2LI-0312 and 2LI-0313, SIT Narrow Range Level 2T008 (Loop 1A) and DETERMINED level between 79.2% and 82.9%.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 3√ 6.1.3	OPEN 2(3)HV-5434, SIT Nitrogen Supply Containment Isolation Valve, and verify SIT Nitrogen header pressure is at least 610 psig (PI-5410).
Standard:	DEPRESSED 2HV-5434, SIT N2 Supply ISO Valve OPEN pushbutton and OBSERVED red OPEN light lit and VERIFIED SIT Nitrogen header pressure ~650 PSIG on 2PI-5410, N2 Fill Line to SI Tanks Pressure.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4√ 6.1.4 & 6.1.4.1	RAISE pressure in **one SIT at a time**, as follows: • OPEN the respective Nitrogen Supply Valve at CR-57.

N2 Supply Valve	SIT	Pressure Instrument
2(3)HV-9344	SIT T-008	PI-0312/P312

Standard:	DEPRESSED 2HV-9344, SIT 2T008 (Loop 1A) N_2 Supply Valve OPEN pushbutton and OBSERVED red OPEN light lit and pressure rising at 2PI-0312 and 2PI-0313, SIT Narrow Range Pressure 2T008 (Loop 1A).
Examiner Note:	**Annunciators 57B38 – PZR PRESS HI AND SIT T008 / T010 PRESS LO and 57B39 – SIT T008 PRESS HI / LO will clear as pressure rises.**
	SAT ☐ UNSAT ☐

Perform Step: 5√ 6.1.4.2	After achieving 620 - 650 psia, then CLOSE the Nitrogen Supply Valve.
Standard:	DEPRESSED 2HV-9344, SIT 2T008 (Loop 1A) N_2 Supply Valve CLOSE pushbutton when pressure is 630 PSIA ± 5 PSIA and OBSERVED green CLOSE light lit.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 6 6.1.4.3	VERIFY SIT level is between 79.2% and 82.9% (NR). (Mark N/A if already performing SO23-3-3.25, Attachment for SIT Level Change Log-Six Hour Monitoring.)
Standard:	OBSERVED 2LI-0312 and 2LI-0313, SIT Narrow Range Level 2T008 (Loop 1A) and VERIFIED level between 79.2% and 82.9%.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 7 6.1.5	If additional SITs will be pressurized, then reperform Section 6.1.4.
Standard:	DETERMINED that no additional SITs will be pressurized.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 8 6.1.6	CLOSE 2(3)HV-5434, SIT Nitrogen Supply Containment Isolation Valve
Standard:	DEPRESSED 2HV-5434, SIT N2 Supply ISO Valve CLOSE pushbutton and OBSERVED green CLOSE light lit
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

INITIAL CONDITIONS: **Given the following conditions:**

- **Unit 2 is in MODE 1.**
- **Safety Injection Tank (SIT) 2T-008 pressure is below the low pressure alarm setpoint.**

INITIATING CUE: **The Control Room Supervisor directs you to PERFORM the following:**

- **RAISE pressure in SIT 2T-008 to 630 ± 5 PSIA per SO23-3-2.7.1, Safety Injection Tank Operation.**
- **START at Step 6.1.**

Facility: SONGS JPM # NRC JPM 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
Alternate Path:	X	Plant:	
Time Critical:			

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 4th Reactor Coolant Pump P-003.
- All actions of SO23-3-1.7, Reactor Coolant Pump Operation, through Step 6.1.19 are complete.
- An Operator is stationed at the Reactor Coolant Pump (RCP) in Containment.

Initiating Cue: The Control Room Supervisor directs you to PERFORM the following:

- PLACE Reactor Coolant Pump P-003 in service per SO23-3-1.7, Reactor Coolant Pump Operation.
- START at Step 6.1.20.

Task Standard: Utilizing SO23-3-1.7, started Reactor Coolant Pump P-003 and tripped Reactor Coolant Pump P-003 when an overcurrent condition was detected.

Required Materials: SO23-3-1.7, Reactor Coolant Pump Operation, Rev. 38-1.
SO23-15-56.C, 56C06 - RCP P003 OC, Rev. 23.

Validation Time: 15 minutes Completion Time: _____ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): _____ Date: _____

SIMULATOR SETUP

MACHINE OPERATOR:

INITIALIZE to IC-245 or any MODE 3 Initial Condition with RCS temperature > 400ºF and PERFORM the following:

- **DISPLAY PCS Trend Group Data page for RCP P-003 as follows:**
  - **ACCESS Main Menu on PCS.**
  - **SELECT Main Points.**
  - **SELECT Point 1.**
  - **POINT TYPE selected to Server Group.**
  - **SELECT RCP 3 PARMS then SELECT Add, then OK.**
- **INSERT and TURN Key #38, CPC A Trip Bypass to ON.**
- **INSERT and TURN Key #42, CPC B Trip Bypass to ON.**
- **INSERT and TURN Key #46, CPC C Trip Bypass to ON.**
- **INSERT and TURN Key #50, CPC D Trip Bypass to ON.**
- **INSERT override 2HS-9161A - CR 56 - SO2 to OUT.**
- **INSERT override 2HS-9161A - CR 56 - SO1 to IN.**
- **INSERT override for Annunciator 56C06 10 seconds after starting RCP P-003.**
- **INSERT override for RCP P-003 ammeter to maximum.**

EXAMINER:

PROVIDE the examinee with a copy of:

- **SO23-3-1.7, Reactor Coolant Pump Operation.**
  - **INITIALED through Step 6.1.19.**
  - **INCLUDE Attachments 1, 2, and 16.**

√ - Check Mark Denotes Critical Step | **START TIME:** |

Examiner Note:	**The following steps are from SO23-3-1.7, Section 6.1.**
Perform Step: 1√ 6.1.20	START one Oil Lift Pump by selecting the NORMAL mode.
Standard:	DEPRESSED the NORMAL pushbutton on either 2HS-9111A, 2P003 Oil Lift Pump 2P264, **or** 2HS-9112A, 2P003 Oil Lift Pump 2P265 and OBSERVED amber NORMAL and red START lights lit.
Examiner Note:	**Annunciator 56C35 – RCP P003 OIL LIFT PRESS LO, will come in and reset. This is an expected alarm.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 2 6.1.21	ENSURE the second Oil Lift pump selected to STANDBY.
Standard:	DEPRESSED the STANDBY pushbutton on either 2HS-9111A, 2P003 Oil Lift Pump 2P264 **or** 2HS-9112A, 2P003 Oil Lift Pump 2P265, whichever was not started in the previous step and VERIFIED amber STANDBY and green STOP lights lit.
Examiner Cue:	**Two minutes has elapsed.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 3√ 6.1.22	After the Oil Lift System has run approximately 2 minutes, then START the ARRD Lube Oil Pump by selecting the NORMAL mode.
Standard:	DEPRESSED the NORMAL pushbutton on either 2HS-9176, 2P003 ARRD Pump 2P403 **or** 2HS-9177, 2P003 ARRD Pump 2P404 and OBSERVED amber NORMAL and red START lights lit.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4 6.1.23	ENSURE the second ARRD pump is available by selecting STANDBY mode.
Standard:	DEPRESSED the STANDBY pushbutton on either 2HS-9176, 2P003 ARRD Pump 2P403 **or** 2HS-9177, 2P003 ARRD Pump 2P404, whichever was not started in the previous step and VERIFIED amber STANDBY and green STOP lights lit.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 5 6.1.24 & 6.1.24.1 thru 6.1.24.7	VERIFY the following alarms on Panel CR56 are reset prior to the start of the associated RCP: • RCP THRUST BEARINGS TEMP HI (56C03, 05, 07, and 09) • RCP LUBE OIL FLOW LO (56C13, 15, 17, and 19) • RCP REVERSE ROTATION (56C14, 16, 18, and 20) • RCP OIL LIFT FLOW LO (56C23, 25, 27, and 29) • RCP OIL LIFT PRESS LO (56C33, 35, 37, and 39) • RCP CCW FLOW LO (56C34, 36, 38, and 40) • RCP ARRD LUBE OIL FLOW LO (56C43, 45, 47, and 49)
Standard:	OBSERVED alarms on Panel CR-56 are RESET prior to starting RCP: • 56C05 - RCP P003 THRUST BRG TEMP HI • 56C15 - RCP P003 LUBE OIL FLOW LO • 56C16 - RCP P003 REVERSE ROTATION • 56C25 - RCP P003 OIL LIFT FLOW LO • 56C35 - RCP P003 OIL LIFT PRESS LO • 56C36 - RCP P003 CCW FLOW LO • 56C45 - RCP P003 ARRD LUBE OIL FLOW LO
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 6 6.1.25	Verify PCS Points selected in Step 6.1.9 are not in alarm.
Standard:	OBSERVED RCP 2P-003 information on Plant Computer System and DETERMINED no alarms present.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 7 6.1.26	Verify RCP CONTROLLED BLEED-OFF FLOW (PCS) is reset or proper RCP CBO flow for the existing RCS pressure.
Standard:	VERIFIED RCP Controlled Bleed-Off Flow on Plant Computer System is RESET (Point ID F-160) **or** proper RCP CBO flow for the existing RCS pressure (~1.5 gpm).
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 8 6.1.27	Verify CCW SEAL HEAT EXCHANGER TEMPERATURE HI (PCS) alarm is reset.
Standard:	VERIFIED CCW Seal Exchanger temperature high alarm on Plant Computer System Point ID TE-9154 is RESET for RCP P-003.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 9 6.1.28 & 6.1.28.1 thru 6.1.28.4	VERIFY the following final configuration: • One Oil Lift Pump selected to NORMAL. • One Oil Lift Pump selected to Standby. • One ARRD Pump selected to Normal. • One ARRD Pump selected to Standby.
Standard:	PERFORMED final configuration check: • VERIFIED Oil Lift Pump, 2P264 **or** 2P265 amber NORMAL light lit. • VERIFIED Oil Lift Pump, 2P264 **or** 2P265 amber STANDBY light lit. • VERIFIED ARRD Pump, 2P403 **or** 2P404 amber NORMAL light lit. • VERIFIED ARRD Pump, 2P403 **or** 2P404 amber STANDBY light lit.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 10 6.1.29	If Backfeeding Unit Aux Transformer (UAT) when in Modes 4 or 5, and a UAT High temperature alarm is received, then ENSURE only one RCP is running on the associated bus.
Standard:	DETERMINED Backfeeding via the Unit Auxiliary Transformer is NOT being performed as Unit 2 is in MODE 3.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 11 6.1.30	VERIFY the RCP Zero Speed lamp is illuminated.
Standard:	OBSERVED 2SL-9110, Zero Speed Indication for RCP 2P003 white ZERO SPEED light lit.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 12 6.1.31	If another RCP is already running, then ENSURE it has been in service for at least 5 minutes.
Standard:	DETERMINED that all three running RCPs have been in service for greater than 5 minutes.
Examiner Cue:	**RCPs were running for more than 5 minutes.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 13 6.1.32	If this RCP start is associated with an idle loop, then COMMENCE monitoring Nuclear Instrumentation and continue for approximately the first minute of pump operation.
Standard:	DETERMINED that RCP 2P001 is running and the loop is NOT idle.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 14 6.1.33	ANNOUNCE pump start using local area page.
Standard:	DIALED 429 on phone and ANNOUNCED Reactor Coolant Pump 2P003 start.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**Annunciator 50A51 – VIB & LOOSE PARTS MONITOR SYSTEM TROUBLE, will come in and reset. This is an expected alarm when starting the RCP.**
Perform Step: 15√ 6.1.34 & 6.1.34.1	START the Reactor Coolant Pump and PERFORM the following: • Verify motor amps stabilize between 470 and 800 amps.
Standard:	DEPRESSED 2HS-9161A, 2P003 START pushbutton: • OBSERVED red START light lit and green STOP light off. • DETERMINED motor amps PEGGED at 1000 amps on ammeter.
Examiner Cue:	**If an attempt is made to research cause of alarm, REPORT that the ARO is at 2L-194 verifying alarm was due to starting the RCP.**
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The following steps represent the Alternate Path of this JPM.**
Perform Step: 16	Acknowledge annunciator 56C06 - RCP P002 OC.
Standard:	ACKNOWLEDGED annunciator 56C06 - RCP P002 OC and REFERRED to 56C06 Annunciator Response Procedure and OBSERVED 2P003 2HS-9161A ammeter PEGGED high.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The following steps are from Annunciator SO23-15-56C06, Step 2.1.**
Examiner Note:	**It is considered skill-of-the-craft to open an upstream breaker using the Annunciator Response Procedures or going directly to the breaker.**
Perform Step: 17√ 2.2 & 2.2	2(3)MP-003, RCP, Seized ENSURE 2(3)MP-003, RCP, Tripped.
Standard:	DEPRESSED 2HS-9161A, 2P003 STOP pushbutton and OBSERVED green STOP light off, red START light lit, and ammeter PEGGED high.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 18√ 2.2 & 2.2	2(3)MP-003, RCP, Seized ENSURE 2(3)MP-003, RCP, Tripped.
Standard:	DEPRESSED 2HS-1610A, RES AUX XFMR 2XR3 FDR BREAKER 2A0202 TRIP pushbutton and OBSERVED green TRIP light lit and 2II-1610 RES AUX XFMR 2XR3 FDR AMPS at zero (0) amps.
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

INITIAL CONDITIONS: **Given the following conditions:**

- **Unit 2 is in MODE 3.**
- **A heat up is in progress to the point of starting the 4th Reactor Coolant Pump P-003.**
- **All actions of SO23-3-1.7, Reactor Coolant Pump Operation, through Step 6.1.19 are complete.**
- **An Operator is stationed at the Reactor Coolant Pump (RCP) in Containment.**

INITIATING CUE: **The Control Room Supervisor directs you to PERFORM the following:**

- **PLACE Reactor Coolant Pump P-003 in service per SO23-3-1.7, Reactor Coolant Pump Operation**
- **START at Step 6.1.20.**

Facility: SONGS JPM # NRC JPM S-5 Task #185048 K/A #059.A2.11 3.0 / 3.3 SF-4S

Title: Reset a Valid Reactor Trip Override

Examinee (Print): _____

Testing Method:

Simulated Performance:		Classroom:	
Actual Performance:	X	Simulator:	X
Alternate Path:	X	Plant:	
Time Critical:			

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 has tripped from full power due to a Turbine Generator fault.
- SO23-12-1, Standard Post Trip Actions, Step 14.b RNO, Reset RTO, is required.
- The Reactor Trip Override (RTO) was validated by another operator.

Initiating Cue: The Control Room Supervisor directs you to PERFORM the following:

- RESET the Reactor Trip Override per SO23-9-6, Feedwater Control System Operation, Section 6.5, Feedwater Control System Operation During a VALID RTO.
- START at Step 6.5.2, Reset the Valid RTO.

Task Standard: Utilizing SO23-9-6, reset Reactor Trip Override on both Steam Generators and then referred to SO23-13-24, Attachment 1, and controlled Steam Generator E-088 level when the Master Controller setpoint failed high.

Required Materials: SO23-9-6, Feedwater Control System Operation, Rev. 28.
SO23-13-24, Feedwater Control System Malfunction, Rev. 5-4.

Validation Time: 10 minutes Completion Time: _____ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): _____ Date: _____

SIMULATOR SETUP

MACHINE OPERATOR:

INITIALIZE to IC-243 or any 100% power IC and PERFORM the following:

- **Manually TRIP the Reactor.**
- **SECURE one (1) Main Feedwater Pump.**

When RTO is RESET, perform the following:

- **EXECUTE malfunction FC05B, Steam Generator E-088 Setpoint Failure to 100% on 180 second ramp.**

MACHINE OPERATOR NOTE:

- **ENSURE SO23-13-24, Attachment 1, Control Board Hard Card is clean after each JPM is performed.**

EXAMINER:

PROVIDE the examinee with a copy of:

- **SO23-9-6, Feedwater Control System Operation.**
  - **Section 6.5, Feedwater Control System Operation During a VALID RTO.**

√ - Check Mark Denotes Critical Step | **START TIME:** |

Examiner Note:	**The following steps are from SO23-9-6, Section 6.5.**
Perform Step: 1√ 6.5.2 & 6.5.2.1	Reset the Valid RTO, as follows: • LOWER Master Controller FIC-1111 Setpoint to within 4% of actual S/G E-089 Level.
Standard:	DEPRESSED Master Controller 2FIC1111 (E089) ▌▌▌ to SELECT Setpoint then DOWN (▼) arrow and ADJUSTED Master Controller to within 4% of actual level.
Comment:	**SAT ☐ UNSAT ☐**

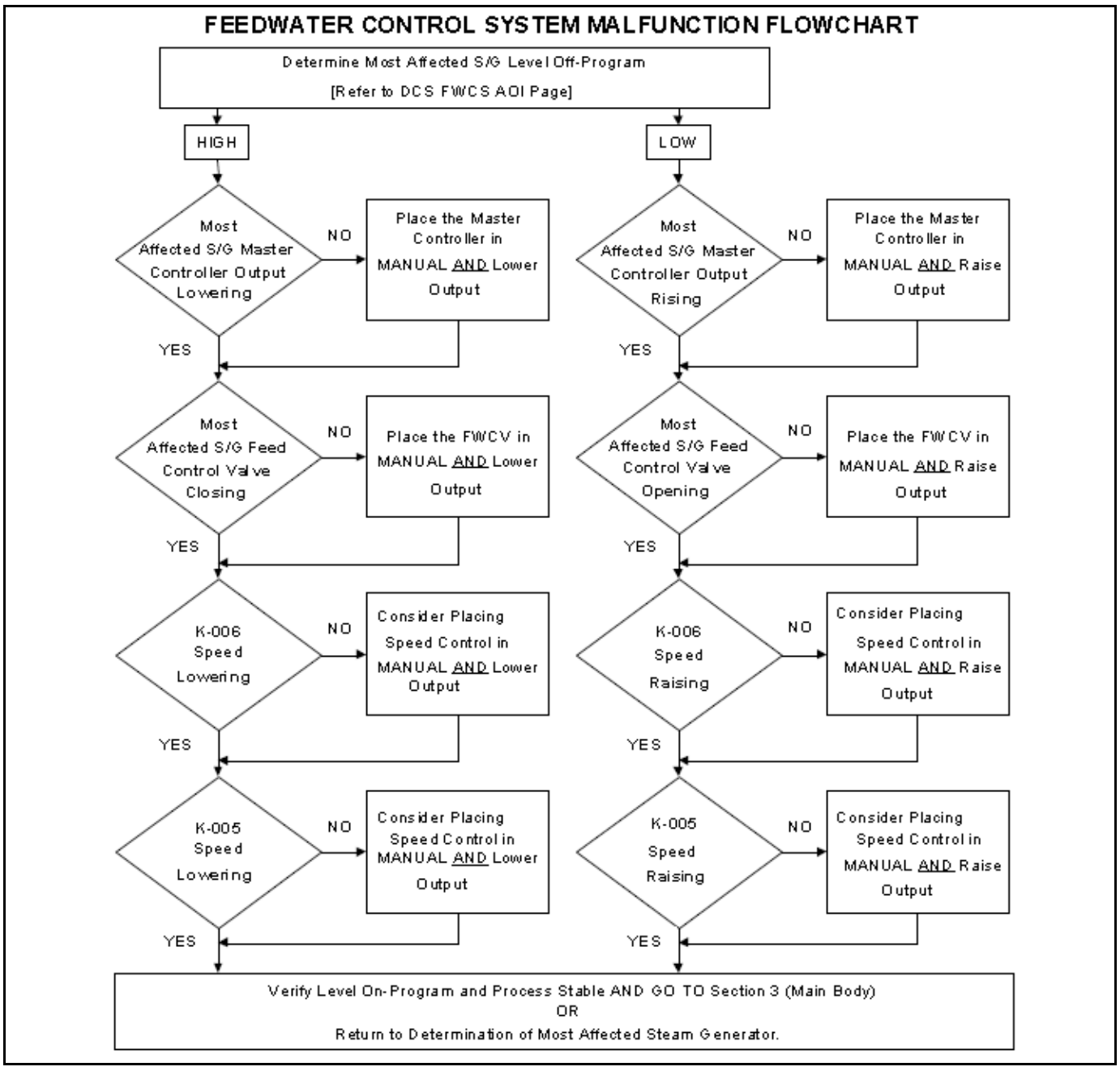
Perform Step: 2√ 6.5.2 & 6.5.2.2	Reset the Valid RTO, as follows: • LOWER Master Controller FIC-1121 Setpoint to within 4% of actual S/G E-088 Level.
Standard:	DEPRESSED Master Controller 2FIC1121 (E088) ▌▌▌ to SELECT Setpoint then DOWN (▼) arrow and ADJUSTED Master Controller to within 4% of actual level.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**This step resets Reactor Trip Override on Steam Generator E-088.**
Perform Step: 3√ 6.5.2.& 6.5.2.3	Reset the Valid RTO, as follows: • After the RTO has reset, then SLOWLY simultaneously adjust both Master Controllers (FIC-1111/FIC-1121), setpoint to 55% NR level, or as directed by the SRO Ops. Supv.
Standard:	OBSERVED Annunciator 52A03 - FWCS SG2 E088 RTO is RESET **or** OBSERVED yellow RTO flag inside DCS SG then DEPRESSED Master Controller 2FIC1121 (E088) UP (▲) arrow to ADJUST setpoint to 55%.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**This step resets Reactor Trip Override on Steam Generator E-089.**
Perform Step: 4√ 6.5.2.& 6.5.2.3	Reset the Valid RTO, as follows: • After the RTO has reset, then SLOWLY simultaneously adjust both Master Controllers (FIC-1111/FIC-1121), setpoint to 55% NR level, or as directed by the SRO Ops. Supv.
Standard:	OBSERVED Annunciator 52A08 - FWCS SG1 E089 RTO is RESET **or** OBSERVE yellow RTO flag inside DCS SG then DEPRESSED Master Controller 2FIC1111 (E089) UP (▲) arrow to ADJUST setpoint to 55%.
Comment:	**SAT ☐ UNSAT ☐**

Machine Operator:	**When RTO is RESET, EXECUTE malfunction FC05B, Steam Generator E-088 Setpoint Failure to 100% on 180 second ramp.**
Examiner Note:	**The following steps represent the Alternate Path of this JPM.**
Examiner Note:	**Examinee may use "prompt and prudent" actions to control level.**
Perform Step: 5 6.5.2 & 6.5.2.4	**Reset the Valid RTO, as follows:** • If the Steam Generator levels are not being properly controlled by DCS, then GO TO SO23-13-24, Feedwater Control System Malfunction.
Standard:	DETERMINED Steam Generator levels are not being properly controlled by DCS and REFERRED to SO23-13-24, Feedwater Control System Malfunction.
Examiner Cue:	**The CRS directs you to use SO23-13-24, Attachment 1, Control Board Hard Card.**
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The following steps are from SO23-13-24, Attachment 1, Flowchart.**
Perform Step: 6 Attachment 1	Determine Most Affected S/G Level Off-Program. • Refer to DCS FWCS AOI Page.
Standard:	DETERMINED Steam Generator E-088 level RISING.
Comment:	**SAT ☐ UNSAT ☐**



Examiner Note:	**When in MANUAL, selecting OUTPUT or observing the lumigraph bar for OUTPUT is sufficient to determine control of the valve.**
Perform Step: 7√ Attachment 1	HIGH - Most Affected S/G Master Controller Output Lowering - NO - Place the Master Controller in MANUAL AND Lower Output
Standard:	DEPRESSED Master Controller 2FIC1121 (E088) MANUAL (**M**) pushbutton then ▌▌▌ to SELECT Output and DEPRESSED DOWN (▼) arrow to ADJUST level to ~55%.
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

INITIAL CONDITIONS: **Given the following conditions:**

- **Unit 2 has tripped from full power due to a Turbine Generator fault.**
- **SO23-12-1, Standard Post Trip Actions, Step 14.b RNO, Reset RTO, is required.**
- **The Reactor Trip Override (RTO) was validated by another operator.**

INITIATING CUE: **The Control Room Supervisor directs you to PERFORM the following:**

- **RESET the Reactor Trip Override per SO23-9-6, Feedwater Control System Operation, Section 6.5, Feedwater Control System Operation During a VALID RTO.**
- **START at Step 6.5.2, Reset the Valid RTO.**

Facility: SONGS JPM # NRC JPM S-6 Task #186171 K/A #022.A4.01 3.6 / 3.6 SF-5

Title: Placing the Containment Emergency Cooling System in Service

Examinee (Print): _____

Testing Method:

Simulated Performance:		Classroom:	
Actual Performance:	X	Simulator:	X
Alternate Path:	X	Plant:	
Time Critical:			

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.
- Both Containment Normal Chillers 2E-201 and 2E-202 have tripped.
- Containment temperature is greater than 105ºF and rising.
- Train A and B Component Cooling Water loops are in service.

Initiating Cue: The Control Room Supervisor directs you to PERFORM the following:

- ALIGN Containment Emergency Cooling per SO23-1-4.1, Containment Emergency Cooling, Section 6.1, Placing the Containment Emergency Cooling System in Service.
- PLACE Containment Emergency Cooling System in service on a system level.
- START at Step 6.1.3.

Task Standard: Utilizing SO23-1-4.1 and SO23-2-17, placed Containment Emergency Cooling System in service on a component basis following failure of the Containment Cooling Actuation Switches to initiate a Containment Cooling Actuation Signal.

Required Materials: SO23-1-4.1, Containment Emergency Cooling, Rev. 16.
SO23-2-17, Component Cooling Water System Operation, Rev. 37.

Validation Time: 15 minutes Completion Time: _____ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): _____ Date: _____

SIMULATOR SETUP

MACHINE OPERATOR:

Execute IC-244 or any 100% power Initial Condition and PERFORM the following:

- **PLACE both CCW Critical Loops in service and START CCW Pump P-026.**
- **OPEN ECU Valves 2HV-6369, 2HV-6373, 2HV-6367, and 2HV-6371.**
- **EXECUTE remote functions CH56C & CH56D to secure Normal Containment Chillers.**
- **EXECUTE lesson plan to DISABLE all four (4) CCAS Actuation Switches.**

EXAMINER:

PROVIDE the examinee with a copy of:

- **SO23-1-4.1, Containment Emergency Cooling.**
- **SO23-2-17, Component Cooling Water System Operation.**
  - **Step 6.1, CCW ECU Return/SDCHX Outlet Valves Preferred Alignment.**

√ - Check Mark Denotes Critical Step | **START TIME:** |

Examiner Note:	**The following steps are from SO23-1.4.1, Section 6.1.**
Perform Step: 1 6.1.3	ENSURE associated CCW Train is in service.
Standard:	DETERMINED that both CCW Trains are in service by OBSERVING Train A and Train B CCW Pump START lights illuminated on CR-64.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**SO23-1.4.1, Step 6.1.4 is performed using SO23-2-17, Step 6.1.**
Perform Step: 2 6.1.4	Ensure proper CCW Valve configuration per SO23-2-17, Section for CCW ECU Return / SDCHX Outlet Valves Preferred Alignment.

Standard:	REVIEWED SO23-2-17, Step 6.1, CCW ECU Return / SDCHX Outlet Valves Preferred Alignment and DETERMINED the following:
	• **PLANT STATUS**:
	  • SDC IS OUT OF SERVICE.
	• **CCW TRAIN STATUS**:
	  • 2 in SERVICE.
	• **PREFERRED ALIGNMENT:**
	  • 2 ECU Return Valves OPEN on Both Trains.
	  • 1 SDCHX Outlet Valve OPEN on Train without NCL aligned.
	  • 1 SDCHX Outlet Valve CLOSED on Train with NCL aligned.

Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 3
6.1.5 & 6.1.5.1
	At CR-60, ENSURE by indication that the following CCW Motor Operated Valves are OPEN:
	• CCW to Containment Emergency Cooling Units:
	  • HV-6366, CCW to CNTMT ECU ME-401 Isolation Valve.
	  • HV-6370, CCW to CNTMT ECU ME-399 Isolation Valve.
	  • HV-6368, CCW to CNTMT ECU ME-400 Isolation Valve.
	  • HV-6372, CCW to CNTMT ECU ME-402 Isolation Valve.

Standard:	At CR-60, VERIFIED OPEN the following CCW to Containment Emergency Cooling Units: • 2HV-6366, CCW to CNTMT ECU 2E401 ISO VALVE red OPEN light lit. • 2HV-6370, CCW to CNTMT ECU 2E399 ISO VALVE red OPEN light lit. • 2HV-6368, CCW to CNTMT ECU 2E400 ISO VALVE red OPEN light lit. • 2HV-6372, CCW to CNTMT ECU 2E402 ISO VALVE red OPEN light lit.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4
6.1.5.& 6.1.5.2
	At CR-60, ENSURE by indication that the following Motor Operated Valves are OPEN:
	• CCW from Containment Emergency Cooling Units
	  • HV-6367, CCW from CNTMT ECU ME-401 Isolation Valve.
	  • HV-6371, CCW from CNTMT ECU ME-399 Isolation Valve.
	  • HV-6369, CCW from CNTMT ECU ME-400 Isolation Valve.
	  • HV-6373, CCW from CNTMT ECU ME-402 Isolation Valve.

Standard:	At CR-60, VERIFIED OPEN CCW from Containment Emergency Cooling Units: • 2HV-6367, CCW from CNTMT ECU 2E401 ISO VALVE red OPEN light lit. • 2HV-6371, CCW from CNTMT ECU 2E399 ISO VALVE red OPEN light lit. • 2HV-6369, CCW from CNTMT ECU 2E400 ISO VALVE red OPEN light lit. • 2HV-6373, CCW from CNTMT ECU 2E402 ISO VALVE red OPEN light lit.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 5√ 6.1.6	PLACE the Containment Emergency Cooling System in service on a system level by manually initiating a Containment Cooling Actuation Signal using: • HS-9138-1 and HS-9138-2 at CR56 or • HS-9138-3 and HS-9138-4 at CR53.
Standard:	DEPRESSED the following Containment Emergency Cooling System pushbuttons: • 2HS-9138-1, CCAS MANUAL INITIATION **and** 2HS-9138-2, CCAS MANUAL INITIATION at CR-56 **and** • 2HS-9138-3, CCAS MANUAL INITIATION **and** 2HS-9138-4, CCAS MANUAL INITIATION at CR-53.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 6 6.1.7 & 6.1.7.1	VERIFY the following Annunciators actuate: • 57A07 - CCAS TRAIN A ACTUATION
Standard:	DETERMINED that Containment Emergency Cooling has NOT actuated and OBSERVED the following Annunciator dark: • 57A07 - CCAS TRAIN A ACTUATION
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 7 6.1.7 & 6.1.7.2	VERIFY the following Annunciators actuate: • 57B07 - CCAS TRAIN B ACTUATION
Standard:	DETERMINED that Containment Emergency Cooling has NOT actuated and OBSERVED the following Annunciator dark: • 57B07 - CCAS TRAIN B ACTUATION
Examiner Cue:	**The SRO Operations Supervisor directs you to align Containment Emergency Cooling on a component basis, starting at Step 6.5.4.**
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The following steps are from SO23-1.4.1, Section 6.5.**
Examiner Note:	**The following steps represent the Alternate Path of this JPM.**

Perform Step: 8√
6.5.4 & 6.5.4.1
1st & 2nd bullets
	At CR-60, START the following fans as required:
	• Containment Emergency Cooling Fans:
	  • ME-401 (Train A)
	  • ME-399 (Train A)

Standard:	DEPRESSED Train A Containment Emergency Cooling Fan START pushbuttons and OBSERVED red START lights lit: • 2HS-9953-1, Containment ECU 2E399 (SW) **and** • 2HS-9947-1, Containment ECU 2E401 (NW).
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 9√
6.5.4 & 6.5.4.1
3rd & 4th bullets
	At CR-60, START the following fans as required:
	• Containment Emergency Cooling Fans:
	  • ME-400 (Train B)
	  • ME-402 (Train B)

Standard:	DEPRESSED Train B Containment Emergency Cooling Fan START pushbuttons and OBSERVED red START lights lit: • 2HS-9939-2, Containment ECU 2E400 (SE) **and** • 2HS-9955-2, Containment ECU 2E402 (NE).
Comment**:**	**SAT ☐ UNSAT ☐**

Perform Step: 10√
6.5.4 & 6.5.4.2
1st & 2nd bullets
	At CR-60, START the following fans as required:
	• Containment Dome Air Circulator Fans:
	  • MA-071 (Train A)
	  • MA-074 (Train A)

Standard:	OBSERVED 2HS-9967-1, CNTMT Dome Air Circ Fan 2A074 (NE) red START light lit and DEPRESSED Train A Containment Dome Air Circulating Fan START pushbutton and OBSERVED red START light lit: • 2HS-9965-1, CNTMT Dome Air Circ Fan 2A071 (NW).
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 11√
6.5.4 & 6.5.4.2
3rd & 4th bullets
	At CR-60, START the following fans as required:
	• Containment Dome Air Circulator Fans:
	  • MA-072 (Train B)
	  • MA-073 (Train B)

Standard:	DEPRESSED the following Train B Containment Dome Air Circulating Fan START pushbuttons and OBSERVED red START lights lit: • 2HS-9966-2, CNTMT Dome Air Circ Fan 2A072 (SW) **and** • 2HS-9968-2, CNTMT Dome Air Circ Fan 2A073 (SE).
Terminating Cue:	**The Radwaste Operator will verify Component Cooling Water flow to the Emergency Cooling Units. This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

INITIAL CONDITIONS: **Given the following conditions:**

- **Unit 2 is in MODE 1.**
- **Both Containment Normal Chillers 2E-201 and 2E-202 have tripped.**
- **Containment temperature is greater than 105ºF and rising.**
- **Train A and B Component Cooling Water loops are in service.**

INITIATING CUE: **The Control Room Supervisor directs you to PERFORM the following:**

- **ALIGN Containment Emergency Cooling per SO23-1-4.1, Containment Emergency Cooling, Section 6.1, Placing the Containment Emergency Cooling System in Service.**
- **PLACE Containment Emergency Cooling System in service on a system level.**
- **START at Step 6.1.3.**

Facility: SONGS JPM # NRC JPM S-7 Task #184468 K/A #062.A4.07 3.1 / 3.1 SF-6

Title: Perform a Drop and Pickup Transfer of Bus 2A06

Examinee (Print): _____

Testing Method:

Simulated Performance:		Classroom:	
Actual Performance:	X	Simulator:	X
Alternate Path:	X	Plant:	
Time Critical:			

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.
- Bus 2A06 is powered from Reserve Auxiliary Transformer 2XR2.
- Emergency Diesel Generator 2G003 is in Maintenance Lockout to support 1E Bus transfer.
- All Bus 2A06 loads are deenergized.
- Unit 2 and Unit 3 Switchgear Rooms are clear of personnel.
- All protective relays have been reset on Bus 2A06.

Initiating Cue: The Control Room Supervisor directs you to PERFORM the following:

- PERFORM a drop and pickup transfer of Bus 2A06 per SO23-6-2, Transferring of 4 kV Buses, Section 6.11, Drop and Pickup Transfer of 1E 4 kV Buses.
- TRANSFER Bus 2A06 from Reserve Auxiliary Transformer 2XR2 to Bus 3A06.

Task Standard: Utilizing SO23-6-2, performed a drop and pick up transfer of Bus 2A06 from Reserve Auxiliary Transformer 2XR2. Following a failure of the drop and transfer test, started the Train B Emergency Diesel Generator, adjusted voltage to allow breaker closure, and reenergized Bus 2A06.

Required Materials: SO23-6-2, Transferring of 4 kV Buses, Rev. 19.

Validation Time: 12 minutes Completion Time: _____ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): _____ Date: _____

SIMULATOR SETUP

MACHINE OPERATOR:

INITIALIZE to IC-246 or any Initial Condition and PERFORM the following:

- **EXECUTE lesson plan to disable Automatic Transfer from Bus 2A06 to Bus 3A06 via the Tie Breaker (amber AUTO light is lit but MANUAL condition is active).**
- **PLACE 1639B2, Auto / Manual Switch in MANUAL.**
- **EXECUTE malfunction EG07B, 2G003 Preset AVR Voltage prior to starting 2G003, Emergency Diesel Generator @ 15% severity.**

MACHINE OPERATOR NOTE:

- **After each JPM, VERIFY Sync Key is in the NON-ESF SYNC MASTER position prior to performance by the next examinee.**

EXAMINER:

PROVIDE the examinee with a copy of:

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

√ - Check Mark Denotes Critical Step | **START TIME:** |

Examiner Note:	**The following steps are from SO23-6-2, Section 6.11.**

NOTE

1) Transferring power supplies on the Train with the running SDC Pump should be avoided. If it is necessary to transfer power supplies on the Train with the running SDC Pump, then consideration should be given to transferring SDC to the opposite Train. (NN201229172)

2) The associated Diesel Generator will start if not in Maintenance Lockout or already running.

Perform Step: 1 6.11.1	Review Attachment 1(2) for breaker sequencing.
Standard:	REVIEWED Attachment 1, Unit 2 4 kV Bus Transfer Sequence and DETERMINED the sequence of breaker transfers is **BUS 2A06 FROM 2XR2 TO BUS TIE** occurs as follows: • Breaker 3A0603 CLOSES. • Breaker 2A0619 CLOSES. • Breaker 2A0618 OPENS.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 2 6.11.2	Ensure the affected Switchgear Room is clear of all unnecessary personnel and maintain it clear until after 4 kV bus transfer is complete.
Standard:	DETERMINED both Switchgear Rooms clear of personnel per the Initial Conditions.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 3 6.11.3	Ensure sufficient Vital Busses are aligned to remain energized during Bus transfer.
Standard:	VERIFIED sufficient Vital Buses are aligned to remain energized during the Bus transfer.
Examiner Cue:	**The SRO Ops Supervisor reports sufficient Vital Buses are aligned.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4√ 6.11.4	OPEN the RUNNING breaker and verify the automatic transfer occurs.
Standard:	DEPRESSED 2HS-1637-2, RES AUX XFMR 2XR2 FDR Breaker 2A0618 OPEN pushbutton and OBSERVED green TRIP light lit and Annunciator 63C05 – 2A06 VOLTAGE LO in alarm.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 5 6.11.4.1	If transfer fails, then re-energize the 4kV Bus by performing one of the following: • Section 6.15 • Section 6.16 • Section 6.17
Standard:	DETERMINED 2HS-1639A2, Bus Tie 2A06 to 3A06 FDR Breaker 2A0619 did NOT close and OBSERVED green TRIP light lit.
Examiner Cue:	**The SRO Ops Supervisor directs you to restore the Bus using Section 6.17 of SO23-6-2.**
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The following steps are from SO23-6-2, Section 6.17.**
Examiner Note:	**The following steps represent the Alternate Path of this JPM.**
Perform Step: 6 6.17.1	If power was lost to the 4 kV bus, and no supply breaker relayed on overcurrent, then prior to re-energizing the bus, ENSURE OPEN all breakers supplying loads from the bus.
Standard:	DETERMINED all breakers supplying loads from Bus 2A06 OPEN from Initial Conditions.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 7 6.17.2	Ensure the Diesel Generator is in Maintenance Lock-out.
Standard:	DETERMINED Train B Emergency Diesel Generator key in MAINT position and OBSERVED white LOCKOUT RESET light out and Annunciator 63C07 – DIESEL GEN 2003 LOCKOUT RELAY TRIPPED lit.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 8 6.17.3	RESET all protective relays for the 4 kV bus to be energized.
Standard:	DETERMINED all protective relays on Bus 2A06 RESET.
Examiner Cue:	**The SRO Ops Supervisor reports no protective relays have actuated in the Train B Switchgear Room.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 9 6.17.4	Ensure the affected Switchgear Room is clear of all unnecessary personnel and maintain it clear until after 4 kV bus is energized.
Standard:	DETERMINED Train B Switchgear Room clear of all unnecessary personnel and MAINTAINED it clear until after Bus 2A06 is energized.
Examiner Cue:	**The SRO Ops Supervisor reports all personnel are clear of Bus 2A06.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 10 6.17.5	Verify the Diesel Generator is available to accept load.
Standard:	DETERMINED 2G003 Emergency Diesel Generator available for loading.
Examiner Cue:	**The SRO Ops Supervisor reports the Diesel Generator is available.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 11 6.17.6	Minimize loading to the 1E 4 kV bus to be energized by the Diesel Generator.
Standard:	MINIMIZED loading to Bus 2A06 by 2G003 Emergency Diesel Generator.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 12 6.17.7	Evaluate effects on the Diesel Generator of the loading (immediate and delayed loads) on the 1E Bus.
Standard:	EVALUATED effects of loading 2G003 Emergency Diesel Generator on Bus 2A06.
Examiner Cue:	**The SRO Ops Supervisor reports the Diesel Generator can accept all loads.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 13√ 6.17.8	Remove the Diesel Generator from Maintenance Lock-out.
Standard:	INSERTED Key #78 and TURNED 2HS-1770-2, Maintenance Lockout keyswitch to NORMAL for 2G003 Diesel Generator.
Comment:	**SAT** ☐ **UNSAT** ☐

Perform Step: 14√ 6.17.9	START and LOAD the Diesel Generator by RESETTING the Lock-out Relay.
Standard:	DEPRESSED 2HS-1644-2, Mode Selector LOCKOUT RESET pushbutton and OBSERVED 2G003 Diesel Generator starts.
Comment:	**SAT** ☐ **UNSAT** ☐

Perform Step: 15√ 6.17.10 & 1st bullet	Adjust Diesel Generator output as required to establish the following: • Voltage approximately 4360V AC.
Standard:	OBSERVED 2EI-1651-2, Diesel Gen 2G003 Volts and DETERMINED voltage is low then: • DEPRESSED 2HS-1648-2, Voltage Regulator RAISE pushbutton until voltage is ~ 4360 VAC. • OBSERVED 2HS-1642-2, Generator Breaker 2A0613 red CLOSE light lit as voltage rises towards 4360 VAC.
Comment:	**SAT** ☐ **UNSAT** ☐

Perform Step: 16√ 6.17.10 & 2nd bullet	Adjust Diesel Generator output as required to establish the following: • Frequency approximately 60 Hz.
Standard:	OBSERVED 2SI-1651-2, Diesel Gen 2G003 Frequency and VERIFIED Frequency is ~60 Hz.
Terminating Cue:	**This JPM is complete.**
Comment:	**SAT** ☐ **UNSAT** ☐

STOP TIME:	

INITIAL CONDITIONS: **Given the following conditions:**

- **Unit 2 is in MODE 3.**
- **Bus 2A06 is powered from Reserve Auxiliary Transformer 2XR2.**
- **Emergency Diesel Generator 2G003 is in Maintenance Lockout to support 1E Bus transfer.**
- **All Bus 2A06 loads are deenergized.**
- **Unit 2 and Unit 3 Switchgear Rooms are clear of personnel.**
- **All protective relays have been reset on Bus 2A06.**

INITIATING CUE: **The Control Room Supervisor directs you to PERFORM the following:**

- **PERFORM a drop and pickup transfer of Bus 2A06 per SO23-6-2, Transferring of 4 kV Buses, Section 6.11, Drop and Pickup Transfer of 1E 4 kV Buses.**
- **TRANSFER Bus 2A06 from Reserve Auxiliary Transformer 2XR2 to Bus 3A06.**

Facility: SONGS JPM # NRC JPM S-8 Task #1413000 K/A #073.A4.02 3.7 / 3.7 SF-7

Title: Bypass Containment Purge Isolation Radiation Monitor

Examinee (Print): _____

Testing Method:

Simulated Performance:		Classroom:	
Actual Performance:	X	Simulator:	X
Alternate Path:		Plant:	
Time Critical:			

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 condition:

- RIC-7804G1, Containment Purge Isolation Radiation Monitor, must be BYPASSED to allow Chemistry to change filters.
- Both 2R-7804G, Gas and 2R-7804P Particulate Monitors must be BYPASSED in the Data Acquisition System (DAS).

Initiating Cue: The Control Room Supervisor directs you to PERFORM the following:

- BYPASS Train A RIC-7804G1, Containment Purge Isolation Radiation Monitor per SO23-3-2.24.11, Containment Radiation Monitor System Operation, Attachment 4, Containment Radiation Monitors Bypass Operation.
- START at Step 2.1

Task Standard: Utilizing SO23-3-2.24.11, bypassed the trip function of RE-7804G1, Containment Purge Isolation Radiation Monitor. Using SO23-3-2.36, bypassed the alarm functions of 2R-7804G, Gas and 2R-7804P Particulate Monitors.

Required Materials: SO23-3-2.24.11, Containment Airborne Radiation Monitor System Operation, Rev.21.
SO23-3-2.36, Radiation Monitor Data Acquisition System, Rev. 7.

Validation Time: 20 minutes Completion Time: _____ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): _____ Date: _____

SIMULATOR SETUP

MACHINE OPERATOR:

INITIALIZE to IC-245 or any Initial Condition and PERFORM the following:

- **VERIFY Key #205, 7804 / 7807 Bypass Key is located in the Key Locker.**

MACHINE OPERATOR NOTE:

- **After each JPM, RETURN Key #205, 7804 / 7807 Bypass Key to the Key Locker.**
- **REMOVE 2R-7804G and 2R-7804P from BYPASS on DAS.**

EXAMINER:

PROVIDE the examinee with a copy of:

- **SO23-3-2.24.11, Containment Airborne Radiation Monitor System Operation (Procedure 1).**
  - **Attachment 4, Containment Radiation Monitors Bypass Operation.**
    - **INITIAL and N/A as required through Step 1.4.**
  - **Attachment 6, Limitations and Specifics.**
- **SO23-3-2.36, Radiation Monitor Data Acquisition System (Procedure 2).**
  - **Section 6.4, Bypassing and Restoring RTP Chassis Monitor Alarms.**
  - **Attachment 4, Radiation Monitor DAS Limitations and Specifics.**

√ - Check Mark Denotes Critical Step | **START TIME:** |

Examiner Note:	**The following steps are from SO23-3-2.24.11, Attachment 4.**
Perform Step: 1√ 2.1.1	REMOVE the CPIS automatic actuation trip function from service by positioning the NORMAL / BYPASS keyswitch to BYPASS. • RIC-7804G1 (Train A) HS-7804B1
Standard:	OBTAINED Key #205 from Key Locker and INSERTED into 2HS-7804B1, CPIS NORMAL BYPASS keyswitch and TURNED to BYPASS position.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 2 2.1.2	VERIFY the associated white RESET/TEST light extinguishes.
Standard:	OBSERVED 2HS-7804L1, CPIS RESET / TEST switch white RESET / TEST light off.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 3 2.1.3	VERIFY 57C40, CPIS AUTO ACTUATION BYPASSED, annunciates.
Standard:	ACKNOWLEDGED Annunciator 57C40 – CPIS AUTO ACTUATION BYPASSED in alarm.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4 2.1.4	PLACE the monitor(s) in Alarm Bypass in DAS per SO23-3-2.36, Section for Bypassing and Restoring MGPI Interfaced Monitor Alarms.
Standard:	REFERRED to SO23-3-2.36, Radiation Monitor Data Acquisition System, Section 6.5, Bypassing and Restoring MGPI Interfaced Monitor Alarms.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The following steps are from SO23-3-2.36, Section 6.5.**
Examiner Note:	**The following steps will be repeated twice, once for 2R-7804G (gas) and once for 2R-7804P (particulate) as 2R-7804 is a dual channel Radiation Monitor.**

GUIDELINE

All operations that change the status of the DAS (e.g., bypass/restoration operations, changing alarms, etc.) should be Peer checked.

Examiner Cue:	**The Shift Manager has temporarily suspended peer checking.**
Perform Step: 5 6.5.1 & 6.5.1.1	Place an MGPI Interfaced Monitor in Alarm Bypass: • Go to Monitor Page for the desired Rad Monitor.
Standard:	From HOME page, CLICKED on 2R-7804 green dot, then CLICKED on green dot in Penetration Building Area.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 6 6.5.1 & 6.5.1.2	Place an MGPI Interfaced Monitor in Alarm Bypass: • If the monitor has dual channels, then go to the Trend Screen for one of the monitor channels.
Standard:	CLICKED on Trend Screen for either 2R7804G **or** 2R7804P.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 7 6.5.1 & 6.5.1.3	Place an MGPI Interfaced Monitor in Alarm Bypass: • Select **DETAILS** on the Navigate Bar.
Standard:	CLICKED on NAVIGATE Page, then DETAIL.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 8 6.5.1 & 6.5.1.4	Place an MGPI Interfaced Monitor in Alarm Bypass: • Select the pull-down menu for **UNIT MODE**.
Standard:	DEPRESSED down (↓) arrow on UNIT MODE pull-down menu.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 9√ 6.5.1 & 6.5.1.5	Place an MGPI Interfaced Monitor in Alarm Bypass: • Select **ALM BYP** to bypass the alarm.
Standard:	CLICKED on ALM BYP to bypass alarm.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 10 6.5.1 & 6.5.1.6	Place an MGPI Interfaced Monitor in Alarm Bypass: • Verify Alarm Level box indicates INST FAIL.
Standard:	VERIFIED Alarm Level box reads INST FAIL.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 11 6.5.1 & 6.5.1.7	Place an MGPI Interfaced Monitor in Alarm Bypass: • Verify the icon on the Home Screen has turned Light Blue, indicating Instrument Fail / Alarm Bypass.
Standard:	CLICKED on NAVIGATE Page, then CLICKED on HOME page, and OBSERVED light blue icon for 2R-7804 lit.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**Either action will ACKNOWLEDGE Alarm Bypass Status change.**
Perform Step: 12 6.5.1 & 6.5.1.8	Place an MGPI Interfaced Monitor in Alarm Bypass: • Acknowledge the Alarm Bypass Status Change alarm on the Alarm Summary Page.
Standard:	ACKNOWLEDGED the Alarm Bypass Status change: • CLICKED on NAVIGATE page, then CLICKED on 2C ALMS page **or** 2C3 ALMS page, then CLICKED on ACK ALL. • DOUBLE-CLICKED 2R-7804 Alarm Bypass Status.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 13 6.5.1 & 6.5.1.9	Place an MGPI Interfaced Monitor in Alarm Bypass: • If monitor has dual channels, then repeat steps 6.5.1.1 through 6.5.1.8 for the other monitor channel.
Standard:	REPEATED Steps 6.5.1.1 through 6.5.1.8 for the other 2R-7804 channel.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 14 6.5.1 & 6.5.1.1	Place an MGPI Interfaced Monitor in Alarm Bypass: • Go to Monitor Page for the desired Rad Monitor.
Standard:	From HOME page, CLICKED on 2R-7804 green dot, then CLICKED on green dot in Penetration Building Area.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**If 2R7804G was initially selected, then 2R7804P will be bypassed and vice versa.**
Perform Step: 15 6.5.1 & 6.5.1.2	Place an MGPI Interfaced Monitor in Alarm Bypass: • If the monitor has dual channels, then go to the Trend Screen for one of the monitor channels.
Standard:	CLICKED on Trend Screen for either 2R7804G **or** 2R7804P.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 16 6.5.1 & 6.5.1.3	Place an MGPI Interfaced Monitor in Alarm Bypass: • Select **DETAILS** on the Navigate Bar.
Standard:	CLICKED on NAVIGATE Page, then DETAIL.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 17 6.5.1 & 6.5.1.4	Place an MGPI Interfaced Monitor in Alarm Bypass: • Select the pull-down menu for **UNIT MODE**.
Standard:	DEPRESSED down (↓) arrow on UNIT MODE pull-down menu.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 18√ 6.5.1 & 6.5.1.5	Place an MGPI Interfaced Monitor in Alarm Bypass: • Select **ALM BYP** to bypass the alarm.
Standard:	CLICKED on ALM BYP to bypass alarm.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 19 6.5.1 & 6.5.1.6	Place an MGPI Interfaced Monitor in Alarm Bypass: • Verify Alarm Level box indicates INST FAIL.
Standard:	VERIFIED Alarm Level box reads INST FAIL.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 20 6.5.1 & 6.5.1.7	Place an MGPI Interfaced Monitor in Alarm Bypass: • Verify the icon on the Home Screen has turned Light Blue, indicating Instrument Fail/Alarm Bypass.
Standard:	CLICKED on NAVIGATE Page, then CLICKED on HOME page, and OBSERVED light blue icon for 2R-7804 lit.
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**Either action will ACKNOWLEDGE Alarm Bypass Status change.**
Perform Step: 21 6.5.1 & 6.5.1.8	Place an MGPI Interfaced Monitor in Alarm Bypass: • Acknowledge the Alarm Bypass Status Change alarm on the Alarm Summary Page.
Standard:	ACKNOWLEDGED the Alarm Bypass Status change: • CLICKED on NAVIGATE page, then CLICKED on 2C ALMS page **or** 2C3 ALMS page, then CLICKED on ACK ALL. • DOUBLE-CLICKED 2R-7804 Alarm Bypass Status.
Terminating Cue:	**The CRS will implement actions of the ODCM. This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

INITIAL CONDITIONS: **Given the following condition:**

- **RIC-7804G1, Containment Purge Isolation Radiation Monitor, must be BYPASSED to allow Chemistry to change filters.**
- **Both 2R-7804G, Gas and 2R-7804P Particulate Monitors must be BYPASSED in the Data Acquisition System (DAS).**

INITIATING CUE: **The Control Room Supervisor directs you to PERFORM the following:**

- **BYPASS Train A RIC-7804G1, Containment Purge Isolation Radiation Monitor per SO23-3-2.24.11, Containment Radiation Monitor System Operation, Attachment 4, Containment Radiation Monitors Bypass Operation.**
- **START at Step 2.1**

Facility: SONGS JPM # NRC JPM P-1 Unit 2 Task #188351 K/A #068.AA1.12 4.4 / 4.4 SF-7

Title: Place the EPPM in Service

Examinee (Print): _____

Testing Method:

Simulated Performance:	X	Classroom:	
Actual Performance:		Simulator:	
Alternate Path:	X	Plant:	X
Time Critical:			

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.
- SO23-13-2, Shutdown from outside the Control Room, Attachment 4, 21 Duties, has been completed through Step 5.1.3.
- Safe Shutdown Kit 21 is in your possession.

Initiating Cue: The Unit Supervisor directs you to PERFORM the following:

- PLACE the Essential Plant Parameters Monitoring (EPPM) Panel in service per SO23-13-2, Shutdown from Outside the Control Room, Attachment 4, 21 Duties.
- START at Step 6.0.

Task Standard: Utilizing SO23-13-2, Attachment 4, placed the Essential Plant Parameters Monitoring Panel in Service.

Required Materials: SO23-13-2, Shutdown from Outside the Control Room, Rev. 17-2.

Validation Time: 10 minutes 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 4, 21 Duties.**

√ - Check Mark Denotes Critical Step | **START TIME:** |

Perform Step: 1	Proceed to Essential Plant Parameters Monitoring Panel.
Standard:	PROCEEDED to Essential Plant Parameters Monitoring Panel (EPPM) at Unit 2 45' Electrical Penetration Room.
Examiner Cue:	
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The following steps are from SO23-13-2, Attachment 3.**
Perform Step: 2 6.1	Connect headset to CKT No. 1 jack on cable tray support and establish communications with the Unit 2 CRS.
Standard:	CONNECTED headset to CKT No. 1 jack on cable tray support and ESTABLISHED communications with the Unit 2 CRS.
Examiner Cue:	**Unit 2 CRS is on the line.**
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**Use the provided picture of the inside of the cabinet.**
Perform Step: 3√ 6.2 & 6.2.1	At EPPM (2L-411), verify the following 2 power supplies (inside rear panel) closed with red and green lights illuminated: • 2L-411PS01, EPPM Panel 2L411 Power Supply.
Standard:	OPENED cabinet and VERIFIED 2L-411PS01, EPPM Panel 2L411 Power Supply red and green lights illuminated.
Examiner Cue:	**Both red and green power supply lights are lit.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4√ 6.2 & 6.2.2	At EPPM (2L-411), verify the following 2 power supplies (inside rear panel) closed with red and green lights illuminated: • 2L-411PS02, EPPM Panel 2L411 Power Supply.
Standard:	OPENED cabinet and VERIFIED 2L-411PS02, EPPM Panel 2L411 Power Supply red and green lights illuminated.
Examiner Cue:	**Both red and green power supply lights are lit.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 5 6.2 & 6.2.3	At EPPM (2L-411), verify the following 2 power supplies (inside rear panel) closed with red and green lights illuminated: • IF power is not indicated, THEN proceed to step 6.11. (Mark N/A if power is indicated.)
Standard:	OBSERVED photograph and DETERMINED power was indicated and MARKED Step 6.2.3 N/A.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 6√ 6.3 & 6.3.1	Placing ***Thot*** and ***Tcold*** indication at the EPPM in service: • Using Key No. 44, place 2HS-0111BX-1 in the LOCAL position on Panel 2L-411A.
Standard:	INSERTED Key No. 44 into keylock and TURNED 2HS-0111BX-1 to LOCAL position on Panel 2L-411A.
Examiner Cue:	**The switch is in LOCAL.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 7√ 6.3 & 6.3.2	Placing ***Thot*** and ***Tcold*** indication at the EPPM in service: • Using Key No. 44, place 2HS-0111BX-2 in the LOCAL position on Panel 2L-411A.
Standard:	INSERTED Key No. 44 into keylock and TURNED 2HS-0111BX-2 to LOCAL position on Panel 2L-411A.
Examiner Cue:	**The switch is in LOCAL. The indication is oscillating.**
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The following step represents an Alternate Path of this JPM.**
Perform Step: 8√ 6.3 & 6.3.2.1	If 2TI-0111BX oscillations are occurring, then cycle 2HS-0111BX-1 **and** 2HS-0111BX-2 in order to clean the contacts to obtain a stable reading.
Standard:	CYCLED handswitches 2HS-0111BX-1 **and** 2HS-0111BX-2 between LOCAL and CONT ROOM until 2TI-0111BX, Loop 1 Hot Leg Temp reading STABILIZED.
Examiner Cue:	**The indication is stable.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 9√ 6.3 & 6.3.3	Placing ***Thot*** and ***Tcold*** indication at the EPPM in service: • Using Key No. 44, place 2HS-0111BY-1 in the LOCAL position on Panel 2L-411A.
Standard:	INSERTED Key No. 44 into keylock and TURNED 2HS-0111BY-1 to LOCAL position on Panel 2L-411B.
Examiner Cue:	**The switch is in LOCAL.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 10√ 6.3 & 6.3.4	Placing ***Thot*** and ***Tcold*** indication at the EPPM in service: • Using Key No. 44, place 2HS-0111BY-2 in the LOCAL position on Panel 2L-411A.
Standard:	INSERTED Key No. 44 into keylock and TURNED 2HS-0111BY-2 to LOCAL position on Panel 2L-411B.
Examiner Cue:	**The switch is in LOCAL. The indication is oscillating.**
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The following step represents an Alternate Path of this JPM.**
Perform Step: 11√ 6.3 & 6.3.4.1	If 2TI-0111BY oscillations are occurring, then cycle 2HS-0111BY-1 **and** 2HS-0111BY-2 in order to clean the contacts to obtain a stable reading.
Standard:	CYCLED handswitches 2HS-0111BY-1 **and** 2HS-0111BY-2 between LOCAL and CONT ROOM until 2TI-0111BY, Loop 1A Cold Leg Temp reading STABILIZED.
Examiner Cue:	**The indication is stable.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 12√ 6.4 & 6.4.1	Place the following handswitches in LOCAL: • 2HS-0100F, PZR pressure
Standard:	PLACED 2HS-0100F, PZR PRESSURE in LOCAL and OBSERVED Pressurizer pressure on 2PI-0100A, PZR PRESS.
Examiner Cue:	**Pressurizer pressure is 2250 PSIA.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 13√ 6.4 & 6.4.2	Place the following handswitches in LOCAL: • 2HS-0103A, PZR level
Standard:	PLACED 2HS-0103A, PZR LEVEL in LOCAL and OBSERVED Pressurizer level on 2LI-0103A, PZR LEVEL.
Terminating Cue:	**Pressurizer level is 38%. This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	


LAMBDA
PS-A
DC ON
POWER
ON
OFF
PS-B
DC ON
POWER
ON
OFF

INITIAL CONDITIONS: **Given the following conditions:**

- **The Control Room has been evacuated.**
- **SO23-13-2, Shutdown from outside the Control Room, Attachment 4, 21 Duties, has been completed through Step 5.1.3.**
- **Safe Shutdown Kit 21 is in your possession.**

INITIATING CUE: **The Unit Supervisor directs you to PERFORM the following:**

- **PLACE the Essential Plant Parameters Monitoring (EPPM) Panel in service per SO23-13-2, Shutdown from Outside the Control Room, Attachment 4, 21 Duties.**
- **START at Step 6.0.**

Facility: SONGS JPM # NRC JPM P-1 Unit 3 Task #188351 K/A #068.AA1.12 4.4 / 4.4 SF-7

Title: Place the EPPM in Service

Examinee (Print): _____

Testing Method:

Simulated Performance:	X	Classroom:	
Actual Performance:		Simulator:	
Alternate Path:	X	Plant:	X
Time Critical:			

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.
- SO23-13-2, Shutdown from outside the Control Room, Attachment 5, 31 Duties, has been completed through Step 5.1.3.
- Safe Shutdown Kit 31 is in your possession.

Initiating Cue: The Unit Supervisor directs you to PERFORM the following:

- PLACE the Essential Plant Parameters Monitoring (EPPM) Panel in service per SO23-13-2, Shutdown from Outside the Control Room, Attachment 5, 31 Duties.
- START at Step 6.0.

Task Standard: Utilizing SO23-13-2, Attachment 5, placed the Essential Plant Parameters Monitoring Panel in Service.

Required Materials: SO23-13-2, Shutdown from Outside the Control Room, Rev. 17-2.

Validation Time: 10 minutes 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 5, 31 Duties.**

√ - Check Mark Denotes Critical Step | **START TIME:** |

Perform Step: 1	Proceed to Essential Plant Parameters Monitoring Panel.
Standard:	PROCEEDED to Essential Plant Parameters Monitoring Panel (EPPM) at Unit 3 45' Electrical Penetration Room.
Examiner Cue:	
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The following steps are from SO23-13-2, Attachment 5.**
Perform Step: 2 6.1	Connect headset to CKT No. 1 jack on cable tray support and establish communications with the Unit 3 CRS.
Standard:	CONNECTED headset to CKT No. 1 jack on cable tray support and ESTABLISHED communications with the Unit 3 CRS.
Examiner Cue:	**Unit 3 CRS is on the line.**
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**Use the provided picture of the inside of the cabinet.**
Examiner Note:	**Procedure enhancement identified for Steps 6.2.1 and 6.2.2.**
Perform Step: 3√ 6.2 & 6.2.1	At EPPM (3L-411), verify the following 2 power supplies (inside rear panel) closed with red and green lights illuminated: • 3L-411PS01, EPPM Panel 2L411 Power Supply.
Standard:	OPENED cabinet and VERIFIED 3L-411PS01, EPPM Panel 3L411 Power Supply red and green lights illuminated.
Examiner Cue:	**Both red and green power supply lights are lit.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 4√ 6.2 & 6.2.2	At EPPM (3L-411), verify the following 2 power supplies (inside rear panel) closed with red and green lights illuminated: • 3L-411PS02, EPPM Panel 2L411 Power Supply.
Standard:	OPENED cabinet and VERIFIED 3L-411PS02, EPPM Panel 3L411 Power Supply red and green lights illuminated.
Examiner Cue:	**Both red and green power supply lights are lit.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 5 6.2 & 6.2.3	At EPPM (3L-411), verify the following 2 power supplies (inside rear panel) closed with red and green lights illuminated: • IF power is not indicated, THEN proceed to step 6.11. (Mark N/A if power is indicated.)
Standard:	OBSERVED photograph and DETERMINED power was indicated and MARKED Step 6.2.3 N/A.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 6√ 6.3 & 6.3.1	Placing ***Thot*** and ***Tcold*** indication at the EPPM in service: • Using Key No. 44, place 3HS-0111BX-1 in the LOCAL position on Panel 3L-411A.
Standard:	INSERTED Key No. 44 into keylock and TURNED 3HS-0111BX-1 to LOCAL position on Panel 3L-411A.
Examiner Cue:	**The switch is in LOCAL.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 7√ 6.3 & 6.3.2	Placing ***Thot*** and ***Tcold*** indication at the EPPM in service: • Using Key No. 44, place 3HS-0111BX-2 in the LOCAL position on Panel 3L-411A.
Standard:	INSERTED Key No. 44 into keylock and TURNED 3HS-0111BX-2 to LOCAL position on Panel 3L-411A.
Examiner Cue:	**The switch is in LOCAL. The indication is oscillating.**
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The following step represents an Alternate Path of this JPM.**
Perform Step: 8√ 6.3 & 6.3.2.1	If 3TI-0111BX oscillations are occurring, then cycle 3HS-0111BX-1 **and** 3HS-0111BX-2 in order to clean the contacts to obtain a stable reading.
Standard:	CYCLED handswitches 3HS-0111BX-1 **and** 3HS-0111BX-2 between LOCAL and CONT ROOM until 3TI-0111BX, Loop 1 Hot Leg Temp reading STABILIZED.
Examiner Cue:	**The indication is stable.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 9√ 6.3 & 6.3.3	Placing ***Thot*** and ***Tcold*** indication at the EPPM in service: • Using Key No. 44, place 3HS-0111BY-1 in the LOCAL position on Panel 3L-411B.
Standard:	INSERTED Key No. 44 into keylock and TURNED 3HS-0111BY-1 to LOCAL position on Panel 3L-411B.
Examiner Cue:	**The switch is in LOCAL.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 10√ 6.3 & 6.3.4	Placing ***Thot*** and ***Tcold*** indication at the EPPM in service: • Using Key No. 44, place 3HS-0111BY-2 in the LOCAL position on Panel 3L-411B.
Standard:	INSERTED Key No. 44 into keylock and TURNED 3HS-0111BY-2 to LOCAL position on Panel 3L-411B.
Examiner Cue:	**The switch is in LOCAL. The indication is oscillating.**
Comment:	**SAT ☐ UNSAT ☐**

Examiner Note:	**The following step represents an Alternate Path of this JPM.**
Perform Step: 11√ 6.3 & 6.3.4.1	If 3TI-0111BY oscillations are occurring, then cycle 3HS-0111BY-1 **and** 3HS-0111BY-2 in order to clean the contacts to obtain a stable reading.
Standard:	CYCLED handswitches 3HS-0111BY-1 **and** 3HS-0111BY-2 between LOCAL and CONT ROOM until 3TI-0111BY, Loop 1A Cold Leg Temp reading STABILIZED.
Examiner Cue:	**The indication is stable.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 12√ 6.4 & 6.4.1	Place the following handswitches in LOCAL: • 3HS-0100F, PZR pressure
Standard:	PLACED 3HS-0100F, PZR PRESSURE in LOCAL and OBSERVED Pressurizer pressure on 3PI-0100A, PZR PRESS.
Examiner Cue:	**Pressurizer pressure is 2250 PSIA.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 13√ 6.4 & 6.4.2	Place the following handswitches in LOCAL: • 3HS-0103A, PZR level
Standard:	PLACED 3HS-0103A, PZR LEVEL in LOCAL and OBSERVED Pressurizer level on 3LI-0103A, PZR LEVEL.
Terminating Cue:	**Pressurizer level is 38%. This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	


LAMBDA
PS-A
DC ON
POWER
ON
OFF
PS-B
DC ON
POWER
ON
OFF

INITIAL CONDITIONS: **Given the following conditions:**

- **The Control Room has been evacuated.**
- **SO23-13-2, Shutdown from outside the Control Room, Attachment 5, 31 Duties, has been completed through Step 5.1.3.**
- **Safe Shutdown Kit 31 is in your possession.**

INITIATING CUE: **The Unit Supervisor directs you to PERFORM the following:**

- **PLACE the Essential Plant Parameters Monitoring (EPPM) Panel in service per SO23-13-2, Shutdown from Outside the Control Room, Attachment 5, 31 Duties.**
- **START at Step 6.0.**

NRC Initial License Exam, SONGS Nov 2011

In Plant JPMs P-2 for Unit 2 and 3

Redacted

Security Related Information

Withhold from Public Disclosure in accordance with 10 CFR 2.390

Facility: SONGS JPM # NRC JPM P-3 Unit 2 Task #190141 K/A #058.AA1.01 3.4 / 3.5 SF-6

Title: Place the Swing Battery Charger in Operation

Examinee (Print): _____

Testing Method:

Simulated Performance:	X	Classroom:	
Actual Performance:		Simulator:	
Alternate Path:		Plant:	X
Time Critical:			

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:

- SO23-13-26, Loss of Power to an AC Bus, has been entered following a loss of power to Bus 2A04.
- Annunciator 63A52 - 2D1 CHARGER TROUBLE, is in alarm and will not reset.
- Response Not Obtained (RNO) actions of SO23-13-26, Step 7b, requires the Swing Battery Charger to be placed in service.
- B021 DC Output Kirk Key was obtained from the NOA.

Initiating Cue: The Unit Supervisor directs you to PERFORM the following:

- PLACE the Unit 2 B021, Swing Battery Charger in operation per SO23-6-15, Operation of 125 VDC Systems, Attachment 16, B021, Swing Battery Charger, Operations.
- START at Step 2.1.1.

Task Standard: Utilizing SO23-6-15, placed the Unit 2 B021, Swing Battery Charger in operation on DC Bus 2D1.

Required Materials: SO23-6-15, Operation of 125 VDC Systems, Rev. 47.

Validation Time: 20 minutes Completion Time: _____ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): _____ Date: _____

PLANT SETUP

EXAMINER:

PROVIDE the examinee with a copy of:

- **SO23-6-15, Operation of 125 VDC Systems.**
  - **Attachment 16, B021, Swing Battery Charger, Operations.**

√ - Check Mark Denotes Critical Step | **START TIME:** |

Examiner Note:	**The following steps are from SO23-6-15, Attachment 16.**
Examiner Note:	**Unit 2 location of the Swing Battery Charger is Room 310-A.**
Perform Step: 1 2.1.1	VERIFY OPEN B02100, Swing Battery Charger B021 AC Input Breaker.
Standard:	VERIFIED 2B02100, Swing Battery Charger 2B021 AC INPUT BKR in OFF position.
Examiner Cue:	**The breaker is in OFF.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 2 2.1.2	VERIFY LOCKED OPEN B02101, Swing Battery Charger B021 DC Output to D1 Battery.
Standard:	VERIFIED LOCKED OPEN 2B02101, Swing Battery Charger 2B021 DC Output to 2D1 Battery.
Examiner Cue:	**The breaker is LOCKED OPEN.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 3 2.1.3	VERIFY LOCKED OPEN B02103, Swing Battery Charger B021 DC Output to D3 Battery.
Standard:	VERIFIED LOCKED OPEN 2B02103, Swing Battery Charger 2B021 DC Output to 2D3 Battery.
Examiner Cue:	**The breaker is LOCKED OPEN.**
Comment:	**SAT ☐ UNSAT ☐**

GUIDELINE

If DC Buses are cross-tied, and:

- transferring Battery Chargers, then Select Battery Bank supplying cross-tied buses

OR

- returning D1/D3 cross-tied buses to normal, then select Battery Banks from both buses

Perform Step: 4 2.1.4	ENSURE CLOSED the 125 VDC **battery** breaker: • D101, Battery Bank B007 (DC Bus D1)
Standard:	VERIFIED 125 VDC 2D101, Battery Bank 2B007 in ON position.
Examiner Cue:	**The battery breaker is in ON.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 5 2.1.5	VERIFY CLOSED D101S, Swing Batt Chgr B021 Iso Bkr to D1 Batt B007.
Standard:	VERIFIED 2D101S, Swing Batt Chgr 2B021 Iso Bkr to 2D1 Batt 2B007 CLOSED.
Examiner Cue:	**The breaker is CLOSED.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 6 2.1.6	VERIFY CLOSED D301S, Swing Batt Chgr B021 Iso Bkr to D3 Batt B009.
Standard:	DETERMINED Step 2.1.6 is N/A.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 7√ 2.1.7	VERIFY CLOSED Swing Battery Charger B021 Feeder Breaker: • Unit 2: BQ-17
Standard:	VERIFIED Swing Battery Charger 2B021 Feeder Breaker, Unit 2: BQ-17 in ON position.
Examiner Cue:	**The breaker is in ON.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 8√ 2.1.8	At the 125 VDC Distribution Panel, check the negative to ground, positive to ground, and battery voltage.
Standard:	At 125 VDC Distribution Panel, TURNED Ground Detector P & N knob to P GROUND, N GROUND, and BATTERY positions and OBSERVED negative to ground, positive to ground, and battery voltage.

INDICATED VOLTAGE	LOCATION OF GROUND
P-GROUND indicates higher voltage than N-GROUND	POSITIVE GROUND
N-GROUND indicates higher voltage than P-GROUND	NEGATIVE GROUND

Examiner Cue:	**No ground is evident. Battery voltage is 130 volts.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 9 2.1.9	ENSURE B021, Swing Battery Charger, is selected to FLOAT.
Standard:	VERIFIED 2B021, Swing Battery Charger Switch SELECTED to FLOAT position.
Examiner Cue:	**Switch is in the FLOAT position.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 10 2.1.10	Request Maintenance to adjust float potentiometer to minimize transients.
Standard:	DETERMINED Step 2.1.10 is N/A.
Comment:	**SAT ☐ UNSAT ☐**

NOTE

B021 has a soft start feature which slowly starts and brings the Battery Charger output voltage up to normal over ~90 seconds. (LS-6.2)

Perform Step: 11√ 2.1.11	CLOSE B02100, Swing Battery Charger B021 AC Input Breaker.
Standard:	CLOSED 2B02100, Swing Battery Charger 2B021 AC Input BKR to ON position.
Examiner Cue:	**90 seconds has elapsed. Voltage is stable.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 12√ 2.1.12	After Output Voltage stabilizes (~90 seconds), then UNLOCK AND CLOSE the Swing Battery Charger B021 DC Output to the selected Battery/DC Bus. • D1: B02101
Standard:	DETERMINED output voltage stabilized, INSERTED Key and UNLOCKED then CLOSED 2B02101, Swing Battery Charger 2B021 DC Output to 2D1 Battery.
Examiner Cue:	**The breaker is CLOSED.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 13 2.1.13 & 2.1.13.1	For the Charger placed in service, check Charger indications normal, as follows: • FLOAT indicating light ILLUMINATED.
Standard:	VERIFIED green FLOAT indicating light is LIT.
Examiner Cue:	**FLOAT indicating light is lit.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 14 2.1.13 & 2.1.13.2	For the Charger placed in service, check Charger indications normal, as follows: • DC volts approximately 131 VDC
Standard:	VERIFIED DC OUTPUT volts approximately 131 VDC.
Examiner Cue:	**DC voltage is approximately 131 VDC.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 15 2.1.13 & 2.1.13.3	For the Charger placed in service, check Charger indications normal, as follows: • If voltage is not in desired band, then request Maintenance to adjust voltage as required. (May be performed during other voltage adjustments.)
Standard:	VERIFIED voltage is in desired band.
Examiner Cue:	**Voltage is in the desired band.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 16 2.1.13 & 2.1.13.4	For the Charger placed in service, check Charger indications normal, as follows: • DC amps 0 to 460 amps
Standard:	VERIFIED DC OUTPUT amps 0 to 460 amps.
Terminating Cue:	**DC ammeter is 100 amps. This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

INITIAL CONDITIONS: **Given the following conditions:**

- **SO23-13-26, Loss of Power to an AC Bus, has been entered following a loss of power to Bus 2A04.**
- **Annunciator 63A52 - 2D1 CHARGER TROUBLE, is in alarm and will not reset.**
- **Response Not Obtained (RNO) actions of SO23-13-26, Step 7b, requires the Swing Battery Charger to be placed in service.**
- **B021 DC Output Kirk Key was obtained from the NOA.**

INITIATING CUE: **The Unit Supervisor directs you to PERFORM the following:**

- **PLACE the Unit 2 B021, Swing Battery Charger in operation per SO23-6-15, Operation of 125 VDC Systems, Attachment 16, B021, Swing Battery Charger, Operations.**
- **START at Step 2.1.1.**

Facility: SONGS JPM # NRC JPM P-3 Unit 3 Task #190141 K/A #058.AA1.01 3.4 / 3.5 SF-6

Title: Place the Swing Battery Charger in Operation

Examinee (Print): _____

Testing Method:

Simulated Performance:	X	Classroom:	
Actual Performance:		Simulator:	
Alternate Path:		Plant:	X
Time Critical:			

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:

- SO23-13-26, Loss of Power to an AC Bus, has been entered following a loss of power to Bus 3A04.
- Annunciator 63A52 - 3D1 CHARGER TROUBLE, is in alarm and will not reset.
- Response Not Obtained (RNO) actions of SO23-13-26, Step 7b, requires the Swing Battery Charger to be placed in service.
- B021 DC Output Kirk Key was obtained from the NOA.

Initiating Cue: The Unit Supervisor directs you to PERFORM the following:

- PLACE the Unit 3 B021, Swing Battery Charger in operation per SO23-6-15, Operation of 125 VDC Systems, Attachment 16, B021, Swing Battery Charger, Operations.
- START at Step 2.1.1.

Task Standard: Utilizing SO23-6-15, placed the Unit 3 B021, Swing Battery Charger in operation on DC Bus 3D1.

Required Materials: SO23-6-15, Operation of 125 VDC Systems, Rev. 47.

Validation Time: 20 minutes Completion Time: _____ minutes

Comments:

Result: SAT ☐ UNSAT ☐

Examiner (Print / Sign): _____ Date: _____

PLANT SETUP

EXAMINER:

PROVIDE the examinee with a copy of:

- **SO23-6-15, Operation of 125 VDC Systems.**
  - **Attachment 16, B021, Swing Battery Charger, Operations.**

√ - Check Mark Denotes Critical Step | **START TIME:** |

Examiner Note:	**The following steps are from SO23-6-15, Attachment 16.**
Examiner Note:	**Unit 3 location of the Swing Battery Charger is Room 310-E.**
Perform Step: 1 2.1.1	VERIFY OPEN B02100, Swing Battery Charger B021 AC Input Breaker.
Standard:	VERIFIED 3B02100, Swing Battery Charger 3B021 AC INPUT BKR in OFF position.
Examiner Cue:	**The breaker is in OFF.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 2 2.1.2	VERIFY LOCKED OPEN B02101, Swing Battery Charger B021 DC Output to D1 Battery.
Standard:	VERIFIED LOCKED OPEN 3B02101, Swing Battery Charger 3B021 DC Output to 3D1 Battery.
Examiner Cue:	**The breaker is LOCKED OPEN.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 3 2.1.3	VERIFY LOCKED OPEN B02103, Swing Battery Charger B021 DC Output to D3 Battery.
Standard:	VERFIED LOCKED OPEN 3B02103, Swing Battery Charger 3B021 DC Output to 3D3 Battery.
Examiner Cue:	**The breaker is LOCKED OPEN.**
Comment:	**SAT ☐ UNSAT ☐**

GUIDELINE

If DC Buses are cross-tied, and:

- transferring Battery Chargers, then Select Battery Bank supplying cross-tied buses

OR

- returning D1/D3 cross-tied buses to normal, then select Battery Banks from both buses

Perform Step: 4 2.1.4	ENSURE CLOSED the 125 VDC **battery** breaker: • D101, Battery Bank B007 (DC Bus D1)
Standard:	VERIFIED 125 VDC 3D101, Battery Bank 3B007 in ON position.
Examiner Cue:	**The battery breaker is in ON.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 5 2.1.5	VERIFY CLOSED D101S, Swing Batt Chgr B021 Iso Bkr to D1 Batt B007.
Standard:	VERIFIED 3D101S, Swing Batt Chgr 3B021 Iso Bkr to 3D1 Batt 3B007 CLOSED.
Examiner Cue:	**The breaker is CLOSED.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 6 2.1.6	VERIFY CLOSED D301S, Swing Batt Chgr B021 Iso Bkr to D3 Batt B009.
Standard:	DETERMINED Step 2.1.6 is N/A.
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 7√ 2.1.7	VERIFY CLOSED Swing Battery Charger B021 Feeder Breaker: • Unit 3: BQ-19
Standard:	VERIFIED Swing Battery Charger 3B021 Feeder Breaker, Unit 3: BQ-19 in ON position.
Examiner Cue:	**The breaker is in ON.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 8√ 2.1.8	At the 125 VDC Distribution Panel, check the negative to ground, positive to ground, and battery voltage.
Standard:	At 125 VDC Distribution Panel, TURNED Ground Detector P & N knob to P GROUND, N GROUND, and BATTERY positions and OBSERVED negative to ground, positive to ground, and battery voltage.

INDICATED VOLTAGE	LOCATION OF GROUND
P-GROUND indicates higher voltage than N-GROUND	POSITIVE GROUND
N-GROUND indicates higher voltage than P-GROUND	NEGATIVE GROUND

Examiner Cue:	**No ground is evident. Battery voltage is 130 volts.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 9 2.1.9	ENSURE B021, Swing Battery Charger, is selected to FLOAT.
Standard:	VERIFIED 3B021, Swing Battery Charger Switch SELECTED to FLOAT position.
Examiner Cue:	**Switch is in the FLOAT position.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 10 2.1.10	Request Maintenance to adjust float potentiometer to minimize transients.
Standard:	DETERMINED Step 2.1.10 is N/A.
Comment:	**SAT ☐ UNSAT ☐**

NOTE

B021 has a soft start feature which slowly starts and brings the Battery Charger output voltage up to normal over ~90 seconds. (LS-6.2)

Perform Step: 11√ 2.1.11	CLOSE B02100, Swing Battery Charger B021 AC Input Breaker.
Standard:	CLOSED 3B02100, Swing Battery Charger 3B021 AC Input BKR to ON position.
Examiner Cue:	**90 seconds has elapsed. Voltage is stable.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 12√ 2.1.12	After Output Voltage stabilizes (~90 seconds), then UNLOCK AND CLOSE the Swing Battery Charger B021 DC Output to the selected Battery/DC Bus. • D1: B02101
Standard:	DETERMINED output voltage stabilized, INSERTED Key and UNLOCKED then CLOSED 3B02101, Swing Battery Charger 3B021 DC Output to 3D1 Battery.
Examiner Cue:	**The breaker is CLOSED.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 13 2.1.13 & 2.1.13.1	For the Charger placed in service, check Charger indications normal, as follows: • FLOAT indicating light ILLUMINATED.
Standard:	VERIFIED green FLOAT indicating light is LIT.
Examiner Cue:	**FLOAT indicating light is lit.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 14 2.1.13 & 2.1.13.2	For the Charger placed in service, check Charger indications normal, as follows: • DC volts approximately 131 VDC
Standard:	VERIFIED DC OUTPUT volts approximately 131 VDC.
Examiner Cue:	**DC voltage is approximately 131 VDC.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 15 2.1.13 & 2.1.13.3	For the Charger placed in service, check Charger indications normal, as follows: • If voltage is not in desired band, then request Maintenance to adjust voltage as required. (May be performed during other voltage adjustments.)
Standard:	VERIFIED voltage is in desired band.
Examiner Cue:	**Voltage is in the desired band.**
Comment:	**SAT ☐ UNSAT ☐**

Perform Step: 16 2.1.13 & 2.1.13.4	For the Charger placed in service, check Charger indications normal, as follows: • DC amps 0 to 460 amps
Standard:	VERIFIED DC OUTPUT amps 0 to 460 amps.
Terminating Cue:	**DC ammeter is 100 amps. This JPM is complete.**
Comment:	**SAT ☐ UNSAT ☐**

STOP TIME:	

INITIAL CONDITIONS: **Given the following conditions:**

- **SO23-13-26, Loss of Power to an AC Bus, has been entered following a loss of power to Bus 3A04.**
- **Annunciator 63A52 - 3D1 CHARGER TROUBLE, is in alarm and will not reset.**
- **Response Not Obtained (RNO) actions of SO23-13-26, Step 7b, requires the Swing Battery Charger to be placed in service.**
- **B021 DC Output Kirk Key was obtained from the NOA.**

INITIATING CUE: **The Unit Supervisor directs you to PERFORM the following:**

- **PLACE the Unit 3 B021, Swing Battery Charger in operation per SO23-6-15, Operation of 125 VDC Systems, Attachment 16, B021, Swing Battery Charger, Operations.**
- **START at Step 2.1.1.**

Appendix D	Scenario Outline	Form ES-D-1

Facility:	SONGS 2 & 3	Scenario No.:	1	Op Test No.:	October 2011 NRC
Examiners:		Operators:			

Initial Conditions: 100% power MOL - RCS Boron is 980 ppm (via sample).

Turnover: Maintain steady-state power conditions.

Critical Tasks:
- Restore SWC Cooling Water Flow Prior to Exceeding CCW Operating Temperature Limits per SO23-13-7, Loss of Component Cooling Water / Saltwater Cooling.
- Manually Trip the Reactor Following Multiple CEA Drops per SO23-13-13, Misaligned or Immovable Control Element Assembly.
- Manually Trip the Reactor Following Reactor Protection System Failure per SO23-12-1, Standard Post Trip Actions.

Event No.	Malf. No.	Event Type*	Event Description
1 +10 min	RC24B	I (RO, SRO)	Pressurizer Spray Valve (PV-0100B) Fails 25% Open.
2 +20 min	SC01A	C (BOP, SRO) TS (SRO)	Salt Water Cooling Pump (P-112) Shaft Seizure.
3 +60 min	RD5603	R (RO) N (BOP, SRO) TS (SRO)	Control Element Assembly (CEA #56) Drops into Core. Power Reduction for Dropped CEA.
4 +65 min	RD0103	C (RO, SRO)	2nd Control Element Assembly (#01) Drops into Core. Reactor Trip Required.
5 +65 min	RP22A-H	C (RO/BOP)	Reactor Trip Breakers Fail to Open Upon Manual Reactor Trip.
6 +65 min	RCP LP	M (RO, BOP, SRO)	Loss of Reactor Coolant Pump Buses 2A01 and 2A02. Loss of Forced Circulation.
7 +65 min	TC02A TC02H	C (BOP)	High Pressure Turbine Stop Valves (HV-2200A & HV-2200H) Fail to Close.
8 +70 min	FW23	C (BOP)	Loss of Condenser Vacuum at 100% Severity.
9 +70 min	RP01O RP01P	C (RO)	Auxiliary Feedwater Pumps (P-141 & P-504) Fail to Start on Emergency Feedwater Actuation Signal.

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

Actual	Target Quantitative Attributes
9	Total malfunctions (5-8)
3	Malfunctions after EOP entry (1-2)
4	Abnormal events (2-4)
1	Major transients (1-2)
2	EOPs entered/requiring substantive actions (1-2)
0	EOP contingencies requiring substantive actions (0-2)
3	Critical tasks (2-3)

SCENARIO SUMMARY NRC #1

The crew will assume the watch at 100% power with no scheduled activities per Operating Instruction (OI) SO23-5-1.7, Power Operations.

The first event is a Pressurizer Spray Valve that fails 25% open. The crew will respond per Annunciator Response Procedures (ARPs) and Abnormal Operating Instruction (AOI) SO23-13-27, Pressurizer Pressure and Level Malfunction. If pressure drops below 2025 PSIA, the SRO will refer to Technical Specifications.

When Pressurizer pressure is normal, the Train A Salt Water Cooling Pump will seize. This will require a transfer to Train B Component Cooling Water System per AOI SO23-13-7, Loss of Component Cooling Water (CCW) / Salt Water Cooling (SWC). The SRO will refer to Technical Specifications.

When CCW and SWC are restored, Control Element Assembly (CEA) #56 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 Reactor Coolant System Cold Leg temperature and then continue with a power reduction using AOI SO23-13-28, Rapid Power Reduction. The SRO will refer to Technical Specifications.

When power has been lowered an additional 3% to 5%, a second CEA (#01) will drop into the core necessitating a manual Reactor Trip. An automatic trip is not initiated as this is not a Targeted CEA.

When the Reactor Trip pushbuttons are depressed, the Reactor Trip Circuit Breakers (RTCBs) will fail to open. This condition creates an Anticipated Transient Without Scram and is remedied by deenergizing 480 Volt Buses B15 and B16 on CR-63 which open the Control Element Drive Mechanism Motor Generator output contactors. The Reactor Trip is complicated by a loss of both Reactor Coolant Pump (RCP) Buses 2A01 and 2A02, High Pressure Turbine Stop Valves that fail to close, loss of Condenser Vacuum, and Motor Driven Auxiliary Feedwater Pumps that fail to start on an Emergency Feedwater Actuation Signal. The RTCBs will eventually open when a bona fide Reactor Protection System signal is received when RCPs are lost.

The crew will perform Emergency Operating Instruction (EOI) SO23-12-1, Standard Post Trip Actions (SPTAs) and then transition to EOI SO23-12-7, Loss of Forced Circulation / Loss of Offsite Power. The scenario is terminated when Natural Circulation is verified per EOI SO23-12-11, EOI Supporting Attachments, Floating Step 3 (FS-3), Monitor Natural Circulation Established.

Risk Significance:

- Failure of risk important system prior to trip: Pressurizer Spray Valve Failure
  Loss of Saltwater Cooling Pump
- Risk significant core damage sequence: Anticipated Transient Without Scram
- Risk significant operator actions: Trip Reactor Due to 2nd Dropped Rod
  Deenergize Buses B15 and B16
  Manually Trip Turbine
  Start MDAFW Pumps Following EFAS

Scenario Event Description
NRC Scenario #1

MACHINE OPERATOR INSTRUCTIONS for SIMULATOR SETUP

INITIALIZE to IC-230 NRC Scenario #1 and associated Setup File.

EVENT	TYPE	MALF #	DESCRIPTION	DEMAND VALUE	INITIATING PARAMETER
SETUP	MF	RP22A-H	Reactor Trip Circuit Breakers fail to open (ATWS)	CLOSE	
	MF	TC02A	Turbine Stop Valve (HV-2200A) fails to close	OPEN	
	MF	TC02H	Turbine Stop Valve (HV-2200H) fails to close	OPEN	
	MF	RP01O	AFW Pump (P-141) fails to start on EFAS		
	MF	RP01P	AFW Pump (P-504) fails to start on EFAS		
	MF	RCP LP	Loss of RCP Buses 2A01 & 2A02	TRIP	
1	MF	RC24B	Pressurizer Spray Valve PV-0100B fails open	25%	
1	MF	RC24B	PV-0100B connector block removed at L-139	0%	
NOTE: When connector block is removed, REDUCE malfunction to 0% to prevent future opening.					
2	MF	SC01A	Salt Water Cooling Pump P-112 seized shaft	SEIZURE	
3	MF	RD5603	CEA #56 Drops into Core / Power reduction	DROP	
4	MF	RD0103	CEA #01 Drops into Core	DROP	
5	MF	RP22A-H	Reactor Trip Circuit Breakers fail to open (ATWS)	CLOSE	
6	MF	RCP LP	Loss of RCP Buses 2A01 & 2A02	TRIP	
7	MF	TC02A/H	Turbine Stop Valves (HV-2200A/H) fail to close	OPEN	
8	MF	FW23	Loss of Condenser Vacuum	100%	
9	MF	RP01O/P	AFW Pumps (P-141/504) Fail to Start on EFAS		

Scenario Event Description
NRC Scenario #1

Machine Operator:	**EXECUTE IC-230 NRC Scenario #1 and SETUP file to align components.** **ENSURE CVCS Blend Setpoints MATCH Shift Turnover Sheet.** **CHANGE Operator Aid Tag #029 (CVCS) to reflect boron concentration.** **VERIFY both Pressurizer Spray Valves in AUTO.** **VERIFY Channel Y Pressurizer Pressure and Level in service.** **ENSURE Turbine Ramp Rate set to 100 MWe per minute.** **PROVIDE procedures in progress, Shift Turnover, and Reactivity Management Guide to crew in Briefing Room:** **- COPY of SO23-5-1.7, Power Operations, Section 6.1, Guidelines for Steady State Operation.** **- LAMINATED COPY of SO23-5-1.7, Power Operations, Attachment 8, Power Maneuvering Guidelines** **PLACE the MOC copy of OPS Physics Summary Book on SRO Desk.** **VERIFY CEA positions with ARO.**
Control Room Annunciators in Alarm:	
NONE	

Operating Test :	NRC	Scenario #	1	Event #	1	Page	5	of	29
Event Description:	Pressurizer Spray Valve Fails Open								

Time	Position	Applicant's Actions or Behavior
Machine Operator:		**When directed, EXECUTE Event 1.** **- RC24B, Pressurizer Spray Valve (PV-0100B) fails 25% open.**
Indications Available:		**50A14 – PZR PRESS HI / LO (+90 seconds from event initiation)**
+2 min	RO	REFER to Annunciator Response Procedures (ARPs).
	RO	RECOGNIZE PZR Pressure Control malfunction and INFORM the SRO SO23-13-27 entry required.
	SRO	ENTER SO23-13-27, Pressurizer Pressure and Level Malfunction.
		• IDENTIFY uncontrolled pressure change and GO to Step 3. [Step 1 - YES]
		GUIDELINES 1) A Pressurizer Pressure signal failure affects the Modulate and Permissive circuits of SBCS in the following way: • Channel X or Y high failure could delay the Master Controller response and bring in the permissives early • Channel X or Y low failure will delay the response of both controllers 2) See Attachment 1 for the Pressurizer Pressure Control Block Diagram. 3) See Attachment 4 for Pressurizer Pressure Control Diagrams. 4) To diagnose controller alarms, refer to SO23-3-1.10, Attachment for Foxboro Alarm Response and Foxboro Controller Page Data. 5) Reactivity will be impacted by changes in Pressurizer Heater configuration and Pressurizer Spray control. The RCS Reactivity Pressure Coefficient is a positive coefficient and is about one tenth the absolute value of the Moderator Temperature Coefficient.
	SRO/RO	DETERMINE Pressurizer Spray Valve PV-100B is STUCK OPEN. [Step 3.a - YES]
	RO	• [RNO] GO to Step 3.c.
	SRO/RO	DETERMINE Pressurizer Pressure is NOT stable and TRENDING low. [Step 3.c - YES]

Operating Test :	NRC	Scenario #	1	Event #	1	Page	6	of	29
Event Description:	Pressurizer Spray Valve Fails Open								

Time	Position	Applicant's Actions or Behavior
	RO	• [RNO] START and/or VERIFY PZR Backup and Proportional Heaters ENERGIZED.
	RO	• [RNO] DETERMINE PV-0100B, Pressurizer Spray Valve from Loop 1B, failed ~25% OPEN.
	RO	• [RNO] DETERMINE PV-0100B, Pressurizer Spray Valve will NOT CLOSE and GO to Step 3.f.
		GUIDELINES 1) When only the connector for HC-0100A is removed, then PV-0100B will continue to operate in manual, and proportional heaters will be fully on. 2) When only the connector for HC-0100B is removed, then PV-0100A will continue to operate in automatic. 3) When both connectors are removed, then neither Pressurizer Spray Valve will operate in manual or automatic, and proportional heaters will be fully on.
	RO	DETERMINE PV-100A, Pressurizer Spray Valve from Loop 1A is NOT STUCK OPEN. [Step 3.f - YES]
	RO	DETERMINE PV-100B, Pressurizer Spray Valve from Loop 1B is STUCK OPEN. [Step 3.g - YES]
	SRO/RO	• [RNO] FAIL CLOSED PV-0100B, Pressurizer Spray Valve.
	SRO/RO	• [RNO] DIRECT the ARO to REMOVE connector block at Cabinet L-139, SPEC 200 Power Supply Cabinet, Nest 2, Slot 7. (HC-0100B).
Examiner Note: Removal of connector block is simulated by removing the malfunction.		
	RO	VERIFY Pressurizer Pressure is controlled. [Step 3.h - YES]
M.O. Cue: If pressure drops below 2025 PSIA, REDUCE malfunction RC24B to 0% and REPORT to the Control Room that the connector block at Cabinet L-138, SPEC 200 Power Supply Cabinet, Nest 4, Slot 10 was removed.		
	SRO	INITIATE notification to I & C. [Step 3.i - NO]

Operating Test :	NRC	Scenario #	1	Event #	1	Page	7	of	29
Event Description:	Pressurizer Spray Valve Fails Open								

Time	Position	Applicant's Actions or Behavior
	RO	VERIFY Pressurizer Pressure signal has NOT failed high. [Step 3.j - YES]
	RO	VERIFY Pressurizer Pressure Control System is operating properly in AUTO. [Step 3.k - YES]
	RO	VERIFY Pressurizer Spray was NOT initiated with ΔT > 180ºF. [Step 3.l - YES]
<u>Examiner Note</u>: Tech Spec LCO 3.4.1 is entered if RCS pressure drops below 2025 PSIA.		
+10 min	SRO	NOTIFY personnel & EVALUATE Technical Specifications. [Step 3.m - YES]
		• LCO 3.4.1.A, RCS DNB Limits.
		• CONDITION A - Pressurizer pressure not within limits. • ACTION A.1 - Restore Pressurizer pressure to within limit within two (2) hours.
When Technical Specifications are addressed, or at Lead Examiner discretion, PROCEED to Event 2.		

Operating Test :	NRC	Scenario #	1	Event #	2	Page	8	of	29
Event Description:	Saltwater Cooling Pump Shaft Seizure								

Time	Position	Applicant's Actions or Behavior
Machine Operator: When directed, EXECUTE Event 2. - SC01A, Salt Water Cooling Pump (P-112) seized shaft.		
Indications Available: **64A24 – SWC PUMP MOTOR BRG TEMP HI** **64A41 – SWC PUMP TRAIN A OC (~10 seconds later)** **64A15 – SWC TRAIN A FLOW HI / LO (~15 seconds later)** **64A55 – SWC TRAIN A FLOW TROUBLE (~20 seconds later)** **Saltwater Cooling Pump P-112 tripped indication**		
+30 secs	BOP	REFER to Annunciator Response Procedures (ARPs).
	BOP	DETERMINE that SWC Pump P-112 has tripped.
Examiner Note: The crew may respond per the ARPs but should enter SO23-13-7.		
	SRO	ENTER SO23-13-7, Loss of Component Cooling Water / Salt Water Cooling.
		• DETERMINE required actions based on loss of a single SWC Pump and GO to Step 14. [Step 1 - YES]
	SRO	ENSURE CCW / SWC on the unaffected loop in service. [Step 14.a - NO]
	SRO	DIRECT transfer of CCW to Train B.
	BOP	START CCW Pump P-026 and VERIFY that SWC Pump P-114 automatically STARTS. [Skill of Craft]
		• DEPRESS HS-6324-2, CCW Pump P-026 START pushbutton and OBSERVE SWC Pump P-114 AUTO START.
CRITICAL TASK STATEMENT		**Restore SWC Cooling Water Flow to Prior to Exceeding CCW Operating Temperature Limits per SO23-13-7, Loss of CCW / SWC.**
CRITICAL TASK	BOP	TRANSFER the CCW Non-Critical Loop to Train B. [Step 1.a.1) RNO - YES]
		• DEPRESS and MAINTAIN DEPRESSED the OPEN pushbuttons for HV-6213 and HV-6219, Critical Loop B Supply and Return to NCL.

Operating Test : NRC	Scenario # 1	Event # 2	Page 9 of 29
Event Description: Saltwater Cooling Pump Shaft Seizure			

Time	Position	Applicant's Actions or Behavior
		• When HV-6212 and HV-6218, Critical Loop A Supply and Return to NCL indicate CLOSED, then RELEASE the OPEN pushbuttons for HV-6213 and HV-6219.
	BOP	TRANSFER Letdown Heat Exchanger to Train B CCW. [Step 1.a.1) RNO - YES]
		• CLOSE HV-6293B/A, CCW Critical Loop A Letdown HX ME-062 Return/Supply Valves.
		• OPEN HV-6522B/A, CCW Critical Loop B Letdown HX ME-062 Return/Supply Valves.
	BOP	VERIFY Train B Saltwater Cooling Pump P-114 in service. [Step 14.b - YES]
	BOP	VERIFY Train B CCW Loop normal parameters. [Step 14.c - YES]
	SRO/BOP	VERIFY Train A and B Heat Exchanger high outlet temperature annunciators - RESET. [Step 14.d - YES]
	BOP	VERIFY Train B Saltwater Cooling flow restored. [Step 14.e - YES]
	SRO	GO to Step 19. [Step 14.f - YES]
	SRO/BOP	ENSURE all system parameters restored to normal. [Step 19.a - YES]
M.O. Cue:		**When directed to investigate pump, WAIT 2 minutes and REPORT that P-112 motor has an odor of burnt insulation. When directed to investigate breaker, WAIT 2 minutes and REPORT breaker 2A0611 has overcurrent flags on Phases B and C**

Operating Test :	NRC	Scenario #	1	Event #	2	Page	10	of	29
Event Description:	Saltwater Cooling Pump Shaft Seizure								

Time	Position	Applicant's Actions or Behavior
+10 min	SRO	NOTIFY personnel & EVALUATE Technical Specifications. [Step 19.b - YES]
		• LCO 3.7.8.A - Saltwater Cooling System.
		• CONDITION A - One SWC train inoperable. • ACTION A - Restore SWC Train to OPERABLE status within 72 hours.
When Train B 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 3.		

Operating Test :	NRC	Scenario #	1	Event #	3	Page	11	of	29
Event Description:	Dropped Control Element Assembly #56 / Power Reduction for Dropped Rod								

Time	Position	Applicant's Actions or Behavior
		Machine Operator: When directed, EXECUTE Event 3. **- RD5603, Dropped Control Element Assembly (CEA) #56.**
		Indications Available: **50A28 – CEA DEVIATION** **50A36 – POWER DEPENDENT INSERTION LIMIT** **50A37 – PRE-POWER DEPENDENT INSERTION LIMIT** **50A38 – CEA GROUP DEVIATION** **50A10 – CEDMCS CEA WITHDRAWAL PROHIBIT** **56B06 – PPS CHANNEL 1 TROUBLE** **56A03 – LOCAL POWER DENSITY HI CHANNEL TRIP** **56A04 – DNBR LO CHANNEL TRIP** **56A13 – LOCAL POWER DENSITY HI PRETRIP** **56A14 – DNBR LO RPS PRETRIP** **50A02 – COLSS ALARM** **CEA #56 yellow Rod Bottom Light indication**
		Examiner Note: A dropped CEA requires the following procedure entries: • **SO23-13-13, Misaligned or Immovable Control Element Assembly (for the dropped CEA).** • **S023-5-1.7, Power Operations (for the initial Turbine load reduction to restore T_{COLD} using Speed/Load Adjustment and later using Setpoint Adjustment to lower load to 85%).** • **SO23-13-28, Rapid Power Reduction (guidance for reducing Reactor power to 85%).** • **SO23-3-2.2, Makeup Operations (for borating the RCS).** • **SO23-3-1.10, Pressurizer Pressure and Level Control (to force Pressurizer Spray flow).** • **SO23-3-2.19, CEDMCS Operation, Section 6.12, Repetitive or Emergent Manual CEA Positioning (CEA operation).**
+10 secs	RO	RECOGNIZE that Regulating Group 4 CEA #56 has dropped and INFORM the SRO SO23-13-13 entry required.
	SRO	ENTER SO23-13-13, Misaligned or Immovable Control Element Assembly.
		Examiner Note: The following steps are from SO23-13-13, Misaligned or Immovable CEA.
	SRO	VERIFY Special Test Exception 3.1.12, Low Power Physics Testing is NOT in progress. [Step 1.a - N/A]

Operating Test : NRC	Scenario # 1	Event # 3	Page 12 of 29
Event Description: Dropped Control Element Assembly #56 / Power Reduction for Dropped Rod			

Time	Position	Applicant's Actions or Behavior
	RO	VERIFY that no more than one CEA is misaligned > 7 inches. [Step 1.b - YES]
	RO	ENSURE CEDMCS Mode Selector Switch in OFF. [Step 1.c - YES]
	RO	VERIFY CEA misaligned. [Step 1.d - YES]
	BOP	REDUCE Turbine load to restore RCS T_{COLD} to the pre-drop value per SO23-5-1.7, Turbine Load Change Using Speed/Load Adjustment. [Step 1.e - YES]
M.O. Cue:		**If sent to investigate CEDMCS, WAIT 3 minutes then REPORT no observable problems. If sent as I & C to investigate, WAIT 5 minutes then REPORT that the CEA estimated repair time cannot be determined.**
		GUIDELINE Since the misaligned CEA will affect Excore RX power, stabilized RX power must be determined from a source **other than** Excore power. Preferred sources are Delta-T power (CV-9739) during transient conditions and Secondary Calibrated Power (CV-9005) after stabilization.
	SRO/RO	VERIFY Reactor is critical. [Step 1.f - YES]
		• RECORD initial and stabilized power levels in the NCO Log for subsequent SDM calculation. [Step 1.f - YES]
	SRO	Within 15 minutes, DIRECT monitoring of DNBR and LPD per SO23-3-3.6, Attachment for DNBR Margin and Linear Heat Rate Limit Monitoring. [Step 1.g - YES]
	SRO	DIRECT performance of Attachment 3, Misaligned CEA checklist. [Step 1.h - YES]
	SRO/RO	VERIFY Reactor power greater than 50%. [Step 1.i - YES]

Operating Test :	NRC	Scenario #	1	Event #	3	Page	13	of	29
Event Description:	Dropped Control Element Assembly #56 / Power Reduction for Dropped Rod								

Time	Position	Applicant's Actions or Behavior

Examiner Note: The SRO should recognize that power reduction due to dropped CEA (~4%) satisfies the 15 minute requirement to initiate a power reduction. The power reduction of 10% must be accomplished within 60 minutes.

✔	TYPE OF CEA	60 MINUTE POWER REDUCTION REQUIREMENT	120 MINUTE POWER REDUCTION REQUIREMENT
	Non-group 6 Full Length	10%	15%
	Group 6 Full Length	5%	10%
	Part Length Initially ≥ 112.5 Inches Withdrawn	None	None
	Part Length Initially < 112.5 Inches Withdrawn	2%	5%

	SRO	Within 15 minutes of discovery, INITIATE Reactor power reduction per the Table (shown above). [Step 2.a - YES]
	RO	• For Non Group 6 Full Length CEA, REDUCE power 10% within 60 minutes. [Step 2.a.1) - YES]
	BOP	• COMMENCE lowering Turbine load while maintaining RCS T_{COLD} per SO23-5-1.7, Power Operations. [Step 2.a.1) - YES]

GUIDELINES

1) If a Group 6 CEA has dropped, then a Group 6 insertion for the power reduction cannot be performed due to the lower electrical interlock in the CEDMCS. For this condition at EOC, a combination of boration and temperature control may be required, as directed by the Shift Manager.

2) The power reduction due to the negative reactivity caused by the misaligned CEA is considered part of the required power reduction.

	RO	• INITIATE boration and/or CEA insertion per SO23-3-2.2, Makeup Operations, to target power level within 1 hour and 45 minutes while maintaining power within requirements of table. [Step 2.a.2).a) - YES]
	RO	• COMMENCE attempting to control ASI near full power ESI. [Step 2.a.3) - YES]

Operating Test :	NRC	Scenario #	1	Event #	3	Page	14	of	29
Event Description:	Dropped Control Element Assembly #56 / Power Reduction for Dropped Rod								

Time	Position	Applicant's Actions or Behavior
		GUIDELINE Initiate CEA recovery expeditiously to minimize the effect on core power distribution. (Ref. 11.4.3)
	SRO	COMMENCE CEA recovery. [Step 3 - YES]
		• REQUEST Reactor Engineering REPORT to Control Room. [Step 3.a - YES]
		• INITIATE recovery of CEA per Attachment 1. [Step 3.b - YES]
		Examiner Note: At this point the SRO will be awaiting field reports to restore the CEA.
		Floor Cue: The Work Control Supervisor will complete the DNBR and LPD monitoring in accordance with SO23-3-3.6, Attachment 1.
		Floor Cue: REPORT as the Shift Manager that I & C states the repair will be delayed. DIRECT the SRO to continue the downpower per the Core Operating Limits Report.
		NOTES 1) COLSS Azimuthal Tilt PID CV9008 and ASI PID CV9198 will be calculated as long as COLSS is still operating, even if inoperable due to a dropped CEA. 2) When a CEA is dropped, then the Azimuthal Tilt (PID-063) constant will usually exceed 0.03 immediately and will likely exceed 0.10 before the CEA is restored. (Tech. Spec. LCO 3.2.3.)
	SRO	CONTINUE plant load reduction and plant monitoring. [Step 4 - YES]
		• INITIATE monitoring Azimuthal Tilt on COLSS PID CV9008. [Step 4.a - YES]
		• DETERMINE Azimuthal Tilt has exceeded 0.03. [Step 4.b - YES]
		• DETERMINE Azimuthal Tilt has exceeded 0.10. [Step 4.c - YES]
		• [RNO] INITIATE Attachment 2.
		• [RNO] IMPLEMENT ACTION requirements of Tech Spec LCO 3.2.3.

Operating Test :	NRC	Scenario #	1	Event #	3	Page	15	of	29
Event Description:	Dropped Control Element Assembly #56 / Power Reduction for Dropped Rod								

Time	Position	Applicant's Actions or Behavior
		• NOTIFY personnel & EVALUATE Technical Specifications. [Step 4.d - YES]
Examiner Note:		**The SRO will identify Technical Specification LCO 3.1.5 as the required entry because power must be reduced within 15 minutes.**
	SRO	EVALUATE Technical Specifications. [Step 4.d - YES]
		• LCO 3.1.5.A, Control Element Assembly Alignment.
		• CONDITION A - One Regulating CEA trippable and misaligned from its group by > 7 inches. • ACTION A.1 - Initiate THERMAL POWER reduction in accordance with COLR requirements within 15 minutes. • ACTION A.2 - Restore the misaligned CEA(s) to within 7 inches of its group within two (2) hours.
Examiner Note:		**The following BOP Steps are from SO23-5-1.7, Power Operations, Section 6.4, Turbine Load Change Using Speed / Load Adjustment.**
		1. This section is normally used for emergent (unplanned) Turbine megawatt changes to stabilize plant conditions (e.g., ARP window, governor valve closure, etc.), or per SRO direction. 2. This section may be used to reduce power by 5MW at 10MWe/min using Course adjust to clear COLSS alarm, or if plant conditions are trending toward a COLSS alarm condition.
	BOP	Turbine Load Change Using Speed/Load Adjustment. [Section 6.4 - YES]
		• If required, PERFORM a Reactivity Brief & Peer Check. [Step 6.4.1 - YES]
		• INITIATE monitoring T_{COLD}AVG. [Step 6.4.2 - YES]
		• ADJUST Turbine load as required to maintain T_{COLD}. [Step 6.4.3 - YES]
		• DEPRESS HS-2210, Main Turbine Speed / Load Control, RAISE or LOWER pushbuttons for **Coarse** adjustment. [Step 6.4.3.1 - YES]
		• ACTIVATE DCS Speed/Load Pushbuttons Box and ENSURE Rate is set at an acceptable MW/MIN value for **Fine** adjustment. [Step 6.4.3.2 - YES]
		• SELECT MODIFY. • DEPRESS UP or DOWN buttons **or** +0.5 or -0.5 buttons.

Operating Test :	NRC	Scenario #	1	Event #	3	Page	16	of	29
Event Description:	Dropped Control Element Assembly #56 / Power Reduction for Dropped Rod								

Time	Position	Applicant's Actions or Behavior
		• VERIFY Turbine load STABILIZES at Target value. [Step 6.4.4 - YES]
Examiner Note:		**The following steps are from SO23-13-28, Rapid Power Reduction (RPR), Attachment 2, RPR – 20% / hour. Using this Attachment, load will be reduced at a rate of 15% per hour to 85%.**
	RO/BOP	PERFORM a Reactivity Brief. [Step 1.1 - YES]
	SRO	NOTIFY the Generation Operations Controller. [Step 1.2 - YES]
	SRO	INITIATE an MSR cooldown if load less than 750 MWe. [Step 1.3 - NO]
		GUIDELINES 1. If RCS Boron is < 110 ppm, then the optimal approach is to use CEAs and MTC with little or no boration. A 5% power reduction credit can be taken for MTC, because the temperature increase adds considerable negative reactivity due to the large negative MTC at the EOC along with Xenon building in. Expect average Tcold to be initially high outside the control band. (LS-1.1, LS-1.4) 2. At EOC, existing conditions may necessitate slowing power change rate when between 80% and 70% power.
	SRO	INITIATE monitoring CV-9739, COLSS Raw ΔT Power. [Step 1.4 - YES]
	SRO	INITIATE forcing Pressurizer Spray flow. [Step 1.5 - YES]
	SRO	INITIATE concurrently using a combination of Boration, CEA insertion, and Turbine load reduction to achieve the targets of SO23-5-1.7. [Step 1.6 - YES]
Examiner Note:		**The following steps are from SO23-3-1.10, Pressurizer Pressure and Level Control, Section 6.3, Forcing Pressurizer Sprays with RCS pressure > 1500 PSIA.**
	RO	COMMENCE forcing Pressurizer Sprays. [Step 6.3.1 - YES]
		• CONDUCT a Reactivity Brief. [Step 6.3.1.1 - YES]

Time	Position	Applicant's Actions or Behavior
		• COMMENCE monitoring RCS pressure. [Step 6.3.1.2 - YES]
		• VERIFY RCS pressure greater than 1500 psia. [Step 6.3.1.3 - YES]
		• PLACE PZR Spray Valve Controller PV-100A in AUTO. [Step 6.3.1.4 - YES]
		• POSITION Backup Heaters to ON or AUTO as necessary to support PZR Spray Valve operation. [Step 6.3.1.5 - YES]
		• LOWER PIC-0100, PZR Pressure Controller setpoint to 2225 PSIA. [Step 6.3.1.6 - YES]
Examiner Note:		**The following steps are from SO23-3-2.2, Makeup Operations, Section 6.3, Borating to the Charging Pump Suction.**
		GUIDELINE This method should normally be used for the following purposes: • Borating to maintain power for Xenon compensation • Normal power reductions (3-15% per hour or per SO23-5-1.7) • Rapid power reductions (15-100% per hour) • Adjusting Boron while Unit is shut down • Charging Pump MP-191 is the preferred pump for boration (LS-1.17) [O# 800260364-0020 (DCE)]
	RO	Borating to the Charging Pump Suction: [Section 6.3 - YES]
		• If required, PERFORM a Reactivity Brief. [Step 6.3.1 - YES]
		• SELECT P-191, Charging Pump. [Step 6.3.2 - YES]
		• ENTER ~5 GPM on FIC-0210Y, BAMU Flow Controller. [Step 6.3.3 - YES]
		• SELECT SET and ENTER 5 GPM. [Step 6.3.3.1 - YES]
		• ENSURE FIC-0210Y in AUTO. [Step 6.3.3.2 - YES]
		• SET FQIS-0210Y, Boration Counter, to ~200 GPM. [Step 6.3.4 - YES]
		• SELECT MODIFY. [Step 6.3.4.1 - YES]
		• ENTER 200 gallons in PRESET. [Step 6.3.4.2 - YES]
		• SELECT SET PRESET. [Step 6.3.4.3 - YES]
		• SELECT EXIT. [Step 6.3.4.4 - YES]
		• SELECT BAMU Pump P-174 or P-175. [Step 6.3.5 - YES]

Operating Test :	NRC	Scenario #	1	Event #	3	Page	18	of	29
Event Description:	Dropped Control Element Assembly #56 / Power Reduction for Dropped Rod								

Time	Position	Applicant's Actions or Behavior
		• VERIFY CLOSED FV-9253, Blended Makeup to VCT Isolation. [Step 6.3.6 - YES]
		• ENSURE HV-9257, BAMU to Charging Pump Suction Block, in AUTO. [Step 6.3.7 - YES]
		• COMMENCE monitoring plant parameters. [Step 6.3.8 - YES]
		• If required to lower VCT pressure, CYCLE HV-9209, VCT Vent Valve. [Step 6.3.9 - AS REQ'D]
		NOTE During the boration, selecting HOLD will close FV-0210Y and HV-9257. The BAMU Pump will continue to run on miniflow. Selecting GO will recommence the boration.
		• SELECT HS-0210, Makeup Mode Selector, to BORATE. [Step 6.3.10 - YES]
		• SELECT MODIFY. [Step 6.3.10.1 - YES]
		• SELECT BORATE. [Step 6.3.10.2 - YES]
		• SELECT GO. [Step 6.3.10.3 - YES]
		• CONFIRM boration stops automatically. [Step 6.3.11 - YES]
		• VERIFY FV-0210Y, BAMU to VCT Flow Control Valve, CLOSED. [Step 6.3.12 - YES]
<u>Examiner Note</u>: The following steps are from SO23-5-1.7, Power Operations, Section 6.3, Turbine Load Change Using Setpoint Adjustment.		
		1. This section is normally used for routine adjustments to optimize plant performance per Attachment 14 or support other required load changes. 2. Adjustments to Demand and/or Rate Setpoints can be made while the load change is in progress without interrupting the load change.
	BOP	Turbine Load Change Using setpoint Adjustment. [Section 6.3 - YES]
		• If required, PERFORM a Reactivity Brief & Peer Check. [Step 6.3.1 - YES]
		• INITIATE monitoring T_{COLD} AVG. [Step 6.3.2 - YES]

Operating Test :	NRC	Scenario #	1	Event #	3	Page	19	of	29
Event Description:	Dropped Control Element Assembly #56 / Power Reduction for Dropped Rod								

Time	Position	Applicant's Actions or Behavior
		• If raising load, then SET CVOL to about 10% above the **final** projected Flow Demand. [Step 6.3.3 - NO]
		• ACTIVATE Turbine DCS Setpoints Box and SELECT MODIFY. [Step 6.3.4 - YES]
		• SET Demand to value (variable) and SELECT ENTER. [Step 6.3.5 - YES]
		• SET Rate to target ~3 MW/MIN value and SELECT ENTER. [Step 6.3.6 - YES]
		• SELECT P2 to INITIATE Turbine load change. [Step 6.3.7 - YES]
		• VERIFY Turbine load stabilizes at Target value. [Step 6.3.8 - YES]
		• RESTORE Rate to 100 MW/MIN and SELECT ENTER. [Step 6.3.9 - YES]
Examiner Note: The following steps are from SO23-13-13, Attachment 1, Restoration of CEA Operability and Alignment.		
GUIDELINES 1) DO NOT bypass a channel that has tripped due to a CEA Misalignment. (Ref. 11.4.2) 2) Initiate CEA recovery expeditiously to minimize the effect on core power distribution. (Ref. 11.4.3)		
+40 min	SRO	COMMENCE CEA recovery. [Step 1 - YES]
		• STATION dedicated operator at the CEA Control Panel. [Step 1.a - YES]
	RO	• VERIFY CEA position indications AGREE: [Step 2.b - YES]
		• COMPARE affected CEA PIDs from CEAC No. 1 and 2 at CPC Operator Console. [Step 2.b.1) - YES]
		• COMPARE affected CEA PIDs from CEAC No. 1 and 2 at Secondary Rod Position CRT [Step 2.b.2) - YES]
		• CHECK UEL and LEL lights. [Step 2.b.3) - YES]
		• VERIFY one CEA has not been misaligned >7 inches for an unknown duration. [Step 2.c. - YES]
		• REQUEST I & C department assistance. [Step 2.d - YES]

Operating Test :	NRC	Scenario #	1	Event #	3	Page	20	of	29
Event Description:	Dropped Control Element Assembly #56 / Power Reduction for Dropped Rod								

Time	Position	Applicant's Actions or Behavior
Examiner Note:		**The following steps are from SO23-3-2.19, CEDMCS Operation, Section 6.12, Repetitive or Emergent Manual CEA Positioning.**
		GUIDELINE This section may be used for the second and additional CEA movements after previous performance of Section 6.1, 6.2, 6.3, or when directed by SO23-3-3.5 or SO23-3-2.19.2. For repetitive manual CEA positioning, these sections and procedures ensure that a Reactivity Brief was evaluated per OSM-14.
	RO	• POSITION Group Select Switch to Group 6. [Step 6.12.1 - YES]
	RO	• If moving a single CEA, POSITION Individual CEA Selection Switch to CEA to be moved. [Step 6.12.2 – N/A]
	RO	• POSITION Mode Select Switch to MANUAL Group. [Step 6.12.3 - YES]
		• VERIFY Group 6 indicator lamps are ILLUMINATED. [Step 6.12.3.1 - YES]
	RO	• POSITION CEAs as directed by SRO. [Step 6.12.4 - YES]
	RO	• When CEA positioning completed, Mode Select Switch to OFF. [Step 6.12.5 - YES]
When a 3% to 5% power reduction is completed, or at Lead Evaluator's discretion, PROCEED to Events 4, 5, 6, 7, 8, and 9.		

Operating Test :	NRC	Scenario #	1	Event #	4, 5, 6, 7, 8, & 9	Page	21	of	29
Event Description:	2nd Dropped CEA / Reactor Trip Circuit Breaker Failure (ATWS) / Loss of Reactor Coolant Pumps / Loss of Vacuum / HP Turbine Stop Valves Failure / Auxiliary Feedwater Pumps Actuation Failure								

Time	Position	Applicant's Actions or Behavior
Machine Operator:		**When directed, EXECUTE Events 4, 5, 6, 7, 8, and 9.** **- RD0103, Dropped CEA #01.** **- RP22A to H, Reactor Trip Circuit Breakers fail to open (ATWS).** **- RCP LP, Loss of Reactor Coolant Pump Buses 2A01 and 2A02.** **- FW23, Loss of Vacuum at 100% severity.** **- TC02A & TC02H, HP Turbine Stop Valves fail to close.** **- RP01O & RP01P, AFW Pumps P&141 / P-504 start failure on EFAS.**
Indications Available: **Dropped CEA #01 indication on CRT Display (no alarm)** **Lowering Pressurizer pressure** **Lowering RCS temperature**		
+10 secs	RO	RECOGNIZE second dropped CEA and manually INITIATE a Reactor trip.
	SRO	ENTER SO23-12-1, Standard Post Trip Actions.
CRITICAL TASK STATEMENT		**Manually Trip the Reactor Following Multiple CEA Drops per SO23-13-13, Misaligned or Immovable Control Element Assembly.**
CRITICAL TASK	RO	MANUALLY TRIP the Reactor.
CRITICAL TASK STATEMENT		**Manually Trip the Reactor Following Reactor Protection System Failure per SO23-12-1, Standard Post Trip Actions.**
CRITICAL TASK	RO	MANUALLY TRIP the Reactor.
	RO	VERIFY Reactor Trip: [Step 1 - YES]
		• DETERMINE Reactor Trip Circuit Breakers CLOSED. [Step 1.a - YES]
	RO	• [RNO] MANUALLY TRIP Reactor.
		• DEPRESS HS-9132-2 **and** HS-9132-3 REACTOR TRIP pushbuttons on CR-56.
		• DEPRESS HS-9132-1 **and** HS-9132-4 REACTOR TRIP pushbuttons on CR-52.
	RO	• [RNO] DEENERGIZE Buses B15 and B16.
		• DEPRESS HS-1691 TRIP pushbutton on Bus B15.

Operating Test :	NRC	Scenario #	1	Event #	4, 5, 6, 7, 8, & 9	Page	22	of	29
Event Description:	2nd Dropped CEA / Reactor Trip Circuit Breaker Failure (ATWS) / Loss of Reactor Coolant Pumps / Loss of Vacuum / HP Turbine Stop Valves Failure / Auxiliary Feedwater Pumps Actuation Failure								

Time	Position	Applicant's Actions or Behavior
		• DEPRESS HS-1707 TRIP pushbutton on Bus B16.
		• VERIFY Reactor Power lowering and Startup Rate NEGATIVE. [Step 1.b - YES]
		• VERIFY maximum of one (1) Full Length CEAs NOT fully inserted. [Step 1.c - YES]
	SRO/RO	VERIFY Reactivity Control criteria satisfied. [Step 1 - YES]
	BOP	VERIFY Turbine Trip: [Step 2 - YES]
		• DETERMINE HP & LP Stop and Governor Valves OPEN. [Step 2.a - YES]
		• [RNO] DEPRESS HS-2200XD, Turbine Emergency Trip pushbutton.
		• VERIFY <u>both</u> Unit Output Breakers OPEN. [Step 2.b - YES]
	SRO	INITIATE Administrative Actions: [Step 3 - YES]
		• INITIATE Attachment 4, Worksheet. [Step 3.a - YES]
		<u>CAUTION</u> DO NOT OPERATE TRIP pushbuttons for tripped breakers. Operation of TRIP pushbuttons will reset overcurrent protection allowing Diesel Generator output breaker to close to a fault.
	BOP	VERIFY Vital Auxiliaries criteria satisfied: [Step 4 - YES]
		• VERIFY both 1E 4 kV Buses 2A04 and 2A06 ENERGIZED. [Step 4.a - YES]
		• VERIFY all 1E 480 V Buses 2B04, 2B24, 2B06, & 2B26 ENERGIZED. [Step 4.b - YES]
		• VERIFY all 1E DC Buses ENERGIZED. [Step 4.c - YES]
		• VERIFY all Non-1E 4 kV Buses 2A03, 2A07, 2A08, & 2A09 ENERGIZED. [Step 4.d - YES]
		• VERIFY CCW Train B OPERATING and ALIGNED to Non-Critical Loop and Letdown Heat Exchanger. [Step 4.e - YES]

Operating Test : NRC	Scenario # 1	Event # 4, 5, 6, 7, 8, & 9	Page 23 of 29
Event Description:	2nd Dropped CEA / Reactor Trip Circuit Breaker Failure (ATWS) / Loss of Reactor Coolant Pumps / Loss of Vacuum / HP Turbine Stop Valves Failure / Auxiliary Feedwater Pumps Actuation Failure		

Time	Position	Applicant's Actions or Behavior
	RO	VERIFY RCS Inventory Control criteria satisfied: [Step 5 - YES]
		• VERIFY PZR level between 10% and 70% and TRENDING to between 30% and 60%. [Step 5.a - YES]
		• VERIFY Core Exit Saturation Margin ≥ 20ºF: [Step 5.b - YES]
		• OBSERVE QSPDS page 611 **or** CFMS page 311.
	RO	VERIFY RCS Pressure Control criteria satisfied: [Step 6 - YES]
		• VERIFY PZR pressure between 1740 PSIA and 2380 PSIA, controlled and TRENDING to between 2025 & 2275 PSIA. [Step 6.a - YES]
	RO	DETERMINE Core Heat Removal criteria NOT satisfied: [Step 7 - YES]
		• DETERMINE no RCPs operating. [Step 7.a - YES]
		• [RNO] GO to Step 7.c.
		• DETERMINE Core Exit Saturation Margin > 20ºF. [Step 7.c - YES]
		• OBSERVE QSPDS page 611 or CFMS page 311.
	BOP	VERIFY RCS Heat Removal criteria satisfied: [Step 8 - YES]
		• VERIFY both SG narrow range levels > 21%. [Step 8.a - YES]
		• VERIFY both SG narrow range levels < 80%. [Step 8.a - YES]
		• DETERMINE Main / Auxiliary Feedwater NOT available. [Step 8.a - YES]
Examiner Note: Dependent upon SG levels, P-141 and P-504 starting may be delayed until SPTA Step 14 is performed by the BOP.		
	BOP	• [RNO] DEPRESS 8 EFAS pushbuttons to manually INITIATE EFAS.
		• DEPRESS HS-4707-1, P-141, AFW Pump START pushbutton.
		• DEPRESS HS-4733-2, P-504, AFW Pump START pushbutton.
		• VERIFY T_{COLD} between 540ºF and 550ºF. [Step 8.b - YES]
		• DETERMINE SG pressures NOT between 960 and 1050 PSIA. [Step 8.c - YES]
		• [RNO] If SG pressure > 1050 PSIA, OPERATE Atmospheric Dump Valves to maintain between 960 and 1050 PSIA.

Operating Test :	NRC	Scenario #	1	Event #	4, 5, 6, 7, 8, & 9	Page	24	of	29
Event Description:	2nd Dropped CEA / Reactor Trip Circuit Breaker Failure (ATWS) / Loss of Reactor Coolant Pumps / Loss of Vacuum / HP Turbine Stop Valves Failure / Auxiliary Feedwater Pumps Actuation Failure								

Time	Position	Applicant's Actions or Behavior
		• DEPRESS HV-8419 OPEN/MODULATE pushbutton and controller A / M pushbutton to place in AUTO.
		• DEPRESS HV-8421 OPEN/MODULATE pushbutton and controller A / M pushbutton to place in AUTO.
Examiner Note:		**A loss of Condenser vacuum will cause P-054, Condenser Vacuum Pump, to start. This condition disrupts the flow through the Condenser Air Ejector Radiation Monitor and causes a SECONDARY RADIATION HI alarm. The crew should use multiple indications to determine that a tube leak does NOT exist.**
	RO	VERIFY Containment Isolation criteria satisfied: [Step 9 - YES]
		• VERIFY Containment Area Radiation Monitors NOT alarming or trending to alarm. [Step 9.b - YES]
		• DETERMINE Secondary Plant Radiation Monitors alarming due to start of Condenser Vacuum Pump. [Step 9.c - YES]
	RO	VERIFY Containment Temperature and Pressure criteria satisfied: [Step 10 - YES]
		• VERIFY Containment average temperature < 120ºF. [Step 10.a - YES]
		• VERIFY Containment pressure < 1.5 PSIG. [Step 10.b - YES]
	SRO	DIAGNOSE event in progress: [Step 11 - YES]
		• DETERMINE some Safety Function criteria are NOT met per Attachment 4, Worksheet. [Step 11.a - YES]
		• [RNO] COMPLETE Attachment 1, Recovery Diagnostics.
		• DETERMINE that Reactor Trip Recovery is NOT diagnosed. [Step 11.b - YES]
		• [RNO] DETERMINE all RCPs STOPPED.
	BOP	• INITIATE steps 12 through 16. [Step 11.c - YES]
		• IMPLEMENT EOI SO23-12-7, Loss of Forced Circulation / Loss of Offsite Power. [Step 11.d - YES]
Examiner Note:		**SO23-12-1, Standard Post Trip Actions, Steps 12 to 16, performed by the BOP are located at the end of the scenario. The following steps are from SO23-12-7, Loss of Forced Circulation / Loss of Offsite Power.**

Operating Test : NRC	Scenario # 1	Event # 4, 5, 6, 7, 8, & 9	Page 25 of 29
Event Description:	2nd Dropped CEA / Reactor Trip Circuit Breaker Failure (ATWS) / Loss of Reactor Coolant Pumps / Loss of Vacuum / HP Turbine Stop Valves Failure / Auxiliary Feedwater Pumps Actuation Failure		

Time	Position	Applicant's Actions or Behavior
	SRO	ENTER SO23-12-12-7, Loss of Forced Circulation / Loss of Offsite Power.
	SRO	RECORD time of EOI entry _____. [Step 1 - YES]
	SRO	VERIFY Loss of Forced Circulation diagnosis: [Step 2 - YES]
		• INITIATE SO23-12-10, Safety Function Status Checks. [Step 2.a - YES]
		• INITIATE Foldout Page. [Step 2.b - YES]
		• DIRECT performance of FS-3, Monitor Natural Circulation Established.
		• VERIFY both Trains of 1E AC and 1E DC electric power AVAILABLE. [Step 2.c - YES]
		• VERIFY all Vital AC Instrument Buses AVAILABLE. [Step 2.d - YES]
		• VERIFY both Buses of 1E 4160 AC power AVAILABLE. [Step 2.e - YES]
		• VERIFY all RCPs STOPPED. [Step 2.f - YES]
	SRO	INITIATE Administrative Actions. [Step 3 - YES]
		• NOTIFY Shift Manger/Operations Leader of entry into SO23-12-7, Loss of Forced Circulation. [Step 3.a - YES]
		• ENSURE Emergency Plan is initiated. [Step 3.b - YES]
		• IMPLEMENT Placekeeper. [Step 3.c - YES]
		• IMPLEMENT Time Dependent steps. [Step 3.d - YES]
	SRO	VERIFY Electric Power Distribution: [Step 4 - YES]
		• VERIFY Reserve Auxiliary Transformers ENERGIZED. [Step 4.a - YES]
		• VERIFY all Non-1E 4160 V Buses ENERGIZED. [Step 4.b - YES]
		• STOP unloaded Diesel Generators. [Step 4.c - NO]
	SRO	IMPLEMENT Floating Steps. [Step 6 - YES]
	SRO	ESTABLISH Pressurizer Level Control: [Step 7 - YES]
		• VERIFY Pressurizer level between 10% and 70% and TRENDING to between 30% and 60%. [Step 7.a - YES]

Operating Test :	NRC	Scenario #	1	Event #	4, 5, 6, 7, 8, & 9	Page	26	of	29
Event Description:	2nd Dropped CEA / Reactor Trip Circuit Breaker Failure (ATWS) / Loss of Reactor Coolant Pumps / Loss of Vacuum / HP Turbine Stop Valves Failure / Auxiliary Feedwater Pumps Actuation Failure								

Time	Position	Applicant's Actions or Behavior
+25 min	SRO	ESTABLISH Pressurizer Pressure Control: [Step 8 - YES]
		• VERIFY Pressurizer Pressure between 1740 PSIA and 2380 PSIA and TRENDING to between 2025 PSIA and 2275 PSIA. [Step 8.a - YES]
Examiner Note: The following steps are from SO23-12-11, EOI Supporting Attachments, FS-3, Monitor Natural Circulation Established.		
	RO	DETERMINE both Steam Generators OPERATING with Feedwater available. [Step a. - YES]
	RO	DETERMINE all Reactor Coolant Pumps STOPPED. . [Step b. - YES]
	RO	DETERMINE both loops ΔT less than 58°F. [Step c. - YES]
	RO	DETERMINE T_{HOT} and T_{COLD} NOT RISING. [Step d. - YES]
	RO	DETERMINE Core Exit Saturation Margin ≥ 20°F. [Step e. - YES]
	RO	DETERMINE operating loop T_{HOT} and REPCET within 16°F. [Step f. - YES]
	RO	DETERMINE Reactor Vessel Level ≥ 100% (Plenum). [Step g. - YES]
When Natural Circulation is verified, or at Lead Evaluator's discretion, TERMINATE the scenario.		

Operating Test :	NRC	Scenario #	1	Event #	4, 5, 6, 7, 8, & 9	Page	27	of	29
Event Description:	2nd Dropped CEA / Reactor Trip Circuit Breaker Failure (ATWS) / Loss of Reactor Coolant Pumps / Loss of Vacuum / HP Turbine Stop Valves Failure / Auxiliary Feedwater Pumps Actuation Failure								

Time	Position	Applicant's Actions or Behavior
Examiner Note: These steps are performed by the BOP per SO23-12-1, Steps 12 through 16.		
	SRO/BOP	INITIATE Attachment 5, Administrative Actions. [Step 12.a - YES]
	SRO/BOP	ENSURE a PA system announcement for Reactor Trip. [Step 12.b - YES]
	BOP	ENSURE the following loads restored: [Step 13 - YES]
		• VERIFY Telecom 480 VAC Feeder Breaker – CLOSED. [Step 13.a - YES].
		• VERIFY Telecom 480 VAC Feeder Breaker – CLOSED. [Step 13.b - YES].
		• DETERMINE all Non-1E Buses – ENERGIZED [Step 13.c - YES].
		• DETERMINE B15 & B16 480 VAC Load Centers – DENERGIZED [Step 13.d - YES].
		• [RNO] VERIFY Annunciator 56A20, REACTOR TRIPPED CEDMCS DEENERGIZED – alarming.
		• [RNO] VERIFY CEDM M/G Set Output – OPEN.
		• [RNO] IF power is available, ENSURE B16 – ENERGIZED.
		• DEPRESS HS-1707 CLOSE pushbutton on Bus B16.
		• [RNO] IF power is available, ENSURE B15 – ENERGIZED.
		• DEPRESS HS-1691 CLOSE pushbutton on Bus B15.
	BOP	VERIFY Main Turbine Coastdown: [Step 14 - YES]
		• DETERMINE Extraction Steam Block Valves – CLOSED. [Step 14.a - YES]
		• DETERMINE Main Steam to Reheater Block, Bypass, Warmup, and Control Valves – CLOSED. [Step 14.a - YES]

Operating Test : NRC	Scenario # 1	Event # 4, 5, 6, 7, 8, & 9	Page 28 of 29
Event Description:	2nd Dropped CEA / Reactor Trip Circuit Breaker Failure (ATWS) / Loss of Reactor Coolant Pumps / Loss of Vacuum / HP Turbine Stop Valves Failure / Auxiliary Feedwater Pumps Actuation Failure		

Time	Position	Applicant's Actions or Behavior
		• DETERMINE HV-2712A/B Bled Steam to Reheaters Block Valve – CLOSED. [Step 14.a - YES]
		• VERIFY Generator lowering – less than 24 kV. [Step 14.b - YES]
		• VERIFY 99A26 - TURBINE LUBE OIL TEMP HI and 99A46 - TURBINE BRG OIL DRAIN TEMP HI Annunciators – RESET. [Step 14.c - YES]
		• INITIATE SO23-10-2, Turbine Shutdown, Attachment for Unloading the Generator and Removing the Unit from Line. [Step 14.d – NO]
	BOP	ESTABLISH desired Condensate and Feedwater Status: [Step 15 - YES]
		• ENSURE 3rd Point Heater Drain Pumps - STOPPED. [Step 15.a - YES]
		• DETERMINE Reactor Trip Override – NOT RESET. [Step 15.b - NO]
		• [RNO] DETERMINE MFW Pump NOT available to RESET RTO.
		• DETERMINE no MFW Pumps and four (4) Condensate Pumps OPERATING. [Step 15.c - YES]
		• [RNO] STOP Condensate Pump P-053.
		• ENSURE FIC-3294, Condensate Pump Miniflow Controller set for Condensate Pump configuration. [Step 15.d - YES]
		• Three (3) Pumps – 9000 GPM.
		• PLACE LV-3245, Condensate Drawoff Valve to DISABLE. [Step 15.e - YES]
		• DETERMINE SO23-12-2, Reactor Trip Recovery, NOT being implemented. [Step 15.f - YES]
		• [RNO] CLOSE HV-4053 & HV-4054, SG Blowdown Valves and GO to Step 16. [Step 15.g - YES].

Operating Test :	NRC	Scenario #	1	Event #	4, 5, 6, 7, 8, & 9	Page	29	of	29
Event Description:	2nd Dropped CEA / Reactor Trip Circuit Breaker Failure (ATWS) / Loss of Reactor Coolant Pumps / Loss of Vacuum / HP Turbine Stop Valves Failure / Auxiliary Feedwater Pumps Actuation Failure								

Time	Position	Applicant's Actions or Behavior
	BOP	VERIFY Start-Up Range Channels: [Step 16 - YES]
		• VERIFY both Start-Up Range Channels – OPERABLE. [Step 16.a - YES]
SO23-12-1, Standard Post Trip Actions, Steps 12 through 16 are complete.		

Appendix D	Scenario Outline	Form ES-D-1

Facility:	SONGS 2 & 3	Scenario No.:	2	Op Test No.:	October 2011 NRC
Examiners:		Operators:			

Initial Conditions: 100% power MOL - RCS Boron is 980 ppm (via sample).

Turnover: Maintain steady-state power conditions.

Critical Tasks:
- Restore Flow to CCW Non-Critical Loop Prior to Exceeding Reactor Coolant Pump Operating Limits per SO23-13-26, Loss of Power to an AC Bus.
- Restore Feedwater Flow to At Least One Steam Generator Prior to Exiting SO23-12-1, Standard Post Trip Actions.
- Restore Power to a 1E 4160 Volt Bus per SO23-12-11, EOI Supporting Attachments, Attachment 24, Supplying 1E 4 kV Bus with Opposite Unit Diesel.

Event No.	Malf. No.	Event Type*	Event Description
1 +10 min	RC15B	I (RO, SRO)	Pressurizer Pressure Control Channel Y (PT-0100Y) Fails High.
2 +20 min	SG03C	I (BOP, SRO) TS (SRO)	Steam Generator (E-088) Pressure Transmitter (PT-1023-3) Fails Low.
3 +25 min	CV19 CVCS LP	I (RO, SRO)	Letdown Temperature Control Valve Transmitter (TT-0223) Fails Low. Boronometer Valve (TV-0224A) Fails to Reposition.
4 +45 min	ED03A	C (RO, BOP, SRO) TS (SRO)	Overcurrent Trip of 1E 4160 Volt Bus 2A04.
5 +50 min	PG24	M (RO, BOP, SRO)	Loss of Offsite Power.
6 +50 min	RD5002 RD6402 RD7402	C (RO)	Three (3) Stuck Control Element Assemblies. Loss of Reactivity Control, Emergency Boration Required.
7 +52 min	EG08B	C (BOP)	Train B Emergency Diesel Generator (G-003) Start Failure. Station Blackout.
8 +55 min	AFW LP	C (BOP)	Auxiliary Feedwater Pump (P-140) Fails to Start on Emergency Feedwater Actuation Signal (EFAS). Loss of Feedwater Flow.

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

Actual	Target Quantitative Attributes
8	Total malfunctions (5-8)
3	Malfunctions after EOP entry (1-2)
3	Abnormal events (2-4)
1	Major transients (1-2)
2	EOPs entered/requiring substantive actions (1-2)
1	EOP contingencies requiring substantive actions (0-2)
3	Critical tasks (2-3)

SCENARIO SUMMARY NRC #2

The crew will assume the watch at 100% power with no scheduled activities per Operating Instruction (OI) SO23-5-1.7, Power Operations. When the Shift Turnover is complete, a Pressurizer Pressure Channel fails high. Actions are per Abnormal Operating Instruction (AOI) SO23-13-27, Pressurizer Pressure and Level Malfunction. The alternate controlling channel will be placed in service and Pressurizer Heaters will be restored to operation. If pressure drops below 2025 PSIA, the SRO will refer to Technical Specifications.

When Technical Specifications have been referenced, a Steam Generator Pressure Channel fails low. The crew will respond per AOI SO23-13-18, Reactor Protection System Failure, and OI SO23-3-2.38, Digital Control System Operation. Steam Generator Pressure trips will be bypassed in the Reactor Protection System and the Feedwater Control System. The SRO will refer to Technical Specifications.

The next event is a low failure of the Letdown Temperature Control Valve (TCV) Transmitter. Letdown temperature quickly rises, causing a high temperature alarm, with a failure of automatic actions to isolate the Boronometer. The crew will respond per the Annunciator Response Procedures (ARPs) to manually satisfy the automatic actions and restore Letdown temperature to normal. The TCV will remain in MANUAL.

When Letdown temperature is stable, a loss of Train A 1E Bus 2A04 will occur due to an overcurrent trip and lockout. The crew will enter AOI SO23-13-26, Loss of Power to an AC Bus. Crew actions include placing a Charging Pump in service, transferring to the Train B Component Cooling Water System, initiating Train B Toxic Gas Isolation System, and starting a Containment Dome Air Circulating Fan. The SRO will refer to Technical Specifications.

When conditions are stable, a Loss of Offsite Power will occur. The crew will enter Emergency Operating Instruction (EOI) SO23-12-1, Standard Post Trip Actions (SPTAs), and perform actions to stabilize the plant. During the trip, three Control Element Assemblies will be stuck, Train B Emergency Diesel Generator (EDG) will fail to start, and the Turbine Driven Auxiliary Feedwater (TDAFW) Pump will fail to start on the Emergency Feedwater Actuation Signal (EFAS). The SRO will recognize a Loss of Reactivity Control, Station Blackout, and Loss of Feedwater requiring entry into EOI SO23-12-9, Functional Recovery.

The Loss of Feedwater event is remedied by manually starting P-140, TDAFW Pump. The Station Blackout cannot be remedied until power is available, therefore, reenergizing the 1E 4 kV Bus is a priority and is accomplished by cross connecting with the Unit 3 Train B Emergency Diesel Generator. The Loss of Reactivity Control is remedied by Reactor power level lowering below $1x10^{-4}$% power. The crew may opt to initiate Emergency Boration when 1E Bus power is restored. The scenario is terminated when power is restored to Bus 2A06 and a Charging Pump and Component Cooling Water Train are returned to service.

Risk Significance:

- Failure of risk important system prior to trip: Loss of 1E 4160 Volt Bus 2A04
- Risk significant core damage sequence: Loss of Reactivity Control
  Station Blackout / Loss of Feedwater Flow
- Risk significant operator actions: Restore Flow to Non-Critical Loop
  Restore Power to 4160 Volt Bus 2A06

Scenario Event Description
NRC Scenario #2

MACHINE OPERATOR INSTRUCTIONS for SIMULATOR SETUP

INITIALIZE to IC-230 NRC Scenario #2 and associated Setup File.

EVENT	TYPE	MALF #	DESCRIPTION	DEMAND VALUE	INITIATING PARAMETER
SETUP	MF	RD5002	Stuck Control Element Assembly #50	STUCK	
	MF	RD6402	Stuck Control Element Assembly #64	STUCK	
	MF	RD7402	Stuck Control Element Assembly #74	STUCK	
	MF	EG08B	Train B EDG start failure		
1	MF	RC15B	Channel X PZR Pressure PT-0100Y failure	2500 psia	
2	MF	SG03C	SG E-088 Pressure Channel PT-1023-3 failure	0 psia	
2	RF	RP51	PPS Door Open Annunciator 56B46 ON	OPEN	By Direction
2	RF	RP54L	Low SG-2 Pressure Channel C	BYPASS	5 sec TD
2	RF	RP54U	High SG-1 DP EFAS-1 Channel C	BYPASS	10 sec TD
2	RF	RP54V	High SG-2 DP EFAS-2 Channel C	BYPASS	15 sec TD
2	RF	RP51	PPS Door Open Annunciator 56B46 OFF	CLOSE	20 sec TD
3	MF	CV19	Letdown Temp. Control Valve TT-0223 fails low	0ºF	
3	LP	CVCS LP	CVCS TV-0224A fails to reposition	AS IS	
4	MF	ED03A	Train A Bus 2A04 overcurrent trip and lockout	FAULT	
4	RF	RP51	PPS Door Open Annunciator 56B46	OPEN	By Direction
4	RF	RP52C	Channel A Hi Local Power	BYPASS	5 sec TD
4	RF	RP52D	Channel A Low DNBR	BYPASS	10 sec TD
4	RF	RP51	PPS Door Open Annunciator 56B46	CLOSE	15 sec TD
5	MF	PG24	Loss of Offsite Power		
6	MF	RD5002	Stuck Control Element Assembly #50	STUCK	
6	MF	RD6402	Stuck Control Element Assembly #64	STUCK	
6	MF	RD7402	Stuck Control Element Assembly #74	STUCK	

7	MF	EG08B	Train B EDG start failure		
7	RF	EG62A	Unit 2 Train B 50.54.X switch	CLOSE	
7	RF	EG62B	Unit 2 Train B 50.54.X switch	CLOSE	
7	RF	EG62C	Unit 3 Train B 50.54.X switch	CLOSE	
7	RF	EG62D	Unit 3 Train B 50.54.X switch	CLOSE	
8	MF	AFW LP	TDAFW Pump P-140 EFAS start failure		

Machine Operator:	**EXECUTE IC-230 NRC Scenario #2 and SETUP file to align components.** **ENSURE CVCS Blend Setpoints MATCH Shift Turnover Sheet.** **CHANGE Operator Aid Tag #029 (CVCS) to reflect boron concentration.** **VERIFY both Pressurizer Spray Valves in AUTO.** **VERIFY Channel Y Pressurizer Pressure and Level in service.** **ENSURE Turbine Ramp Rate set to 100 MWe per minute.** **PROVIDE procedures in progress, Shift Turnover, and Reactivity Management Guide to crew in Briefing Room:** **- COPY of SO23-5-1.7, Power Operations, Section 6.1, Guidelines for Steady State Operation.** **- LAMINATED COPY of SO23-5-1.7, Power Operations, Attachment 8, Power Maneuvering Guidelines** **PLACE the MOC copy of OPS Physics Summary Book on SRO Desk.** **VERIFY CEA positions with ARO.**
Control Room Annunciators in Alarm:	
NONE	

Operating Test :	NRC	Scenario #	2	Event #	1	Page	6	of	34
Event Description:	Pressurizer Pressure Control Channel Failure								

Time	Position	Applicant's Actions or Behavior
Machine Operator: When directed, EXECUTE Event 1. - RC15B, Pressurizer Pressure Controlling Channel PT-0110Y fails high.		
Indications Available: **50A04 – PZR PRESS DEVIATION HI / LO** **50A14 – PZR PRESS HI / LO** **Pressurizer Heaters off** **Both Pressurizer Spray Valves full open**		
+30 secs	RO	REFER to Annunciator Response Procedures (ARPs).
	RO	DETERMINE which channel initiated the alarm using PR-100.
		• RECOGNIZE Channel Y (PR-0100B) has failed high.
Examiner Note: RO may use "prompt and prudent" action to swap Channels. The next steps are from Annunciator Response Procedure 50A14 - PZR PRESS HI / LO.		
	RO	DETERMINE controlling channel has failed and POSITION HS-0100A, Pressurizer Pressure Channel Select Switch to Channel X. [Steps 1.1 & 1.1.1 - YES]
	RO	DETERMINE controlling channel has failed and INFORM the SRO SO23-13-27 entry required. [Steps 1.1 & 1.1.2 - YES]
Examiner Note: The following steps are from SO23-13-27, Pressurizer Pressure and Level Malfunction.		
	SRO	ENTER SO23-13-27, Pressurizer Pressure and Level Malfunction.
		• IDENTIFY uncontrolled pressure change and GO to Step 3. [Step 1 - YES]

Operating Test :	NRC	Scenario #	2	Event #	1	Page	7	of	34
Event Description:	Pressurizer Pressure Control Channel Failure								

Time	Position	Applicant's Actions or Behavior
		GUIDELINES 1) A Pressurizer Pressure signal failure affects the Modulate and Permissive circuits of SBCS in the following way: • Channel X or Y high failure could delay the Master Controller response and bring in the permissives early • Channel X or Y low failure will delay the response of both controllers 2) See Attachment 1 for the Pressurizer Pressure Control Block Diagram. 3) See Attachment 4 for Pressurizer Pressure Control Diagrams. 4) To diagnose controller alarms, refer to SO23-3-1.10, Attachment for Foxboro Alarm Response and Foxboro Controller Page Data. 5) Reactivity will be impacted by changes in Pressurizer Heater configuration and Pressurizer Spray control. The RCS Reactivity Pressure Coefficient is a positive coefficient and is about one tenth the absolute value of the Moderator Temperature Coefficient.
	SRO/RO	DETERMINE Pressurizer Spray Valve is NOT STUCK OPEN. [Step 3.a - YES]
	SRO/RO	DETERMINE Pressurizer pressure Channel Y NOT between 2225 PSIA and 2275 PSIA. [Step 3.b - YES]
	RO	• [RNO] OBSERVE PR-0100A and DETERMINE Pressurizer pressure Channel X available.
	RO	• [RNO] POSITION HS-0100A, Pressurizer Pressure Channel Select Switch to Channel X.
	SRO/RO	DETERMINE Pressurizer Pressure is NOT stable and TRENDING low. [Step 3.c - YES]
	RO	• [RNO] START and/or VERIFY PZR Backup and Proportional Heaters ENERGIZED.
	RO	• [RNO] DETERMINE Pressurizer Spray Valves – CLOSED.
	RO	DETERMINE normal Charging and Letdown – IN SERVICE. [Step 3.d - YES]
	SRO	GO to Step 3.i. [Step 3.e - YES]

Operating Test : NRC	Scenario # 2	Event # 1	Page 8 of 34
Event Description: Pressurizer Pressure Control Channel Failure			

Time	Position	Applicant's Actions or Behavior
	SRO	INITIATE notification to I & C. [Step 3.i - NO]
	SRO/RO	DETERMINE Pressurizer Pressure signal HAS failed high. [Step 3.j - YES]
	RO	• [RNO] OPERATE PZR Backup and Proportional Heaters as required by direction.
	RO	VERIFY Pressurizer Pressure Control System operating properly in AUTO. [Step 3.k - YES]
	RO	VERIFY Pressurizer Spray NOT initiated with ΔT > 180ºF. [Step 3.l - YES]
Examiner Note: Technical Specification LCO 3.4.1 is entered if RCS pressure drops below 2025 PSIA.		
+10 min	SRO	NOTIFY personnel & EVALUATE Technical Specifications. [Step 3.m - YES]
		• LCO 3.4.1.A, RCS DNB Limits.
		• CONDITION A - Pressurizer pressure not within limits. • ACTION A.1 - Restore Pressurizer pressure to within limit within two (2) hours.
When Technical Specifications are addressed, or at Lead Examiner discretion, PROCEED to Event 2.		

Operating Test :	NRC	Scenario #	2	Event #	2	Page	9	of	34
Event Description:	Steam Generator Pressurizer Pressure Transmitter Failure								

Time	Position	Applicant's Actions or Behavior
Machine Operator: When directed, EXECUTE Event 2. - SG03C, SG E-088 Pressure Transmitter PT-1023-3 fails low.		
Indications Available: **52A13 – FWCS TROUBLE** **56A41 – SG2 E088 PRESS LO CHANNEL TRIP** **56A44 – SG1 E089 PRESS > SG2 E088 ESFAS CH TRIP** **56A51 – SG2 E088 PRESS LO PRETRIP** **56A54 – SG1 E089 PRESS > SG2 E088 PRETRIP** **56B26 – PPS CHANNEL 3 TROUBLE** **PI-1023A3, SG E088 Pressure Transmitter indication fails low**		
+30 sec	RO/BOP	REFER to Annunciator Response Procedures (ARPs).
	BOP	RECOGNIZE Steam Generator E-088 Pressure Channel failure and INFORM the SRO SO23-13-18 entry required.
Examiner Note: The following steps are from SO23-13-18, Reactor Protection System Failure.		
	SRO	ENTER SO23-13-18, Reactor Protection System Failure.
	RO	OBSERVE instrumentation for the affected channel and alternate redundant indications monitoring the same parameter to DETERMINE failure. [Step 1.a - YES]
NOTE For failures affecting RPS/ESFAS Matrix Logic, RPS/ESFAS Initiation Logic, RTCBs, RPS/ESFAS Manual Trip or ESFAS Actuation Logic, refer to Tech. Spec. LCO 3.3.4 and LCO 3.3.6.		
	RO	IDENTIFY SG E-088 Pressure Channel indication PI-1023-3 failure and GO to Step 3. [Step 1.a - YES]

Operating Test :	NRC	Scenario #	2	Event #	2	Page	10	of	34
Event Description:	Steam Generator Pressurizer Pressure Transmitter Failure								

Time	Position	Applicant's Actions or Behavior
		NOTE Failure of a measured variable channel may affect more than one Functional Unit (e.g., PZR Pressure Hi affects DNBR and LPD).
	SRO	REFER to Attachment 10 and DETERMINE Functional Unit affected is Steam Generator E-088 Pressure Transmitter PT-1023-3. [Step 3.a - YES]
	SRO	DIRECT placing the Functional Unit in BYPASS per SO23-3-2.12, Reactor Protection System Operation. [Step 3.b - YES]
	RO	PLACE Functional Unit in BYPASS per SO23-3-2.12, RPS Operation, Section 6.3, Bypass Operation of Trip Channels. [Step 3.b - YES]
Examiner Note:		**The following steps are from SO23-3-2.12, Reactor Protection System Operation, Section 6.3, Bypass Operation of Trip Channels.**
		NOTE The PPS CHANNEL 1 (2,3,4) TRIP BYPASSED alarm does not have reflash capability. It will annunciate once when the first functional unit is placed in bypass. Additional functional units placed in bypass on the same PPS channel will not annunciate. When functional units are being removed from bypass, then the alarm will not reset until the last functional unit on that PPS channel is removed from bypass. **CAUTION** Prior to testing the Reactor Protective System (RPS) portion of a PPS Bay, the RPS trips shall be bypassed.
	RO	VERIFY that the same bistable is not in BYPASS on any other Channel. [Step 6.3.1 - YES]
	ARO	UNLOCK and OPEN the Bistable Control Panel. [Step 6.3.2 - YES]
Examiner Note:		**Trip BYPASS is performed by the Machine Operator and verified by the RO.**

Operating Test :	NRC	Scenario #	2	Event #	2	Page	11	of	34
Event Description:	Steam Generator Pressurizer Pressure Transmitter Failure								

Time	Position	Applicant's Actions or Behavior
		M.O. Cue: When directed, EXECUTE the following remote functions: **RP51 = OPEN (PPS Door Open Annunciator 56B46)** **RP54L = BYPASS (Low SG-2 Pressure Channel C)** **RP54U = BYPASS (High SG-1 DP EFAS-1 Channel C)** **RP54V = BYPASS (High SG-2 DP EFAS-2 Channel C)** **DELETE RP51 (PPS Door Open Annunciator 56B46)**
		Examiner Note: Several Step 6.3.2 sub-steps cannot be performed in the Simulator.
	RO	OBSERVE Annunciator 56A49 - PPS CHANNEL 3 TRIP BYPASSED in alarm **and** amber BYPASS light on Channel C PPS Operator Module. [Step 6.3.2.4 - YES]
	RO	LOG the Bypass and Reason in Control Operator Log. [Step 6.3.2.5 - YES]
	SRO	INITIATE a LCOAR or follow guidelines of SO123-0-A5. [Step 6.3.2.6 - NO]
		Examiner Note: The following steps are from SO23-13-18, Reactor Protection System Failure.
	SRO	CONFIRM failure does NOT affect RPS/ESFAS Matrix Logic, RPS/ESFAS Initiation Logic, RTCBs, RPS/ESFAS Manual Trip, or ESFAS Actuation Logic. [Step 3.c - YES]
	SRO/BOP	CONFIRM failure AFFECTS the Feedwater Digital Control System. [Step 3.d - YES]
		• [RNO] DIRECT bypass of Steam Generator E-088 pressure transmitter per SO23-3-2.38, Digital Control System Operation.
		Floor Cue: If not initiated, DIRECT SRO as Shift Manager to perform SO23-3-2.38 actions.
	SRO	EVALUATE Technical Specifications. [Step 3.e - YES]
		• LCO 3.3.1.A, Reactor Protection System Instrumentation.
		• CONDITION A - One or more Functions with one automatic RPS trip channel inoperable. • ACTION A.1 - Place Channel in bypass or trip within one (1) hour.

Operating Test :	NRC	Scenario #	2	Event #	2	Page	12	of	34
Event Description:	Steam Generator Pressurizer Pressure Transmitter Failure								

Time	Position	Applicant's Actions or Behavior
		• LCO 3.3.5.B, ESFAS Instrumentation.
		• CONDITION B - One automatic trip channel inoperable for SG Pressure-Low or SG Pressure Difference-High for the EFAS function. • ACTION B.1 - Place Functional Unit in bypass within one (1) hour.
	SRO	CONFIRM failure did NOT involve a failed PPS Power Supply. [Step 3.f - YES]
	SRO	NOTIFY Shift Manager to PERFORM Administrative Actions. [Step 3.g - YES]
Examiner Note: The following steps are from SO23-3-2.38, Digital Control System Operation, Section 6.7, Bypassing Selected Feedwater Control Signals.		
NOTE Only three of four instruments are used for determining the parameter output (Selected Signal). "D" channel is the default channel for bypass. If there are only two instruments, then both are used to determine output.		
	BOP	VERIFY affected instrument can be bypassed in Feedwater DCS. [Step 6.7.1 - YES]

PARAMETER	E088	E089
SG Pressure	PT-1023-1, -2, -3, -4	PT-1013-1, -2, -3, -4
Feedwater Flow	FT-1121, FT-1122	FT-1111, FT-1112
NR Level	LT-1123-1, -2, -3, -4	LT-1113-1, -2, -3, -4
WR Level	LT-1125-1, -2	LT-1115-1, -2
Feedwater Temperature	TW-4036, TW-4037, TW-4040, TW-4045 (Same instruments are on both S/G screens)	

Operating Test :	NRC	Scenario #	2	Event #	2	Page	13	of	34
Event Description:	Steam Generator Pressurizer Pressure Transmitter Failure								

Time	Position	Applicant's Actions or Behavior
	BOP	PLACE Feedwater Control instrument in BYPASS: [Step 6.7.2 - YES]
		• CONDUCT a Reactivity Brief. [Step 6.7.2.1 - YES]
		• ACCESS **Selected Signals** screen for SG E-088. [Step 6.7.2.2 - YES]
		• VERIFY SG E-088 Channel D signal is valid. [Step 6.7.2.3 - YES]
		• SELECT BYPASS for Channel C SG pressure. [Step 6.7.2.4 - YES]
		• VERIFY Channel C indicates BYPASS. [Step 6.7.2.5 - YES]
		• VERIFY Channel D NOT in BYPASS. [Step 6.7.2.6 - YES]
+10 min		• VERIFY Channel D output looks valid. [Step 6.7.2.7 - YES]
When Technical Specifications are addressed, or at Lead Examiner discretion, PROCEED to Event 3.		

Operating Test :	NRC	Scenario #	2	Event #	3	Page	14	of	34
Event Description:	Letdown Heat Exchanger Temperature Control Valve Failure								

Time	Position	Applicant's Actions or Behavior
Machine Operator:		**When directed, EXECUTE Event 3.** **- CV19, Letdown Temperature Control Valve Transmitter fails low.** **- CVCS LP, Boronometer Control Valve (TV-0224A) fail to reposition.**
Indications Available:		**58A32 – LETDOWN HX OUTLET TEMP HI**
+30 secs	RO	REFER to Annunciator Response Procedures (ARPs).
Examiner Note:		**The BOP may perform "prompt and prudent" actions to control Letdown temperature. This is allowed per SO123-0-A1, Conduct of Operations, Section 6.8, Procedure Use and Adherence, Step 6.8.3.**
Examiner Note:		**The following steps are from Annunciator 58A32 - LETDOWN HX OUTLET TEMP HI.**
	RO	RECOGNIZE Letdown Heat Exchanger outlet high temperature alarm and INFORM SRO ARP SO23-15-58.A, Annunciator 58A32 entry required.
	SRO	ENTER SO23-15-58.A, 58A32 - LETDOWN HX OUTLET TEMP HI.
	RO	DETERMINE TV-0224B, Demineralizer Temperature Control Valve CLOSED on high temperature and AUTO ALIGNED to BYPASS position. [Steps 1.1 & 1.1.1 - YES]
	RO	DETERMINE TV-0224A, Boronometer Isolation Valve failed to AUTO CLOSE on high temperature. I [Steps 1.1 & 1.1.2 - YES]
		• [RNO] DEPRESS 2TV-0224A, Boronometer Isolation Valve CLOSE pushbutton.
	SRO	CONTACT I & C to investigate cause of problem. [Step - YES]
M.O. Cue:		**If I & C is contacted, REPORT a connector between the field and temperature controller must be replaced. Estimated Time of Repair is four hours.**
	RO	If Letdown Heat Exchanger is > 130ºF take MANUAL control of TIC-0223. [Step 3.1 - YES]

Operating Test :	NRC	Scenario #	2	Event #	3	Page	15	of	34
Event Description:	Letdown Heat Exchanger Temperature Control Valve Failure								

Time	Position	Applicant's Actions or Behavior
		• [RNO] TRANSFER 2TIC-0223, Letdown HX Outlet Temperature to MANUAL.
		• [RNO] ADJUST Controller to maintain desired Letdown HX Outlet temperature.
+5 min	RO	MONITOR Letdown Heat Exchanger outlet temperature at least twice per Shift. [Step 4.1 - YES]
When CVCS control is restored, or at Lead Evaluator's discretion, PROCEED to Event 4.		

Operating Test :	NRC	Scenario #	2	Event #	4	Page	16	of	34
Event Description:	Train A Bus 2A04 Overcurrent Trip and Lockout								

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 / 2B24 VOLTAGE LO** **63B25 – 2A04 SUPPLY BKR 2A0418 OC** **Multiple 1E 4160 Volt Bus related alarms**
+30 sec	RO/BOP	REFER to Annunciator Response Procedures (ARPs).
	RO/BOP	RECOGNIZE low Bus 2A04 voltage and INFORM the SRO SO23-13-26 entry required.
	SRO	ENTER SO23-13-26, Loss of Power to an AC Bus.
		• DETERMINE Bus 2A04 has lost power. [Step 4.1.1 - YES]
		• PLACE Check Mark next to deenergized Bus 2A04. [Step 4.1.2 - YES]
		• GO to SO23-13-26, Attachment 1. [Step 4.1.3 - YES]
		• IF more than one bus has lost power, THEN perform attachments and steps concurrently. [Step 4.1.4 - NO]
	SRO	ENTER SO23-13-26, Loss of Power to an AC Bus.
	SRO	DIRECT performance of SO23-13-26, Loss of Power to an AC Bus, Attachment 1, Loss of 1E 4 kV Bus.
Examiner Note:		**The following steps are from SO23-13-26, Loss of Power to an AC Bus Attachment 1, Loss of 1E 4 kV Bus.**

NOTE

Tech. Spec. LCO 3.0.3 is the most limiting shutdown action associated with the loss of a 1E bus. There are numerous other Tech. Spec. actions impacted, some of which are not readily apparent (e.g., Tech. Spec. 3.6.3 for the Noncritical Loop to Containment Isolation Valves).
All affected equipment should be evaluated for Tech. Spec. impact.

Operating Test :	NRC	Scenario #	2	Event #	4	Page	17	of	34
Event Description:	Train A Bus 2A04 Overcurrent Trip and Lockout								

Time	Position	Applicant's Actions or Behavior
	SRO	DETERMINE CCW noncritical loop is NOT aligned to an operating LOOP and DIRECT starting of Train B CCW. [Step 1.a - YES]
	BOP	• [RNO] START CCW Pump P-026 and VERIFY that SWC Pump P-114 automatically STARTS.
		• DEPRESS HS-6324-2, CCW Pump P-026 START pushbutton and OBSERVE SWC Pump P-114 AUTO START.
CRITICAL TASK STATEMENT		**Restore Flow to CCW Non-Critical Loop Prior to Exceeding Reactor Coolant Pump Operating Limits per SO23-13-26, Loss of Power to an AC Bus.**
CRITICAL TASK	BOP	TRANSFER the CCW Non-Critical Loop to Train B. [Step 1.a RNO - YES]
		• DEPRESS and MAINTAIN DEPRESSED the OPEN pushbuttons for HV-6213 and HV-6219, Critical Loop B Supply and Return to NCL.
		• When HV-6212 and HV-6218, Critical Loop A Supply and Return to NCL indicate CLOSED, then RELEASE the OPEN pushbuttons for HV-6213 and HV-6219.
	BOP	TRANSFER Letdown Heat Exchanger to Train B CCW. [Step 1.a RNO - YES]
		• CLOSE HV-6293B/A, CCW Critical Loop A Letdown HX ME-062 Return/Supply Valves.
		• OPEN HV-6522B/A, CCW Critical Loop B Letdown HX ME-062 Return/Supply Valves.
	SRO	When contacted, DETERMINE that loss of 2A04 is NOT due to fire. [Step 1.b - YES]
M.O. Cue: When directed to investigate 2A0418 overcurrent, WAIT 3 minutes and REPORT an overcurrent flag on Phase B.		
	SRO	DIRECT performance of SO23-6-9, 6.9 kV, 4 kV and 480 V Bus Feeder Faults. [Step 1.c.1) RNO - YES]
	SRO	DIRECT performance of SO23-13-26, Loss of Power to an AC Bus, Attachment 3, Equipment Actions for Loss of Bus A04. [Step 1.c.2) RNO - YES]

Operating Test :	NRC	Scenario #	2	Event #	4	Page	18	of	34
Event Description:	Train A Bus 2A04 Overcurrent Trip and Lockout								

Time	Position	Applicant's Actions or Behavior
Examiner Note: The following steps are from SO23-13-26, Loss of Power to an AC Bus, Attachment 3, Equipment Actions for Loss of Bus A04.		
	SRO	EVALUATE Technical Specification LCO 3.8.9. [Step 2.1 - YES]
		• LCO 3.8.9, Distribution Systems - Operating.
		• CONDITION A - One AC electrical power distribution system inoperable. • ACTION A.1 - Restore AC electrical power distribution system to OPERABLE status within eight hours.
	CREW	PERFORM the following associated actions: [Step 2.2 - YES]
	BOP	• ENSURE Train B SWC Pump running. [Step 2.2.1 - YES]
	BOP	• PLACE HS-1767-1, 2G002 Maintenance Lockout Switch in MAINT position. [Step 2.2.2 - YES]
	SRO	• Within 1 hour, DIRECT performance of SO23-3-3.23, Attachment for AC Sources Verification for both Units. [Step 2.2.2 - YES]
	RO	• PLACE Makeup Mode Selector in MANUAL MODE and PLACE a Caution Tag next to Boration / Dilution HSI Panel [Step 2.2.3 - YES]
		• SELECT MODIFY in Mode Selector window.
		• ACTIVATE window and SELECT MANUAL.
	SRO	• DIRECT restoring Battery Chargers to D1 and D3. [Step 2.2.4 - YES]
	SRO	• DIRECT Channel A DNBR and LPD trips BYPASSED. [Step 2.2.4.1) - YES]
	SRO	• DIRECT setting CEAC 2 INOP Flags in all CPCs by changing each CPC Addressable Constant Point ID 062 to 2. [Step 2.2.4.2) - YES]

Operating Test :	NRC	Scenario #	2	Event #	4	Page	19	of	34
Event Description:	Train A Bus 2A04 Overcurrent Trip and Lockout								

Time	Position	Applicant's Actions or Behavior
	SRO	• DISPATCH operator to OPEN Channel A CPC Power Supplies to REDUCE D1 Battery load. [Step 2.2.4.3) - YES]
M.O. Cue: If asked, REPORT Unit 3 Train B Component Cooling Water is operating.		
	RO/BOP	• If MCC BQ is powered from Unit 2, ENSURE Train B CCW / SWC in service for Unit supplying ME-335. [Step 2.2.5 - YES]
	BOP	• INITIATE Train B CRIS. [Step 2.2.5 - YES]
	BOP	• ENSURE A-072 **or** A-073, Dome Air Circulating Fan running. [Step 2.2.6 - YES]
	SRO	• DIRECT aligning P-10, Spent Fuel Pool Cooling Pump per SO23-13-23. [Step 2.2.7 - YES]
	SRO	• DIRECT aligning P-025, CCW Pump to Train B. [Step 2.2.8 - YES]
	SRO	• DIRECT aligning P-018, HPSI Pump to Train B. [Step 2.2.9 - YES]
+20 min	SRO	• DIRECT aligning Charging Pump P-191 to Train B. [Step 2.2.10 - YES]
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.		

Operating Test :	NRC	Scenario #	2	Event #	5, 6, 7, & 8	Page	20	of	34
Event Description:	Loss of Offsite Power / Three (3) Stuck Control Element Assemblies / Train B Emergency Diesel Generator Start Failure / Turbine Driven Auxiliary Feedwater Pump EFAS Start Failure								

Time	Position	Applicant's Actions or Behavior
Machine Operator: When directed, EXECUTE Events 5, 6, 7, and 8. **- PG24, Loss of Offsite Power.** **- RD5002, RD6402, & RD7402, Stuck CEAs #50, #64, & #74.** **- EG08B, Train B Emergency Diesel Generator start failure.** **- AFW LP, Auxiliary Feedwater Pump P-140 EFAS start failure.**		
Indications Available: **Numerous Loss of Offsite Power and Reactor Trip related alarms**		
	SRO	DIRECT performance of SO23-12-1, Standard Post Trip Actions.
	RO	VERIFY Reactor Trip: [Step 1 - YES]
		• VERIFY Reactor Trip Circuit Breakers OPEN. [Step 1.a - YES]
		• VERIFY Reactor Power lowering and Startup Rate NEGATIVE. [Step 1.b - YES]
		• DETERMINE three (3) Full Length CEAs NOT fully inserted. [Step 1.c - YES]
	SRO/RO	DETERMINE Reactivity Control criteria NOT satisfied. [Step 1 - YES]
Examiner Note: The EOI Bases do NOT require Emergency Boration with ≥ 2 stuck CEAs if power has decayed below 1x10^{-4}%. During validation, power was well below this threshold prior to restoration of Bus 2A06.		
Examiner Note: The following steps are from SO23-13-11, Emergency Boration of the RCS. These actions cannot be performed until power is restored to Bus 2A06.		
	RO	OPEN HV-9247, Emergency Boration Block Valve. [Step 2.c.1) - NO]
		• [RNO] INITIATE Emergency Boration using Gravity Feed:
		• [RNO] ENSURE HV-9247, Emergency Boration Block Valve – CLOSED.
		• [RNO] OPEN HV-9240, BAMU Tank MT-071 to Charging Pump Gravity Feed Valve.
		• [RNO] OPEN HV-9235, BAMU Tank MT-072 to Charging Pump Gravity Feed Valve.
		• [RNO] GO to Step 2.h.

Operating Test :	NRC	Scenario #	2	Event #	5, 6, 7, & 8	Page	21	of	34
Event Description:	Loss of Offsite Power / Three (3) Stuck Control Element Assemblies / Train B Emergency Diesel Generator Start Failure / Turbine Driven Auxiliary Feedwater Pump EFAS Start Failure								

Time	Position	Applicant's Actions or Behavior
		VERIFY OPEN HV-9240, BAMU Tank MT-071 **and/or** HV-9235, BAMU Tank MT-072 to Charging Pump Gravity Feed Valves. [Step 2.h.1) - NO]
		CLOSE HV-9253, Makeup to VCT Valve, in MANUAL. [Step 2.h.2) - NO]
		ENSURE Charging flow > 40 gpm. [Step 2.i - NO]
	BOP	VERIFY Turbine Trip: [Step 2 - YES]
		• VERIFY HP & LP Stop and Governor Valves CLOSED. [Step 2.a - YES]
		• VERIFY both Unit Output Breakers OPEN. [Step 2.b - YES]
	SRO	INITIATE Administrative Actions: [Step 3 - YES]
		• INITIATE Attachment 4, Worksheet. [Step 3.a - YES]
		CAUTION DO NOT OPERATE TRIP pushbuttons for tripped breakers. Operation of TRIP pushbuttons will reset overcurrent protection allowing Diesel Generator output breaker to close to a fault.
	BOP	DETERMINE Vital Auxiliaries criteria NOT satisfied: [Step 4 - YES]
		• DETERMINE both 1E 4 kV Buses 2A04 and 2A06 DEENERGIZED. [Step 4.a - YES]
		• [RNO] DETERMINE Train A EDG in Maintenance Lockout.
		• [RNO] DETERMINE Train B EDG did NOT start.
		• DETERMINE all 1E 480 V Buses 2B04, 2B24, 2B06, & 2B26 DEENERGIZED. [Step 4.b - YES]
		• [RNO] DETERMINE Train A EDG in Maintenance Lockout.
		• [RNO] If Train B Bus B26 DEENERGIZED, PLACE Train B EDG in Maintenance Lockout.
		• INSERT key and TURN HS-1770-2 to MAINT position.
		• INITIATE Attachment 2, Diesel Generator Follow-Up Actions.
		• VERIFY all 1E DC Buses ENERGIZED. [Step 4.c - YES]
		• DETERMINE all Non-1E 4 kV Buses 2A03, 2A07, 2A08, & 2A09 DEENERGIZED. [Step 4.d - YES]

Operating Test :	NRC	Scenario #	2	Event #	5, 6, 7, & 8	Page	22	of	34
Event Description:	Loss of Offsite Power / Three (3) Stuck Control Element Assemblies / Train B Emergency Diesel Generator Start Failure / Turbine Driven Auxiliary Feedwater Pump EFAS Start Failure								

Time	Position	Applicant's Actions or Behavior
		• [RNO] RESTORE power to buses as time and resources permits.
		• DETERMINE CCW Train NOT OPERATING and NOT ALIGNED to Non-Critical Loop and Letdown Heat Exchanger due to Station Blackout. [Step 4.e - YES]
	RO	VERIFY RCS Inventory Control criteria satisfied: [Step 5 - YES]
		• VERIFY PZR level between 10% and 70% and TRENDING to between 30% and 60%. [Step 5.a - YES]
		• VERIFY Core Exit Saturation Margin ≥ 20ºF: [Step 5.b - YES]
		• OBSERVE QSPDS page 611 **or** CFMS page 311.
	RO	DETERMINE RCS Pressure Control criteria NOT satisfied: [Step 6 - YES]
		• DETERMINE PZR pressure NOT between 1740 PSIA and 2380 PSIA, NOT controlled and NOT TRENDING to between 2025 PSIA and 2275 PSIA. [Step 6.a - YES]
		• [RNO] DETERMINE PZR Pressure Control System is NOT restoring PZR pressure.
		• [RNO] ENSURE Normal and Aux Spray Valves CLOSED.
	RO	DETERMINE Core Heat Removal criteria NOT satisfied: [Step 7 - YES]
		• DETERMINE no RCPs operating. [Step 7.a - YES]
		• [RNO] GO to Step 7.c.
		• DETERMINE Core Exit Saturation Margin ≥ 20ºF. [Step 7.c - YES]
		• OBSERVE QSPDS page 611 **or** CFMS page 311.
	BOP	VERIFY RCS Heat Removal criteria satisfied: [Step 8 - YES]
		• VERIFY both SG narrow range levels > 21%. [Step 8.a - YES]
		• VERIFY both SG narrow range levels < 80%. [Step 8.a - YES]
		• DETERMINE Main / Auxiliary Feedwater NOT available. [Step 8.a - YES]

Operating Test :	NRC	Scenario #	2	Event #	5, 6, 7, & 8	Page	23	of	34
Event Description:	Loss of Offsite Power / Three (3) Stuck Control Element Assemblies / Train B Emergency Diesel Generator Start Failure / Turbine Driven Auxiliary Feedwater Pump EFAS Start Failure								

Time	Position	Applicant's Actions or Behavior
CRITICAL TASK STATEMENT		**Restore Feedwater Flow to At Least One Steam Generator Prior to Exiting SO23-12-1, Standard Post Trip Actions.**
CRITICAL TASK	BOP	DETERMINE EFAS initiated and manually START P-140, TDAFW Pump.
		• DEPRESS HV-4716, P-140, TDAFW Pump START pushbutton.
		• VERIFY T_{COLD} between 540ºF and 550ºF. [Step 8.b - YES]
		• VERIFY SG pressures between 960 and 1050 PSIA. [Step 8.c - YES]
	RO	VERIFY Containment Isolation criteria satisfied: [Step 9 - YES]
		• VERIFY Containment pressure < 1.5 PSIG. [Step 9.a - YES]
		• VERIFY Containment Area Radiation Monitors NOT alarming or trending to alarm. [Step 9.b - YES]
		• VERIFY Secondary Plant Radiation Monitors NOT alarming or trending to alarm. [Step 9.c - YES]
	RO	VERIFY Containment Temperature and Pressure criteria satisfied: [Step 10 - YES]
		• VERIFY Containment average temperature < 120ºF. [Step 10.a - YES]
		• VERIFY Containment pressure < 1.5 PSIG. [Step 10.b - YES]
	SRO	DIAGNOSE event in progress: [Step 11 - YES]
		• DETERMINE some Safety Function criteria are NOT met per Attachment 4, Worksheet. [Step 11.a - YES]
		• [RNO] COMPLETE Attachment 1, Recovery Diagnostics.
		• DETERMINE that Reactor Trip Recovery is NOT diagnosed. [Step 11.b - YES]
		• [RNO] DETERMINE all RCPs STOPPED.
	BOP	• INITIATE steps 12 through 16. [Step 11.c - YES]
		• IMPLEMENT EOI SO23-12-9, Functional Recovery. [Step 11.d - YES]
Examiner Note:		**SO23-12-1, Standard Post Trip Actions, Steps 12 to 16, performed by the BOP are located at the end of the scenario. The following steps are from SO23-12-9, Functional Recovery.**

Operating Test :	NRC	Scenario #	2	Event #	5, 6, 7, & 8	Page	24	of	34
Event Description:	Loss of Offsite Power / Three (3) Stuck Control Element Assemblies / Train B Emergency Diesel Generator Start Failure / Turbine Driven Auxiliary Feedwater Pump EFAS Start Failure								

Time	Position	Applicant's Actions or Behavior
		M.O. Cue: 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.
		M.O. Cue: If Unit 3 status is requested, REPORT that Bus 3A06 is energized from EDG 3G003 and Bus 3A04 is energized from EDG 3G002.
	SRO	ENTER SO23-12-9, Functional Recovery.
	SRO	RECORD time of EOI entry _____. [Step 1.a - YES]
		M.O. Cue: When SO23-12-9 is initiated, CALL as SDG&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.
	SRO	VERIFY Functional Recovery Diagnosis: [Step 2 - YES]
		• INITIATE SO23-12-10, Safety Function Status Checks. [Step 2.a - YES]
		• INITIATE Foldout Page. [Step 2.b - YES]
		• DIRECT performance of FS-3, Monitor Natural Circulation Established.
		• DIRECT performance of SO23-12-11, Attachment 8, Restoration of Offsite Power.
		• DIRECT performance of SO23-12-11, Attachment 6, Diesel Generator Failure Follow-up Actions.
		• DIRECT performance of SO23-12-11, Attachment 19, Non-1E DC Load Reduction.
		• DIRECT performance of SO23-12-11, Attachment 9, Control Building Ventilation Emergency Actions.
		• DIRECT performance of SO23-12-11, Attachment 20, Class 1E Battery Load Reduction.
		• DIRECT performance of SO23-12-11, Attachment 24, Supply 1E 4 kV Bus with Opposite Unit Diesel.
		• DIRECT performance of FS-18, Secondary Plant Protection.

Operating Test :	NRC	Scenario #	2	Event #	5, 6, 7, & 8	Page	25	of	34
Event Description:	Loss of Offsite Power / Three (3) Stuck Control Element Assemblies / Train B Emergency Diesel Generator Start Failure / Turbine Driven Auxiliary Feedwater Pump EFAS Start Failure								

Time	Position	Applicant's Actions or Behavior
		• DIRECT Chemistry to sample both SGs for radioactivity and boron. [Step 2.c - YES]
M.O. Cue:		**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.**
M.O. Cue:		**When directed to initiate Non-1E DC Load Reduction, ACKNOWLEDGE and STATE you will report when complete.**
M.O. Cue:		**When directed to initiate Class 1E Battery Load Reduction, ACKNOWLEDGE and STATE you will report when complete.**
	SRO	INITIATE Administrative actions:
		• NOTIFY Shift Manager/Operations Leader of SO23-12-9 initiation. [Step 3.a - YES]
		• ENSURE Emergency Plan is initiated. [Step 3.b - YES]
		• IMPLEMENT Placekeeper. [Step 3.c - YES]
		• IMPLEMENT Time Dependent Steps. [Step 3.d - YES]
	SRO	DETERMINE ESF NOT Actuated and GO to Step 6. [Step 4 - YES]
	SRO	EVALUATE Immediate Safety Function Recovery Actions. [Step 6 - YES]
		• VERIFY any Safety Function Recovery Attachments indicated by any optimal EOI. [Step 6.a - YES]
	SRO	• INITIATE FR-2, Recovery-Vital Auxiliaries. [Step 6.b - YES]
		• DETERMINE success path will be from Unit 3 EDG and IMPLEMENT SO23-12-11, Attachment 24.
	RO	• IMPLEMENT precautionary actions: [Step 6.c - YES]
		• INITIATE Boration of greater than 40 GPM. [Step 6.c.1) - NO]
		• DETERMINE all RCPs STOPPED. [Step 6.c.2) - NO]

Operating Test :	NRC	Scenario #	2	Event #	5, 6, 7, & 8	Page	26	of	34
Event Description:	Loss of Offsite Power / Three (3) Stuck Control Element Assemblies / Train B Emergency Diesel Generator Start Failure / Turbine Driven Auxiliary Feedwater Pump EFAS Start Failure								

Time	Position	Applicant's Actions or Behavior
	SRO	• DETERMINE ESDE NOT indicated. [Step 6.d - YES]
	SRO	• DETERMINE SGTR NOT indicated. [Step 6.e - YES]
	SRO	• DETERMINE LOFW NOT indicated. [Step 6.f - YES]
Examiner Note: The following steps are from SO23-12-11, EOI Supporting Attachments, Attachment 24, Supplying 1E 4 kV Bus with Opposite Unit Diesel.		
	SRO	DIRECT performance of SO23-12-11, Attachment 24, Supplying 1E 4 kV Bus with Opposite Unit Diesel.
	BOP	EVALUATE Train to Energize. [Step 1 - YES]
		• SELECT Unit 2 Train B 1E 4 kV Bus to energize and GO to Step 11. [Step 1.a.2) - YES]
NOTE Energizing a second train may be considered based on existing Emergency Diesel Generator loading and overall status of the Safety Functions.		
	BOP	EVALUATE energizing Unit 2 Train B. [Step 11 - YES]
	BOP	VERIFY Bus 3A06 energized by 3G003 Diesel Generator. [Step 11.a - YES]
CAUTION Declaration and use of 10 CFR 50.54(x) and 50.54(y) should only be used if the restoration of a 4kV bus is immediately needed to protect the public health and safety. Declaration of 10 CFR 50.54(x) and 50.54(y) requires NRC notification within one hour of the declaration.		
	SRO/BOP	OBTAIN approval of Shift Manager. [Step 12 - YES]

Operating Test :	NRC	Scenario #	2	Event #	5, 6, 7, & 8	Page	27	of	34
Event Description:	Loss of Offsite Power / Three (3) Stuck Control Element Assemblies / Train B Emergency Diesel Generator Start Failure / Turbine Driven Auxiliary Feedwater Pump EFAS Start Failure								

Time	Position	Applicant's Actions or Behavior
	SRO	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 Bus 3A06 EDG. [Step 12.a.1) - YES]
	SRO/BOP	REQUEST SM initiates NRC notification within one hour regarding actions per this attachment. [Step 12.a.2) - YES]
		NOTE Operation of the Diesel Generator Cross Tie Permissive switches will block automatic sequencing of ESF loads onto both A06 buses. Needed ESF loads must be manually started.
	SRO/BOP	ESTABLISH Initial Train B Configuration. [Step 13 - YES]
	SRO/BOP	NOTIFY opposite Unit SRO that automatic sequencing of ESF loads onto opposite Unit 1E 4 kV Bus 3A06 will be blocked. [Step 13.a - YES]
	BOP	VERIFY Unit 3 1E 4kV bus 3A06 ENERGIZED by Unit 3 Train B EDG. [Step 13.b - YES]
	BOP	ENSURE 1E 4 kV Bus Tie breaker AUTO/MANUAL transfer switches selected to MANUAL. [Step 13.c - YES]
		• 2A0619 (HS-1639B2) and 3A0603 (3HS-1639B2).
	BOP	ENSURE 1E 4 kV Bus Tie breakers open. [Step 13.d - YES]
		• 2A0619 and 3A0603.
	BOP	ENSURE 2G003 Diesel Generator selected to MAINT position. [Step 13.e - YES]
	SRO	DIRECT performance of Train B Diesel Generator Cross-Tie Permissive switch alignment on 50' Elevation. [Step 14 - YES]

Operating Test :	NRC	Scenario #	2	Event #	5, 6, 7, & 8	Page	28	of	34
Event Description:	Loss of Offsite Power / Three (3) Stuck Control Element Assemblies / Train B Emergency Diesel Generator Start Failure / Turbine Driven Auxiliary Feedwater Pump EFAS Start Failure								

Time	Position	Applicant's Actions or Behavior
		NOTE Fire Isolation Panels L-413 on both units are locked panels. **Unit 2:** Key# 73; **Unit 3:** Key# 77.
	BOP	CONTACT the PPEO and INITIATE Unit 2 Train B Diesel Generator Cross-Tie Permissive switch alignment on 50' Elevation.
		• VERIFY feeder faults NOT indicated by relay flags on: [Step 14.a.1) - YES]
		• 2A0616 – Unit Aux Transformer
		• 2A0618 – Reserve Aux Transformer
		• 2A0619 – 2A06 Bus Tie
		• 2A0613 – 2G003 EDG
M.O. Cue:		**When asked, REPORT no feeder faults on breakers.**
	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. [Step 14.a.2) - YES]
		• HS-5054XA2 and HS-5054XB2
M.O. Cue:		**When directed, PERFORM remote functions EG62A and EG62B and REPORT that the Unit 2 50.54X switches have been aligned.**
	BOP	CONTACT the PPEO and INITIATE Unit 3 Train B Diesel Generator Cross-Tie Permissive switch alignment on 50' Elevation.
		• VERIFY feeder faults NOT indicated by relay flags on: [Step 14.b.1) - YES]
		• 3A0603 – 3A06 Bus Tie
M.O. Cue:		**When asked, REPORT no feeder faults on breaker.**
	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. [Step 14.b.2) - YES]

Operating Test :	NRC	Scenario #	2	Event #	5, 6, 7, & 8	Page	29	of	34
Event Description:	Loss of Offsite Power / Three (3) Stuck Control Element Assemblies / Train B Emergency Diesel Generator Start Failure / Turbine Driven Auxiliary Feedwater Pump EFAS Start Failure								

Time	Position	Applicant's Actions or Behavior
		• 3HS-5054XA2 and 3HS-5054XB2
M.O. Cue:		**When directed, PERFORM remote functions EG62C and EG62D and REPORT that the Unit 3 50.54X switches have been aligned.**
	BOP	ESTABLISH final Train B configuration. [Step 15 - YES]
	BOP	VERIFY 3G003 Diesel Generator loading less than 3.4 MW. [Step 15.a - YES]
	BOP	MAINTAIN 3G003 Diesel Generator loading STABLE. [Step 15.b - YES]
	BOP	VERIFY Bus 2A06 NOT energized. [Step 15.c - YES]
	BOP	VERIFY Unit 2 overcurrent/ground alarms reset. [Step 15.d - YES]
		• 63C15 - 2A06 SUPPLY BKR 2A0616 OC
		• 63C25 - 2A06 SUPPLY BKR 2A0618 OC
	BOP	VERIFY 1E DC Bus voltages 2D2 and 3D2 greater than 108 VDC. [Step 15.e - YES]
M.O. Cue:		**When asked, REPORT 3D2 voltage at 129 VDC.**
	BOP	ENSURE 1E 4 kV Bus 2A06 supply breakers OPEN. [Step 15.f - YES]
		• 2A0616 – Unit Aux Transformer
		• 2A0618 – Reserve Aux Transformer
		• 2A0613 – 2G003 EDG
	BOP	ENSURE 1E 4 kV Bus A06 tie breakers OPEN. [Step 15.g - YES]
		• 2A0619 – 2A06 Bus Tie
		• 3A0603 – 3A06 Bus Tie

Operating Test :	NRC	Scenario #	2	Event #	5, 6, 7, & 8	Page	30	of	34
Event Description:	Loss of Offsite Power / Three (3) Stuck Control Element Assemblies / Train B Emergency Diesel Generator Start Failure / Turbine Driven Auxiliary Feedwater Pump EFAS Start Failure								

Time	Position	Applicant's Actions or Behavior
	BOP	ENSURE 1E 4 kV Bus 2A06 load breakers OPEN. [Step 15.h - YES]
		• Emergency Chillers
		• Containment Spray Pumps
		• HPSI Pumps
		• LPSI Pumps
		• AFW Pump
		• CCW Pumps
		• SWC Pumps
	BOP	ENERGIZE Unit 2 Train B Bus 2A06. [Step 16 - YES]
	BOP	VERIFY Train B Diesel Generator Cross-Tie Permissive Switches on both Units are in the 50.54X position. [Step 16.a - YES]
	BOP	CLOSE Unit 3 Bus Tie breaker 3A0603. [Step 16.b - YES]
	BOP	VERIFY Unit 3 Diesel Generator 3G003 output breaker remains closed. [Step 16.c - YES]
CRITICAL TASK STATEMENT		**Restore Power to a 1E 4160 Volt Bus per SO23-12-11, EOI Supporting Attachments, Attachment 24, Supplying 1E 4 kV Bus with Opposite Unit Diesel.**
CRITICAL TASK	BOP	CLOSE Unit 2 Bus Tie breaker 2A0619. [Step 16.d.1) - YES]
	BOP	VERIFY Unit 2 1E buses 2A06 and 2B06 energized. [Step 16.d.2) - YES]
	BOP	VERIFY Unit 3 Train B EDG output breaker remains CLOSED. [Step 16.e.1) - YES]
	BOP	VERIFY Unit 3 Train B EDG DROOP-IN light EXTINGUISHED. [Step 16.e.2) - YES]
	BOP	VERIFY Unit 3 Train B EDG voltage ~4.36 kV.[Step 16.e.3) - YES]

Operating Test :	NRC	Scenario #	2	Event #	5, 6, 7, & 8	Page	31	of	34
Event Description:	Loss of Offsite Power / Three (3) Stuck Control Element Assemblies / Train B Emergency Diesel Generator Start Failure / Turbine Driven Auxiliary Feedwater Pump EFAS Start Failure								

Time	Position	Applicant's Actions or Behavior
	BOP	VERIFY Unit 3 Train B EDG frequency ~ 60 Hz. [Step 16.e.4) - YES]
	BOP	VERIFY Unit 2 Buses 2B06 and 2B26 ENERGIZED. [Step 16.e.5) - YES]
	BOP	VERIFY Unit 2 Train B 1E DC Bus D2 ENERGIZED. [Step 17) - YES]
	BOP	ESTABLISH 1E 4 kV Bus loads. [Step 18 - YES]

NOTE

Load ratings stated are the highest design limits. Actual load is expected to be lower.

CAUTION

A SIAS on Unit 3 may challenge Emergency Diesel Generator loading as Unit 3 loads are manually started. DO NOT exceed maximum Emergency Diesel Generator load limits of 5.17 MW at any time, or 4.7 MW for more than 2 hours in a 24 hour period.

CAUTION

If loads are being supplied on both units, there is not sufficient load capacity to establish all loads for all Safety Functions. Loads should be started as directed by the SRO-in-charge based on the highest priority Safety Function that is not controlled. Consideration may be given to alternating loads after a Safety Function is controlled.

	BOP	START CCW Pump P-026 on Train B. [Step 18.a - YES]
	RO	VERIFY Charging Pump P-192 starts on Train B. [Step 18.b - YES]
	RO	VERIFY SWC Pump P-114 START on Train B. [Step 18.c - YES]

When Bus 2A06 is energized, or at the Lead Evaluator's discretion, TERMINATE the scenario.

Operating Test :	NRC	Scenario #	2	Event #	5, 6, 7, & 8	Page	32	of	34
Event Description:	Loss of Offsite Power / Three (3) Stuck Control Element Assemblies / Train B Emergency Diesel Generator Start Failure / Turbine Driven Auxiliary Feedwater Pump EFAS Start Failure								

Time	Position	Applicant's Actions or Behavior
Examiner Note: These steps are performed by the BOP per SO23-12-1, Steps 12 through 16.		
	SRO/BOP	INITIATE Attachment 5, Administrative Actions. [Step 12.a - YES]
	SRO/BOP	ENSURE a PA system announcement for Reactor Trip. [Step 12.b - YES]
	BOP	ENSURE the following loads restored: [Step 13 - YES]
		• VERIFY Telecom 480 VAC Feeder Breaker – CLOSED. [Step 13.a – NO].
		• [RNO] DETERMINE HS-0800S2, Telecom 480 VAC Feeder Breaker – OPEN.
		• [RNO] DEPRESS HS-0800S2 OVERRIDE and VERIFY Telecom 480 VAC Feeder Breaker – CLOSED.
		• [RNO] VERIFY Unit 3 HS-0800S2, Telecom 480 VAC Feeder Breaker – CLOSED.
		• VERIFY Telecom 480 VAC Feeder Breaker – CLOSED. [Step 13.b – NO].
		• [RNO] DETERMINE HS-0800N2, Telecom 480 VAC Feeder Breaker – OPEN.
		• [RNO] DEPRESS HS-0800N2 OVERRIDE and VERIFY Telecom 480 VAC Feeder Breaker – CLOSED.
		• [RNO] VERIFY Unit 3 HS-0800N2, Telecom 480 VAC Feeder Breaker – CLOSED.
		• DETERMINE all Non-1E Buses – DENERGIZED [Step 13.c - YES].
		• [RNO] IF all Circulating Water Pumps – OFF then CLOSE MSIVs.
		• [RNO] OPERATE ADVs to maintain S/G pressure between 960 PSIA and 1050 PSIA.
		• DETERMINE B15 & B16 480 VAC Load Centers – DENERGIZED [Step 13.d - YES].
		• [RNO] VERIFY Annunciator 56A20, REACTOR TRIPPED CEDMCS DEENERGIZED – alarming.
		• [RNO] VERIFY CEDM M/G Set Output – OPEN.

Operating Test :	NRC	Scenario #	2	Event #	5, 6, 7, & 8	Page	33	of	34
Event Description:	Loss of Offsite Power / Three (3) Stuck Control Element Assemblies / Train B Emergency Diesel Generator Start Failure / Turbine Driven Auxiliary Feedwater Pump EFAS Start Failure								

Time	Position	Applicant's Actions or Behavior
	BOP	VERIFY Main Turbine Coastdown: [Step 14 - YES]
		• DETERMINE Extraction Steam Block Valves – CLOSED. [Step 14.a - NO]
		• DETERMINE Main Steam to Reheater Block, Bypass, Warmup, and Control Valves – CLOSED. [Step 14.a - NO]
		• DETERMINE HV-2712A/B Bled Steam to Reheaters Block Valve – CLOSED. [Step 14.a - NO]
		• VERIFY Generator lowering – less than 24 kV. [Step 14.b - YES]
		• VERIFY 99A26 - TURBINE LUBE OIL TEMP HI and 99A46 - TURBINE BRG OIL DRAIN TEMP HI Annunciators – RESET. [Step 14.c - NO]
		• INITIATE SO23-10-2, Turbine Shutdown, Attachment for Unloading the Generator and Removing the Unit from Line. [Step 14.d - NO]
	BOP	ESTABLISH desired Condensate and Feedwater Status: [Step 15 - YES]
		• ENSURE 3rd Point Heater Drain Pumps – STOPPED. [Step 15.a - YES]
		• DETERMINE Reactor Trip Override – RESET. [Step 15.b - NO]
		• DETERMINE Main Feedwater Pumps and Condensate Pumps NOT OPERATING. [Step 15.c - YES]
		• [RNO] ENSURE SG levels maintained by AFW Pumps.
		• ENSURE FIC-3294, Condensate Pump Miniflow Controller set for Condensate Pump configuration. [Step 15.d - NO]
		• PLACE LV-3245, Condensate Drawoff Valve to – DISABLE. [Step 15.e - YES]

Operating Test :	NRC	Scenario #	2	Event #	5, 6, 7, & 8	Page	34	of	34
Event Description:	Loss of Offsite Power / Three (3) Stuck Control Element Assemblies / Train B Emergency Diesel Generator Start Failure / Turbine Driven Auxiliary Feedwater Pump EFAS Start Failure								

Time	Position	Applicant's Actions or Behavior
		• DETERMINE SO23-12-2, Reactor Trip Recovery, NOT being implemented. [Step 15.f - YES]
		• [RNO] ENSURE HV-4053 & HV-4054, SG Blowdown Valves CLOSED and GO to Step 16.
	BOP	VERIFY Start-Up Range Channels: [Step 16 - YES]
		• DETERMINE only one (1) Start-Up Range Channel – OPERABLE. [Step 16.a - YES]
		• [RNO] NOTIFY SRO of TS 3.3.13 and LCS 3.3.111 entry.
		• [RNO] INITIATE SO23-3-2.15, Section for Start-Up Range Channel failure.
SO23-12-1, Standard Post Trip Actions, Steps 12 through 16 are complete.		

Appendix D	Scenario Outline	Form ES-D-1

Facility:	SONGS 2 & 3	Scenario No.:	3	Op Test No.:	October 2011 NRC
Examiners:		Operators:			

Initial Conditions: 100% power MOL - RCS Boron is 980 ppm (via sample).

Turnover: Maintain steady-state power conditions.

Critical Tasks:
- Restore Flow to the CCW Non-Critical Loop Prior to Exceeding Reactor Coolant Pump Operating Limits per SO23-13-7, Loss of Component Cooling Water / Saltwater Cooling.
- Establish Stable Reactor Coolant System Temperature per SO23-12-11, EOI Supporting Attachments, FS-30, Establish Stable RCS Temperature during ESDE.
- Identify and Isolate the Most Affected Steam Generator Prior to Exiting SO23-12-5, Excess Steam Demand Event.

Event No.	Malf. No.	Event Type*	Event Description
1 +10 min	CC06B CCW LP	C (BOP, SRO) TS (SRO)	Component Cooling Water Pump (P-025) Overcurrent Trip. Component Cooling Water Pump (P-024) Start Failure.
2 +20 min	NI08C	I (RO, SRO) TS (SRO)	Nuclear Instrument Linear Power Channel (JI-0002C) Low Failure.
3 +45 min	FW23	R (RO) N (BOP, SRO)	Partial Loss of Condenser Vacuum @ 3% Severity. Perform a Turbine Load Reduction.
4 +55 min	FC05B	I (BOP, SRO)	Steam Generator (E-088) Main Feedwater Master Controller Setpoint Fails to 45% Level on 240 Second Ramp.
5 +57 min	MS03A	M (RO, BOP, SRO)	Steam Generator (E-088) Main Steam Line Break Inside Containment @ 0.5% Severity. ESDE Inside Containment.
6 +60 min	K403B	I (RO)	Train B Safety Injection Actuation Signal Relay Failure.
7 +65 min	RP01M	C (RO)	Containment Spray Pump (P-012) Start Failure.
8 +65 min	MSIS LP	C (BOP)	Main Steam Isolation Signal Fails to Actuate.

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

Actual	Target Quantitative Attributes
8	Total malfunctions (5-8)
3	Malfunctions after EOP entry (1-2)
4	Abnormal events (2-4)
1	Major transients (1-2)
2	EOPs entered/requiring substantive actions (1-2)
0	EOP contingencies requiring substantive actions (0-2)
3	Critical tasks (2-3)

SCENARIO SUMMARY NRC #3

The crew will assume the watch at 100% power with no scheduled activities per Operating Instruction (OI) SO23-5-1.7, Power Operations.

The first event is a trip of the running Component Cooling Water (CCW) Pump P-025. The crew will attempt to start the standby Train A CCW Pump P-024, however, this pump also fails to start. Operator actions are per Abnormal Operating Instruction (AOI) SO23-13-7, Loss of Component Cooling Water/Salt Water Cooling. The crew will transfer CCW to Train B along with the Non-Critical Loop and Letdown Heat Exchanger. The SRO will refer to Technical Specifications.

When the plant systems are stable, Linear Power Channel C will fail low. The crew will refer to AOI SO23-13-18, Reactor Protection System Failure / Loss of Vital Bus. The RO will determine the affected instrument by operating the Channel C Core Protection Calculator ROM Station. Once identified, the affected Channel C trips will be bypassed. The SRO will refer to Technical Specifications.

When the channel is bypassed, a partial loss of Condenser vacuum will occur. The crew will respond per the Annunciator Response Procedures (ARPs) and AOI SO23-13-10, Loss of Condenser Vacuum and lower power level until the Turbine Vacuum Limit is in the Area of Unrestricted Operation. Once power level is reduced, the source of the vacuum leak will be located and Condenser vacuum will be restored.

When plant parameters are stable, Steam Generator E-088 Master Controller Setpoint slowly fails to 45%. Entry into SO23-13-24, Feedwater Control System Malfunction is required. Steam Generator level control is restored by placing the Master Controller in MANUAL and will remain in this position until the Main Steam Line break occurs.

When control of level is established, a Main Steam Line break will occur inside Containment on Steam Generator E-088. The crew will enter Emergency Operating Instruction (EOI) SO23-12-1, Standard Post Trip Actions (SPTAs) and then transition to EOI SO23-12-5, Excess Steam Demand Event (ESDE). Procedure entries include EOI SO23-12-11, EOI Supporting Attachments, Floating Step 30 (FS-30), Establish Stable RCS Temperature during ESDE, which is required to stabilize Reactor Coolant System (RCS) temperature when E-088 dryout is reached or pressure lowers below 200 PSIG.

This scenario is complicated by a failure of Train B Safety Injection Actuation System valves to open, a Train A Containment Spray Pump start failure, and a Main Steam Isolation Signal that fails to actuate. This scenario is terminated when RCS Cold Leg temperature has been stabilized per FS-30 and the affected Steam Generator isolated per SO23-12-5, Excess Steam Demand Event.

Risk Significance:

- Failure of risk important system prior to trip: Loss of Component Cooling Water
- Risk significant core damage sequence: ESDE Inside Containment
- Risk significant operator actions: Transfer CCW Non-Critical Loop
  Initiate Main Steam Isolation Signal
  Stabilize RCS Temperature during ESDE
  Isolate Steam Generator E-088

Scenario Event Description
NRC Scenario #3

MACHINE OPERATOR INSTRUCTIONS for SIMULATOR SETUP

INITIALIZE to IC-230 NRC Scenario #3 and associated Setup File.

EVENT	TYPE	MALF #	DESCRIPTION	DEMAND VALUE	INITIATING PARAMETER
SETUP	MF	RP01M	Containment Spray Pump (P-012) start failure		
1	MF	CC06B	CCW Pump P-025 overcurrent trip	TRIP	
1	LP	CCW LP	CCW Pump P-024 start failure	AS IS	
2	MF	NI08C	Linear Power Channel C fails low	0% six	
2	RF	RP51	PPS Door Open Annunciator 56B46 ON	OPEN	By Direction
2	RF	RP54A	High Linear Power Channel C	BYPASS	5 sec TD
2	RF	RP54C	High Local Power Density Channel C	BYPASS	10 sec TD
2	RF	RP54D	Low DNBR Channel C	BYPASS	15 sec TD
2	RF	RP54N	Loss of Load Channel C	BYPASS	15 sec TD
2	RF	RP51	PPS Door Open Annunciator 56B46 OFF	CLOSE	20 sec TD
3	MF	FW23	Loss of Condenser Vacuum	3%	
4	MF	FC05B	E-088 MFW Master Controller Setpoint failure	45%	240 sec. ramp
5	MF	MS03A	ESDE inside Containment	0.5%	180 sec. ramp
5	MF	MS03A	ESDE inside Containment	2%	UPON MSIS
6	MF	K403B	Train B SIAS relay failure		
7	MF	RP01M	Containment Spray Pump (P-012) start failure		
8	LP	MSIS LP	MSIS fails to actuate		
	RF	ED85	Non-Qualified Loads Restoration	RESTORE	By Direction

Machine Operator:	**EXECUTE IC-230 NRC Scenario #3 and SETUP file to align components.** **ENSURE CVCS Blend Setpoints MATCH Shift Turnover Sheet.** **CHANGE Operator Aid Tag #029 (CVCS) to reflect boron concentration.** **VERIFY both Pressurizer Spray Valves in AUTO.** **VERIFY Channel Y Pressurizer Pressure and Level in service.** **ENSURE Turbine Ramp Rate set to 100 MWe per minute.** **PROVIDE procedures in progress, Shift Turnover, and Reactivity Management Guide to crew in Briefing Room:** **- COPY of SO23-5-1.7, Power Operations, Section 6.1, Guidelines for Steady State Operation.** **- LAMINATED COPY of SO23-5-1.7, Power Operations, Attachment 8, Power Maneuvering Guidelines** **PLACE the MOC copy of OPS Physics Summary Book on SRO Desk.** **VERIFY CEA positions with ARO.**
Control Room Annunciators in Alarm:	
NONE	

Operating Test : NRC	Scenario # 3	Event # 1	Page 5 of 33
Event Description: Train A Component Cooling Water Pump Trip / Train A Component Cooling Water Pump Start Failure			

Time	Position	Applicant's Actions or Behavior
Machine Operator: When directed, EXECUTE Event 1. - CC06B, CCW Pump P-025 overcurrent trip. - CCW LP, CCW Pump P-024 start failure.		
Indications Available: **64A21 – CCW PUMP TRAIN A OC** **64A10 – CCW NON-CRITICAL LOOP RETURN FLOW LO** **56C34/36/38/40 – RCP P001/P003/P004/P002 CCW FLOW LO** **Miscellaneous loss of CCW flow alarms**		
+30 secs	BOP	REFER to Annunciator Response Procedures (ARPs).
	BOP	RECOGNIZE CCW Pump P-025 has tripped.
	SRO	DIRECT starting Component Cooling Water Pump P-024.
	BOP	START Component Cooling Water Pump P-024.
		• DEPRESS HS-6314-1, P-024, CCW Pump and REPORT pump will NOT start.
	BOP	RECOGNIZE Train A CCW NOT available and INFORM the SRO SO23-13-7 entry required.
Examiner Note: The following steps are from SO23-13-7, Loss of CCW / SWC.		
	SRO	ENTER SO23-13-7, Loss of Component Cooling Water / Saltwater Cooling.
		• DETERMINE required actions based on loss of a single CCW Pump and GO to Step 2. [Step 1 - YES]
	SRO	ENSURE CCW / SWC on the unaffected loop in service. [Step 2.a - NO]
	SRO	DIRECT transfer of CCW to Train B.
	BOP	START CCW Pump P-026 and VERIFY that SWC Pump P-114 automatically STARTS. [Skill of Craft]
		• DEPRESS HS-6324-2, CCW Pump P-026 START pushbutton and OBSERVE SWC Pump P-114 AUTO START.

Operating Test : NRC	Scenario # 3	Event # 1	Page 6 of 33
Event Description: Train A Component Cooling Water Pump Trip / Train A Component Cooling Water Pump Start Failure			

Time	Position	Applicant's Actions or Behavior
	SRO	DIRECT transfer of Component Cooling Water Non-Critical Loop to Train B. [Step 2.b - YES]
CRITICAL TASK STATEMENT		**Restore Flow to CCW Non-Critical Loop Prior to Exceeding Reactor Coolant Pump Operating Limits per SO23-13-7, Loss of CCW / SWC.**
CRITICAL TASK	BOP	TRANSFER the CCW Non-Critical Loop to Train B. [Step 2.b - YES]
		• DEPRESS and MAINTAIN DEPRESSED the OPEN pushbuttons for HV-6213 and HV-6219, Critical Loop B Supply and Return to NCL.
		• When HV-6212 and HV-6218, Critical Loop A Supply and Return to NCL indicate CLOSED, then RELEASE the OPEN pushbuttons for HV-6213 and HV-6219.
	SRO	DIRECT transfer of Letdown Heat Exchanger to Train B CCW. [Step 2.b - YES]
	BOP	TRANSFER Letdown Heat Exchanger to Train B CCW. [Step 2.b - YES]
		• CLOSE HV-6293B/A, CCW Critical Loop A Letdown HX ME-062 Return/Supply Valves.
		• OPEN HV-6522B/A, CCW Critical Loop B Letdown HX ME-062 Return/Supply Valves.
	SRO	DETERMINE P-025, CCW Pump NOT available. [Step 2.c - YES]
	SRO	VERIFY E-335 / E-336, Emergency Chillers, ALIGNED to the operating Loop. [Step 2.d - YES]
	SRO	DETERMINE Shutdown Cooling is NOT in service. [Step 2.e - YES]
	SRO	VERIFY ECCS Systems NOT required. [Step 2.f - YES]
	SRO	GO to Step 19. [Step 2.g - YES]
	SRO/BOP	ENSURE all system parameters restored to normal. [Step 19.a - YES]

Operating Test :	NRC	Scenario #	3	Event #	1	Page	7	of	33
Event Description:	Train A Component Cooling Water Pump Trip / Train A Component Cooling Water Pump Start Failure								

Time	Position	Applicant's Actions or Behavior
+10 min	SRO	NOTIFY personnel & EVALUATE Technical Specifications. [Step 19.b - YES]
		• LCO 3.7.7.A, Component Cooling Water System.
		• CONDITION A - One CCW train inoperable. • ACTION A.1 - Restore CCW train to OPERABLE status within 72 hours.
M.O. Cue:		**If directed to open the DC power supply breaker for CCW Pumps P-024 & P-025, ACKNOWLEDGE the order but do not perform (Time restriction).** **If directed to open the DC power supply breaker for the Train A ESF Pumps, ACKNOWLEDGE the order but do not perform (Time restriction).** **If directed to transfer Emergency Chiller E-335/E-336 to Unit 3, ACKNOWLEDGE the order but do not perform (Time restriction).** **If directed to transfer HPSI Pump P-018 from Train A to Train B, ACKNOWLEDGE the order but do not perform (Time restriction).**
When Technical Specifications are addressed, or at Lead Examiner discretion, PROCEED to Event 2.		

Operating Test :	NRC	Scenario #	3	Event #	2	Page	8	of	33
Event Description:	Linear Power Channel Failure								

Time	Position	Applicant's Actions or Behavior
Machine Operator:		**When directed, EXECUTE Event 2. - NI08C, Linear Power Channel C Upper Detector amplifier fails to 0%.**
Indications Available:		**56A03 – LOCAL POWER DENSITY HI CHANNEL TRIP 56A04 – DNBR LO CHANNEL TRIP 56A13 – LOCAL POWER DENSITY HI PRETRIP 56A14 – DNBR LO RPS PRETRIP 56B26 – PPS CHANNEL 3 TROUBLE 56B 21 – LINEAR POWER DEVIATION CHANNEL 3 HI / LO (in and out) 56C21 – CPC CHANNEL 3 SENSOR FAILURE Channel C Linear Power Range Recorders indicate ~63% Channel C Local Power Density Margin reads 0 KW/FT Channel C DNBR Margin reads 0 DNBR**
+1 min	RO	REFER to Annunciator Response Procedures (ARPs).
	RO	RECOGNIZE Power Range Channel C failure and INFORM the SRO SO23-13-18 entry required.
Floor Cue:		**Follow Annunciator 56C21 guidance to locate sensor that has failed.**
	RO	REFER to SO23-3-2.13, Section for CPC/CEAC Sensor Failures and Auto Restart Codes. [Step 2.1 - YES]
Examiner Note:		**The following steps are from SO23-3-2.13, Core Protection / Control Element Assembly Calculator Operation, Section 6.4, CPC/CEAC Sensor Failures and Auto Restart Codes.**
	RO	IDENTIFY CPC/CEAC sensor failures per Attachment 1. [Step 6.4.1 - YES]
		• DETERMINE the LAST FAILED POINT using one of the following:
		• Failed Sensor Stack.
		• Sensor Status.
		• Auto Restart Codes.
		• IDENTIFY failed Upper Channel C Power Range Detector.
Examiner Note:		**The following steps are from SO23-13-18, Reactor Protection System Failure.**

Operating Test :	NRC	Scenario #	3	Event #	2	Page	9	of	33
Event Description:	Linear Power Channel Failure								

Time	Position	Applicant's Actions or Behavior
	SRO	ENTER SO23-13-18, Reactor Protection System Failure.
	RO	OBSERVE instrumentation for the affected channel and alternate redundant indications monitoring the same parameter to DETERMINE failure. [Step 1.a - YES]
		NOTE For failures affecting RPS/ESFAS Matrix Logic, RPS/ESFAS Initiation Logic, RTCBs, RPS/ESFAS Manual Trip or ESFAS Actuation Logic, refer to Tech. Spec. LCO 3.3.4 and LCO 3.3.6.
	RO	IDENTIFY Linear Power Channel C JI-0002C failure and GO to Step 3. [Step 1.a - YES]
		NOTE Failure of a measured variable channel may affect more than one Functional Unit (e.g., PZR Pressure Hi affects DNBR and LPD).
	SRO	REFER to Attachment 10 and DETERMINE Functional Unit affected is Linear Power Channel C JI-0002C. [Step 3.a - YES]
	SRO	DIRECT placing the Functional Unit in BYPASS per SO23-3-2.12, Reactor Protection System Operation. [Step 3.b - YES]
	RO	PLACE Functional Unit in BYPASS per SO23-3-2.12, RPS Operation, Section 6.3, Bypass Operation of Trip Channels. [Step 3.b - YES]
Examiner Note:		**The following steps are from SO23-3-2.12, Reactor Protection System Operation, Section 6.3, Bypass Operation of Trip Channels.**

Operating Test :	NRC	Scenario #	3	Event #	2	Page	10	of	33
Event Description:	Linear Power Channel Failure								

Time	Position	Applicant's Actions or Behavior
		NOTE The PPS CHANNEL 1 (2,3,4) TRIP BYPASSED alarm does not have reflash capability. It will annunciate once when the first functional unit is placed in bypass. Additional functional units placed in bypass on the same PPS channel will not annunciate. When functional units are being removed from bypass, then the alarm will not reset until the last functional unit on that PPS channel is removed from bypass.
		CAUTION Prior to testing the Reactor Protective System (RPS) portion of a PPS Bay, the RPS trips shall be bypassed.
	RO	VERIFY that the same bistable is not in BYPASS on any other Channel. [Step 6.3.1 - YES]
	ARO	UNLOCK and OPEN the Bistable Control Panel. [Step 6.3.2 - YES]
Examiner Note: Trip BYPASS is performed by the Machine Operator and verified by the RO.		
M.O. Cue: When directed, EXECUTE the following remote functions: **RP51 = OPEN (PPS Door Open Annunciator 56B46)** **RP54A = BYPASS (High Linear Power Channel C)** **RP54C = BYPASS (High Local Power Density Channel C)** **RP54D = BYPASS (Low DNBR Channel C)** **RP54N = BYPASS (Loss of Load Channel C)** **DELETE RP51 (PPS Door Open Annunciator 56B46)**		
	RO	OBSERVE Annunciator 56A49 - PPS CHANNEL 3 TRIP BYPASSED in alarm **and** amber BYPASS light on Channel C PPS Operator Module. [Step 6.3.2.4 - YES]
	RO	LOG the Bypass and Reason in Control Operator Log. [Step 6.3.2.5 - YES]
	SRO	INITIATE a LCOAR or follow guidelines of SO123-0-A5. [Step 6.3.2.6 - NO]

Operating Test :	NRC	Scenario #	3	Event #	2	Page	11	of	33
Event Description:	Linear Power Channel Failure								

Time	Position	Applicant's Actions or Behavior
Examiner Note: The following steps are from SO23-13-18, Reactor Protection System Failure.		
	SRO	CONFIRM failure does NOT affect RPS/ESFAS Matrix Logic, RPS/ESFAS Initiation Logic, RTCBs, RPS/ESFAS Manual Trip, or ESFAS Actuation Logic. [Step 3.c - YES]
	SRO	CONFIRM failure does NOT affect Feedwater Digital Control System. [Step 3.d - YES]
+10 min	SRO	EVALUATE Technical Specifications. [Step 3.e - YES]
		• LCO 3.3.1.A, Reactor Protection System Instrumentation.
		• CONDITION A - One or more Functions with one automatic RPS trip channel inoperable. • ACTION A.1 - Place Channel in bypass or trip within one (1) hour.
	SRO	CONFIRM failure did NOT involve a failed PPS Power Supply. [Step 3.f - YES]
	SRO	NOTIFY Shift Manager to PERFORM Administrative Actions. [Step 3.g - YES]
When Technical Specifications are addressed, or at Lead Examiner discretion, PROCEED to Event 3.		

Operating Test :	NRC	Scenario #	3	Event #	3	Page	12	of	33
Event Description:	Partial Loss of Condenser Vacuum / Turbine Load Reduction								

Time	Position	Applicant's Actions or Behavior
Machine Operator:		**When directed, EXECUTE Event 3. - FW23, Partial Loss of Condenser Vacuum @ 3%.**
Indications Available:		**99B37 – VACUUM LO 99B46 – EXHAUST SPRAY WATER FLOW Indication of rising Main Condenser backpressure into the Area of Restricted Operation Slight drop in Main Generator MWe output Condensate Pump P-053 may AUTO START due to the secondary transient Vacuum Pump P-054 AUTO START**
+1 min	BOP	REFER to Annunciator Response Procedures (ARPs).
	BOP	DETERMINE that vacuum is degrading and the Main Turbine is operating in the restricted area of SO23-5-1.7, Attachment 5, Turbine Vacuum Limitations and INFORM the SRO SO23-13-10 entry required.
	SRO	ENTER SO23-13-10, Loss of Condenser Vacuum.
Examiner Note:		**A loss of Condenser vacuum will cause P-054, Condenser Vacuum Pump, to start. This condition disrupts the flow through the Condenser Air Ejector Radiation Monitor and causes a SECONDARY RADIATION HI alarm. The crew should use multiple indications to determine that a tube leak does NOT exist.**
	BOP	VERIFY Vacuum Pump P-054 automatically starts. [Step 1.a - YES]
	SRO	• DECLARE RT-7870, Condenser process flow rate monitor INOPERABLE and INITIATE a LCOAR/EDMR. [Step 1.a.1) - NO]
	SRO	• Within one hour of a change in Condenser evacuation flow, PERFORM SO23-3-3.21, Attachment for Shiftly Flow Estimates. [Step 1.a.2) - NO]
	SRO/BOP	• INITIATE aligning S21313MU219, Hogger / SJAE Nozzle Manifold Selector fully to the MP-054 position. [Step 1.a.3) - YES]
	BOP	After two minutes of operating, PLACE Vacuum Pump P054 in MANUAL.
		• DEPRESS HS-3331A, P-054 MANUAL pushbutton. [Step 1.b - YES]
	BOP	VERIFY Gland Seal steam pressure > 2 psig on PI-2845. [Step 1.c - YES]

Operating Test : NRC	Scenario # 3	Event # 3	Page 13 of 33
Event Description: Partial Loss of Condenser Vacuum / Turbine Load Reduction			

Time	Position	Applicant's Actions or Behavior
	BOP	DETERMINE Condenser backpressure is NOT in area of Unrestricted Operation in Attachment 3. [Step 1.d - YES]
	SRO	• [RNO] INITIATE Attachment 1 and GO to Step 2.
Examiner Note: Attachment 1 actions are performed in the Turbine Building.		
	SRO/BOP	INITIATE Attachment 1 and DISPATCH personnel to locate source of vacuum leak.
	RO	VERIFY Reactor trip has not occurred. [Step 2.a - YES]
	BOP	VERIFY Turbine trip has not occurred. [Step 2.b - YES]
M.O. Cue: If crew is having trouble with Condenser vacuum, LOWER malfunction FW23, Condenser Vacuum leakage in 1% increments to 1%.		
	BOP	REDUCE Turbine load as required. [Step 2.c - YES]
		• MAINTAIN Backpressure in Area of Unrestricted Operation in Attachment 3.
		• MAINTAIN Condenser ΔT ≤ 25ºF.
Floor Cue: If asked, REPORT Condenser ΔT is 22ºF.		
	RO	NOTIFY Generation Operations Controller. [Step 2.d - YES]
M.O. Cue: If Unit 3 is asked about recent equipment changes, REPORT that there were no recent activities that could have resulted in Loss of Condenser Vacuum.		
	SRO	VERIFY loss of vacuum NOT result of equipment status changes on either Unit. [Step 2.e - YES]
Examiner Note: The following steps are from SO23-13-28, Rapid Power Reduction, Attachment 2, RPR – 20%/ Hour.		

Operating Test : NRC	Scenario # 3	Event # 3	Page 14 of 33
Event Description: Partial Loss of Condenser Vacuum / Turbine Load Reduction			

Time	Position	Applicant's Actions or Behavior
	RO/BOP	PERFORM a Reactivity Brief. [Step 1.1 - YES]
	SRO	NOTIFY the Generation Operations Controller. [Step 1.2 - YES]
	SRO	INITIATE an MSR cooldown if load less than 750 MWe. [Step 1.3 - NO]
		GUIDELINES 1. If RCS Boron is < 110 ppm, then the optimal approach is to use CEAs and MTC with little or no boration. A 5% power reduction credit can be taken for MTC, because the temperature increase adds considerable negative reactivity due to the large negative MTC at the EOC along with Xenon building in. Expect average Tcold to be initially high outside the control band. (LS-1.1, LS-1.4) 2. At EOC, existing conditions may necessitate slowing power change rate when between 80% and 70% power.
	SRO	INITIATE monitoring CV-9739, COLSS Raw ΔT Power. [Step 1.4 - YES]
	SRO	INITIATE forcing Pressurizer Spray flow. [Step 1.5 - YES]
	SRO	INITIATE concurrently using a combination of Boration, CEA insertion, and Turbine load reduction to achieve the targets of SO23-5-1.7. [Step 1.6 - YES]
Examiner Note:		**The following RO steps are from SO23-3-1.10, Pressurizer Pressure and Level Control, Section 6.3, Forcing Pressurizer Sprays with RCS pressure > 1500 PSIA.**
	RO	COMMENCE forcing Pressurizer Sprays. [Step 6.3.1 - YES]
		• CONDUCT a Reactivity Brief. [Step 6.3.1.1 - YES]
		• COMMENCE monitoring RCS pressure. [Step 6.3.1.2 - YES]
		• VERIFY RCS pressure greater than 1500 psia. [Step 6.3.1.3 - YES]
		• PLACE both PZR Spray Valve Controllers in AUTO. [Step 6.3.1.4 - YES]
		• POSITION Backup Heaters to ON or AUTO as necessary to support PZR Spray Valve operation. [Step 6.3.1.5 - YES]

Time	Position	Applicant's Actions or Behavior
		• LOWER PIC-0100, PZR Pressure Controller setpoint to 2225 PSIA. [Step 6.3.1.6 - YES]
Examiner Note: The following RO Steps are from SO23-3-2.2, Makeup Operations, Section 6.3, Borating to the Charging Pump Suction.		
GUIDELINE This method should normally be used for the following purposes: • Borating to maintain power for Xenon compensation • Normal power reductions (3-15% per hour or per SO23-5-1.7) • Rapid power reductions (15-100% per hour) • Adjusting Boron while Unit is shut down • Charging Pump MP-191 is the preferred pump for boration (LS-1.17) [O# 800260364-0020 (DCE)]		
	RO	Borating to the Charging Pump Suction: [Section 6.3 - YES]
		• If required, PERFORM a Reactivity Brief. [Step 6.3.1 - YES]
		• SELECT P-191, Charging Pump. [Step 6.3.2 - YES]
		• ENTER ~5 GPM on FIC-0210Y, BAMU Flow Controller. [Step 6.3.3 - YES]
		• SELECT SET and ENTER 5 GPM. [Step 6.3.3.1 - YES]
		• ENSURE FIC-0210Y in AUTO. [Step 6.3.3.2 - YES]
		• SET FQIS-0210Y, Boration Counter, to 400 GPM. [Step 6.3.4 - YES]
		• SELECT MODIFY. [Step 6.3.4.1 - YES]
		• ENTER 400 gallons in PRESET. [Step 6.3.4.2 - YES]
		• SELECT SET PRESET. [Step 6.3.4.3 - YES]
		• SELECT EXIT. [Step 6.3.4.4 - YES]
		• SELECT BAMU Pump P-174 or P-175. [Step 6.3.5 - YES]
		• VERIFY CLOSED FV-9253, Blended Makeup to VCT Isolation. [Step 6.3.6 - YES]
		• ENSURE HV-9257, BAMU to Charging Pump Suction Block, in AUTO. [Step 6.3.7 - YES]
		• COMMENCE monitoring plant parameters. [Step 6.3.8 - YES]

Operating Test :	NRC	Scenario #	3	Event #	3	Page	16	of	33
Event Description:	Partial Loss of Condenser Vacuum / Turbine Load Reduction								

Time	Position	Applicant's Actions or Behavior
		• If required to lower VCT pressure, CYCLE HV-9209, VCT Vent Valve. [Step 6.3.9 - AS REQ'D]
		NOTE During the boration, selecting HOLD will close FV-0210Y and HV-9257. The BAMU Pump will continue to run on miniflow. Selecting GO will recommence the boration.
		• SELECT HS-0210, Makeup Mode Selector, to BORATE. [Step 6.3.10 - YES]
		• SELECT MODIFY. [Step 6.3.10.1 - YES]
		• SELECT BORATE. [Step 6.3.10.2 - YES]
		• SELECT GO. [Step 6.3.10.3 - YES]
		• CONFIRM boration stops automatically. [Step 6.3.11 - YES]
		• VERIFY FV-0210Y, BAMU to VCT Flow Control Valve, CLOSED. [Step 6.3.12 - YES]

Examiner Note: The following BOP Steps are from SO23-5-1.7, Power Operations, Section 6.3, Turbine Load Change Using Setpoint Adjustment.

1. This section is normally used for routine adjustments to optimize plant performance per Attachment 14 or support other required load changes.
2. Adjustments to Demand and/or Rate Setpoints can be made while the load change is in progress without interrupting the load change.

+25 min	BOP	Turbine Load Change Using setpoint Adjustment. [Section 6.3 - YES]
		• If required, PERFORM a Reactivity Brief & Peer Check. [Step 6.3.1 - YES]
		• INITIATE monitoring T_{COLD}AVG. [Step 6.3.2 - YES]
		• If raising load, then SET CVOL to about 10% above the **final** projected Flow Demand. [Step 6.3.3 - NO]
		• ACTIVATE Turbine DCS Setpoints Box and SELECT MODIFY. [Step 6.3.4 - YES]

Operating Test :	NRC	Scenario #	3	Event #	3	Page	17	of	33
Event Description:	Partial Loss of Condenser Vacuum / Turbine Load Reduction								

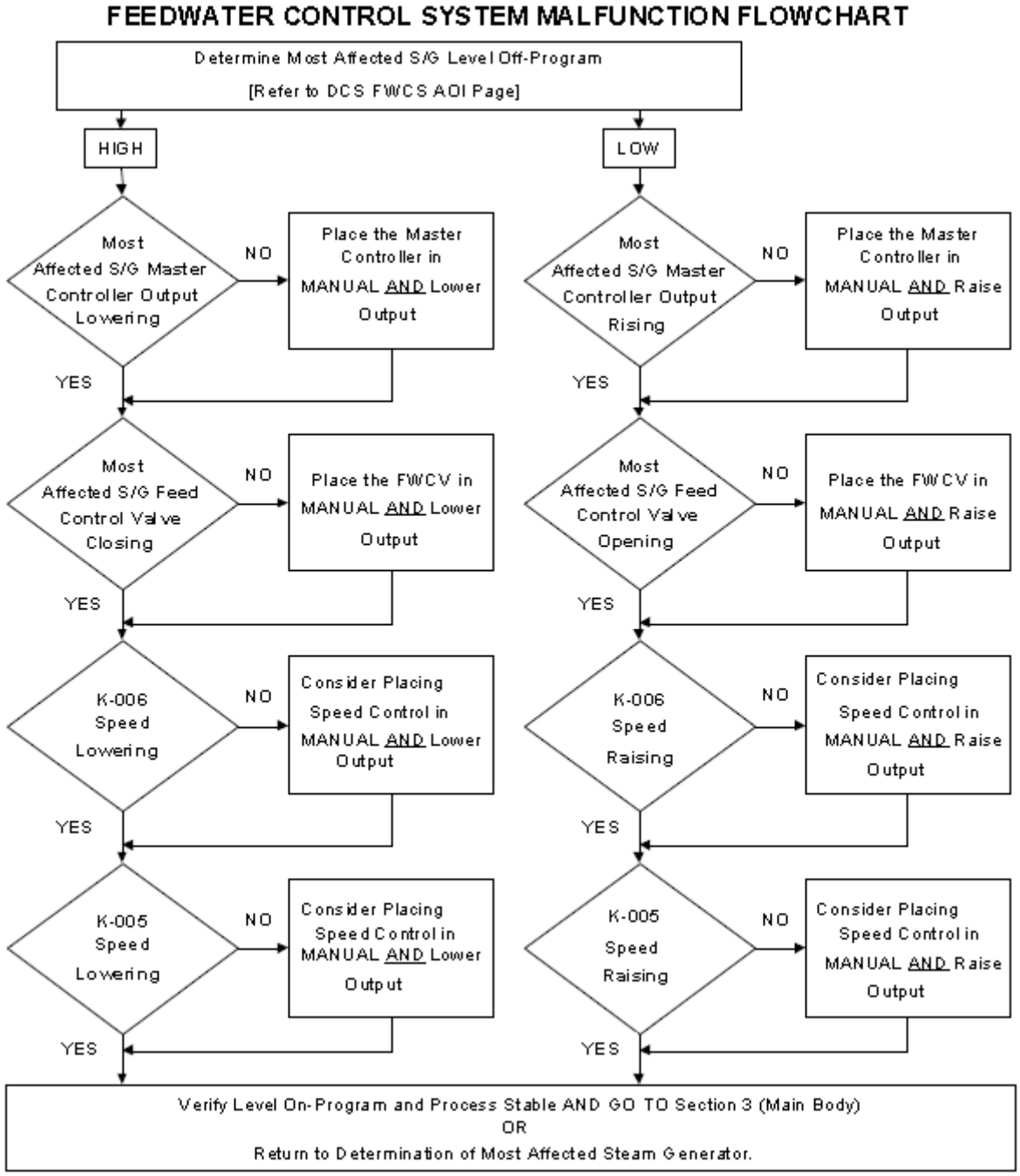
Time	Position	Applicant's Actions or Behavior
		• SET Demand to ~940 MW value and SELECT ENTER. [Step 6.3.5 - YES]
		• SET Rate to target ~3 MW/MIN value and SELECT ENTER. [Step 6.3.6 - YES]
		• SELECT P2 to INITIATE Turbine load change. [Step 6.3.7 - YES]
		• VERIFY Turbine load stabilizes at Target value. [Step 6.3.8 - YES]
		• RESTORE the Rate to 100 MW/MIN and SELECT ENTER. [Step 6.3.9 - YES]
Examiner Note: Crew may determine that Part Length CEA insertion is necessary for ASI control.		
M.O. Cue: After load is lowered 3% to 5%, REPORT a dry loop seal on a vacuum breaker and makeup is in progress, DELETE FW23, Condenser Vacuum Leak Malfunction.		
When Condenser vacuum has stabilized, power reduction is completed, or at Lead Evaluator's discretion, PROCEED to Event 4.		

Operating Test :	NRC	Scenario #	3	Event #	4	Page	18	of	33
Event Description:	Steam Generator E-088 Master Controller Setpoint Failure								

Time	Position	Applicant's Actions or Behavior
Machine Operator:		**When directed, EXECUTE Event 4. - FC05B, SG E-088 Master Controller Setpoint fails to 45% on 240 second ramp.**
Indications Available:		**52A02 – FWCS SG2 E088 LEVEL DEVIATION 53B23 – CONDENSATE FLOW BALANCE TROUBLE (~60 seconds later) SG E088 Feedwater Control Valve modulating closed then opens as SG level stabilizes at 45% SG E088 level lowering**
+60 sec	BOP	REFER to Annunciator Response Procedures (ARPs).
	BOP	RECOGNIZE E-088 Master Controller Setpoint lowering to 45% and INFORM the SRO SO23-13-24 entry required.
	SRO	ENTER SO23-13-24, Feedwater Control System Malfunction.
		• EVALUATE combination of Conditions to IDENTIFY failure mode and Steps to perform: [Step 1 - YES]
		• Steam Generator level anomaly: GO to Attachment 1. [Step 1 - YES]
Examiner Note:		**The following steps are from SO23-13-24, Feedwater Control System Malfunction, Attachment 1, Feedwater Control System Malfunction Flowchart.**
	BOP	DETERMINE that SG E-088 level is LOW.
	BOP	DETERMINE that SG E-088 Master Controller output is LOWERING.
	BOP	PLACE SG E-088 Master Controller in MANUAL and RAISE output.
Floor Cue: If required, REPORT as Shift Manager to maintain SG level at 67% in MANUAL.		
	BOP	DETERMINE that SG E-088 Feed Control Valve is OPENING.
	BOP	DETERMINE that Main Feedwater Pumps K-005 and K-006 speed RISING.

Operating Test :	NRC	Scenario #	3	Event #	4	Page	19	of	33
Event Description:	Steam Generator E-088 Master Controller Setpoint Failure								

Time	Position	Applicant's Actions or Behavior



	SRO	CONTACT I & C to investigate.

M.O. Cue: If contacted as I & C, REPORT the controller logic card appears to be the problem and the Master Controller must remain in MANUAL.

Operating Test :	NRC	Scenario #	3	Event #	4	Page	20	of	33
Event Description:	Steam Generator E-088 Master Controller Setpoint Failure								

Time	Position	Applicant's Actions or Behavior
	SRO	VERIFY SG E-088 level STABLE at or near program level with E-088 Master Controller in MANUAL and GO to Section 3.
	SRO/BOP	VERIFY SG E-088 level remains stable. [Step 3.a - YES]
	SRO/BOP	MONITOR SG E-088 level. [Step 3.a.1) - YES]
	BOP	MONITOR Feedwater Control System performance. [Step 3.a.2) - YES]
	BOP	ADJUST SG E-088 level to maintain approximately 67%. [Step 3.a.3) - YES]
	SRO	CONTACT the Shift Manager. [Step 3.b) - YES]
	SRO/BOP	VERIFY EFAS has not actuated. [Step 3.c) - YES]
+10 min	SRO/BOP	VERIFY Feedwater Control System is functioning properly with all components in AUTO. [Step 3.d - YES]
When SG level is restored, or at Lead Evaluator's discretion, PROCEED to Events 5, 6, 7, and 8.		

Operating Test :	NRC	Scenario #	3	Event #	5, 6, 7, & 8	Page	21	of	33
Event Description:	Main Steam Line Break inside Containment / Train B SIAS Relay Failure / Containment Spray Pump Start Failure / Main Steam Isolation Signal Actuation Failure								

Time	Position	Applicant's Actions or Behavior
Machine Operator:		**When directed, EXECUTE Events 5, 6, 7, and 8.** **- MS03A, SG E-088 Steam Line break inside Containment @ 0.5% severity.** **- K403B, Train B SIAS relay failure.** **- RP01M, Containment Spray Pump P-012 start failure.** **- MSIS LP, Main Steam Isolation Signal (MSIS) fails to actuate.**
Indications Available:		**60A02 – CONTAINMENT HUMIDITY HI** **60A12 – REACTOR CAVITY TEMP HI (~5 seconds later)** **56A56 – CONTAINMENT SUMP LEVEL HI (~10 seconds later)** **56A35 – CONTAINMENT PRESSURE HI PRETRIP (~30 seconds later)** **Numerous Excess Steam Demand Event related alarms**
Examiner Note:		**The Steam Line break begins at 0.5% (~100,000 lbm/hr). When MSIS is manually actuated, the severity changes to 2.0% (~400,000 lbm/hr).**
Examiner Note:		**The SRO may pull forward the actions of FS-30, Establish Stable RCS Temperature during ESDE. These steps are identified later in this scenario.**
+1 min	RO	RECOGNIZE high Containment humidity with increasing Containment Sump level and no corresponding radiation alarms.
	RO	OBSERVE RPS Pre-trips for CONTAINMENT PRESSURE HI.
	SRO	DIRECT a Reactor and Turbine trip.
	RO/BOP	Manually TRIP Reactor.
		• DEPRESS Reactor Trip pushbuttons at CR-56 **or** CR-53.
	SRO	ENTER SO23-12-1, Standard Post Trip Actions.
	RO	VERIFY Reactor Trip: [Step 1 - YES]
		• VERIFY Reactor Trip Circuit Breakers OPEN. [Step 1.a - YES]
		• VERIFY Reactor Power lowering and Startup Rate NEGATIVE. [Step 1.b - YES]
		• VERIFY maximum of one (1) Full Length CEAs NOT fully inserted. [Step 1.c - YES]

Operating Test :	NRC	Scenario #	3	Event #	5, 6, 7, & 8	Page	22	of	33
Event Description:	Main Steam Line Break inside Containment / Train B SIAS Relay Failure / Containment Spray Pump Start Failure / Main Steam Isolation Signal Actuation Failure								

Time	Position	Applicant's Actions or Behavior
	SRO/RO	VERIFY Reactivity Control criteria satisfied. [Step 1 - YES]
	BOP	VERIFY Turbine Trip: [Step 2 - YES]
		• VERIFY HP & LP Stop and Governor Valves CLOSED. [Step 2.a - YES]
		• VERIFY <u>both</u> Unit Output Breakers OPEN. [Step 2.b - YES]
	SRO	INITIATE Administrative Actions: [Step 3 - YES]
		• INITIATE Attachment 4, Worksheet. [Step 3.a - YES]
		CAUTION DO NOT OPERATE TRIP pushbuttons for tripped breakers. Operation of TRIP pushbuttons will reset overcurrent protection allowing Diesel Generator output breaker to close to a fault.
	BOP	VERIFY Vital Auxiliaries criteria satisfied: [Step 4 - YES]
		• VERIFY both 1E 4 kV Buses 2A04 and 2A06 ENERGIZED. [Step 4.a - YES]
		• VERIFY all 1E 480 V Buses 2B04, 2B24, 2B06, & 2B26 ENERGIZED. [Step 4.b - YES]
		• VERIFY all 1E DC Buses ENERGIZED. [Step 4.c - YES]
		• VERIFY all Non-1E 4 kV Buses 2A03, 2A07, 2A08, & 2A09 ENERGIZED. [Step 4.d - YES]
		• DETERMINE Train B CCW OPERATING and ALIGNED to Non-Critical Loop and Letdown Heat Exchanger. [Step 4.e - YES]
		• [RNO] If CIAS actuated, STOP all RCPs and GO to Step 5.
	RO	VERIFY RCS Inventory Control criteria satisfied: [Step 5 - YES]
		• VERIFY PZR level between 10% and 70% and TRENDING to between 30% and 60%. [Step 5.a - YES]
		• VERIFY Core Exit Saturation Margin ≥ 20ºF: [Step 5.b - YES]
		• OBSERVE QSPDS page 611 **<u>or</u>** CFMS page 311.

Operating Test :	NRC	Scenario #	3	Event #	5, 6, 7, & 8	Page	23	of	33
Event Description:	Main Steam Line Break inside Containment / Train B SIAS Relay Failure / Containment Spray Pump Start Failure / Main Steam Isolation Signal Actuation Failure								

Time	Position	Applicant's Actions or Behavior
	RO	VERIFY RCS Pressure Control criteria satisfied: [Step 6 - YES]
		• VERIFY PZR pressure between 1740 PSIA and 2380 PSIA, controlled and TRENDING to between 2025 & 2275 PSIA. [Step 6.a - YES]
	RO	DETERMINE Core Heat Removal criteria NOT satisfied: [Step 7 - YES]
		• DETERMINE no RCPs operating. [Step 7.a - YES]
		• [RNO] GO to Step 7.c.
		• DETERMINE Core Exit Saturation Margin > 20ºF. [Step 7.c - YES]
		• OBSERVE QSPDS page 611 **or** CFMS page 311.
	BOP	DETERMINE RCS Heat Removal criteria NOT satisfied: [Step 8 - YES]
		• DETERMINE SG E-088 narrow range level < 21%. [Step 8.a - YES]
		• VERIFY both SG narrow range levels < 80%. [Step 8.a - YES]
		• DETERMINE Main Feedwater NOT available. [Step 8.a - YES]
		• [RNO] DETERMINE EFAS-1 & EFAS-2 AUTO initiation.
		• DETERMINE T_{COLD} less than 540ºF. [Step 8.b - YES]
		• [RNO] ENSURE Feedwater flow not excessive.
		• [RNO] ENSURE Steam Bypass Control Valves CLOSED.
		• [RNO] ENSURE Atmospheric Dump Valves CLOSED.
		• [RNO] DETERMINE MSIS has NOT actuated and manually ACTUATE MSIS.
		• DEPRESS HS-9137-1 **and** HS-9137-2 MSIS pushbuttons on CR-56.
		• DEPRESS HS-9137-3 **and** HS-9137-4 MSIS pushbuttons on CR-53.
		• DETERMINE SG pressures NOT between 960 and 1050 PSIA. [Step 8.c - YES]
		• [RNO] If SG pressure < 740 PSIA, ENSURE MSIS actuated & GO to Step 9.
	RO	DETERMINE Containment Isolation NOT criteria satisfied: [Step 9 - YES]
		• DETERMINE Containment pressure > 1.5 PSIG. [Step 9.a - YES]

Operating Test :	NRC	Scenario #	3	Event #	5, 6, 7, & 8	Page	24	of	33
Event Description:	Main Steam Line Break inside Containment / Train B SIAS Relay Failure / Containment Spray Pump Start Failure / Main Steam Isolation Signal Actuation Failure								

Time	Position	Applicant's Actions or Behavior
		• [RNO] If Containment pressure > 3.4 PSIG, ENSURE SIAS / CIAS / CCAS / CRIS actuated
		• OPEN Train B SIAS Valves:
		• HV-9323, HPSI Header 2 to Loop 1A.
		• HV-9329, HPSI Header 2 to Loop 2A.
		• HV-9322, LPSI Header to Loop 1A.
		• [RNO] ENSURE all RCPs STOPPED.
		• VERIFY Containment Area Radiation Monitors NOT alarming or trending to alarm. [Step 9.b - YES]
		• VERIFY Secondary Plant Radiation Monitors NOT alarming or trending to alarm. [Step 9.c - YES]
	RO	DETERMINE Containment Temperature and Pressure criteria NOT satisfied: [Step 10 - YES]
		• DETERMINE Containment average temperature > 120ºF. [Step 10.a - YES]
		• [RNO] ENSURE proper functioning of Normal Containment Cooling.
		• [RNO] ENSURE at least one Containment Dome Air Circulator OPERATING.
		• DETERMINE Containment pressure > 3.4 PSIG. [Step 10.b - YES]
		• [RNO] If Containment pressure > 3.4 PSIG, ENSURE SIAS / CIAS / CCAS / CRIS actuated
		• [RNO] ENSURE all RCPs STOPPED.
		• [RNO] ENSURE all available Containment Emergency Cooling Units OPERATING.
		• [RNO] DETERMINE Containment pressure > 14 PSIG.
		• [RNO] ENSURE CSAS actuated.
		• DEPRESS HS-9395-1, P-012, Containment Spray Pump START pushbutton.
		• [RNO] ENSURE all available Containment Spray Header flows > 1600 GPM.
+15 min	SRO	DIAGNOSE event in progress: [Step 11 - YES]
		• DETERMINE some Safety Function criteria are NOT met per Attachment 4, Worksheet. [Step 11.a - YES]

Operating Test :	NRC	Scenario #	3	Event #	5, 6, 7, & 8	Page	25	of	33
Event Description:	Main Steam Line Break inside Containment / Train B SIAS Relay Failure / Containment Spray Pump Start Failure / Main Steam Isolation Signal Actuation Failure								

Time	Position	Applicant's Actions or Behavior
		• [RNO] COMPLETE Attachment 1, Recovery Diagnostics.
		• DETERMINE Reactor Trip Recovery is NOT diagnosed. [Step 11.b - YES]
	RO	• [RNO] DETERMINE all RCPs STOPPED.
	BOP	• INITIATE steps 12 through 16. [Step 11.c - YES]
		• IMPLEMENT EOI SO23-12-5, Excess Steam Demand Event. [Step 11.d - YES]
Examiner Note:		**SO23-12-1, Standard Post Trip Actions, Steps 12 to 16, performed by the BOP are located at the end of the scenario. The following steps are from SO23-12-5, Excess Steam Demand Event.**
	SRO	ENTER SO23-12-5, Excess Steam Demand Event.
	SRO	RECORD time of EOI entry _____. [Step 1.a - YES]
	SRO	VERIFY ESDE diagnosis: [Step 2 - YES]
		• INITIATE SO23-12-10, Safety Function Status Checks. [Step 2.a - YES]
		• INITIATE Foldout Page. [Step 2.b - YES]
		• DIRECT performance FS-30, Establish Stable RCS Temperature during ESDE.
		• DIRECT performance of FS-7, Verify SI Throttle/Stop Criteria.
		• DIRECT performance of SO23-12-11, Attachment 22, Non-Qualified Load Restoration.
		• VERIFY ESDE diagnosis using Figure 1, Break Identification Chart. [Step 2.c - YES]
		• DIRECT Chemistry to sample both SGs for radioactivity and boron. [Step 2.d - YES]
M.O. Cue:		**If directed to sample SGs, WAIT 3 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.**
	SRO	INITIATE Administrative Actions. [Step 3 - YES]

Operating Test : NRC	Scenario # 3	Event # 5, 6, 7, & 8	Page 26 of 33
Event Description: Main Steam Line Break inside Containment / Train B SIAS Relay Failure / Containment Spray Pump Start Failure / Main Steam Isolation Signal Actuation Failure			

Time	Position	Applicant's Actions or Behavior
		• NOTIFY Shift Manager/Operations Leader of SO23-12-5, Excess Steam Demand Event initiation. [Step 3.a - YES]
		• ENSURE Emergency Plan is initiated. [Step 3.b - YES]
		• IMPLEMENT Placekeeper. [Step 3.c - YES]
		• IMPLEMENT Time Dependent Steps. [Step 3.d - YES]
	RO	VERIFY ESF actuation. [Step 4 - YES]
		• VERIFY SIAS actuation required. [Step 4.a - YES]
		• DETERMINE Containment pressure greater than SIAS setpoint.
		• ENSURE the following actuated: [Step 4.b - YES]
		• SIAS / CCAS / CRIS
		• RECORD time of SIAS: _____ [Step 4.c - YES]
	BOP	• STOP unloaded Diesel Generators. [Step 4.d - YES]
		• DEPRESS HS-1670-1, Train A EDG SIAS OVERRIDE STOP pushbutton.
		• DEPRESS HS-1649-2, Train B EDG SIAS OVERRIDE STOP pushbutton.
	BOP	• INITIATE SO23-12-11, Attachment 22, Non-Qualified Load Restoration. [Step 4.e - YES]
M.O. Cue:		**When directed to restore non-qualified loads, WAIT 2 minutes, then EXECUTE remote function ED85, Non-Qualified Loads Restoration. INFORM the Control Room that you have restored Non-Qualified Loads.**
		• VERIFY MSIS actuation required. [Step 4.f - YES]
		• DETERMINE SG pressure < 740 PSIA.
	BOP	• ENSURE MSIS actuated. [Step 4.g - YES]

Operating Test :	NRC	Scenario #	3	Event #	5, 6, 7, & 8	Page	27	of	33
Event Description:	Main Steam Line Break inside Containment / Train B SIAS Relay Failure / Containment Spray Pump Start Failure / Main Steam Isolation Signal Actuation Failure								

Time	Position	Applicant's Actions or Behavior
	RO	• VERIFY CIAS actuation required. [Step 4.h - YES]
		• DETERMINE Containment pressure >3.4 PSIG.
	RO	• ENSURE CIAS actuated. [Step 4.i - YES]
	RO	• ENSURE SIAS actuated. [Step 4.j - YES]
	RO	ESTABLISH Optimum SI Alignment: [Step 5 - YES]
		• ESTABLISH two train operation: [Step 5.a - YES]
		• DETERMINE all available Charging Pumps OPERATING. [Step 5.a.1) - YES]
		• DETERMINE both HPSI and LPSI Trains OPERATING. [Step 5.a.2) - YES]
		• VERIFY all Cold Leg flow paths ALIGNED. [Step 5.a.3) - YES]
		• DETERMINE SI flow required AND indicated. [Step 5.a.4) - YES]
	BOP	DETERMINE MSIVs and MSIV Bypasses CLOSED. [Step 6 - YES]
	SRO	PREVENT Pressurize Thermal Shock: [Step 7 - YES]
		NOTE WHEN excess steam demand remains NOT isolated and all RCPs are stopped, THEN RCS T_{COLD} in loop with *least affected* S/G may be higher than REP CET temperature.
		CAUTION Failure to establish steaming flow path on least affected S/G before most affected S/G loses effective heat removal capabilities will result in rapid re-pressurization (PTS consideration).
		• DIRECT performance of FS-30, Establish Stable RCS Temperature During ESDE. [Step 7.a - YES]

Operating Test :	NRC	Scenario #	3	Event #	5, 6, 7, & 8	Page	28	of	33
Event Description:	Main Steam Line Break inside Containment / Train B SIAS Relay Failure / Containment Spray Pump Start Failure / Main Steam Isolation Signal Actuation Failure								

Time	Position	Applicant's Actions or Behavior
		• DIRECT performance of VERIFY FS-7, Verify SI Throttle/Stop Criteria. [Step 7.b - YES]
	RO	DETERMINE RCP NPSH requirements of SO23-12-11, Attachment 30, not applicable. [Step 8 - YES]
Examiner Note:		**The following steps from SO23-12-11, EOI Supporting Attachments, FS-30, Establish Stable RCS Temperature during ESDE, will be performed when conditions are met. SO23-12-5 steps are continued later.**
		NOTE WHEN excess steam demand remains NOT isolated and all RCPs are stopped, **THEN** RCS T_{COLD} in loop with least affected S/G may be higher than REP CET temperature
+20 min	BOP	VERIFY SG least affected by ESDE, SG E-089, NOT isolated for SGTR. [Step a - YES]
		CAUTION Failure to establish steaming flow path on least affected S/G before most affected S/G loses effective heat removal capabilities will result in rapid re-pressurization (PTS consideration).
	BOP	VERIFY most affected SG level E-088 - less than 50% WR. [Step b - YES]
	BOP	PERFORM the following on least affected SG E-089: [Step c - YES]
		• TRANSFER HV-8421, SG E-089 ADV to AUTO / MODULATE. [Step c.1) - YES]
		• MAINTAIN SG E-089 pressure 200 PSIA above SG E-088 pressure. [Step c.2) - YES]
Examiner Note:		**During validation, Steam Generator E-088 reached 200 PSIA before wide range level indication was lost.**

Operating Test :	NRC	Scenario #	3	Event #	5, 6, 7, & 8	Page	29	of	33
Event Description:	Main Steam Line Break inside Containment / Train B SIAS Relay Failure / Containment Spray Pump Start Failure / Main Steam Isolation Signal Actuation Failure								

Time	Position	Applicant's Actions or Behavior
	BOP	VERIFY SG dryout on most affected SG E-088: [Step d - YES]
		• DETERMINE RCS T_{COLD} - STABLE or RISING. [Step d.1) - NO]
		• DETERMINE SG pressure - 200 PSIA. [Step d.2) - YES]
		NOTE When MSIS is actuated, unstable S/G pressures can cause cycling of AFW flow due to differential steam pressure between the two S/Gs.
CRITICAL TASK STATEMENT		**Establish Stable Reactor Coolant System Temperature per SO23-12-11, E0I Supporting Attachments, FS-30, Establish Stable RCS Temperature during ESDE.**
CRITICAL TASK	BOP	STABILIZE least affected SG E-089 pressure: [Step e - YES]
		• VERIFY ADV on SG E-089 in AUTO / MODULATE. [Step e.1) - YES]
		• MAINTAIN P_{SAT} for lowest RCS T_{COLD} on SG E-089. [Step e.2) - YES]
		• STABILIZE AFW flow on SG E-089. [Step e.3) - YES]
	RO	VERIFY RCS pressure is to the right of the Appendix E curve on Attachment 30, Post-Accident Pressure / Temperature Limits. [Step f - YES]
	BOP	OPERATE Feedwater on SG E-089 to maintain between 40% and 80% NR. [Step g - YES]
Examiner Note: The following steps are from SO23-12-5, Excess Steam Demand Event.		
	BOP	DETERMINE Excess Steam Demand NOT isolated. [Step 9.a - YES]
		• [RNO] GO to Step c.

Operating Test :	NRC	Scenario #	3	Event #	5, 6, 7, & 8	Page	30	of	33
Event Description:	Main Steam Line Break inside Containment / Train B SIAS Relay Failure / Containment Spray Pump Start Failure / Main Steam Isolation Signal Actuation Failure								

Time	Position	Applicant's Actions or Behavior
		NOTE IF a most affected S/G CANNOT be defined, THEN either or both S/Gs may be defined as least affected.
	SRO/BOP	DETERMINE SG E-088 most affected Steam Generator. [Step 9.c - YES]
		NOTE IF the electric AFW Pump associated with the *most affected* S/G is x-tied to supply the *least affected* S/G, THEN it should NOT be secured.
	BOP	ISOLATE Steam Generator E-088. [Step 10.a - YES]
CRITICAL TASK STATEMENT		**Identify and Isolate Most Affected Steam Generator (ESDE) Prior to Exiting SO23-12-5, Excess Steam Demand Event.**
CRITICAL TASK	BOP	• ISOLATE Steam Generator E-088: [Step 10.a - YES]
		• CLOSE / STOP SG E-088 components: [Step 10.a.1) - YES]
		• DETERMINE HV-8205, Main Steam Isolation Valve CLOSED.
		• DETERMINE HV-8203, Main Steam Isolation Valve Bypass CLOSED.
		• DEPRESS HV-8419, Atmospheric Dump Valve CLOSE pushbutton.
		• DEPRESS HV-4048, Main Feed Isolation Valve CLOSE pushbutton.
		• DEPRESS HV-4730, Auxiliary Feedwater Valve CLOSE pushbuttons.
		• DEPRESS HV-4714, Auxiliary Feedwater Valve CLOSE pushbutton.
		• DEPRESS HV-8201, P-140, Steam to Auxiliary Feedwater Pump CLOSE pushbutton.
		• DETERMINE HV-4054, SG Blowdown Isolation Valve CLOSED.

Operating Test :	NRC	Scenario #	3	Event #	5, 6, 7, & 8	Page	31	of	33
Event Description:	Main Steam Line Break inside Containment / Train B SIAS Relay Failure / Containment Spray Pump Start Failure / Main Steam Isolation Signal Actuation Failure								

Time	Position	Applicant's Actions or Behavior
		• DEPRESS HV-4058, SG Water Sample Isolation SG Water Sample Isolation Valve CLOSE pushbutton.
		• DEPRESS HS-4733-2, P-504, Auxiliary Feedwater Pump STOP pushbutton.
+30 min	BOP	ENSURE HV-8419, SG E-088 ADV selected to MANUAL. [Step 10.a.2) - YES]
When Steam Generator E-088 is isolated, or at Lead Evaluator's discretion, TERMINATE the scenario.		

Operating Test :	NRC	Scenario #	3	Event #	5, 6, 7, & 8	Page	32	of	33
Event Description:	Main Steam Line Break inside Containment / Train B SIAS Relay Failure / Containment Spray Pump Start Failure / Main Steam Isolation Signal Actuation Failure								

Time	Position	Applicant's Actions or Behavior
<u>Examiner Note</u>: These steps are performed by the BOP per SO23-12-1, Steps 12 through 16.		
	SRO/BOP	INITIATE Attachment 5, Administrative Actions. [Step 12.a - YES]
	SRO/BOP	ENSURE a PA system announcement for Reactor Trip. [Step 12.b - YES]
	BOP	ENSURE the following loads restored: [Step 13 - YES]
		• VERIFY Telecom 480 VAC Feeder Breaker – CLOSED. [Step 13.a - YES].
		• VERIFY Telecom 480 VAC Feeder Breaker – CLOSED. [Step 13.b - YES].
		• DETERMINE all Non-1E Buses – ENERGIZED [Step 13.c - YES].
		• [RNO] OPERATE ADVs to maintain S/G pressure between 960 PSIA and 1050 PSIA.
		• DETERMINE B15 & B16 480 VAC Load Centers – ENERGIZED [Step 13.d - YES].
	BOP	VERIFY Main Turbine Coastdown: [Step 14 - YES]
		• DETERMINE Extraction Steam Block Valves – CLOSED. [Step 14.a - YES]
		• DETERMINE Main Steam to Reheater Block, Bypass, Warmup, and Control Valves – CLOSED. [Step 14.a - YES]
		• DETERMINE HV-2712A/B Bled Steam to Reheaters Block Valve – CLOSED. [Step 14.a - YES]
		• VERIFY Generator lowering – less than 24 kV. [Step 14.b - YES]

Operating Test :	NRC	Scenario #	3	Event #	5, 6, 7, & 8	Page	33	of	33
Event Description:	Main Steam Line Break inside Containment / Train B SIAS Relay Failure / Containment Spray Pump Start Failure / Main Steam Isolation Signal Actuation Failure								

Time	Position	Applicant's Actions or Behavior
		• VERIFY 99A26 - TURBINE LUBE OIL TEMP HI and 99A46 - TURBINE BRG OIL DRAIN TEMP HI Annunciators – RESET. [Step 14.c - YES]
		• INITIATE SO23-10-2, Turbine Shutdown, Attachment for Unloading the Generator and Removing the Unit from Line. [Step 14.d - NO]
	BOP	ESTABLISH desired Condensate and Feedwater Status: [Step 15 - YES]
		• ENSURE 3rd Point Heater Drain Pumps – STOPPED. [Step 15.a - YES]
		• DETERMINE Reactor Trip Override – NOT RESET. [Step 15.b - YES]
		• DETERMINE no Main Feedwater Pumps and three (3) Condensate Pumps OPERATING. [Step 15.c - YES]
		• [RNO] ENSURE SG levels maintained by AFW Pumps.
		• ENSURE FIC-3294, Condensate Pump Miniflow Controller set for Condensate Pump configuration. [Step 15.d - YES]
		• Three (3) Pumps – 9000 GPM.
		• PLACE LV-3245, Condensate Drawoff Valve to – DISABLE. [Step 15.e - YES]
		• DETERMINE SO23-12-2, Reactor Trip Recovery, NOT being implemented. [Step 15.f - YES]
		• [RNO] ENSURE HV-4053 & HV-4054, SG Blowdown Valves CLOSED and GO to Step 16.
	BOP	VERIFY Start-Up Range Channels: [Step 16 - YES]
		• VERIFY both Start-Up Range Channels – OPERABLE. [Step 16.a - YES]
SO23-12-1, Standard Post Trip Actions, Steps 12 through 16 are complete.		

Appendix D	Scenario Outline	Form ES-D-1

Facility: SONGS 2 & 3	Scenario No.: 4	Op Test No.: October 2011 NRC
Examiners: _____	Operators: _____	
_____	_____	
_____	_____	

Initial Conditions: 100% power MOL - RCS Boron is 980 ppm (via sample).

Turnover: Maintain steady-state power conditions.

Critical Tasks:
- Restore Component Cooling Water Flow Due to Train A Leakage Prior to Exiting SO23-13-7, Loss of Component Cooling Water / Saltwater Cooling.
- Initiate Emergency Boration for Two (2) Stuck Control Element Assemblies Prior to Exiting SO23-12-1, Standard Post Trip Actions.
- Restore Feedwater Flow to At Least One Steam Generator Prior to Exiting SO23-12-6, Loss of Feedwater.

Event No.	Malf. No.	Event Type*	Event Description
1 +10 min	RC15B	I (RO, SRO)	Pressurizer Pressure Control Channel Y (PT-0100Y) Fails Low.
2 +20 min	CC05A	C (BOP, SRO) TS (SRO)	Train A Component Cooling Water Heat Exchanger (E-001) Tube Leak.
3 +25 min	RP18	I (RO, SRO) TS (SRO)	Control Element Assembly Calculator #2 Failure.
4 +45 min	MFW LP	R (RO) N (BOP, SRO)	Main Feedwater Pump (K-005 / P-063) Trip. Initiate Rapid Power Reduction to 70%.
5 +50 min	FW09D FW09E	M (RO, BOP, SRO)	Main Feedwater Pump (K-006 / P-062) High Vibration Trip.
6 +50 min	RD0602 RD4102	C (RO)	Two (2) Stuck Control Element Assemblies (#6 & #41) upon Reactor Trip. Emergency Boration Required.
7 +51 min	2A07 LP	C (BOP)	Non-1E Bus 2A07 Fails to AUTO Transfer Upon Reactor Trip.
8 +55 min	FW02A FW02B FW25	C (BOP)	Motor Driven AFW Pumps (P-141 / P-504) Shaft Seizure (post-trip). Turbine Driven AFW Pump (P-140) Overspeed Trip (post-trip). Loss of all Feedwater.

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

Actual	Target Quantitative Attributes
8	Total malfunctions (5-8)
3	Malfunctions after EOP entry (1-2)
3	Abnormal events (2-4)
1	Major transients (1-2)
2	EOPs entered/requiring substantive actions (1-2)
0	EOP contingencies requiring substantive actions (0-2)
3	Critical tasks (2-3)

SCENARIO SUMMARY NRC #4

The crew will assume the watch at 100% power with no scheduled activities per Operating Instruction (OI) SO23-5-1.7, Power Operations. When the Shift Turnover is complete, a Pressurizer Pressure Channel fails low. Actions are per the Annunciator Response Procedures (ARPs) and Abnormal Operating Instruction (AOI) SO23-13-27, Pressurizer Pressure and Level Malfunction. The alternate controlling channel will be placed in service and Pressurizer Heaters will be restored to operation. If pressure rises above 2275 PSIA, the SRO will refer to Technical Specifications.

When conditions are stable, a tube leak will develop on the Train A Component Cooling Water (CCW) Heat Exchanger. The crew will respond per AOI SO23-13-7, Loss of Component Cooling Water / Saltwater Cooling. Crew actions include transferring to the Train B Component Cooling Water System as well is attempting to isolate the Train A leakage. The SRO will refer to Technical Specifications.

When CCW actions are complete, a Control Element Assembly Calculator (CEAC) will fail. The crew will perform actions per the ARPs and OI SO23-3-2.13, Core Protection / Control Element Assembly Calculator Operation. The SRO will refer to Technical Specifications.

The next event is a trip of Main Feedwater Pump P-062. The crew will reference AOI SO23-13-28, Rapid Power Reduction. A Rapid Power Reduction is performed to reduce Main Turbine load to 70%. Actions include a Boration to the Charging Pump suction per OI SO23-3-2.2, Makeup Operations and insertion of Control Element Assemblies per OI SO23-3-2.19, Control Element Drive Mechanism Control System Operation.

When power is stable at 70%, a second Main Feedwater Pump will trip requiring a manual Reactor trip. The crew will enter Emergency Operating Instruction (EOI) SO23-12-1, Standard Post Trip Actions (SPTAs), and determine that two Control Element Assemblies have failed to insert and requiring an Emergency Boration.

The scenario is complicated with a failure of Non-1E Bus 2A07 to AUTO transfer on Reactor Trip. The Motor Driven Auxiliary Feedwater Pumps will operate for two minutes prior to tripping and the Turbine Driven AFW Pump will trip after five minutes rendering a total Loss of Feedwater Flow.

The crew will transition from EOI SO23-12-1, SPTAs, to EOI SO23-12-6, Loss of Feedwater. When the Reactor Coolant Pumps are secured in EOI SO23-12-6, the Turbine Driven Auxiliary Feedwater Pump overspeed trip will be reset per EOI SO23-12-11, EOI Supporting Attachments, FS-11, Reset P-140 Overspeed Trip.

The scenario is terminated when Auxiliary Feedwater System flow is restored to either Steam Generator.

Risk Significance:

- Failure of risk important system prior to trip: Train A CCW Heat Exchanger
- Risk significant core damage sequence: Loss of Feedwater Flow
- Risk significant operator actions: Transfer CCW Non-Critical Loop

  Emergency Borate Due to Stuck CEAs

  Restore Feedwater Flow to any Steam Generator

Scenario Event Description
NRC Scenario #4

MACHINE OPERATOR INSTRUCTIONS for SIMULATOR SETUP

INITIALIZE to IC-230 NRC Scenario #4 and associated Setup File.

EVENT	TYPE	MALF #	DESCRIPTION	DEMAND VALUE	INITIATING PARAMETER
SETUP	MF	FW02A	P-141, Auxiliary Feedwater Pump shaft seizure	TRIP	RX TRIP
	MF	FW02B	P-504, Auxiliary Feedwater Pump shaft seizure	TRIP	RX TRIP
	MF	FW25	P-140, Auxiliary Feedwater Pump overspeed	TRIP	RX TRIP
	MF	RD0602	Stuck CEA #06	STUCK	
	MF	RD4102	Stuck CEA #41	STUCK	
1	MF	RC15B	Channel X PZR Pressure PT-0100Y failure	2500 psia	
2	MF	CC05A	Train A CCW HX (E-001) Tube Leak	100%	
2	RF	CC60	Train A HV-6225, CCW Surge Tank outlet valve	CLOSE	
3	MF	RP18	Control Element Assembly Calculator #2 failure	OFF	
4	LP	MFW LP	Main Feedwater Pump (K-005 / P-063) trip	TRIP	
5	MF	FW09D	Main Feedwater Pump (K-006 / P-062) trip	TRIP	
5	MF	FW09E	Main Feedwater Pump (K-006 / P-062) trip	TRIP	
6	MF	RD0602	Stuck CEA #06	STUCK	
6	MF	RD4102	Stuck CEA #41	STUCK	
7	LP	2A07 LP	Bus 2A07 fails to AUTO TRANSFER		RX TRIP
8	MF	FW02A	P-141, Auxiliary Feedwater Pump shaft seizure post trip (PT)	TRIP	RX TRIP (120 seconds PT)
8	MF	FW02B	P-504, Auxiliary Feedwater Pump shaft seizure post trip (PT)	TRIP	RX TRIP (120 seconds PT)
8	MF	FW25	P-140, Auxiliary Feedwater Pump overspeed post trip (PT)	TRIP	RX TRIP (300 seconds PT)
8	RF	FW52	Reset TDAFW Pump P-140 overspeed trip	RESET	Upon direction
8	RF	FW103	P-140 Throttle Valve MU122.	CLOSE	Upon direction

Machine Operator:	**EXECUTE IC-230 NRC Scenario #4 and SETUP file to align components.** **ENSURE CVCS Blend Setpoints MATCH Shift Turnover Sheet.** **CHANGE Operator Aid Tag #029 (CVCS) to reflect boron concentration.** **VERIFY both Pressurizer Spray Valves in AUTO.** **VERIFY Channel Y Pressurizer Pressure and Level in service.** **ENSURE Turbine Ramp Rate set to 100 MWe per minute.** **PROVIDE procedures in progress, Shift Turnover, and Reactivity Management Guide to crew in Briefing Room:** **- COPY of SO23-5-1.7, Power Operations, Section 6.1, Guidelines for Steady State Operation.** **- LAMINATED COPY of SO23-5-1.7, Power Operations, Attachment 8, Power Maneuvering Guidelines** **PLACE the MOC copy of OPS Physics Summary Book on SRO Desk.** **VERIFY CEA positions with ARO.**
Control Room Annunciators in Alarm:	
NONE	

Operating Test :	NRC	Scenario #	4	Event #	1	Page	5	of	29
Event Description:	Pressurizer Pressure Control Channel Failure								

Time	Position	Applicant's Actions or Behavior
Machine Operator: When directed, EXECUTE Event 1. - RC15B, Pressurizer Pressure Controlling Channel PT-0110Y fails low.		
Indications Available: **50A04 – PZR PRESS DEVIATION HI / LO** **50A14 – PZR PRESS HI / LO** **Pressurizer Heaters on**		
Examiner Note: If Pressurizer Heaters are left energized for an extended length of time, Annunciator 50A02 – COLSS ALARM will alarm and require additional actions listed at the end of this event. Specifically, Turbine load must be reduced by 5 MWe to clear the alarm.		
+30 secs	RO	REFER to Annunciator Response Procedures (ARPs).
	RO	DETERMINE which channel initiated the alarm using PR-100.
		• RECOGNIZE Channel Y (PR-0100B) has failed low.
Examiner Note: RO may use "prompt and prudent" action to swap Channels. The next steps are from Annunciator Response Procedure 50A14 - PZR PRESS HI / LO.		
	RO	DETERMINE controlling channel has failed and POSITION HS-0100A, Pressurizer Pressure Channel Select Switch to Channel X. [Steps 1.1 & 1.1.1 - YES]
	RO	DETERMINE controlling channel has failed and INFORM the SRO SO23-13-27 entry required. [Steps 1.1 & 1.1.2 - YES]
Examiner Note: The following steps are from SO23-13-27, Pressurizer Pressure and Level Malfunction.		
	SRO	ENTER SO23-13-27, Pressurizer Pressure and Level Malfunction.
		• IDENTIFY uncontrolled pressure change and GO to Step 3. [Step 1 - YES]

Operating Test :	NRC	Scenario #	4	Event #	1	Page	6	of	29
Event Description:	Pressurizer Pressure Control Channel Failure								

Time	Position	Applicant's Actions or Behavior
		GUIDELINES 1) A Pressurizer Pressure signal failure affects the Modulate and Permissive circuits of SBCS in the following way: • Channel X or Y high failure could delay the Master Controller response and bring in the permissives early • Channel X or Y low failure will delay the response of both controllers 2) See Attachment 1 for the Pressurizer Pressure Control Block Diagram. 3) See Attachment 4 for Pressurizer Pressure Control Diagrams. 4) To diagnose controller alarms, refer to SO23-3-1.10, Attachment for Foxboro Alarm Response and Foxboro Controller Page Data. 5) Reactivity will be impacted by changes in Pressurizer Heater configuration and Pressurizer Spray control. The RCS Reactivity Pressure Coefficient is a positive coefficient and is about one tenth the absolute value of the Moderator Temperature Coefficient.
	SRO/RO	DETERMINE Pressurizer Spray Valve is NOT STUCK OPEN. [Step 3.a - YES]
	SRO/RO	DETERMINE Pressurizer pressure Channel Y NOT between 2225 PSIA and 2275 PSIA. [Step 3.b - YES]
	RO	• [RNO] OBSERVE PR-0100A and DETERMINE Pressurizer pressure Channel X available.
	RO	• [RNO] POSITION HS-0100A, Pressurizer Pressure Channel Select Switch to Channel X.
	SRO/RO	DETERMINE Pressurizer Pressure is stable but TRENDING high. [Step 3.c - YES]
	RO	• [RNO] If necessary, TRANSFER PIC-0100, Pressurizer Pressure Controller to MANUAL.
	RO	• [RNO] ADJUST output of PIC-0100 as necessary to maintain setpoint.
	RO	• [RNO] SECURE Pressurizer Heaters as required.
	RO	DETERMINE normal Charging and Letdown – IN SERVICE. [Step 3.d - YES]

Operating Test :	NRC	Scenario #	4	Event #	1	Page	7	of	29
Event Description:	Pressurizer Pressure Control Channel Failure								

Time	Position	Applicant's Actions or Behavior
Examiner Note: The next event should be started at this time since it takes a few minutes for CCW Surge Tank level to lower to the alarm setpoint.		
	SRO	GO to Step 3.i. [Step 3.e - YES]
	SRO	INITIATE a notification to I & C. [Step 3.i - NO]
	SRO/RO	DETERMINE Pressurizer Pressure signal NOT failed high. [Step 3.j - YES]
	RO	VERIFY Pressurizer Pressure Control System operating properly in AUTO. [Step 3.k - YES]
	RO	VERIFY Pressurizer Spray NOT initiated with $\Delta T > 180^{o}F$. [Step 3.l - YES]
Examiner Note: Technical Specification LCO 3.4.1 is entered if RCS pressure rises above 2275 PSIA.		
+10 min	SRO	NOTIFY personnel & EVALUATE Technical Specifications. [Step 3.m - YES]
		• LCO 3.4.1.A, RCS DNB Limits.
		• CONDITION A - Pressurizer pressure not within limits. • ACTION A.1 - Restore Pressurizer pressure to within limit within two (2) hours.
Examiner Note: The following steps are from Annunciator 50A02 – COLSS ALARM.		
	RO/BOP	If COLSS ALARM is annunciated, LOWER Turbine load 5 MWe at 10 MWe / min to maintain power margin. [Step 1.1 - YES]
		• As required, DEPRESS HS-2210 Main Turbine Speed / Load Control LOWER pushbutton. [Step 1.1 - YES]
	RO	If COLSS inoperability is suspected, REFER to Technical Specifications 3.2.1 and 3.2.4 for 15 minute ACTION requirements. [Step 1.2 - NO]

Operating Test :	NRC	Scenario #	4	Event #	1	Page	8	of	29
Event Description:	Pressurizer Pressure Control Channel Failure								

Time	Position	Applicant's Actions or Behavior
	RO	If loss of T_{AVE} program has occurred, REFER to 50A05 - T AVG HI. [Step 1.3 - NO]
	RO	If at any time the COLSS (Primary and Backup) Computers fail, then initiate SO23-3-3.6, COLSS Out of Service Surveillance. [Step 1.4 - NO]
When Technical Specifications are addressed, or at Lead Examiner discretion, PROCEED to Event 2.		

Operating Test :	NRC	Scenario #	4	Event #	2	Page	9	of	29
Event Description:	Train A Component Cooling Water Heat Exchanger Tube Leak								

Time	Position	Applicant's Actions or Behavior
Machine Operator:		**When directed, EXECUTE Event 2. - CC05A, Train A CCW Heat Exchanger tube leak @ 100% severity.**
Indications Available:		
64A26 – CCW SURGE TANK TRAIN A LEVEL HI/LO (time delay of ~ 2 to 5 min)		
+2 min	BOP	REFER to Annunciator Response Procedures (ARPs).
M.O. Cue:		**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 SRO SO23-13-7 entry required.
Examiner Note:		**if Annunciator Response Procedure actions are followed, the crew will swap to Train B CCW without isolating Radwaste.**
Examiner Note:		**The following steps are from SO23-13-7, Loss of CCW / SWC.**
	SRO	ENTER SO23-13-7, Loss of Complement Cooling Water / Saltwater Cooling.
		• DETERMINE required actions based on lowering Surge Tank level and GO to Step 5. [Step 1 - YES]
		CAUTION Operators should be alert to a possible confined space hazard due to nitrogen leakage into the vaults and rooms in the vicinity of a large break in a CCW header.
	BOP	CLOSE the following valves to ISOLATE Radwaste. [Step 5.a - YES]
		• HV-6465, Unit 2 CCW NCL to Radwaste Supply Block Valve.
		• HV-6465, Unit 2 CCW NCL to Radwaste Supply Block Valve.
		• HV-6217, Unit 2 CCW NCL to Radwaste Return Block Valve.
		• HV-6217, Unit 2 CCW NCL to Radwaste Return Block Valve.
	SRO/BOP	DETERMINE that the leak is NOT isolated. [Step 5.b - YES]

Time	Position	Applicant's Actions or Behavior
		• [RNO] GO to Step 5.c.
CRITICAL TASK STATEMENT		**Restore Component Cooling Water Flow Due to Train A Leakage Prior to Exiting SO23-13-7, Loss of Component Cooling Water / Saltwater Cooling.**
CRITICAL TASK	BOP	PLACE Train B CCW/SWC in service. [Step 5.c - YES]
		• START CCW Pump P-026 and VERIFY that SWC P-114 automatically starts.
		• DEPRESS HS-6324-2, CCW Pump P-026 START pushbutton.
	SRO	DIRECT transfer of Letdown Heat Exchanger to Train B. [Step 5.d - YES]
	BOP	TRANSFER Letdown Heat Exchanger to Train B. [Step 5.d - YES]
		• CLOSE HV-6293B/A, CCW Critical Loop A Letdown HX ME-062 Return/Supply Valves.
		• OPEN HV-6522B/A, CCW Critical Loop B Letdown HX ME-062 Return/Supply Valves.
	SRO	DIRECT transfer of CCW Non-Critical Loop to Train B. [Step 5.e - YES]
	BOP	TRANSFER the CCW Non-Critical Loop to Train B. [Step 5.e - YES]
		• DEPRESS and MAINTAIN DEPRESSED the OPEN pushbuttons for HV-6213 and HV-6219, Critical Loop B Supply and Return to NCL.
		• When HV-6212 and HV-6218, Critical Loop A Supply and Return to NCL indicate CLOSED, then RELEASE the OPEN pushbuttons for HV-6213 and HV-6219.
	SRO	DIRECT securing CCW Pump P-025. [Step 5.f - YES]
	BOP	STOP CCW Pump P-025 and SWC Pump P-112. [Step 5.f - YES]
M.O. Cue: If directed to rack out breaker for CCW Pump P-025, REPORT that it is in progress.		
	SRO	DETERMINE ECCS is NOT required. [Step 5.g - YES]

Operating Test :	NRC	Scenario #	4	Event #	2	Page	11	of	29
Event Description:	Train A Component Cooling Water Heat Exchanger Tube Leak								

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	DISPATCH PEO to CLOSE HV-6225, Train A CCW Surge Tank Outlet Valve. [Step 5.h - YES]
M.O. Cue:		**If directed to close HV-6225, Train A CCW Surge Tank Outlet Valve, WAIT 3 minutes and EXECUTE remote function CC60.**
	BOP	VERIFY Train A CCW Surge level STABLE. [Step 5.i - YES]
M.O. Cue:		**If contacted to report status of Unit 3 CCW Surge Tank Level, REPORT that Train A CCW Surge Tank level is stable and unchanged.**
	BOP	CLOSE HV-6273, Train A CCW Surge Tank Makeup Valve. [Step 5.j - YES]
	SRO/BOP	DISPATCH personnel to locate source of leak. [Step 5.k - YES]
	BOP	VERIFY E-335 / E-336, Emergency Chillers, aligned to operating loop. [Step 5.l - YES]
Examiner Note:		**SO23-13-7, Steps 5.m thru 5.o are used for locating and isolating the leak.**
	SRO	GO to Step 19. [Step 5.p - YES]
	SRO/BOP	ENSURE all system parameters RESTORED to normal. [Step 19.a - YES]
+10 min	SRO	NOTIFY personnel & EVALUATE Technical Specifications. [Step 19.b - YES]
		• LCO 3.7.7.A, Component Cooling Water System.
		• CONDITION A - One CCW train inoperable. • ACTION A.1 - Restore CCW train to OPERABLE status within 72 hours.
When Technical Specifications are addressed, or at Lead Evaluator's discretion, PROCEED to Event 3.		

Operating Test :	NRC	Scenario #	4	Event #	3	Page	12	of	29
Event Description:	Control Element Assembly Calculator (CEAC) Failure								

Time	Position	Applicant's Actions or Behavior
Machine Operator:		**When directed, EXECUTE Event 3. - RP18, CEAC #2 failure.**
Indications Available: **56C42 - CEAC 2 FAILURE**		
+30 secs	RO	REFER to Annunciator Response Procedures (ARPs).
Examiner Note:		**The following steps are from Annunciator 56C42 - CEAC 2 FAILURE.**
	RO	SELECT CEAC #2 display on CEA-CRT to VERIFY failure. [Step 1.1 - YES]
	RO	DETERMINE CEAC #2 failure and INFORM SRO SO23-3-2.13, entry required for CEAC/RSPT Erratic or INOP. [Step 1.2 - YES]
		NOTE If the failure has reset, then the CEAC will do an auto restart.
	RO	DETERMINE failure has NOT RESET:
		• DEPRESS CEAC Fail Indicator Pushbutton on ROM Channel C. [Step 1.3 - YES]
	RO	PERFORM CEA Verification once per 4 hours per SO23-3-3.25 Section for Reactivity Control Systems. [Step 2.1 - YES]
	RO	NOTIFY the Computer Technician to investigate CEAC #2 Channel failure. [Step 2.1.1 - YES]
	RO	ENSURE the CEA-CRT is displaying CEAC #1. [Step 2.1.2 - YES]
Floor Cue:		**Once actions of ARP are complete, DIRECT SRO to evaluate Technical Specifications. Do not allow the RO to set CEAC INOP flags due to time constraints.**

Operating Test :	NRC	Scenario #	4	Event #	3	Page	13	of	29
Event Description:	Control Element Assembly Calculator (CEAC) Failure								

Time	Position	Applicant's Actions or Behavior
	SRO	ENTER SO23-3-2.13, Core Protection / Control Element Assembly Calculator Operation, Section for CEAC / RSPT Erratic or INOP.
Examiner Note: The following steps are from SO23-3-2.13, Core Protection / Control Element Assembly Calculator Operation, Section 6.5, CEAC / RSPT Erratic or INOP.		
	SRO/RO	Actions for Erratic or Failed CEAC / RSPT: [Step 6.5.1 - NO]
		• SET CEAC INOP flags per Step 6.5.5 or 6.5.6. [Step 6.5.1.1 - NO]
+10 min	SRO	EVALUATE Technical Specifications.
		• LCO 3.3.3.A, Control Element Assembly Calculator (CEAC).
		• CONDITION A - One CEAC inoperable. • ACTION A.1 - Perform SR 3.1.5.1 (CEA Verification) once per 4 hours, AND • ACTION A.2 - Restore CEAC to OPERABLE status within 7 days.
When Technical Specifications are addressed, or at Lead Examiner discretion, PROCEED to Event 4.		

Operating Test :	NRC	Scenario #	4	Event #	4	Page	14	of	29
Event Description:	Main Feedwater Pump Trip / Rapid Power Reduction								

Time	Position	Applicant's Actions or Behavior
		Machine Operator: When directed, EXECUTE Event 4. **- FW LP, Main Feedwater Pump (K-005/P-063) trip.**
		Indications Available: **53B03 – MFWP / TURBINE P063 / K005 TRIP** **52A13 – FWCS TROUBLE** **52A02 – FWCS SG2 E088 LEVEL DEVIATION (~30 seconds later)** **52A07 – FWCS SG1 E089 LEVEL DEVIATION (~30 seconds later)** **Multiple Main Feedwater Pump trip alarms**
		Examiner Note: A tripped MFW Pump requires the following procedure entries: • **SO23-13-28, Rapid Power Reduction (guidance for reducing Reactor power 30% in 5 minutes).** • **SO23-3-2.2, Makeup Operations (for borating the RCS).** • **SO23-3-1.10, Pressurizer Pressure and Level Control (to force Pressurizer Spray flow).** • **SO23-3-2.19, CEDMCS Operation, Section 6.12, Repetitive or Emergent Manual CEA Positioning (CEA operation).**
+10 secs	BOP	REFER to Annunciator Response Procedures (ARPs).
	BOP	DETERMINE Main Feedwater Pump P-063 trip and INFORM SRO SO23-13-28 entry required.
	SRO	ENTER SO23-13-28, Rapid Power Reduction.
		Examiner Note: The following steps are from SO23-13-28, Rapid Power Reduction.
		GUIDELINE The rate for an RPR is 15 to 100%/hr, normally 20%/hr. The actual rate is directed by the SRO Ops. Supv. based on the expediency required by a Tech. Spec./LCS Action Statement (e.g., S/G Tube Leak, dropped CEA) or plant condition (e.g., loss of MFWP).
	SRO	DETERMINE conditions for Rapid Power Reduction (RPR). [Step 1 - YES]
		• RPR due to a Main Feedwater Pump Trip, INITIATE Attachment 1.

Time	Position	Applicant's Actions or Behavior
	SRO	NOTIFY the Manager, Plant Operations. [Step 2 - YES]
Examiner Note:		**The following steps are from SO23-13-28, Rapid Power Reduction (RPR), Attachment 1, RPR - 30% in 5 Minutes.**
		OBJECTIVE: Perform a RPR due to a Main Feedwater Pump Trip or other transient with Rx Power > 65%.
	RO/BOP	DEPRESS all EFAS Actuation pushbuttons once to INITIATE EFAS. [Step 1.1 - YES]
	CREW	Concurrently PERFORM the following steps: [Step 1.2 - YES]
	SRO	DIRECT initiation of the Alternate Boration.
	RO	• OPEN HV-9247, Emergency Boration Valve, per the Reactivity Brief. Total Gallons _____ Time _____ [Step 1.2.1 - YES]
		• START a second Charging Pump. [Step 1.2.1.1 - YES]
Examiner Note:		**The following steps are from SO23-3-2.2, Makeup Operations, Section 6.9, Alternate Boration Using BAMU Pump through HV-9247.**
		GUIDELINE Alternate boration is preferred when performing a Rapid Power Reduction (RPR) in response to the loss of a Main Feedwater Pump.
	RO	CONDUCT a Reactivity Brief. [Step 6.9.1 - YES]
		• COMMENCE periodically changing Boronometer setpoints. [Step 6.9.1.1 - NO]
		• COMMENCE monitoring plant parameters. [Step 6.9.1.2 - YES]
	RO	ENSURE all Makeup Operations STOPPED. [Step 6.9.2 - YES]

Time	Position	Applicant's Actions or Behavior
		• SELECT Alternate BORATION. [Step 6.9.3.1 - YES]
		• SELECT CONFIRM (~400 gallons). [Step 6.9.3.2 - YES]
		• SELECT GO. [Step 6.9.3.3 - YES]
		• ENSURE two Charging Pumps are running. [Step 6.9.3.4 - YES]
		• When Alternate Boration has timed out (4.33 minutes), VERIFY HV-9247 CLOSED. [Step 6.9.3.5 - YES]
		• SELECT CANCEL. [Step 6.9.3.6 - YES]
		• OPERATE Charging Pumps per SRO direction. [Step 6.9.3.7 - YES]
<u>Examiner Note</u>: The following steps continue from Attachment 1, RPR - 30% in 5 Minutes.		
	BOP	• ENSURE all available Condensate Pumps running or START Condensate Pump P-053. [Step 1.2.2 - YES]
	BOP	• INITIATE Attachment 4 for Turbine Load change. [Step 1.2.3 - YES]
	RO	• INSERT CEAs as required per SO23-3-2.19. [Step 1.2.4 - YES]
		• INSERT Group 6 to 105 inches **<u>or</u>** as established in Reactivity Brief. [Step 1.2.4.1 - YES]
	RO/BOP	INITIATE monitoring CV-9739, COLSS Raw ΔT Power. [Step 1.3 - YES]
	CREW	INITIATE monitoring T_{COLD} AVG between 542ºF and 545ºF. [Step 1.4 - YES]
	BOP	• If T_{COLD} AVG > 545ºF, PAUSE Turbine load reduction until temperature within band. [Step 1.4.1 - YES]
	RO	• If T_{COLD} AVG < 542ºF, PAUSE CEA insertion until temperature within band. [Step 1.4.2 - YES]
	CREW	RESET the EFAS Cycling Relays. [Step 1.5 - YES]
	BOP	• VERIFY Steam Generator levels STABLE or RISING. [Step 1.5.1 - YES]
	BOP	• VERIFY Steam Generator low-level alarms RESET. [Step 1.5.2 - YES]
	BOP	• VERIFY Feedwater Control Valves < 100% OPEN and controlling level. [Step 1.5.3 - YES]

Operating Test : NRC	Scenario # 4	Event # 4	Page 17 of 29
Event Description: Main Feedwater Pump Trip / Rapid Power Reduction			

Time	Position	Applicant's Actions or Behavior
	RO/BOP	• When directed by the SRO, DEPRESS all EFAS Actuation pushbuttons a second time to RESET the Cycling Relays. [Step 1.5.4 - YES]
	BOP	INITIATE SO23-2-2, Section for On-Line Operation of P-053. [Step 1.6 - NO]
	SRO	NOTIFY Generation Operations Controller and LOG notification. [Step 1.7 - YES]
	RO	INITIATE Forcing PZR Spray flow using two valves per SO23-3-1.10. [Step 1.8 - YES]
Examiner Note:		**The following steps are from SO23-3-1.10, Pressurizer Pressure and Level Control, Section 6.3, Forcing Pressurizer Sprays with RCS pressure > 1500 PSIA.**
	RO	COMMENCE forcing Pressurizer Sprays. [Step 6.3.1 - YES]
		• CONDUCT a Reactivity Brief. [Step 6.3.1.1 - YES]
		• COMMENCE monitoring RCS pressure. [Step 6.3.1.2 - YES]
		• VERIFY RCS pressure greater than 1500 psia. [Step 6.3.1.3 - YES]
		• PLACE both PZR Spray Valve Controllers in AUTO. [Step 6.3.1.4 - YES]
		• POSITION Backup Heaters to ON or AUTO as necessary to support PZR Spray Valve operation. [Step 6.3.1.5 - YES]
		• LOWER PIC-0100, PZR Pressure Controller setpoint to 2225 PSIA. [Step 6.3.1.6 - YES]
	BOP	INITIATE a Manual Runback for Turbine load change.
Examiner Note:		**The following steps are from SO23-13-28, Rapid Power Reduction, Attachment 4, Turbine Load Change Using Manual Runback.**

Operating Test :	NRC	Scenario #	4	Event #	4	Page	18	of	29
Event Description:	Main Feedwater Pump Trip / Rapid Power Reduction								

Time	Position	Applicant's Actions or Behavior
		NOTES 1. This section is normally used to stabilize plant conditions after a MFW Pump trip. [LS-1.3] 2. During this activity, the Megawatt indication at the Turbine DCS is preferred for monitoring. 3. During this activity, TCOLDAVG should be monitored on the PCS.
	BOP	ENSURE only the Frequency Loop in service. [Step 1.1 - YES]
	BOP	INITIATE Turbine Manual Runback. [Step 1.2 - YES]
		• SELECT INITIATE / CANCEL in Manual Runback box. [Step 1.2.1 - YES]
		• SELECT INITIATE RUNBACK {P2} in Confirm Manual Runback window. [Step 1.2.2 - YES]
		• MAINTAIN Confirm Manual Runback window OPEN to allow cancelling the RUNBACK quickly {P3} if needed. [Step 1.2.2.1 - YES] • To re-open, SELECT INITIATE / CANCEL. [Step 1.2.2.1 – AS REQ'D]
		• CANCEL and INITIATE the Manual Runback as required to MAINTAIN T_{COLD} between 542ºF and 545ºF. [Step 1.2.3 - YES]
		• SELECT P2 to INITIATE Turbine load change. [Step 1.2.4 - YES]
		• VERIFY Turbine load stabilizes at the target value. [Step 1.2.5 - YES]
	BOP	MONITOR Turbine Load Using Speed/Load Change. [Section 1.3 - YES]
		• ADJUST Turbine load as required to maintain T_{COLD}. [Step 1.3.1 - YES]
		• DEPRESS HS-2210, Main Turbine Speed / Load Control, RAISE or LOWER pushbuttons for **Coarse** adjustment. [Step 1.3.1.1 - YES]
		• ACTIVATE DCS Speed/Load Pushbuttons Box and ENSURE Rate is set at an acceptable MW/MIN value for **Fine** adjustment. [Step 1.3.1.2 - YES]
		• SELECT MODIFY. • DEPRESS UP or DOWN buttons **or** +0.5 or -0.5 buttons.
+15 min		• VERIFY Turbine load stabilizes at the Target value. [Step 1.3.2 - YES]
Examiner Note:		**The following steps are from SO23-3-2.19, CEDMCS Operation, Section 6.12, Repetitive or Emergent Manual CEA Positioning.**

Operating Test :	NRC	Scenario #	4	Event #	4	Page	19	of	29
Event Description:	Main Feedwater Pump Trip / Rapid Power Reduction								

Time	Position	Applicant's Actions or Behavior
		GUIDELINE This section may be used for the second and additional CEA movements after previous performance of Section 6.1, 6.2, 6.3, or when directed by SO23-3-3.5 or SO23-3-2.19.2. For repetitive manual CEA positioning, these sections and procedures ensure that a Reactivity Brief was evaluated per OSM-14.
	RO	• POSITION Group Select Switch to Group 6. [Step 6.12.1 - YES]
	RO	• If moving a single CEA, POSITION Individual CEA Selection Switch to CEA to be moved. [Step 6.12.2 – N/A]
	RO	• POSITION Mode Select Switch to MANUAL Group. [Step 6.12.3 - YES]
		• VERIFY Group 6 indicator lamps are ILLUMINATED. [Step 6.12.3.1 - YES]
	RO	• POSITION CEAs as directed by SRO. [Step 6.12.4 - YES]
	RO	• When CEA positioning completed, Mode Select Switch to OFF. [Step 6.12.5 - YES]
When power level is stable at approximately 70%, or at Lead Evaluator's discretion, PROCEED to Event 5.		

Operating Test :	NRC	Scenario #	4	Event #	5	Page	20	of	29
Event Description:	Main Feedwater Pump Trip on High Vibration								

Time	Position	Applicant's Actions or Behavior
Machine Operator:		**When directed, EXECUTE Event 5.** **- FW09D, Main Feedwater Pump (K-006/P-062) high vibration.** **- FW09E, Main Feedwater Pump (K-006/P-062) high vibration.**
Indications Available:		**53A15 – MFWP P062 SUCTION PRESS LO PRETRIP** **53B03 – MFWP / TURBINE P062 / K005 TRIP (~10 seconds later)**
+10 secs	BOP	REFER to Annunciator Response Procedures (ARPs).
	BOP	RECOGNIZE Main Feedwater Pump P-062 trip.
	SRO	DIRECT a manual Reactor Trip.
+30 secs	RO/BOP	Manually TRIP Reactor.
		• DEPRESS HS-9132-2 **and** HS-9132-3 REACTOR TRIP pushbuttons on CR-56.
		• DEPRESS HS-9132-1 **and** HS-9132-4 REACTOR TRIP pushbuttons on CR-52.
When Reactor and Turbine are tripped, or at Lead Evaluator's discretion, PROCEED to Events 6, 7, and 8.		

Operating Test :	NRC	Scenario #	4	Event #	6, 7, & 8	Page	21	of	29
Event Description:	Two Stuck Control Element Assemblies / Bus 2A07 Auto Transfer Failure / Loss of Feedwater								

Time	Position	Applicant's Actions or Behavior
Machine Operator:		**When directed, EXECUTE Events 6, 7, and 8.** **- RD0602 & RD4102, Stuck CEAs #06 & #41** **- 2A07 LP, Non-1E Bus 2A07 fails to AUTO transfer.** **- FW02A, P-141, Auxiliary Feedwater Pump shaft seizure @ 120 seconds.** **- FW02B, P-504, Auxiliary Feedwater Pump shaft seizure @ 120 seconds.** **- FW25, P-140, Auxiliary Feedwater Pump overspeed trip @ 300 seconds.**
Indications Available:		**Numerous Reactor Trip related alarms**
	SRO	DIRECT performance of SO23-12-1, Standard Post Trip Actions.
	RO	VERIFY Reactor Trip: [Step 1 - YES]
		• VERIFY Reactor Trip Circuit Breakers OPEN. [Step 1.a - YES]
		• VERIFY Reactor Power lowering and Startup Rate NEGATIVE. [Step 1.b - YES]
		• DETERMINE two (2) Full Length CEAs NOT fully inserted. [Step 1.c - YES]
	SRO/RO	DETERMINE Reactivity Control criteria NOT satisfied. [Step 1 - YES]
CRITICAL TASK STATEMENT		**Initiate Emergency Boration for Two (2) Stuck Control Element Assemblies Prior to Exiting SO23-12-1, Standard Post Trip Actions.**
CRITICAL TASK	RO	• [RNO] COMMENCE Emergency Boration at greater than 40 gpm.
Examiner Note:		**The following steps are from SO23-13-11, Emergency Boration of the RCS.**
	RO	OPEN HV-9247, Emergency Boration Block Valve. [Step 2.c.1) - YES]
		START either BAMU Pump. [Step 2.c.2) - YES]
		• DEPRESS P-174, BAMU Pump START pushbutton.
		• DEPRESS P-175, BAMU Pump START pushbutton.
		CLOSE HV-9236, BAMU Pump P-174 Recirculation Valve. [Step 2.d - YES]
		CLOSE HV-9231, BAMU Pump P-175 Recirculation Valve. [Step 2.e - YES]
		CLOSE HV-9253, Makeup to VCT Valve, in MANUAL. [Step 2.f - YES]

Operating Test : NRC	Scenario # 4	Event # 6, 7, & 8	Page 22 of 29
Event Description: Two Stuck Control Element Assemblies / Bus 2A07 Auto Transfer Failure / Loss of Feedwater			

Time	Position	Applicant's Actions or Behavior
		GO to Step 2.i. [Step 2.g - YES]
		ENSURE Charging flow > 40 gpm. [Step 2.i - YES]
		RECORD time of Emergency Boration initiation _____. [Step 2.i - YES]
	BOP	VERIFY Turbine Trip: [Step 2 - YES]
		• VERIFY HP & LP Stop and Governor Valves CLOSED. [Step 2.a - YES]
		• VERIFY both Unit Output Breakers OPEN. [Step 2.b - YES]
	SRO	INITIATE Administrative Actions: [Step 3 - YES]
		• INITIATE Attachment 4, Worksheet. [Step 3.a - YES]
		CAUTION DO NOT OPERATE TRIP pushbuttons for tripped breakers. Operation of TRIP pushbuttons will reset overcurrent protection allowing Diesel Generator output breaker to close to a fault.
	BOP	VERIFY Vital Auxiliaries criteria satisfied: [Step 4 - YES]
		• VERIFY both 1E 4 kV Buses 2A04 and 2A06 ENERGIZED. [Step 4.a - YES]
		• VERIFY all 1E 480 V Buses 2B04, 2B24, 2B06, & 2B26 ENERGIZED. [Step 4.b - YES]
		• VERIFY all 1E DC Buses ENERGIZED. [Step 4.c - YES]
		• VERIFY Non-1E 4 kV Buses 2A03, 2A08, & 2A09 ENERGIZED. [Step 4.d - YES]
		• DETERMINE Non-1E 4 kV Bus 2A07 DEENERGIZED. [Step 4.d - YES]
		• [RNO] RESTORE power to Bus as time and resources permits.
		• VERIFY CCW Train B OPERATING and ALIGNED to Non-Critical Loop and Letdown Heat Exchanger. [Step 4.e - YES]
	RO	VERIFY RCS Inventory Control criteria satisfied: [Step 5 - YES]
		• VERIFY PZR level between 10% and 70% and TRENDING to between 30% and 60%. [Step 5.a - YES]

Time	Position	Applicant's Actions or Behavior
		• VERIFY Core Exit Saturation Margin ≥ 20ºF: [Step 5.b - YES]
		• OBSERVE QSPDS page 611 **or** CFMS page 311.
	RO	VERIFY RCS Pressure Control criteria satisfied: [Step 6 - YES]
		• VERIFY PZR pressure between 1740 PSIA and 2380 PSIA, controlled and TRENDING to between 2025 & 2275 PSIA. [Step 6.a - YES]
	RO	VERIFY Core Heat Removal criteria satisfied: [Step 7 - YES]
		• VERIFY at least one (1) RCP OPERATING. [Step 7.a - YES]
		• VERIFY Core Loop ΔT ($T_{HOT} – T_{COLD}$) < 10ºF. [Step 7.b - YES]
		• VERIFY Core Exit Saturation Margin ≥ 20ºF. [Step 7.c - YES]
		• OBSERVE QSPDS page 611 **or** CFMS page 311.
	BOP	DETERMINE RCS Heat Removal criteria NOT satisfied: [Step 8 - YES]
		• DETERMINE both SG narrow range levels NOT > 21%. [Step 8.a - YES]
		• DETERMINE both SG narrow range levels < 80%. [Step 8.a - YES]
		• DETERMINE Main / Auxiliary Feedwater NOT available. [Step 8.a - YES]
		• [RNO] DETERMINE EFAS-1 & EFAS-2 AUTO initiation.
		• DETERMINE T_{COLD} between 540ºF and 550ºF. [Step 8.b - YES]
		• DETERMINE SG pressures between 960 and 1050 PSIA. [Step 8.c - YES]
	RO	VERIFY Containment Isolation criteria satisfied: [Step 9 - YES]
		• VERIFY Containment pressure < 1.5 PSIG. [Step 9.a - YES]
		• VERIFY Containment Area Radiation Monitors NOT alarming or trending to alarm. [Step 9.b - YES]
		• VERIFY Secondary Plant Radiation Monitors NOT alarming or trending to alarm. [Step 9.c - YES]
	RO	VERIFY Containment Temperature and Pressure criteria satisfied: [Step 10 - YES]
		• VERIFY Containment average temperature < 120ºF. [Step 10.a - YES]
		• VERIFY Containment pressure < 1.5 PSIG. [Step 10.b - YES]

Operating Test :	NRC	Scenario #	4	Event #	6, 7, & 8	Page	24	of	29
Event Description:	Two Stuck Control Element Assemblies / Bus 2A07 Auto Transfer Failure / Loss of Feedwater								

Time	Position	Applicant's Actions or Behavior
+15 min	SRO	DIAGNOSE event in progress: [Step 11 - YES]
		• DETERMINE some Safety Function criteria are NOT met per Attachment 4, Worksheet. [Step 11.a - YES]
		• [RNO] COMPLETE Attachment 1, Recovery Diagnostics.
		• DETERMINE that Reactor Trip Recovery is NOT diagnosed. [Step 11.b - YES]
	RO	• [RNO] ENSURE at least one (1) RCP in each loop STOPPED.
	BOP	• INITIATE steps 12 through 16. [Step 11.c - YES]
	SRO	• IMPLEMENT EOI SO23-12-6, Loss of Feedwater. [Step 11.d - YES]
Examiner Note:		**SO23-12-1, Standard Post Trip Actions, Steps 12 to 16, performed by the BOP are located at the end of the scenario. The following steps are from SO23-12-6, Loss of Feedwater.**
	SRO	ENTER SO23-12-6, Loss of Feedwater.
	SRO	RECORD time of EOI entry _____. [Step 1 - YES]
	SRO	VERIFY Loss of Feedwater diagnosis: [Step 2 - YES]
		• INITIATE SO23-12-10, Safety Function Status Checks. [Step 2.a - YES]
		• INITIATE Foldout Page. [Step 2.b - YES]
		• DIRECT performance of FS-11, Reset P-140 Overspeed Trip.
		• ENSURE EFAS-1 and EFAS-2 actuated. [Step 2.c - YES]
		• VERIFY Loss of Feedwater diagnosis. [Step 2.d - YES]
		• VERIFY SG levels < 40% NR and TOTAL AFW flow < 400 GPM. [Step 2.d.1) - YES]
		• VERIFY Pressurizer level STABLE or RISING. [Step 2.d.2) - YES]
		• VERIFY Pressurizer pressure STABLE or RISING. [Step 2.d.3) - YES]
		• VERIFY SG E-088 pressure > 740 PSIA and STABLE or RISING. [Step 2.d.4) - YES]
		• VERIFY SG E-089 pressure > 740 PSIA and STABLE or RISING. [Step 2.d.5) - YES]

Operating Test :	NRC	Scenario #	4	Event #	6, 7, & 8	Page	25	of	29
Event Description:	Two Stuck Control Element Assemblies / Bus 2A07 Auto Transfer Failure / Loss of Feedwater								

Time	Position	Applicant's Actions or Behavior
M.O. Cue: One minute after entering SO23-12-6, INFORM the SRO scaffolding was moved in AFW Pump Room and P-140 was inadvertently tripped. P-140 can be RESET.		
	SRO	INITIATE Administrative Actions. [Step 3 - YES]
		• NOTIFY Shift Manger/Operations Leader of entry into SO23-12-6, Loss of Feedwater. [Step 3.a - YES]
		• ENSURE Emergency Plan is initiated. [Step 3.b - YES]
		• IMPLEMENT Placekeeper. [Step 3.c - YES]
		• IMPLEMENT Time Dependent steps. [Step 3.d - YES]
	RO	ENSURE all RCPs stopped. [Step 4.a - YES]
	BOP	CLOSE SG Blowdown and Sample valves. [Step 5.a - YES]
		• DEPRESS HV-4054, SG E-088 Blowdown Valve CLOSE pushbutton.
		• DEPRESS HV-4058, SG E-088 Sample Valve CLOSE pushbutton.
		• DEPRESS HV-4053-2, SG E-089 Blowdown Valve CLOSE pushbutton.
		• DEPRESS HV-4057, SG E-089 Sample Valve CLOSE pushbutton.
	SRO	IDENTIFY available equipment: [Step 6 - YES]
	BOP	• VERIFY AFW Pump available with overspeed trip NOT RESET and GO to Step 7. [Step 6.a - YES]
	BOP	ESTABLISH AFW Flow to At Least One Steam Generator. [Step 7 - YES]
		• DETERMINE AFW Pump NOT operating. [Step 7.a - YES]
		• DETERMINE P-140 tripped on overspeed. [Step 7.b - YES]
		• [RNO] INITIATE FS-11, Reset P-140 Overspeed Trip.
		• DETERMINE AFW Pump P-140 available. [Step 7.c - YES]
Examiner Note: The following step is from SO23-12-11, EOI Supporting Attachments, FS-11, Reset P-140 Overspeed Trip.		
	BOP	DEPRESS HV-4716, P-140 Steam Supply Valve OVERRIDE and CLOSE pushbuttons.

Operating Test :	NRC	Scenario #	4	Event #	6, 7, & 8	Page	26	of	29
Event Description:	Two Stuck Control Element Assemblies / Bus 2A07 Auto Transfer Failure / Loss of Feedwater								

Time	Position	Applicant's Actions or Behavior
M.O. Cue:		**When directed to RESET P-140, DELETE malfunction FW25 then EXECUTE remote function FW52 to RESET TDAFW Pump P-140 overspeed trip, and REPORT the overspeed trip on P-140 has been reset.**
	SRO	DETERMINE FS-11, Reset P-140 Overspeed Trip is complete.
	BOP	VERIFY AFW Pump P-140 Discharge Valves CLOSED. [Step 7.d - YES]
		• DEPRESS HV-4705, P-140 Discharge Valve CLOSE pushbutton.
		• DEPRESS HV-4706, P-140 Discharge Valve CLOSE pushbutton.
Examiner Note:		**HV-4705 and HV-4706 may not close due to an EFAS signal being present. If this is the case, they will need an outside operator to close the manual discharge valve for P-140 (MU122).**
M.O. Cue:		**If required, EXECUTE remote function FW103 for closing P-140 Throttle Valve MU122.**
	BOP	DEPRESS HV-4716, P-140 AFW Pump OPEN pushbutton. [Step 7.e - YES]
	BOP	ENSURE at least one AFW to SG Isolation Valve to each SG open. [Step 7.f - YES]
		• Steam Generator E-088 - either HV-4714 or HV-4730.
		• Steam GenerE-089 - either HV-4715 or HV-4731.
M.O. Cue:		**If required, THROTTLE OPEN AFW using remote function FW103, P-140 Throttle Valve MU122. 25% open is approximately equal to 130 GPM per Steam Generator.**
CRITICAL TASK STATEMENT		**Restore Feedwater Flow to At Least One Steam Generator Prior to Exiting SO23-12-6, Loss of Feedwater.**
CRITICAL TASK	BOP	THROTTLE P-140 AFW Pump Discharge Valve as necessary to maintain flow between 130 and 150 GPM. [Step 7.g RNO - YES]
	BOP	MAINTAIN reduced AFW flow for 5 minutes. [Step 7.h - YES]

Operating Test :	NRC	Scenario #	4	Event #	6, 7, & 8	Page	27	of	29
Event Description:	Two Stuck Control Element Assemblies / Bus 2A07 Auto Transfer Failure / Loss of Feedwater								

Time	Position	Applicant's Actions or Behavior
+30 min	BOP	RAISE total AFW flow to greater than 400 GPM. [Step 7.i - YES]
When feedwater is restored to both Steam Generators, or at Lead Evaluator's discretion, TERMINATE the scenario.		

Operating Test :	NRC	Scenario #	4	Event #	6, 7, & 8	Page	28	of	29
Event Description:	Two Stuck Control Element Assemblies / Bus 2A07 Auto Transfer Failure / Loss of Feedwater								

Time	Position	Applicant's Actions or Behavior
<u>Examiner Note</u>: These steps are performed by the BOP per SO23-12-1, Steps 12 through 16.		
	SRO/BOP	INITIATE Attachment 5, Administrative Actions. [Step 12.a - YES]
	SRO/BOP	ENSURE a PA system announcement for Reactor Trip. [Step 12.b - YES]
	BOP	ENSURE the following loads restored: [Step 13 - YES]
		• VERIFY Telecom 480 VAC Feeder Breaker – CLOSED. [Step 13.a - YES].
		• VERIFY Telecom 480 VAC Feeder Breaker – CLOSED. [Step 13.b - YES].
		• DETERMINE Non-1E Bus 2A07 – DEENERGIZED. [Step 13.c - YES].
		• [RNO] TRANSFER Non-1E 4kV Bus 2A07 to Reserve Auxiliary Transformer.
		• SELECT 2/3HS-1627A, NON-1E Synchroscope to ON
		• DEPRESS SYNC pushbutton for Breaker 2A0703.
		• PLACE Breaker 2A0703 Mode Selector in MANUAL.
		• DEPRESS Breaker 2A0703 CLOSE pushbutton.
		• DETERMINE B15 & B16 480 VAC Load Centers – ENERGIZED [Step 13.d - YES].
	BOP	VERIFY Main Turbine Coastdown: [Step 14 - YES]
		• DETERMINE Extraction Steam Block Valves – CLOSED. [Step 14.a - YES]
		• DETERMINE Main Steam to Reheater Block, Bypass, Warmup, and Control Valves – CLOSED. [Step 14.a - YES]
		• DETERMINE HV-2712A/B Bled Steam to Reheaters Block Valve – CLOSED. [Step 14.a - YES]

Operating Test :	NRC	Scenario #	4	Event #	6, 7, & 8	Page	29	of	29
Event Description:	Two Stuck Control Element Assemblies / Bus 2A07 Auto Transfer Failure / Loss of Feedwater								

Time	Position	Applicant's Actions or Behavior
		• VERIFY Generator lowering – less than 24 kV. [Step 14.b - YES]
		• VERIFY 99A26 - TURBINE LUBE OIL TEMP HI and 99A46 - TURBINE BRG OIL DRAIN TEMP HI Annunciators – RESET. [Step 14.c - YES]
		• INITIATE SO23-10-2, Turbine Shutdown, Attachment for Unloading the Generator and Removing the Unit from Line. [Step 14.d - NO]
	BOP	ESTABLISH desired Condensate and Feedwater Status: [Step 15 - YES]
		• ENSURE 3rd Point Heater Drain Pumps – STOPPED. [Step 15.a - YES]
		• DETERMINE Reactor Trip Override – RESET. [Step 15.b - NO]
		• DETERMINE both Main Feedwater Pumps TRIPPED and two (2) Condensate Pumps OPERATING. [Step 15.c - YES]
		• ENSURE FIC-3294, Condensate Pump Miniflow Controller set for Condensate Pump configuration. [Step 15.d - YES]
		• Two (2) Pumps – 6000 GPM.
		• PLACE LV-3245, Condensate Drawoff Valve to – DISABLE. [Step 15.e - YES]
		• DETERMINE SO23-12-2, Reactor Trip Recovery, NOT being implemented. [Step 15.f - YES]
		• [RNO] ENSURE HV-4053 & HV-4054, SG Blowdown Valves CLOSED and GO to Step 16.
	BOP	VERIFY Start-Up Range Channels: [Step 16 - YES]
		• VERIFY both Start-Up Range Channels – OPERABLE. [Step 16.a - YES]
SO23-12-1, Standard Post Trip Actions, Steps 12 through 16 are complete.		

Appendix D	Scenario Outline	Form ES-D-1

Facility:	SONGS 2 & 3	Scenario No.:	5	Op Test No.:	October 2011 NRC
Examiners:		Operators:			

Initial Conditions: 100% power MOL - RCS Boron is 980 ppm (via sample).

Turnover: Maintain steady-state power conditions. Pump the Containment Normal Sump.

Critical Tasks:
- Manually Initiate Reactor Trip Following Reactor Protection System Failure Within One Minute of Entry into SO23-12-1, Standard Post Trip Actions.
- Establish Minimum Safety Injection Flow Prior to Exiting SO23-12-1, Standard Post Trip Actions.
- Establish Stable Reactor Coolant System Temperature per SO23-12-11, EOI Supporting Attachments, FS-30, Establish Stable RCS Temperature during ESDE.
- Identify and Isolate the Most Affected Steam Generator Prior to Exiting SO23-12-11, EOI Supporting Attachments, Attachment 29, Isolation of Steam Generator with ESDE.

Event No.	Malf. No.	Event Type*	Event Description
1 +10 min		N (RO)	Pump Containment Normal Sump for Return to Service Testing of Containment Sump Pump (P-008).
2 +20 min	SG05F	I (BOP, SRO) TS (SRO)	Steam Generator (E-089) Narrow Range Level (LT-1113-2) Fails Low.
3 +35 min	RC16B PZR LP	I (RO, SRO) TS (SRO)	Pressurizer Level Control Channel Y (LT-0110-2) Fails High. 1E 480 Volt Pressurizer Heater Bank Overcurrent Trip.
4 +40 min	NSW LP	C (BOP, SRO)	Nuclear Service Water Pump (P-139) Overcurrent Trip. Nuclear Service Water Pump (P-138) Auto Start Failure.
5 +41 min	OBE LP		Operating Basis Earthquake (OBE) Without Main Feedwater Pump Trip.
6 +41 min	TU08 RP15 RP24A-D RC19	I (RO)	Inadvertent Turbine Trip. Automatic Reactor Trip Failure. Diverse Scram System / ATWS Trip Failure. Failed Fuel Upon Reactor Trip.
7 +43 min	RC03 MS03B	M (RO, BOP, SRO)	Small Break Loss of Coolant Accident at 300 GPM. Steam Generator (E-089) Steam Line Break Inside Containment.
8 +45 min	RP01H	C (BOP)	Component Cooling Water Pump (P-026) Start Failure on SIAS. Manual Start Required.
9 +45 min	EC08DA RP01C	C (RO)	Train A HPSI Pump (P-018) Overcurrent Trip. Train B HPSI Pump (P-019) Start Failure on SIAS. Manual Start Required.

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

Actual	Target Quantitative Attributes
9	Total malfunctions (5-8)
4	Malfunctions after EOP entry (1-2)
2	Abnormal events (2-4)
2	Major transients (1-2)
1	EOPs entered/requiring substantive actions (1-2)
1	EOP contingencies requiring substantive actions (0-2)
4	Critical tasks (2-3)

SCENARIO SUMMARY NRC #5

The crew will assume the watch at 100% power per Operating Instruction (OI) SO23-5-1.7, Power Operations. Scheduled activities include performance of Return-to-Service testing of Containment Sump Pump P-008 per OI SO23-2-16, Operation of Waste Water Systems.

When the Containment Sump is pumped, a Steam Generator Level Transmitter will fail low. The crew will determine level instrument failure per Annunciator Response Procedures (ARPs), enter Abnormal Operating Instruction (AOI) SO23-13-18, Reactor Protection System Failure, and be required to bypass the failed signal using SO23-3-2.38, Digital Control System Operation. The SRO will refer to Technical Specifications.

When bypassing is complete, the controlling Pressurizer Level Channel will fail high. Actions are per the ARPs and AOI SO23-13-27, Pressurizer Pressure and Level Malfunction. This event is complicated by a Train B 1E Pressurizer Heater overcurrent trip. The SRO will refer to Technical Specifications.

Once Technical Specifications are addressed, the running Nuclear Service Water (NSW) Low Pressure Pump will trip. The standby NSW High Pressure Pump will fail to AUTO start and require manual actions as outlined in the Annunciator Response Procedures.

When NSW flow is restored, an Operating Basis Earthquake will occur which is immediately followed by an inadvertent Turbine trip. The Reactor will fail to trip upon Turbine trip and require manual actions by the crew. A Small Break Loss of Coolant Accident, failed fuel, and an Excess Steam Demand Event (ESDE) inside Containment are initiated when the Reactor is manually tripped.

The crew will enter Emergency Operating Instruction (EOI) SO23-12-1, Standard Post Trip Actions (SPTAs), and then transition to EOI SO23-12-9, Functional Recovery. Recovery actions include entry into EOI SO23-12-11, EOI Supporting Attachments, Attachment 29, Isolation of Steam Generator with ESDE, and FS-30, Establish Stable RCS Temperature during ESDE.

This scenario is complicated by failure of the Train B Component Cooling Water and High Pressure Safety Injection Pumps to automatically start upon a Safety Injection Actuation Signal (SIAS). Additionally, the Train A High Pressure Safety Injection Pump will overcurrent trip upon SIAS.

The scenario is terminated when Steam Generator E-089 is isolated per SO23-12-11, EOI Supporting Attachments, Attachment 29, Isolation of Steam Generator with ESDE.

Risk Significance:

- Failure of risk important system prior to trip: Loss of Train B 1E Pressurizer Heaters
- Risk significant core damage sequence: Inadvertent Turbine Trip with Reactor Trip Failure
  Small Break LOCA with ESDE
- Risk significant operator actions: Initiate Manual Reactor Trip
  Start Train B Component Cooling Water Pump
  Start Train B High Pressure Safety Injection Pump
  Isolate Steam Generator E-089

Scenario Event Description
NRC Scenario #5

MACHINE OPERATOR INSTRUCTIONS for SIMULATOR SETUP

INITIALIZE to IC-230 NRC Scenario #5 and associated Setup File.

EVENT	TYPE	MALF #	DESCRIPTION	DEMAND VALUE	INITIATING PARAMETER
SETUP	MF	EC08DA	HPSI Pump P-018 overcurrent trip	TRIP	
	MF	RP01C	HPSI Pump P-019 start failure		
	MF	RP01H	CCW Pump P-026 start failure on SIAS		
	MF	RP15	Reactor Trip failure	OPEN	
	MF	RC19	Failed Fuel	1%	RX TRIP
	MF	RC03	Small Break LOCA @ 300 GPM	6%	RX TRIP
	MF	MS03B	ESDE Inside Containment on E-089	1%	RX TRIP
1	-	-	Pump Containment Normal Sump with P-008		
2	MF	SG05F	SG (E-089) NR Level (LT-1113-2) failure	0%	
2	RF	RP51	PPS Door Open Annunciator 56B46 ON	OPEN	By Direction
2	RF	RP53G	Low SG-1 Level Channel B	BYPASS	5 sec TD
2	RF	RP53I	High SG-1 Level Channel B	BYPASS	10 sec TD
2	RF	RP53U	High SG-1 DP EFAS-1 Channel B	BYPASS	15 sec TD
2	RF	RP51	PPS Door Open Annunciator 56B46 OFF	CLOSE	20 sec TD
2	RF	RP68A	DEFAS-1 at L-034	BYPASS	By Direction
3	MF	RC16B	PZR Level Channel Y (LT-0110-2) failure	100%	
3	LP	PZR LP	Pressurizer Heater Bank overcurrent trip	O/C TRIP	20 sec TD
4	LP	NSW LP	Nuclear Service Water Pump overcurrent trip	TRIP	
4	LP	NSW LP	Nuclear Service Water Pump start failure		
5	MF	OBE LP	Seismic Event <u>without</u> MFW Pump trip		
6	MF	TU08	Inadvertent Turbine Trip		
6	MF	RP15	Reactor Trip failure		
6	MF	RP24A	Channel A ATWS / DSS failure		

Scenario Event Description
NRC Scenario #5

6	MF	RP24B	Channel B ATWS / DSS failure		
6	MF	RP24C	Channel C ATWS / DSS failure		
6	MF	RP24D	Channel DATWS / DSS failure		
6	MF	RC19	Failed Fuel	1%	RX TRIP
7	MF	RC03	Small Break LOCA @ 300 GPM	6%	RX TRIP
7	MF	MS03B	ESDE Inside Containment on E-089	1%	RX TRIP
8	MF	RP01H	CCW Pump P-026 start failure on SIAS		
9	MF	EC08DA	HPSI Pump P-018 overcurrent trip	TRIP	
9	MF	RP01C	HPSI Pump P-019 start failure		
	RF	ED85	Non-Qualified Loads Restoration	RESTORE	By Direction

Scenario Event Description
NRC Scenario #5

Machine Operator:	**EXECUTE IC-230 NRC Scenario #5 and SETUP file to align components.** **ENSURE CVCS Blend Setpoints MATCH Shift Turnover Sheet.** **CHANGE Operator Aid Tag #029 (CVCS) to reflect boron concentration.** **VERIFY both Pressurizer Spray Valves in AUTO.** **VERIFY Channel Y Pressurizer Pressure and Level in service.** **ENSURE Turbine Ramp Rate set to 100 MWe per minute.** **PROVIDE procedures in progress, Shift Turnover, and Reactivity Management Guide to crew in Briefing Room:** **- COPY of SO23-5-1.7, Power Operations, Section 6.1, Guidelines for Steady State Operation.** **- LAMINATED COPY of SO23-5-1.7, Power Operations, Attachment 8, Power Maneuvering Guidelines** **PLACE the MOC copy of OPS Physics Summary Book on SRO Desk.** **VERIFY CEA positions with ARO.**
Control Room Annunciators in Alarm:	
NONE	

Operating Test :	NRC	Scenario #	5	Event #	1	Page	7	of	34
Event Description:	Pump Containment Normal Sump								

Time	Position	Applicant's Actions or Behavior
Machine Operator:		**REPORT as Electrical Maintenance standing by at Motor Control Center 2BF-08 for P-008, Containment Sump Pump Return-to-Service testing.**
Indications Available:		
56A46 – CONTAINMENT SUMP PUMP P008 RUNNING (when P-008 is started)		
Examiner Note:		**The Containment Normal Sump will be pumped approximately 10% to support Return-to-Service testing of Containment Sump Pump P-008.**
	SRO	DIRECT pumping of Containment Normal Sump per SO23-2-16, Operation of Waste Water Systems, Section 6.20, Pumping the Containment Normal Sump.
Examiner Note:		**The following steps are from SO23-2-16, Operation of Waste Water Systems, Section 6.20, Pumping the Containment Normal Sump.**
	RO	INITIATE pumping Containment Sump to the Radwaste Sump, as follows: [Step 6.20.3 - YES]
		• OBTAIN Radwaste Operator concurrence to pump to the Radwaste Sump. [Step 6.20.3.1 - YES]
		• OPEN HV-5803, Sump Pump Containment Isolation Valve. [Step 6.20.3.2 - YES]
		• OPEN HV-5804, Sump Pump Containment Isolation Valve. [Step 6.20.3.3 - YES]
		• OPEN HV-7911, Nuclear Service Water to Containment. [Step 6.20.3.4 - YES]
		• START Containment Sump Pump P-008. [Step 6.20.3.5 - YES]
		• DEPRESS HS-5801B, P-008 START pushbutton.
		• VERIFY Annunciator 56A46 - CONTAINMENT SUMP PUMP P008 RUNNING. [Step 6.20.3.6 - YES]
M.O. Cue:		**REPORT as Electrical Maintenance that P-008 operation is satisfactory.**
+5 min	RO	When Containment Sump has been lowered 10%, PERFORM the following: [Step 6.20.4 - YES]
		• STOP Containment Sump Pump P-008. [Step 6.20.4.1 - YES]

Operating Test :	NRC	Scenario #	5	Event #	1	Page	8	of	34
Event Description:	Pump Containment Normal Sump								

Time	Position	Applicant's Actions or Behavior
		• VERIFY 56A46 - CONTAINMENT SUMP PUMP P008 RUNNING, Annunciator RESET. [Step 6.20.4.2 - YES]
		NOTE: The remaining Steps may be performed concurrently or in any order.
		• CLOSE HV-7911, Nuclear Service Water to Containment. [Step 6.20.4.3 - YES]
		• CLOSE HV-5803, Sump Pump Containment Isolation Valve. [Step 6.20.4.4 - YES]
		• CLOSE HV-5804, Sump Pump Containment Isolation Valve. [Step 6.20.4.5 - YES]
When Containment Normal Sump is lowered 10%, or at Lead Examiner discretion, PROCEED to Event 2.		

Operating Test :	NRC	Scenario #	5	Event #	2	Page	9	of	34
Event Description:	Steam Generator E-089 Narrow Range Level Transmitter Failure								

Time	Position	Applicant's Actions or Behavior
		Machine Operator: When directed, EXECUTE Event 2. **- SG05F, SG E-089 Level Transmitter LT-1113-2 fails low.**
		Indications Available: **52A13 – FWCS TROUBLE** **56A24 – SG1 E089 LEVEL LO CHANNEL TRIP** **56A34 – SG1 E089 LEVEL LO PRETRIP** **50A56 – ATWS / DEFAS TROUBLE** **56B16 – PPS CHANNEL 2 TROUBLE** **2LI-1113-2, SG E089 Narrow Range Level Transmitter indication fails low**
		Examiner Note: Annunciator 50A56 – ATWS / DEFAS TROUBLE is a DEFAS-1 related alarm. The DEFAS-1 Cabinet is NOT modeled in the Simulator.
		M.O. Cue: When bypassing of DEFAS-1 is requested, REPORT the ARO will perform and EXECUTE remote function RP68A, DEFAS-1 L-034 BYPASS.
+30 sec	RO/BOP	REFER to Annunciator Response Procedures (ARPs).
	BOP	RECOGNIZE Steam Generator E-089 Level Channel failure and INFORM the SRO SO23-13-18 entry required.
		Examiner Note: The following steps are from SO23-13-18, Reactor Protection System Failure.
	SRO	ENTER SO23-13-18, Reactor Protection System Failure.
	RO/BOP	OBSERVE instrumentation for the affected channel and alternate redundant indications monitoring the same parameter to DETERMINE failure. [Step 1.a - YES]
		NOTE For failures affecting RPS/ESFAS Matrix Logic, RPS/ESFAS Initiation Logic, RTCBs, RPS/ESFAS Manual Trip or ESFAS Actuation Logic, refer to Tech. Spec. LCO 3.3.4 and LCO 3.3.6.
	RO/BOP	IDENTIFY SG E-089 Level Channel indication LI-1113-2 failure and GO to Step 3. [Step 1.a - YES]

Operating Test :	NRC	Scenario #	5	Event #	2	Page	10	of	34
Event Description:	Steam Generator E-089 Narrow Range Level Transmitter Failure								

Time	Position	Applicant's Actions or Behavior
		NOTE Failure of a measured variable channel may affect more than one Functional Unit (e.g., PZR Pressure Hi affects DNBR and LPD).
	SRO	REFER to Attachment 10 and DETERMINE Functional Unit affected is Steam Generator E-089 Level Transmitter LT-1113-2. [Step 3.a - YES]
	SRO	DIRECT placing the Functional Unit in BYPASS per SO23-3-2.12, Reactor Protection System Operation. [Step 3.b - YES]
	RO	PLACE Functional Unit in BYPASS per SO23-3-2.12, RPS Operation, Section 6.3, Bypass Operation of Trip Channels. [Step 3.b - YES]
Examiner Note:		**The following steps are from SO23-3-2.12, Reactor Protection System Operation, Section 6.3, Bypass Operation of Trip Channels.**
		NOTE The PPS CHANNEL 1 (2,3,4) TRIP BYPASSED alarm does not have reflash capability. It will annunciate once when the first functional unit is placed in bypass. Additional functional units placed in bypass on the same PPS channel will not annunciate. When functional units are being removed from bypass, then the alarm will not reset until the last functional unit on that PPS channel is removed from bypass. **CAUTION** Prior to testing the Reactor Protective System (RPS) portion of a PPS Bay, the RPS trips shall be bypassed.
	RO	VERIFY that the same bistable is not in BYPASS on any other Channel. [Step 6.3.1 - YES]
	ARO	UNLOCK and OPEN the Bistable Control Panel. [Step 6.3.2 - YES]

Operating Test :	NRC	Scenario #	5	Event #	2	Page	11	of	34
Event Description:	Steam Generator E-089 Narrow Range Level Transmitter Failure								

Time	Position	Applicant's Actions or Behavior
Examiner Note: Trip BYPASS is performed by the Machine Operator and verified by the RO.		
M.O. Cue: When directed, EXECUTE the following remote functions: **RP51 = OPEN (PPS Door Open Annunciator 56B46)** **RP53G = BYPASS (Low SG-1 Level Channel B)** **RP53I = BYPASS (High SG-1 Level Channel B)** **RP53U = BYPASS (High SG-1 ΔP EFAS-1 Channel B)** **DELETE RP51 (PPS Door Open Annunciator 56B46)**		
Examiner Note: Several Step 6.3.2 sub-steps cannot be performed in the Simulator.		
	RO	OBSERVE Annunciator 56A39 - PPS CHANNEL 2 TRIP BYPASSED in alarm **and** amber BYPASS light on Channel B PPS Operator Module. [Step 6.3.2.4 - YES]
	RO	LOG the Bypass and Reason in Control Operator Log. [Step 6.3.2.5 - YES]
	SRO	INITIATE a LCOAR or follow guidelines of SO123-0-A5. [Step 6.3.2.6 - NO]
Examiner Note: The following steps are from SO23-13-18, Reactor Protection System Failure.		
	SRO	CONFIRM failure does NOT affect RPS/ESFAS Matrix Logic, RPS/ESFAS Initiation Logic, RTCBs, RPS/ESFAS Manual Trip, or ESFAS Actuation Logic. [Step 3.c - YES]
	SRO/BOP	CONFIRM failure AFFECTS the Feedwater Digital Control System. [Step 3.d - YES]
		• [RNO] DIRECT bypass of Steam Generator E-089 Level Transmitter per SO23-3-2.38, Digital Control System Operation.
Floor Cue: If not initiated, DIRECT SRO as Shift Manager to perform SO23-3-2.38 actions.		

Operating Test :	NRC	Scenario #	5	Event #	2	Page	12	of	34
Event Description:	Steam Generator E-089 Narrow Range Level Transmitter Failure								

Time	Position	Applicant's Actions or Behavior
	SRO	EVALUATE Technical Specifications. [Step 3.e - YES]
		• LCO 3.3.1.A, Reactor Protection System Instrumentation.
		• CONDITION A - One or more Functions with one automatic RPS trip channel inoperable. • ACTION A.1 - Place Channel in bypass or trip within one (1) hour.
		• LCO 3.3.5.A, ESFAS Instrumentation.
		• CONDITION A - One or more Functions with one automatic ESFAS trip channel inoperable. • ACTION A.1 - Place Functional Unit in bypass or trip within one (1) hour.
	SRO	CONFIRM failure did NOT involve a failed PPS Power Supply. [Step 3.f - YES]
	SRO	NOTIFY Shift Manager to PERFORM Administrative Actions. [Step 3.g - YES]
Examiner Note:		**The following steps are from SO23-3-2.38, Digital Control System Operation, Section 6.7, Bypassing Selected Feedwater Control Signals.**
		NOTE Only three of four instruments are used for determining the parameter output (Selected Signal). "D" channel is the default channel for bypass. If there are only two instruments, then both are used to determine output.
	BOP	VERIFY affected instrument can be bypassed in Feedwater DCS. [Step 6.7.1 - YES]

Operating Test :	NRC	Scenario #	5	Event #	2	Page	13	of	34
Event Description:	Steam Generator E-089 Narrow Range Level Transmitter Failure								

Time	Position	Applicant's Actions or Behavior

PARAMETER	E088	E089
SG Pressure	PT-1023-1, -2, -3, -4	PT-1013-1, -2, -3, -4
Feedwater Flow	FT-1121, FT-1122	FT-1111, FT-1112
NR Level	LT-1123-1, -2, -3, -4	LT-1113-1, -2, -3, -4
WR Level	LT-1125-1, -2	LT-1115-1, -2
Feedwater Temperature	TW-4036, TW-4037, TW-4040, TW-4045 (Same instruments are on both S/G screens)	

	BOP	PLACE Feedwater Control instrument in BYPASS: [Step 6.7.2 - YES]
		• CONDUCT a Reactivity Brief. [Step 6.7.2.1 - YES]
		• ACCESS **Selected Signals** screen for SG E-089. [Step 6.7.2.2 - YES]
		• VERIFY SG E-089 Channel D signal is valid. [Step 6.7.2.3 - YES]
		• SELECT BYPASS for Channel B SG level. [Step 6.7.2.4 - YES]
		• VERIFY Channel B indicates BYPASS. [Step 6.7.2.5 - YES]
		• VERIFY Channel D NOT in BYPASS. [Step 6.7.2.6 - YES]
+10 min		• VERIFY Channel D output looks valid. [Step 6.7.2.7 - YES]

When Technical Specifications are addressed, or at Lead Examiner discretion, PROCEED to Event 3.

Operating Test :	NRC	Scenario #	5	Event #	3	Page	14	of	34
Event Description:	Pressurizer Level Control Channel Failure / Train B Pressurizer Heater Bank Trip								

Time	Position	Applicant's Actions or Behavior
Machine Operator: When directed, EXECUTE Event 3. - RC16B, PZR Level Controlling Channel Y LT-0110-2 fails high. - PZR LP, Pressurizer Heater Bank overcurrent trip (20 second time delay).		
Indications Available: **50A22 – PZR LEVEL ERROR HI** **50A12 – PZR LEVEL ERROR HI-HI** **50A27 – PZR HEATERS TRAIN B OVERRIDE / NOT IN AUTO (when Train B 1E PZR Heater trips)** **50A34 – PZR BACKUP HEATER OC (when Train B 1E PZR Heater trips)** **50A02 – COLSS ALARM (alarm comes in if Heaters are left on and RCS pressure rises)** **Letdown flow increasing** **2LI-0110A2, Hot Calibrated Pressurizer Level indication failed high**		
Examiner Note: If Pressurizer Heaters are left energized for an extended length of time, Annunciator 50A02 – COLSS ALARM will alarm and require additional actions listed at the end of this event. Specifically, Turbine load must be reduced by 5 MWe to clear the alarm.		
+1 min	RO	REFER to Annunciator Response Procedures (ARPs).
	RO	OBSERVE minimum Charging flow and maximum Letdown flow.
Examiner Note: RO may use "prompt and prudent" action to place Channel in MANUAL. The following steps are from Annunciator 50A12 - PZR LEVEL ERROR HI-HI.		
	RO	DEPRESS A / M pushbutton on LIC-0110, PZR Level Controller, to PLACE PZR Level Control in MANUAL. [Step 1.1 - YES]
	RO	INITIATE SO23-13-27, Pressurizer Pressure and Level Malfunction. [Steps 1.1.1 - YES]
Examiner Note: The following steps are from SO23-13-27, Pressurizer Pressure and Level Malfunction.		
	SRO	ENTER SO23-13-27, Pressurizer Pressure and Level Malfunction.
		• IDENTIFY uncontrolled level change and GO to Step 2. [Step 1 - YES]

Operating Test :	NRC	Scenario #	5	Event #	3	Page	15	of	34
Event Description:	Pressurizer Level Control Channel Failure / Train B Pressurizer Heater Bank Trip								

Time	Position	Applicant's Actions or Behavior
		GUIDELINES 1) See Attachment 2 for the Pressurizer Level Control Block Diagram. 2) See Attachment 4 for the Pressurizer Level Control Setpoint Diagram. 3) To diagnose controller alarms, refer to SO23-3-1.10, Attachment for Foxboro Alarm Response and Foxboro Controller Page Data. 4) Reactivity will be impacted by changes in Pressurizer level control, Pressurizer Heater configuration, and Charging Pump configuration.
	RO	DETERMINE Letdown and Charging are NOT responding as desired and PERFORM the following (as applicable): [Step 2 - YES]
		• DEPRESS the A / M button on LIC-0110, PZR Level Controller, and PLACE PZR Level Control in MANUAL. [Step 2.a - YES]
		• As required, START Charging Pumps to MATCH Letdown flow as closely as possible. [Step 2.b - YES]
		• ADJUST LIC-0110, PZR Level Controller, to MATCH Letdown and Charging flows. [Step 2.b.1) - YES]
		• SECURE PZR heaters as necessary to control Pressurizer pressure. [Step 2.c - YES]
		• VERIFY normal Charging and Letdown in service. [Step 2.d - YES]
		• DETERMINE Level Channel indications LI-0110A1, LI-0110A2, and LI-103 NOT reading the same. [Step 2.e - YES]
		• [RNO] GO to Step 2.h.
	RO	• TRANSFER to the OPERABLE level channel. [Step 2.h - YES]
		• VERIFY Level Channel X (LI-0110X) READING within program band by OBSERVING lumigraph. [Step 2.h.1) - YES]
		• POSITION HS-0110, PZR Level Channel Select Switch, to Channel X. [Step 2.h.2) - YES]

Operating Test :	NRC	Scenario #	5	Event #	3	Page	16	of	34
Event Description:	Pressurizer Level Control Channel Failure / Train B Pressurizer Heater Bank Trip								

Time	Position	Applicant's Actions or Behavior
		• ADJUST LIC-0110 output to MATCH actual level (middle column) with Pressurizer Level Setpoint (left column) to within 2%. [Step 2.h.3) - YES]
		• When level is within 2%, DEPRESS A / M pushbutton to TRANSFER LIC-0110, PZR Level Controller to AUTO. [Step 2.h.4) - YES]
		• DEPRESS HS-0100C, PZR LO-LO Level Heater Cutout Channel Selector Level Transmitter X. [Step 2.h.5) - YES]
Examiner Note: Procedure enhancement has been submitted to address 1E & Non-1E Heaters.		
	RO	• DETERMINE Non-1E PZR Heaters have TRIPPED. [Step 2.h.6) - YES]
		• [RNO] RESET all PZR Non-1E Backup and Proportional Heaters.
		• [RNO] OPERATE PZR Non-1E Backup and Proportional Heaters per SRO direction.
		• OPERATE Charging Pumps as directed by SRO. [Step 2.h.7) - YES]
		• VERIFY Pressurizer Level Control System operating in AUTO within band of Attachment 3. [Step 2.h.8) - YES]
	SRO	• GO to Step 2.k. [Step 2.i - YES]
	RO	• ENSURE LIC-0110 in AUTO. [Step 2.k - YES]
Examiner Note: Technical Specification LCO 3.4.1 is entered if RCS pressure rises above 2275 PSIA.		
+10 min	SRO	NOTIFY personnel & EVALUATE Technical Specifications. [Step 2.l - YES]
		• LCO 3.4.9.B, Pressurizer.
		• CONDITION B - One required group of pressurizer heaters inoperable. • ACTION B.1 - Restore required group of pressurizer heaters to OPERABLE status within 72 hours.
		• LCO 3.4.1.A, RCS DNB Limits.

Operating Test :	NRC	Scenario #	5	Event #	3	Page	17	of	34
Event Description:	Pressurizer Level Control Channel Failure / Train B Pressurizer Heater Bank Trip								

Time	Position	Applicant's Actions or Behavior
		• CONDITION A - Pressurizer pressure not within limits. • ACTION A.1 - Restore Pressurizer pressure to within limit within two (2) hours.
Examiner Note: The following steps are from Annunciator 50A34 – PZR BACKUP HEATER OC.		
	RO	DISPATCH Operator to Penetration Building to check for SPECIFIC CAUSES listed in Section 2.0. [Step 1.1 - YES]
	RO	OPERATE Backup Heaters to compensate for PZR Heater loss. [Step 1.2 - YES]
	RO	REFER to SO23-6-9, Section for MCC Feeder Circuit Relay/Guidelines for Resetting Tripped Breakers. [Step 1.3 - NO]
	RO	NOTIFY SRO to review Technical Specification LCO 3.4.9. [Step 3.1 - YES]
Examiner Note: The following steps are from Annunciator 50A02 – COLSS ALARM.		
	RO/BOP	If COLSS ALARM is annunciated, LOWER Turbine load 5 MWe at 10 MWe / min to maintain power margin. [Step 1.1 - YES]
		• As required, DEPRESS HS-2210 Main Turbine Speed / Load Control LOWER pushbutton. [Step 1.1 - YES]
	RO	If COLSS inoperability is suspected, REFER to Technical Specifications 3.2.1 and 3.2.4 for 15 minute ACTION requirements. [Step 1.2 - NO]
	RO	If loss of T_{AVE} program has occurred, REFER to 50A05 - T AVG HI. [Step 1.3 - NO]
	RO	If at any time the COLSS (Primary and Backup) Computers fail, then initiate SO23-3-3.6, COLSS Out of Service Surveillance. [Step 1.4 - NO]
When Technical Specifications have been addressed, or at Lead Evaluator's discretion, PROCEED to Event 4.		

Operating Test :	NRC	Scenario #	5	Event #	4	Page	18	of	34
Event Description:	Nuclear Service Water Pump Overcurrent Trip								

Time	Position	Applicant's Actions or Behavior
Machine Operator: When directed, EXECUTE Event 4. - NSW LP, Nuclear Service Water LP Pump P-139 overcurrent trip.		
Indications Available: **61A32 – NUCLEAR SERVICE WATER PUMP PRESS LO** **61A33 – NUCLEAR SERVICE WATER PUMP PRESS LO-LO** **61A43 – NUCLEAR SERVICE WATER PUMP OC** **P-139, Nuclear Service Water Pump double brilliant STOP light on 2/3HS-7903**		
+30 sec	BOP	REFER to Annunciator Response Procedures (ARPs).
	BOP	RECOGNIZE Nuclear Service Water Low Pressure Pump P-139 overcurrent trip and INFORM the SRO ARP SO23-15-61.A2 - 61A43 entry required.
	SRO	DIRECT performance of SO23-15-61.A2 - 61A43 – NUCLEAR SERVICE WATER PUMP OC.
Examiner Note: The following steps are from Annunciator 61A43 – NUCLEAR SERVICE WATER PUMP OC.		
	BOP	START standby Nuclear Service Water Pump. [Step 1.1 - YES]
		• DEPRESS HS-7902, P-138, Nuclear Service Water High Pressure Pump START pushbutton.
		• OBSERVE PI-7934, NSW System pressure RISING.
+5 min	BOP	DETERMINE P-139 Nuclear Service Water Low Pressure Pump tripped. [Step 2.1 - YES]
		• DISPATCH operator to CHECK 2B07-03 breaker. [Step 2.2 - YES]
		• PERFORM actions of SO23-6-9, 6.9 KV, for KV, and 480 V Buses and Feeder Faults, Section for MCC Feeder Circuit Fault Relay / Guidelines for Resetting Tripped Breakers and/or Thermals. [Step 2.2 - NO]
When Nuclear Service Water is returned to normal, or at Lead Examiner discretion, PROCEED to Events 5 and 6.		

Operating Test :	NRC	Scenario #	5	Event #	5 & 6	Page	19	of	34
Event Description:	Earthquake / Inadvertent Turbine Trip / Reactor Trip Failure / Failed Fuel								

Time	Position	Applicant's Actions or Behavior
Machine Operator: When directed, EXECUTE Events 5 and 6. **- OBE LP, Seismic OBE without Main Feedwater Pump trip.** **- TU08, Inadvertent Turbine Trip (~30 second time delay).** **- RP15, Reactor Trip failure.** **- RP24A/B/C/D, Diverse Scram System / ATWS Trip failure.** **- RC19 Failed Fuel upon Reactor trip (1% severity).**		
Indications Available: **61C21 – SEISMIC RECORDING SYSTEM ACTIVATED** **61C22 – OPERATING BASIS EARTHQUAKE DETECTED** **Numerous Seismic related alarms** **Numerous tank level alarms due to sloshing** **The following alarms occur ~30 seconds later:** **99A24 – TURBINE TRIP RELAY TRIPPED** **56A25 – LOSS OF LOAD CHANNEL TRIP**		
+10 secs	RO/BOP	REFER to Annunciator Response Procedures (ARPs).
	RO/BOP	RECOGNIZE Operating Basis Earthquake and INFORM the SRO SO23-13-3 entry required.
+30 secs	RO	RECOGNIZE inadvertent Turbine Trip and INFORM the SRO Reactor Trip required.
CRITICAL TASK STATEMENT		**Manually Initiate Reactor Trip Following Reactor Protection System Failure Within One Minute of Entry into SO23-12-1, Standard Post Trip Actions.** **Elapsed Time: _____**
CRITICAL TASK	RO/BOP	MANUALLY TRIP the Reactor.
		• DEPRESS Reactor Trip pushbuttons at CR-56 **or** CR-53.
		• DEPRESS HS-9132-2 **and** HS-9132-3 REACTOR TRIP pushbuttons on CR-56.
		• DEPRESS HS-9132-1 **and** HS-9132-4 REACTOR TRIP pushbuttons on CR-52.

Operating Test :	NRC	Scenario #	5	Event #	5 & 6	Page	20	of	34
Event Description:	Earthquake / Inadvertent Turbine Trip / Reactor Trip Failure / Failed Fuel								

Time	Position	Applicant's Actions or Behavior
+2 min	SRO	ENTER SO23-12-1, Standard Post Trip Actions.
When Reactor is manually tripped, or at Lead Evaluator's discretion, PROCEED to Events 7, 8, and 9.		

Operating Test :	NRC	Scenario #	5	Event #	7, 8, & 9	Page	21	of	34
Event Description:	Small Break LOCA / ESDE inside Containment / Train B Component Cooling Water & High Pressure Safety Injection (HPSI) Pumps Start Failure on SIAS / Train A HPSI Pump Overcurrent Trip								

Time	Position	Applicant's Actions or Behavior
Machine Operator:		**When directed, EXECUTE Events 7, 8, and 9.** **- RC03, Small Break Loss of Coolant Accident @300 GPM (6% severity).** **- MS03B, SG E-089 Steam Line Break inside Containment (1% severity).** **- RP01H, CCW pump P-026 fails to start on SIAS.** **- EC08DA, Train A HPSI Pump P-018 overcurrent trip.** **- RP01C, Train B HPSI Pump P-019 fails to start on SIAS.**
Indications Available:		**Numerous Reactor Trip / LOCA / ESDE related alarms**
Examiner Note:		**The SRO may pull forward the actions of FS-30, Establish Stable RCS Temperature during ESDE. These steps are identified later in this scenario.**
	SRO	DIRECT performance of SO23-12-1, Standard Post Trip Actions.
	RO	VERIFY Reactor Trip: [Step 1 - YES]
		• VERIFY Reactor Trip Circuit Breakers OPEN. [Step 1.a - YES]
		• VERIFY Reactor Power lowering and Startup Rate NEGATIVE. [Step 1.b - YES]
		• VERIFY maximum of one (1) Full Length CEAs NOT fully inserted. [Step 1.c - YES]
	SRO/RO	VERIFY Reactivity Control criteria satisfied. [Step 1 - YES]
	BOP	VERIFY Turbine Trip: [Step 2 - YES]
		• VERIFY HP & LP Stop and Governor Valves CLOSED. [Step 2.a - YES]
		• VERIFY <u>both</u> Unit Output Breakers OPEN. [Step 2.b - YES]
	SRO	INITIATE Administrative Actions: [Step 3 - YES]
		• INITIATE Attachment 4, Worksheet. [Step 3.a - YES]

Operating Test :	NRC	Scenario #	5	Event #	7, 8, & 9	Page	22	of	34
Event Description:	Small Break LOCA / ESDE inside Containment / Train B Component Cooling Water & High Pressure Safety Injection (HPSI) Pumps Start Failure on SIAS / Train A HPSI Pump Overcurrent Trip								

Time	Position	Applicant's Actions or Behavior
		CAUTION DO NOT OPERATE TRIP pushbuttons for tripped breakers. Operation of TRIP pushbuttons will reset overcurrent protection allowing Diesel Generator output breaker to close to a fault.
	BOP	VERIFY Vital Auxiliaries criteria satisfied: [Step 4 - YES]
		• VERIFY both 1E 4 kV Buses 2A04 and 2A06 ENERGIZED. [Step 4.a - YES]
		• VERIFY all 1E 480 V Buses 2B04, 2B24, 2B06, & 2B26 ENERGIZED. [Step 4.b - YES]
		• VERIFY all 1E DC Buses ENERGIZED. [Step 4.c - YES]
		• VERIFY all Non-1E 4 kV Buses 2A03, 2A07, 2A08, & 2A09 ENERGIZED. [Step 4.d - YES]
		• VERIFY CCW Train A OPERATING and NOT ALIGNED to Non-Critical Loop and Letdown Heat Exchanger. [Step 4.e - YES]
	BOP	• [RNO] DETERMINE CIAS actuated, STOP all RCPs, & GO to Step 5.
	BOP	• If SIAS is actuated, DETERMINE Train B CCW Pump NOT Running.
		• DEPRESS HS-6324-2, CCW Pump P-026 START pushbutton and OBSERVE SWC Pump P-114 AUTO START.
	RO	DETERMINE RCS Inventory Control criteria NOT satisfied: [Step 5 - YES]
		• DETERMINE PZR level NOT between 10% and 70% and NOT TRENDING to between 30% and 60%. [Step 5.a - YES]
		• [RNO] ENSURE Pressurizer Level Control System operating in AUTO to restore Pressurizer level.
		• VERIFY Core Exit Saturation Margin ≥ 20ºF: [Step 5.b - YES]
Examiner Note: Starting either HPSI Pump meets the Critical Task requirements.		
CRITICAL TASK STATEMENT		**Establish Minimum Safety Injection Flow Prior to Exiting SO23-12-1, Standard Post Trip Actions.**

Operating Test :	NRC	Scenario #	5	Event #	7, 8, & 9	Page	23	of	34
Event Description:	Small Break LOCA / ESDE inside Containment / Train B Component Cooling Water & High Pressure Safety Injection (HPSI) Pumps Start Failure on SIAS / Train A HPSI Pump Overcurrent Trip								

Time	Position	Applicant's Actions or Behavior
CRITICAL TASK	RO	DEPRESS HS-9394-2, P-019, Train B HPSI Pump START pushbutton.
CRITICAL TASK	RO	DEPRESS HS-9392-1, P-017, Train A HPSI Pump START pushbutton.
	RO	DETERMINE RCS Pressure Control criteria NOT satisfied: [Step 6 - YES]
		• DETERMINE PZR pressure NOT between 1740 PSIA and 2380 PSIA, NOT controlled and NOT TRENDING to between 2025 PSIA and 2275 PSIA. [Step 6.a - YES]
		• [RNO] DETERMINE PZR Pressure Control System is NOT restoring PZR pressure.
		• [RNO] ENSURE Normal and Aux Spray Valves CLOSED.
		• [RNO] If Pressurizer pressure < 1740 PSIA, ENSURE SIAS / CCAS / CRIS actuated.
	RO	DETERMINE Core Heat Removal criteria NOT satisfied: [Step 7 - YES]
		• DETERMINE no RCPs operating. [Step 7.a - YES]
		• [RNO] GO to Step 7.c.
		• DETERMINE Core Exit Saturation Margin > 20ºF. [Step 7.c - YES]
		• OBSERVE QSPDS page 611 **or** CFMS page 311.
	BOP	DETERMINE RCS Heat Removal criteria NOT satisfied: [Step 8 - YES]
		• DETERMINE SG E-088 narrow range level > 21%. [Step 8.a - YES]
		• DETERMINE SG E-089 narrow range level < 21%. [Step 8.a - YES]
		• VERIFY both SG narrow range levels < 80%. [Step 8.a - YES]
		• DETERMINE Auxiliary Feedwater available. [Step 8.a - YES]
		• [RNO] VERIFY EFAS initiated.
		• DETERMINE T_{COLD} less than 540ºF. [Step 8.b - YES]
		• [RNO] ENSURE Feedwater flow not excessive.
		• [RNO] ENSURE Steam Bypass Control Valves CLOSED.
		• [RNO] ENSURE Atmospheric Dump Valves CLOSED.
		• [RNO] If MSIS has actuated and cooldown is terminated, STABILIZE RCS temperature for lowest RCS $T_{COLD.}$

Operating Test :	NRC	Scenario #	5	Event #	7, 8, & 9	Page	24	of	34
Event Description:	Small Break LOCA / ESDE inside Containment / Train B Component Cooling Water & High Pressure Safety Injection (HPSI) Pumps Start Failure on SIAS / Train A HPSI Pump Overcurrent Trip								

Time	Position	Applicant's Actions or Behavior
		• DETERMINE SG pressures NOT between 960 and 1050 PSIA. [Step 8.c - YES]
		• [RNO] If SG pressure < 740 PSIA, ENSURE MSIS actuated & GO to Step 9.
	RO	DETERMINE Containment Isolation NOT criteria satisfied: [Step 9 - YES]
		• DETERMINE Containment pressure > 1.5 PSIG. [Step 9.a - YES]
		• [RNO] DETERMINE Containment pressure > 3.4 PSIG.
		• [RNO] ENSURE all RCPs STOPPED.
		• DETERMINE Containment Area Radiation Monitors ALARMING or TRENDING to alarm. [Step 9.b - YES]
		• DETERMINE Secondary Plant Radiation Monitors NOT alarming or trending to alarm. [Step 9.c - YES]
	RO	DETERMINE Containment Temperature and Pressure criteria NOT satisfied: [Step 10 - YES]
		• DETERMINE Containment average temperature > 120ºF and RISING. [Step 10.a - YES]
		• [RNO] ENSURE proper functioning of Normal Containment Cooling.
		• [RNO] ENSURE at least one Containment Dome Air Circulator OPERATING.
		• DETERMINE Containment pressure > 3.4 PSIG. [Step 10.b - YES]
		• [RNO] If Containment pressure > 3.4 PSIG, ENSURE SIAS / CIAS / CCAS / CRIS actuated.
		• [RNO] ENSURE all RCPs STOPPED.
		• [RNO] ENSURE all available Containment Emergency Cooling Units OPERATING.
		• [RNO] DETERMINE Containment pressure > 14 PSIG.
		• [RNO] ENSURE CSAS actuated.
		• [RNO] ENSURE all available Containment Spray Header flows > 1600 GPM.
	SRO	DIAGNOSE event in progress: [Step 11 - YES]
		• DETERMINE some Safety Function criteria are NOT met per Attachment 4, Worksheet. [Step 11.a - YES]

Operating Test :	NRC	Scenario #	5	Event #	7, 8, & 9	Page	25	of	34
Event Description:	Small Break LOCA / ESDE inside Containment / Train B Component Cooling Water & High Pressure Safety Injection (HPSI) Pumps Start Failure on SIAS / Train A HPSI Pump Overcurrent Trip								

Time	Position	Applicant's Actions or Behavior
		• [RNO] COMPLETE Attachment 1, Recovery Diagnostics.
		• DETERMINE that Reactor Trip Recovery is NOT diagnosed. [Step 11.b - YES]
	RO	• [RNO] DETERMINE all RCPs STOPPED.
	BOP	• INITIATE steps 12 through 16. [Step 11.c - YES]
		• IMPLEMENT EOI SO23-12-9, Functional Recovery. [Step 11.d - YES]
Examiner Note:		**SO23-12-1, Standard Post Trip Actions, Steps 12 to 16, performed by the BOP are located at the end of the scenario. The following steps are from SO23-12-9, Functional Recovery.**
	SRO	ENTER SO23-12-9, Functional Recovery.
	SRO	RECORD time of EOI entry _____. [Step 1.a - YES]
	SRO	VERIFY Functional Recovery Diagnosis: [Step 2 - YES]
		• INITIATE SO23-12-10, Safety Function Status Checks. [Step 2.a - YES]
		• INITIATE Foldout Page. [Step 2.b - YES]
		• DIRECT performance of FS-7, Verify SI Throttle / Stop Criteria.
		• DIRECT performance of FS-3, Monitor Natural Circulation Established.
		• DIRECT performance of SO23-12-11, Attachment 22, Non-Qualified Load Restoration.
		• DIRECT Chemistry to sample both SGs for radioactivity and boron. [Step 2.c - YES]
M.O. Cue:		**If directed to sample SGs, WAIT 5 minutes and REPORT that E-088 and E-089 sample lines were frisked, and no elevated activity was detected. If the SG sample valves are closed, REPORT that you are unable to establish sample flow.**
	SRO	INITIATE Administrative actions:
		• NOTIFY Shift Manager/Operations Leader of SO23-12-9 initiation. [Step 3.a - YES]
		• ENSURE Emergency Plan is initiated. [Step 3.b - YES]

Operating Test : NRC	Scenario # 5	Event # 7, 8, & 9	Page 26 of 34
Event Description:	Small Break LOCA / ESDE inside Containment / Train B Component Cooling Water & High Pressure Safety Injection (HPSI) Pumps Start Failure on SIAS / Train A HPSI Pump Overcurrent Trip		

Time	Position	Applicant's Actions or Behavior
		• IMPLEMENT Placekeeper. [Step 3.c - YES]
		• IMPLEMENT Time Dependent Steps. [Step 3.d - YES]
	SRO/RO	VERIFY ESF Actuation. [Step 4 - YES]
		• VERIFY SIAS actuation required. [Step 4.a - YES]
		• DETERMINE Pressurizer pressure less than SIAS setpoint.
		• DETERMINE Containment pressure greater than 3.4 PSIG.
	RO	• ENSURE the following actuated: [Step 4.b - YES]
		• SIAS / CCAS / CRIS
	SRO/RO	• RECORD time of SIAS: _____ [Step 4.c - YES]
	RO	• VERIFY CIAS actuated. [Step 4.d - YES]
	BOP	• STOP unloaded Diesel Generators. [Step 4.e - YES]
		• DEPRESS HS-1670-1, Train A EDG SIAS OVERRIDE STOP pushbutton.
		• DEPRESS HS-1649-2, Train B EDG SIAS OVERRIDE STOP pushbutton.
	BOP	• INITIATE SO23-12-11, Attachment 22, Non-Qualified Load Restoration. [Step 4.f - YES]
M.O. Cue:	**When directed to restore non-qualified loads, WAIT 2 minutes, then EXECUTE remote function ED85, Non-Qualified Loads Restoration. INFORM the Control Room that you have restored Non-Qualified Loads.**	
	SRO	• DETERMINE RCP NPSH requirements NOT MET. [Step 4.g - YES]
		• [RNO] DETERMINE all RCPs STOPPED.
	RO	• [RNO] INITIATE FS-3, Monitor Natural Circulation Established.
	RO	ESTABLISH Optimum SI Alignment: [Step 5 - YES]

Operating Test :	NRC	Scenario #	5	Event #	7, 8, & 9	Page	27	of	34
Event Description:	Small Break LOCA / ESDE inside Containment / Train B Component Cooling Water & High Pressure Safety Injection (HPSI) Pumps Start Failure on SIAS / Train A HPSI Pump Overcurrent Trip								

Time	Position	Applicant's Actions or Behavior
		• ESTABLISH two train operation: [Step 5.a - YES]
		• DETERMINE all Charging Pumps OPERATING. [Step 5.a.1) - YES]
		• DETERMINE Train B HPSI and both LPSI Trains OPERATING. [Step 5.a.2) - YES]
		• If not running, DEPRESS HS-9392-1-1 P-017, Train A HPSI Pump START pushbutton.
		• VERIFY all Cold Leg flow paths ALIGNED. [Step 5.a.3) - YES]
		• DETERMINE SI flow required AND indicated. [Step 5.a.4) - YES]
	SRO	EVALUATE Immediate Safety Function Recovery Actions. [Step 6 - YES]
		• VERIFY any Safety Function Recovery Attachments indicated by any optimal EOI. [Step 6.a - NO]
		• [RNO] GO to Step c.
	RO	• IMPLEMENT precautionary actions: [Step 6.c - YES]
		• DETERMINE Emergency Boration of > 40 GPM INITIATED. [Step 6.c.1) - YES]
		• DETERMINE all RCPs STOPPED. [Step 6.c.2) - YES]
	SRO	• DETERMINE ESDE indicated. [Step 6.d - YES]
		• [RNO] INITIATE SO23-12-11, Attachment 29, Isolation of Steam Generator with ESDE.
		• [RNO] INITIATE FS-30, Establish Stable RCS Temperature during ESDE.
	SRO	• DETERMINE SGTR NOT indicated. [Step 6.e - YES]
	SRO	• DETERMINE LOFW NOT indicated. [Step 6.f - YES]
<u>Examiner Note</u>:		**The following steps from SO23-12-11, EOI Supporting Attachments, FS-30, Establish Stable RCS Temperature during ESDE, will be performed when conditions are met.**

Operating Test :	NRC	Scenario #	5	Event #	7, 8, & 9	Page	28	of	34
Event Description:	Small Break LOCA / ESDE inside Containment / Train B Component Cooling Water & High Pressure Safety Injection (HPSI) Pumps Start Failure on SIAS / Train A HPSI Pump Overcurrent Trip								

Time	Position	Applicant's Actions or Behavior
		NOTE WHEN excess steam demand remains NOT isolated and all RCPs are stopped, **THEN** RCS T_{COLD} in loop with least affected S/G may be higher than REP CET temperature
	BOP	VERIFY SG least affected by ESDE, SG E-088, NOT isolated for SGTR. [Step a - YES]
		CAUTION Failure to establish steaming flow path on least affected S/G before most affected S/G loses effective heat removal capabilities will result in rapid re-pressurization (PTS consideration).
	BOP	VERIFY most affected SG level E-089 - less than 50% WR. [Step b - YES]
	BOP	PERFORM the following on least affected SG E-088: [Step c - YES]
		• TRANSFER HV-8419, SG E-088 ADV to OVERRIDE then OPEN then AUTO / MODULATE. [Step c.1) - YES]
		• MAINTAIN SG E-088 pressure 200 PSIA above SG E-089 pressure. [Step c.2) - YES]
Examiner Note:		**During validation, Steam Generator E-089 reached 200 PSIA before wide range level indication was lost.**
	BOP	VERIFY SG dryout on most affected SG E-089: [Step d - YES]
		• DETERMINE RCS T_{COLD} - STABLE or RISING. [Step d.1) - NO]
		• DETERMINE SG pressure - 200 PSIA. [Step d.2) - YES]

Operating Test :	NRC	Scenario #	5	Event #	7, 8, & 9	Page	29	of	34
Event Description:	Small Break LOCA / ESDE inside Containment / Train B Component Cooling Water & High Pressure Safety Injection (HPSI) Pumps Start Failure on SIAS / Train A HPSI Pump Overcurrent Trip								

Time	Position	Applicant's Actions or Behavior
		NOTE When MSIS is actuated, unstable S/G pressures can cause cycling of AFW flow due to differential steam pressure between the two S/Gs.
CRITICAL TASK STATEMENT		**Establish Stable Reactor Coolant System Temperature per SO23-12-11, E0I Supporting Attachments, FS-30, Establish Stable RCS Temperature during ESDE.**
CRITICAL TASK	BOP	STABILIZE least affected SG E-088 pressure: [Step e - YES]
		• VERIFY ADV on SG E-088 in AUTO / MODULATE. [Step e.1) - YES]
		• MAINTAIN P_{SAT} for lowest RCS T_{COLD} on SG E-088. [Step e.2) - YES]
		• STABILIZE AFW flow on SG E-088. [Step e.3) - YES]
	RO	VERIFY RCS pressure is to the right of the Appendix E curve on Attachment 30, Post-Accident Pressure / Temperature Limits. [Step f - YES]
	BOP	OPERATE Feedwater on SG E-088 to maintain between 40% and 80% NR. [Step g - YES]
Examiner Note:		**The following steps are from SO23-12-11, EOI Supporting Attachments, Attachment 29, Isolation of Steam Generator with ESDE.**
	SRO	IDENTIFY most affected Steam Generator. [Step 1 - YES]
	SRO/BOP	IDENTIFY most affected Steam Generator as E-089. [Step 1.a - YES]

Operating Test :	NRC	Scenario #	5	Event #	7, 8, & 9	Page	30	of	34
Event Description:	Small Break LOCA / ESDE inside Containment / Train B Component Cooling Water & High Pressure Safety Injection (HPSI) Pumps Start Failure on SIAS / Train A HPSI Pump Overcurrent Trip								

Time	Position	Applicant's Actions or Behavior

	S/G		Flow		Most Affected S/G
	Pressure	T_{COLD}	Steam	MFW	
S/G E-088	LOWER THAN S/G E-089		HIGHER THAN S/G E-089		E-088
S/G E-089	LOWER THAN S/G E-088		HIGHER THAN S/G E-088		E-089

	SRO	NOTIFY Shift Manager of most affected Steam Generator E-089. [Step 1.b - YES]
	SRO	VERIFY RCS Heat Removal Path: [Step 2 - YES]

CAUTION

Failure to establish steaming flow path on least affected S/G before most affected S/G level lowers to 10% WR will result in rapid re-pressurization (PTS consideration).

	SRO/BOP	DETERMINE FS-30, Establish Stable RCS Temperature During ESDE already performed. [Step 2.a - YES]

NOTE

Heat Removal takes priority over Containment Isolation. If a ruptured S/G (ESDE or SGTR) is the only S/G available for heat removal, it should remain in service until an alternate heat sink is made available. Alternate heat sinks can be the other S/G being made available (feedwater or steaming capability for example), or SDC can become available.

NOTE

When one S/G has an ESDE and the other S/G has a SGTR, then it is generally preferred to use the SGTR S/G for heat removal and isolate the ESDE S/G. In this context the SGTR S/G may be considered least affected.

Operating Test :	NRC	Scenario #	5	Event #	7, 8, & 9	Page	31	of	34
Event Description:	Small Break LOCA / ESDE inside Containment / Train B Component Cooling Water & High Pressure Safety Injection (HPSI) Pumps Start Failure on SIAS / Train A HPSI Pump Overcurrent Trip								

Time	Position	Applicant's Actions or Behavior
	SRO	VERIFY SG least affected by ESDE, SG E-088, NOT isolated for SGTR. [Step 2.b - YES]
		NOTE IF the electric AFW Pump associated with the *most affected* S/G is x-tied to supply the *least affected* S/G, THEN it should NOT be secured.
	SRO	ISOLATE Excess Steam Demand: [Step 3 - YES]
CRITICAL TASK STATEMENT		**Identify and Isolate the Most Affected Steam Generator Prior to Exiting SO23-12-11, EOI Supporting Attachments, Attachment 29, Isolation of Steam Generator with ESDE.**
CRITICAL TASK	BOP	• ISOLATE Steam Generator E-089: [Step 10.a - YES]
		• CLOSE / STOP SG E-089 components: [Step 3.a.1) - YES]
		• DETERMINE HV-8204, Main Steam Isolation Valve CLOSED.
		• DETERMINE HV-8202, Main Steam Isolation Valve Bypass CLOSED.
		• DETERMINE HV-8421, Atmospheric Dump Valve CLOSED.
		• DETERMINE HV-4052, Main Feed Isolation Valve CLOSED.
		• DETERMINE HV-4731, Auxiliary Feedwater Valve CLOSED.
		• DETERMINE HV-4715, Auxiliary Feedwater Valve CLOSED.
		• DEPRESS OVERRIDE then CLOSE pushbuttons for HV-8200, P-140, Steam to Auxiliary Feedwater Pump.
		• DETERMINE HV-4053, SG Blowdown Isolation Valve CLOSED.
		• DETERMINE HV-4057, SG Water Sample Isolation SG Water Sample Isolation Valve CLOSED.
		• DEPRESS OVERRIDE then STOP pushbuttons for HS-4707-1, P-141, Auxiliary Feedwater Pump.
+30 min	BOP	ENSURE HV-8421, SG E-089 ADV selected to MANUAL. [Step 3.a.2) - YES]

Operating Test :	NRC	Scenario #	5	Event #	7, 8, & 9	Page	32	of	34
Event Description:	Small Break LOCA / ESDE inside Containment / Train B Component Cooling Water & High Pressure Safety Injection (HPSI) Pumps Start Failure on SIAS / Train A HPSI Pump Overcurrent Trip								

Time	Position	Applicant's Actions or Behavior
		When Steam Generator E-089 is isolated, or at Lead Evaluator's discretion, TERMINATE the scenario.

Operating Test :	NRC	Scenario #	5	Event #	7, 8, & 9	Page	33	of	34
Event Description:	Small Break LOCA / ESDE inside Containment / Train B Component Cooling Water & High Pressure Safety Injection (HPSI) Pumps Start Failure on SIAS / Train A HPSI Pump Overcurrent Trip								

Time	Position	Applicant's Actions or Behavior
<u>Examiner Note</u>: These steps are performed by the BOP per SO23-12-1, Steps 12 through 16.		
	SRO/BOP	INITIATE Attachment 5, Administrative Actions. [Step 12.a - YES]
	SRO/BOP	ENSURE a PA system announcement for Reactor Trip. [Step 12.b - YES]
	BOP	ENSURE the following loads restored: [Step 13 - YES]
		• VERIFY Telecom 480 VAC Feeder Breaker – CLOSED on Unit 3. [Step 13.a - YES].
		• VERIFY Telecom 480 VAC Feeder Breaker – CLOSED on Unit 3. [Step 13.b - YES].
		• DETERMINE all Non-1E Buses – ENERGIZED [Step 13.c - YES].
		• DETERMINE B15 & B16 480 VAC Load Centers – ENERGIZED [Step 13.d - YES].
	BOP	VERIFY Main Turbine Coastdown: [Step 14 - YES]
		• DETERMINE Extraction Steam Block Valves – CLOSED. [Step 14.a - YES]
		• DETERMINE Main Steam to Reheater Block, Bypass, Warmup, and Control Valves – CLOSED. [Step 14.a - YES]
		• DETERMINE HV-2712A/B Bled Steam to Reheaters Block Valve – CLOSED. [Step 14.a - YES]
		• VERIFY Generator lowering – less than 24 kV. [Step 14.b - YES]
		• VERIFY 99A26 - TURBINE LUBE OIL TEMP HI and 99A46 - TURBINE BRG OIL DRAIN TEMP HI Annunciators – RESET. [Step 14.c - YES]

Operating Test :	NRC	Scenario #	5	Event #	7, 8, & 9	Page	34	of	34
Event Description:	Small Break LOCA / ESDE inside Containment / Train B Component Cooling Water & High Pressure Safety Injection (HPSI) Pumps Start Failure on SIAS / Train A HPSI Pump Overcurrent Trip								

Time	Position	Applicant's Actions or Behavior
		• INITIATE SO23-10-2, Turbine Shutdown, Attachment for Unloading the Generator and Removing the Unit from Line. [Step 14.d = NO]
	BOP	ESTABLISH desired Condensate and Feedwater Status: [Step 15 - YES]
		• ENSURE 3rd Point Heater Drain Pumps – STOPPED. [Step 15.a - YES]
		• DETERMINE Reactor Trip Override – NOT RESET due to MSIS. [Step 15.b - YES]
		• DETERMINE both Main Feedwater Pumps TRIPPED and three (3) Condensate Pumps OPERATING. [Step 15.c - YES]
		• ENSURE FIC-3294, Condensate Pump Miniflow Controller set for Condensate Pump configuration. [Step 15.d - YES]
		• Three (3) Pumps – 9000 GPM.
		• PLACE LV-3245, Condensate Drawoff Valve to – DISABLE. [Step 15.e - YES]
		• DETERMINE SO23-12-2, Reactor Trip Recovery, NOT being implemented. [Step 15.f - YES]
		• [RNO] ENSURE HV-4053 & HV-4054, SG Blowdown Valves CLOSED and GO to Step 16.
	BOP	VERIFY Start-Up Range Channels: [Step 16 - YES]
		• VERIFY both Start-Up Range Channels – OPERABLE. [Step 16.a - YES]
SO23-12-1, Standard Post Trip Actions, Steps 12 through 16 are complete.		

Appendix D	Scenario Outline	Form ES-D-1

Facility:	SONGS 2 & 3	Scenario No.:	6	Op Test No.:	October 2011 NRC
Examiners:		Operators:			

Initial Conditions: ~4% power MOL - RCS Boron is 1450 ppm (via sample).

Turnover: Place Auxiliary Feedwater System in Standby and raise Reactor power from 4% to 18%.

Critical Tasks:
- Reduce Reactor Coolant System T_{HOT} to less than 530ºF Prior to Exiting SO23-12-4, Steam Generator Tube Rupture.
- Manually Actuate Safety Injection and Containment Isolation Actuation Signals Prior to Exiting SO23-12-4, Steam Generator Tube Rupture.
- Isolate the Ruptured Steam Generator Prior to Exiting SO23-12-4, Steam Generator Tube Rupture.

Event No.	Malf. No.	Event Type*	Event Description
1 +10 min		N (BOP, SRO)	Place Auxiliary Feedwater System in Standby.
2 +30 min		R (RO) N (BOP, SRO)	Raise Reactor Power from 4% to 18% in Preparation for Turbine Startup.
3 +40 min	RC11A	I (RO, SRO)	Reactor Coolant System Loop 1 T_{HOT} (TT-0111X1) Fails High.
4 +45 min	TP02B TP08A	C (BOP, SRO)	Turbine Plant Cooling Water Pump (TPCW) P-120 Trip. TPCW Pump P-119 Auto Start Failure. Manual Start Required.
5 +50 min	CS05A	TS (SRO)	Refueling Water Storage Tank Level Transmitter (LT-0305-1) Fails Low.
6 +55 min	SG06B	C (RO, SRO) TS (SRO)	Steam Generator Tube Leak (E-089) at ~10 GPM.
7 +60 min	SG06B	M (RO, BOP, SRO)	Steam Generator Tube Rupture (E-089) at ~300 GPM.
8 +60 min	ED06R	C (BOP)	1E 480 Volt Buses 2B06 and 2B26 Feeder Breaker Ground Overcurrent.
9 +65 min	SIAS LP CCAS LP	I (RO)	Safety Injection (SIAS) and Containment Cooling Actuation Signals (CCAS) Fail To Automatically Actuate. Manual Actuation Required.

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

Actual	Target Quantitative Attributes
7	Total malfunctions (5-8)
2	Malfunctions after EOP entry (1-2)
2	Abnormal events (2-4)
1	Major transients (1-2)
1	EOPs entered/requiring substantive actions (1-2)
0	EOP contingencies requiring substantive actions (0-2)
3	Critical tasks (2-3)

SCENARIO SUMMARY NRC #6

The crew will assume the watch with Reactor power at 4% per Operating Instruction (OI) SO23-5-1.3.1, Plant Startup from Hot Standby to Minimum Load. The Steam Bypass Control System is in operation controlling Reactor Coolant System temperature.

When Shift Turnover is complete, the Auxiliary Feedwater System will be placed in Standby per OI SO23-2-4, Auxiliary Feedwater System Operation. When the Auxiliary Feedwater Pumps are secured, a power increase to 18% using CEAs and Reactor Coolant System Dilution with entry into MODE 1 will be performed.

When power has been raised 3% to 5%, a Reactor Coolant System (RCS) Loop 1 T_{HOT} Channel will fail high. Actions are per Abnormal Operating Instruction (AOI) SO23-13-27, Pressurizer Pressure and Level Malfunction. Actions include transferring to an OPERABLE channel, changing the input to the T_{AVE} program, and restoring Pressurizer level.

When Pressurizer level is restored, the running Turbine Plant Cooling Water (TPCW) Pump will trip. The crew will respond per the Annunciator Response Procedures (ARPs) and start the standby TPCW Pump.

When plant conditions are stable, a Refueling Water Storage Tank Level Transmitter fails low. The crew will reference AOI SO23-13-18, Reactor Protection System Failure, and place the failed unit in BYPASS. The SRO will refer to Technical Specifications.

The next event is a Steam Generator E-089 Tube Leak. Entry into AOI SO23-13-4, Reactor Coolant Leak, will direct the crew to identify the source and quantity of leakage. The SRO will refer to Technical Specifications and based on leakage indications, will direct a Reactor Trip and entry into Emergency Operating Instruction (EOI) SO23-12-1, Standard Post Trip Actions (SPTAs).

When the Reactor is tripped, a Steam Generator Tube Rupture will occur. The event is complicated with a loss of 1E 480 Volt Buses 2B06 and 2B26 and a failure of the Safety Injection Actuation (SIAS) and Containment Cooling Actuation Signals (CCAS). Both signals must be manually initiated from the Control Room and the Train B Emergency Diesel Generator placed in Maintenance Lockout.

Actions to cooldown and isolate the Steam Generator are performed per EOI SO23-12-4, Steam Generator Tube Rupture. During the cooldown, all Reactor Coolant Pumps must be secured and Natural Circulation verified per EOI SO23-12-11, EOI Supporting Attachments, FS-3, Monitor Natural Circulation Established. The scenario is terminated when Reactor Coolant System T_{HOT} is lowered below 530ºF, the ruptured Steam Generator is isolated, and Natural Circulation is verified.

Risk Significance:

- Failure of risk important system prior to trip: Steam Generator Tube Leak
- Risk significant core damage sequence: Steam Generator Tube Rupture
- Risk significant operator actions: Loss of 1E 480 Volt Buses 2B06 & 2B26

  Manually Actuate SIAS & CCAS

  Lower RCS T_{HOT} below 530ºF

  Isolate Ruptured Steam Generator

Scenario Event Description
NRC Scenario #6

MACHINE OPERATOR INSTRUCTIONS for SIMULATOR SETUP

INITIALIZE to IC-231 NRC Scenario #6 and associated Setup File.

EVENT	TYPE	MALF #	DESCRIPTION	DEMAND VALUE	INITIATING PARAMETER
SETUP	MF	SG06B	SGTR (E-089) at 300 GPM	1.0%	RX TRIP
	MF	ED06R	2B06 & 2B26 Feeder Breaker ground overcurrent	100%	RX TRIP
1	-	-	Place Auxiliary Feedwater System in Standby		
2	-	-	Raise Reactor Power from 4% to 18%		
3	MF	RC11A	RCS Loop 1 T_{HOT} (TT-0111X1) fails high	625ºF	
4	MF	TP02B	TPCW Pump (TPCW) P-120 overcurrent trip	FAULT	
4	MF	TP08A	TPCW Pump P-119 auto start failure		
5	MF	CS05A	RWST Level Transmitter (LT-0305-1) fails low	0%	
5	RF	RP51	PPS Door Open Annunciator 56B46	OPEN	By Direction
5	RF	RP52T	RWST Level Transmitter LT-0305-1	BYPASS	5 sec TD
5	RF	RP51	PPS Door Open Annunciator 56B46	CLOSE	10 sec TD
6	MF	SG06B	SG Tube Leak (E-089) at ~10 GPM	0.05%	
7	MF	SG06B	SGTR (E-089) at ~300 GPM	1.0%	
8	MF	ED06R	2B06 & 2B26 Feeder Breaker ground overcurrent	100%	RX TRIP
9	MF	SIAS LP	SIAS fails to AUTO actuate		
9	MF	CIAS LP	CIAS fails to AUTO actuate		
	RF	ED85	Non-Qualified Loads Restoration	RESTORE	By Direction

Scenario Event Description
NRC Scenario #6

Machine Operator: **EXECUTE IC-231 NRC Scenario #6 and SETUP file to align components.**

ENSURE CVCS Blend Setpoints MATCH Shift Turnover Sheet.

CHANGE Operator Aid Tag #029 (CVCS) to reflect boron concentration.

CHANGE Operator Aid Tag #005-9 (AFW T-120/121 alignment) to AUTO MAKEUP for both T-120 and T-121.

VERIFY forcing Pressurizer Spray flow with Backup PZR Heaters ON.

ENSURE Steam Generator level is controlled at 50% to 55%.

PLACE Steam Generator Level on TREND at the 22 PCS Monitor.

ENSURE HV-3354, Condenser Overboard Valve CLOSED.

ENSURE AFW Cross-Connect Valves indicate CLOSED on Feedwater DCS.

ADJUST Hotwell levels as necessary to minimize nuisance alarms.

PROVIDE procedures in progress, Shift Turnover, and Reactivity Management Guide to crew in Briefing Room:

- MARKED UP copy of SO23-5-1.3.1, Plant Startup from Hot Standby to Minimum Load INITIALED as appropriate through Step 6.7.1.

- MARKED UP copy of SO23-5-1.7, Power Operations, Attachment 9, Power Maintenance and Change Calculation.

- MARKED UP copy of SO23-2-4, Auxiliary Feedwater System Operation, Section 6.3, Stopping Auxiliary Feedwater Pumps, with Steps 6.3.1, 6.3.3.2, and 6.3.4 N/A.

- MARKED UP copy of SO23-3-2.18, Steam Bypass Control System Operation, Section 6.9, Transfer SBCS to Local Auto Setpoint Operation with SBCS Operating.

- LAMINATED COPY of SO23-5-1.7, Power Operations, Attachment 8, Power Maneuvering Guidelines.

ENSURE MOC copy of OPS Physics Summary Book on SRO Desk.

VERIFY CEA positions (Group 6 @103 and PLCEAs @115).

Significant Control Room Annunciators in Alarm:

50A02 – COLSS ALARM
50A07 – SBCS DEMAND PRESENT
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
Numerous low power condition alarms

Operating Test :	NRC	Scenario #	6	Event #	1	Page	5	of	33
Event Description:	Place Auxiliary Feedwater System in Standby								

Time	Position	Applicant's Actions or Behavior
Machine Operator: If necessary, REPORT as SM to secure AFW System prior to raising power.		
	SRO	DIRECT performance of SO23-2-4, Auxiliary Feedwater System Operation, Section 6.3, Stopping Auxiliary Feedwater Pumps.
Examiner Note: The following steps are from SO23-2-4, Auxiliary Feedwater System Operation, Section 6.3, Stopping Auxiliary Feedwater Pumps.		
	BOP	PLACE the AFW System in STANDBY per SO23-2-4, Section 6.3, Stopping AFW Pumps. [Step 6.3 - YES]
		• SECURE P-140, Turbine Driven AFW Pump. [Step 6.3.1 – N/A]
		• ENSURE the following valves are CLOSED: [Step 6.3.2 - YES]
		• DETERMINE HV-4713, P-141 to E-089 DISCH Valve CLOSED.
		• DETERMINE HV-4706, P-140 to E-089 DISCH Valve CLOSED.
		• DETERMINE HV-4712, P-504 to E-088 DISCH Valve CLOSED.
		• DETERMINE HV-4705, P-140 to E-088 DISCH Valve CLOSED.
		• DETERMINE HV-4762, P-504 to E-088 DISCH Bypass Valve CLOSED.
		• DETERMINE HV-4763, P-141 to E-089 DISCH Bypass Valve CLOSED.
		• DEPRESS HV-4731, AFW to E-089 Isolation Valve CLOSE pushbutton.
		• DETERMINE HV-4715, AFW to E-089 Isolation Valve CLOSED.
		• DEPRESS HV-4714, AFW to E-088 Isolation Valve CLOSE pushbutton.
		• DETERMINE HV-4730, AFW to E-088 Isolation Valve CLOSED.
		• STOP all Auxiliary Feedwater Pumps. [Step 6.3.3 - YES]
		• DEPRESS HS-4733-2, P-504 AFW Pump STOP pushbutton. [Step 6.3.3.1 - YES]
		• DEPRESS HS-4707-1, P-141 AFW Pump STOP pushbutton. [Step 6.3.3.1 - YES]

Operating Test : NRC	Scenario # 6	Event # 1	Page 6 of 33
Event Description: Place Auxiliary Feedwater System in Standby			

Time	Position	Applicant's Actions or Behavior
		• If required, DEPRESS HV-4716, P-140 TDAFW Pump CLOSE pushbutton. [Step 6.3.3.2 – N/A]
+10 min	BOP	• ISOLATE Nitrogen and SECURE Auto Makeup Level Control. [Step 6.3.4 – N/A]
When Auxiliary Feedwater is secured, or at Lead Evaluator's discretion, PROCEED to Event 2.		

Operating Test :	NRC	Scenario #	6	Event #	2	Page	7	of	33
Event Description:	Power Ascension to 18%								

Time	Position	Applicant's Actions or Behavior
Examiner Note: The following steps are from SO23-5-1.3.1, Plant Startup from Hot Standup to Minimum Load, Section 6.7, Entry into MODE 1.		
+1 min	SRO	VERIFY Requisite Steps 6.2, 6.3, 6.5, and 6.6 in SO23-5-1.3.1 completed. [Step 6.7.1 - YES]
	SRO/RO	CONTINUE power increase and LOG entry into MODE 1. [Step 6.7.1 - YES]
		• LOG entry into MODE 1. [Step 6.7.1.1 - YES]
	SRO/RO	ENSURE the guidelines of Attachment 5 are being followed. [Step 6.7.3 - YES]
	SRO/RO	COMMENCE targeting CPC Pseudo Hot Pin per Shift Turnover. [Step 6.7.4 - YES]
Examiner Note: The following steps are from SO23-3-2.19, CEDMCS Operation, Section 6.12, Repetitive or Emergent Manual CEA Positioning.		
GUIDELINE This section may be used for the second and additional CEA movements after previous performance of Section 6.1, 6.2, 6.3, or when directed by SO23-3-3.5 or SO23-3-2.19.2. For repetitive manual CEA positioning, these sections and procedures ensure that a Reactivity Brief was evaluated per OSM-14.		
	RO	• POSITION Group Select Switch to Group 6. [Step 6.12.1 - YES]
	RO	• If moving a single CEA, POSITION Individual CEA Selection Switch to CEA to be moved. [Step 6.12.2 – N/A]
	RO	• POSITION Mode Select Switch to MANUAL Group. [Step 6.12.3 - YES]
		• VERIFY Group 6 indicator lamps are ILLUMINATED. [Step 6.12.3.1 - YES]
	RO	• POSITION CEAs as directed by SRO. [Step 6.12.4 - YES]
	RO	• When CEA positioning completed, Mode Select Switch to OFF. [Step 6.12.5 - YES]

Operating Test :	NRC	Scenario #	6	Event #	2	Page	8	of	33
Event Description:	Power Ascension to 18%								

Time	Position	Applicant's Actions or Behavior
Examiner Note:		**The following steps are from SO23-5-1.3.1, Plant Startup from Hot Standup to Minimum Load, Section 6.8, MODE 1 Entry to 20% RX Power.**
	SRO	VERIFY Step 6.7 completed. [Step 6.8.1 - YES]
	RO/BOP	INCREASE power by Boron Dilution per SO23-3-2.2 and / or CEA withdrawal per SO23-3-2.19 as directed by the SRO. [Step 6.8.2 - YES]
Examiner Note:		**The following steps are from SO23-3-2.2, Makeup Operations, Section 6.5, Dilution Makeup Mode.**
		GUIDELINE This method should normally be used for the following purposes: • When adjusting Boron concentration prior to or during plant startup • When diluting to raise power from one plateau to another
	RO	Dilution Makeup Mode: [Section 6.5 - YES]
		• If required, PERFORM a Reactivity Brief. [Step 6.5.1 - YES]
		• DETERMINE Shutdown Bank A is withdrawn. [Step 6.5.2 - YES]
		• DETERMINE Boration Saturation of Ion Exchanger NOT in progress. [Step 6.5.3 - YES]
		• DETERMINE all Reactor Coolant Pumps OPERATING. [Step 6.5.4 - YES]
		• ADJUST Boronometer setpoints as required. [Step 6.5.5 - NO]
		• ENSURE 66.5 GPM on FIC-0210X, Dilution Flow Controller. [Step 6.5.6 - YES]
		• SELECT SET and VERIFY 66.5 GPM. [Step 6.5.6.1 - YES]
		• ENSURE FIC-0210X in AUTO. [Step 6.5.6.2 - YES]
		• SET FQIS-0210X, Dilution Counter, to 80 GPM. [Step 6.5.7 - YES]
		• SELECT MODIFY. [Step 6.5.7.1 - YES]
		• ENTER 80 gallons in PRESET. [Step 6.5.7.2 - YES]
		• SELECT SET PRESET. [Step 6.5.7.3 - YES]

Operating Test :	NRC	Scenario #	6	Event #	2	Page	9	of	33
Event Description:	Power Ascension to 18%								

Time	Position	Applicant's Actions or Behavior
		• SELECT EXIT. [Step 6.5.7.4 - YES]
		• ENSURE FV-9253, Blended Makeup to VCT Isolation in AUTO. [Step 6.5.8 - YES]
		• VERIFY PW Pump P-200 or P-201 in AUTO. [Step 6.5.9 - YES]
		• COMMENCE monitoring plant parameters. [Step 6.5.10 - YES]
		• If required to lower VCT level, DIVERT to Radwaste. [Step 6.5.11 - AS REQ'D]
		• If required to lower VCT pressure, CYCLE HV-9209, VCT Vent Valve. [Step 6.5.12 - AS REQ'D]
		• SELECT HS-0210, Makeup Mode Selector, to DILUTE: [Step 6.5.13 - YES]
		• SELECT MODIFY. [Step 6.5.13.1 - YES]
		• SELECT DILUTE. [Step 6.5.13.2 - YES]
		• SELECT GO. [Step 6.5.13.3 - YES]
		• CONFIRM Dilution stops when desired volume added: [Step 6.5.14 - YES]
		• CONFIRM Dilution stops automatically. [Step 6.5.14.1 - YES]
		• SELECT CANCEL. [Step 6.5.14.2 - YES]
		• SELECT AUTO. [Step 6.5.14.3 - YES]
		• SELECT EXIT. [Step 6.5.14.4 - YES]
+20 min		• PERFORM the following when Dilution completed: [Step 6.5.15 - YES]
		• ENSURE FV-9253, Blended Makeup to VCT Isolation in AUTO. [Step 6.5.15.1 - YES]
		• ENSURE LV-0227A, VCT Inlet Valve, selected to VCT. [Step 6.5.15.2 - YES]
		• ENSURE HV-9209, VCT Vent Valve CLOSED. [Step 6.5.15.3 - YES]
		• DETERMINE Blend Setpoint NOT changed. [Step 6.5.16 - YES]
When power is raised 3% to 5%, or at Lead Evaluator's discretion, PROCEED to Event 3.		

Operating Test :	NRC	Scenario #	6	Event #	3	Page	10	of	33
Event Description:	Reactor Coolant System Loop 1 T_{HOT} Failure								

Time	Position	Applicant's Actions or Behavior
Machine Operator:		**When directed, EXECUTE Event 3: - RC11A, Loop 1 narrow range T_{HOT} TT-0111X1 fails to 625°F.**
Indications Available:		**50A02 – COLSS ALARM 50A05 – TAVG HI 50A15 – HOT LEG LOOP 1 TEMP HI Letdown lowers to minimum RCS Loop 1 narrow range T_{HOT} TI-0111AX indication pegged high**
Examiner Note:		**If Pressurizer Heaters are left energized for an extended length of time, Annunciator 50A02 – COLSS ALARM will continue to alarm and require additional actions listed at the end of this event. Specifically, Turbine load must be reduced by 5 MWe to clear the alarm.**
+30 sec	RO	REFER to Annunciator Response Procedures (ARPs).
	RO	OBSERVE maximum Charging flow and minimum Letdown flow.
	RO	RECOGNIZE T_{HOT} failure and INFORM the SRO AOI SO23-13-27 entry required.
Examiner Note:		**RO may use "prompt and prudent" action to place Channel Y in MANUAL and secure two (2) Charging Pumps. The following steps are from Annunciator 50A15 - HOT LEG LOOP 1 TEMP HI.**
	RO	DETERMINE Charging and Letdown Systems NOT responding as desired. [Step 1.1 - YES]
	RO	DEPRESS A / M pushbutton on LIC-0110, PZR Level Controller, to PLACE PZR Level Control in MANUAL. [Step 1.1.1 - YES]
	RO	INITIATE SO23-13-27, Pressurizer Pressure and Level Malfunction. [Steps 1.1.2 - YES]
Examiner Note:		**The following steps are from SO23-13-27, Pressurizer Pressure and Level Malfunction.**

Operating Test :	NRC	Scenario #	6	Event #	3	Page	11	of	33
Event Description:	Reactor Coolant System Loop 1 T_{HOT} Failure								

Time	Position	Applicant's Actions or Behavior
	SRO	ENTER SO23-13-27, Pressurizer Pressure and Level Malfunction.
		• IDENTIFY uncontrolled level change and GO to Step 2. [Step 1 - YES]
		GUIDELINES 1) See Attachment 2 for the Pressurizer Level Control Block Diagram. 2) See Attachment 4 for the Pressurizer Level Control Setpoint Diagram. 3) To diagnose controller alarms, refer to SO23-3-1.10, Attachment for Foxboro Alarm Response and Foxboro Controller Page Data. 4) Reactivity will be impacted by changes in Pressurizer level control, Pressurizer Heater configuration, and Charging Pump configuration.
	RO	DETERMINE Letdown and Charging are NOT responding as desired and PERFORM the following (as applicable): [Step 2 - YES]
		• DEPRESS the A / M button on LIC-0110, PZR Level Controller, and PLACE PZR Level Control in MANUAL. [Step 2.a - YES]
	RO	• STOP Charging Pumps to MATCH Letdown flow as closely as possible. [Step 2.b - YES]
		• ADJUST LIC-0110, PZR Level Controller, to MATCH Letdown and Charging flows. [Step 2.b.1) - YES]
	RO	• SECURE PZR heaters as necessary to control Pressurizer pressure. [Step 2.c - YES]
	RO	• VERIFY normal Charging and Letdown in service. [Step 2.d - YES]
	RO	• DETERMINE Level Channel indications LI-0110A1, LI-0110A2, and LI-103 reading the same. [Step 2.e - YES]
	SRO/RO	• VERIFY Pressurizer level is NOT lowering due to a valid RCS leak. [Step 2.f - YES]

Operating Test : NRC	Scenario # 6	Event # 3	Page 12 of 33
Event Description: Reactor Coolant System Loop 1 T_{HOT} Failure			

Time	Position	Applicant's Actions or Behavior
	SRO	• GO to Step 2.j. [Step 2.g - YES]
	SRO	• DIRECT transfer of Pressurizer Level Remote Setpoint. [Step 2.j - YES]
	RO	• ENSURE Controller alarms ACKNOWLEDGED. [Step 2.j.1) - YES]
	RO	• SELECT (TAG) to Page 2 on LIC-0110 controller and OBSERVE "IN1" displayed. [Step 2.j.2) - YES]
		• NOTE displayed PZR level. [Step 2.j.2).a - YES]
	RO	• DEPRESS SEL pushbutton to display "IN2." [Step 2.j.3) - YES]
		• NOTE displayed PZR level. [Step 2.j.3).a - YES]
	RO	• DETERMINE IN2 will be selected to control PZR level. [Step 2.j.4) - YES]
	RO	• DISPLAY PZR level Remote Setpoint currently selected and DEPRESS SEL until Selected Indicating Light is extinguished. [Step 2.j.5) - YES]
	RO	• SELECT new Remote Setpoint. [Step 2.j.6) - YES]
		• To select IN1, DEPRESS the LOWER (▼) pushbutton once. [Step 2.j.6).a - NO]
		• To select IN2, DEPRESS the RAISE (▲) pushbutton once. [Step 2.j.6).b - YES]
	RO	• SELECT (TAG) to Page 1 on controller. [Step 2.j.7) - YES]
	RO	• Manually ADJUST output (right column) until actual level (middle column) is matched with generated setpoint (left column). [Step 2.j.8) - YES]
	RO	• When within 2%, DEPRESS A / M pushbutton to transfer LIC-0110 to AUTO. [Step 2.j.9) - YES]

Operating Test : NRC	Scenario # 6	Event # 3	Page 13 of 33
Event Description: Reactor Coolant System Loop 1 T_{HOT} Failure			

Time	Position	Applicant's Actions or Behavior
	RO	• OBSERVE Letdown flow and pressure to ensure no unusual oscillations. [Step 2.j.10) - YES]
	RO	• RESTORE PZR Heaters as required to control RCS pressure. [Step 2.j.11) - YES]
	RO	• OPERATE Charging Pumps as directed by SRO. [Step 2.j.12) - YES]
	RO	• TRANSFER HS-8430, SBCS Quick Open Block Tavg Selector Switch to the non-affected loop. [Step 2.j.13) – N/A]
	RO	• ENSURE LIC-0110, Pressurizer Level Controller in AUTO. [Step 2.j.13) – N/A]
+10 min	SRO	• NOTIFY Shift Manager of event. [Step 2.j.14) – N/A]
When PZR level control is normal, or at Lead Examiner discretion, PROCEED to Event 4.		

Operating Test :	NRC	Scenario #	6	Event #	4	Page	14	of	33
Event Description:	Turbine Plant Cooling Water Pump Overcurrent Trip and Auto Start Failure								

Time	Position	Applicant's Actions or Behavior
Machine Operator:		**When directed, EXECUTE Event 4.** **- TP02B, TPCW Pump P-120 overcurrent trip.** **- TP08A, TPCW Pump P-119 auto start failure.**
Indications Available:		**99A31 – TPCW PUMP OC** **99A41 – ISO PHASE BUS HX FLOW LO** **99A51 – TPCW PUMP OOS / NOT IN AUTO** **99A12 – TPCW PRESS LO-LO** **99A17 – TPCW SURGE TANK OUTLET VALVE CLOSED** **TPCW P120 will trip and P119 remains in standby**
+10 sec	BOP	REFER to Annunciator Response Procedures (ARPs).
	BOP	REPORT P-120, TPCW Pump has tripped and DETERMINES P-119, TPCW Pump has NOT AUTO started.
Examiner Note:		**The following steps are from Annunciator 99A31 – TPCW PUMP OC.**
	BOP	ENSURE Standby TPCW Pump has AUTO started. [Step 1.1 - YES]
		• DEPRESS HS-6940, P-119 TPCW Pump START pushbutton.
	SRO	CONTACT Maintenance to determine cause of failure.
+5 min	SRO	DISPATCH PEO to check TPCW Pump and Breaker.
M.O. Cue:		**If sent to check TPCW Pump P-120 and breaker, REPORT that there is an overcurrent flag at the breaker, and the pump appears normal. If sent to check P-119, REPORT that there is no apparent problem at the pump or breaker.**
When TPCW is restored, or at Lead Examiner discretion, PROCEED to Event 5.		

Operating Test :	NRC	Scenario #	6	Event #	5	Page	15	of	33
Event Description:	Refueling Water Storage Tank Level Transmitter Failure								

Time	Position	Applicant's Actions or Behavior
Machine Operator: When directed, EXECUTE Event 5. - CS05A, RWST Level Indication LT-0305-1 fails low.		
Indications Available: **56A27 - RWST LEVEL LO ESFAS CHANNEL TRIP** **56A37 - RWST LEVEL LO PRETRIP** **56B06 - PPS CHANNEL 1 TROUBLE** **2LI-0305-1, RWT 2T006 LEVEL indication failed low**		
+1 min	RO	REFER to Annunciator Response Procedures (ARPs).
	RO	RECOGNIZE Refueling Water Storage Tank Level Channel failure and INFORM the SRO SO23-13-18 entry required.
Examiner Note: The following steps are from SO23-13-18, Reactor Protection System Failure.		
	SRO	ENTER SO23-13-18, Reactor Protection System Failure.
	RO	OBSERVE instrumentation for the affected channel and alternate redundant indications monitoring the same parameter to DETERMINE failure. [Step 1.a - YES]
NOTE For failures affecting RPS/ESFAS Matrix Logic, RPS/ESFAS Initiation Logic, RTCBs, RPS/ESFAS Manual Trip or ESFAS Actuation Logic, refer to Tech. Spec. LCO 3.3.4 and LCO 3.3.6.		
	RO	IDENTIFY RWST Level Channel indication LI-0305-1 failure. [Step 1.a - YES]
NOTE Failure of a measured variable channel may affect more than one Functional Unit (e.g., PZR Pressure Hi affects DNBR and LPD).		

Operating Test :	NRC	Scenario #	6	Event #	5	Page	16	of	33
Event Description:	Refueling Water Storage Tank Level Transmitter Failure								

Time	Position	Applicant's Actions or Behavior
	SRO	REFER to Attachment 10 and DETERMINE Functional Unit affected is RWST Level Transmitter LT-0305-1. [Step 3.a - YES]
	SRO	DIRECT placing the Functional Unit in BYPASS per SO23-3-2.12, Reactor Protection System Operation. [Step 3.b - YES]
	RO	PLACE Functional Unit in BYPASS per SO23-3-2.12, RPS Operation, Section 6.3, Bypass Operation of Trip Channels. [Step 3.b - YES]
Examiner Note: If desired, the Steam Generator Tube Leak (Event 6) can be started at this time.		
Examiner Note: The following steps are from SO23-3-2.12, Reactor Protection System Operation, Section 6.3, Bypass Operation of Trip Channels.		
NOTE The PPS CHANNEL 1 (2,3,4) TRIP BYPASSED alarm does not have reflash capability. It will annunciate once when the first functional unit is placed in bypass. Additional functional units placed in bypass on the same PPS channel will not annunciate. When functional units are being removed from bypass, then the alarm will not reset until the last functional unit on that PPS channel is removed from bypass.		
CAUTION Prior to testing the Reactor Protective System (RPS) portion of a PPS Bay, the RPS trips shall be bypassed.		
	RO	VERIFY that the same bistable is not in BYPASS on any other Channel. [Step 6.3.1 - YES]
	ARO	UNLOCK and OPEN the Bistable Control Panel. [Step 6.3.2 - YES]
Examiner Note: Trip BYPASS is performed by the Machine Operator and verified by the RO.		

Operating Test :	NRC	Scenario #	6	Event #	5	Page	17	of	33
Event Description:	Refueling Water Storage Tank Level Transmitter Failure								

Time	Position	Applicant's Actions or Behavior
M.O. Cue:		**When directed, EXECUTE the following remote functions:** **RP51 = OPEN (PPS Door Open Annunciator 56B46)** **RP52T = BYPASS (Low RWST Level Channel A)** **DELETE RP51 (PPS Door Open Annunciator 56B46)**
	RO	OBSERVE Annunciator 56A29 - PPS CHANNEL 1 TRIP BYPASSED in alarm **and** amber BYPASS light on Channel A PPS Operator Module. [Step 6.3.2.4 - YES]
	RO	LOG the Bypass and Reason in Control Operator Log. [Step 6.3.2.5 - YES]
	SRO	INITIATE a LCOAR or follow guidelines of SO123-0-A5. [Step 6.3.2.6 - NO]
Examiner Note:		**The following steps are from SO23-13-18, Reactor Protection System Failure.**
	SRO	CONFIRM failure does NOT affect RPS/ESFAS Matrix Logic, RPS/ESFAS Initiation Logic, RTCBs, RPS/ESFAS Manual Trip, or ESFAS Actuation Logic. [Step 3.c - YES]
	SRO	CONFIRM failure does NOT affect Feedwater Digital Control System. [Step 3.d - YES]
	SRO	EVALUATE Technical Specifications. [Step 3.e - YES]
		• LCO 3.3.5.B, Engineered Safety Features Actuation System Instrumentation.
		• CONDITION B - One automatic trip channel inoperable for RWST Level-Low for the RAS function. • ACTION B.1 - Place Functional Unit in Bypass within 1 hour.
	SRO	CONFIRM failure did NOT involve a failed PPS Power Supply. [Step 3.f - YES]

Operating Test :	NRC	Scenario #	6	Event #	5	Page	18	of	33
Event Description:	Refueling Water Storage Tank Level Transmitter Failure								

Time	Position	Applicant's Actions or Behavior
+10 min	SRO	NOTIFY Shift Manager to PERFORM Administrative Actions. [Step 3.g - YES]
When Technical Specifications have been evaluated, or at Lead Evaluator's discretion, PROCEED to Event 6.		

Operating Test :	NRC	Scenario #	6	Event #	6	Page	19	of	33
Event Description:	Steam Generator E-089 Tube Leak								

Time	Position	Applicant's Actions or Behavior
Machine Operator: When directed, EXECUTE Event 6. - SG06B @ 0.05%, SG E-089 Tube Leak at ~10 GPM.		
Indications Available: **60A46 – SECONDARY RADIATION HI**		
+2 to 3 min	RO/BOP	REFER to Annunciator Response Procedures (ARPs).
	BOP	RECOGNIZE increasing Secondary Radiation levels and INFORM the SRO SO23-13-14 entry required.
	SRO	ENTER SO23-13-14, Reactor Coolant System Leak, Step 4, Primary to Secondary leakage.
Examiner Note: The following steps are from SO23-13-14, Reactor Coolant System Leak.		
	SRO/RO	EVALUATE plant conditions against the following to Identify leak location and Procedural Steps to perform: [Step 1 - YES]
		• DETERMINE Annunciator 60A46 - SECONDARY RADIATION HI in alarm and GO to Step 4. [Step 1 - YES]
	RO	DETERMINE PZR level slowly lowering. [Step 4.a - YES]
		• [RNO] ENSURE all available Charging Pumps in AUTO.
	RO	DETERMINE PZR level NOT lowering with all available Charging Pumps OPERATING. [Step 4.b - YES]
	RO	DETERMINE PZR level STABLE. [Step 4.c - YES]
	RO	DETERMINE VCT level is maintained within program band. [Step 4.d - YES]
M.O. Cue: If directed to sample SGs, WAIT 3 minutes and then REPORT that SG sample lines were frisked and E-089 has elevated radiation levels with E-088 at background.		

Operating Test :	NRC	Scenario #	6	Event #	6	Page	20	of	33
Event Description:	Steam Generator E-089 Tube Leak								

Time	Position	Applicant's Actions or Behavior
		GUIDELINE The rate of change limit is provided to identify the potential need for a rapid power reduction to 50% power, and applies to progressively increasing leak rates and ***not*** to leak rate spikes followed by leak rate reductions. It is based on Radiation Monitor readings. (LS-1.7)
	SRO/RO	DETERMINE Steam Generator tube leak is greater than 150 GPD and increasing at greater than 30 GPD/hr. [Step 4.e - YES]
Examiner Note:		**As the SRO follows the guidance of SO23-13-14 for a Steam Generator Tube Leak, they never reach the point where a Technical Specification call is made. LCO 3.4.13.B is listed here for reference following scenario completion.**
	SRO	EVALUATE Technical Specifications.
		• LCO 3.4.13.B, RCS Operational LEAKAGE.
		• CONDITION B - Primary to secondary LEAKAGE not within limit. • ACTION B.1 - Be in MODE 3 within six (6) hours, AND • ACTION B.2 - Be in MODE 5 within 36 hours.
	SRO	PERFORM the following: [Step 4.f - YES]
		• DETERMINE Reactor power less than 35%. [Step 4.f.1 - YES]
		• DIRECT a Reactor Trip and ENTRY into SO23-12-1, Standard Post Trip Actions. [Step 4.f.1.a - YES]
+5 min	RO/BOP	Manually TRIP Reactor using **either** set of REACTOR TRIP pushbuttons.
		• DEPRESS HS-9132-2 **and** HS-9132-3 REACTOR TRIP pushbuttons on CR-56.
		• DEPRESS HS-9132-1 **and** HS-9132-4 REACTOR TRIP pushbuttons on CR-52.
When the Reactor is tripped, or at Lead Examiner discretion, PROCEED to Events 7, 8, and 9.		

Operating Test :	NRC	Scenario #	6	Event #	7, 8, & 9	Page	21	of	33
Event Description:	Steam Generator E-089 Tube Rupture / Loss of 480 V Bus / Safety Injection And Containment Cooling Actuation Signals Failure								

Time	Position	Applicant's Actions or Behavior
		Machine Operator: When directed, EXECUTE Events 7, 8, and 9. **- SG06B, Steam Generator Tube Rupture (E-089) at 300 GPM.** **- ED06R, 480 Volt Buses 2B06 & 2B26 feeder breaker ground overcurrent.** **- SIAS / CCAS LP, SIAS and CCAS Actuation Signals fail to auto actuate.**
		Indications Available: **Numerous Reactor Trip related alarms**
	SRO	DIRECT performance of SO23-12-1, Standard Post Trip Actions.
	RO	VERIFY Reactor Trip: [Step 1 - YES]
		• VERIFY Reactor Trip Circuit Breakers OPEN. [Step 1.a - YES]
		• VERIFY Reactor Power lowering and Startup Rate NEGATIVE. [Step 1.b - YES]
		• VERIFY maximum of one (1) Full Length CEAs NOT fully inserted. [Step 1.c - YES]
	SRO/RO	VERIFY Reactivity Control criteria satisfied. [Step 1 - YES]
	BOP	VERIFY Turbine Trip: [Step 2 - YES]
		• VERIFY HP & LP Stop and Governor Valves CLOSED. [Step 2.a - YES]
		• VERIFY <u>both</u> Unit Output Breakers OPEN. [Step 2.b - YES]
	SRO	INITIATE Administrative Actions: [Step 3 - YES]
		• INITIATE Attachment 4, Worksheet. [Step 3.a - YES]
		CAUTION DO NOT OPERATE TRIP pushbuttons for tripped breakers. Operation of TRIP pushbuttons will reset overcurrent protection allowing Diesel Generator output breaker to close to a fault.
	BOP	VERIFY Vital Auxiliaries criteria satisfied: [Step 4 - YES]
		• VERIFY both 1E 4 kV Buses 2A04 and 2A06 ENERGIZED. [Step 4.a - YES]

Operating Test : NRC	Scenario # 6	Event # 7, 8, & 9	Page 22 of 33
Event Description: Steam Generator E-089 Tube Rupture / Loss of 480 V Bus / Safety Injection And Containment Cooling Actuation Signals Failure			

Time	Position	Applicant's Actions or Behavior
		• VERIFY 1E 480 V Buses 2B04 & 2B24 ENERGIZED. [Step 4.b - YES]
		• DETERMINE 1E 480 V Buses 2B06, & 2B26 DEENERGIZED. [Step 4.b - YES]
		• [RNO] If Train B Bus B26 DEENERGIZED, PLACE Train B EDG in Maintenance Lockout.
		• INSERT key and TURN HS-1770-2 to MAINT position.
		• INITIATE Attachment 2, Diesel Generator Follow-Up Actions.
		• VERIFY all 1E DC Buses ENERGIZED. [Step 4.c - YES]
		• VERIFY all Non-1E 4 kV Buses 2A03, 2A07, 2A08, & 2A09 ENERGIZED. [Step 4.d - YES]
		• VERIFY CCW Train A OPERATING and ALIGNED to Non-Critical Loop and Letdown Heat Exchanger. [Step 4.e - YES]
	RO	DETERMINE RCS Inventory Control criteria NOT satisfied: [Step 5 - YES]
		• DETERMINE PZR level between 10% and 70% and NOT TRENDING to between 30% and 60%. [Step 5.a - YES]
		• [RNO] ENSURE Pressurizer Level Control System operating in AUTO to restore Pressurizer level.
		• VERIFY Core Exit Saturation Margin ≥ 20ºF: [Step 5.b - YES]
		• OBSERVE QSPDS page 611 **or** CFMS page 311.
	RO	DETERMINE RCS Pressure Control criteria NOT satisfied: [Step 6 - YES]
		• DETERMINE PZR pressure between 1740 PSIA and 2380 PSIA, NOT controlled and NOT TRENDING to between 2025 PSIA and 2275 PSIA. [Step 6.a - YES]
		• [RNO] DETERMINE PZR Pressure Control System is NOT restoring PZR pressure.
		• [RNO] ENSURE Normal and Aux Spray Valves CLOSED.
		• [RNO] If Pressurizer pressure < 1740 PSIA, ENSURE SIAS / CCAS / CRIS actuated.
	RO	VERIFY Core Heat Removal criteria satisfied: [Step 7 - YES]
		• VERIFY at least one (1) RCP OPERATING. [Step 7.a - YES]

Operating Test : NRC	Scenario # 6	Event # 7, 8, & 9	Page 23 of 33
Event Description: Steam Generator E-089 Tube Rupture / Loss of 480 V Bus / Safety Injection And Containment Cooling Actuation Signals Failure			

Time	Position	Applicant's Actions or Behavior
		• VERIFY Core Loop ΔT (T_{HOT} - T_{COLD}) < 10ºF. [Step 7.b - YES]
		• VERIFY Core Exit Saturation Margin ≥ 20ºF. [Step 7.c - YES]
		• OBSERVE QSPDS page 611 **or** CFMS page 311.
	BOP	VERIFY RCS Heat Removal criteria satisfied: [Step 8 - YES]
		• VERIFY both SG narrow range levels > 21%. [Step 8.a - YES]
		• VERIFY both SG narrow range levels < 80%. [Step 8.a - YES]
		• VERIFY Main or Auxiliary Feedwater AVAILABLE. [Step 8.a - YES]
		• VERIFY T_{COLD} between 540ºF and 550ºF. [Step 8.b - YES]
		• VERIFY SG pressures between 960 and 1050 PSIA. [Step 8.c - YES]
	RO	DETERMINE Containment Isolation criteria NOT satisfied: [Step 9 - YES]
		• DETERMINE Containment pressure < 1.5 PSIG. [Step 9.a - YES]
		• DETERMINE Containment Area Radiation Monitors NOT alarming or trending to alarm. [Step 9.b - YES]
		• DETERMINE Secondary Plant Radiation Monitors alarming or trending to alarm. [Step 9.c - YES]
	RO	VERIFY Containment Temperature and Pressure criteria satisfied: [Step 10 - YES]
		• VERIFY Containment average temperature < 120ºF. [Step 10.a - YES]
		• VERIFY Containment pressure < 1.5 PSIG. [Step 10.b - YES]
	SRO	DIAGNOSE event in progress: [Step 10 - YES]
		• DETERMINE some Safety Function criteria are NOT met per Attachment 4, Worksheet. [Step 10.a - YES]
		• [RNO] COMPLETE Attachment 1, Recovery Diagnostics.
		• DETERMINE that Reactor Trip Recovery is NOT diagnosed. [Step 10.b - YES]
	RO	• [RNO] ENSURE at least one (1) RCP in each loop STOPPED.
	BOP	• INITIATE steps 12 through 16. [Step 10.c - YES]
		• IMPLEMENT EOI SO23-12-4, Steam Generator Tube Rupture. [Step 10.d - YES]

Operating Test :	NRC	Scenario #	6	Event #	7, 8, & 9	Page	24	of	33
Event Description:	Steam Generator E-089 Tube Rupture / Loss of 480 V Bus / Safety Injection And Containment Cooling Actuation Signals Failure								

Time	Position	Applicant's Actions or Behavior
Examiner Note:		**SO23-12-1, Standard Post Trip Actions, Steps 12 to 16, performed by the BOP are located at the end of the scenario. The following steps are from SO23-12-4, Steam Generator Tube Rupture.**
	SRO	ENTER SO23-12-4, Steam Generator Tube Rupture.
	SRO	RECORD time of EOI entry _____. [Step 1.a - YES]
	SRO	VERIFY SGTR Diagnosis: [Step 2 - YES]
		• INITIATE SO23-12-10, Safety Function Status Checks. [Step 2.a - YES]
		• INITIATE Foldout Page. [Step 2.b - YES]
		• DIRECT performance of FS-7, Verify SI Throttle/Stop Criteria.
		• DIRECT performance of SO23-12-11, Attachment 22, Non-Qualified Load Restoration.
		• DIRECT performance of FS-3, Monitor Natural Circulation Established.
		• VERIFY SGTR diagnosis using Figure 1, Break Identification Chart. [Step 2.c - YES]
		• INITIATE sampling of both Steam Generators for radioactivity and boron. [Step 2.d - YES]
M.O. Cue:		**If directed to sample SGs, WAIT 3 minutes and then REPORT that E-089 has elevated radiation levels based on frisk of sample lines.**
	SRO	INITIATE Administrative Actions. [Step 3 - YES]
		• NOTIFY Shift Manager/Operations Leader of SO23-12-4, Steam Generator Tube Rupture initiation. [Step 3.a - YES]
		• ENSURE Emergency Plan is initiated. [Step 3.b - YES]
		• IMPLEMENT Placekeeper. [Step 3.c - YES]
		• IMPLEMENT Time Dependent Steps. [Step 3.d - YES]
CRITICAL TASK STATEMENT		**Reduce Reactor Coolant System T_{HOT} to less than 530ºF Prior to Exiting SO23-12-4, Steam Generator Tube Rupture.**

Operating Test :	NRC	Scenario #	6	Event #	7, 8, & 9	Page	25	of	33
Event Description:	Steam Generator E-089 Tube Rupture / Loss of 480 V Bus / Safety Injection And Containment Cooling Actuation Signals Failure								

Time	Position	Applicant's Actions or Behavior
CRITICAL TASK	SRO	DIRECT lowering RCS T_{HOT} to less than 530ºF: [Step 4 - YES]
		NOTE Lowering RCS T_{HOT} below 530ºF using BOTH S/Gs is preferred to minimize the possibility of lifting Steam Generator safeties after isolating a Steam Generator.
	BOP/RO	• ENSURE one RCP in each loop – STOPPED. [Step 4.a - YES]
		• INITIATE lowering T_{HOT} to less than 530ºF using SBCS. [Step 4.b - YES]
		• DEPRESS HV-8423 Permissive MANUAL pushbutton.
		• PLACE HV-8423 Controller in LOCAL and OPEN valve 35%.
		• DEPRESS HV-8425 Permissive MANUAL pushbutton.
		• PLACE HV-8425 Controller in LOCAL and OPEN valve 35%.
		CAUTION Failure to reset S/G Low Pressure setpoints during a controlled cooldown will result in MSIS actuation.
	RO	• As required, RESET SG Low Pressure setpoints during cooldown. [Step 4.c - YES]
		• DEPRESS SG Low Pressure Setpoint RESET pushbutton on Reactor Protection System ROMs for Channels A, B, C, and D.
Examiner Note: **During validation, the following was observed:** • **SIAS did not occur until the cooldown was in progress.** • **Loss of NPSH to the running RCPs will occur and they must be stopped.**		
Examiner Note: **When SIAS has actuated, the following steps are performed.**		

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Time	Position	Applicant's Actions or Behavior
	RO	VERIFY ESF actuation. [Step 5 - YES]
		• VERIFY SIAS actuation required. [Step 5.a - YES]
		• DETERMINE PZR pressure less than SIAS setpoint. [Step 5.a.1) - YES]
		• ENSURE the following actuated: [Step 5.b - YES]
CRITICAL TASK STATEMENT		**Manually Actuate Safety Injection and Containment Isolation Actuation Signals Prior to Exiting SO23-12-4, Steam Generator Tube Rupture.**
CRITICAL TASK	BOP	• DETERMINE SIAS and CCAS NOT actuated.
		• DEPRESS HS-9135-3 **and** HS-9135-4 SIAS MANUAL INITIATION pushbuttons on CR-53, **or**
		• DEPRESS HS-9135-1 **and** HS-9135-2 SIAS MANUAL INITIATION pushbuttons on CR-56.
		• DEPRESS HS-9138-3 **and** HS-9138-4 CCAS MANUAL INITIATION pushbuttons on CR-53, **or**
		• DEPRESS HS-9138-1 **and** HS-9138-2 CCAS MANUAL INITIATION pushbuttons on CR-56.
		• RECORD time of SIAS: _____ [Step 5.c - YES]
	BOP	• STOP unloaded Diesel Generators. [Step 5.d - YES]
		• DEPRESS HS-1670-1, Train A EDG SIAS OVERRIDE STOP pushbutton.
		• DETERMINE Train B EDG in MAINT LOCKOUT.
	BOP	• INITIATE SO23-12-11, Attachment 22, Non-Qualified Load Restoration. [Step 5.e - YES]
M.O. Cue: When directed to restore non-qualified loads, WAIT 2 minutes, then EXECUTE remote function ED85, Non-Qualified Loads Restoration. INFORM the Control Room that you have restored Non-Qualified Loads.		
	SRO/RO	VERIFY Containment pressure less than Instrument Air pressure. [Step 5.f - YES]

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Time	Position	Applicant's Actions or Behavior
	RO	OVERRIDE and OPEN HV-5388, Instrument Air to Containment and ENSURE HV-5343, Excess Flow Check Valve OPEN. [Step 5.g - YES]
	RO	ESTABLISH Optimum SI Alignment: [Step 6 - YES]
		• ESTABLISH two train operation: [Step 6.a - YES]
		• DETERMINE Train A Charging Pumps OPERATING. [Step 6.a.1) - YES]
		• DETERMINE Train A HPSI and LPSI OPERATING. [Step 6.a.2) - YES]
		• DETERMINE Train A Cold Leg flow paths ALIGNED. [Step 6.a.3) - YES]
		• DETERMINE SI flow required AND indicated. [Step 6.a.4) - YES]
	SRO	IDENTIFY E-089 as affected SG: [Step 7 - YES]
		• EVALUATE SG radioactive release indications - rising. [Step 7.a - YES]
		• SG Blowdown monitors. [Step 7.a.1) - YES]
		• SG sample results. [Step 7.a.2) - YES]
		• Main Steam Line monitors. [Step 7.a.3) - YES]
	BOP	• EVALUATE indications on E-089: [Step 7.b - YES]
		• SG level rising when not feeding. [Step 7.b.1) - YES]
		• SG feedwater flowrate - significantly mismatched between SGs. [Step 7.b.2) - YES]
		• Steam/feed flow prior to trip NOT normal. [Step 7.b.3) - YES]
	BOP	• DETERMINE E-089 is affected SG. [Step 7.c - YES]

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Time	Position	Applicant's Actions or Behavior
		NOTE Until the ruptured S/G is isolated, it is preferred to maintain the level greater than 40% NR while still maintaining Tech. Spec. cooldown limits. Maintaining level at or greater than the prescribed level improves scrubbing action and the retention of iodine in the S/G and may require override of EFAS equipment.
	BOP	• OPERATE MFW to maintain Steam Generator E-089 level > 40% AND RCS cooldown less than 100ºF. [Step 7.d - YES]
	SRO	• NOTIFY Shift Manager / Operations Leader that E-089 is affected SG. [Step 7.e - YES]
	SRO	VERIFY heat removal by least affected Steam Generator E-088. [Step 8 - YES]
		NOTE Heat Removal takes priority over Containment Isolation. If the ruptured S/G is the only S/G available for heat removal, it should remain in service until an alternate heat sink is made available. Alternate heat sinks can be the other S/G being made available (feedwater or steaming capability for example), or SDC can become available.
	BOP	• DETERMINE electric AFW Pumps NOT OPERATING. [Step 8.a - YES]
		• [RNO] DETERMINE Main Feedwater Pump OPERATING and GO to Step c.
	BOP	• DETERMINE SG E-088 available for continued heat removal. [Step 8.c - YES]
	SRO	ISOLATE most affected Steam Generator E-089. [Step 9 - YES]
	BOP	• ENSURE RCS T_{HOT} less than 530ºF. [Step 9.a - YES]

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Time	Position	Applicant's Actions or Behavior

NOTE

IF the electric AFW Pump associated with the *most* Affected S/G is X-tied to supply the *least affected* S/G, THEN it should NOT be secured.

CRITICAL TASK STATEMENT		**Isolate the Ruptured Steam Generator Prior to Exiting SO23-12-4, Steam Generator Tube Rupture.**
CRITICAL TASK	BOP	• ISOLATE Steam Generator E-089: [Step 9.b - YES]
		• CLOSE / STOP SG E-089 components: [Step 9.b.1) - YES]
		• DEPRESS HV-8204, Main Steam Isolation Valve CLOSE pushbuttons.
		• DETERMINE HV-8202, Main Steam Isolation Valve Bypass CLOSED.
		• DETERMINE HV-8421, Atmospheric Dump Valve CLOSED.
		• DEPRESS HV-4052, MFW Isolation Valve CLOSE pushbuttons.
		• DETERMINE HV-4731, AFW Valve CLOSED.
		• DETERMINE HV-4715, AFW Valve CLOSED.
		• DEPRESS HV-8200, P-140, Steam to AFW Pump CLOSE pushbutton.
		• DEPRESS HV-4053, SG Blowdown Valve CLOSE pushbutton.
		• DEPRESS HV-4057, SG Water Sample Isolation SG Water Sample Isolation Valve CLOSE pushbutton.
		• DETERMINE P-141, AFW Pump STOPPED.
		• RECORD time of SG isolation _____. [Step 9.b.2) - YES]
		• ENSURE HV-8421, Steam Generator E-089 Atmospheric Dump Valve in MANUAL. [Step 9.b.3) - YES]
		• INITIATE closure of 1301MU1258 **or** 1301MU1001, Main Steam Drain Isolation Valves. [Step 9.b.4) - YES]

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Time	Position	Applicant's Actions or Behavior
+30 min	SRO	• INITIATE FS-28, Monitor Isolated SG. [Step 9.c - YES]
When Steam Generator E-089 is isolated, or at the Lead Evaluator's discretion, TERMINATE the scenario.		

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Time	Position	Applicant's Actions or Behavior
Examiner Note: These steps are performed by the BOP per SO23-12-1, Steps 12 through 16.		
	SRO/BOP	INITIATE Attachment 5, Administrative Actions. [Step 12.a - YES]
	SRO/BOP	ENSURE a PA system announcement for Reactor Trip. [Step 12.b - YES]
	BOP	ENSURE the following loads restored: [Step 13 - YES]
		• DETERMINE Unit 2 Telecom 480 VAC Feeder Breaker – OPEN. [Step 13.a - YES].
		• [RNO] VERIFY Unit 3 HS-0800S2, Telecom 480 VAC Feeder Breaker – CLOSED.
		• DETERMINE Unit 2 Telecom 480 VAC Feeder Breaker – OPEN. [Step 13.b - YES].
		• [RNO] VERIFY Unit 3 HS-0800N2, Telecom 480 VAC Feeder Breaker – CLOSED.
		• DETERMINE all Non-1E Buses – ENERGIZED [Step 13.c - YES].
		• DETERMINE B15 & B16 480 VAC Load Centers – ENERGIZED [Step 13.d - YES].
	BOP	VERIFY Main Turbine Coastdown: [Step 14 - YES]
		• DETERMINE Extraction Steam Block Valves – CLOSED. [Step 14.a - YES]
		• DETERMINE Main Steam to Reheater Block, Bypass, Warmup, and Control Valves – CLOSED. [Step 14.a - YES]
		• DETERMINE HV-2712A/B Bled Steam to Reheaters Block Valve – CLOSED. [Step 14.a - YES]
		• VERIFY Generator lowering – less than 24 kV. [Step 14.b - YES]

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Time	Position	Applicant's Actions or Behavior
		• VERIFY 99A26 - TURBINE LUBE OIL TEMP HI and 99A46 - TURBINE BRG OIL DRAIN TEMP HI Annunciators – RESET. [Step 14.c - YES]
		• INITIATE SO23-10-2, Turbine Shutdown, Attachment for Unloading the Generator and Removing the Unit from Line. [Step 14.d - NO]
	BOP	ESTABLISH desired Condensate and Feedwater Status: [Step 15 - YES]
		• ENSURE 3rd Point Heater Drain Pumps – STOPPED. [Step 15.a - YES]
		• DETERMINE Reactor Trip Override – RESET. [Step 15.b - YES]
		• DETERMINE both Main Feedwater Pumps and three (3) Condensate Pumps OPERATING. [Step 15.c - YES]
		• ENSURE FIC-3294, Condensate Pump Miniflow Controller set for Condensate Pump configuration. [Step 15.d - YES]
		• Three (3) Pumps – 9000 GPM.
		• PLACE LV-3245, Condensate Drawoff Valve to – DISABLE. [Step 15.e – YES]
		• DETERMINE SO23-12-2, Reactor Trip Recovery, NOT being implemented. [Step 15.f – YES]
		• [RNO] ENSURE HV-4053 & HV-4054, SG Blowdown Valves CLOSED and GO to Step 16.

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Time	Position	Applicant's Actions or Behavior
	BOP	VERIFY Start-Up Range Channels: [Step 16 - YES]
		• DETERMINE both Start-Up Range Channels NOT OPERABLE. [Step 16.a - YES]
		• [RNO] NOTIFY SRO of TS 3.3.13 and LCS 3.3.111 entry.
		• [RNO] INITIATE SO23-3-2.15, Section for Start-Up Range Channel failure.
SO23-12-1, Standard Post Trip Actions, Steps 12 through 16 are complete.		