

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	003 A4.08	
	Importance Rating	3.2	

Ability to manually operate and/or monitor in the control room: RCP Cooling Water Supply

Proposed Question: Common 1

Given the following plant conditions:

- Unit 2 operating at 100% power
- CCW pump 2P-025 in service and aligned to Train B for single train operation
- A ground fault causes a Loss of 4KV Bus 2A06
- CCW Train A is in Standby

What operator actions are required to restore CCW to the RCPs?

Manually start CCW Pump...

- A. 2P-024 and transfer the Non-Critical Loop.
- B. 2P-024 and SWC pump 2P-114.
- C. 2P-026 and SWC pump 2P-114.
- D. 2P-026 and transfer the Non-Critical Loop.

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. P-114 is wrong SWC pump
- C. Incorrect. P-026 and P-024 are powered from A06
- D. Incorrect. P-026 is powered from A06

Technical Reference(s): SO23-13-7 (Attach if not previously provided)
SD-SO23-400

Proposed references to be provided to applicants during examination: _____

Learning Objective: 55542 (As available)

Question Source: Bank # X(N56847)
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	003 K4.03	
	Importance Rating	2.8	

Knowledge of RCPS design feature(s) and/or interlock(s) which provide for the following: Adequate lubrication of the RCP

Proposed Question: Common 2

Given the following conditions

RCP Lift Oil Pump P-266 on RCP 2P004 is in the NORMAL position:

Which ONE (1) of the following describes the operation of P-266 when the RCP STOP pushbutton is depressed?

- A. Automatically starts after a 15 second time delay.
- B. Automatically starts in 15 seconds ONLY if the STANDBY Lift Oil Pump fails to start.
- C. Automatically starts when the RCP speed is less than 90%.
- D. Will not AUTO start but may be started manually when RCP speed is less than 90%.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Would start after 15 seconds if witch in STBY and NORM pump failed to start
- B. Incorrect. Opposite switch positions from actual operation
- C. Correct.
- D. Incorrect. Does not have to be started manually if pump is in NORM

Technical Reference(s): SD-SO23-360 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 2XAR02 Obj. 2 (As available)

Question Source: Bank # _____

Modified Bank # X (Note changes or attach parent)
New

Question History: Last NRC Exam

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u> </u>
	Group #	<u>1</u>	<u> </u>
	K/A #	<u>004 K2.01</u>	<u> </u>
	Importance Rating	<u>2.9</u>	<u> </u>

Knowledge of bus power supplies to the following: Boric Acid Makeup Pumps

Proposed Question: Common 3

Which ONE (1) of the following describes the power supplies to the Boric Acid Makeup (BAMU) Pumps?

	<u>BAMU P-174</u>	<u>BAMU P-175</u>
A.	2B04	2B06
B.	2B06	2B04
C.	2B04	2B04
D.	2B06	2B06

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. P-175 powered from B04(BY15)
- B. Incorrect. P-174 powered from B04(BY14)
- C. Correct.
- D. Incorrect. Both pumps powered from opposite bus (B04)

Technical Reference(s): SD-SO23-390 (Attach if not previously provided)
SD-SO23-120

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)

New

X

Question History:

Last NRC Exam Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or AnalysisX

10 CFR Part 55 Content:

55.41 X55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	004 A3.13	
	Importance Rating	3.4	

Ability to monitor automatic operation of the CVCS, including: RCS temperature and pressure

Proposed Question: Common 4

Given the following conditions:

- Unit 3 at 100% power.
- All control systems are in AUTO.
- Charging Pump 3P-191 is RUNNING.
- A transient causes RCS temperature to rise.

What effect will these conditions have on the Letdown Flow Control Valve, Backpressure Control Valve and Charging flow?

- A. Letdown Flow Control Valve will OPEN further, Backpressure control Valve will OPEN slightly and Charging flow will remain the same.
- B. Letdown Flow control Valve will FULLY OPEN, Backpressure control Valve will FULLY OPEN and Charging flow will DECREASE to minimum.
- C. Letdown Flow Control Valve will FULLY OPEN, Backpressure Control Valve will FULLY OPEN and charging flow will remain the same.
- D. Letdown Flow Control Valve will OPEN further, Backpressure Control Valve will CLOSE slightly and Charging flow will DECREASE to minimum.

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. Charging flow will not automatically decrease. One charging pump is in operation and will remain in operation
- C. Incorrect. Charging flow does remain constant, but letdown flow and pressure control valves will not fully open on a temperature increase. An additional failure would have to occur
- D. Incorrect. Charging flow will remain the same, and pressure control will open, not close, to maintain pressure

Technical Reference(s): SD-SO23-390 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source:	Bank #	<u>X</u>	
	Modified Bank #	_____	(Note changes or attach parent)
	New	_____	

Question History: Last NRC Exam _____

Question Cognitive Level:	Memory or Fundamental Knowledge	_____
	Comprehension or Analysis	<u>X</u>

10 CFR Part 55 Content:	55.41	<u>X</u>
	55.43	_____

Comments:

Examination Outline Cross-reference:

Level

RO

SRO

Tier #

2

Group #

1

K/A #

005 A1.01

Importance Rating

3.5

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the RHRS controls including: Heatup/cooldown rate

Proposed Question: Common 5

Which of the following is "Throttled Closed" to reduce the RCS cooldown rate with ONE train of Shutdown Cooling in service?

- A. Shutdown Cooling Heat Exchanger Outlet Valve (HV-8150 or HV-8151).
- B. Shutdown Cooling Heat Exchanger CCW Cooling Valve (HV-6500 or HV-6501).
- C. Shutdown Cooling Heat Exchanger Inlet Valve (HV-8152 or HV-8153).
- D. SDC HX Bypass Normal Flow Control Valve (HV-8160).

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. CCW valves are normally in a set position open. Not used for throttling
- C. Incorrect. HX inlet valve used for isolation, not throttling
- D. Incorrect. Throttling this valve open would reduce cooldown rate by raising the HX bypass flow.

Technical Reference(s): SO23-3-2.6 (Attach if not previously provided)

Proposed references to be provided to applicants during examination:

Learning Objective: 53010 (As available)

Question Source: Bank # X

Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	005 K5.09	
	Importance Rating	3.2	

Knowledge of the operational implications of the following concepts as they apply the RHRS: Dilution and boration considerations

Proposed Question: Common 6

Given the following conditions:

- Unit 2 is in Mode 6. Fuel is in the reactor vessel.
- Shutdown Cooling loop 'A' is in service using Low Pressure Safety Injection Pump 2MP015.
- 23.5 feet of water above the reactor vessel flange.
- It is desired to stop Shutdown Cooling for approximately 30 minutes to move lighting and equipment in the refueling cavity
- No Core Alterations or movement of Irradiated Fuel Assemblies, are in progress.

Which ONE (1) of the following correctly describes the requirement associated with this evolution?

- A. The RCS must be less than 100°F.
- B. Immediately close all containment penetrations providing direct access from containment atmosphere to outside atmosphere.
- C. Activities involving reduction of RCS boron concentration are not permitted.
- D. Cavity level must be raised to greater than 25 feet above the reactor vessel flange.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Mode 6 temperature limit is 140
- B. Incorrect. Action for radiation level rising in containment
- C. Correct.
- D. Incorrect. 23 feet is the level requirement

Technical Reference(s): TS 3.9.4 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 X
55.43 X

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	006 A1.16	
	Importance Rating	4.1	

Ability to predict and/or monitor changes in parameters RCS temperature, including superheat, saturation, and subcooled

Proposed Question: Common 7

The following conditions exist on Unit 2:

- The plant tripped from 100% power due to a LOCA
- The crew is checking SI Throttle / Stop criteria
- S/G E088 Level is 63% NR with AFW flow available
- E088 ADV is throttled open
- S/G E089 Level is 12% NR, with no AFW flow available
- E089 ADV is closed
- CET temperature is 537°F
- Pressurizer Pressure is 1000 psia
- Pressurizer Level is 98% and stable
- Reactor Vessel Head Level is 20% as read on QSPDS
- Reactor Vessel Plenum Level is 100% as read on QSPDS

Which ONE (1) of the following parameters must be RAISED prior to performing SI Throttle / Stop?

- A. AFW flow.
- B. Pressurizer Level.
- C. RCS subcooling.
- D. Reactor Vessel Head Level.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. AFW flow is available, regardless of SG levels
- B. Incorrect. Pressurizer level is above the requirement, although due to a vapor space break
- C. Correct. 537 temp and 1000 psi pressure is less than 20 degrees subcooling
- D. Incorrect. Plenum level 100% satisfies the requirement, although head is less than 100%

Technical Reference(s): SO23-12-11, FS-7 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: Steam Tables

Learning Objective: _____ (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	007 A4.10	
	Importance Rating	3.6	

Ability to manually operate and/or monitor in the control room: Recognition of a leaking PORV/code safety.

Proposed Question: Common 8

The following stable plant conditions exist following a normal reactor shutdown:

- PZR level = 52%
- PZR pressure = 1400 psia
- Quench Tank level = 50%
- Quench Tank pressure = 15 psig

What tail pipe temperature would be expected for a leaking PZR code safety valve under these conditions?

- A. 193°F
- B. 234°F
- C. 272°F
- D. 306°F

Proposed Answer: C

Explanation (Optional):

Isenthalpic process results in ~270°F for 30 psia (must use absolute pressure on Mollier diagram vice gage pressure); 193, 234, and 306 are T_{sat} for 10 psia, 24.4 psia, and 1200 psia respectively.

Technical Reference(s): Steam Tables (Attach if not previously provided)

Proposed references to be provided to applicants during examination: Steam Tables

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # X (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	008 A2.01	
	Importance Rating	3.3	

Ability to (a) predict the impacts of the following malfunctions or operations on the CCWS, and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of CCW pump

Proposed Question: Common 9

Given the following plant conditions:

- Unit 2 has tripped due to a LOCA. SIAS and CIAS have actuated.
- Pressurizer pressure is 1100 psia and lowering.
- All equipment responds as designed.
- Subsequently, CCW P-025, running on Train B, trips on overcurrent.

Which ONE (1) of the following describes the impact on plant operation, and the actions that are required?

- A. Train B components have lost CCW flow. Ensure the Non-Critical Loop is aligned to Train A.
- B. Train B components have lost CCW flow. Start CCW P026 or evaluate the need for continued operation of ECCS equipment supplied from Train B CCW and continue in the EOIs
- C. CCW flow is maintained to all components because CCW pump P026 started on low header pressure. Ensure temperatures of components cooled by CCW remain within limits.
- D. CCW flow is maintained to all components because CCW pump P026 started on the SIAS signal. Ensure temperatures of components cooled by CCW remain within limits.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Non-Critical loop not aligned because RCPs are tripped on CIAS (NCL is isolated)
- B. Correct.
- C. Incorrect. Auto start on low pressure has been removed
- D. Incorrect. If P025 was running on SIAS, P026 would not be running. It must be manually started

Technical Reference(s): SO23-13-7, pg 5 of 105 (Attach if not previously provided)
SO23-12-1

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	010 K5.01	
	Importance Rating	3.5	

Knowledge of the operational implications of the following concepts as they apply to the PZR PCS: Determination of condition of fluid in PZR, using steam tables

Proposed Question: Common 10

Given the following conditions:

- The Pressurizer is SOLID; a bubble is being drawn.
- RCS pressure is 335 psig with the Letdown Backpressure Control Valve in AUTO.
- Pressurizer temperature is 380°F and rising at 1°F per minute.

Which ONE (1) of the following is the approximate time before a bubble is formed in the Pressurizer?

- A. Less than 15 minutes.
- B. 15 - 30 minutes.
- C. 45 to 60 minutes.
- D. 75 to 90 minutes.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect.
- B. Incorrect.
- C. Correct. At 350 psia (335 psig) the saturation temperature 431.73 deg F. A bubble is formed when the pressurizer reaches saturation, so $431 - 380 = 51$ deg F. With a 1 deg F per minute heatup, it will take 51 minutes to reach saturation.
- D. Incorrect.

Technical Reference(s): Steam Tables (Attach if not previously provided)

Proposed references to be provided to applicants during examination: Steam Tables

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # X (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

WTSI Exam Bank – BVPS 2005 NRC Exam

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	010 G2.2.22	
	Importance Rating	3.4	

Equipment Control Knowledge of limiting conditions for operations and safety limits.

Proposed Question: Common 11

What are TWO (2) of the Reactor Trips that will be affected by the loss of a Narrow Range Pressurizer Pressure Instrument?

- A. Local Power Density (High), and DNBR (Low).
- B. Local Power Density (Low), and DNBR (High).
- C. Pressurizer Pressure (Low) (CCAS), and Pressurizer Pressure (Low) (RPS).
- D. Pressurizer Pressure (High) (SIAS/CCAS), and Pressurizer Pressure (Low) (RPS).

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. Power Density would be HIGH. DNBR would be LOW
- C. Incorrect. Parameters affected by pressurizer pressure WR
- D. Incorrect. Parameters affected by pressurizer pressure WR failure. (SIAS/CCAS LOW)

Technical Reference(s): SO23-13-18 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 55180 (As available)

Question Source: Bank # X(N3205)
Modified Bank # _____ (Note changes or attach parent)

New

Question History:

Last NRC Exam

Question Cognitive Level:

Memory or Fundamental Knowledge
Comprehension or Analysis

X

10 CFR Part 55 Content:

55.41 X

55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	010 K2.01	
	Importance Rating	3.0	

Knowledge of bus power supplies to the following: PZR heaters

Proposed Question: Common 12

Which ONE (1) of the following correctly describes the power supplies to the Unit 2 Pressurizer heaters?

	Backup Heater Train A (E128)	Backup Heater Train B (E129)	Proportional Heater (E122)
A.	2B04	2B06	2B02
B.	2B06	2B04	2B02
C.	2B02	2B04	2B06
D.	2B04	2B02	2B06

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. E128 and E129 swapped
- C. Incorrect. E128, E129, E122 all wrong supplies.
- D. Incorrect. E129 and E122 are swapped

Technical Reference(s): SD-SO23-360 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 55417 (As available)

Question Source: Bank # _____

Modified Bank # X (Note changes or attach parent)
New

Question History: Last NRC Exam

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	012 K2.01	
	Importance Rating	3.3	

Knowledge of bus power supplies to the following: RPS channels, components, and interconnections

Proposed Question: Common 13

Given the following conditions:

- Unit 2 is at 100% power.
- Pressurizer Level Control is selected to Channel X
- Pressurizer Pressure Control is selected to Channel X

Which ONE (1) of the following describes a result from a loss of Vital Instrument Bus 2Y02?

- A. CEAC 1 failure.
- B. All Pressurizer Heaters energize.
- C. All 3 Charging Pumps automatically start.
- D. Reactor trip due to a CPC channel B Aux Trip.

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. Would be correct for channel Y loss of power (2Y01)
- C. Incorrect. Would be correct for channel Y loss of power (2Y01)
- D. Incorrect. Need more than 1 channel to trip to generate reactor trip on a CPC Aux Trip. Only 1 channel trips

Technical Reference(s): SO23-13-18 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 55180 (As available)

Question Source: Bank # _____
Modified Bank # X (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	013 K3.01	
	Importance Rating	4.4	

Knowledge of the effect that a loss or malfunction of the ESFAS will have on the following: Fuel

Proposed Question: Common 14

Given the following conditions:

- A LOCA has occurred.
- RCS pressure is 100 psig.
- All LPSI pumps are tripped.
- HPSI Pump P-018 is operating as designed.
- All other HPSI pumps are tripped.
- Rx Vessel Plenum Level is 20%

If this condition continues, which ONE (1) of the following describes the effect on the fuel assemblies?

- A. Fuel failure will not occur. Minimum safety function requirements are met.
- B. Fuel failure will not occur. SIT injection will maintain core cooling.
- C. Fuel failure may occur. Minimum safety function requirements are NOT met.
- D. Fuel failure may occur. Minimum safety function requirements are met, but the break is too large for a HPSI pump to provide core cooling.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Safety Function requires 1 full train of ECCS
- B. Incorrect. SIT Injection design basis is for refill on a LBLOCA with LOOP. For this event, they have already performed their design function
- C. Correct.
- D. Incorrect. Minimum SF are NOT met with less than 1 full train of ECCS

Technical Reference(s): _____ (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	022 A4.01	
	Importance Rating	3.6	

Ability to manually operate and/or monitor in the control room: CCS fans

Proposed Question: Common 15

Given the following sequence of events (the below items are listed in chronological order):

- T = 0 sec - Unit 2 was at 100% power when a reactor trip occurred.
- T = 0 sec - An Excess Steam Demand Event (ESDE) inside containment is in progress.
- T = 30 sec - Safety Injection Actuation System (SIAS) has automatically actuated.
- T = 35 sec - Reserve Auxiliary Transformer 2XR1 relays on sudden pressure.
- T = 38 sec - Diesel Generator 2G003 started and is loaded on bus 2A06.
- T = 38 sec - Diesel Generator 2G002 started and tripped.

Which Containment Emergency Cooling Units are performing the containment cooling function 2 minutes after event initiation?

- A. Only Train A.
- B. Only Train B.
- C. Both Train A and B.
- D. Neither Train A nor Train B.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Train A cooling is not available with LOOP and loss of G002
- B. Correct. Train B cooling is available if 2XR1 relays, causing a LOOP. G003 is running loaded. Automatic SIAS starts ECUs with power available
- C. Incorrect. Train A unavailable
- D. Incorrect. Train B is available because G003 is available

Technical Reference(s): SD-SO23-720 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	026 A1.02	
	Importance Rating	3.6	

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CSS controls including: Containment temperature

Proposed Question: Common 16

Given the following conditions:

- A LOCA has occurred.
- SIAS/CCAS did NOT actuate automatically or manually. All other required actions have occurred.
- Bus 2A06 is locked out.
- RCS pressure is 600 psig.
- Containment pressure is 26 psig and rising.
- Containment temperature is 220°F.

Which ONE (1) of the following describes the MINIMUM actions required to reduce containment parameters?

- A. Manually actuate a Containment Spray Actuation signal (CSAS).
- B. Start Containment Spray Pump P-012.
- C. Open Containment Spray Pump discharge isolation.
- D. Start all available ECU's, Spray Pump P-012, and open Containment Spray Pump discharge isolation.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Will not start a Cnmt Spray Pump by actuating CSAS
- B. Correct. Did not start because SIAS is NOT actuated
- C. Incorrect. Will already be open because CSAS has occurred
- D. Incorrect. No need to open valve

Technical Reference(s): SD-SO23-720 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	039 G2.1.30	
	Importance Rating	3.9	

Conduct of Operations: Ability to locate and operate components, including local controls.

Proposed Question: Common 17

Which ONE (1) of the following describes the sequence of actions necessary to locally operate a SG ADV?

- A. Remove clevis pin.
Isolate air and N₂.
Open valve.
- B. Remove clevis pin.
Isolate air and N₂.
Re-install clevis pin.
Open valve.
- C. Isolate air and N₂.
Remove clevis pin.
Rotate shaft to re-install clevis pin.
Open valve.
- D. Isolate air and N₂.
Remove clevis pin.
Open valve.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Isolate air first
- B. Incorrect. Isolate air first
- C. Correct.
- D. Incorrect. Clevis pin must be installed

Technical Reference(s): SO23-13-2, Attachment 23 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	059 K3.02	
	Importance Rating	3.6	

Knowledge of the effect that a loss or malfunction of the MFW will have on the following: AFW system

Proposed Question: Common 18

15 minutes ago a complete loss of off-site power occurred, resulting in a unit trip from full power.

NO operator actions have been taken, and all systems have functioned as designed.

How are the S/Gs being automatically maintained as a heat removal path?

- A. AFW supplying S/Gs; steaming out Main Steam Safety Valves
- B. AFW supplying S/Gs; steaming using the Atmospheric Dump Valves.
- C. MFW supplying S/Gs; steaming using the Atmospheric Dump Valves.
- D. AFW supplying S/Gs; steaming using the SBCS.

Proposed Answer: A

Explanation (Optional):

- A. Correct. MSRs are isolated, so only steam path would be through MSSVs
- B. Incorrect. ADV setpoints are manually adjusted. Without action, they remain closed.
- C. Incorrect. With a LOOP, MFW is unavailable
- D. Incorrect. With a LOOP, Circ Water is lost, meaning SBCS is unavailable

Technical Reference(s): 2TA708 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 6816 (As available)

Question Source: Bank # X

Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	061 K6.01	
	Importance Rating	2.5	

Knowledge of the effect of a loss or malfunction of the following will have on the AFW components: Controllers and positioners

Proposed Question: Common 19

Given the following conditions:

- The unit tripped from 100% power 20 minutes ago.
- Both Steam Generator levels lowered to 17% (NR) and have recovered to 26% (NR).
- The operator depressed the "Override" pushbuttons for the AFW valves and continued to feed both steam generators at 200 GPM each.

Subsequently:

- Steam Generator E088 pressure decreases to 700 psia.
- Steam Generator E089 pressure decreases to 850 psia.

Which ONE (1) of the following conditions will exist based upon the above conditions? (Assume no further operator actions.)

- A. Both steam generators E088 and E089 will be fed.
- B. E088 will be fed and E089 will be isolated.
- C. Neither steam generator E088 nor E089 will be fed.
- D. E089 will be fed and E088 will be isolated.

Proposed Answer: A

Explanation (Optional):

AFW control valves already overridden open do not respond to subsequent EFAS or MSIS signals. AFW pumps are not affected by MSIS. If not in override, the SG with the higher pressure (E089) would be fed, so in this configuration, it is possible to feed a SG with low pressure

Technical Reference(s): SDF-SO23-780 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 6512 (As available)

Question Source: Bank # X(8048)
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u> </u>
	Group #	<u>1</u>	<u> </u>
	K/A #	<u>062 G2.4.6</u>	<u> </u>
	Importance Rating	<u>3.1</u>	<u> </u>

Emergency Procedures / Plan Knowledge symptom based EOP mitigation strategies.

Proposed Question: Common 20

Given the following conditions:

- A Station Blackout has occurred.
- The diesel generators have both failed to start.
- SO23-12-1 Standard post trip Actions steps 1 through 10 have been completed.
- Diagnosis of Station Blackout has been verified.
- Actions have been taken to notify the Shift Manager of the situation.
- The Emergency plan has been initiated.

In accordance with SO23-12-8, Station Blackout, which ONE (1) of the following describes the **FIRST** action taken by the crew?

- A. Isolate Letdown to conserve RCS Inventory.
- B. Initiate SO23-12-11, Attachment 8, Restoration of Offsite Power.
- C. Restore and maintain at least one (1) S/G level between 30% and 80% NR.
- D. Bleed steam as necessary to maintain S/G pressure 1100 psia using ADV's.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Performed after restoration is initiated
- B. Correct.
- C. Incorrect. SG level is maintained, but at a minimum of 40%
- D. Incorrect. 1100 psig is too high. Pressure would be maintained at 1000 psia

Technical Reference(s): SO23-12-8 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Last NRC Exam

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:

Level

RO

SRO

Tier #

2

Group #

1

K/A #

063 A4.01

Importance Rating

2.8

Ability to manually operate and/or monitor in the control room: Major breakers and control power fuses

Proposed Question: Common 21

EDG 2G002 is being operated in parallel with normal power when the Diesel Generator output breaker control power fuses blow. In this configuration, the generator output breaker:

- A. Will immediately trip open.
- B. Can be opened from the control room.
- C. Will trip open on a loss of generator excitation.
- D. Can only be opened manually at the breaker cubical.

Proposed Answer: D

Explanation (Optional):

On a loss of breaker control power the breaker cannot be operated remotely. It will not open on most generator trip signals, including loss of field. It will remain closed unless manually tripped from the breaker cubicle.

Technical Reference(s): DWG 30328 (Attach if not previously provided)

Proposed references to be provided to applicants during examination:

Learning Objective: (As available)

Question Source:

Bank #

X

Modified Bank #

(Note changes or attach parent)

New

Question History: Last NRC Exam 4/2005Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	064 K1.03	
	Importance Rating	3.6	

Knowledge of the physical connections and/or cause-effect relationships between the ED/G system and the following systems:
Diesel fuel oil supply system

Proposed Question: Common 22

Which ONE (1) of the following conditions requires entry into a Technical Specification action statement while Unit 2 is at normal operating temperature and pressure?

- A. Diesel Generator 2G002 Fuel Oil Day Tank level is 32 inches.
- B. Fuel Oil Storage Tank 2T035 level is 45,200 gallons.
- C. Tcold is 544°F.
- D. Charging Pump 2P191 is tagged out for repairs.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Day Tank minimum TS level is 30 inches.
- B. Correct. Fuel Oil Storage Tank minimum TS level is 45,662 gal.
- C. Incorrect. Minimum Tcold is 541
- D. Incorrect. If 2P191 is OOS, would only be in a TSAS if nother Charging Pump was OOS

Technical Reference(s): TS 3.8.3 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam 4/2005Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	073 K1.01	
	Importance Rating	3.6	

Knowledge of the physical connections and/or cause-effect relationships between the PRM system and the following systems:
Those systems served by PRMs

Proposed Question: Common 23

The Plant Vent Stack/Containment Purge Radiation Monitor, 2RE-7865, is currently aligned to the plant vent stack.

Which ONE (1) of the following actions will occur upon alarm of 2RE-7865?

- A. Continuous Exhaust Fans A310, A311, A312 stop.
- B. Containment Purge Isolation Signal is initiated.
- C. Outside Containment Purge Isolation valves receive a close signal.
- D. Waste Gas Discharge Isolation Valve, HV-7202, receives a close signal.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. If the fans tripped, then 7202 would close,
- B. Incorrect. Aligned to Plant Vent, CPIS will not be generated
- C. Incorrect. Valves would not receive an input from RE7865 if it was aligned to the plant vent
- D. Correct.

Technical Reference(s): SD-SO23-690, 660 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 7582 (As available)

Question Source: Bank # X(3139)
Modified Bank # (Note changes or attach parent)
New

Question History: Last NRC Exam

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	073 K4.01	
	Importance Rating	4.0	

Knowledge of PRM system design feature(s) and/or interlocks which provide for the following: Release termination when radiation exceeds setpoint

Proposed Question: Common 24

Given the following conditions:

- Unit 2 is in MODE 6.
- During fuel inspection activities, the fuel inspection device was raised out of the Spent Fuel Pool.
- Airborne radiation levels as sensed by the Fuel Handling Building Vent Airborne Monitors RE-7822 & RE-7823 have exceeded the alarm/trip setpoint.
 - RE-7822 is in bypass
 - RE-7823 is in normal operation

Based on these conditions, which of the following statements represents correct system response?

- A. FHIS actuation, Train 'A'.
- B. FHIS actuation, Train 'B'.
- C. FHIS actuation, Trains 'A' and 'B'.
- D. No FHIS actuation occurs.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Train A is initiated by 7822, which is in BYPASS

B. Correct.

C. Incorrect. No cross train trip on FHIS, so only 7823 will provide a trip to it's own train

D. Incorrect. 1 out of 2, each gets it's own. Does not require 2 of 2 logic to isolate

Technical Reference(s): SD-SO23-690 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # X(864)
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	076 A3.02	
	Importance Rating	3.7	

Ability to monitor automatic operation of the SWS, including: Emergency heat loads

Proposed Question: Common 25

Given the following conditions:

- Following a CCW system failure, CCW and SWC are transferred from Train A to Train B operation.
- All equipment has been shifted to Train B and the ACO depresses the SWC Pump P112 STOP Pushbutton.
- NO other action is taken on SWC Pump P112.

Subsequently:

- An automatic SIAS signal is generated

Which ONE (1) of the following describes the subsequent operation of SWC Pump P112?

- A. Immediately starts automatically. SWC Pump P112 flow will be aligned to Train "B" CCW.
- B. Starts automatically in approximately 20 seconds. SWC Pump P112 flow will be aligned to Train "A" CCW.
- C. Must be manually started, and will start 5 seconds after the START Pushbutton is depressed. SWC Pump P112 flow will be aligned to Train "B" CCW.
- D. Must be manually started if no CCW pump starts. SWC Pump P112 flow will be aligned to Train "A" CCW.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. No immediate start for SWC on SIAS.
- B. Correct. Train A SWC will align to Train A CCW
- C. Incorrect. Will auto start, although would get an auto start signal 5 seconds after CCW starts
- D. Incorrect. Will auto start on sequenced safeguards signal

Technical Reference(s): SD-SO23-410 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 6253 (As available)

Question Source:	Bank #	X	
	Modified Bank #		(Note changes or attach parent)
	New		

Question History: Last NRC Exam _____

Question Cognitive Level:	Memory or Fundamental Knowledge	_____
	Comprehension or Analysis	X

10 CFR Part 55 Content:	55.41	X
	55.43	_____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	078 K4.01	
	Importance Rating	2.7	

Knowledge of IAS design feature(s) and/or interlock(s) which provide for the following: Manual/automatic transfers of control

Proposed Question: Common 26

The following conditions exist on Unit 3:

- Preparations for Refueling operations are in progress.
- SFP gates have been installed.
- Service Air to the gate seals is lost.

How is pressure restored to the seals and what additional actions are required if the loss of air is expected to last longer than 2 hours?

- Nitrogen backup cylinders must be valved into service to supply nitrogen at 70 psig. The operator will then monitor and log seal pressure at least every 30 minutes.
- Compressed air backup cylinders must be valved into service to supply air at 15 psig. The operator will then monitor and log seal pressure at least every 30 minutes.
- Nitrogen backup cylinders automatically supply air when pressure falls to 70 psig. The operator will then adjust the in-service nitrogen bottle regulator to clear the low pressure alarm.
- Compressed air backup cylinders automatically supply air when pressure falls to 15 psig. The operator will then adjust the in-service air bottle regulator to clear the low pressure alarm.

Proposed Answer: D

Explanation (Optional):

- Incorrect. Air is backup, not N₂. Pressure is 15 psig
- Incorrect. Monitor and log required for loss of only 1 seal; maintaining alarm status functional is required for loss of both.
- Incorrect. N₂ is not backup supply
- Correct.

Technical Reference(s): SO23-13-20 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	078 K3.01	
	Importance Rating	3.1	

Knowledge of the effect that a loss or malfunction of the IAS will have on the following: Containment air system

Proposed Question: Common 27

Instrument Air will automatically ISOLATE if an Instrument Air rupture develops, in which of the following areas?

- A. Penetration Area.
- B. Fuel Handling Building.
- C. Radwaste Building.
- D. Containment.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. Must be manually located and isolated
- B. Incorrect. Must be manually located and isolated
- C. Incorrect. Must be manually located and isolated
- D. Correct. Excess flow check valve

Technical Reference(s): SD-SO23-570 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # X(27855)
 Modified Bank # _____ (Note changes or attach parent)
 New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	103 K3.01	
	Importance Rating	3.3	

Knowledge of the effect that a loss or malfunction of the containment system will have on the following: Loss of containment integrity under shutdown conditions

Proposed Question: Common 28

Which ONE (1) of the following conditions would be considered a "Loss of Containment Integrity" with the plant in MODE 6? (Core Alterations are in progress)

- A. One door in each air lock becomes inoperable.
- B. Equipment hatch being held closed by two (2) bolts.
- C. One Containment Purge Isolation valve fails closed.
- D. One Containment Emergency Cooling Unit Containment Isolation Valve becomes inoperable.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Mode 6, only 1 door in each airlock is required
- B. Correct. Minimum of 4 bolts required
- C. Incorrect. If Purge Isolation failed open, would potentially be a loss of integrity
- D. Incorrect. ECU CIV inop does not constitute a loss of integrity. Valves fail closed.

Technical Reference(s): TS 3.9.3 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u> </u>
	Group #	<u>2</u>	<u> </u>
	K/A #	<u>011 K5.09</u>	<u> </u>
	Importance Rating	<u>2.6</u>	<u> </u>

Knowledge of the operational implications of the following concepts as they apply to the PZR LCS: Reason for manually controlling PZR level

Proposed Question: Common 30

The plant is operating at 50% power.

The selected Pressurizer level SETPOINT fails high.

- The Pressurizer Level Control System responds as designed.
- The CRO places the Pressurizer Level controller, LIC-0110, to MANUAL.

What ADDITIONAL action must be taken to minimize the change in Pressurizer level resulting from the SETPOINT failure?

- A. Secure two Charging Pumps.
- B. Reduce Letdown flow to minimum.
- C. Isolate Letdown.
- D. Manually start Charging Pumps as necessary.

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. Letdown flow will already be at minimum
- C. Incorrect. Would not be required to isolate, because an actual low level does not exist
- D. Incorrect. A false low level exists, not an actual low level.

Technical Reference(s): ARP 50A12 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # X(N57474)
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	014 A2.04	
	Importance Rating	3.4	

Ability to (a) predict the impacts of the following malfunctions or operations on the RPIS; and (b) based on those on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Misaligned rod

Proposed Question: Common 31

The following conditions exist:

- Unit 2 is at 65 % power and CEA recovery of a dropped CEA, # 20, is in progress.
- Group 6 is at 149 inches withdrawn.
- CEA # 20 (a Group 6 CEA) is at 100 inches withdrawn.
- CEA # 1 (a Group 2 CEA) drops into the core, indicating 6 inches withdrawn.

Which of the following is/are the correct required action(s)?

- Continue realigning CEA # 20, then align CEA # 1 with their respective groups.
- Realign CEA # 1, then continue aligning CEA # 20 with their respective groups.
- Manually trip the reactor.
- Initiate a rapid downpower.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. More than 1 CEA misaligned requires a reactor trip
- B. Incorrect. More than 1 CEA does not have to be dropped, only misaligned, to require a reactor trip
- C. Correct.
- D. Incorrect. Correct action for 1 CEA misaligned

Technical Reference(s): SO23-13-13 (Attach if not previously provided)

Proposed references to be provided to applicants during examination:

Learning Objective: _____ (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u> </u>
	Group #	<u>2</u>	<u> </u>
	K/A #	<u>015 K4.06</u>	<u> </u>
	Importance Rating	<u>3.9</u>	<u> </u>

Knowledge of NIS design feature(s) and/or interlock(s) provide for the following: Reactor trip bypasses

Proposed Question: Common 32

Given the following conditions:

- Unit 2 is at 100% power.
- RPS Channel 1 Hi Log Power is in BYPASS for I&C testing.
- RPS Channel 2 Hi Log Power is operating erratically and must be taken out of service.

Which ONE (1) of the following describes the action that is required for taking the channel out of service?

- A. Channel 2 must be placed in TRIP.
- B. Channel 2 may be placed in BYPASS for testing for up to 2 hours.
- C. Channel 2 may be placed in BYPASS. One Channel must be returned to service within 1 hour, or one channel placed in TRIP.
- D. Channel 2 may NOT be placed in TRIP or BYPASS until Channel 1 is returned to service.

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. Cannot have 2 channels in bypass at the same time. Placing a channel in bypass will insert a trip on the other channel
- C. Incorrect. May not place in bypass if a channel is already in bypass
- D. Incorrect. Channel may be placed in TRIP

Technical Reference(s): SO23-3-2.12 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Learning Objective: _____ (As available)

Question Source: Bank # X(N5743)
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u> </u>
	Group #	<u>2</u>	<u> </u>
	K/A #	<u>029 K3.01</u>	<u> </u>
	Importance Rating	<u>2.9</u>	<u> </u>

Knowledge of the effect that a loss or malfunction of the Containment Purge System will have on the following: Containment parameters

Proposed Question: Common 34

Given the following:

- The plant is in Mode 4.
- A Containment Mini-Purge is in progress.
- The Containment Mini-Purge Exhaust Isolation valve fails closed.
- NO other components reposition.

Which ONE (1) of the following describes the containment parameter MOST affected by this failure?

- A. Pressure
- B. Temperature
- C. Radiation Level
- D. Humidity Level

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. Temperature will remain constant since the Purge system does not provide a cooling function
- C. Incorrect. Radiation levels would only rise to cause a purge isolation, they would not rise because of an isolation
- D. Incorrect. Humidity is a function of the containment temperature and dewpoint, which are unaffected by purge control operation.

Technical Reference(s): SD-SO23-770 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	035 A2.04	
	Importance Rating	3.6	

Ability to (a) predict the impacts of the following mal-functions or operations on the S/GS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Steam flow/feed mismatch

Proposed Question: Common 35

Given the following conditions on SG E088:

- Steam flow is greater than Feed flow.
- Narrow Range level is lowering.
- FWCS master controller output is lowering.
- FWCV is closing.
- Both Feedwater Pump Speeds are stable.

Which ONE (1) of the following actions is required in accordance with SO23-13-24, Feedwater Control System Malfunctions?

- A. Place E088 Master Controller in Preferred Manual and attempt to raise level.
- B. Place E088 FWCV in manual and attempt to raise output
- C. Place K-006 or K-005 EAP/MSD in manual and attempt to raise output.
- D. Reevaluate determination of affected SG or ensure system is operating in automatic as required.

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. FWCV is performing its required function
- C. Incorrect. Feed Pump speed control is not the cause of the problem. Would perform if master does not function
- D. Incorrect. Determination can be made from the indications available. Would perform if indications were not clear

Technical Reference(s): SO23-13-24 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 55123 (As available)

Question Source: Bank # _____
Modified Bank # X (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u> </u>
	Group #	<u>2</u>	<u> </u>
	K/A #	<u>041 K5.01</u>	<u> </u>
	Importance Rating	<u>2.9</u>	<u> </u>

Knowledge of the operational implications of the following concepts as they apply to the SDS: Relationship of no-load T-ave. to saturation pressure relief setting on valves

Proposed Question: Common 36

Given the following conditions:

- The plant is in Mode 3.
- SBCS is maintaining steam pressure at 1000 psig in AUTO.
- All SBCS valves have subsequently failed closed.

Approximately how far will RCS temperature rise prior to reaching the lift setpoint of the low set SG safety valves?

- A. 2°F
- B. 5°F
- C. 8°F
- D. 11°F

Proposed Answer: D

Explanation (Optional):

Incorrect. Corresponds to normal modulating range of SBCS with allowance for psig/psia errors

Incorrect. See above

Incorrect. See above

Correct. No Load temperature is approximately 544 deg F at 1000 psig. Low set safety valve is at 1100 psig, corresponding to approximately 555 deg F

Technical Reference(s): Steam Tables (Attach if not previously provided)

Proposed references to be provided to applicants during examination: Steam Tables

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # X _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X _____

10 CFR Part 55 Content: 55.41 X _____
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u> </u>
	Group #	<u>2</u>	<u> </u>
	K/A #	<u>002 A3.03</u>	<u> </u>
	Importance Rating	<u>4.4</u>	<u> </u>

Ability to monitor automatic operation of the RCS, including: Pressure, temperature, and flows

Proposed Question: Common 38

Unit 3 is operating at 100% power when the following occurs:

- Loss of Off-Site Power
- Reactor Trip

Subsequently ten minutes after the trip, the following conditions exist:

- AFW P-140 is feeding BOTH SGs
- SG E088 Pressure is 1000 psia and stable
- SG E089 Pressure is 1000 psia and stable
- All RCPs are OFF
- PZR Pressure is 2200 psia and slowly rising
- Thot is approximately 560 °F in both loops and stable
- REPCET is 560 °F
- Tcold is approximately 545 °F in both loops and stable
- Reactor Vessel Level is 100% (Head)

Which ONE (1) of the following describes the status of RCS Heat Removal?

- A. Natural Circulation exists. The SBCS control valves are maintaining heat removal.
- B. Natural Circulation does not exist. Heat removal may be established by opening the SBCS control valves.
- C. Natural Circulation exists. ADVs are maintaining heat removal.
- D. Natural Circulation does not exist. Heat removal may be established by opening the ADVs.

Proposed Answer: C

Explanation (Optional):

Incorrect. LOOP; SBCS unavailable due to loss of Circ Pumps

Incorrect. LOOP; SBCS unavailable due to loss of Circ Pu

Correct.

Incorrect. Natural Circ exists because Tcold is close to saturation of SGs, REP CET and
Thot are within 16 deg F.Technical Reference(s): SO23-12-11, FS-3 (Attach if not previously provided)
SO23-12-1

Proposed references to be provided to applicants during examination: _____

Learning Objective: 103865 (As available)Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	007 EK2.02	
	Importance Rating	2.6	

Knowledge of the interrelations between a reactor trip and the following: Breakers, relays and disconnects

Proposed Question: Common 39

Which ONE (1) of the following combinations of OPEN RTCBs will result in a Reactor Trip?

- A. Trip breakers 1, 2, 5, 6.
- B. Trip breakers 1, 3, 5, 7.
- C. Trip breakers 3, 4, 7, 8.
- D. Trip breakers 6, 7, 8, 9.

Proposed Answer: B

Explanation (Optional):

A combination of trip breakers must be open for a scram to occur. Breakers 1 and 5 and breakers 3 and 7 must be open making B the correct answer.

Technical Reference(s): SD-SO23-710 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
 Modified Bank # X (Note changes or attach parent)
 New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	008 AK1.02	
	Importance Rating	3.1	

Knowledge of the operational implications of the following concepts as they apply to a Pressurizer Vapor Space Accident: Change in leak rate with change in pressure

Proposed Question: Common 40

Initial Conditions:

- An RCS Leak has occurred.
- RCS pressure is 2200 psia.
- Pressurizer level is 20% and lowering.
- The leak size is estimated at 1000 gpm.

Current Conditions:

- The RCS leak is determined to be a vapor space break.
- RCS pressure is 1100 psia and stable.
- Pressurizer level is 70% and rising.

What is the current approximate RCS leak rate?

- A. 1000 gpm
- B. 700 gpm
- C. 500 gpm
- D. 300 gpm

Proposed Answer: B

Explanation (Optional):

Leak rate is proportional to the square root of the DP. Half the original pressure will correspond to a leak rate approximately 70% of original

Technical Reference(s): Formula Sheet (Attach if not previously provided)

Proposed references to be provided to applicants during examination:

Learning Objective: (As available)

Question Source: Bank #
Modified Bank # (Note changes or attach parent)
New X

Question History: Last NRC Exam

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	009 EA1.17	
	Importance Rating	3.4	

Ability to operate and monitor the following as they apply to a small break LOCA: PRT

Proposed Question: Common 41

Given the following Unit 2 conditions:

- Reactor tripped from 100% power.
- A LOCA is in progress.
- Pressurizer pressure = 1870 psia.
- Containment pressure = 3.8 psig.

Which ONE (1) of the following states where RCP bleedoff flow is being directed?

- A. Volume Control Tank
- B. Reactor Coolant Drain Tank
- C. Quench Tank
- D. Containment Sump

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Normal bleedoff flow goes to VCT
- B. Incorrect. RCDT gets other drains as well as Quench Tank Drains
- C. Correct. CIAS isolates seal bleedoff and
- D. Incorrect. Containment Sump would not receive input from RCP bleedoff unless there was a leak

Technical Reference(s): SD-SO23-360 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	015 AA1.20	
	Importance Rating	2.7	

Ability to operate and / or monitor the following as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow): RCP bearing temperature indicators

Proposed Question: Common 42

A loss of the CCW Non-Critical Loop occurred 1 minute ago.

The crew is performing actions of SO23-13-7, Loss of Component Cooling Water (CCW)/Saltwater Cooling (SWC).

RCP Thrust Bearing temperatures indicate 221°F and are rising at 1°F per minute.

Assuming the current trends continue, what is the MAXIMUM time available prior to exceeding a limit requiring a reactor trip?

- A. 1 minute
- B. 2 minutes
- C. 3 minutes
- D. 4 minutes

Proposed Answer: D

Explanation (Optional):

Incorrect. See explanation for D

Incorrect.

Incorrect.

Correct. Loss of CCW for 5 minutes, or temperature reaching 225 deg F requires a reactor trip

Technical Reference(s): SO23-13-6 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 6537 (As available)

Question Source: Bank # _____
Modified Bank # X (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	025 AA1.08	
	Importance Rating	2.9	

Ability to operate and / or monitor the following as they apply to the Loss of Residual Heat Removal System: RHR cooler inlet and outlet temperature indicators

Proposed Question: Common 43

Given the following conditions:

- Unit 2 is in Mode 5.
- A complete loss of SDC flow has occurred.
- Core Exit temperature is 90°F and rising.
- TI-8148, Shutdown Cooling Heat Exchanger Inlet temperature, indicates 88°F and rising.
- T351X, Shutdown Cooling Heat Exchanger Outlet temperature, indicates 86°F and rising.
- RCS Reactor Water Level Indication (RWLI) NR level indicates 10 inches.

Which ONE (1) of the following is the procedural sequence that the control room team would use to recover from these circumstances?

- A.
 - 1. Restore RCS Temperature
 - 2. Restore RCS Level
 - 3. Restore SDC Flow
- B.
 - 1. Restore SDC Flow
 - 2. Restore RCS Temperature
 - 3. Restore RCS Level
- C.
 - 1. Restore RCS Level
 - 2. Restore SDC Flow
 - 3. Restore RCS Temperature
- D.
 - 1. Restore SDC Flow
 - 2. Restore RCS Level
 - 3. Restore RCS Temperature

Proposed Answer: C

Explanation (Optional):

Incorrect.

Incorrect.

Correct. See procedure. Priority is level, then flow. This allows restoration of temperature

Incorrect.

Technical Reference(s): SO23-13-15 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 6576 (As available)

Question Source:	Bank #	X(1900)	
	Modified Bank #		(Note changes or attach parent)
	New		

Question History: Last NRC Exam _____

Question Cognitive Level:	Memory or Fundamental Knowledge	X
	Comprehension or Analysis	

10 CFR Part 55 Content:	55.41	X
	55.43	

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	026 AA1.05	
	Importance Rating	3.1	

Ability to operate and / or monitor the following as they apply to the Loss of Component Cooling Water: The CCWS surge tank, including level control and level alarms, and radiation alarm

Proposed Question: Common 44

Given the following conditions:

- Unit 2 is shutdown.
- RCS Temperature is 280° F.
- RCS pressure is 300 psia.
- Train B CCW Surge Tank Level has risen from 40% to 55% in 20 minutes.
- RE-7819, CCW radiation monitor, is in Alarm.
- Pressurizer Level is 60% and stable.
- VCT level dropped from 77% to 73% in 20 minutes.

Which ONE (1) of the following components is causing the CCW Surge Tank Level rise?

- A. Spent Fuel Pool heat exchanger tube leak.
- B. Shutdown Cooling heat exchanger tube leak.
- C. CEDM Cooler leak.
- D. Steam Generator sample cooler leak.

Proposed Answer: B

Explanation (Optional):

Incorrect. Lower pressure than CCW

Correct.

Incorrect. Lower pressure than CCW

Incorrect. Lower pressure than CCW

Technical Reference(s): SO23-13-7 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam 2003 NRC

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	027 AA2.05	
	Importance Rating	3.2	

Ability to determine and interpret the following as they apply to the Pressurizer Pressure Control Malfunctions: PZR Heater setpoints

Proposed Question: Common 45

The following conditions exist on Unit 2:

- Reactor tripped from 100% power about 10 minutes ago.
- Pzr Pressure control is selected to PT 0100X and this channel has failed HIGH.
- Pzr spray valves are in MANUAL and closed; Pzr heaters are in AUTO.
- Pzr pressure – 2100 PSIA
- Pzr level fell to 28% and is recovering.
- S/G levels fell to 18% (E089), 19% (E088) and are now recovering.
- S/G pressure – 1000 psia (E089); 1010 psia (E088).

Which ONE (1) of the following is the condition of the pressurizer heaters?

- A. All Pzr heaters are on.
- B. The backup heaters and proportional heaters are on. Both 1E heater banks are off.
- C. All Pzr heaters are off.
- D. Train 'A' 1E heater bank is on, Train 'B' 1E heater bank, the backup heaters and the proportional heaters are off.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. All heaters are off because controlling channel failed high
- B. Incorrect. All heaters are off because controlling channel is failed high
- C. Correct. All heaters are controlled by Channel X, which was selected and failed high
- D. Incorrect. Backup heaters will be off if the controlling channel is failed

Technical Reference(s): SO23-13-27, Att 1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	029 EK3.11	
	Importance Rating	4.2	

Knowledge of the reasons for the following responses as they apply to the ATWS: Initiating emergency boration

Proposed Question: Common 46

Which ONE (1) of the following describes a reason for initiating an emergency boration while performing Standard Post Trip Actions?

- A. To insert negative reactivity in the event that the Main Turbine fails to trip.
- B. To ensure Technical Specification Shutdown Margin requirements are met.
- C. Emergency boration is the ONLY means available to shut down the reactor if the Manual reactor trip pushbuttons do not function.
- D. Boration flow is required because the Diverse Scram System (DSS) is not credited in the SONGS Safety Analysis.

Proposed Answer: B

Explanation (Optional):

Incorrect. ATWS and turbine fail to trip are different events for the SPTAs. While boration will provide the function, the reason is different

Correct.

Incorrect. Other methods available, such as inserting CEAs manually, opening PG breakers.

Incorrect. Although DSS is not credited, it is not the reason boration flow is required

Technical Reference(s): SO23-14-1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	038 EA1.39	
	Importance Rating	3.6	

Ability to operate and monitor the following as they apply to a SGTR: Drawing SG into the RCS, using the "Feed and Bleed" method

Proposed Question: Common 47

Given the following conditions:

- A Steam Generator Tube Rupture has occurred on SG E-089.
- Actions of EOI 12-4, SGTR, are in effect.
- SG E-089 level is off-scale high.
- Pzr level is off-scale low.
- ECCS is operating as designed.
- E-089 has just been isolated.
- REP-CET is 500° F
- RCS pressure is 1250 psig and slowly lowering.
- SG E-089 pressure is 1050 psig and slowly rising.

Which ONE (1) of the following actions is required?

- A. Open SG E-089 MSIV to prevent overpressurization of the ruptured SG.
- B. Commence lowering RCS pressure to initiate backflow.
- C. Maintain RCS pressure greater than SG E-089 pressure to minimize RCS dilution.
- D. Raise the setpoint of SG E-089 ADV to minimize radiological release.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Would cause Main Steam Lines to fill with water
- B. Correct.
- C. Incorrect. Overfill is occurring. Keep safety valves from lifting by initiating backflow
- D. Incorrect. Raise the setpoint could potentially challenge MSSVs

Technical Reference(s): SO23-12-4 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	040 AA1.09	
	Importance Rating	3.4	

Ability to operate and / or monitor the following as they apply to the Steam Line Rupture: Setpoints of main steam safety and PORVs

Proposed Question: Common 48

An ESDE has occurred on SG-E088.

The following conditions exist:

- SG E088 pressure 20 psia stable.
- Loop 2 Lowest T-Cold was 400°F and is now rising.
- SG E089 pressure is 540 psia and lowering.
- Loop 1 T-Cold is 480°F and lowering.

What is the required setpoint for the ADV on SG-E089, per SO23-12-11 Floating Step 30, Establish Stable RCS Temperature During an ESDE?

- A. 250 psia
- B. 300 psia
- C. 350 psia
- D. 400 psia

Proposed Answer: A

Explanation (Optional):

Correct. Saturation for lowest Tcold is the pressure to stabilize at.

Incorrect. Close to value but provides for error

Incorrect. Potential choice if wrong temperature is used

Incorrect. Potential choice if wrong temperature value is used

Technical Reference(s): Steam Tables (Attach if not previously provided)

SO23-12-11, FS-30

Proposed references to be provided to applicants during examination: Steam Tables

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	054 AK1.01	
	Importance Rating	4.1	

Knowledge of the operational implications of the following concepts as they apply to Loss of Main Feedwater (MFW): MFW line break depressurizes the S/G (similar to a steam line break)

Proposed Question: Common 49

Which ONE (1) of the following describes the characteristics of a Main Feedwater line break at the entry to the Steam Generator, downstream of the double check valves?

- A. RCS temperature lowering prior to reactor trip. SG continues to depressurize after MSIV closure.
- B. RCS temperatures lowering prior to reactor trip. SG pressure stabilizes after MSIV closure.
- C. RCS temperature rising prior to reactor trip. SG continues to depressurize after MSIV closure.
- D. RCS temperature rising prior to reactor trip. SG pressure stabilizes after MSIV closure.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Less heat is removed, causing temperature to rise
- B. Incorrect. Less heat is removed, and MSIS will do nothing to stop the depressurization
- C. Correct.
- D. Incorrect. MSIS cannot stop depressurization from a break in this location

Technical Reference(s): SD-SO23-250 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____

Modified Bank # _____ (Note changes or attach parent)

New

X

Question History:

Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or AnalysisX

10 CFR Part 55 Content:

55.41 X

55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	055 EA2.05	
	Importance Rating	3.4	

Ability to determine or interpret the following as they apply to a Station Blackout: When battery is approaching fully discharged

Proposed Question: Common 50

During a Station Blackout, the crew is preparing to perform Floating Step 26, Connect G005 Portable Generator to L411 EPPM Panel/Start-up Channel.

Which ONE (1) of the following is the 1E Instrument Bus voltage at which FS-26 is performed?

- A. 118 Volts.
- B. 108 Volts.
- C. 98 Volts.
- D. 88 Volts.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Low voltage, but not time to transfer supply
- B. Correct.
- C. Incorrect. Critically low
- D. Incorrect. Battery would be discharged at this voltage

Technical Reference(s): SO23-12-11, FS-26 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)

New

X

Question History:

Last NRC Exam

Question Cognitive Level:

Memory or Fundamental Knowledge
Comprehension or Analysis

X

10 CFR Part 55 Content:

55.41

X

55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	056 AA2.83	
	Importance Rating	2.7	

Ability to determine and interpret the following as they apply to the Loss of Offsite Power: Instrument air pressure gauge

Proposed Question: Common 51

A loss of off-site power has occurred.

All equipment has functioned as designed.

Which ONE (1) of the following describes the Instrument Air Pressure reading on Control Room Instrument Air Header Pressure indicator PI-7666?

- A. 105 – 110 psig.
- B. 90 – 100 psig.
- C. 80 – 85 psig.
- D. 55 – 60 psig.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Normal air compressor pressure
- B. Incorrect. Backup air compressor pressure
- C. Correct. N2 backup approximately 83 psig
- D. Incorrect. Pressure at which components are failing

Technical Reference(s): SD-SO23-570 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	057 G2.4.6	
	Importance Rating	3.1	

Emergency Procedures / Plan Knowledge symptom based EOP mitigation strategies.

Proposed Question: Common 52

Which of the following strategies employed by the Emergency Operating Instructions (EOI's) will extend the time the 1E Instrument Buses remain energized during a Station Black Out (SBO)?

- A. Install portable ventilation in the 1E Battery Rooms.
- B. Initiate an MSIS on a loss of A03 and A07.
- C. Place two 1E Instrument Buses on their alternate power sources.
- D. Perform 1E Battery Load Reduction within 30 Minutes.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. Action will decrease hydrogen buildup
- B. Incorrect. Action will assist in controlling cooldown
- C. Incorrect. Alternate power will not be available during a blackout
- D. Correct.

Technical Reference(s): SO23-12-8 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
 Modified Bank # _____ (Note changes or attach parent)
 New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	062 G2.4.4	
	Importance Rating	4.0	

Emergency Procedures / Plan Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.

Proposed Question: Common 53

Given the following conditions:

Unit 2 is at 100% power. All systems are in their normal alignments.

The following alarm is received in the control room:

- 56A09, CCW FROM RCP SEAL HX TEMP HI

The CRO determines that 2TI-9144, CCW from 2P-001 Heat Exchanger Temperature indication, is reading 145°F and RISING.

Which ONE (1) of the following describes the procedure that will be used to address the current condition?

- A. SO23-5-1.7, Power Operations, section for Rapid Shutdown.
- B. SO23-12-1, Standard Post Trip Actions.
- C. SO23-13-14, Reactor Coolant Leak
- D. SO23-13-7, Loss of CCW/SWC

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. A rapid shutdown may be performed if temperature continues to rise
- B. Incorrect. Trip not required for this condition of temperature rise. Will be handled in AOs
- C. Incorrect. RCS leak may be indicated by high temperature, but not the procedure transition for these indications
- D. Correct.

Technical Reference(s): ARP 56A09 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 55542 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	065 G2.4.46	
	Importance Rating	4.3	

Emergency Procedures / Plan Ability to verify that alarms are consistent with plant conditions

Proposed Question: Common 54

Given the following conditions:

- Unit 2 and 3 are at 100% power.
- The following alarms are received in the control room:
 - 61C19, INST AIR HEADER PRESS LOW
 - 61B39, INST AIR DRYER TEMP/LVL/DP HI
- 2PI5344A and 3PI5344A, Instrument Air Header Pressure, both indicate 85 psig and lowering slowly.
- All Instrument Air Compressors are running.
- An operator has been dispatched to locally check instrument air flow and pressure indication.

Which ONE (1) of the following actions will be performed next?

- A. Trip the reactor; perform EOI 12-1, Standard Post Trip Actions.
- B. Open SA2417MU036, Air Dryer Bypass Valve. Place the standby instrument air filter in service.
- C. Place Auxiliary Spray in service per SO23-3-1.10 and operate charging pumps as necessary to maintain pressurizer level.
- D. Fail open in-service Salt Water Cooling discharge valves to prevent a loss of Salt Water Cooling system flow.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Do not trip until <60 psig
- B. Correct.
- C. Incorrect. Would perform subsequently if pressure is not recovered
- D. Incorrect. Would perform subsequently if pressure is not recovered

Technical Reference(s): SO23-13-5 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source:	Bank #	<u>X</u>	
	Modified Bank #	<u> </u>	(Note changes or attach parent)
	New	<u> </u>	

Question History: Last NRC Exam

Question Cognitive Level:	Memory or Fundamental Knowledge	<u> </u>
	Comprehension or Analysis	<u>X</u>

10 CFR Part 55 Content:	55.41	<u>X</u>
	55.43	<u> </u>

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	E02 EK3.2	
	Importance Rating	2.8	

Knowledge of the reasons for the following responses as they apply to the (Reactor Trip Recovery) Normal, abnormal and emergency operating procedures associated with (Reactor Trip Recovery).

Proposed Question: Common 55

Which ONE (1) of the following describes the intent of the Reactivity Control verification step when performing SPTAs per SO23-12-1?

- A. Verify the accuracy and behavior of NIs and Startup Rate indication.
- B. Ensure the Rx is shutdown, this will ensure that the only core heat input to the RCS is from decay heat.
- C. Provide action to mitigate the potential for other events that may be caused by an ATWS.
- D. Provide immediate action in the event of an ATWS coincident with a Loss of Feedwater.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. The NIs are observed but not for accuracy.
- B. Correct.
- C. Incorrect. Actions in RNO provided for ATWS but not intent of AER. Step does not mitigate other events caused by ATWS.
- D. Incorrect. Actions in RNO provided for ATWS but not intent of AER. Step does not mitigate loss of feedwater event.

Technical Reference(s): SO23-14-1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Last NRC Exam

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	E06 EK2.2	
	Importance Rating	3.5	

Knowledge of the interrelations between the (Loss of Feedwater) and the following: Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.

Proposed Question: Common 56

Given the following conditions:

- A Loss of Feedwater has occurred.
- The crew is performing SO23-12-6, Loss of Feedwater.

Which ONE (1) of the following describes the actions taken to mitigate the event in progress in accordance with EOI SO23-12-6?

- Attempt to restore AFW flow. If flow cannot be restored, then trip RCPs to limit RCS heat input.
- Trip RCPs to limit RCS heat input. Then attempt to restore AFW flow with available AFW pumps.
- Attempt to restore AFW flow. If flow cannot be restored, then trip RCPs to minimize potential for RCP Seal damage.
- Trip RCPs to minimize the potential for RCP Seal damage. Then attempt to restore AFW flow with available AFW pumps.

Proposed Answer: B

Explanation (Optional):

- Incorrect. RCPs are tripped first
- Correct.
- Incorrect. RCPs are tripped first. Seal damage is not consideration for loss of feed
- Incorrect. RCP seal damage is not the prime consideration for this event

Technical Reference(s): SO23-14-6 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	024 AA1.25	
	Importance Rating	3.4	

Ability to operate and / or monitor the following as they apply to the Emergency Boration: Boration valve indicators

Proposed Question: Common 57

Given the following conditions:

- An ATWS has occurred and power is at 95 %.
- The CRO has started a boration in accordance with SO23-13-11, Emergency Boration of the RCS/Inadvertent Dilution or Boration.
- All equipment has operated as designed.
- SIAS has NOT actuated.
- RCS pressure is 2210 psia and trending DOWN.
- Tcold is 555 °F and slowly trending DOWN.

Which of the following valves is/are OPEN?

- A. Emergency Boration Valve HV-9247
- B. Boric Acid Make Up Tank Gravity Feed Valves HV-9240 and HV-9235
- C. Boration Block Valve HV-9257
- D. Blended Makeup to the VCT Block Valve FV-9253

Proposed Answer: A

Explanation (Optional):

Correct.

Incorrect. Emergency Boration, these valves are not opened unless 9247 fails

Incorrect. Valve is a normally closed manual valve

Incorrect. For emergency boration, this valve is closed

Technical Reference(s): SO23-13-11 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>1</u>	<u> </u>
	Group #	<u>2</u>	<u> </u>
	K/A #	<u>028 AA2.06</u>	<u> </u>
	Importance Rating	<u>2.7</u>	<u> </u>

Ability to determine and interpret the following as they apply to the Pressurizer Level Control Malfunctions: Letdown flow indicator

Proposed Question: Common 58

Given the following plant conditions on Unit 3:

- Plant is in a normal full power alignment.
- A failure has occurred in the Pressurizer Level Control System.
- Pressurizer level is 43%.
- Pressurizer level setpoint is 48%.

Which of the following is the expected automatic response of the CVCS system?

- A. Three charging pumps in service and letdown flow at minimum.
- B. Three charging pumps in service and letdown flow at maximum.
- C. One charging pump in service and letdown flow at minimum.
- D. One charging pump in service and letdown flow at maximum.

Proposed Answer: A

Explanation (Optional):

Correct.

Incorrect. Level deviation of -5%, letdown would be throttling back

Incorrect. Level deviation of -5%, additional charging will start

Incorrect. Additional charging, and reduced letdown are required

Technical Reference(s): SO23-13-27 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 55219 (As available)

Question Source: Bank # X(N56684)
Modified Bank # (Note changes or attach parent)
New

Question History: Last NRC Exam

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	036 AK3.03	
	Importance Rating	3.7	

Knowledge of the reasons for the following responses as they apply to the Fuel Handling Incidents: Guidance contained in EOP for fuel handling incident

Proposed Question: Common 59

Refueling is in progress.

Refueling Cavity level is lowering RAPIDLY. The cause is UNDETERMINED.

The actions of AOI 13-20, Fuel Handling Accidents/Loss of Cavity or SFP Level Control, are being performed.

Which ONE (1) of the following describes the reason for notifying the Containment Work Manager within 5 minutes of the event?

- A. To verify the Spent Fuel Transfer Pool Gate is closed.
- B. To ensure Containment closure is performed prior to boiling in the core.
- C. To assemble work teams and coordinate attempts to identify and isolate the leak.
- D. To identify work in progress that may subject workers to unplanned radiological hazards due to the event in progress.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Responsibility of Ops Dept if necessary
- B. Correct.
- C. Incorrect. Ops or E-Plan org will search for leak
- D. Incorrect. HP will monitor work in progress

Technical Reference(s): SO23-13-20 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	060 AA2.06	
	Importance Rating	3.6	

Ability to determine and interpret the following as they apply to the Accidental Gaseous Radwaste: Valve lineup for the release of radioactive gases

Proposed Question: Common 60

Given the following conditions:

- A decay tank release to the Plant Vent Stack is in progress with flow rate manually set by the operator.

Assuming NO action is taken by the operator, which ONE (1) of the following events would cause FV-7202 to automatically close?

- A. The in-service Decay Tank Pressure has been reduced below the setpoint.
- B. The in-service Waste Gas Compressor tripped on low suction pressure.
- C. The in-service Waste Gas Compressor Discharge pressure caused a high flow rate due to high DP across PV-7814.
- D. Waste Gas Header Pressure Control Valve PV-7814 drifted open.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. If decay tank pressure lowers, then the radioactive release would be lower
- B. Incorrect. The waste gas compressor should have no effect when releasing a decay tank. The compressor trips on suction pressure aligned to the surge drum
- C. Incorrect. The compressor will not be aligned to a decay tank that is being discharged
- D. Correct. If the DP valve drifts open with the flow control valve in manual, backpressure, and therefore flow, will increase through the flow control valve

Technical Reference(s): SD-SO23-660 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	061 AA2.03	
	Importance Rating	3.0	

Ability to determine and interpret the following as they apply to the Area Radiation Monitoring (ARM) System Alarms: Setpoints for alert and high alarms

Proposed Question: Common 61

Operating which of the following will determine Containment General Area Radiation Monitor RE-7848 "High Alarm" setpoint?

- A. Depressing the AMBER Trip 1 pushbutton on RISH-7848 at Radiation Monitor Panel L405
- B. Positioning the Alarm Toggle to the SP position on RISH-7848, at Radiation Monitor Panel 2/3 L90
- C. Depressing the RED Trip 2 pushbutton on RISH-7848 at Radiation Monitor Panel L405
- D. On the Remote Display Unit for RISH-7848, at Radiation Monitor Panel L104

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. See procedure
- B. Correct.
- C. Incorrect. See procedure
- D. Incorrect. See procedure

Technical Reference(s): SO23-3-2.24.1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____

Modified Bank # _____ (Note changes or attach parent)

New

X

Question History:

Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or AnalysisX

10 CFR Part 55 Content:

55.41 X

55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	074 EK1.08	
	Importance Rating	2.8	

Knowledge of the operational implications of the following concepts as they apply to the Inadequate Core Cooling : Definition of subcooled liquid

Proposed Question: Common 62

Which ONE (1) of the following could be an indication of the core becoming uncovered?
(Assume instruments are accurate.)

CET temperature equal to:

- A. 535°F with RCS pressure equal to 1100 psia.
- B. 570°F with RCS pressure equal to 1550 psia.
- C. 590°F with RCS pressure equal to 1350 psia.
- D. 605°F with RCS pressure equal to 1900 psia.

Proposed Answer: C

Explanation (Optional):

Checking steam tables, answer is C because it is the only answer resulting in superheated conditions, which indicate core uncover. Answers A, B, & D are at subcooled conditions.

Technical Reference(s): Steam Tables (Attach if not previously provided)

Proposed references to be provided to applicants during examination: Steam Tables

Learning Objective: _____ (As available)

Question Source: Bank # X
 Modified Bank # _____ (Note changes or attach parent)
 New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	A11 AA1.3	
	Importance Rating	3.0	

Ability to operate and / or monitor the following as they apply to the (RCS Overcooling) Desired operating results during abnormal and emergency situations.

Proposed Question: Common 63

The following conditions exist:

- An Excess Steam Demand Event is in progress.
- SO23-12-5 Excess Steam Demand has been implemented.
- Engineered Safety Systems equipment failures have occurred.
- STA reports that the Pressure Control SFSC is UNSATISFACTORY.
- RCS Pressure is 2175 psia.
- CET Temperature is 455°F and stable.
- Pressurizer level is 65% and stable.
- AFW is available to the unaffected SG.
- Two RCPs are running.

Which ONE (1) of the following actions will restore the RCS Pressure Control Safety Function?

- A. Perform HPSI Throttle/Stop per FS-7.
- B. Initiate a rapid RCS Cooldown to restore RCS subcooling within limits.
- C. Initiate Main Spray flow to restore RCS subcooling within limits.
- D. Ensure maximum HPSI flow to collapse RCS voids while operating pressurizer heaters as necessary to ensure the limits of SO23-12-11, Attachment 29, Post-Accident Pressure/Temperature Limits are met.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. FR-4 would direct this action, but would not improve this condition
- B. Incorrect. Cooldown has caused the SFSC to be unsat
- C. Correct. Lower to restore subcooling to <160
- D. Incorrect. Would not maximize HPSI flow in this condition. Determining voiding would indicate a misdiagnosis

Technical Reference(s): SO23-12-9 FR-4 PC-1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 6907 (As available)

Question Source:	Bank #	<u>X</u>	
	Modified Bank #	<u> </u>	(Note changes or attach parent)
	New	<u> </u>	

Question History: Last NRC Exam

Question Cognitive Level:	Memory or Fundamental Knowledge	<u> </u>
	Comprehension or Analysis	<u>X</u>

10 CFR Part 55 Content:	55.41	<u>X</u>
	55.43	<u> </u>

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	A13 AK2.1	
	Importance Rating	3.0	

Knowledge of the interrelations between the (Natural Circulation Operations) and the following: Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Proposed Question: Common 64

The plant experienced a LOCA approximately 30 minutes ago. All ESFAS actuations have occurred as required.

The following plant conditions exist:

- Pressurizer Pressure is 1800 psia and dropping slowly.
- Pressurizer Level is 5% and dropping slowly.
- RCS Hot Leg Temperature is 582°F and slowly rising.
- RCS Cold Leg Temperature is 540°F and slowly rising.
- Representative CET is 584°F and slowly rising.
- SG Pressures are 1000 psia.
- SG Levels are 24% NR and slowly dropping.
- Containment Pressure is 2.1 psig and rising slowly.
- All other indications are within required limits.

The CRS has determined that Single Phase Natural Circulation criteria is **NOT** being met.

What action will be taken to restore Single Phase Natural Circulation?

- Carry out the actions of SO23-12-11 Floating Step 10, Eliminate Voids.
- Pressurizer pressure must be reduced to allow safety injection flow.
- Steam Generator steaming rate must be raised to increase RCS heat removal.
- All charging pumps must be started to regain pressurizer level.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Pressurizer level does not indicate voids, although loss of subcooling may.
- B. Incorrect. If pressure is reduced, it may result in voiding
- C. Correct.
- D. Incorrect. Starting charging pumps will not restore heat removal

Technical Reference(s): SO23-12-11, FS-3 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 103865 (As available)

Question Source:	Bank #	<u>X</u>	
	Modified Bank #	<u> </u>	(Note changes or attach parent)
	New	<u> </u>	

Question History: Last NRC Exam

Question Cognitive Level:	Memory or Fundamental Knowledge	<u> </u>
	Comprehension or Analysis	<u>X</u>

10 CFR Part 55 Content:	55.41	<u>X</u>
	55.43	<u> </u>

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	A16 AK2.2	
	Importance Rating	3.0	

Knowledge of the interrelations between the (Excess RCS Leakage) and the following: Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.

Proposed Question: Common 65

Due to an RCS leak, the crew is performing a leak rate calculation in accordance with SO23-3-3.37, RCS Water Inventory Balance.

Which ONE (1) of the following actions will NOT affect the accuracy of the calculation?

- A. Draining a SIT
- B. Chemistry sampling of the RCS
- C. Pumping the Containment Sump to Radwaste
- D. Diverting VCT inlet to Radwaste

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Will affect inventory
- B. Incorrect. Will affect inventory
- C. Correct. Considered for normal RCS leakage monitoring, but not for this surveillance
- D. Incorrect. Will affect inventory

Technical Reference(s): SO23-3-3.37 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	1	
	K/A #	G2.1.19	
	Importance Rating	3.0	

Ability to use plant computer to obtain and evaluate parametric information on system or component STATUS

Proposed Question: Common 66

Which ONE (1) of the following describes the PRIMARY indication available to determine the status of the RVLMS Heated Junction Thermocouples?

- A. CR56
- B. Plant Monitoring System (PMS)
- C. Core Operating Limit Supervisory System (COLSS)
- D. Qualified Safety Parameter Display System (QSPDS)

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. Subcooling is displayed, but not vessel level
- B. Incorrect. PMS is the secondary display, fed from QSPDS
- C. Incorrect. COLSS monitors plant parameters but not including RVLMS
- D. Correct.

Technical Reference(s): SD-SO23-360 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
 Modified Bank # _____ (Note changes or attach parent)
 New X _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	1	
	K/A #	G2.1.16	
	Importance Rating	2.9	

Ability to operate plant phone, paging system, and two-way radio.

Proposed Question: Common 67

Given the following conditions:

- Unit 3 has an A06/B06 outage in progress.
- Unit 2 has experienced a LOCA
- SIAS actuated on Unit 2 10 minutes after the reactor trip.

Which ONE (1) of the following describes the MINIMUM actions required to maintain full operability of the 800 Mhz radio system?

- A. Depress 'Override' and then 'Close' Pushbuttons for either Q800N OR Q800S to ensure at least one bus remains energized.
- B. Depress 'Override' and then 'Close' Pushbuttons for Q800N AND Q800S to ensure both buses remain energized.
- C. Depress 'Override' Pushbutton for either Q800N OR Q800S to ensure at least one bus remains energized.
- D. Depress 'Override' Pushbuttons for Q800N AND Q800S to ensure both buses remain energized.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. Do not need to press close pushbuttons
- B. Incorrect. Do not need to press close pushbuttons
- C. Incorrect. Must push both override pushbuttons
- D. Correct.

Technical Reference(s): SO23-12-1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	1	
	K/A #	G2.1.22	
	Importance Rating	2.8	

Ability to determine Mode of Operation.

Proposed Question: Common 68

What MODE of operation would the Unit be in if the reactivity condition is 0.95 K-eff and average Reactor Coolant temperature is 300°F?

- A. Mode 2 – Startup
- B. Mode 3 – Hot Standby
- C. Mode 4 – Hot Shutdown
- D. Mode 5 – Cold Shutdown

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Temperature would be higher with a higher Keff and RTCBs closed
- B. Incorrect. Temperature would be above 350
- C. Correct.
- D. Incorrect. Temperature must be less than 200

Technical Reference(s): TS section 1, table 1.1-1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:

Level

RO

SRO

Tier #

3

Group #

2

K/A #

G2.2.13

Importance Rating

3.6

Knowledge of tagging and clearance procedures.

Proposed Question: Common 69

What tag is hung on a “Temporary Power Supply” that is used to power MCC loads during a Motor Control Center (MCC) Outage?

- A. Caution
- B. In-Test
- C. Permission
- D. Clearance

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. System is not in test, it is temporarily modified
- C. Incorrect. No permission to operate required
- D. Incorrect. Clearance tags hung for deenergization

Technical Reference(s): SO23-6-32 (Attach if not previously provided)

Proposed references to be provided to applicants during examination:

Learning Objective: (As available)

Question Source:

Bank #

X(B51808)

Modified Bank #

(Note changes or attach parent)

New

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	2	
	K/A #	G2.2.27	
	Importance Rating	2.6	

Knowledge of the refueling process.

Proposed Question: Common 70

Given the following conditions:

- Unit is in Mode 6.
- Refueling Pool is being filled and is currently flooded to the Reactor Vessel Flange.
- Fuel Transfer Tube is open.
- PEO in the Fuel Handling Building reports that both seals on the Fuel Transfer gate have failed.

Which ONE (1) of the following actions MUST initially be performed per SO23-13-20, Fuel Handling Accidents/Loss of Cavity or SFP Level Control?

- A. Secure filling the Refueling Pool.
- B. Ensure the Fuel Transfer Carriage is retracted, then close the Fuel Transfer Tube isolation valve.
- C. Evacuate Containment and initiate radiation monitoring of the Containment Building.
- D. Initiate Make-up to Refueling Cavity until level is equalized ≥ 23 feet above the fuel in the Reactor Core.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Filling pool at this level would have no effect, so stopping the fill serves no purpose
- B. Correct.
- C. Incorrect. There is time prior to evacuation in this condition
- D. Incorrect. Action will not address the failure of SFP gate seals

Technical Reference(s): SO23-13-20 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 6604 (As available)

Question Source: Bank # X(57462)
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	1	
	K/A #	G2.2.23	
	Importance Rating	2.6	

Ability to track limiting conditions for operations.

Proposed Question: Common 71

Unit 2 is operating in MODE 1 with the following conditions:

- Train "A" CCW has been inoperable for 20 hours for maintenance.
- LPSI Pump 2P016 has just been declared inoperable.

Which ONE (1) of the following is the most limiting applicable LCO for these conditions?

- A. 3.0.3
- B. 3.5.2, Condition A
- C. 3.5.2, Condition B
- D. 3.7.7, Condition B

Proposed Answer: A

Explanation (Optional):

A. Correct.

B. Incorrect. Would apply if only 1 ECCS train was affected, but CCW failure causes both to be affected

C. Incorrect. Condition is beyond B

D. Incorrect. Condition is beyond B

Technical Reference(s): TS 3.5.2, TS 3.7.7, TS 3.0.3 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: TS 3.5.2, TS 3.7.7

Learning Objective: _____ (As available)

Question Source: Bank # X(A1400)
Modified Bank # (Note changes or attach parent)
New

Question History: Last NRC Exam

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 X

Comments:

Question Source: Bank # _____
Modified Bank # X (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	3	
	K/A #	G2.3.10	
	Importance Rating	2.9	

Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.

Proposed Question: Common 73

A job must be performed under the following conditions:

- Dose rate at job location is 90 mrem/hr.
- Airborne Radioactivity Area from particulates due to weld grinding:
 - Total Internal dose for the job if respirator is worn is 0 mrem.
 - Total Internal dose for the job if **no** respirator is worn is 82 mrem.
- Time to complete job while wearing a respirator is 3.5 hours.
- Time to complete job **without** wearing a respirator is 2.75 hours.

Which ONE (1) of the following describes whether a respirator will be worn, and why?

- A. No, wearing a respirator will raise total exposure.
- B. Yes, wearing a respirator will lower total exposure.
- C. No, wearing a respirator will make no difference to the total exposure.
- D. Yes, a respirator must be worn anytime airborne radiation is present.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. 315 total mr vs. 329.5 mr without respirator
- B. Correct. 315 total mr
- C. Incorrect. There is a difference if you add the internal dose
- D. Incorrect. Not if total dose would be higher by wearing a respirator

Technical Reference(s): SO23-VII-20 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 X
55.43 _____

Comments:

WTSI Bank – Callaway 2005 NRC Exam

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	4	
	K/A #	G2.4.39	
	Importance Rating	3.3	

Knowledge of the RO's responsibilities in emergency plan implementation.

Proposed Question: Common 74

Following declaration of an emergency event, you have been assigned as Unit 2/3 Operations Leader and directed to perform an accountability of on-shift operators.

Which ONE (1) of the following actions would satisfy the requirements for initial accountability of on-shift operators?

- A. Provide the names and red badge numbers of all on-shift operators to the OSC.
- B. List the names and current locations of on-shift operators in the Operations Leader logbook.
- C. Write the red badge numbers and locations of on-shift operators on a copy of the watch bill.
- D. List the current locations of all on-shift operators next to their names on a copy of the watch bill.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Initial accountability may not have OSC manned yet
- B. Incorrect. Not IAW procedure. Need red badge #'s for tracking
- C. Correct.
- D. Incorrect. Need red badge #'s

Technical Reference(s): SO23-VIII-30 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 4752 (As available)

Question Source: Bank # X(57508)
Modified Bank # (Note changes or attach parent)
New

Question History: Last NRC Exam

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	4	
	K/A #	G2.4.46	
	Importance Rating	3.5	

Ability to verify that the alarms are consistent with the plant conditions.

Proposed Question: Common 75

Quench Tank level has been rising.

Which of the following annunciators would assist the operator in determining why this is occurring?

- 57B17, PZR Relief Valve Open.
- 50A32, PZR Spray Valve Bellows Seal Failure.
- 50A35, Reactor Vessel Seal Leakage.
- 56C46, RCP Intergasket Leakage.

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. Would not leak to Quench Tank, but to containment atmosphere or internal to valve
- C. Incorrect. Would leak to RCDT
- D. Incorrect. Would leak to containment or RCDT

Technical Reference(s): ARP 57B17 (Attach if not previously provided)

Proposed references to be provided to applicants during examination:

Learning Objective: (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)

New

Question History:

Last NRC Exam

Question Cognitive Level:

Memory or Fundamental Knowledge
Comprehension or Analysis

X

10 CFR Part 55 Content:

55.41

X

55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	1
	Group #	_____	1
	K/A #	007 G2.4.6	_____
	Importance Rating	_____	4.0

Emergency Procedures/Plan: Knowledge of symptom based EOP mitigation strategies

Proposed Question: SRO 76

Given the following conditions:

- Unit 2 has tripped from 100% power.
- Four (4) full length CEAs are stuck out.
- Reactor power is lowering.
- Start up Rate is negative.
- Emergency boration is in progress.

Which ONE (1) of the following describes the correct actions in accordance with SO23-12-1, Standard Post Trip Actions?

- A. Finish the Standard Post Trip Actions and diagnose a Reactor Trip Recovery event
- B. Immediately go to the Reactor Trip Recovery
- C. Immediately go to the Functional Recovery
- D. Finish the Standard Post Trip Actions and diagnose a Functional Recovery entry

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. Complete SPTAs first
- C. Incorrect. Complete SPTAs. Perform diagnosis
- D. Incorrect. Would diagnose a RTR

Technical Reference(s): SO23-12-1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	1
	Group #	_____	1
	K/A #	015 G2.4.11	_____
	Importance Rating	_____	3.6

Emergency Procedures/Plan: Knowledge of abnormal condition procedures

Proposed Question: SRO 77

The following annunciators are received in the control room:

- 56C24, RCP P001 SEAL PRESS HI/LO
- 56B57, RCP BLEEDOFF FLOW HI/LO

The CRO determines the following for RCP P001:

- Middle seal cavity pressure = 2200 psia.
- Upper seal cavity pressure = 2115 psia.
- Vapor seal cavity pressure = 64 psia.

Which ONE (1) of the following describes the event in progress and the action required?

- A. Middle and Lower seals have failed. Trip the reactor. When Reactivity Control is verified, trip RCP P001.
- B. Middle and Upper seals have failed. Trip the reactor. When Reactivity Control is verified, trip RCP P001.
- C. Middle and Upper seals have failed. Initiate a controlled plant shutdown and stop RCP P001 after the reactor is tripped and CEAs have been inserted for 5 seconds.
- D. Middle and Lower seals have failed. Initiate a controlled plant shutdown and stop RCP P001 after the reactor is tripped and CEAs have been inserted for 5 seconds.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. Do not trip unless 3 seals have failed
- B. Incorrect. Upper seal does not indicate failure. No trip required
- C. Incorrect. Upper seal does not indicate failure
- D. Correct.

Technical Reference(s): SO23-13-6 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source:	Bank #	X	
	Modified Bank #		(Note changes or attach parent)
	New		

Question History: Last NRC Exam _____

Question Cognitive Level:	Memory or Fundamental Knowledge	_____
	Comprehension or Analysis	X

10 CFR Part 55 Content:	55.41	_____
	55.43	5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	1
	Group #	_____	1
	K/A #	022 AA2.01	_____
	Importance Rating	_____	3.8

Ability to determine and interpret the following as they apply to the Loss of Reactor Coolant Pump Makeup: Whether charging line leak exists

Proposed Question: SRO 78

Given the following conditions:

- The plant is at 100% power.
- Three (3) Charging Pumps are operating.
- Letdown flow is 28 GPM and stable.
- VCT Level is 41% and lowering.
- Pressurizer level is 51% and lowering.
- CFMS page 122, Ctmt Sump Tank 30 minute flow indicates 132 GPM.
- TI-221 and TI-9267, Regenerative Heat Exchanger Outlet Temperature, is rising.

The crew is attempting to locate and isolate the leak in accordance with SO23-13-14, Reactor Coolant Leak.

Which ONE (1) of the following describes the location of the leak and the action required?

- Charging Header downstream of the Regenerative Heat Exchanger. Initiate a Rapid Shutdown in accordance with SO23-13-14 Reactor Coolant Leak AOI.
- Charging Header upstream of the Regenerative Heat Exchanger. Isolate Letdown in accordance with SO23-13-14 Reactor Coolant Leak AOI.
- Letdown Header downstream of the Regenerative Heat Exchanger. Isolate Letdown in accordance with SO23-13-14 Reactor Coolant Leak AOI.
- Letdown Header upstream of the Regenerative Heat Exchanger. Trip the reactor and enter SO23-12-1, Standard Post Trip Actions.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. If the leak was downstream of the heat exchanger, then HX outlet temperature would be stable or lowering
- B. Correct.
- C. Incorrect. If the leak were on the letdown line upstream of the heat exchanger, then no letdown flow would be indicated and pressurizer level would be stable
- D. Incorrect. If the leak was downstream of the HX on the letdown line, pressurizer level would be stable and letdown would not be throttled back

Technical Reference(s): SO23-13-14 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____

Modified Bank # _____ (Note changes or attach parent)

New X _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____

Comprehension or Analysis X _____

10 CFR Part 55 Content: 55.41 _____

55.43 5 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	1
	Group #	_____	1
	K/A #	040 G2.4.16	_____
	Importance Rating	_____	4.0

Emergency Procedures / Plan Knowledge of EOP implementation hierarchy and coordination with other support procedures

Proposed Question: SRO 79

Given the following plant conditions:

- The plant tripped due to a small break Loss of Coolant Accident (LOCA) inside Containment.
- The Optimal Recovery Procedure for a LOCA, SO23-12-3, has been entered.

If an Excess Steam Demand Event (ESDE) were to now occur, the guidance to mitigate both of these events would be found in which ONE (1) of the following?

- A. Reactor Trip Recovery Procedure, SO23-12-2.
- B. ESDE Optimal Recovery Procedure, SO23-12-5.
- C. LOCA Optimal Recovery Procedure, SO23-12-3.
- D. Functional Recovery Procedure, SO23-12-9.

Proposed Answer: D

Explanation (Optional):

Incorrect. Would not go to RTR with another event in progress

Incorrect. Would be possible, but a dual event is in progress, requiring FR actions

Incorrect. Already in 12-3, would have to diagnose FR entry

Correct.

Technical Reference(s): SO23-12-1, SO23-12-9 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	1
	Group #	_____	1
	K/A #	056 AA2.57	_____
	Importance Rating	_____	4.1

Ability to determine and interpret the following as they apply to the Loss of Offsite Power: RCS hot-leg and cold-leg temperatures

Proposed Question: SRO 80

Given the following conditions:

- Time +0 min. A reactor trip has occurred on Unit 2.
- Time +10 min. While performing SPTAs 10 minutes after the reactor trip, the following alarm is received:
- o 63C31, 2XR3 PROTECTION TRIP
- Time +13 min. The CRS is preparing to diagnose the event per SO23-12-1, SPTAs.

At time +13 minutes, which ONE (1) of the following describes (1) Core Delta T indication from Time +10, and (2) procedure the crew will transition to?

- A. (1) Core Delta T rises
(2) SO23-12-8, Station Blackout
- B. (1) Core Delta T lowers
(2) SO23-12-9, Functional Recovery
- C. (1) Core Delta T lowers
(2) SO23-12-2, Reactor Trip Recovery
- D. (1) Core Delta T rises
(2) SO23-12-7, Loss of Forced Circulation/Loss of Offsite Power

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. Blackout not diagnosed unless DGs are failed Also
- B. Incorrect. Delta T will rise as Natural Circ sets up
- C. Incorrect. RTR not diagnosed because even though SIAS not actuated, LOOP would take precedence with loss of this transformer(2XR3)
- D. Correct.

Technical Reference(s): SO23-12-1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 6897 (As available)

Question Source: Bank # _____
Modified Bank # X (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	1
	Group #	_____	1
	K/A #	057 AA2.19	_____
	Importance Rating	_____	4.3

Ability to determine and interpret the following as they apply to the Loss of Vital AC Instrument Bus: The plant automatic actions that will occur on the loss of a vital ac electrical instrument bus

Proposed Question: SRO 81

The plant is at 100% power.

A loss of Instrument Bus Y01 has occurred.

Which ONE (1) of the following describes (1) automatic action that occurs, and (2) the actions you will direct after restoration of the bus?

- A. (1) Reactor Trip Paths 1 and 2 are actuated.
(2) Reset and reclose associated RTCBs at PPS Cabinet L-032.
- B. (1) Reactor Trip Paths 1 and 3 are actuated.
(2) Reset and reclose associated RTCBs at PPS Cabinet L-032.
- C. (1) Reactor Trip Paths 1 and 2 are actuated.
(2) Reset and reclose associated RTCBs locally at the breakers.
- D. (1) Reactor Trip Paths 1 and 3 are actuated.
(2) Reset and reclose associated RTCBs locally at the breakers.

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. ESFAS pths 1 and 3 are actuated. RPS paths 1 and 2
- C. Incorrect. Local closure not performed for restoration
- D. Incorrect. Trip paths 1 and 2 for RPS, and local closure not performed

Technical Reference(s): SO23-13-18 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #	003 G2.2.25	
	Importance Rating		3.7

Equipment Control: Knowledge of bases in technical specifications for LCOs and safety limits

Proposed Question: SRO 82

With the Unit operating at 90% power, one full length CEA is determined to be misaligned from its group by more than 8 inches.

Which ONE (1) of the following describes the required operator action and the reason for the action?

- A. Requires a reduction of thermal power providing assurance of fuel integrity during continued operation.
- B. Requires a stabilization of thermal power providing assurance that minimum Moderator Temperature Coefficient is maintained.
- C. Requires a stabilization of thermal power providing assurance of fuel integrity during continued operation.
- D. Requires a reduction of thermal power providing assurance that minimum Moderator Temperature Coefficient is maintained.

Proposed Answer: A

Explanation (Optional):

- A. Correct. SO23-13-13 requires a load reduction TS basis states reason
- B. Incorrect. Reduce power within 1 hour (SO23-13-13 first step is to stabilize)
- C. Incorrect. Reduce power within 1 hour
- D. Incorrect. Maintaining MTC in analyzed range is a reason for CEA alignment

Technical Reference(s): TS 3.1.5 basis (Attach if not previously provided)
SO23-13-13

Proposed references to be provided to applicants during examination: _____

Learning Objective: 7173 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Last NRC Exam

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41
55.43 2

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	1
	Group #	_____	2
	K/A #	024 G2.4.4	_____
	Importance Rating	_____	4.3

Emergency Procedures / Plan Ability to recognize abnormal indications for system operating parameters which are entry level conditions for emergency and abnormal operating procedures

Proposed Question: SRO 83

Given the following conditions:

- A Turbine Load Rejection has occurred.
- The CRO manually inserted CEAs attempting to maintain Tcold on program.
- Reactor power is currently 80%.
- Pre-PDIL and PDIL alarm windows are illuminated.
- Group 6 CEA's indicate 40 inches.
- SBCS valves are modulating closed.

Which ONE (1) of the following actions is required?

- A. Trip the reactor and enter SO23-12-1, Standard Post-Trip Actions.
- B. Realign Group 6 CEA's in accordance with SO23-13-13, Misaligned or Immovable Control Element Assembly.
- C. Raise Turbine load to ensure SBCS valve closure and maintain Tcold on program.
- D. Initiate Emergency Boration in accordance with SO23-13-11, Emergency Boration of the RCS/Inadvertent Dilution or Boration.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. No trip criteria is met
- B. Incorrect. CEAs are not misaligned from their group
- C. Incorrect. Raising turbine load may cause power transient after a load reject, and CEAs below PDIL requires boration
- D. Correct.

Technical Reference(s): SO23-13-11 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	1
	Group #	_____	2
	K/A #	068 AA2.09	_____
	Importance Rating	_____	4.3

Ability to determine and interpret the following as they apply to the Control Room Evacuation: Saturation margin

Proposed Question: SRO 84

The crew is performing SO23-13-2, Shutdown From Outside the Control Room.

You are verifying Natural Circulation in accordance with Attachment 15. (Attached)

Pressurizer pressure is 1200 psia.

Which ONE (1) of the following represents the HIGHEST value of T_{hot} that will result in a SATISFACTORY verification of natural circulation?

- A. 440°F
- B. 455°F
- C. 515°F
- D. 535°F

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Allows for mistakes on curve for allowable operation
- B. Incorrect. Allows for mistakes on curve for allowable operation
- C. Correct.
- D. Incorrect. Normal 20 degrees subcooling

Technical Reference(s): SO23-13-2 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: SO23-13-2, Att. 15

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 1

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #	A16 AA2.2	
	Importance Rating		3.7

Ability to determine and interpret the following as they apply to the (Excess RCS Leakage) Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.

Proposed Question: SRO 85

The Unit is in MODE 3 progressing toward Shutdown Cooling (SDC) entry conditions for a planned outage, when annunciator 57C10 (Containment Rad Hi) begins to alarm.

The Radiation Monitor Data Acquisition System (DAS) shows rising trends on Containment airborne rad monitors RE-7804 and RE-7807 and area radiation monitors RE-7845 and RE-7848.

Based on available indications, the STA believes RCS leak rate to be 150-200 gpm.

What should be the flowpath of procedures used by Control Room personnel in response to this event?

- A. Respond to alarm 57C10 using ARP SO23-15-57.C, followed by SO23-13-14 (RCS Leak), and then SO23-12-3 (LOCA).
- B. Respond to alarm 57C10 using ARP SO23-15-57.C, followed by SO23-13-15 (Loss of SDC), and then SO23-12-4 SGTR.
- C. Immediately implement SO23-13-14 (RCS Leak), followed by SO23-12-1 (SPTA).
- D. Immediately implement SO23-13-15 (Loss of SDC), followed by SO23-12-9 (Functional Recovery).

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. Rad indication is LOCA, not SGTR
- C. Incorrect. Would not use SPTAs in this condition
- D. Incorrect. Would not use FR because only 1 event is evident.

Technical Reference(s): SO23-13-14, SO123-0-A1 (Attach if not previously provided)

ARP 15-57.C, SO23-13-4

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source:	Bank #	<u>X</u>	
	Modified Bank #	<u> </u>	(Note changes or attach parent)
	New	<u> </u>	

Question History: Last NRC Exam

Question Cognitive Level:	Memory or Fundamental Knowledge	<u> </u>
	Comprehension or Analysis	<u>X</u>

10 CFR Part 55 Content:	55.41	<u> </u>
	55.43	<u>5</u>

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #	008 A2.08	
	Importance Rating		2.7

Ability to (a) predict the impacts of the following malfunctions or operations on the CCWS, and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Effects of shutting (automatically or otherwise) the isolation valves of the letdown cooler

Proposed Question: SRO 86

Given the following conditions:

- The plant is at 100% power.
- CCW Train A and B are in service.
- CCW Train A is supplying the Non-Critical Loop and Letdown Heat Exchanger.
- TIC-223, Letdown Heat Exchanger Temperature Control, is at 100% DEMAND.
- Letdown Heat Exchanger Outlet Temperature is RISING.
- All other CCW indications are NORMAL.

Which ONE (1) of the following describes (1) the event in progress, and (2) the action that will be required to mitigate the condition?

- A. (1) CCW pipe rupture on the Letdown HX supply line.
(2) Transfer the Letdown HX to CCW Train B. Non-Critical Loop remains on Train A to maintain CCW flow balancing.
- B. (1) CCW supply isolation valve to the Letdown HX failed closed.
(2) Transfer the Letdown HX to CCW Train B. Non-Critical Loop remains on Train A to maintain CCW flow balancing.
- C. (1) CCW pipe rupture on the Letdown HX supply line.
(2) Transfer the Letdown HX and the Non-Critical Loop to CCW Train B.
- D. (1) CCW supply isolation valve to the Letdown HX failed closed.
(2) Transfer the Letdown HX and the Non-Critical Loop to CCW Train B.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. For pipe rupture, Surge tank level would be lowering
- B. Incorrect. Flow balancing is not performed in this manner
- C. Incorrect. Not a pipe rupture
- D. Correct.

Technical Reference(s): SO23-13-7 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____

Modified Bank # _____ (Note changes or attach parent)

New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____

Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____

55.43 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	2
	Group #	_____	1
	K/A #	013 A2.01	_____
	Importance Rating	_____	4.8

Ability to (a) predict the impacts of the following malfunctions or operations on the ESFAS; and (b) based Ability on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations; LOCA

Proposed Question: SRO 87

Unit 2 has sustained a small break LOCA and S023-12-3 "Loss of Coolant Accident" has been entered. All three HPSI pumps have FAILED.

Which ONE (1) of the following describes the action required by the CRS?

- A. Continue use of S023-12-3 until an alternate procedure is designated by S023-12-3 or the Safety Function Status Check.
- B. Continue the use of S023-12-3 since the event has been diagnosed as a LOCA and the LOCA procedure is designed to mitigate the event under all postulated scenarios.
- C. Immediately exit S023-12-3 since no HPSI flow is available.
- D. Return to the Event Diagnosis chart in S023-12-1 "Standard Post Trip Actions"; remain in the LOCA procedure, and continue trying to restore HPSI to operable.

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. Would only continue until directed by failed SFSC
- C. Incorrect. Wait until directed
- D. Incorrect. Once the diagnosis chart has been performed, continue in the EOIs and follow symptom based direction

Technical Reference(s): SO23-12-10 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # X(N5497)
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	2
	Group #	_____	1
	K/A #	062 G2.1.11	_____
	Importance Rating	_____	3.8

Conduct of Operations: Knowledge of less than 1 hour technical specification action statements for systems

Proposed Question: SRO 88

Diesel Generator 2G002 has FAILED its quarterly surveillance.

If the diesel remains inoperable, what is the MAXIMUM amount of time that may elapse prior to taking action in accordance with Technical Specifications?

- A. 1 hour
- B. 2 hours
- C. 4 hours
- D. 6 hours

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. Other 3.8 tech specs related to DC distribution are 2 hours
- C. Incorrect. Other TS are 4 hours. Time placed in to make distractors symmetrical
- D. Incorrect. 6 hours to hot standby for other TS

Technical Reference(s): TS 3.8.1.1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)

New

X

Question History:

Last NRC Exam

Question Cognitive Level:

Memory or Fundamental Knowledge
Comprehension or Analysis

X

10 CFR Part 55 Content:

55.41

55.43

1, 2

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #	064 G2.1.14	
	Importance Rating		3.3

Conduct of Operations: Knowledge of system status criteria which require the notification of plant personnel.

Proposed Question: SRO 89

Given the following conditions:

- The station experienced a loss of off-site power following a small break LOCA on Unit 2.
- Following the loss of power, both Unit 2 Emergency Diesel Generators failed to start.
- Unit 3 Emergency Diesel Generators started and are supplying their respective busses.
- Consideration is being given to cross-connecting to Unit 3 power busses that are not covered by a normal operating procedure.

According to part 50.54 (x and y) of Title 10 of the Code of Federal Regulations, this action is:

- A. not permitted because it is a violation of the station operating license issued by the NRC.
- B. permitted if approved by a licensed senior operator.
- C. permitted if approved by the NRC.
- D. not permitted because it would violate the electrical separation between safety divisions requirement of 10CFR50, Appendix A.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Permitted if SRO is notified and gives approval
- B. Correct.
- C. Incorrect. NRC must be notified, but they do not approve
- D. Incorrect. Normally not permitted, but will be under this law

Technical Reference(s): 10CFR50.54(x) and (y) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 _____
55.43 1,2,5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #	103 G2.1.12	
	Importance Rating		4.0

Conduct of Operations: Ability to apply technical specifications for a system

Proposed Question: SRO 90

The Unit is operating at 100% power.

A containment entry is in progress to perform on line maintenance.

The crew entering containment reports that the gasket on the inner air lock door has been damaged. There is a gouge across the entire sealing surface approximately 1/8 inch deep and 1/2 inch wide and they could hear air flow through the gouge before they equalized pressure.

Which ONE (1) of the following actions is required in accordance with Technical Specifications?

- A. Verify that at least the outer air lock door is closed within 1 hour, and within 24 hours lock the outer air lock door closed. Operation may then continue provided that the outer air lock door is verified to be locked closed at least once per 31 days.
- B. Verify that the inner air lock door is closed within 1 hour, and within 24 hours lock the inner air lock door closed. Be in at least Mode 3 within 6 hours and in Mode 5 within 36 hours.
- C. Verify that the outer air lock door is closed within 1 hour, and within 24 hours lock the outer air lock door closed and be in at least Mode 3 within 6 hours and in Mode 5 within 36 hours.
- D. Verify that at least the inner air lock door is closed within 1 hour, and within 24 hours lock the inner air lock door closed. Operation may then continue provided that the inner air lock door is verified to be locked closed at least once per 31 days.

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. Inner door is broken
- C. Incorrect. Do not have to go to Mode 3 if outer door is closed
- D. Incorrect. Inner door is inoperable, outer door must be closed

Technical Reference(s): TS 3.6.2 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 6236 (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 1,2

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	<u>2</u>
	Group #	_____	<u>2</u>
	K/A #	<u>041 G2.1.33</u>	_____
	Importance Rating	_____	<u>4.0</u>

Conduct of Operations: Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.

Proposed Question: SRO 91

Following a plant shutdown, a cooldown using SBCS is in progress.

The following table is a plot of the cooldown:

<u>TIME</u>	<u>RCS T_{COLD}</u>
0800	547°F
0815	523°F
0830	499°F
0845	473°F
0900	449°F
0915	425°F
0930	398°F

Determine whether Tech Spec RCS Cooldown rate limits were exceeded, and if so, at what time were they first exceeded?

- A. Exceeded at 0900.
- B. Exceeded at 0915.
- C. Exceeded at 0930.
- D. Limits were not exceeded.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. 98 deg F in 1 hour
- B. Incorrect. 98 deg F in 1 hour
- C. Correct.
- D. Incorrect. Limits were exceeded at 0930 because c/d rate was 101 deg F for that hour

Technical Reference(s): TS 3.4.3 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 1, 2

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	<u>2</u>
	Group #	_____	<u>2</u>
	K/A #	<u>002 G2.2.25</u>	_____
	Importance Rating	_____	<u>3.7</u>

Equipment Control Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.

Proposed Question: SRO 92

Which ONE (1) of the following describes ALL equipment assumed to operate at their setpoints to ensure the RCS pressure safety limit is NOT exceeded?

- A. Pressurizer Safety Valves and SG Safety Valves ONLY.
- B. Pressurizer Pressure High Reactor Trip and Pressurizer Safety valves ONLY.
- C. Steam Generator Low-Level Reactor Trip, Pressurizer Pressure High Reactor Trip, and Pressurizer Safety Valves.
- D. Pressurizer Pressure High Reactor Trip, Pressurizer Safety Valves, SG Safety Valves.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. Also high pressure trip
- B. Incorrect. Also SG Safety Valves
- C. Incorrect. SG Low Level trip is not for RCS pressure safety limit
- D. Correct.

Technical Reference(s): TS basis 2.1.2 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
 Modified Bank # _____ (Note changes or attach parent)
 New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____10 CFR Part 55 Content: 55.41 _____
55.43 1

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		2
	K/A #	071 A2.09	
	Importance Rating		2.9

Ability to (a) predict the impacts of the following malfunctions or operations on the Waste Gas Disposal System ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of meteorological tower

Proposed Question: SRO 93

Given the following conditions:

- 10 minutes ago, Waste Gas Decay Tank T-083 pressure began to lower.
- Pressure currently indicates 200 psig and lowering slowly. The cause has been determined to be a stuck open relief valve.
 - 2RE-7808, Plant Vent Stack radiation monitor, indicates $5.5E^6$ $\mu\text{Ci/cc}$.
 - 2RE-7865, Plant Vent Stack/Containment Purge Wide Range Gas Monitor, peaked at $0.8E^7$ $\mu\text{Ci/cc}$ 5 minutes ago and now reads $0.5E^7$ $\mu\text{Ci/cc}$.
 - 3RE-7865, Plant Vent Stack/Containment Purge Wide Range Gas Monitor, peaked at $0.9E^7$ $\mu\text{Ci/cc}$ 5 minutes ago and now reads $0.7E^7$ $\mu\text{Ci/cc}$.
 - 2RE-7841, Radwaste Gas Surge Tank ARM, indicates 2.9 R/Hr
 - Dose projections are NOT immediately available.

Which ONE (1) of the following describes the EPIP classification, if any, for the current plant conditions?

- A. Alert
- B. Unusual Event
- C. Site Area Emergency
- D. No classification required

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. See EAL. UE conditions exceeded
- C. Incorrect. See EAL. SAE conditions met but not for enough time to declare it.
- D. Incorrect. See EAL. GE conditions appear met but time is not long enough to declare

Technical Reference(s): SO123-VIII-1 Tab A1-A3 (Attach if not previously provided)Proposed references to be provided to applicants during examination: EPIP EAL Tabs

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	3
	Group #	_____	1
	K/A #	G2.1.5	_____
	Importance Rating	3.4	_____

Ability to locate and use procedures and directives related to shift staffing and activities.

Proposed Question: SRO 94

Given the following:

- Unit 2 is in Mode 1
- You are the Shift Manager on watch
- Shifts are 12 hours long
- All shifts are manned to the minimum composition per Technical Specifications
- Your relief is NOT on site for shift turnover
- You are the only Shift Manager Qualified Individual On-Site, at this time

Which of the following describes the Tech Spec requirements regarding the shift composition and required action in this situation?

- A. Cannot drop below the minimum due to your relief being absent. Remain on watch until properly relieved.
- B. Cannot drop below the minimum unless you will exceed 16 hours on watch. If 16 hours will be exceeded then leave a turnover for the oncoming SM and depart.
- C. May be one less than the minimum for two hours. Turnover to one of the Unit CRS's if your relief will be arriving within the next two hours.
- D. May be one less than the minimum while attempting to contact the absent individual. Turnover to one of the Unit CRS's and have the CRS attempt to contact the absent individual.

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect.
- C. Incorrect.
- D. Incorrect.

Technical Reference(s): SO123-0-A1, Att 2 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # X(N37982)
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 _____
55.43 2

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		1
	K/A #	G2.1.33	
	Importance Rating		4.0

Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.

Proposed Question: SRO 95

Given the following conditions:

- Unit 3 is in Mode 1.
- The latest RCS leak rate data is as follows:
 - Total RCS leak rate - 10.1 GPM
 - Leakage into Reactor Drain Tank - 5.2 GPM
 - SI system check valve leakage - 1.5 GPM
 - Total primary to secondary leakage - 0.1 GPM
 - Charging Pump leakage - 1.5 GPM
 - No indication of pressure boundary leakage

Which ONE (1) of the following RCS leakage limits, if any, is being exceeded?

- A. Identified
- B. Unidentified
- C. Primary to Secondary
- D. RCS leakage is within limits

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Identified is less than 10 GPM
- B. Correct.
- C. Incorrect. Whether sleeves are installed or not, primary to secondary leakage is within limits.
- D. Incorrect. Unidentified leakage is > 1 gpm. (10.1 total – 8.3 identified = 1.8)

Technical Reference(s): TS 3.4.13 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # X (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 1, 2

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		2
	K/A #	G2.2.29	
	Importance Rating		3.8

Knowledge of SRO fuel handling responsibilities.

Proposed Question: SRO 96

The plant is in Mode 6 with the reactor vessel head removed. The following conditions exist:

- Fuel transfer activities have been stopped while a problem with the upender is being fixed
- The Refueling SRO is attending an outage planning brief
- The Nuclear Fuels Management people in the Control Room ask the Refueling Bridge Operator to reposition a portable light in the vessel.

Which of the following is correct concerning this situation?

- A. The Refueling SRO is not required to be present at the Refueling Pool, since this is not considered a core alteration.
- B. A Control Room SRO must oversee this activity in the Control Room since this is a core alteration. No other requirements are necessary.
- C. A Control Room SRO and Reactor Engineer must oversee this activity in the Control Room, but it is not considered a core alteration.
- D. The Refueling SRO must be present at the Refueling Pool since this is a core alteration.

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. This is not a core alt
- C. Incorrect. Not a core alt, but not required to be supervised from CR
- D. Incorrect. This is not a core alt

Technical Reference(s): SO23-5-1.8 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 54863 (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 _____
55.43 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	3
	Group #	_____	3
	K/A #	G2.3.4	_____
	Importance Rating	_____	3.1

Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.

Proposed Question: SRO 97

Given the following conditions:

- A General Emergency has been declared due to a LOCA with extremely high off-site radioactive release rates.
- A worker attempting to isolate an uncontrolled release has sustained life-threatening injuries in a high dose area.
- The Emergency Response Organization is planning a rescue operation.
- The estimated exposure for the rescue is 35 Rem.

In accordance with SO123-VIII-10, which ONE (1) of the following describes the restriction, if any, on attempting the rescue?

- A. The rescue may proceed without restriction since the estimated exposure is less than the limit for life saving operations.
- B. Due to the amount of expected exposure, the rescue may only proceed if a volunteer is available.
- C. A volunteer is desired, but not required, prior to proceeding with the rescue. If a volunteer cannot be located, an employee may be chosen by the Emergency Coordinator.
- D. The rescue may NOT be attempted because the estimated exposure exceeds the federal limit for life saving operations.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Not without restriction, although there is no limit for lifesaving
- B. Correct.
- C. Incorrect. Volunteer required for this amount of dose
- D. Incorrect. There is no actual federal limit for lifesaving

Technical Reference(s): SO23-VIII-10 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 4

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	3
	Group #	_____	3
	K/A #	G2.3.1	_____
	Importance Rating	_____	3.0

Knowledge of 10 CFR: 20 and related facility radiation control requirements

Proposed Question: SRO 98

Which ONE (1) of the following parameter limits is designed to ensure that radiation releases will remain within the limits of 10CFR20?

- A. Primary system activity
- B. Secondary system activity
- C. Primary to secondary leakage
- D. Liquid Waste discharge activity

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. 10CFR100 is limiting
- B. Incorrect. No actual value, just conductivity based on other factors
- C. Incorrect. 10CFR100 is limiting
- D. Correct

Technical Reference(s): ODCM _____ (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____10 CFR Part 55 Content: 55.41 _____
55.43 1 Comments:
WTSI Bank

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	3
	Group #	_____	4
	K/A #	G2.4.41	_____
	Importance Rating	_____	4.1

Knowledge of the emergency action level thresholds and classifications.

Proposed Question: SRO 99

Given the following conditions:

- Unit 2 is in Mode 4.
- A cable tray fire has been burning for 20 minutes below the control room floor.
- The fire has resulted in heavy smoke coming out from below the floor.
- The Shift Manager has just announced his decision to abandon the control room.

At the current time, the Emergency Plan requires which ONE (1) of the following to be declared?

- A. Unusual Event
- B. Alert
- C. Site Area Emergency
- D. General Emergency

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Fire would provide for UE
- B. Correct.
- C. Incorrect. No indication that control cannot be established from Remote S/D
- D. Incorrect. No indication that control is lost or cannot be established from Remote S/D

Technical Reference(s): EPIP EAL Tables, SO123-VIII-1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: EPIP EAL Tabs

Learning Objective: _____ (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	3
	Group #	_____	4
	K/A #	G2.4.29	_____
	Importance Rating	_____	4.0

Knowledge of the emergency plan.

Proposed Question: SRO 100

Given the following conditions:

- An ALERT has been declared.
- The Shift Manager has assumed responsibility as the Emergency Coordinator. (EC)
- The EOF and TSC are **NOT** yet activated.

Which ONE (1) of the following may the EC delegate to another individual?

- A. Re-Classifying the event in progress
- B. Terminating the event when conditions are no longer met
- C. Notifying Off-Site Agencies
- D. Making Protective Action Recommendations

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. EC must perform
- B. Incorrect. EC must perform
- C. Correct.
- D. Incorrect. EC must perform

Technical Reference(s): EPIP SO123-VIII-10 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 6839 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Last NRC Exam

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41
55.43 5

Comments:
WTSI Bank

JPM INFORMATION SHEET

JPM NUMBER

SO 10-05 JPM NRC RO A.1.a

INITIAL PLANT CONDITIONS

Unit 2 has experienced a Loss of Forced Circulation/Loss of Offsite Power.

Recovery actions have commenced and SO23-12-7, Loss of Forced Circulation/Loss of Offsite Power, is in progress. Cooldown and Depressurization, Attachment 3 of SO23-12-11, has been started.

The Reactor tripped 16 hours ago.

TASK TO BE PERFORMED

Using Attachment 16 of SO23-12-11, EOI Supporting Attachments, Determine the Time Until Shutdown Cooling is Required.

JOB PERFORMANCE MEASURE

SO 10-05 JPM NRC RO A.1.a

SUGGESTED TESTING ENVIRONMENT:	PLANT	X	SIMULATOR	X
ACTUAL TESTING ENVIRONMENT:	PLANT	_____	SIMULATOR	_____
ACTUAL TESTING METHOD:	PERFORMED	_____	SIMULATED	_____

OPERATOR'S NAME: _____

The operator's performance was evaluated against the standards contained in this JPM and is determined to be:

SATISFACTORY: _____

UNSATISFACTORY: _____

DOCUMENTATION

SO 10-05 JPM NRC RO A.1.a

JPM LEVEL: RO/SRO

ESTIMATED TIME TO COMPLETE: 15 minutes

TIME CRITICAL JPM: NO **CRITICAL TIME:** N/A

POSITION: ACO

TASK SYS ID: 2637

TASK DESCRIPTION

Determine the time until Shutdown Cooling is required.

KA NUMBER: 025-AK1.01

KA VALUES: **RO** 3.9 **SRO** 4.3

10CFR55.45 APPLICABILITY: 7

REFERENCES:

SO23-12-11, EOI Supporting Attachments, Attachment 16, Determine the Time Until Shutdown Cooling is Required, Rev. 3

AUTHOR: L. Zilli

DATE: _____

OPERATIONS REVIEW: M. Jones

DATE: _____

APPROVED BY: A. Hagemeyer

DATE: _____

MODIFICATION HISTORY

REV	DESCRIPTION OF CHANGE	MODIFIED BY	DATE MODIFIED	SOT APPROVAL
3	Compared against SO23-12-7, Rev. 16 added a missing step and made procedural modifications.	LRZ	6/14/00	WLL
3-1	Changed reference to SO23-12-11, Rev. 1. Modified Initial Plant Conditions. Minor wording modifications to follow procedures changes. Added 2 non-critical steps to follow procedures changes.	RCW	11/06/03	AHH
3-2	Fixed typo in NOTE prior to JPM Step 1.	RCW	01/06/04	N/A
3-3	Converted to an ADMIN JPM.	RCW	09/29/04	MRN
4	Compared against SO23-12-11, Rev. 3 and modified initial conditions and DWST Tank levels to yield new critical steps for available feedwater and time until SDC is required.	LRZ	07/27/05	REV

SET-UP

Provide the Examinee with a copy of SO23-12-11, EOI Supporting Attachments, Attachment 16, Determine Time Until Shutdown Cooling is Required.

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
NOTE: Provide the examinee with a copy of S023-12-11, EOI Supporting Attachments, Attachment 16. CUE: Once you have identified the appropriate instrumentation the examiner will supply you with the value the instrument is reading.				
1	Verify T-120/T-121 the only current feedwater source to SGs.	VERIFY T-120/T-121 the only current feedwater source to SGs.		Start Time: _____
CUE: T-120 / T-121 is the only current Feedwater Sources to the SGs.				
2	Observes T-120 level indication.	OBSERVE T-120 level indication 2LI-4357B.		
CUE: 2LI-4357B indicates 21.3%.				
3*	Determine T-120 inventory from Table 1, Condensate Storage Tank Inventory.	DETERMINE T-120 inventory to be 95,262 gallons.		
4	Observes T-121 level indication.	OBSERVE T-121 level indication 2LI-3204-1 and 2LI-3204-2.		
CUE: 2LI-3204-1 and 2LI-3204-2 indicate 63.1%.				
5*	Determine T-121 inventory from Table 1, Condensate Storage Tank Inventory.	DETERMINE T-121 inventory to be 93,755 gallons.		
6*	Determine combined inventory from both Condensate Storage Tanks.	DETERMINE total condensate inventory to be 189,017 gallons.		
7	Determine additional feedwater source inventory.	DETERMINE additional feedwater source inventory to be zero (0) gallons.		
8	Determine Total feedwater source inventory.	DETERMINE total feedwater source inventory to be 189,017 gallons.		

JPM: SO 10-05 JPM NRC RO A.1.a

TITLE: Determine the Time Until Shutdown Cooling is Required

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
9*	Determine Net Available Feedwater for decay heat removal.	DETERMINE Net Available Feedwater available for decay heat removal to be 134,017 gallons.		
10	Determine the number of hours the reactor has been shutdown.	DETERMINE Reactor was shutdown sixteen (16) hours ago.		
11*	Using Figure 3: Remaining Time SGs Available as Heat Sink determine time remaining until shutdown Cooling required for decay heat removal.	DETERMINE time Steam Generators remain available for a heat sink and Shutdown Cooling will be required to be 13.5 (± 1) hours.		
TERMINATING CUE: This JPM is complete.				Stop Time: _____

JPM CHECKLIST

1. The JPM is:
 - a. X Supported by facility's job task analysis.
 - b. X Operationally important (meets threshold criterion of K/A 3.0 or greater).
 - c. X Designed as either SRO only, or RO/SRO.

2. Each JPM includes:
 - a. X Initial conditions.
 - b. X Initiating cues.
 - c. X References, including associated procedures.
 - d. X Performance standards which are specific in that control and indication nomenclature and criteria (switch position, meter reading) are specified, even if these criteria are not specified in the procedural step.

 - e. X System response cues that are complete and correct so that the examiner can properly cue the Examinee, if asked.

 - f. X Statements describing important actions or observations that should be made by the Examinee.

 - g. X Criteria for successful completion.
 - h. X Identification of the critical steps and their associated performance standards.
 - i. X Validated time limits (average time allowed for completion).
 - j. X JPMs identified as time critical or not time critical by the Operations Division based on NRC commitments.

COMPLETED BY: L. Zilli **DATE:** 08/05/05

PA/SIREN COORDINATION
NON-SECURITY EVENTS PA/SIREN MENU

I. " Attention all personnel! Attention all personnel!"

"A(n)	<input type="checkbox"/>	Unusual Event	<input checked="" type="checkbox"/>	has been declared at Unit <u> 2 </u>
	<input type="checkbox"/>	Alert	<input type="checkbox"/>	due to _____
	<input checked="" type="checkbox"/>	Site Area Emergency	<input type="checkbox"/>	remain clear of _____
	<input type="checkbox"/>	General Emergency	<input type="checkbox"/>	is in progress _____
			<input type="checkbox"/>	has been closed out"

II. Unusual Event Only

A. ☐ "All **personnel** continue with your normal activities. No response is required."

III. Alert or Higher Classification

a. **FOR EMERGENCY RESPONSE PERSONNEL**

☒ "All **emergency** response personnel report to your emergency duty stations."

OR

☐ "All **emergency** response personnel report to your alternate emergency duty stations."

b. **FOR NON-EMERGENCY RESPONSE PERSONNEL WHEN NO EVACUATION**

☐ "All **non-emergency** response personnel go indoors and wait for further instructions."

OR

☒ "All **non-emergency** response personnel report to designated assembly areas."

c. **FOR NON-EMERGENCY PERSONNEL WHEN EVACUATING**

☐ "All **non-emergency** response personnel proceed to your vehicles and leave the site as directed."

AND EITHER

☐ "Report to a Reception Center for radiological monitoring."

OR

☐ "Do not report to a Reception Center."

IV. As Needed

c. ☒ "No eating, drinking or smoking until further notice."

☐ (Other) _____

JPM INFORMATION SHEET

JPM NUMBER

SO 10-05 JPM NRC RO A.4

INITIAL PLANT CONDITIONS

You are the Auxiliary Control Operator. A Site Area Emergency has just been declared at Unit 2. This is **NOT** a Security Event. The Shift Manager (Emergency Coordinator) has assigned you to the position of Operations Leader.

The Shift Manager has informed you that:

- Emergency response personnel are to report to their emergency duty stations.
- Non-emergency response personnel are to report to assembly areas.
- There is to be no eating, drinking or smoking until further notice.

TASK TO BE PERFORMED

Perform the Siren and PA coordination using SO23-VIII-30, Units 2/3 Operations Leader Duties, Attachment 1.

JOB PERFORMANCE MEASURE

SO 10-05 JPM NRC RO A.4

SUGGESTED TESTING ENVIRONMENT:	PLANT	X	SIMULATOR	X
ACTUAL TESTING ENVIRONMENT:	PLANT	_____	SIMULATOR	_____
ACTUAL TESTING METHOD:	PERFORMED	_____	SIMULATED	_____

OPERATOR'S NAME: _____

The operator's performance was evaluated against the standards contained in this JPM and is determined to be:

SATISFACTORY: _____

UNSATISFACTORY: _____

DOCUMENTATION

SO 10-05 JPM NRC RO A.4

JPM LEVEL: RO/SRO

ESTIMATED TIME TO COMPLETE: 10 minutes

TIME CRITICAL JPM: NO **CRITICAL TIME:** N/A

POSITION: ACO

TASK SYS ID: 895

TASK DESCRIPTION

Activate the Emergency Sirens during an Emergency Event.

KA NUMBER: 2.4.38

KA VALUES: **RO** 2.2 **SRO** 4.0

10CFR55.45 APPLICABILITY: 11

REFERENCES:

SO23-VIII-30, Units 2/3 Operations Leader Duties, Revision 10-1

AUTHOR: L. Zilli

DATE: 06/13/00

OPERATIONS REVIEW: M. Jones

DATE: 06/27/00

APPROVED BY: W. Lyke

DATE: 06/29/00

MODIFICATION HISTORY

REV	DESCRIPTION OF CHANGE	MODIFIED BY	DATE MODIFIED	SOT APPROVAL
1	Reviewed SO23-VIII-30, Rev. 3, TCN 3-1 and modified as required.	LRZ	06/13/00	WLL
1-1	Compared against SO23-VIII-30, Rev. 5, with minor wording changes to comply with procedure. Changed K/A number.	LRZ	08/15/01	KR
1-2	Deleted perimeter PA. The simulator doesn't have a perimeter PA phone.	KM	10/18/01	KR
1-3	Compared against SO23-VIII-30, Rev. 5, with minor wording changes required.	LRZ	07/27/01	AHH
1-3	Compared against SO23-VIII-30, Rev. 10-1, with minor wording changes required.	LRZ	08/05/05	AHH

SET-UP

Any IC can be used. The Phone Turret and Emergency Evacuation Siren pushbuttons will function in any Simulator setup.

INSTRUCTOR/MACHINE OPERATOR

The Phone Turret pushbuttons in the simulator do not back-light. There are cues in the JPM to compensate for this.

Provide the Examinee with a copy of SO23-VIII-30, Units 2/3 Operations Leader Duties.

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
NOTE: Provide the Examinee with a copy of SO23-VIII-30, Units 2/3 Operations Leader Duties. NOTE: The lights on the phone turret pushbuttons do not work. CUE: The Siren/PA process is <u>not</u> being coordinated from outside the Control Room.				
1*	Prepare the Site PA message using Attachment 1.	PREPARE the Site PA message using Attachment 1 and MARK the boxes on Attachment 1 per the Initial Conditions:		Time Start: _____
NOTE: Refer to Attachment 1 answer key for appropriate markups.				
2*	Announce the prepared Site PA message <u>once</u> over the Site PA system.	MAKE the Site PA announcement by DEPRESSING the PA SITE pushbutton (bottom two rows, left-hand button) on the phone turret. USE the black phone handset indicated by the directional arrow on the Site PA pushbutton. Can also dial 429 on a Control Room phone to make a Site PA. Makes the announcement <u>once</u> .		
3*	Sound Unit 2/3 sirens. Hold down the PA Tone Generator "Siren All" button on the phone turret until the "Kill" button illuminates.	SOUND Unit 2/3 sirens. HOLD DOWN the PA Tone Generator "Siren All" button on the phone turret until the "Kill" button illuminates.		
CUE: The Siren Kill light illuminates in 1 to 4 seconds, and extinguishes after 60 seconds. NOTE: The lights on the phone turret pushbuttons do not work.				
4*	Press the Emergency Evacuation Siren start pushbutton (HS-7890-1) on CR 57.	DEPRESS 2HS-7890-1, Emergency Evacuation Siren START pushbutton on CR-57.		

JPM: SO 10-05 JPM NRC RO A.4

TITLE: Perform Siren and PA Coordination Duties as Operations Leader

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
CUE: 60 seconds has elapsed.				
5*	After a 60 second run, press the Emergency Evacuation Siren stop pushbutton on CR 57.	After a 60 second run, DEPRESS 2HS-7890-1, Emergency Evacuation Siren STOP pushbutton on CR 57.		
6	Ensure all sirens are secured.	ENSURE all sirens are secured by checking with Plant personnel, or VERIFY 2HS-7890-1, Emergency Evacuation Siren, green light is illuminated.		
CUE: All sirens are secured.				
7*	Repeat the PA announcement from Attachment 1 <u>two</u> (2) times.	MAKE the Site PA announcement by DEPRESSING the PA SITE pushbutton (bottom two rows, left-hand button) on the phone turret. USE the black phone handset indicated by the directional arrow on the Site PA pushbutton. Can also dial 429 on a Control Room phone to make a Site PA. MAKE the announcement <u>twice</u> .		
TERMINATING CUE: This JPM is complete. Time Stop: _____				

JPM CHECKLIST

1. The JPM is:
 - a. X Supported by facility's job task analysis.
 - b. X Operationally important (meets threshold criterion of K/A 3.0 or greater).
 - c. X Designed as either SRO only, or RO/SRO.

2. Each JPM includes:
 - a. X Initial conditions.
 - b. X Initiating cues.
 - c. X References, including associated procedures.
 - d. X Performance standards which are specific in that control and indication nomenclature and criteria (switch position, meter reading) are specified, even if these criteria are not specified in the procedural step.

 - e. X System response cues that are complete and correct so that the examiner can properly cue the Examinee, if asked.

 - f. X Statements describing important actions or observations that should be made by the Examinee.

 - g. X Criteria for successful completion.
 - h. X Identification of the critical steps and their associated performance standards.
 - i. X Validated time limits (average time allowed for completion).
 - j. X JPMs identified as time critical or not time critical by the Operations Division based on NRC commitments.

COMPLETED BY: L. Zilli **DATE:** 07/27/05

JPM INFORMATION SHEET

JPM NUMBER

SO 10-05 JPM NRC RO/SRO A.1.b

INITIAL PLANT CONDITIONS

Unit 3 is in Mode 1 when you are directed to perform a blended makeup to the Unit 3 RWSTs at a total flow of 40 gpm to raise level 3%. The RWSTs are currently at 97%.

The Plant Monitoring System is UNAVAILABLE.

Current RWST Boron concentration is 2650 ppm.

BAMU Tank concentration is 5420 ppm and BAMU Tank T-071 is at 97% and BAMU Tank T-071 is at 93%.

TASKS TO BE PERFORMED

1. Determine the required volume to raise RWST level from 97% to 100%.
2. Determine the required Boric Acid Flow Rate and Primary Makeup Water Flow Rate for a makeup concentration of 2650 ppm at a total flowrate of 40 gpm.
3. Complete the Prerequisites for SO23-3-2.2, Makeup Operations, Attachment 14, BAMU Tank Makeup to the RWSTs.

JOB PERFORMANCE MEASURE

SO 10-05 JPM NRC RO/SRO A.1.b

SUGGESTED TESTING ENVIRONMENT:	PLANT	X	SIMULATOR	X
ACTUAL TESTING ENVIRONMENT:	PLANT	_____	SIMULATOR	_____
ACTUAL TESTING METHOD:	PERFORMED	_____	SIMULATED	_____

OPERATOR'S NAME: _____

The operator's performance was evaluated against the standards contained in this JPM and is determined to be:

SATISFACTORY: _____
UNSATISFACTORY: _____

DOCUMENTATION

SO 10-05 JPM NRC RO/SRO A.1.b

JPM LEVEL: RO/SRO

ESTIMATED TIME TO COMPLETE: 20 minutes

TIME CRITICAL JPM: NO **CRITICAL TIME:** N/A

POSITION: CO

TASK SYS ID: 141358

TASK DESCRIPTION

Calculate a blend for automatic or manual makeup operations.

KA NUMBER: G2.1.23

KA VALUES: **RO** 3.9 **SRO** 4.0

10CFR55.45 APPLICABILITY: 2, 6

REFERENCES:

SO23-3-2.2, Makeup Operations, Rev. 18.

Licensee Controlled Specifications Figure 3.1.104-1, Minimum Stored Acid Volume, Rev. 2.

AUTHOR: L. Zilli

DATE: _____

OPERATIONS REVIEW: M. Jones

DATE: _____

APPROVED BY: A. Hagemeyer

DATE: _____

MODIFICATION HISTORY

REV	DESCRIPTION OF CHANGE	MODIFIED BY	DATE MODIFIED	SOT APPROVAL
0	New. This JPM was derived from JPM 215A.	-	-	-

SET-UP

Provide candidate with a complete copy of SO23-3-2.2, Makeup Operations and a copy of the Licensee Controlled Specifications.

JPM: SO 10-05 JPM NRC RO/SRO A.1.b TITLE: Perform an RWST Blended Makeup Calculation

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
CUE: Provide examinee with a complete copy of SO23-3-2.2, Makeup Operations and a copy of the Licensee Controlled Specifications.				
1	Identifies Attachment 10, Section 2.2 applies.	LOCATE Attachment 10 and IDENTIFY Section 2.2 as required "Formula to Calculate a Blended Makeup to the RWSTs."		Start Time: _____
2*	Determines Boric Acid flow rate.	DETERMINE Boric Acid flow rate. RWST ppm (2650) / BAMU ppm (5420) X Desired Flow Rate (40 gpm) = 19.5 ± 0.1 gpm Boric Acid for blend.		
3*	Determines PMW flow rate.	DETERMINE PMW flow rate. Desired Total Flow (40 gpm) – gpm Acid for Blend (19.5) = 20.5 ± 0.1 gpm PMW for blend.		
4	Identifies Attachment 10, Section 2.4 applies.	LOCATE Attachment 10 and IDENTIFY Section 2.5 as required "Formula to Determine RWST Volume from a Change in Level."		
5*	Determines volume required to raise RWST volume from 97% to 100%.	DETERMINE required RWST volume. RWST volume in gallons = 4924 gallons / % x 3% = 14772 gallons.		
CUE: The SRO Operations Supervisor reports the necessary Boration Flowpaths are OPERABLE.				
6*	Complete Attachment 14, Section 1.0, Prerequisites.	VERIFY current copy of procedure and CALCULATE that 14772 gallons of makeup is required to raise the RWST from 97% to 100% per Attachment 10 Step 2.4.		

JPM: SO 10-05 JPM NRC RO/SRO A.1.b TITLE: Perform an RWST Blended Makeup Calculation

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
8	Complete Attachment 14, Step 1.5, Determine RWST final Boron Concentration.	DETERMINE that the initial and final boron concentration will be 2650 ppm .		
9	Complete Attachment 14, Step 1.6; Is final RWST Boron Concentration between 2650 and 2800 ppm?	DETERMINE that the final boron concentration is 2650 ppm and CHECK the YES box.		
10*	Complete Attachment 14, Step 1.6.2 by determining the volume of boric acid available in the BAMU Tanks.	CALCULATE the volume of boric acid available using Attachment 10, Section 2.6, "Formula to Determine BAMU Tank Volume from a Change in Level." 97 % x 106 gal. / % = 10282 gallons in T-071. 93 % x 106 gal. / % = 9858 gallons in T-072. Total gallons available = 20140 gallons		
11*	Complete Attachment 14, Step 1.6.2 by determining the volume of boric acid used.	CALCULATE the volume of boric acid used: 19.5 BA flow / 40 MU flow x 14772 gallons = 7201 ± 10 gallons of boric acid added.		
12*	Complete Attachment 14, Step 1.6.2 by determining the volume of boric acid available in the BAMU Tanks following addition to the RWSTs.	CALCULATE the volume of boric acid available in the BAMU Tanks following the addition to the RWST: 20140 – 7201 = 12939 ± 10 gallons available in the BAMU tanks.		

JPM: SO 10-05 JPM NRC RO/SRO A.1.b TITLE: Perform an RWST Blended Makeup Calculation

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
13*	Complete Attachment 14, Step 1.6.2 by determining the minimum volume of boric acid required.	REFER to LCS Figure 3.1.104-1, “Minimum Stored Acid Volume (Gallons)” and DETERMINE 7500 ± 200 gallons is the required minimum volume with the RWST at 2650 ppm and the BAMU Tanks at 3.1 weight % .		
14*	Complete Attachment 14, Step 1.6.2; Based on delta volume added to the RWST, will the BAMU Tanks continue to meet the requirements of LCS Figure 3.1.104-1?	DETERMINE that sufficient boron is available in the BAMU Tanks and CHECK the YES box.		
<p>TERMINATING CUE: Stop Time: _____ This JPM is complete.</p>				

JPM CHECKLIST

1. The JPM is:
 - a. X Supported by facility's job task analysis.
 - b. X Operationally important (meets threshold criterion of K/A 3.0 or greater).
 - c. X Designed as either SRO only, or RO/SRO.

2. Each JPM includes:
 - a. X Initial conditions.
 - b. X Initiating cues.
 - c. X References, including associated procedures.
 - d. X Performance standards which are specific in that control and indication nomenclature and criteria (switch position, meter reading) are specified, even if these criteria are not specified in the procedural step.

 - e. X System response cues that are complete and correct so that the examiner can properly cue the Examinee, if asked.

 - f. X Statements describing important actions or observations that should be made by the Examinee.

 - g. X Criteria for successful completion.
 - h. X Identification of the critical steps and their associated performance standards.
 - i. X Validated time limits (average time allowed for completion).
 - j. X JPMs identified as time critical or not time critical by the Operations Division based on NRC commitments.

COMPLETED BY: L. Zilli **DATE:** 08/05/05

JPM INFORMATION SHEET

JPM NUMBER

SO 10-05 NRC RO/SRO A.3

INITIAL PLANT CONDITIONS

You have been directed to perform a valve alignment in for the Shutdown Cooling Heat Exchanger 3E004 Room. The task involves uncapping and opening drain valve S31206MR040, and attaching a drain hose directed to the floor drain.

TASK TO BE PERFORMED

Select the appropriate REP for the work to be performed **and** determine allowable stay time in the work area.

JOB PERFORMANCE MEASURE

SO 10-05 NRC RO/SRO A.3

SUGGESTED TESTING ENVIRONMENT:	PLANT	X	SIMULATOR	X
		<hr/>		<hr/>
ACTUAL TESTING ENVIRONMENT:	PLANT	<hr/>	SIMULATOR	<hr/>
ACTUAL TESTING METHOD:	PERFORMED	<hr/>	SIMULATED	<hr/>

OPERATOR'S NAME: _____

The operator's performance was evaluated against the standards contained in this JPM and is determined to be:

SATISFACTORY: _____

UNSATISFACTORY: _____

DOCUMENTATION

SO 10-05 NRC RO/SRO A.3

JPM LEVEL: RO/SRO

ESTIMATED TIME TO COMPLETE: 10 minutes

TIME CRITICAL JPM: NO **CRITICAL TIME:** N/A

POSITION: ACO

TASK SYS ID: N/A

TASK DESCRIPTION

Determine Stay Time.

KA NUMBER: G2.3.2

KA VALUES: **RO** 2.5 **SRO** 2.9

10CFR55.45 APPLICABILITY: 8, 9

REFERENCES:

SO123-VII-20.9, Radiological Surveys, Rev. 6-3

AUTHOR: L. Zilli

DATE: _____

OPERATIONS REVIEW: M. Jones

DATE: _____

APPROVED BY: A. Hagemeyer

DATE: _____

MODIFICATION HISTORY

REV	DESCRIPTION OF CHANGE	MODIFIED BY	DATE MODIFIED	SOT APPROVAL
0	New	-	-	-
1	Compared against SO123-VII-20.9 with minor changes required. Modified JPM with new Survey Maps and REPs. Selected different location for JPM to be performed.	LRZ	07/25/05	AHH

SET-UP

Provide applicant with survey maps and REPs to choose from. Also supply Unit 3 Safety Equipment Building Floor Plan. (Mosaic will NOT be available.)

Note to Examiner: Information regarding methods of posting Radiological conditions on Survey Maps can be found in Section 6.2 of SO123-VII-20.9. Definitions for Survey Map abbreviations and acronyms can be found in Attachment 2 of SO123-VII-20.9

JPM: SO 10-05 NRC RO/SRO A.3

TITLE: Determine Stay Time for Work to be Performed

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
CUE: Provide applicant with Survey Map #050705-006, Elevation 8' (2 maps) and -15' (2 maps), and 3 REPs to choose from. Direct candidate to assume all radiation exposure received is in the general area. Also supply Unit 3 Safety Equipment Building Floor Plan. (Mosaic will NOT be available)				
1*	Determine applicable survey map.	LOCATE survey map #050705-006, Page 4 of 4 for the task to be performed. (Safety Equipment Building: Train "A" Shutdown Cooling Heat Exchanger Room 3E-004 Room.)		Start Time: _____
2*	Determine REP that provides coverage of the task performed.	LOCATE and REVIEW REP #200198 , which allows vent and drain activities.		
3*	Determine Stay Time in work area.	Based upon general area radiation levels in area and required setpoint of alarming dosimeter, DETERMINE that stay time will be 110 minutes based on 30 mR/hr general area radiation and 100 mR dose alarm.		
TERMINATING CUE: This JPM is complete.				Stop Time: _____

JPM CHECKLIST

1. The JPM is:
 - a. X Supported by facility's job task analysis.
 - b. X Operationally important (meets threshold criterion of K/A 3.0 or greater).
 - c. X Designed as either SRO only, or RO/SRO.

2. Each JPM includes:
 - a. X Initial conditions.
 - b. X Initiating cues.
 - c. X References, including associated procedures.
 - d. X Performance standards which are specific in that control and indication nomenclature and criteria (switch position, meter reading) are specified, even if these criteria are not specified in the procedural step.
 - e. X System response cues that are complete and correct so that the examiner can properly cue the Examinee, if asked.
 - f. Statements describing important actions or observations that should be made by the Examinee.
 - g. X Criteria for successful completion.
 - h. X Identification of the critical steps and their associated performance standards.
 - i. X Validated time limits (average time allowed for completion).
 - j. X JPMs identified as time critical or not time critical by the Operations Division based on NRC commitments.

COMPLETED BY: L. Zilli **DATE:** 08/05/05

JPM INFORMATION SHEET

JPM NUMBER

SO 10-05 JPM NRC SRO A.1.a

INITIAL PLANT CONDITIONS

Unit 2 has been operating for several days at a steady state power level greater than 20%.

A reactor power calculation (Manual Method) has been performed due to COLSS Primary calculation being unavailable.

There is NO Auxiliary Feedwater Flow indicated.

TASK TO BE PERFORMED

As the Control Room Supervisor, review the Reactor Power Calculation (Manual Method) IAW SO23-3-3.38.

JOB PERFORMANCE MEASURE

SO 10-05 JPM NRC SRO A.1.a

SUGGESTED TESTING ENVIRONMENT:	PLANT	X	SIMULATOR	X
ACTUAL TESTING ENVIRONMENT:	PLANT	_____	SIMULATOR	_____
ACTUAL TESTING METHOD:	PERFORMED	_____	SIMULATED	_____

OPERATOR'S NAME: _____

The operator's performance was evaluated against the standards contained in this JPM and is determined to be:

SATISFACTORY: _____
UNSATISFACTORY: _____

DOCUMENTATION

SO 10-05 JPM NRC SRO A.1.a

JPM LEVEL: SRO

ESTIMATED TIME TO COMPLETE: 30 minutes

TIME CRITICAL JPM: NO **CRITICAL TIME:** N/A

POSITION: CRS

TASK SYS ID: 187652

TASK DESCRIPTION

Authorize, supervise, and review all surveillance tests performed on shift.

KA NUMBER: G2.1.20

KA VALUES: **RO** 4.3 **SRO** 4.2

10CFR55.45 APPLICABILITY: 12

REFERENCES:

SO23-3-3.38, Reactor Power Calculation (Manual Method), Revision 7

AUTHOR: L. Zilli

DATE: _____

OPERATIONS REVIEW: M. Jones

DATE: _____

APPROVED BY: A. Hagemeyer

DATE: _____

MODIFICATION HISTORY

REV	DESCRIPTION OF CHANGE	MODIFIED BY	DATE MODIFIED	SOT APPROVAL
0	New	-	-	-
1	Compared against SO23-3.3.38, Rev. 7 and modified errors contained within the Reactor Power Calculation. Additionally, new final power level calculation required by SRO.	LRZ	07/27/05	REV

SET-UP

Provide the examinee with a copy of SO23-3-3.38, Reactor Power Calculation (Manual Method), with a filled out calculation.

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
NOTE: Provide the examinee with a copy of SO23-3-3.38, Reactor Power Calculation (Manual Method), with a filled out calculation.				
1	Complete prerequisites.	VERIFY prerequisites are complete by checking: <ul style="list-style-type: none"> • Power > 20% • No AFW Flow • Reactor Power Stable 		Start Time: _____
2	Verify data in Attachment 1 Steps 2.2.1 thru 2.2.4.	VERIFY the PMS Computer was used to record data in Steps 2.2.1 thru 2.2.4 and VERIFY the appropriate boxes to indicate whether Preferred or Alternate points were used.		
3	Determine Average Feedwater Inlet Temperature.	VERIFY the Average Feedwater Inlet Temperature was calculated and recorded (447°F) in the lower right hand column of Step 2.2.1.		
4*	Determine Average Feedwater Pressure.	VERIFY the Average SG Inlet Pressure was calculated and recorded and DETERMINE the <u>incorrect number</u> was placed in the lower right hand column of Step 2.2.2 (1025 psia vice 1024 psia) and <u>corrects error</u> .		

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
5	Determine Average SG Pressure.	VERIFY the Average SG Pressure was calculated and recorded and the correct number (809 psia) placed in the lower right hand column of Step 2.2.3.		
6	Determine Total Feedwater Flow.	VERIFY Total Feedwater flow and DETERMINE the correct number (1.484 E7 lbm/hr) was placed in the lower right hand column of Step 2.2.4.		
7	Verify SG E-088 Stm/FW Flow recorder NR & WR Pen indications agree within 500K lbm/hr.	VERIFY SG E-088 Stm/FW Flow Recorder NR (Blue) Pen 2FT-1122 & WR (Green) Pen 2FT-1121 indications and VERIFY they agree within 500K lbm/hr.		
CUE: SG E-088 indications agree within 500K lbm/hr.				
8	Verify SG E-089 Stm/FW Flow Recorder NR & WR Pen indications agree within 500K lbm/hr.	VERIFY SG E-089 Stm/FW Flow Recorder NR (Blue) Pen 2FT-1112 & WR (Green) Pen 2FT-1111 indications and VERIFY they agree within 500K lbm/hr.		
CUE: SG E-089 indications agree within 500K lbm/hr.				
CUE: Refer to Comments in Section 3.0. The Control Operator used the Tables in Attachment 2, Properties of Water.				
9*	Determine the Change in Average Enthalpy.	VERIFY the Change in Average Enthalpy 1199.1 ± 1 Btu/lbm - 427.2 ± 1 Btu/lbm = 771.9 ± 1 Btu/lbm and DETERMINE correct number was placed in the lower right hand column of Step 2.3.1.		

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
10*	Determine Average Secondary Power.	DETERMINE the Average Secondary Power $771.9 \text{ Btu/lbm} \times 1.484 \text{ E7 lbm/hr} = 1.1454\text{E10 Btu/hr}$ and DETERMINE the <u>incorrect number</u> was placed in the lower right hand column of Step 2.3.2 and <u>corrects error</u> .		
11*	Determine % Full Reactor Power.	DETERMINE the % Full Reactor Power $(1.1454\text{E10 Btu/hr} \div 1.173\text{E8 Btu/hr} = 97.65 \pm 0.5\%)$ and DETERMINE the <u>incorrect power level</u> was calculated and recorded in the lower right hand column of Step 2.3.3. Value should be $97.65 \pm 0.5\%$, corrects error of 96.75%.		
12	Verify acceptance criteria have been met.	VERIFY the acceptance criteria has been met by ensuring the following conditions were maintained during the calculations: <ul style="list-style-type: none"> • Power > 20% • No AFW Flow • Reactor Power Stable 		
TERMINATING CUE: This JPM is complete.				Stop Time: _____

JPM CHECKLIST

1. The JPM is:
 - a. X Supported by facility's job task analysis.
 - b. X Operationally important (meets threshold criterion of K/A 3.0 or greater).
 - c. X Designed as either SRO only, or RO/SRO.

2. Each JPM includes:
 - a. X Initial conditions.
 - b. X Initiating cues.
 - c. X References, including associated procedures.
 - d. X Performance standards which are specific in that control and indication nomenclature and criteria (switch position, meter reading) are specified, even if these criteria are not specified in the procedural step.

 - e. X System response cues that are complete and correct so that the examiner can properly cue the Examinee, if asked.

 - f. X Statements describing important actions or observations that should be made by the Examinee.

 - g. X Criteria for successful completion.
 - h. X Identification of the critical steps and their associated performance standards.
 - i. X Validated time limits (average time allowed for completion).
 - j. X JPMs identified as time critical or not time critical by the Operations Division based on NRC commitments.

COMPLETED BY: L. Zilli **DATE:** 08/05/05

JPM INFORMATION SHEET

JPM NUMBER

SO 10-05 JPM NRC SRO A.2

INITIAL PLANT CONDITIONS

Unit 3 is in Hot Standby at ~1% power with all equipment operating normally except the LCOAR/EDMR Tracking System (LETS) Computer is not available. The Shift Manager received a call from the Shift Chemist and Engineering this morning October 24, 2005 at 8 AM (10/24/05 @ 0800) stating that the biennial calculation for Unit 3 Trisodium Phosphate Dodecahydrate crystals was determined to be 285 ft³. It is believed that the cause is due to settling of contents over time. A Safety Function Determination (SFD) has been completed. A Non-Conformance Report (NCR), Work Authorization Request (WAR), and Action Request (AR) to correct the problem are in progress. A calculation for Unit 2 is also in progress.

TASK TO BE PERFORMED

The Shift Manager has directed you to complete a manual LCOAR for Unit 3 Trisodium Phosphate Dodecahydrate. Inform the Shift Manager when complete.

JOB PERFORMANCE MEASURE

SO 10-05 JPM NRC SRO A.2

SUGGESTED TESTING ENVIRONMENT:	PLANT	X	SIMULATOR	X
		<hr/>		<hr/>
ACTUAL TESTING ENVIRONMENT:	PLANT	<hr/>	SIMULATOR	<hr/>
ACTUAL TESTING METHOD:	PERFORMED	<hr/>	SIMULATED	<hr/>

OPERATOR'S NAME: _____

The operator's performance was evaluated against the standards contained in this JPM and is determined to be:

SATISFACTORY: _____
UNSATISFACTORY: _____

DOCUMENTATION

SO 10-05 JPM NRC SRO A.2

JPM LEVEL: SRO

ESTIMATED TIME TO COMPLETE: 20 minutes

TIME CRITICAL JPM: NO **CRITICAL TIME:** N/A

POSITION: CRS

TASK SYS ID: 192880

TASK DESCRIPTION

Initiate, review, and closeout an LCOAR.

KA NUMBER: 2.2.24

KA VALUES: **RO** 2.6 **SRO** 3.8

10CFR55.45 APPLICABILITY: 13

REFERENCES:

SO123-0-A5, Technical Specification LCOAR/EDMR, Revision 2-1

Technical Specification 3.5.5, Trisodium Phosphate Dodecahydrate

SO123-III-1.14.23, Trisodium Phosphate Rack Inspection, Sample Collection, and Testing, Rev. 6.

AUTHOR: L. Zilli

DATE: _____

OPERATIONS REVIEW: M. Jones

DATE: _____

APPROVED BY: A. Hagemeyer

DATE: _____

MODIFICATION HISTORY

REV	DESCRIPTION OF CHANGE	MODIFIED BY	DATE MODIFIED	SOT APPROVAL
1	Compared against new version of procedure using SO123-0-A5, Rev. 2-1 and implemented changes as required. Modified JPM to reflect new Technical Specification used.	LRZ	08/02/05	REV

SET-UP

Provide the examinee with a copy of SO123-0-A5, Technical Specification LCOAR/EDMR with extra copies of Attachments 1, 2 and 3 and Technical Specifications.

Complete Attachment 1 for use as an answer guide.

Definitions:

LCOAR – Limiting Condition for Operation ACTION Requirement

EDMR – Equipment Deficiency MODE Restraint

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
NOTE: When located, provide the examinee with a copy of SO123-0-A5, Technical Specification LCOAR/EDMR with extra copies of Attachments 1, 2 and 3 and Technical Specifications.				
1*	Refer to Tech Specs to identify the LCO and Action requirements.	REFER to Tech Specs and IDENTIFY Limiting Condition Operation 3.5.5 Action A.		Start Time: _____
2*	Refer to the procedure and select the proper forms.	REFER to SO123-0-A5 and SELECT Attachment 1.		
NOTE: Keypoints in Step 3 are not critical to task completion. Keypoints in Step 4 <u>are</u> critical to task completion. Any Keypoints not listed may or may not be filled in by the examinee.				
3	Complete LCOAR, Attachment 1.	COMPLETE Attachment 1, Keypoints 1, 2, 3, 6, 7, 10, 11 and 12 (as a minimum). REFER to Attachment 3 as necessary to complete the LCOAR.		
NOTE: Examinee may choose to complete Keypoint 18 as opposed to the LCO shown in Keypoint 8.				
4*	Complete LCOAR, Attachment 1.	COMPLETE Attachment 1, Keypoints 4, 5, 8, and 9 (as a minimum). REFER to Attachment 3 as necessary to complete the LCOAR.		
NOTE: Refer to the completed Attachment 1 for representative entries for each Keypoint. It is not expected that the wording used by the candidate will match the reference Attachment 1 exactly.				

JPM: SO 10-05 JPM NRC SRO A.2

TITLE: Complete a Manual LCOAR for Trisodium Phosphate Dodecahydrate

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
5	Inform the Shift Manager when complete.	INFORM the Shift Manager that the LCOAR is complete.		
TERMINATING CUE: This JPM is complete.				Stop Time: _____

JPM CHECKLIST

1. The JPM is:
 - a. X Supported by facility's job task analysis.
 - b. X Operationally important (meets threshold criterion of K/A 3.0 or greater).
 - c. X Designed as either SRO only, or RO/SRO.

2. Each JPM includes:
 - a. X Initial conditions.
 - b. X Initiating cues.
 - c. X References, including associated procedures.
 - d. X Performance standards which are specific in that control and indication nomenclature and criteria (switch position, meter reading) are specified, even if these criteria are not specified in the procedural step.

 - e. X System response cues that are complete and correct so that the examiner can properly cue the Examinee, if asked.

 - f. X Statements describing important actions or observations that should be made by the Examinee.

 - g. X Criteria for successful completion.
 - h. X Identification of the critical steps and their associated performance standards.
 - i. X Validated time limits (average time allowed for completion).
 - j. X JPMs identified as time critical or not time critical by the Operations Division based on NRC commitments.

COMPLETED BY: L. Zilli **DATE:** 08/05/05

JPM INFORMATION SHEET

JPM NUMBER

SO 10-05 JPM NRC SRO A.4

**NOTE: THIS JPM IS WITHHELD FROM PUBLIC DISCLOSURE
BECAUSE IT CONTAINS SENSITIVE UNCLASSIFIED INFORMATION**

JPM INFORMATION SHEET

JPM NUMBER

SO 10-05 JPM NRC RO S-8

INITIAL PLANT CONDITIONS

The reactor has just tripped from full power. The CRS has directed the crew to carry out the Standard Post Trip Actions and report. The crew is performing the second pass through the SPTAs.

TASK TO BE PERFORMED

Perform the Control Operators actions of the Standard Post Trip Actions. Provide feedback to the CRS, as appropriate.

SUGGESTED TESTING ENVIRONMENT:	PLANT _____	SIMULATOR <u> X </u>
ACTUAL TESTING ENVIRONMENT:	PLANT _____	SIMULATOR _____
ACTUAL TESTING METHOD:	PERFORMED _____	SIMULATED _____

OPERATOR'S NAME: _____

The operator's performance was evaluated against the standards contained in this JPM and is determined to be:

SATISFACTORY: _____

UNSATISFACTORY: _____

DOCUMENTATION

SO 10-05 JPM NRC RO S-8

JPM LEVEL: RO/SRO

ESTIMATED TIME TO COMPLETE: 10 minutes

TIME CRITICAL JPM: NO **CRITICAL TIME:** N/A

POSITION: CO

TASK SYS ID:

TASK DESCRIPTION

Respond to a reactor trip by performing the standard post trip actions.

KA NUMBER: 013 A3.02

KA VALUES: **RO** 4.1 **SRO** 4.2

10CFR55.45 APPLICABILITY: 5 and 6

REFERENCES:

SO23-12-1, Standard Post Trip Actions, Rev. 20

SO23-3-2.22, ESFAS Operation, Rev. 14-5

AUTHOR: L. Zilli

DATE: _____

OPERATIONS REVIEW: M. Jones

DATE: _____

APPROVED BY: A. Hagemeyer

DATE: _____

MODIFICATION HISTORY

REV	DESCRIPTION OF CHANGE	MODIFIED BY	DATE MODIFIED	SOT APPROVAL
0	New. This JPM was developed using J182FS to include a Containment Cooling Actuation Signal that fails to actuate. Additionally, the RNO steps for lowering Pressurizer level and pressure were removed as they are N/A for this scenario.	-	-	-

SET-UP

Use IC-173 (Event File Delete J-100) for October 2005 NRC JPM Exams.

Otherwise, begin with any full power initial condition, and perform the following:

- Insert malfunction for CIAS does not auto actuate.
- Insert malfunction for CCAS fails to actuate / must manually align.
- Trip the unit.
- Insert malfunction MS03A at 1.0% (Steamline break inside Containment) then remove the malfunction 2 minutes and 10 seconds later.

NOTE: The examinee will use the Control Room “Hardcards” or a copy of SO23-12-1, Standard Post Trip Actions to perform this JPM. The examiner should have a copy of SO23-3-2.22, ESFAS Operation available if requested.

JPM: SO 10-05 JPM NRC RO S-8

TITLE: Perform the Control Room Operator Actions of the Standard Post Trip Actions

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
<p>NOTE: As the examinee reports the SPTA safety functions, it is permissible for the examiner to state: (name), Understand (safety function name) is satisfied.</p> <p>NOTE: The examinee will use the Control Room “Hardcards” or a copy of SO23-12-1, Standard Post Trip Actions to perform this JPM.</p> <p>CUE: (NAME), report Reactivity Control.</p>				
1	VERIFY reactor trip circuit breakers (8) open.	OBSERVE Reactor Trip Status, 2UI-9157 green lights illuminated for reactor trip breakers.		Start Time: _____
2	VERIFY maximum of one full length CEA not fully inserted.	OBSERVE CEA Bottom Indication, 2ZI-9131 all lights illuminated; CEA Operator Module, 2UI-9134 green lights illuminated; Secondary Rod Position, 2ZI-9133 indicating all rods inserted.		
3	VERIFY reactor power lowering.	OBSERVE Startup Channel 1 and 2 Percent Power, 2JI-0006B1 and 2JI-0005B2 and/or LOG POWER, 2JI-0001-1, 2JI-0001-2, 2JI-0001-A3, and 2JI-0001-A4 and DETERMINE that Reactor power is lowering.		
4	VERIFY startup rate negative.	OBSERVE Startup Rate Channel 1, 2JI-9153-1 and Startup Rate Channel 2, 2JI-9153-2 and determines that startup rate is negative.		
<p>CUE: The ACO reports Vital Auxiliaries criteria to the CRS.</p> <p>CUE: (NAME), report RCS Inventory Control.</p>				

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
5	VERIFY PZR level between 10% and 70% AND trending to between 30% and 60%.	OBSERVE indicators 2LI-0110A1, Pressurizer Level; 2LI-0110A2, Pressurizer Level; 2LI-0103, Pressurizer Level Density Compensated; and recorder 2LR-0110A, Pressurizer Level and determines that pressurizer level is between 10% and 70% and is trending to between 30% and 60%.		
6	VERIFY Core Exit Saturation Margin greater than or equal to 20°F.	SELECT page 611 on QSPDS or page 311 on CFMS and determines that Core Exit Saturation Margin is greater than 20°F.		
CUE: (NAME), report RCS Pressure Control.				
7	VERIFY PZR pressure (WR and NR) between 1740 psia and 2380 psia and controlled AND trending to between 2025 psia and 2275 psia.	OBSERVE Pressurizer Pressure Narrow Range 2PI-0101A or 2PI-0101B; Pressurizer Pressure Wide Range 2PI-0102A or 2PI-0102B; Pressurizer E087 Pressure Narrow Range 2PI-0101-1, -2, -3, -4; Pressurizer E087 Pressure Wide Range 2PI-0102A1, A2, A3, A4 and determines that PZR pressure is between 1740 psia and 2380 psia and is trending to between 2025 psia and 2275 psia.		
CUE: (NAME), report Core Heat Removal.				
8	VERIFY at least one RCP operating.	OBSERVE red lights and pump amps for 2P001(SE) 2HS-9160A, 2P003(SW) 2HS-9161A, 2P004(NW) 2HS-9162A, 2P002(NE) 2HS-9163A and determines that all RCPs are running.		

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
9	VERIFY core loop ΔT ($T_H - T_C$) less than 10°F.	OBSERVE temperature instruments to calculate ΔT . Hot Leg Narrow Range Temp Loop 1, 2TI-0112-1,-2,-3,-4; Hot Leg Narrow Range Temp Loop 2, 2TI-0122-1,-2,-3,-4; Cold Leg Temperature Loop 1A, 2TI-9178-1 & 2TI-9178-3; Cold Leg Temperature Loop 2A, 2TI-9179-1 & 2TI-9179-3; Cold Leg Temperature Loop 1B, 2TI-9178-2 & 2TI-9178-4; Cold Leg Temperature Loop 2B, 2TI-9179-2 & 2TI-9179-4 and determines that core loop ΔT is less than 10°F.		
10	VERIFY Core Exit Saturation Margin greater than or equal to 20°F.	SELECT page 611 on QSPDS or page 311 on CFMS and determines that Core Exit Saturation Margin is greater than 20°F.		
CUE: The ACO reports RCS Heat Removal criteria to the CRS. CUE: (NAME), report Containment Isolation.				
11	VERIFY Containment Pressure less than 1.5 psig.	OBSERVE indicators for Containment Pressure Narrow Range 2PI-0351-1, -2, -3, -4 and DETERMINE that Containment Pressure is greater than 3.4 psig.		
12	ENSURE SIAS is actuated.	OBSERVE annunciators 57A01 and 57B01 and DETERMINE that SIAS has actuated.		

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
13	ENSURE CIAS is actuated.	OBSERVE annunciators 57A02 and 57B02 and DETERMINE that CIAS has NOT actuated.		
14*	Manually ACTUATE CIAS.	DEPRESS CIAS Manual Initiation 2HS-9136-1 and -2 or 2HS-9136-3 and -4.		
15	ENSURE CCAS is actuated.	OBSERVE annunciators 57A07 and 57B07 and DETERMINE that CCAS has NOT actuated.		
16*	Manually ACTUATE CCAS.	DEPRESS CCAS Manual Initiation 2HS-9138-1 and 2HS-9138-2 or 2HS-9138-3 and 2HS-9138-4 and DETERMINE CCAS has not actuated.		
17	ENSURE CRIS is actuated.	OBSERVE annunciators 60B07 and determines that CRIS has actuated.		
18*	STOP all RCPs.	DEPRESS STOP pushbuttons for 2P001(SE) 2HS-9160A, 2P003(SW) 2HS-9161A, 2P004(NW) 2HS-9162A, and 2P002(NE) 2HS-9163A.		
19	VERIFY Containment Area Radiation Monitors – energized AND – NOT alarming or trending to alarm.	OBSERVE Containment Area Radiation Monitors are energized and NOT alarming using the Data Acquisition System (DAS) screens.		

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
20	VERIFY Secondary Plant Radiation Monitors – energized AND – NOT alarming or trending to alarm.	OBSERVE Secondary Plant Radiation Monitors are energized and NOT alarming using the Data Acquisition System (DAS) screens.		
CUE: (NAME), report Containment Temperature, Pressure and Combustible Gas Control.				
21	VERIFY Containment average temperature – less than 120°F.	OBSERVE indicators for Containment Temperature 2TI-9903-1 and 2TI-9911-2 and DETERMINE that Containment Temperature is greater than 120°F.		
22	VERIFY Containment pressure – less than 1.5 PSIG.	OBSERVE indicators for Containment Pressure Narrow Range 2PI-0351-1, -2, -3, -4 and DETERMINE that Containment Pressure is greater than 3.4 psig.		
NOTE: Examinee will transition to the RNO column.				
23	ENSURE proper functioning of Normal Containment Cooling.	OBSERVE Normal Containment Cooling. is NOT functioning properly due to SIAS and CIAS.		

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
24*	ENSURE at least one Containment Dome Air Circulator – operating.	<p>VERIFY Containment Dome Air Circulator 2A074 is running and START all other Containment Dome Air Circulators:</p> <p>DEPRESS START pushbutton 2HS-9965-1 for 2A071 (NW) and VERIFY red START light illuminated.</p> <p>DEPRESS START pushbutton 2HS-9966-2 for 2A072 (SW) and VERIFY red START light illuminated.</p> <p>DEPRESS START pushbutton 2HS-9968-2 for 2A073 (SE) and VERIFY red START light illuminated.</p>		
25	IF Containment pressure – greater than 3.4 PSIG, THEN ENSURE the following actuated: SIAS, CIAS, CCAS, CRIS	OBSERVE indicators for Containment Pressure Narrow Range 2PI-0351-1, -2, -3, -4 and DETERMINE that Containment Pressure is greater than 3.4 psig.		

JPM: SO 10-05 JPM NRC RO S-8

**TITLE: Perform the Control Room Operator Actions of the Standard
Post Trip Actions**

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
26	ENSURE all available Containment Emergency Cooling Units – operating.	DEPRESS the START pushbutton for all Containment Emergency Cooling Units: 2HS-9947-1 for Containment ECU 2E401 (NW). 2HS-9953-1 for Containment ECU 2E399 (SW). 2HS-9939-2 for Containment ECU 2E400 (SE). 2HS-9955-2 for Containment ECU 2E402 (NE).		
TERMINATING CUE: This JPM is complete.				Stop Time: _____

JPM CHECKLIST

1. The JPM is:
 - a. X Supported by facility's job task analysis.
 - b. X Operationally important (meets threshold criterion of K/A 3.0 or greater).
 - c. X Designed as either SRO only, or RO/SRO.

2. Each JPM includes:
 - a. X Initial conditions.
 - b. X Initiating cues.
 - c. X References, including associated procedures.
 - d. X Performance standards which are specific in that control and indication nomenclature and criteria (switch position, meter reading) are specified, even if these criteria are not specified in the procedural step.
 - e. X System response cues that are complete and correct so that the examiner can properly cue the Examinee, if asked.
 - f. Statements describing important actions or observations that should be made by the Examinee.
 - g. X Criteria for successful completion.
 - h. X Identification of the critical steps and their associated performance standards.
 - i. X Validated time limits (average time allowed for completion).
 - j. X JPMs identified as time critical or not time critical by the Operations Division based on NRC commitments.

COMPLETED BY: L. Zilli **DATE:** 08/05/05

JPM INFORMATION SHEET

JPM NUMBER

SO 10-05 JPM NRC RO/SRO C-5

INITIAL PLANT CONDITIONS

A Station Blackout has occurred on Units 2 & 3. The Control Room has lost ventilation.

The Control Room Emergency AC Units were aligned as follows prior to the Station Blackout:

Train A (E-418) was aligned to Unit 2.

Train B (E-419) was aligned to Unit 3.

TASK TO BE PERFORMED

Perform Attachment 9, Control Building Ventilation Emergency Actions per SO23-12-11, EOI Supporting Attachments.

JOB PERFORMANCE MEASURE

SO 10-05 JPM NRC RO/SRO C-5

SUGGESTED TESTING ENVIRONMENT:	PLANT	X	SIMULATOR
ACTUAL TESTING ENVIRONMENT:	PLANT		SIMULATOR
ACTUAL TESTING METHOD:	PERFORMED		SIMULATED

OPERATOR'S NAME: _____

The operator's performance was evaluated against the standards contained in this JPM and is determined to be:

SATISFACTORY: _____
UNSATISFACTORY: _____

DOCUMENTATION

SO 10-05 JPM NRC RO/SRO C-5

JPM LEVEL: RO/SRO

ESTIMATED TIME TO COMPLETE: 15 minutes

TIME CRITICAL JPM: NO

CRITICAL TIME: N/A

POSITION: CO/ACO

VISION ID: 188352

TASK DESCRIPTION

Response to a Station Blackout.

KA NUMBER: 055-EK3.02

KA VALUES: **RO** 4.3 **SRO** 4.6

10CFR55.45 APPLICABILITY: 6, 12

REFERENCES:

SO23-12-11, EOI Supporting Attachments, Attachment 9, Control Building Ventilation
Emergency Actions, Rev. 3

AUTHOR: L.Zilli

DATE: 03/12/05

OPERATIONS REVIEW: M. Jones

DATE: 03/22/05

APPROVED BY: A. Hagemeyer

DATE: 03/22/05

MODIFICATION HISTORY

REV	DESCRIPTION OF CHANGE	MODIFIED BY	DATE MODIFIED	SOT APPROVAL
0	New	-	-	-
0-1	Compared against SO23-12-11, Rev 3 with minor changes required.	LRZ	07/26/05	AHH

SET-UP

Provide the Examinee with a copy of SO23-12-11, Attachment 9, Control Building Ventilation Emergency Actions.

JPM: SO 10-05 JPM NRC RO/SRO C-5 TITLE: Control Building Ventilation Emergency Actions

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
NOTE: Provide the Examinee with a copy of SO23-12-11, Attachment 9, Control Building Ventilation Emergency Actions.				
CUE: No Unit 2 or Unit 3 4160 volt or 480 volt Buses are energized. Remind examinee to simulate all actions.				
1	VERIFY a CR Emergency AC Unit aligned to other units energized 1E 480V bus: <div><div><u>Train A</u></div><div>E-418</div></div> <div><div><u>Train B</u></div><div>E-419</div></div>	VERIFY that both CR Emergency AC Units are de-energized per the Initial Conditions and TRANSITIONS to the RNO.		Start Time: _____
CUE: Open Priority 1 doors ONLY. You have the keys to unlock the Control Room Cabinet Doors.				
2*	INITIATE opening CR Cabinet Doors listed in Table 1.	INITIATE opening CR Cabinet Doors listed in Table 1.		
PANEL	DESCRIPTION	PANEL DOORS TO BE OPENED	KEY NO.	
2L154	HVAC Systems Control Panel	Rear (4 doors)	Unlocked	
2L034	ESFAS Auxiliary Cabinet A	Bays 1,2,3,4,5 and 8 – outer doors; Bay 5 – inner door	24	
2L035	ESFAS Auxiliary Cabinet B	Bays 1,2,3,4,5 and 8 – outer doors; Bay 5 – inner door	25	
2L122	SPEC 200 Instrument Cabinet Process Protection, Channel 1	Front	27 or 28	
2L123	SPEC 200 Instrument Cabinet Process Protection, Channel 1	Front	27 or 28	
2L126	SPEC 200 Instrument Cabinet Process Protection, Channel 2	Front	27 or 28	
2L127	SPEC 200 Instrument Cabinet Process Protection, Channel 2	Front	27 or 28	
2L130	SPEC 200 Instrument Cabinet Process Protection, Channel 3	Front	27 or 28	
2L422	SPEC 200 NSSS Interface Cabinet	Front	27 or 28	
2L134	SPEC 200 Instrument Cabinet Process Protection, Channel 4	Front	27 or 28	
2L188A	SPEC 200 NSSS Cabinet "A" Train	Front	27 or 28	
2L188B	SPEC 200 NSSS Cabinet "B" Train	Front	27 or 28	
CUE: All Priority 1 and Priority 2 doors are open.				

JPM: SO 10-05 JPM NRC RO/SRO C-5 TITLE: Control Building Ventilation Emergency Actions

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
NOTE: If the Control Room is not accessible for continuing, then terminate this JPM.				
3	IF 1E 480V bus energized at opposite Unit, THEN Transfer CR Emergency AC Unit E-416 or E-419 power supply per SO23- 3.2.27, Control Room Isolation and Emergency Ventilation System.	DETERMINE that no 1E 480V bus energized at opposite Unit.		
CUE: Unit 3 EDG 3G003 has been started and Bus 3A06 is energized. CCW Pump 3P026 is running.				
4	VERIFY an Emergency Chiller aligned to other units energized 1E 4kV bus: <u>Train A</u> <u>Train B</u> E-336 E-335	VERIFY Emergency Chiller E-335 is aligned to the Unit 3 Bus 3A06.		
CUE: Emergency Chiller E-335 is aligned to the Unit 3 Bus 3A06.				
5*	ACTUATE CRIS for available train of CR Emergency HVAC.	ACTUATE Train B of CRIS by DEPRESSING 2/3HS-7825A2.		
CUE: Train B of CRIS is actuated.				
6*	START ESF Switchgear Room Emergency Cooling Unit E-255 or E-257 for available train.	START ESF Switchgear Room Emergency Cooling E-257 on Unit 3 by DEPRESSING 3HS-9829-2.		
CUE: ESF Switchgear Room Emergency Cooling E-257 on Unit 3 is running.				
7	VERIFY Control Room Emergency AC Unit E-418 or E-419 – operating.	VERIFY Control Room Emergency AC Unit 3 E-419 is operating.		
CUE: Control Room Emergency AC Unit 3 E-419 is running.				

JPM: SO 10-05 JPM NRC RO/SRO C-5 TITLE: Control Building Ventilation Emergency Actions

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
8	VERIFY ESF Switchgear Room Emergency Cooling Unit E-255 or E-257 – operating.	VERIFY ESF Switchgear Room Emergency Cooling E-257 on Unit 3 is running.		
CUE: ESF Switchgear Room Emergency Cooling E-257 on Unit 3 is running. There are no Control Room Cabinet Emergency Cooling Units operating.				
9*	VERIFY Control Room Cabinet Emergency Cooling Units – operating. <u>Train A</u> <u>Train B</u> E-424 E-423 E-427 E-426	START Control Room Cabinet Emergency Cooling Unit E-426 on Unit 3 by DEPRESSING 3HS-9739-2.		
		TERMINATING CUE: Emergency Cooling Unit E-426 on Unit 3 is running. This JPM is complete.		Stop Time: _____

JPM CHECKLIST

1. The JPM is:
 - a. X Supported by facility's job task analysis.
 - b. X Operationally important (meets threshold criterion of K/A 3.0 or greater).
 - c. X Designed as either SRO only, or RO/SRO.

2. Each JPM includes:
 - a. X Initial conditions.
 - b. X Initiating cues.
 - c. X References, including associated procedures.
 - d. X Performance standards which are specific in that control and indication nomenclature and criteria (switch position, meter reading) are specified, even if these criteria are not specified in the procedural step.
 - e. X System response cues that are complete and correct so that the examiner can properly cue the Examinee, if asked.
 - f. X Statements describing important actions or observations that should be made by the Examinee.
 - g. X Criteria for successful completion.
 - h. X Identification of the critical steps and their associated performance standards.
 - i. X Validated time limits (average time allowed for completion).
 - j. X JPMs identified as time critical or not time critical by the Operations Division based on NRC commitments.

COMPLETED BY: R. Hampton **DATE:** 07/23/05

JPM INFORMATION SHEET

JPM NUMBER

SO 10-05 JPM NRC RO/SRO P-1

INITIAL PLANT CONDITIONS

A station blackout has occurred seven (7) hours ago. Class 1E Battery Bus voltages are currently 105 VDC and lowering. Power is not expected to be restored for at least 20 hours.

TASK TO BE PERFORMED

The Shift Manager directs you to align 2G005 (Unit 2) **or** 3G005 (Unit 3) per SO23-12-11, Attachment 2, Floating Step 26.

SUGGESTED TESTING ENVIRONMENT:	PLANT	X	SIMULATOR	_____
ACTUAL TESTING ENVIRONMENT:	PLANT	_____	SIMULATOR	_____
ACTUAL TESTING METHOD:	PERFORMED	_____	SIMULATED	_____

OPERATOR'S NAME: _____

The operator's performance was evaluated against the standards contained in this JPM and is determined to be:

SATISFACTORY: _____
UNSATISFACTORY: _____

DOCUMENTATION

SO 10-05 JPM NRC RO/SRO P-1

JPM LEVEL: RO/SRO

ESTIMATED TIME TO COMPLETE: 15 minutes

TIME CRITICAL JPM: NO **CRITICAL TIME:** N/A

POSITION: CO/ACO

VISION ID: 192231

TASK DESCRIPTION

Transfer L411 EPPM Panel power to G005 portable generator.

KA NUMBER: 055-EA1.04

KA VALUES: **RO** 3.5 **SRO** 3.9

10CFR55.45 APPLICABILITY: 6, 12

REFERENCES:

SO23-12-11, EOI Supporting Attachments, Attachment 2, Floating Step 26, Connect G005 Portable Generator to L411 EPPM Panel / Startup Channel, Rev. 3

AUTHOR: L. Zilli

DATE: 03/12/05

OPERATIONS REVIEW: M. Jones

DATE: 03/22/05

APPROVED BY: A. Hagemeyer

DATE: 03/22/05

MODIFICATION HISTORY

REV	DESCRIPTION OF CHANGE	MODIFIED BY	DATE MODIFIED	SOT APPROVAL
0	New	-	-	-
0-1	Compared against SO23-12-11, Rev 3 with minor changes required. Deleted Cue for mislabeled door that was corrected in Revision 3.	LRZ	07/26/05	AHH

SET-UP

Provide the Examinee with a copy of SO23-12-11, Floating Step 26, Connect G005 Portable Generator to L411 EPPM Panel/Start-up Channel.

NOTE: Circle the Unit on which this JPM will be performed and inform the Examinee

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
NOTE: Provide the Examinee with a copy of SO23-12-11, Floating Step 26, Connect G005 Portable Generator to L411 EPPM Panel/Start-up Channel.				
1	VERIFY elapsed time from Station Blackout greater than 6 hours AND restoration of power NOT expected to occur within 8 hours following a Station Blackout, OR ALL Class 1E Battery Bus voltages – less than 108 VDC.	VERIFY elapsed time from Station Blackout greater than 6 hours AND restoration of power NOT expected to occur within 8 hours following a Station Blackout and IDENTIFY Class 1E Battery Bus voltages are 105 VDC and lowering.		Start Time: _____
2	OBTAIN approval of Shift Manager to use G005, Portable Generator to supply: <ul style="list-style-type: none"> - L411, EPPM Panel - Start-up Channel B. 	ACKNOWLEDGE that the Shift Manager has already directed performance of this Floating Step.		

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
3	INFORM Security and Health Physics that the following doors will be blocked open: <ul style="list-style-type: none"> - Door 302 on Units 2 & 3 (45' Pen. To 50' SEB Roof) - Door 307 on Unit 2 (45' Pen. To Cable Spreading Room) - Door 342 on Unit 3 (45' Pen. To Cable Spreading Room) 	INFORM Security and Health Physics that the following doors will be blocked open: <ul style="list-style-type: none"> - Door 302 on Units 2 & 3 (45' Pen. To 50' SEB Roof) - Door 307 on Unit 2 (45' Pen. To Cable Spreading Room) - Door 342 on Unit 3 (45' Pen. To Cable Spreading Room) 		
CUE: (When located) The doors are blocked open.				
4*	ALIGN L411, EPPM Panel: <ul style="list-style-type: none"> - CONNECT extension cord to L411P, Plug for EPPM Panel. - SELECT HS-411X – to L411P. - SELECT XS-411 – to ALTERNATE. 	ALIGN L411, EPPM Panel: <ul style="list-style-type: none"> - CONNECT extension cord to L411P, Plug for EPPM Panel. - SELECT HS-411X – to L411P. - SELECT XS-411 – to ALTERNATE. 		

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
CUE: Another operator will align L539 Start-up Channel in the Train A Switchgear Room.				
NOTE: Step 5 is left for examiner reference only. These actions are not performed in this JPM as it would require the examinee to violate the HP Radiation Control Area and go to the 50' Control Building.				
5	ALIGN L539, Start-up Channel: - CONNECT extension cord L539P, Plug for Start-up Channel: (Train A 1E Switchgear Room). - SELECT HS-539X – to L539P. - SELECT XS-539B – to ALTERNATE.	Another operator ALIGNS L539, Start-up Channel: - CONNECTS extension cord L539P, Plug for Start-up Channel in the Train A 1E Switchgear Room. - SELECTS HS-539X to L539P. - SELECTS XS-539B to ALTERNATE.		
6*	MOVE G005, Portable Generator from G005 locker, (45' Pen. Bldg, west end), to SEB roof outside of Door 302.	MOVE G005, Portable Generator from G005 locker, (45' Pen. Bldg, west end), to SEB roof outside of Door 302.		
NOTE: The examinee will be unable to go out onto the SEB roof without violating HP Radiation Controls. Have the examinee explain where they would go (outside onto the roof) and what they would do (get gas can from locker to fill G005 tank). The gasoline is located in a locker approximately 30' from Door 302.				
CUE: (When located) G005 is on the SEB Roof.				
7*	ADD gasoline located in storage area on SEB Roof (Between feedwater regulating valves Rooms 110 and 111) to G005.	ADD gasoline located in storage area on SEB Roof (Between feedwater regulating valves Rooms 110 and 111) to G005.		
CUE: (When located) The gas tank is full.				
8	VERIFY oil level between marks.	VERIFY G005 oil level is between marks on the oil fill stick.		

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
CUE: (When located) The oil level is between the marks.				
9	ENSURE all loads at G005 – disconnected.	ENSURE all loads at G005 are disconnected.		
10*	ENSURE tank vent – ON.	PLACE the G005 gas tank vent to ON.		
CUE: (When located) The gas tank vent is on.				
11*	ENSURE choke – CLOSED.	PLACE the G005 choke to CLOSED.		
CUE: (When located) The choke is closed.				
12*	ENSURE Eco-throttle switch – CLOSED.	PLACE the G005 Eco-throttle switch to CLOSED.		
CUE: (When located) The Eco-throttle switch is closed.				
13*	ENSURE engine switch – ON.	PLACE the G005 engine switch to ON.		
CUE: (When located) The engine switch is on.				
14*	PULL starter.	PULL the starter on G005.		
CUE: If the previous steps were completed correctly, tell the examinee that G005 is running and the engine is warm.				
15*	MOVE choke – to OPEN as engine warms up.	MOVE choke to OPEN as engine warms up.		
CUE: (When located) The choke is open.				

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
16*	CONNECT extension cords to G005 from L411P, EPPM Panel AND from L539P, Start-up Channel B.	CONNECT extension cords to G005 from L411P, EPPM Panel and from L539P, Start-up Channel B.		
CUE: (When located) The extension cords are connected.				
NOTE: L411 (Essential Plant Parameters Monitoring Panel) power supplies are located inside L411 at the bottom of the cabinet. If permission has not been obtained to open the cabinet door then the examinee should explain the general location of the indicating lights and breakers.				
17	VERIFY L411 power supply PS-A energized: - Breaker CLOSED AND Red and Green lights illuminated.	VERIFY L411 power supply PS-A energized with breaker CLOSED and Red and Green lights illuminated.		
CUE: (When located) The breaker is closed and the Red and Green lights are illuminated.				
18	VERIFY L411 power supply PS-B energized: - Breaker CLOSED AND Red and Green lights illuminated.	VERIFY L411 power supply PS-B energized with breaker CLOSED and Red and Green lights illuminated.		
CUE: (When located) The breaker is closed and the Red and Green lights are illuminated.				

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
19*	SELECT SG level indications – to LOCAL. <div style="display: flex; justify-content: space-around;"><u>E088</u><u>EO89</u></div> <div style="display: flex; justify-content: space-around;">HS-1106HS-1105</div>	SELECT HS-1106 for E088 and HS-1105 for E089, SG level indication hand switches to LOCAL.		
CUE: (When located) The SG level indication hand switches are in LOCAL.				
20*	SELECT HS-0100F, PZR pressure indication – to LOCAL.	SELECT HS-0100F, PZR Pressure indication hand switch to LOCAL.		
CUE: (When located) The PZR Pressure indication hand switch is in LOCAL.				
21*	SELECT HS-0103A, PZR level indication – to LOCAL.	SELECT HS-0103A, PZR Level indication hand switch to LOCAL.		
CUE: (When located) The PZR Level indication hand switch is in LOCAL.				
22*	VERIFY Startup-up Channel B – energized.	VERIFY Startup-up Channel B is energized.		
CUE: Startup Channel B is energized.				
TERMINATING CUE: This JPM is complete.				Stop Time: _____

JPM CHECKLIST

1. The JPM is:
 - a. X Supported by facility's job task analysis.
 - b. X Operationally important (meets threshold criterion of K/A 3.0 or greater).
 - c. X Designed as either SRO only, or RO/SRO.

2. Each JPM includes:
 - a. X Initial conditions.
 - b. X Initiating cues.
 - c. X References, including associated procedures.
 - d. X Performance standards which are specific in that control and indication nomenclature and criteria (switch position, meter reading) are specified, even if these criteria are not specified in the procedural step.
 - e. X System response cues that are complete and correct so that the examiner can properly cue the Examinee, if asked.
 - f. X Statements describing important actions or observations that should be made by the Examinee.
 - g. X Criteria for successful completion.
 - h. X Identification of the critical steps and their associated performance standards.
 - i. X Validated time limits (average time allowed for completion).
 - j. X JPMs identified as time critical or not time critical by the Operations Division based on NRC commitments.

COMPLETED BY: R. Hampton **DATE:** 07/23/05

JPM INFORMATION SHEET

JPM NUMBER

SO 10-05 JPM NRC RO/SRO P-2

INITIAL PLANT CONDITIONS

You are the Unit 2(3) Primary ACO. The Control Room has been evacuated due to dense smoke.

All actions recommended or required to be accomplished prior to leaving the Control Room have been completed.

TASK TO BE PERFORMED

Perform duties of Unit 2 (Unit 3) Primary ACO up to and including notifying the Unit 2 (Unit 3) ACO that 2G002 (3G002) is running at normal voltage and frequency.

THIS IS A TIME CRITICAL JPM

SUGGESTED TESTING ENVIRONMENT:	PLANT	X	SIMULATOR	_____
ACTUAL TESTING ENVIRONMENT:	PLANT	_____	SIMULATOR	_____
ACTUAL TESTING METHOD:	PERFORMED	_____	SIMULATED	_____

OPERATOR'S NAME: _____

The operator's performance was evaluated against the standards contained in this JPM and is determined to be:

SATISFACTORY: _____
UNSATISFACTORY: _____

DOCUMENTATION

SO 10-05 JPM NRC RO/SRO P-2

JPM LEVEL: RO/SRO

ESTIMATED TIME TO COMPLETE: 6 minutes

TIME CRITICAL JPM: YES **CRITICAL TIME:** 10 minutes

POSITION: SPEO

TASK SYS ID: 190519

TASK DESCRIPTION

Perform secondary plant shutdown during a plant shutdown from outside the Control Room.

KA NUMBER: 068-AA1.31

KA VALUES: **RO** 3.9 **SRO** 4.0

10CFR55.45 APPLICABILITY: 5, 6

REFERENCES:

SO23-13-2, Shutdown From Outside the Control Room, Rev. 7-4

AUTHOR: R. Clement

DATE: 11/18/91

OPERATIONS REVIEW: J. Braisted

DATE: 09/05/93

APPROVED BY: M. Kirby

DATE: 10/26/93

MODIFICATION HISTORY

REV	DESCRIPTION OF CHANGE	MODIFIED BY	DATE MODIFIED	SOT APPROVAL
1	New format. Split step 13 into 2 steps. Minor wording changes. Suggested Time Critical JPM, with a maximum time of 12 minutes. Actual time allow in SONGS 2/3 Appendix R Time and Manpower study is 6.2 minutes. Since we do not have past performance times, it is recommended 25 minutes be used to accommodate the examinees describing their actions until better times are obtained.	SW	07/26/93	MJK
1-1	Compared to SO23-13-2, TCN 2-17; no changes required.	HJW	12/27/93	N/A
1-2	Changed setup page; minor editorial corrections for clarity; changed critical time from 12 to 10 based on history.	HJW	03/17/94	N/A
1-3	Compared against SO23-13-2, TCN 2-18 with no changes required.	HJW	09/08/94	N/A
1-4	Compared against SO23-13-2, TCN 2-20 with no changes required.	HJW	04/26/96	N/A
1-5	Compared against SO23-13-2, Rev. 3 with minor editorial corrections. Upgraded Document page for NUREG-1122, Rev. 1.	HJW	06/04/97	N/A
1-6	Compared against SO23-13-2, Rev. 5 with no changes required. Swapped JPM steps 12 and 13 to coincide with procedure sequencing.	RCW	08/26/98	N/A

REV	DESCRIPTION OF CHANGE	MODIFIED BY	DATE MODIFIED	SOT APPROVAL
1-7	Compared against SO23-13-2, TCN 5-2, expanded cue that informs student that D/G will be supplying A04 thus idle start is n/a. Added Unit 3 designator to all components so that JPM can be performed on either unit. Setup includes instructions to provide Att. 8 (U2) or Att. 9 (U3). Upgraded KA and changed old task number to VISION SYS ID. Added clarifying information to the note at the beginning of the JPM that the timing starts when the D/G bldg is entered. Cue changed to reflect that the student already has been to the SSD locker and has his kit and equip.	JJM	10/15/99	FM
1-8	Compared against SO23-13-2, TCN 6-5. Removed BR-0122 Category from doc page. Added equipment obtained from SSD locker and added alpha-numeric designation for reset lamp and reset pushbutton.	JJM	08/06/02	AH
1-9	Compared against SO23-13-2, TCN 7-3. Added several cues. Made minor editorial changes. Updates Task Sys ID.	RCW	09/01/04	AH
1-10	Compared against SO23-13-2, TCN 7-4 with no changes required.	RHH	07/27/05	AHH

SET-UP

Provide the Examinee with a copy of SO23-13-2, Shutdown from Outside the Control Room, Attachment 8 (Unit 2) or Attachment 9 (Unit 3).

NOTE: Circle the Unit on which this JPM will be performed and inform the Examinee.

JPM: SO 10-05 JPM NRC RO/SRO P-2 TITLE: Perform Duties of Unit 2(3) Primary ACO to Start 2(3)G002

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
<p>NOTE: Proceed to 2G002 (3G002), then provide the examinee with a copy of SO23-13-2, Shutdown from Outside the Control Room, Attachment 8(9). The timing of this JPM starts when the student enters the Diesel Generator Building.</p> <p>CUE: You have been to the Safe Shutdown Locker and have obtained the following from Safe Shutdown Kit 23(33): Emergency lantern, earplugs, headset, set of Security keys and Atmosphere Monitor.</p>				
1	Connect headset to CKT No. 1 jack in the West Lobby Area.	LOCATE Circuit 1 jack in West Lobby Area and SIMULATE connecting a headset.		Start Time: _____
2*	Select 2(3)G002 Fire Isolation switch HS-1670A1 to local at 2(3)L160.	SIMULATE PLACING 2(3)HS-1670A1, Fire Isolation Switch DG Control, on 2(3)L160, in LOCAL position.		
CUE: The switch is in LOCAL.				
3*	Select 2(3)G002 Fire Isolation switch HS-1669A1 to local at 2(3)L160.	SIMULATE PLACING 2(3)HS-1669A1, Fire Isolation Switch Gov. & Exct. Cont, on 2(3)L160, in LOCAL.		
CUE: The switch is in LOCAL.				
4*	Select 2(3)G002 Fire Isolation switch HS-9537EI to local at 2(3)L160.	SIMULATE PLACING 2(3)HS-9537E1, Fire Isolation Switch DG Bldg Fans, on 2(3)L160, in LOCAL position.		
<p>CUE: The switch is in LOCAL.</p> <p>CUE: There is no sound of an engine running.</p>				

JPM: SO 10-05 JPM NRC RO/SRO P-2 TITLE: Perform Duties of Unit 2(3) Primary ACO to Start 2(3)G002

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
5	Determine whether 2(3)G002 Cooling Water System has been impaired, as indicated by presence of either of the following alarms: "HI-HI COOLANT TEMPERATURE ENGINE #1" "HI-HI COOLANT TEMPERATURE ENGINE #2"	OBSERVE both HI-HI Coolant Temperature Engine 1 and 2 alarms on 2(3)UA-0160 not alarming.		
CUE: Both alarms are clear.				
6	Select Diesel Generator Control Panel ammeter to 1, 2 or 3.	SIMULATE PLACING Diesel Generator Control Panel Ammeter 2(3)HS-E936 on 2(3)L160 to 1, 2 or 3 position.		
CUE: The switch is as-found.				
7	Select the Diesel Generator Control Panel voltmeter to 1-2, 2-3, or 3-1.	SIMULATE PLACING Diesel Generator Control Panel Voltmeter 2(3)HS-E935 on 2(3)L160 to 1-2, 2-3 or 3-1 position.		
CUE: The switch is as-found.				
8	Ensure Diesel Generator Lockout Relay reset [2(3)HS-E934; Reset Lamp is 2 (3) ZL-E906]	OBSERVE Diesel Generator Lockout Relay Reset lamp 2 (3) ZL-E906 on 2(3)L160 illuminated.		
CUE: Lockout Relay Reset lamp is on.				
9	Establish communications with and notify the Unit 2(3) ACO that 2(3)G002 ready to start.	SIMULATE CONTACTING Unit 2(3) ACO via sound powered phone, radio or PAX, indicate 2(3)G002 is ready to start.		
CUE: Unit 2(3) ACO directs you to start the diesel and informs you that the diesel will be supplying Bus 2(3)A04.				

JPM: SO 10-05 JPM NRC RO/SRO P-2 TITLE: Perform Duties of Unit 2(3) Primary ACO to Start 2(3)G002

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
10*	Start 2(3)G002 by momentarily placing the Local Engine Control Switch to START.	SIMULATE PLACING Local Engine Control Switch, 2(3)HS-5995-1, to START.		
CUE: Engine speed increases.				
11	Observe 2(3)G002 runup to normal voltage and frequency ranges.	OBSERVE indicators 2(3)SI-E933, Generator Frequency, and 2(3)EI-E931, Generator Voltage, for 2(3)G002.		
CUE: (When observed) Frequency indicates 58.5 Hz, Voltage 4100 VAC.				
12	Adjust 2(3)G002 frequency to 60 Hz.	SIMULATE PLACING Governor 2(3)HS-E940 to the RAISE position.		
CUE: (When observed) Frequency indication is 60 Hz.				
13	Adjust 2(3)G002 voltage to 4360 VAC.	SIMULATE PLACING Local Volt Adjust 2(3)HS-E942 to the RAISE position.		
CUE: (When observed) Voltage indication is 4360 VAC.				
14	Notify the Unit 2(3) ACO when 2(3)G002 is running at normal voltage and frequency.	NOTIFY Unit 2(3) ACO via sound powered phone, radio or PAX, that 2(3)G002 is running at normal voltage and frequency.		
TERMINATING CUE: This JPM is complete. Stop Time: _____				

JPM CHECKLIST

1. The JPM is:
 - a. X Supported by facility's job task analysis.
 - b. X Operationally important (meets threshold criterion of K/A 3.0 or greater).
 - c. X Designed as either SRO only, or RO/SRO.

2. Each JPM includes:
 - a. X Initial conditions.
 - b. X Initiating cues.
 - c. X References, including associated procedures.
 - d. X Performance standards which are specific in that control and indication nomenclature and criteria (switch position, meter reading) are specified, even if these criteria are not specified in the procedural step.

 - e. X System response cues that are complete and correct so that the examiner can properly cue the Examinee, if asked.

 - f. X Statements describing important actions or observations that should be made by the Examinee.

 - g. X Criteria for successful completion.
 - h. X Identification of the critical steps and their associated performance standards.
 - i. X Validated time limits (average time allowed for completion).
 - j. X JPMs identified as time critical or not time critical by the Operations Division based on NRC commitments.

COMPLETED BY: R. Hampton **DATE:** 07/24/05

JPM INFORMATION SHEET

JPM NUMBER

SO 10-05 JPM NRC RO/SRO P-3

INITIAL PLANT CONDITIONS

The Control Room has been evacuated. Both Units completed necessary actions prior to evacuation.

You are the Radwaste Operator.

You have been to the Safe Shutdown Locker, and have obtained all of the required equipment.

TASK TO BE PERFORMED

If performing on Unit 2:

Perform the Unit 2 duties of the Radwaste Operator following a Control Room evacuation, using SO23-13-2, Shutdown From Outside The Control Room, Attachment 10, Radwaste Operator Duties - Unit 2.

If performing on Unit 3:

Perform the Unit 3 duties of the Auxiliary Primary Operator following a Control Room evacuation, using SO23-13-2, Shutdown from Outside the Control Room, Attachment 11, Auxiliary Primary Operator Duties - Unit 3.

SUGGESTED TESTING ENVIRONMENT:	PLANT	X	SIMULATOR
		<u> </u>	<u> </u>
ACTUAL TESTING ENVIRONMENT:	PLANT	<u> </u>	SIMULATOR
		<u> </u>	<u> </u>
ACTUAL TESTING METHOD:	PERFORMED	<u> </u>	SIMULATED
		<u> </u>	<u> </u>

OPERATOR'S NAME: _____

The operator's performance was evaluated against the standards contained in this JPM and is determined to be:

SATISFACTORY: _____
UNSATISFACTORY: _____

DOCUMENTATION

SO 10-05 JPM NRC RO/SRO P-3

JPM LEVEL: RO/SRO

ESTIMATED TIME TO COMPLETE: 20 minutes

TIME CRITICAL JPM: NO **CRITICAL TIME:** N/A

POSITION: ACO

TASK SYS ID: 191625

TASK DESCRIPTION

Perform the Radwaste Operator/Auxiliary Reactor Operator (Auxiliary Primary ACO) tasks during a shutdown from outside the Control Room.

KA NUMBER: 068 AA1.08

KA VALUES: **RO** 4.2 **SRO** 4.2

10CFR55.45 APPLICABILITY:

REFERENCES:

SO23-13-2, Shutdown from Outside the Control Room, Rev 7-4.

AUTHOR: R. Whitehouse

DATE: 09/20/04

OPERATIONS REVIEW: M. Jones

DATE: 09/20/04

APPROVED BY: S. Whitley

DATE: 09/20/04

MODIFICATION HISTORY

REV	DESCRIPTION OF CHANGE	MODIFIED BY	DATE MODIFIED	SOT APPROVAL
0	New – from J123F: J123F was Unit 3 only and J122 was dual unit for the same task but not faulted. Converted J123F to J122F to be the faulted version of the dual unit JPM.	RCW	08/17/04	NEW
1	Removed the requirement to go to the SSD locker. This was a critical step.	RCW	09/20/04	REV
1-1	Compared against SO23-13-2, Rev 7-4 with no changes required.	RHH	07/27/05	AHH

SET-UP

Provide Examinee with a copy of SO23-13-2, Shutdown from Outside the Control Room, Attachment 10 if performing on Unit 2 or Attachment 11 if performing on Unit 3.

This is a faulted JPM. The faulted condition is that valve 2(3)HV-6497, SWC/CCW HX Outlet Valve is closed and cannot be opened.

NOTE: Circle the Unit on which this JPM will be performed and inform the Examinee.

JPM: SO 10-05 JPM NRC RO/SRO P-3 TITLE: Perform the Primary Operator Tasks During a Shutdown From Outside the Control Room

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
NOTE: Provide the Examinee with a copy of SO23-13-2, Shutdown from Outside the Control Room, Attachment 10 for Unit 2 or Attachment 11 for Unit 3. CUE: You have been to the SSD locker and have all of the required equipment.				
1	Proceed to Radwaste via Control Building Central Stairwell and the Health Physics Control Point.	PROCEED to Radwaste via the Control Building Central Stairwell and the Health Physics Control Point.		Start Time: _____
2*	At 24' Radwaste open 2(3)HV-9235, BAMU Gravity Feed.	At 24' Radwaste, SIMULATE OPENING 2(3)HV-9235, BAMU Tank 2(3)T072 Gravity Feed to Charging Pump suction Isolation Valve.		
CUE: 2(3)HV-9235 is open.				
3*	At 24' Radwaste open 2(3)HV-9240, BAMU Gravity Feed.	At 24' Radwaste, SIMULATE OPENING 2(3)HV-9240 2(3)T071 Gravity Feed to Charging Pump suction Isolation Valve.		
CUE: 2(3)HV-9240 is open. NOTE: After the examinee locates Room 319 A (B) read the following cue. (The room will not be entered due to ALARA considerations.) CUE: Describe the actions that you would take within this room.				
4*	At 37' Radwaste close 2(3)LV-0227B, VCT Outlet (RM. 319B, Key No. HR)	At 37' Radwaste, SIMULATE CLOSING 2(3)LV-0227B, VCT Outlet Valve in Room 319B. A key may not be needed for this room depending on present radiological conditions.		

JPM: SO 10-05 JPM NRC RO/SRO P-3 TITLE: Perform the Primary Operator Tasks During a Shutdown From Outside the Control Room

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
CUE: 2(3)LV-0227B is closed.				
5	At 9' Radwaste ensure closed 2 (3) LV-0227C, RWST to Charging Pump suction.	At 9' Radwaste, VERIFY 2(3)LV-0227C, Boric Acid to Charging System Control Valve is CLOSED.		
CUE: 2(3)LV-0227C is closed.				
6*	ENSURE OPEN 2(3)HV-6497, SWC/CCW HX Outlet Valve.	LOCATE 2(3)HV-6497, SWC/CCW HX Outlet Valve, and IDENTIFY the valve position indicator.		
CUE: 2(3)HV-6497, SWC/CCW HX Outlet Valve indicates closed and <u>cannot</u> be opened.				
7*	OPEN MCC Breaker 2BK23 (3BK22).	SIMULATE OPENING MCC Breaker 2BK23 (3BK22), Salt Wtr Fr Component Clg Wtr Heat Exchanger 2(3)HV-6496.		
CUE: 2BK23 (3BK22) is open.				
8*	MANUALLY OPEN 2(3)HV-6496, Overboard Block Valve to Seawall.	SIMULATE OPENING 2(3)HV-6496, Overboard Block Valve to Seawall.		
TERMINATING CUE: 2(3)HV-6496 is open. This JPM is complete.				Stop Time: _____

JPM CHECKLIST

1. The JPM is:
 - a. X Supported by facility's job task analysis.
 - b. X Operationally important (meets threshold criterion of K/A 3.0 or greater).
 - c. X Designed as either SRO only, or RO/SRO.

2. Each JPM includes:
 - a. X Initial conditions.
 - b. X Initiating cues.
 - c. X References, including associated procedures.
 - d. X Performance standards which are specific in that control and indication nomenclature and criteria (switch position, meter reading) are specified, even if these criteria are not specified in the procedural step.

 - e. X System response cues that are complete and correct so that the examiner can properly cue the Examinee, if asked.

 - f. X Statements describing important actions or observations that should be made by the Examinee.

 - g. X Criteria for successful completion.
 - h. X Identification of the critical steps and their associated performance standards.
 - i. X Validated time limits (average time allowed for completion).
 - j. X JPMs identified as time critical or not time critical by the Operations Division based on NRC commitments.

COMPLETED BY: R. Hampton **DATE:** 07/24/05

JPM INFORMATION SHEET

JPM NUMBER

SO 10-05 JPM NRC RO/SRO S-1

INITIAL PLANT CONDITIONS

Unit 2 was operating at 100% power when a Steam Generator Tube Rupture (SGTR) occurred.

Both Steam Generators appear to have tube leakage.

A Main Steam Isolation Signal (MSIS) has occurred due to a rapid cooldown during the Steam Generator isolation phase.

SO23-12-4, Steam Generator Tube Rupture, has been completed through Step 16a.

E088 is isolated.

TASK TO BE PERFORMED

Verify isolation of the most affected Steam Generator using SO23-12-4, Steam Generator Tube Rupture.

SO23-12-4, Steam Generator Tube Rupture, has been completed through Step 16a.

SUGGESTED TESTING ENVIRONMENT:	PLANT _____	SIMULATOR <u> X </u>
ACTUAL TESTING ENVIRONMENT:	PLANT _____	SIMULATOR _____
ACTUAL TESTING METHOD:	PERFORMED _____	SIMULATED _____

OPERATOR'S NAME: _____

The operator's performance was evaluated against the standards contained in this JPM and is determined to be:

SATISFACTORY: _____

UNSATISFACTORY: _____

DOCUMENTATION

SO 10-05 JPM NRC RO/SRO S-1

JPM LEVEL: RO/SRO

ESTIMATED TIME TO COMPLETE: 15 minutes

TIME CRITICAL JPM: NO **CRITICAL TIME:** N/A

POSITION: ACO

TASK SYS ID: 186690

TASK DESCRIPTION

Respond to a Steam Generator tube rupture.

KA NUMBER: 038 EA1.32

KA VALUES: **RO** 4.6 **SRO** 4.7

10CFR55.45 APPLICABILITY: 4, 6, 9

REFERENCES:

SO23-12-4, Steam Generator Tube Rupture, Revision 20

AUTHOR: L. Zilli

DATE: _____

OPERATIONS REVIEW: M. Jones

DATE: _____

APPROVED BY: A. Hagemeyer

DATE: _____

MODIFICATION HISTORY

REV	DESCRIPTION OF CHANGE	MODIFIED BY	DATE MODIFIED	SOT APPROVAL
New	Verified against SO23-12-4, Rev. 20. This JPM was modified to require the operator to control SG pressure using the ADVs due to an MSIS. See J094FS for the original version.	-	-	-

SET-UP

SIMULATOR

Use IC-171 for the October 2005 NRC Exam. This is an unsupported IC, and may be deleted after the exams are complete.

Otherwise, use any at power IC, and perform the following:

- Insert SG06A = 0.01 (SGTR on E088).
- Insert SG06B = 0.6 (SGTR on E089).
- Initiate an MSIS
- Take actions to lower Th to less than 530°F.
- Initial conditions should be about 518°F and 1430 psia.
- Leave 1 MFP and 3 Condensate Pumps running.
- Perform the following to isolate the incorrect Steam Generator (E-088):
 - Press CLOSE on 2HS-8205, MSIV.
 - Press CLOSE on 2HS-4048, MFIV.
 - Press OVERRIDE and then CLOSE on 2HS-8201, Steam to P140.
 - Press CLOSE on 2HS-4058, S/G Sample Isol.
 - Press OVERRIDE and then STOP on 2HS-4733, P504 handswitch.
 - Ensure E088 level >40%.

EXAMINER

Provide the Examinee with a copy of SO23-12-4, Steam Generator Tube Rupture, when located.

JPM: SO 10-05 JPM NRC RO/SRO S-1 TITLE: Verify Isolation of Most Affected Steam Generator per SO23-12-4

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
NOTE: Provide the Examinee with a copy of SO23-12-3, Steam Generator Tube Rupture, when located.				
1	IDENTIFY appropriate procedure and step.	IDENTIFY SO23-12-4, Steam Generator Tube Rupture, Step 16 to be performed.		Time Start: _____
2	VERIFY Steam Line radiation level not rising.	Using DAS or 2L-405, Wide Range Monitoring Panel, OBSERVE Main Steam Line Radiation Monitors 2RI-7874/75A1 (SG E088 low/high range) and 2RI-7874/75B1 (SG E089 low/high range).		
CUE: 2RI-7874B1, Steam Generator E089 Low Range Main Steam Line Radiation Monitor, indicates a rising trend.				
3	VERIFY Blowdown radiation level not rising.	OBSERVE Blowdown Radiation Monitors 2RIT-6753 and 2RIT-6759.		
CUE: 2RIT-6753, SG E089 Blowdown Radiation Monitor, indicates a rising trend.				
4	VERIFY Air Ejector radiation level not rising.	OBSERVE Air Ejector Radiation Monitors 2RT-7818 and 2RY-78701.		
CUE: 2RY-78701, Air Ejector Radiation Monitors, indicates a rising trend.				
5	EVALUATE SG samples and VERIFY isolated SG has highest activity levels.	IDENTIFY Chemistry results that show E089 is the most affected SG instead of E088. ENTERS RNO to restore isolated SG to service and isolate opposite SG.		
CUE: Chemistry reports Steam Generator E089 activity is 1.9E-2 µci/ml and Steam Generator E088 activity is 7.7E-3µci/ml.				

JPM: SO 10-05 JPM NRC RO/SRO S-1 TITLE: Verify Isolation of Most Affected Steam Generator per SO23-12-4

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
6	Verify isolated SG trend consistent with plant conditions.	OBSERVE E088 level indications 2LI-1123-1, 2, 3, and A4, SG E088 Downcomer Level.		
CUE: E088 level trend is rising.				
7	VERIFY SBCS available – Condenser back pressure less than the SBCS interlock setpoint.	DETERMINE that SBCS is not available for operation.		
8*	ESTABLISH RCS temperature control with ADV on isolated SG.	ESTABLISH RCS temperature control by SETTING 2HV-8419-1 to the pressure setpoint on 2HV-8421-2 and DEPRESS the Open/Modulate pushbutton on 2HV-8419 and select AUTO on 2HV-8419-1, SG E088 (N) Atmospheric Dump Valve controller.		
CUE: CRS directs starting P504 to feed E088.				
9	START AFW Pump P504.	DEPRESS the START pushbutton 2HS-4733-2 for P504.		
10	OVERRIDE and OPEN AFW Pump Discharge Valve HV-4762 for P-504 to 35% open.	DEPRESS OVERRIDE and then OPEN for 2HV-4762, AFWP 2P504 to SG E088 (N) Disch Valve Bypass.		
CUE: CRS directs you to OVERRIDE and OPEN 2HV-4714 to feed E088.				
11	OVERRIDE and OPEN AFW Valve HV-4714.	DEPRESS OVERRIDE and then OPEN for 2HV-4714, AFWP to SG E088 (N) Disch Valve.		
12	MAINTAIN reduced flow for 5 minutes.	OBSERVE E-088 level indicators on CR-52 > 40% by observing 2LI-1123-1, -2, -3 and A4, SG E088 Downcomer Level.		

JPM: SO 10-05 JPM NRC RO/SRO S-1 TITLE: Verify Isolation of Most Affected Steam Generator per SO23-12-4

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
CUE: 5 minutes have elapsed. CUE: Present Steam Generator E088 level is greater than 40% narrow range level.				
13	VERIFY recovered SG level > 40% NR and feedwater available, OR, level trending to between 40% NR and 80% NR.	VERIFY SG E-088 level > 40% NR by: Observing 2LI-1123-1, -2, -3 and A4, SG E088 Downcomer Level, and VERIFY feedwater available.		
14	ENSURE all valves to initially unisolated SG closed per Step 9.	TRANSITION to Step 9 of SO23-12-4.		
15	CLOSE SG E-089 MSIV, 2HV-8204.	VERIFY green CLOSE indicating light 2HV-8204, SG E089 (S) Main Steam Iso Valve closed at CR52 or CR57.		
16	VERIFY SG E-089 MSIV Bypass, 2HV-8202 is closed.	VERIFY green CLOSE indicating light on 2HV-8202, SG 2E089 Main Steam Iso Valve Bypass.		
17*	VERIFY SG E-089 ADV, 2HV-8421 is closed.	DEPRESS the CLOSE pushbutton on 2HV-8421, SG E089 (S) Atmospheric Dump Valve and OBSERVE the green CLOSE indicating light.		
18	CLOSE SG E-089 Main Feed Isolation, 2HV-4052.	VERIFY 2HV-4052 FW to SG 2E089 (S) Iso Valve CLOSED at CR52 or CR57.		
19*	CLOSE Aux Feed to SG E-089, 2HV-4731.	DEPRESS the CLOSE pushbutton on 2HV-4731, AFW to SG 2E089 (S) Iso Valve, and OBSERVE the green CLOSE indicating light.		
20	CLOSE Aux Feed to SG E-089, 2HV-4715.	VERIFY 2HV-4715, AFW to SG 2E089 (S) Iso Valve, is CLOSED.		

JPM: SO 10-05 JPM NRC RO/SRO S-1 TITLE: Verify Isolation of Most Affected Steam Generator per SO23-12-4

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
21*	CLOSE Main Steam to Aux Feed Pump Turbine, 2HV-8200.	DEPRESS OVERRIDE and CLOSE pushbuttons for 2HV-8200, Main STM to AFWPT 2K007 SG 2E089 (S) Iso Valve and OBSERVE the green CLOSE indicating light.		
22	CLOSE SG E-089 Blowdown Isolation, 2HV-4053.	VERIFY 2HV-4053-2, SG 2E089 (S) Blowdown Iso Valve, is CLOSED.		
23	CLOSE SG E-089 Steam Generator Water Sample Isolation, 2HV-4057.	VERIFY 2HV-4057, SG 2E089 (S) Water Sample Iso Valve, is CLOSED.		
24*	STOP Aux Feed Pump P-141.	DEPRESS OVERRIDE and STOP pushbuttons for 2HS-4701-1, AFWP 2P141.		
TERMINATING CUE: This JPM is complete.				Time Stop: _____

JPM CHECKLIST

1. The JPM is:
 - a. X Supported by facility's job task analysis.
 - b. X Operationally important (meets threshold criterion of K/A 3.0 or greater).
 - c. X Designed as either SRO only, or RO/SRO.

2. Each JPM includes:
 - a. X Initial conditions.
 - b. X Initiating cues.
 - c. X References, including associated procedures.
 - d. X Performance standards which are specific in that control and indication nomenclature and criteria (switch position, meter reading) are specified, even if these criteria are not specified in the procedural step.

 - e. X System response cues that are complete and correct so that the examiner can properly cue the Examinee, if asked.

 - f. X Statements describing important actions or observations that should be made by the Examinee.

 - g. X Criteria for successful completion.
 - h. X Identification of the critical steps and their associated performance standards.
 - i. X Validated time limits (average time allowed for completion).
 - j. X JPMs identified as time critical or not time critical by the Operations Division based on NRC commitments.

COMPLETED BY: L. Zilli **DATE:** 07/25/05

JPM INFORMATION SHEET

JPM NUMBER

SO 10-05 JPM NRC RO/SRO S-2

INITIAL PLANT CONDITIONS

Unit 2 is cooling down. Both Shutdown Cooling (SDC) pumps and both SDC heat exchangers are in operation.

TASK TO BE PERFORMED

Perform the actions required to place the Shutdown Cooling System in a single pump/single heat exchanger lineup. Remove P-016 and E-003 from service per SO23-3-2.6.

SUGGESTED TESTING ENVIRONMENT:	PLANT _____	SIMULATOR <u> X </u>
ACTUAL TESTING ENVIRONMENT:	PLANT _____	SIMULATOR _____
ACTUAL TESTING METHOD:	PERFORMED _____	SIMULATED _____

OPERATOR'S NAME: _____

The operator's performance was evaluated against the standards contained in this JPM and is determined to be:

SATISFACTORY: _____
UNSATISFACTORY: _____

DOCUMENTATION

SO 10-05 JPM NRC RO/SRO S-2

JPM LEVEL: RO/SRO

ESTIMATED TIME TO COMPLETE: 15 minutes

TIME CRITICAL JPM: NO **CRITICAL TIME:** N/A

POSITION: ACO

TASK SYS ID: 007814

TASK DESCRIPTION

Transfer from parallel to single shutdown cooling heat exchangers.

KA NUMBER: S04S-005-000-A1-01

KA VALUES: **RO** 3.5 **SRO** 3.6

10CFR55.45 APPLICABILITY: 2, 4, 6, 7, 10, 12

REFERENCES:

SO23-3-2.6, Shutdown Cooling System Operation, Rev. 21-2.

AUTHOR: L. Zilli

DATE: _____

OPERATIONS REVIEW: A. Hagemeyer

DATE: _____

APPROVED BY: M. Jones

DATE: _____

MODIFICATION HISTORY

REV	DESCRIPTION OF CHANGE	MODIFIED BY	DATE MODIFIED	SOT APPROVAL
1	Changed task number to properly reflect task performed by JPM. NR-0122 Group III system approved for use as JPM due to KA value >3.0.	HJW	10/05/93	MJK
1-1	Changed setup page; minor editorial corrections to standards for clarity.	HJW	03/22/94	N/A
1-2	Compared against SO23-3-2.6, TCN 7-18 with no changes required.	HJW	05/27/94	N/A
1-3	Compared against SO23-3-2.6, TCN 7-18 with no changes required.	HJW	09/24/94	N/A
1-4	Changed setup page to position valves HV-8150 & 8151 to 32% open instead of 80% open.	HJW	10/26/94	N/A
1-5	Compared against SO23-3-2.6, TCN 8-2 with minor changes required for step reference and flow limit updates.	HJW	05/03/95	N/A
1-6	Compared against SO23-3-2.6, TCN 8-4 with minor changes to step reference numbers and parameters. Corrected some standards to comply with actual plant components. Deleted step 3.	HJW	10/17/95	N/A
1-7	Compared against SO23-3-2.6, Rev. 9 with no changes required.	HJW	09/18/96	N/A
2	Compared against SO23-3-2.6, Rev. 21-2 and revised as required. Deleted critical steps to reflect the MOVAT improvements that no longer require holding the switches for valve closure. Added a critical step to close 2HV-6500.	LRZ	07/11/05	REV

SET-UP

Use IC-5.

The following keys are required: 13, 14, 15, 16, 19, 21, 22, 28, 29, 30, 31, 34, 35, 36, 38, 42, 46, and 50.

Fully open 2HV-9325 & 2HV-9328.

Fully open 2HV-9322 & 2HV-9331

Start LPSI 2P015.

Position 2HV-8150 & 2HV-8151 to 32% open.

Allow conditions to stabilize.

Check 2FI-0306 between 8000 and 8400 gpm.

Provide examinee with a copy of SO23-3-2.6, Shutdown Cooling System Operation.

JPM: SO 10-05 JPM NRC RO/SRO S-2 TITLE: Perform the Actions Required to Place the SDC in a Single Pump / Single Heat Exchanger Lineup (Remove P-016 and E-003 from Service)

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
NOTE: Provide examinee with a copy of SO23-3-2.6, Shutdown Cooling System Operation.				
1	NOTIFY Health Physics that radiation levels in the SDC heat exchanger and LPSI pump areas may change.	NOTIFY Health Physics that radiation levels in the SDC heat exchanger and LPSI pump areas may change.		Start Time: _____
CUE: Health Physics has been notified.				
2	TRANSITION to Step 6.6.6.	TRANSITION to Step 6.6.6 for securing LPSI Pump P016.		
CUE: If asked, inform the examinee that the RCS is filled with a bubble in the pressurizer.				
3*	Slowly CLOSE LPSI Header Isolation valve HV-9322.	DEPRESS and hold the JOG CLOSE pushbutton for 2HV-9322, HDR to Loop 1A, until the GREEN light is illuminated.		
4*	Slowly CLOSE LPSI Header Isolation valve HV-9331.	DEPRESS and hold the JOG CLOSE pushbutton for 2HV-9331, HDR to Loop 2B, until the GREEN light is illuminated.		
5*	STOP LPSI Pump P-016.	DEPRESS STOP pushbutton 2HS-9391-2, LPSI Pump 2P016 (N).		
NOTE: Values listed below are the limits through one heat exchanger.				
6	THROTTLE the in-service SDC heat exchanger bypass flow valve, HV-8160; to control SDCS flow as required by present Mode and RCS level conditions.	DEPRESS the JOG OPEN or JOG CLOSED pushbutton to THROTTLE 2HV-8160, SDC HX Bypass Normal Flow Valve, to achieve >2500 to <5320 gpm with an optimum value of >3900 gpm.		

JPM: SO 10-05 JPM NRC RO/SRO S-2 TITLE: Perform the Actions Required to Place the SDC in a Single Pump / Single Heat Exchanger Lineup (Remove P-016 and E-003 from Service)

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
NOTE: The examinee may not perform the next step since immediately following this step the second heat exchanger is removed from service. This is acceptable as long as temperature is monitored.				
7	THROTTLE the SDC heat exchanger outlet to LPSI header valves, HV-8150 and HV-8151, to achieve the desired RCS cooling conditions.	TURN the JOG OPEN or JOG CLOSED keylock switches as required THROTTLING 2HV-8150, SDC HX 2E004 to LPSI Header Control Valve and 2HV-8151, SDC HX 2E003 to LPSI Header Control Valve, to maintain temperature relatively constant.		
CUE: Cooling requirement at this time is only to maintain present RCS conditions until evolution completed. NOTE: The following two steps should be performed alternately to remove the second heat exchanger from service.				
8*	THROTTLE CLOSE on HV-8151, SDC Heat Exchanger E-003 outlet to LPSI header valve.	TURN and HOLD the JOG CLOSED keylock switch for 2HV-8151, SDC HX 2E003 to LPSI Header Control Valve, until the GREEN light is illuminated.		
9*	THROTTLE OPEN HV-8150, SDC Heat Exchanger E-004 outlet to LPSI header valve.	TURN and HOLD the JOG OPEN keylock switch for 2HV-8150, SDC HX 2E004 to LPSI Header Control Valve, to achieve the desired valve position.		

JPM: SO 10-05 JPM NRC RO/SRO S-2 TITLE: Perform the Actions Required to Place the SDC in a Single Pump / Single Heat Exchanger Lineup (Remove P-016 and E-003 from Service)

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
10	THROTTLE the in-service SDC heat exchanger outlet to LPSI header valve, HV-8150, to achieve the desired RCS cooling conditions.	TURN the JOG OPEN or JOG CLOSED keylock switch as required THROTTLING 2HV-8150, SDC HX 2E004 to LPSI Header Control Valve, to achieve the desired RCS cooling conditions.		
11	After the off-going SDC heat exchanger outlet valve is fully closed, READJUST SDCS flow to same value as before by throttling HV-8160.	After the off-going SDC heat exchanger outlet valve is fully closed, READJUST SDCS flow by DEPRESSING the JOG OPEN or JOG CLOSED pushbutton to 2HV-8160, SDC HX Bypass Normal Flow Valve to ~4000 gpm.		
12	CLOSE the CCW Outlet Valve for the off-going heat exchanger.	CLOSE 2HV-6500, CCW from SDC HX 2E003 Block Valve.		
<p>TERMINATING CUE: Stop Time: _____</p> <p>This JPM is complete.</p>				

JPM CHECKLIST

1. The JPM is:
 - a. X Supported by facility's job task analysis.
 - b. X Operationally important (meets threshold criterion of K/A 3.0 or greater).
 - c. X Designed as either SRO only, or RO/SRO.

2. Each JPM includes:
 - a. X Initial conditions.
 - b. X Initiating cues.
 - c. X References, including associated procedures.
 - d. X Performance standards which are specific in that control and indication nomenclature and criteria (switch position, meter reading) are specified, even if these criteria are not specified in the procedural step.

 - e. X System response cues that are complete and correct so that the examiner can properly cue the Examinee, if asked.

 - f. X Statements describing important actions or observations that should be made by the Examinee.

 - g. X Criteria for successful completion.
 - h. X Identification of the critical steps and their associated performance standards.
 - i. X Validated time limits (average time allowed for completion).
 - j. X JPMs identified as time critical or not time critical by the Operations Division based on NRC commitments.

COMPLETED BY: L. Zilli **DATE:** 07/25/05

JPM INFORMATION SHEET

JPM NUMBER

SO 10-05 JPM NRC RO/SRO S-3

INITIAL PLANT CONDITIONS

A LOCA has occurred and a Recirculation Actuation Signal has actuated.

TASK TO BE PERFORMED

Perform SO23-12-11, EOI Supporting Attachments, Attachment 14, RAS Operation.

SUGGESTED TESTING ENVIRONMENT:	PLANT _____	SIMULATOR <u> X </u>
ACTUAL TESTING ENVIRONMENT:	PLANT _____	SIMULATOR _____
ACTUAL TESTING METHOD:	PERFORMED _____	SIMULATED _____

OPERATOR'S NAME: _____

The operator's performance was evaluated against the standards contained in this JPM and is determined to be:

SATISFACTORY: _____

UNSATISFACTORY: _____

DOCUMENTATION

SO 10-05 JPM NRC RO/SRO S-3

JPM LEVEL: RO/SRO

ESTIMATED TIME TO COMPLETE: 15 min

TIME CRITICAL JPM: NO **CRITICAL TIME:** N/A

POSITION: CO

TASK SYS ID: 192219

TASK DESCRIPTION

Initiate RAS and verify actuation.

KA NUMBER: E11-EK3.3

KA VALUES: **RO** 3.8 **SRO** 3.8

10CFR55.45 APPLICABILITY: 2, 3, 4, 6, 7

REFERENCES:

SO23-12-11, EOI Supporting Attachments, Attachment 14, RAS Operation, Rev. 3

AUTHOR: L. Zilli

DATE: _____

OPERATIONS REVIEW: M. Jones

DATE: _____

APPROVED BY: A. Hagemeyer

DATE: _____

MODIFICATION HISTORY

REV	DESCRIPTION OF CHANGE	MODIFIED BY	DATE MODIFIED	SOT APPROVAL
0	New	-	-	-

SET-UP

Use IC # 175 for the October 2005 NRC Exam. Enter malfunctions CH07A and CH07B, Containment Sump Basket Filter Clog per the “Blocked Sumps” Event File.

Provide the Examinee with a copy of SO23-12-11, Attachment 14, RAS Operation.

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
NOTE: Provide the Examinee with a copy of SO23-12-11, Attachment 14, RAS Operation.				
1	VERIFY RWST level – less than 19%.	OBSERVE RWT 2T006 LEVEL LI-0305-1, -2, -3, -4 and/or RWT 2T005 LEVEL 2LI-0301 less than 19%.		Start Time: _____
2	VERIFY Containment Emergency Sump Level – greater than 18 feet 4 inches.	OBSERVE CNTMT EMER SUMP LEVEL 2LI-9386-1 OR 2LI-9389-2 greater than 18 feet 4 inches.		
3	ENSURE Containment Emergency Sump Outlet Valves – open. <u>Train A</u> <u>Train B</u> HV-9303 HV-9302 HV-9305 HV-9304	OBSERVE Containment Emergency Sump Outlet Valve red OPEN lights illuminated for: <u>Train A</u> <u>Train B</u> 2HV-9303 2HV-9302 2HV-9305 2HV-9304		
4	ENSURE LPSI Pumps stopped.	OBSERVE LPSI PUMP P015 2HS-9390-1 and P016 2HS-9390-1 green STOP lights illuminated.		
5	ENSURE SI Pumps and Containment Spray Pump Miniflow Isolation Valves - closed. <u>Train A</u> <u>Train B</u> HV-9306 HV-9347 HV-9307 HV-9348	OBSERVE SI Pumps and Containment Spray Pump Miniflow Isolation Valves green CLOSE lights illuminated for: <u>Train A</u> <u>Train B</u> 2HV-9306 2HV-9347 2HV-9307 2HV-9348		
6	ENSURE CCAS – actuated.	OBSERVE CCAS actuated by observing Annunciators 57A07 and 57B07 CCAS TRAIN A (B) ACTUATION.		

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
7	ENSURE available Containment Emergency Cooling Units – operating. <u>Train A</u> <u>Train B</u> E-399 E-400 E-401 E-402	OBSERVE available Containment Emergency Cooling Unit red START lights illuminated on Panel 60: <u>Train A</u> <u>Train B</u> 2E-399 2E-400 2E-401 2E-402		
8	ENSURE CCW Valves to operating Emergency Cooling Units - open. <u>Train A</u> <u>Train B</u> HV-6370 HV-6368 HV-6371 HV-6369 HV-6366 HV-6372 HV-6367 HV-6373	OBSERVE CCW Valves to operating Emergency Cooling Units red OPEN lights illuminated on Panel 60: <u>Train A</u> <u>Train B</u> 2HV-6370 2HV-6368 2HV-6371 2HV-6369 2HV-6366 2HV-6372 2HV-6367 2HV-6373		
9	ENSURE available Containment Dome Air Circulating Fans – operating. <u>Train A</u> <u>Train B</u> A-071 A-072 A-074 A-073	OBSERVE available Containment Dome Air Circulating Fan red START lights illuminated on Panel 60: <u>Train A</u> <u>Train B</u> 2A-071 2A-072 2A-074 2A-073		
10	VERIFY Containment Emergency Sump Level – greater than 22 feet.	OBSERVE CNTMT EMER SUMP AREA LVL 2LI-9387-1 or 2LI-9388-2 greater than 22 feet.		
11*	CLOSE RWST Outlet Isolation Valves: HV-9300 HV-9301	OBTAIN key from Key Locker and INSERT and CLOSE RWT 2T005 Outlet Iso Valve 2HV-9300 and RWT 2T006 Outlet Iso Valve 2HV-9301.		

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
12	CLOSE CCW to/from Letdown Heat Exchanger Valves: <u>Train A</u> <u>Train B</u> HV-6293B/A HV-6522B/A	DEPRESS the CLOSE pushbutton for CCW CLA LTDN HX 2E062 Supply/Return Valve 2HV-6293B/A and VERIFY CLOSED CCW CLA LTDN HX 2E062 Supply/Return Valve 2HV-6522B/A.		
13	VERIFY ECCS Pump(s) suction performance: Operating ECCS Pump(s) flow – stable. Operating ECCS Pump(s) discharge pressure – stable. Operating ECCS Pump(s) motor amps – stable.	OBSERVE HPSI Pump fluctuating flow on Train A Flow Indications 2FI-0321-1 and 2FI-0331-1 and Train B Flow Indications 2FI-0311-2 and 2FI-0341-2. OBSERVE LPSI Pump fluctuating flow on Train A and B Flow Indication 2FI-0306. OBSERVE HPSI Pump fluctuating discharge pressure on 2PI-0308 for 2P-017 and 2PI-0309 for 2P-019. OBSERVE LPSI Pump fluctuating discharge pressure on 2PI-0307. OBSERVE HPSI and LPSI Pump fluctuating motor amps.		
14*	OVERRIDE and STOP both Containment Spray Pumps.	OVERRIDE and STOP both Containment Spray Pumps by DEPRESSING STOP pushbuttons on 2HS-9395-1 for Containment Spray Pump 2P012 (SE) and 2HS-9396-2 for Containment Spray Pump 2P013 (NW) and OBSERVE green STOP lights illuminated.		

JPM: SO 10-05 JPM NRC RO/SRO S-3

TITLE: Perform Recirculation Actuation Signal Actions

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
15*	OVERRIDE and CLOSE both Containment Spray Pump Discharge Valves.	OVERRIDE and CLOSE both Containment Spray Pump Discharge Valves by DEPRESSING STOP pushbuttons on 2HV-9368 for CNTMT Spray HDR NO2 Control Valve and 2HV- 9367 for CNTMT Spray HDR NO1 Control Valve and OBSERVE green CLOSED lights illuminated.		
16*	If HPSI Pump performance – unstable then throttle flow.	DETERMINE that HPSI Pump performance is stable and RETURN to the Action / Expected Response column.		
17*	MAINTAIN HPSI pump(s) flow: - greater than 160 GPM in any one loop per operating pump. Cold Leg Injection: <div><div><u>Train A</u></div><div><u>Train B</u></div></div> FI-0321FI-0311FI-0331FI-0341Hot Leg Injection: <div><div><u>Train A</u></div><div><u>Train B</u></div></div> FI-9421FI-9435	OBSERVE Train A Flow Indications 2FI-0321-1 and 2FI-0331-1 and Train B Flow Indications 2FI-0311-2 and 2FI-0341-2 greater than 160 GPM in any one loop. <div><div><u>Train A</u></div><div><u>Train B</u></div></div> 2FI-0321-12FI-0311-22FI-0331-12FI-0341-2		
TERMINATING CUE: This JPM is complete.				Stop Time: _____

JPM CHECKLIST

1. The JPM is:
 - a. X Supported by facility's job task analysis.
 - b. X Operationally important (meets threshold criterion of K/A 3.0 or greater).
 - c. X Designed as either SRO only, or RO/SRO.

2. Each JPM includes:
 - a. X Initial conditions.
 - b. X Initiating cues.
 - c. X References, including associated procedures.
 - d. X Performance standards which are specific in that control and indication nomenclature and criteria (switch position, meter reading) are specified, even if these criteria are not specified in the procedural step.
 - e. X System response cues that are complete and correct so that the examiner can properly cue the Examinee, if asked.
 - f. X Statements describing important actions or observations that should be made by the Examinee.
 - g. X Criteria for successful completion.
 - h. X Identification of the critical steps and their associated performance standards.
 - i. X Validated time limits (average time allowed for completion).
 - j. X JPMs identified as time critical or not time critical by the Operations Division based on NRC commitments.

COMPLETED BY: L. Zilli **DATE:** 07/25/05

JPM INFORMATION SHEET

JPM NUMBER

SO 10-05 JPM NRC RO/SRO S-4

INITIAL PLANT CONDITIONS

Unit 2 is operating at 70% power. Both CCW Loops are in service. Preparations are in progress to place the Train A CCW/SWC Loop in Standby IAW SO23-2-17, Component Cooling Water System Operation. The procedure is complete up to and including Step 6.4.4.

TASK TO BE PERFORMED

The Control Room Supervisor directs you to place the Train A CCW/SWC Loop in standby.

SUGGESTED TESTING ENVIRONMENT:	PLANT _____	SIMULATOR <u> X </u>
ACTUAL TESTING ENVIRONMENT:	PLANT _____	SIMULATOR _____
ACTUAL TESTING METHOD:	PERFORMED _____	SIMULATED _____

OPERATOR'S NAME: _____

The operator's performance was evaluated against the standards contained in this JPM and is determined to be:

SATISFACTORY: _____

UNSATISFACTORY: _____

DOCUMENTATION

SO 10-05 JPM NRC RO/SRO S-4

JPM LEVEL: RO/SRO

ESTIMATED TIME TO COMPLETE: 18 minutes

TIME CRITICAL JPM: NO **CRITICAL TIME:** N/A

POSITION: ACRO

TASK SYS ID: 577

TASK DESCRIPTION

Transfer the component cooling water non-critical loop.

KA NUMBER: 008 A4.01

KA VALUES: **RO** 3.3 **SRO** 3.1

10CFR55.45 APPLICABILITY: 5, 7

REFERENCES:

SO23-2-17, Component Cooling Water System Operation, Revision 18-3

AUTHOR: L. Zilli

DATE: _____

OPERATIONS REVIEW: M. Jones

DATE: _____

APPROVED BY: A. Hagemeyer

DATE: _____

MODIFICATION HISTORY

REV	DESCRIPTION OF CHANGE	MODIFIED BY	DATE MODIFIED	SOT APPROVAL
1	Compared to SO23-2-17, Rev. 15 and made changes as required. Deleted steps that isolated CCW to the SDC heat exchanger.	LRZ	08/01/00	WLL
1-1	Compared to SO23-2-17, TCN 15-3 and made changes to reflect the new format of the procedure and added steps that ensure two ECU Return valves are open on each train and that SDCHX outlet valves are to be repositioned during the performance of the JPM. Changed the setup page to reflect the changes to the procedure.	JJM	10/26/00	WLL
2	Compared to SO23-2-17, TCN 15-4 and made changes to reflect added steps to the procedure. Added Critical step to close the discharge valve on the SWC Pump that was secured.	LRZ	05/14/01	WLL
2-1	Compared to SO23-2-17, Rev. 18. Updated Set-up page. Added cue. Minor editorial changes.	RCW	11/20/03	FM
3	Compared to SO23-2-17, Rev. 18-3. Added two Critical Steps (Step 7 and 23). Added Cue before Step 22 to direct operator to align ECU and SDC Valves. Made minor editorial changes.	LRZ	07/26/05	REV

SET-UP

Use IC-174 (Event File Delete J-70) for October 2005 NRC JPM Exams.

Otherwise, Place both CCW Critical Loops in service and start CCW Pump P-026.

OPEN the following ECU valves:

- 2HV-6369
- 2HV-6373
- 2HV-6367
- 2HV-6371

Restore operability to and OPEN SDCHX Valve 2HV-6500

Restore operability to and CLOSE SDCHX Valve 2HV-6501

Ensure the Non-critical Loop and the Letdown Heat Exchanger are aligned to the Train A CCW Critical Loop.

Provide the examinee with a copy of SO23-2-17, CCW System Operation, completed through Step 6.4.4.

NOTE: Examiner should be aware that some steps may be performed out of sequence. Preview JPM and monitor examinee actions to ensure all critical steps are performed.

JPM: SO 10-05 JPM NRC RO/SRO S-4 TITLE: Place the “A” CCW Critical Loop in Standby

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
NOTE: Provide examinee with a copy of SO23-2-17, CCW System Operation, completed through Step 6.4.4.				
1	ENSURE the Non-Critical Loop is aligned to the train that is to remain in service.	TRANSITION to Section 6.6 of SO23-2-17 to Transfer the CCW Non-Critical Loop from Critical Loop A to Critical Loop B.		Start Time: _____
NOTE: JPM Steps 2 through 12 are done IAW Section 6.6 of SO23-2-17.				
2	ENSURE CCW Train B is running.	OBSERVE CCW Pump P-026 is running on Train B with red START light illuminated.		
3	ENSURE OPEN HV-6371, Containment Emergency Cooler ME-399 CCW Return Containment Isolation Valve.	OBSERVE 2HV-6371, CCW from CNTMT ECU 2E399 Iso Valve red OPEN light illuminated.		
4	ENSURE OPEN HV-6367, Containment Emergency Cooler ME-401 CCW Return Containment Isolation Valve.	OBSERVE 2HV-6367, CCW from CNTMT ECU 2E401 Iso Valve red OPEN light illuminated.		
5	ENSURE OPEN HV-6369, containment Emergency Cooler ME-400 CCW Return Containment Isolation Valve.	OBSERVE 2HV-6369, CCW from CNTMT ECU 2E400 Iso Valve red OPEN light illuminated.		
6	ENSURE OPEN HV-6373, Containment Emergency Cooler ME-402 CCW Return Containment Isolation Valve.	OBSERVE 2HV-6373, CCW from CNTMT ECU 2E402 Iso Valve red OPEN light illuminated.		

JPM: SO 10-05 JPM NRC RO/SRO S-4 TITLE: Place the “A” CCW Critical Loop in Standby

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
7*	ENSURE CLOSED HV-6500, CCW from SDCHX, ME-003 Block Valve.	DEPRESS the CLOSE pushbutton for 2HV-6500, CCW from SDC HX 2E003(N) Block Valve and OBSERVE green light illuminated.		
8*	DEPRESS and MAINTAIN DEPRESSED the Open pushbutton for HV-6213 and HV-6219, Critical Loop B Supply and Return to NCL.	DEPRESS <u>and</u> HOLD the OPEN pushbuttons for 2HV-6213 and 2HV-6219, CCW to NCL to/from Loop B Isolation Valves.		
9*	<u>When</u> 2HV-6212 and 2HV-6218, Critical Loop A Supply and Return to NCL indicate CLOSED, <u>then</u> RELEASE the Open pushbutton for 2HV-6213 and 2HV-6219.	OBSERVE the green lights illuminate for 2HV-6212 and 2HV-6218, CCW to NCL to/from Loop A Isolation Valves and then RELEASE the OPEN pushbuttons for 2HV-6213 and 2HV-6219, CCW to NCL to/from Loop B Isolation Valves.		
10	Verify 2HV-6213 and 2HV-6219 remain OPEN.	VERIFY 2HV-6213 and 2HV-6219 remain OPEN and OBSERVE that only the red lights remain illuminated.		
11	Verify 2HV-6212 and 2HV-6218 are fully CLOSED.	VERIFY 2HV-6212 and 2HV-6218 are fully CLOSED and OBSERVE that only the green lights remain illuminated.		
NOTE: With Train A being placed in standby the examinee may not elect to do this step.				
12	ENSURE OPEN 2HV-6501, CCW from SDCHX ME-004 Block Valve.	DEPRESS the OPEN pushbutton for 2HV-6501, CCW from SDC HX 2E004(S) Block Valve and OBSERVE red light illuminated.		

JPM: SO 10-05 JPM NRC RO/SRO S-4 TITLE: Place the “A” CCW Critical Loop in Standby

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
13	ENSURE the Letdown Heat Exchanger is aligned to the train that is to remain in service.	VERIFY that the Letdown Heat Exchanger is not aligned to Train B and proceeds to align it to Train B.		
14	ENSURE the CCW Train that the Letdown Heat Exchanger is being transferred to is running.	OBSERVE that CCW Pump 2P-026 and SWC Pump 2P-114 are running on Train B.		
15*	CLOSE HV-6293B/A, CCW Critical Loop A Letdown HX ME-062 Return/Supply Valves.	DEPRESS the CLOSE pushbutton for 2HV-6293B/A, CCW CLA LTDN HX 2E062 Supply/Return Valves and OBSERVE that the green light illuminates.		
16*	OPEN 2HV-6522B/A, CCW Critical Loop B Letdown HX ME-062 Return/Supply Valves.	DEPRESS the OPEN pushbutton for 2HV-6522B/A, CCW CLB LTDN HX 2E062 Supply/Return Valves and OBSERVE that the red light illuminates.		
17*	STOP the CCW Pump on the train being placed in standby.	DEPRESS the STOP pushbutton for 2HS-6320-1, CCW Pump 2P025 and OBSERVE that the green light illuminates.		
CUE: It is required to stop the SWC Pump on the train being placed in standby.				
18*	STOP the SWC Pump on the train being placed in standby.	DEPRESS the STOP pushbutton for 2HS-6380-1, Saltwater Pump 2P112 and OBSERVE that the green light illuminates.		
19*	CLOSE the Discharge Valve on the Salt Water Cooling Pump that was secured.	DEPRESS the CLOSE pushbutton for 2HS-6200, Saltwater Pump 2P112(W) Discharge Valve and OBSERVE that the green light illuminates.		

JPM: SO 10-05 JPM NRC RO/SRO S-4 TITLE: Place the “A” CCW Critical Loop in Standby

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
CUE: The SWC Pump P-112 will not be restarted within one (1) hour.				
20*	CLOSE SWC Bearing Seal Water Supply Valve.	DEPRESS the CLOSE pushbutton for 2HV-6376, Saltwater Pump 2P112(W) Bearing Water Supply Valve and OBSERVE that the green light illuminates.		
21*	CLOSE the SWC Heat Exchanger Outlet Valve.	DEPRESS the CLOSE pushbutton for 2HV-6497, Saltwater from CCW HX 2E001 Circ Water Block Valve and OBSERVE that the green light illuminates.		
22	ENSURE ECU Return Valves are positioned per Table in Section 6.1.	OBSERVE that two ECU Return Valves are OPEN on both Trains: 2HV-6367, CCW from CNTMT ECU to 2E401 Iso Valve for Train A. 2HV-6371, CCW from CNTMT ECU to 2E399 Iso Valve for Train A. 2HV-6369, CCW from CNTMT ECU to 2E400 Iso Valve for Train B. 2HV-6373, CCW from CNTMT ECU to 2E402 Iso Valve for Train B.		

JPM: SO 10-05 JPM NRC RO/SRO S-4 TITLE: Place the “A” CCW Critical Loop in Standby

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
23*	CLOSE Shutdown Cooling Heat Exchanger CCW Outlet Valve that is not required per Table in Section 6.1.	DEPRESS the CLOSE pushbutton for 2HV-6501, SDC HX 2E004(S) Block Valve and OBSERVE that the green light illuminates and VERIFY that 2HV-6500, SDC HX 2E003(N) Block Valve is closed.		
<p>TERMINATING CUE: CCW Out of Service tags will be placed on the Control Boards by another operator. This JPM is complete.</p> <p>Stop Time: _____</p>				

JPM CHECKLIST

1. The JPM is:
 - a. X Supported by facility's job task analysis.
 - b. X Operationally important (meets threshold criterion of K/A 3.0 or greater).
 - c. X Designed as either SRO only, or RO/SRO.

2. Each JPM includes:
 - a. X Initial conditions.
 - b. X Initiating cues.
 - c. X References, including associated procedures.
 - d. X Performance standards which are specific in that control and indication nomenclature and criteria (switch position, meter reading) are specified, even if these criteria are not specified in the procedural step.
 - e. X System response cues that are complete and correct so that the examiner can properly cue the Examinee, if asked.
 - f. Statements describing important actions or observations that should be made by the Examinee.
 - g. X Criteria for successful completion.
 - h. X Identification of the critical steps and their associated performance standards.
 - i. X Validated time limits (average time allowed for completion).
 - j. X JPMs identified as time critical or not time critical by the Operations Division based on NRC commitments.

COMPLETED BY: L. Zilli **DATE:** 07/26/05

JPM INFORMATION SHEET

JPM NUMBER

SO 10-05 JPM NRC RO/SRO S-6

INITIAL PLANT CONDITIONS

You are operating at a power level of 70% and ESI is determined to be - 0.07.

The CRS directs you to restore ASI using PLCEAs.

TASK TO BE PERFORMED

Restore ASI to the 70% power level ESI using SO23-5-1.7, Power Operations, Attachment 6.

SUGGESTED TESTING ENVIRONMENT:	PLANT _____	SIMULATOR <u> X </u>
ACTUAL TESTING ENVIRONMENT:	PLANT _____	SIMULATOR _____
ACTUAL TESTING METHOD:	PERFORMED _____	SIMULATED _____

OPERATOR'S NAME: _____

The operator's performance was evaluated against the standards contained in this JPM and is determined to be:

SATISFACTORY: _____
UNSATISFACTORY: _____

DOCUMENTATION

SO 10-05 JPM NRC RO/SRO S-6

JPM LEVEL: RO/SRO

ESTIMATED TIME TO COMPLETE: 10 minutes

TIME CRITICAL JPM: NO **CRITICAL TIME:** N/A

POSITION: ACO

TASK SYS ID: 188098

TASK DESCRIPTION

Monitor and control ASI during steady state operations.

KA NUMBER: 001 A2.19

KA VALUES: **RO** 3.6 **SRO** 4.0

10CFR55.45 APPLICABILITY: 2, 4, 5, 6

REFERENCES:

SO23-5-1.7, Power Operations, Rev. 24

SO23-3-2.19, CEDMCS, Rev. 18

SO23-13-13, Misaligned Control Element Assembly, Rev.10-2

AUTHOR: L. Zilli

DATE: 03/10/05

OPERATIONS REVIEW: M. Jones

DATE: 03/18/05

APPROVED BY: A. Hagemeyer

DATE: 03/18/05

MODIFICATION HISTORY

REV	DESCRIPTION OF CHANGE	MODIFIED BY	DATE MODIFIED	SOT APPROVAL
0	New	---	---	---
0-1	Compared against SO23-5-1.7 Rev. 24 with minor changes required.	LRZ	03/10/05	AHH

SET-UP

Reset to IC #174 (Event File Delete J-70) for the October 2005 NRC Exam.

Malfunction numbers:

RD3003 for CEA # 30

RD3103 for CEA # 31

Provide the examinee with a copy of SO23-5-1.7, Power Operations.

CAUTION: Leave the simulator in freeze until the examinee is ready to move the PLCEAs.

JPM: SO 10-05 JPM NRC RO/SRO S-6 TITLE: Restore ASI to ESI

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
NOTE: The applicant may also refer to SO23-3-2.19, CEDMCS Operation.				
1	SELECT the PLCEAs with the Group Selector Switch.	PLACE the Group Selector Switch to P.		Start Time: _____
2*	SELECT MANUAL GROUP on the Mode Select Switch.	PLACE the Mode Select Switch in MANUAL GROUP.		
3*	INSERT the PLCEAs.	INSERT the PLCEAs in small, smooth, frequent movements of less than 3 inches per minute. PLACE Mode Select Switch in OFF when rod insertion is complete. Insertion should not exceed 112.5" (TS 3.1.8 and LCS 3.1.103).		
4	MONITOR ASI and ESI.	OBSERVE PMS screen and/or chart for ASI trend. DETERMINE that a second CEA insertion is required.		
NOTE: The examiner may cue the simulator to insert malfunction at any time once the second CEA insertion is initiated by the examinee.				
CUE: When Examiner directs, initiate malfunction to drop CEAs #30 and #31.				
5*	INSERT the PLCEAs.	INSERT the PLCEAs in small, smooth, frequent movements of less than 3 inches per minute. PLACE Mode Select Switch in OFF when rod insertion is complete. Insertion should not exceed 112.5" (TS 3.1.8 and LCS 3.1.103).		

JPM: SO 10-05 JPM NRC RO/SRO S-6 TITLE: Restore ASI to ESI

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
6	DETERMINE that two PLCEAs have dropped.	VERIFY Rod Bottom indication for CEAs #30 and #31.		
NOTE: Applicant may refer to SO23-13-13, Misaligned Control Element Assembly, to determine appropriate action.				
7*	TRIP the reactor.	INITIATE a Reactor Trip by DEPRESSING at least two manual Reactor trip pushbuttons: 2HS-9132-2 and 2HS-9132-3 <u>or</u> 2HS-9132-1 and 2HS-9132-4		
TERMINATING CUE: When the examinee has tripped the Reactor, the evaluation for this JPM is complete.				Stop Time: _____

JPM CHECKLIST

1. The JPM is:
 - a. X Supported by facility's job task analysis.
 - b. X Operationally important (meets threshold criterion of K/A 3.0 or greater).
 - c. X Designed as either SRO only, or RO/SRO.

2. Each JPM includes:
 - a. X Initial conditions.
 - b. X Initiating cues.
 - c. X References, including associated procedures.
 - d. X Performance standards which are specific in that control and indication nomenclature and criteria (switch position, meter reading) are specified, even if these criteria are not specified in the procedural step.
 - e. X System response cues that are complete and correct so that the examiner can properly cue the Examinee, if asked.
 - f. X Statements describing important actions or observations that should be made by the Examinee.
 - g. X Criteria for successful completion.
 - h. X Identification of the critical steps and their associated performance standards.
 - i. X Validated time limits (average time allowed for completion).
 - j. X JPMs identified as time critical or not time critical by the Operations Division based on NRC commitments.

COMPLETED BY: L. Zilli **DATE:** 07/26/05

JPM INFORMATION SHEET

JPM NUMBER

SO 10-05 JPM NRC RO/SRO S-7

INITIAL PLANT CONDITIONS

The plant is at 70% power with all systems operable.

The CO notices that Safety Injection Tank (SIT T-007) pressure is near the low pressure alarm setpoint.

TASK TO BE PERFORMED

The Control Operator directs you to increase pressure in SIT T-007 to 630 psia.

SUGGESTED TESTING ENVIRONMENT:	PLANT _____	SIMULATOR <u> X </u>
ACTUAL TESTING ENVIRONMENT:	PLANT _____	SIMULATOR _____
ACTUAL TESTING METHOD:	PERFORMED _____	SIMULATED _____

OPERATOR'S NAME: _____

The operator's performance was evaluated against the standards contained in this JPM and is determined to be:

SATISFACTORY: _____
UNSATISFACTORY: _____

DOCUMENTATION

SO 10-05 JPM NRC RO/SRO S-7

JPM LEVEL: RO/SRO

ESTIMATED TIME TO COMPLETE: 10 minutes

TIME CRITICAL JPM: NO **CRITICAL TIME:** N/A

POSITION: ACO

TASK SYS ID: 141245

TASK DESCRIPTION

Pressurize the Safety Injection Tank.

KA NUMBER: 006 A1.13

KA VALUES: **RO** 3.5 **SRO** 3.7

10CFR55.45 APPLICABILITY: 2, 6, and 8

REFERENCES:

SO23-3-2.7.1 Safety Injection Tank Operations, Revision 12

AUTHOR: L. Zilli

DATE: _____

OPERATIONS REVIEW: M. Jones

DATE: _____

APPROVED BY: A. Hagemeyer

DATE: _____

MODIFICATION HISTORY

REV	DESCRIPTION OF CHANGE	MODIFIED BY	DATE MODIFIED	SOT APPROVAL
2	Compared against SO23-3-2.7.1, Rev 12 and removed NOTE that was no longer applicable. Modified setup for performance consistency. Removed Step for SIT Nitrogen Header Pressure verification as that indication is no longer available on the Control Board.	LRZ	07/26/05	REV

SET-UP

Machine Operator:

Use IC-174 (Event File Delete J-70) for October 2005 NRC JPM Exams. Otherwise use any 100% IC.

Reduce SIT T-007 pressure to about 620 psig.

Provide copy of SO23-3-2.7.1, Safety Injection Tank Operation, AFTER examinee identifies procedure to be used.

JPM: SO 10-05 JPM NRC RO/SRO S-7 TITLE: Increase Pressure in SIT T-007 by 10 PSIG

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
NOTE: Provide copy of SO23-3-2.7.1, Safety Injection Tank Operation, AFTER examinee identifies procedure to be used.				
1	Identify the procedure and step to be used.	LOCATE a current copy of SO23-3-2.7.1 and go to Step 6.1.		Start Time: _____
2	Ensure SIT pressure is ≥ 300 psia.	OBSERVE SIT T-007 Narrow Range Pressure, 2PI-0322 and/or 2PI-0323 and DETERMINE that it is ≥ 300 psia.		
3	Verify SIT level is between 79.2% and 82.9% NR for T-007.	OBSERVE 2LI-0322 and/or 2LI-0323 SIT Narrow Range Level T007 (LOOP 1B) and DETERMINE that it is between 79.2% and 82.9%.		
4*	Open SIT Nitrogen Supply Containment Isolation Valve 2HV-5434 and verify SIT Nitrogen header pressure is at least 610 psig (PI-5410).	DEPRESS the OPEN pushbutton for 2HV-5434, SIT N2 Supply Iso Valve and VERIFY SIT Nitrogen header pressure is at least 610 psig on 2PI-5410.		
5*	Open Nitrogen Supply Valve to SIT T-007, 2HV-9354.	DEPRESS the OPEN pushbutton for 2HV-9354, SIT 2T007 (LOOP 1B) N2 Supply Valve.		
6*	After achieving 630 psia, CLOSE the Nitrogen Supply Valve to SIT T-007, 2HV-9354.	DEPRESS the CLOSE pushbutton for 2HV-9354, SIT N2 Supply Iso Valve when the pressure has increased to 630 psia \pm 2 psia.		

JPM: SO 10-05 JPM NRC RO/SRO S-7 TITLE: Increase Pressure in SIT T-007 by 10 PSIG

* Denotes a CRITICAL STEP

NO	PERFORMANCE STEP	STANDARD	S/U	COMMENTS (Required for Unsat)
7	Verify SIT T-007 level is between 79.2% and 82.9%.	OBSERVE 2LI-0322 and/or 2LI-0323 SIT Narrow Range Level T007 (LOOP 1B) and DETERMINE that level remains between 79.2% and 82.9%		
8	Close SIT Nitrogen Supply Containment Isolation Valve 2HV-5434.	DEPRESS the CLOSE pushbutton for 2HV-5434, SIT Nitrogen Supply Containment Isolation Valve.		
TERMINATING CUE: The CO will make all required log entries. This JPM is complete.				Stop Time: _____

JPM CHECKLIST

1. The JPM is:
 - a. X Supported by facility's job task analysis.
 - b. X Operationally important (meets threshold criterion of K/A 3.0 or greater).
 - c. X Designed as either SRO only, or RO/SRO.

2. Each JPM includes:
 - a. X Initial conditions.
 - b. X Initiating cues.
 - c. X References, including associated procedures.
 - d. X Performance standards which are specific in that control and indication nomenclature and criteria (switch position, meter reading) are specified, even if these criteria are not specified in the procedural step.

 - e. X System response cues that are complete and correct so that the examiner can properly cue the Examinee, if asked.

 - f. X Statements describing important actions or observations that should be made by the Examinee.

 - g. X Criteria for successful completion.
 - h. X Identification of the critical steps and their associated performance standards.
 - i. X Validated time limits (average time allowed for completion).
 - j. X JPMs identified as time critical or not time critical by the Operations Division based on NRC commitments.

COMPLETED BY: L. Zilli **DATE:** 07/26/05

Facility:	San Onofre	Scenario No.:	1	Op Test No.:	NRC
Examiners:	_____	Operators:	_____		
	_____		_____		
	_____		_____		
Initial Conditions: <ul style="list-style-type: none"> 100% power - RCS Boron is 888 ppm by Chemistry Sample Train A Component Cooling Water Pump (P-025) in service Train A Auxiliary Feedwater Pump (P-141) OOS Train A High Pressure Safety Injection (P-017) OOS Condenser Air Ejector Low Range Radiation Monitor (RM-7818) OOS 					
Turnover: Maintain steady-state power conditions.					
Critical Tasks: <ul style="list-style-type: none"> Establish RCS temperature control (Turbine fails to trip). Trip any RCP not satisfying RCP operating limits. Stabilize RCS temperature/pressure following loss of heat removal from the faulted Steam Generator. 					
Event No.	Malf. No.	Event Type*	Event Description		
1 + 5 min	FW23	C (ACO, CRS)	Partial loss of Condenser vacuum @ 3%.		
2 + 10 min		R (CO) N (ACO, CRS)	Downpower for Condenser Backpressure.		
3 + 20 min	CV17A CV17B	C (CO, CRS) TS(CRS)	Both BAMU Pumps trip.		
4 + 25 min		TS (CRS)	Main Steam and Main Feedwater Isolation Valves declared <i>inoperable</i> .		
5 + 30 min	RD2103	C (CO, ACO, CRS) TS (CRS)	Dropped CEA #21.		
6 + 50 min	MS03B	M (ALL)	ESDE on E089 inside Containment.		
7 +50 min	TU07	C (ACO)	Turbine auto trip failure, manual trip required.		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS) Technical Specifications					

SCENARIO SUMMARY NRC #1

The crew will assume the watch at 100% power and maintain steady-state conditions per SO23-5-1.7, Power Operations.

When turnover is complete, a partial loss of vacuum will occur. The crew will respond per the Annunciator Response Procedures (ARP) 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.

When the CO initiates RCS boration for the power reduction, the in-service and standby Boric Acid Makeup Pumps (BAMU) will trip, requiring gravity feed from the BAMU tanks for boration. The CRS will evaluate Technical Specifications.

Once the plant is stabilized, the Main Steam and Main Feedwater Isolation Valves will be declared *inoperable* due to improper hydraulic fluid. The CRS will evaluate Technical Specifications.

This is followed by a dropped CEA and requires crew actions per the ARPs and AOI SO23-13-13, Misaligned or Immovable Control Element Assembly.

The EOP entry point is caused by an ESDE on E089 inside Containment. The crew performs SO23-12-1, Standard Post Trip Actions and diagnoses an ESDE. The crew will transition to SO23-12-5, Excess Steam Demand Event and perform necessary actions to stabilize RCS temperature.

During this event the Turbine fails to trip requiring manual actions on the part of the ACO. The scenario is terminated when the crew stabilizes RCS temperature/pressure following pressure following loss of heat removal from the faulted Steam Generator.

Risk Significance:

- | | |
|---|--|
| • Risk important components out of service: | HPSI P-017, AFW P-141 |
| • Failure of risk important system prior to trip: | Loss of BAMU Pumps |
| • Risk significant core damage sequence: | ESDE with Turbine trip failure |
| • Risk significant operator actions: | Failure to trip Main Turbine |
| | Stabilize RCS temperature following ESDE |

Scenario Event Description

NRC Scenario 1

SONGS

2005 Facility NRC Initial License Examination

Simulator Scenario Setup

Scenario 1

MACHINE OPERATOR'S INSTRUCTIONS

SETUP

IC: Use IC #176 and see attached Event File for NRC Scenario #1.

STEPS	TYPE	MALF #	DESCRIPTION	DEMAND VALUE	INITIATING PARAMETER

Op Test No.:	<u>NRC</u>	Scenario #	<u>1</u>	Event #	<u>1, 2, & 3</u>	Page	<u>4</u>	of	<u>20</u>
Event Description:		Partial Loss of Condenser Vacuum, Downpower, RCS Boration using Gravity Feed							
Time	Position	Applicant's Actions or Behavior							

Machine Operator: EXECUTE IC #176 and NRC Scenario #1 SETUP file to align components.
 ENSURE Control Board Tags are hung on P-017 and P-141.
 ENSURE procedures in progress are on the CO desk.
 - MYLAR copy of SO32-5-1.7, Power Operations (open to Section 6.4, Guidelines for Steady State Operation)

Control Room Annunciators in Alarm at 100%:

57A58 – EMERGENCY FEEDWATER SYS TRAIN A INOPERABLE

Machine Operator: When directed, EXECUTE FW23, Partial Loss of Condenser Vacuum @ 3% and CV17A & B, BAMU Pump trips.

Indications available:

99B37 – VACUUM LO

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

58A46 – BAMU PUMP P174 OC (once boration is attempted)

58A47 – BAMU PUMP P175 OC (once boration is attempted)

+1 min	ACO	REFER to Annunciator Response Procedure.
	ACO	DETERMINE that vacuum is degrading due to an unknown and/or uncontrollable cause, and the Main Turbine is operating in the restricted area of SO23-5-1.7, Attachment 5, Turbine Vacuum Limits and INFORM the CRS AOI SO23-13-10 entry required.
	CRS	DIRECT performance of AOI SO23-13-10, Loss of Condenser Vacuum.
	ACO	VERIFY Vacuum Pump P-054 auto starts or manually START Vacuum Pump.

Op Test No.:	<u>NRC</u>	Scenario #	<u>1</u>	Event #	<u>1, 2, & 3</u>	Page	<u>5</u>	of	<u>20</u>
Event Description:		Partial Loss of Condenser Vacuum, Downpower, RCS Boration using Gravity Feed							
Time	Position	Applicant's Actions or Behavior							

	ACO	After two minutes of operating, PLACE Vacuum Pump P-054 in MANUAL.
	ACO	VERIFY Gland Seal steam pressure > 2 psig on PI-2845.
	ACO	DETERMINE Condenser backpressure is NOT in the area of Unrestricted Operation in Attachment 3.
+5 min	CREW	INITIATE Attachment 1 and DISPATCH personnel to locate source of vacuum leak.
	CO	VERIFY a Reactor trip has not occurred.
	ACO	VERIFY a Turbine trip has not occurred.
	ACO	REDUCE Turbine load as required to maintain:
		<ul style="list-style-type: none"> Backpressure in the Area of Unrestricted Operation in Attachment 3.
		<ul style="list-style-type: none"> Condenser Delta T \leq 25°F.
Floor Cue: Condenser Delta T is 22°F.		
	CO	BORATE the RCS or INSERT CEAs as Turbine load is reduced.
	CO	INITIATE boration in accordance with SO23-3-2.2, Makeup Operations.
	CO	DETERMINE amount of boric acid to be added from thumb rules page.

Op Test No.:	<u>NRC</u>	Scenario #	<u>1</u>	Event #	<u>1, 2, & 3</u>	Page	<u>6</u>	of	<u>20</u>
Event Description:		Partial Loss of Condenser Vacuum, Downpower, RCS Boration using Gravity Feed							
Time	Position	Applicant's Actions or Behavior							

	CO	COMMENCE periodically changing boronometer setpoints to (+50, -25 ppm) of existing boron concentration.
	CO	POSITION FIC-0210Y, BAMU Flow Controller, to AUTOMATIC and set to the required flowrate.
	CO	SET FQIS-0210Y, BAMU to VCT T-077, Borate Batching Counter, to the required volume (103 gallons for 5%).
	CO	SELECT the BAMU Pump associated with the BAMU Tank used.
+12 min	CO	BORATE to the Charging Pump suction:
		<ul style="list-style-type: none"> • VERIFY closed FV-9253, Blended Makeup to VCT isolation.
		<ul style="list-style-type: none"> • PLACE HV-9257, BAMU to Charging Pump Suction Block Valve in AUTOMATIC.
	CO	SELECT HS-0210, Makeup Mode Selector, to BORATE.
	CO	DETERMINE that selected BAMU Pump tripped upon starting:
		<ul style="list-style-type: none"> • 58A46 - BAMU PUMP P174 OC.
	CO	START BAMU Pump P-175 by placing the pump control switch in START or by placing HS-9264 to the P-175 position.
	CO	DETERMINE that selected BAMU Pump tripped upon starting:
		<ul style="list-style-type: none"> • 58A47 - BAMU PUMP P175 OC.
M.O. Cue: If directed to report status of BAMU Pump P-174 breaker, WAIT 3 minutes and REPORT that breaker 2BY14 has an overcurrent flag.		

Op Test No.:	<u>NRC</u>	Scenario #	<u>1</u>	Event #	<u>1, 2, & 3</u>	Page	<u>7</u>	of	<u>20</u>
Event Description:		Partial Loss of Condenser Vacuum, Downpower, RCS Boration using Gravity Feed							
Time	Position	Applicant's Actions or Behavior							

M.O. Cue: If directed to report status of BAMU Pump P-175 breaker, WAIT 3 minutes and REPORT that breaker 2BY15 has an overcurrent flag.		
	CO	OPEN Gravity Feed Valves from BAMU Tank (HV-9235 or HV-9240) or RWST Gravity Feed Valve (LV-0227C) to initiate boration or INSERT CEAs.
	CO	MONITOR plant parameters.
+20 min	CRS	EVALUATE Technical Specifications.
		<ul style="list-style-type: none"> 3.1.9.A is applicable (72 hour ACTION) to restore boron injection flowpath to OPERABLE status.
		<ul style="list-style-type: none"> NOTE: Loss of both BAMU Pumps represents loss of a <u>single</u> flowpath as both BAMU Pumps are powered from Train A. The Gravity Feed Valves are powered from Train B and represent the other Train.
	CRS	NOTIFY GCC of the load reduction.
NOTE: Crew may determine that Part Length CEA insertion is necessary for ASI control.		
	CRS	VERIFY that the loss of vacuum is not the result of recent equipment status changes on either Unit.
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.		

Op Test No.:	<u>NRC</u>	Scenario #	<u>1</u>	Event #	<u>1, 2, & 3</u>	Page	<u>8</u>	of	<u>20</u>
Event Description:		Partial Loss of Condenser Vacuum, Downpower, RCS Boration using Gravity Feed							
Time	Position	Applicant's Actions or Behavior							

M.O. Cue: After the crew has dropped load 3 to 5% and Technical Specifications have been addressed, **REPORT** that you found a leaking seal on a vacuum breaker, and you are initiating makeup, then **DELETE** FW23, Condenser Vacuum Leak Malfunction.

When vacuum has stabilized and/or power reduction is complete, or at Lead Evaluator's discretion, PROCEED to Event 4.

Op Test No.: NRC Scenario # 1 Event # 4 Page 9 of 20

Event Description: Main Steam and Main Feedwater Isolation Valves Declared Inoperable

Time	Position	Applicant's Actions or Behavior
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Machine Operator: When directed, **CONTACT** Control Room as Maintenance Engineering and **REPORT** that the wrong hydraulic fluid was placed into the MSIVs and MFW Isolation Valves.

Indications available:**None**

+1 min	CRS	EVALUATE Technical Specifications.
		<ul style="list-style-type: none"> No available 3.7.2 LCO for two MSIVs <i>inoperable</i> in Mode 1 requires LCO 3.0.3 entry (7 hour ACTION).
		<ul style="list-style-type: none"> 3.7.3.A is applicable (7 day ACTION).
		<ul style="list-style-type: none"> Close or isolate <i>inoperable</i> MFIV.

+5 min	CRS	DIRECT performance of a Plant Shutdown per SO23-5-1.7, Power Operations to place the Unit in Mode 3.
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When Technical Specifications have been reviewed, or at Lead Evaluator's discretion, PROCEED to Event 5.

Op Test No.:	<u>NRC</u>	Scenario #	<u>1</u>	Event #	<u>5</u>	Page	<u>10</u>	of	<u>20</u>
Event Description:		Dropped CEA #21							
Time	Position	Applicant's Actions or Behavior							

Machine Operator: When directed, EXECUTE RD2103, Dropped CEA #21.

Indications available:

50A28 – CEA DEVIATION

50A36 – POWER DEPENDENT INSERTION LIMIT

50A37 – PRE-POWER DEPENDENT INSERTION LIMIT

50A38 – CEA GROUP DEVIATION

50A02 – COLSS ALARM

50A10 – CEDMCS CEA WITHDRAWAL PROHIBIT

CEA #21 Rod Bottom indication

+1 min	CO	RECOGNIZE that Regulating Group 1 CEA 21 has dropped and INFORM the CRS AOI SO23-13-13 entry required.
	CRS	DIRECT performance of AOI SO23-13-13, Misaligned or Immovable Control Element Assembly.
	CO	VERIFY that no more than one CEA is misaligned > 7 inches.
	CO	ENSURE CEDMCS Mode Selector Switch in OFF.
	ACO	REDUCE Turbine load using CVOL to restore RCS Tcold to the pre-CEA drop value and block load changes.
M.O. Cues: If sent as Radwaste PEO to investigate CEDMCS, WAIT 3 minutes and REPORT no observable problems. If sent as I&C to investigate, WAIT 5 minutes and REPORT that a bad ACTM Card requires replacement. The estimated repair time is 15 minutes.		
	CO	VERIFY Reactor is critical.
	CRS	RECORD initial and stabilized reactor power for subsequent SDM calculation.

Op Test No.: NRC Scenario # 1 Event # 5 Page 11 of 20

Event Description: Dropped CEA #21

Time	Position	Applicant's Actions or Behavior
	CRS	Within 15 minutes, DIRECT monitoring of DNBR and LPD per SO23-3-3.6, Attachment 1.
Floor Cue: The Work Control Supervisor will complete the DNBR and LPD monitoring in accordance with SO23-3-3.6, Attachment 1.		
	CRS	DIRECT performance of Attachment 3, Misaligned CEA checklist.
	CRS	Within 15 minutes of discovery, DIRECT initiation of Reactor power reduction.
		<ul style="list-style-type: none"> For Non Group 6 Full Length CEA, REDUCE power 10% within 60 minutes.
NOTE: CRS should recognize that power reduction due to dropped CEA (~3%) satisfies the 15 minute requirement to initiate a power reduction. The remaining power reduction must be accomplished within 60 minutes.		
	ACO	COMMENCE lowering Turbine Generator load using CVOL while maintaining Tcold per SO23-5-1.7.
	CRS	DIRECT initiation of boration of the RCS per SO23-3-2.2 to achieve target power level.
	CO	COMMENCE attempting to control ASI near full power ESI.
	CRS	REQUEST Reactor Engineering to report to the Control Room.
	CRS	INITIATE recovery of affected CEA per Attachment 1.

Op Test No.: NRC Scenario # 1 Event # 5 Page 12 of 20

Event Description: Dropped CEA #21

Time	Position	Applicant's Actions or Behavior
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	CO	VERIFY CEA position indications agree:
		<ul style="list-style-type: none"> COMPARE affected CEA PIDs from CEAC No. 1 and 2 at CPC Operator Console.
		<ul style="list-style-type: none"> COMPARE affected CEA PIDs from CEAC No. 1 and 2 at Secondary Rod Position CRT.
		<ul style="list-style-type: none"> CHECK UEL and LEL lights.
+20 min	CO/CRS	VERIFY one CEA has not been misaligned >7 inches for an unknown duration.
<p><i>When the CEA evaluation is completed, or at Lead Evaluator's discretion, PROCEED to Events 6 and 7.</i></p>		

Op Test No.: NRC Scenario # 1 Event # 6, 7 Page 13 of 20

Event Description: ESDE on E089 Inside Containment / Turbine Trip Failure

Time	Position	Applicant's Actions or Behavior
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Machine Operator: When directed, EXECUTE TU07, Turbine Trip Failure and MS03B ESDE on E089 inside Containment @ 1.2%.

Indications available:

60A02 – CONTAINMENT HUMIDITY HIGH
60A12 – REACTOR CAVITY TEMP HI
60A03 – CONTAINMENT / FHB TEMP HI
56A35 – CONTAINMENT PRESSURE HI PRE-TRIP
56A16 – PRESSURIZER PRESSURE LO PRE-TRIP

	CO/ACO	RECOGNIZE that an uncontrolled cooldown is in progress and INFORM the CRS that reactor trip is required.
	CRS	DIRECT entry into SO23-12-1, Standard Post Trip Actions.
	CRS	INITIATE Administrative Actions:
		<ul style="list-style-type: none"> RECORD time of Reactor trip _____. ANNOUNCE Reactor trip via PA System. INITIATE Attachment 4, WORKSHEET. INITIATE Attachment 5, ADMINISTRATIVE ACTIONS.
	CO	VERIFY Reactivity Control criteria satisfied:
		<ul style="list-style-type: none"> VERIFY Reactor Trip Circuit Breakers (8) – open. VERIFY maximum of one full length CEA – NOT fully inserted. VERIFY Reactor power – lowering AND Startup rate – negative.
	ACO	VERIFY Vital Auxiliaries functioning properly:
CRITICAL TASK		<ul style="list-style-type: none"> Establish RCS Temperature Control - DETERMINE Main Turbine NOT tripped and MANUALLY TRIP Turbine. HP and LP Stop and Governor Valves – closed. MWE output – lowering.

Op Test No.: NRC Scenario # 1 Event # 6, 7 Page 14 of 20

Event Description: ESDE on E089 Inside Containment / Turbine Trip Failure

Time	Position	Applicant's Actions or Behavior
		<ul style="list-style-type: none"> • VERIFY both Unit Output Breakers – open.
		<ul style="list-style-type: none"> • VERIFY Main Turbine speed - less than 2000 RPM OR - lowering.
		<ul style="list-style-type: none"> • VERIFY CCW Pump aligned to Non-Critical Loop (NCL) and Letdown Heat Exchanger – operating.
		<ul style="list-style-type: none"> • VERIFY both 1E 4 kV Buses – energized.
		<ul style="list-style-type: none"> • VERIFY both 1E 480 V Buses B04 and B06 - energized.
		<ul style="list-style-type: none"> • VERIFY all 6.9 kV and Non-1E Buses – energized.
		<ul style="list-style-type: none"> • VERIFY all Class 1E DC Buses – energized.
M.O. Cue: If directed to check Main Steam Safety Valve status, REPORT as the 24 that all safety valves appear to be seated, with no steam coming from the MSIV roof.		
	CO	DETERMINE RCS Inventory Control criteria NOT satisfied:
		<ul style="list-style-type: none"> • DETERMINE PZR level NOT between 10% and 70% AND NOT trending to between 30% and 60%.
		<ul style="list-style-type: none"> • VERIFY Core Exit Saturation Margin – greater than or equal to 20°F:
		QSPDS page 611.
		CFMS page 311.
	CO	DETERMINE RCS Pressure Control criteria NOT satisfied:
		<ul style="list-style-type: none"> • DETERMINE PZR pressure (WR and NR) NOT between 1740 PSIA and 2380 PSIA AND NOT controlled AND NOT trending to between 2025 PSIA and 2275 PSIA.
	CO	DETERMINE Core Heat Removal criteria is NOT satisfied:
CRITICAL TASK		<ul style="list-style-type: none"> • Trip any RCP not satisfying RCP operating limits - STOP all RCPs due to CIAS.
		<ul style="list-style-type: none"> • RECORD time of all RCPs off.
		<ul style="list-style-type: none"> • VERIFY operating loop Delta T (Th-Tc) less than 58°F.

Op Test No.: NRC Scenario # 1 Event # 6, 7 Page 15 of 20

Event Description: ESDE on E089 Inside Containment / Turbine Trip Failure

Time	Position	Applicant's Actions or Behavior
		<ul style="list-style-type: none"> • VERIFY Th and Tc not rising.
		<ul style="list-style-type: none"> • VERIFY operating loop Th and REP CET within 16°F.
		<ul style="list-style-type: none"> • QSPDS page 611.
		<ul style="list-style-type: none"> • CFMS page 311.
		<ul style="list-style-type: none"> • VERIFY Core Exit Saturation Margin $\geq 20^{\circ}\text{F}$.
		<ul style="list-style-type: none"> • QSPDS page 611.
		<ul style="list-style-type: none"> • CFMS page 311.
		<ul style="list-style-type: none"> • VERIFY Reactor Vessel level $\geq 100\%$ (plenum).
		<ul style="list-style-type: none"> • QSPDS page 622.
		<ul style="list-style-type: none"> • CFMS page 312.
NOTE: It is acceptable for CO to report only “Monitoring for Natural Circulation.”		
	ACO	DETERMINE RCS Heat Removal criteria NOT satisfied:
		<ul style="list-style-type: none"> • DETERMINE both SGs level – NOT greater than 21% NR.
		<ul style="list-style-type: none"> • VERIFY both SGs level – less than 80% NR.
		<ul style="list-style-type: none"> • DETERMINE the following:
		<ul style="list-style-type: none"> • Auxiliary feedwater available to restore E088 SG level – between 40% NR and 80% NR.
		<ul style="list-style-type: none"> • Main feedwater NOT available to restore both SGs level – between 40% NR and 80% NR with flow to each SG (MSIS actuated):
		<ul style="list-style-type: none"> • No MFW Pumps – operating.
		<ul style="list-style-type: none"> • RTO – actuated to both SGs.
		<ul style="list-style-type: none"> • PREVENT SG high level:
		<ul style="list-style-type: none"> • CLOSE MFW Block Valves:
		<div style="display: flex; justify-content: space-around;"> <div> <u>E-088</u> HV-4047 </div> <div> <u>E-089</u> HV-4051 </div> </div>
		<ul style="list-style-type: none"> • DETERMINE heat removal NOT adequate:

Op Test No.: NRC Scenario # 1 Event # 6, 7 Page 16 of 20

Event Description: ESDE on E089 Inside Containment / Turbine Trip Failure

Time	Position	Applicant's Actions or Behavior
		<ul style="list-style-type: none"> • T_C – less than 555°F.
		<ul style="list-style-type: none"> • SG pressures – less than 1000 PSIA.
		<ul style="list-style-type: none"> • DETERMINE T_C less than 545°F and NOT controlled.
		<ul style="list-style-type: none"> • DETERMINE SG pressures – less than 740 PSIA.
	CO	DETERMINE Containment Isolation criteria NOT satisfied:
		<ul style="list-style-type: none"> • DETERMINE Containment pressure – greater than 1.5 PSIG.
		<ul style="list-style-type: none"> • VERIFY Containment Area Radiation Monitors energized AND NOT alarming or trending to alarm.
		<ul style="list-style-type: none"> • VERIFY Secondary Plant Radiation Monitors energized AND NOT alarming or trending to alarm.
	CO	DETERMINE Containment Temperature, Pressure and Combustible Gas Control criteria NOT satisfied:
		<ul style="list-style-type: none"> • DETERMINE Containment average temperature – greater than 120°F.
		<ul style="list-style-type: none"> • DETERMINE Containment pressure – greater than 1.5 PSIG.
+15 min	CRS	DIAGNOSE Event in Progress:
		<ul style="list-style-type: none"> • DETERMINE all safety function criteria are NOT met per Attachment 4, WORKSHEET.
		<ul style="list-style-type: none"> • COMPLETE Attachment 1, Recovery Diagnostic.
		<ul style="list-style-type: none"> • DIAGNOSE ESDE in progress.
		<ul style="list-style-type: none"> • NOTIFY personnel of event in progress.
		<ul style="list-style-type: none"> • DESIGNATE SRO-in-charge.
		<ul style="list-style-type: none"> • DIRECT initiation of Steps 11 through 14.
	CRS	DIRECT performance of SO23-12-5, Excess Steam Demand Event.

Op Test No.: NRC Scenario # 1 Event # 6, 7 Page 17 of 20

Event Description: ESDE on E089 Inside Containment / Turbine Trip Failure

Time	Position	Applicant's Actions or Behavior
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	CRS	ENSURE SO23-12-1, Standard Post Trip Actions, Steps 1-10, complete.
		<ul style="list-style-type: none"> RECORD time of EOI entry.

	CRS	VERIFY ESDE diagnosis.
		<ul style="list-style-type: none"> INITIATE SO23-12-10, Safety Function Status Checks.
		<ul style="list-style-type: none"> INITIATE Foldout Page.
		<ul style="list-style-type: none"> FS-7, SI Throttle/Stop
		<ul style="list-style-type: none"> FS-3, Monitor Natural Circulation
		<ul style="list-style-type: none"> Attachment 22, Non-Qualified Loads Restoration
		<ul style="list-style-type: none"> FS-30, Stabilize RCS Temperature
		<ul style="list-style-type: none"> Attachment 28, Isolation of SG with ESDE
		<ul style="list-style-type: none"> VERIFY ESDE diagnosis using Figure 1, Break Identification Chart.
		<ul style="list-style-type: none"> INITIATE sampling of both Steam Generators for radioactivity and boron.

M.O. Cue: If directed to sample SGs, WAIT 10 minutes and then REPORT that E088 and E089 both have activity near background, and normal boron levels. If the SG sample valves are closed, REPORT that you are unable to establish sample flow.

	CRS	INITIATE Administrative Actions.
		<ul style="list-style-type: none"> NOTIFY Shift Manager/Operations Leader of SO23-12-5, Excess Steam Demand Event initiation.
		<ul style="list-style-type: none"> ENSURE Emergency Plan is initiated.
		<ul style="list-style-type: none"> IMPLEMENT Placekeeper.

	CO	VERIFY ESF actuation.
		<ul style="list-style-type: none"> VERIFY SIAS actuation required.
		<ul style="list-style-type: none"> PZR pressure less than SIAS setpoint.
		OR

Op Test No.: NRC Scenario # 1 Event # 6, 7 Page 18 of 20

Event Description: ESDE on E089 Inside Containment / Turbine Trip Failure

Time	Position	Applicant's Actions or Behavior
		<ul style="list-style-type: none"> Containment pressure > 3.4 PSIG.
		<ul style="list-style-type: none"> ENSURE the following actuated:
		<ul style="list-style-type: none"> SIAS / CCAS / CRIS
	CRS	RECORD time of SIAS.
	ACO	STOP unloaded Diesel Generators.
	ACO	INITIATE SO23-12-11, Attachment 22, Non-Qualified Load Restoration.
M.O. Cue: When directed to restore non-qualified loads, WAIT 3 minutes, then CALL the Control Room and REPORT that you are ready to restore. When directed, EXECUTE ED85, Non-Qualified Loads Restoration. When complete, INFORM the Control Room that you have restored non-qualified loads.		
	ACO	VERIFY MSIS actuation required and ENSURE MSIS actuated.
		<ul style="list-style-type: none"> SG pressure < 740 PSIA..
	CO	VERIFY CIAS actuation required and ENSURE CIAS actuated.
		<ul style="list-style-type: none"> Containment pressure > 3.4 psig.
		<ul style="list-style-type: none"> CFMS pages 342 and 343.
	CO	VERIFY SIAS actuated.
	CO	ESTABLISH Optimum SI Alignment.
		<ul style="list-style-type: none"> ESTABLISH two train operation
		<ul style="list-style-type: none"> All Charging Pumps operating
		<ul style="list-style-type: none"> One HPSI and one LPSI per train operating.
		<ul style="list-style-type: none"> All Cold leg flow paths aligned
		<ul style="list-style-type: none"> VERIFY SI flow required

Op Test No.: NRC Scenario # 1 Event # 6, 7 Page 19 of 20

Event Description: ESDE on E089 Inside Containment / Turbine Trip Failure

Time	Position	Applicant's Actions or Behavior
		<ul style="list-style-type: none"> SI flow indicated
		<ul style="list-style-type: none"> RCS pressure greater than 1250 psia
		OR
		<ul style="list-style-type: none"> VERIFY FS-7, Verify SI Throttle/Stop criteria satisfied.
	ACO	CLOSE MSIVs and MSIV Bypasses.
		<ul style="list-style-type: none"> ENSURE MSIVs - closed.
		<ul style="list-style-type: none"> HV-8205 for E088
		<ul style="list-style-type: none"> HV-8204 for E089
		<ul style="list-style-type: none"> ENSURE MSIV Bypasses - closed
		<ul style="list-style-type: none"> HV-8203 for E088
		<ul style="list-style-type: none"> HV-8202 for E089
	CREW	PREVENT Pressurized Thermal Shock.
		<ul style="list-style-type: none"> INITIATE FS-30, Establish Stable RCS temperature during ESDE.
NOTE: The following steps from FS-30 will be performed when conditions are met. Both the ESDE procedure and the ESDE Foldout Page direct performance of these steps.		
+20 min	ACO	VERIFY SG least affected by ESDE, SG E088, NOT isolated for SGTR.
CRITICAL TASK	ACO	Stabilize RCS temperature/pressure following loss of heat removal from the faulted Steam Generator.
		OPERATE ADV on SG E088 to stabilize RCS temperatures as faulted SG level lowers.
		<ul style="list-style-type: none"> SG E089 at 10% WR, position SG E088 ADV, HV-8419 to 10% open.
		<ul style="list-style-type: none"> SG E089 at 5% WR, set SG E088 ADV, HV-8419, at P_{sat} for lowest Tc.

Op Test No.: NRC Scenario # 1 Event # 6, 7 Page 20 of 20

Event Description: ESDE on E089 Inside Containment / Turbine Trip Failure

Time	Position	Applicant's Actions or Behavior
		<ul style="list-style-type: none"> SG E089 initial dryout, adjust SG E088 ADV, HV-8419, at P_{sat} for lowest Tc attained as SG boils dry.
	ACO	STABILIZE least affected SG E088 pressure.
		<ul style="list-style-type: none"> OPERATE ADV in automatic.
		<ul style="list-style-type: none"> STABILIZE AFW flow.
	CO	VERIFY RCS pressure is to the right of the Appendix E curve on Attachment 29, Post-Accident Pressure/Temperature Limits.
	ACO	OPERATE feedwater on SG E088 to maintain level between 40% and 80% NR.
	ACO	ISOLATE SG E089. CLOSE/STOP the following components:
		<ul style="list-style-type: none"> MSIV HV-8204
		<ul style="list-style-type: none"> MSIV Bypass HV-8202
		<ul style="list-style-type: none"> ADV HV-8421
		<ul style="list-style-type: none"> MFIV HV-4052
		<ul style="list-style-type: none"> AFW valves HV-4715, HV-4731
		<ul style="list-style-type: none"> Steam to AFW P-140 HV-8200
		<ul style="list-style-type: none"> SG Blowdown Isolation HV-4053
		<ul style="list-style-type: none"> SG Water Sample Isolation HV-4057
		<ul style="list-style-type: none"> Electric AFW Pump P-141
	ACO	ENSURE ADV on SG E089 selected to MANUAL.
When the affected Steam Generator E089 is isolated, TERMINATE the scenario.		

Facility:	San Onofre	Scenario No.:	2	Op Test No.:	NRC
Examiners:	_____	Operators:	_____		
	_____		_____		
	_____		_____		
Initial Conditions: <ul style="list-style-type: none"> 70% power – RCS Boron is 977 ppm by Chemistry Sample Train A Component Cooling Water Pump (P-025) in service Train A Auxiliary Feedwater Pump (P-141) OOS Train A High Pressure Safety Injection (P-017) OOS Condenser Air Ejector Low Range Radiation Monitor (RM-7818) OOS 					
Turnover: Dilution and power ascension in progress.					
Critical Tasks: <ul style="list-style-type: none"> Establish minimum design Safety Injection flowrate - HPSI Pump start failure, manual start required. Restore feedwater flow to at least one Steam Generator. 					
Event No.	Malf. No.	Event Type*	Event Description		
1 +15 min		R (CO) N (ACO, CRS)	Dilution and power ascension in progress at 15%/hr.		
2 +25 min	RC16B	I (CO, CRS) TS (CRS)	PZR Level Control Channel LT-0110-2 fails high.		
3 + 35 min	MS12B	I (ACO, CRS)	SG E088 Steam Flow FT-1011 fails to 7E ⁶ lbm/hr.		
4 + 45 min	RC03	C (CO, CRS) TS (CRS)	RCS leak < Charging Pump capacity.		
5 +55 min	SEISMIC OBE w/ FWPT	C (ACO, CRS)	Seismic event with Feedwater Pump trip.		
6 +65 min	ED03B	M (ALL)	Bus 2A06 Overcurrent trip.		
7 +65 min	RC03	M (ALL)	LOCA @ ~500 gpm.		
8 +65 min	FW09A/B FW25	M (ALL)	Loss of all Feedwater.		
9 +65 min	RP01B	C (CO)	HPSI Pump P-018 start failure, manual start required.		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS) Technical Specifications					

SCENARIO SUMMARY NRC #2

The crew will assume the watch with a dilution and power ascension in progress per SO23-5-1.7, Power Operations.

After the crew has demonstrated control of the power change to approximately 73 – 75% power, a Pressurizer Level instrument fails high and will require crew actions per the Annunciator Response Procedures (ARPs) and Abnormal Operating Instruction (AOI) SO23-13-27, Pressurizer Pressure and Level Malfunction. The CRS will evaluate Technical Specifications.

When the plant is stable, a Steam Flow Transmitter will fail to 92%. The crew will regain control of feedwater per Annunciator Response Procedures and/or AOI SO23-13-24, Feedwater Malfunctions.

The next event is an RCS leak. The SRO will be required to evaluate Technical Specifications and enter AOI SO23-13-14, Reactor Coolant System Leak. The SRO will determine that a plant shutdown per the AOI is required.

After the determination to shutdown is reached a seismic event will occur. This will result in a Main Feedwater Pump trip. The crew will stabilize feedwater flow and perform actions in AOI SO23-13-3, Earthquake and SO23-13-24, Feedwater Malfunction. Shortly thereafter, a Loss of Bus 2A06 (set up for loss of feed only) will coincide with a Loss of Coolant Accident and Loss of all Feedwater will occur. The crew performs SO23-12-1, Standard Post Trip Actions and diagnoses a LOCA and a LOFW and transitions to SO23-12-9, Functional Recovery.

Following the trip, a HPSI Pump fails to start and the CO will be required to manually start the pump. The scenario is terminated when the Steam Driven AFW Pump overspeed trip is reset and RCS temperature and pressure are stabilized while in the Functional Recovery procedure and associated Floating Steps.

Risk Significance:

- Risk important components out of service: HPSI P-017, AFW P-141
- Failure of risk important system prior to trip: MFW Pump trip
- Risk significant core damage sequence: LOCA and LOFW
- Risk significant operator actions: Failure to manually start HPSI
Failure to supply feedwater

Scenario Event Description

NRC Scenario 2

SONGS

2005 Facility NRC Initial License Examination

Simulator Scenario Setup

Scenario 2

MACHINE OPERATOR'S INSTRUCTIONS

SETUP

IC: Use IC #170 and see attached Event File for NRC Scenario #2.

STEPS	TYPE	MALF #	DESCRIPTION	DEMAND VALUE	INITIATING PARAMETER

Op Test No.:	<u>NRC</u>	Scenario #	<u>2</u>	Event #	<u>1</u>	Page	<u>4</u>	of	<u>23</u>
Event Description:		Dilution and Power Ascension in Progress at 15%/hr							
Time	Position	Applicant's Actions or Behavior							

Machine Operator: EXECUTE IC #170 and NRC Scenario #2 SETUP file to align components.

ALIGN both Pressurizer Spray Valves to Automatic.

ENSURE Control Board Tags are hung on P-017 and P-141.

ENSURE procedures in progress are on the CO desk.

- Copy of SO23-5-1.7 (open to Step 6.3.13, 50-80% Reactor Power)
- Copy of SO23-3-2.2 (check off Steps 6.6.1 through 6.6.5)
- Copy of SO23-3-1.10 (open to Section 6.2, Forcing Pressurizer Sprays)

VERIFY that dilution is in progress then PLACE in FREEZE.

Control Room Annunciators in Alarm at 70%:

57A58 – EMERGENCY FEEDWATER SYS TRAIN A INOPERABLE

NOTE: Crew turnover will be performed with simulator in FREEZE due to dilution and power increase in progress at turnover.

+1 min	CRS	DIRECT performance of SO23-5-1.7, Power Operations, SO23-3-2.2, Makeup Operations, and SO23-10-1, Main Turbine Operations.
	CO	VERIFY Batch Counter and Makeup Integrator settings.
	CO	VERIFY dilution valve alignment.
		<ul style="list-style-type: none"> • FV-9253 open and FIC-0210X in AUTO. • HS-0210 selected to DILUTE.
	CO	VERIFY Tcold changing as dilution progresses.

Op Test No.:	<u>NRC</u>	Scenario #	<u>2</u>	Event #	<u>1</u>	Page	<u>5</u>	of	<u>23</u>
Event Description:		Dilution and Power Ascension in Progress at 15%/hr							
Time	Position	Applicant's Actions or Behavior							

+15 min	ACO	MAINTAIN Tcold within required band by raising Main Generator load using VV OPEN LMT RAISE pushbutton.
<i>When power has been raised 3 to 5%, or at Lead Evaluator's discretion, PROCEED to Event 2.</i>		

Op Test No.: NRC Scenario # 2 Event # 2 Page 6 of 23

Event Description: PZR Level Control Channel LT-0110-2 Fails High

Time	Position	Applicant's Actions or Behavior
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Machine Operator: When directed, EXECUTE RC16B, PZR Level Controlling Channel Y LT-0110-2 fails high.

Indications available:**50A22 – PZR LVL ERROR HI****50A12 – PZR LVL HI-HI****Letdown flow INCREASING**

+1 min	CO	REFER to Annunciator Response Procedures.
	CO	OBSERVE minimum Charging flow and maximum Letdown flow.
	CO	DETERMINE Letdown and Charging systems are NOT responding as desired and PERFORM the following:
		<ul style="list-style-type: none"> DEPRESS the A/M button on LIC-0110, PZR Level Controller, to place PZR level control in MANUAL.
		<ul style="list-style-type: none"> START Charging Pumps to match Letdown flow as closely as possible.
		<ul style="list-style-type: none"> ADJUST LIC-0110, PZR Level Controller, to match Letdown and Charging flows.
		<ul style="list-style-type: none"> MONITOR PZR level and maintain stable.
	CO	DETERMINE that PZR Level Channel Y (LI-0110A2) is cause of failure and INFORM the CRS AOI SO23-13-27 entry required.
	CRS	DIRECT performance of SO23-13-27, Pressurizer Pressure and Level Malfunction, to transfer PZR Level Control to the operable transmitter.
	CO	VERIFY Level Channel X (LI-0110X) is OPERABLE.
	CO	ENSURE LIC-0110 is in MANUAL with stable Letdown flow.

Op Test No.: NRC Scenario # 2 Event # 2 Page 7 of 23

Event Description: PZR Level Control Channel LT-0110-2 Fails High

Time	Position	Applicant's Actions or Behavior
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+5 min	CO	POSITION HS-0110, PZR Level Channel Select switch, to Channel X.
	CO	On LIC-0110 (page 1), MATCH actual level (middle column) with the Pressurizer Level setpoint (left column) by ADJUSTING the output (right column).
	CO	TRANSFER LIC-0110 PZR Level Controller to AUTO by depressing the A/M pushbutton.
	CO	DEPRESS HS-0100C, PZR Lo-Lo Level Heater Cutout Channel selector, selecting OPERABLE Level Transmitter X.
	CO	RESET PZR heaters by depressing OFF, then AUTO.
	CO	RESTORE Backup Charging Pumps to AUTO.
NOTE: Crew may elect to switch the CFMS point display for PZR level from Channel Y to Channel X.		
+10 min	CRS	EVALUATE Technical Specifications.
		<ul style="list-style-type: none"> 3.3.11.A is applicable (30 day ACTION) Post Accident Monitoring Instrumentation.
		<ul style="list-style-type: none"> Restore required channel to OPERABLE status.
When Technical Specifications are addressed, or at Lead Evaluator's discretion, PROCEED to Event 3.		

Op Test No.: NRC Scenario # 2 Event # 3 Page 8 of 23

Event Description: SG E088 Steam Flow FT-1021 Fails to 80%

Time	Position	Applicant's Actions or Behavior
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Machine Operator: When directed, EXECUTE MS12B @ 7E⁶ lbm/hr, Steam Generator E088 Steam Flow FT-1021 fails high.

Indications available:**52A01 – SG2 E088 LEVEL HI/LO****SG E088 Steam Flow Indicator FT-1021 rising****SG E088 Feedwater Control Valve modulating open****SG E088 level rising****MFWP speed slowly increasing****Condensate Pump P-053 may auto start due to the secondary system transient**

	ACO	REFER to Annunciator Response Procedure.
	ACO	RECOGNIZE E088 Steam Flow Transmitter failure and INFORM the CRS AOI SO23-13-24 entry required.
	CRS	DIRECT performance of AOI SO23-13-24, Feedwater Control System Malfunctions.
	CRS	DIRECT use of AOI SO23-13-24, Attachment 1.
	ACO	DETERMINE that SG E088 level is high.
	ACO	DETERMINE that SG E088 Master Controller output is rising.
+5 min	ACO	PLACE SG E088 Master controller in PREFERRED MANUAL and lower output.
	ACO	DETERMINE that SG E088 Feed Control Valve is closing.
	ACO	DETERMINE that Main Feedwater Pumps K-005 and K-006 speed is lowering.

Op Test No.: <u> NRC </u> Scenario # <u> 2 </u> Event # <u> 3 </u> Page <u> 9 </u> of <u> 23 </u>		
Event Description: SG E088 Steam Flow FT-1021 Fails to 80%		
Time	Position	Applicant's Actions or Behavior

+10 min	ACO	VERIFY SG E088 level is stable at or near program level with SG E088 Master Controller in MANUAL.
<i>When SG level is restored, or at Lead Evaluator's discretion, PROCEED to Event 4.</i>		

Op Test No.: NRC Scenario # 2 Event # 4 Page 10 of 23

Event Description: RCS Leak < Charging Pump Capacity

Time	Position	Applicant's Actions or Behavior
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Machine Operator: When directed, EXECUTE RC03 @ 1.2%, RCS leak in Containment (~50 gpm).

Indications available:Unidentified RCS leakrate ≥ 1 gpm

Charging flow > Letdown flow with plant conditions stable

VCT level lowering

57C43 - RCS LEAKAGE ABNORMAL/RECIRC SYS VV MISALIGNED

Containment Sump inlet flow ≥ 1 gpm on the CFMS

Rising radiation levels in Containment

Followed shortly thereafter by:

57C10 – CONTAINMENT RADIATION HI

57C20 – RCS LEAKAGE DETECTION ACTIVITY HI

60A02 – CONTAINMENT HUMIDITY HI

+1 min	CO	REFER to Annunciator Response Procedures.
	CO	RECOGNIZE RCS leak and INFORM the CRS AOI SO23-13-14 entry required.
	CRS	DIRECT performance of SO23-13-14, RCS Leak.
+3 min	CO	VERIFY Pressurizer level lowering.
	CO	ENSURE Charging Pumps start to maintain Pressurizer level.
	CO/ACO	DETERMINE RCS leakrate.

NOTE: At this point, the PMS Water Inventory Balance Calculation may or may not indicate a leak greater than 25 gpm. If it does, then the crew will transition to a Rapid Power Reduction per SO23-5-1.7, Power Operations. If it does not, the crew will continue in the RCS Leak procedure.

Op Test No.: NRC Scenario # 2 Event # 4 Page 11 of 23

Event Description: RCS Leak < Charging Pump Capacity

Time	Position	Applicant's Actions or Behavior
+5 min	CO	VERIFY VCT level is being maintained within programmed band.
	CO	OPERATE Blended Makeup System to maintain VCT level.
	CO	VERIFY Pressurizer level – NOT LOWERING.
	CO	VERIFY Pressurizer Level – STABLE or RISING.
	CREW	QUANTIFY RCS leakage by Charging and Letdown mismatch and REPORT leakage rate to the Shift Manager.
+10 min	CRS	EVALUATE Technical Specifications.
		<ul style="list-style-type: none"> LCO 3.4.13 is applicable (4 hour ACTION).
		<ul style="list-style-type: none"> Reduce leakage to within limits.
	CREW	DETERMINE source of leak:
		<ul style="list-style-type: none"> INSPECT Charging and Letdown Systems.
		<ul style="list-style-type: none"> INSPECT Penetration Building.
		<ul style="list-style-type: none"> MONITOR Radiation Monitors.
		<ul style="list-style-type: none"> SAMPLE Containment Atmosphere.
	CREW	CONFIRM Radiation Monitors and Containment Atmosphere samples indicate RCS leak is in Containment.
	CREW	VERIFY that RCS Leakage exceeds one (1) gpm and the source of the leakage is not identified.

Op Test No.: <u> NRC </u> Scenario # <u> 2 </u> Event # <u> 4 </u> Page <u> 12 </u> of <u> 23 </u>		
Event Description: RCS Leak < Charging Pump Capacity		
Time	Position	Applicant's Actions or Behavior

	CRS	DIRECT a Plant Shutdown to be in Hot Standby within 7 hours per SO23-5-1.7, Power Descension.
<p><i>When Technical Specifications are addressed, or at Lead Evaluator's discretion, PROCEED to Event 5.</i></p>		

Op Test No.: NRC Scenario # 2 Event # 5 Page 13 of 23

Event Description: Seismic Event With Feedwater Pump Trip

Time	Position	Applicant's Actions or Behavior
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Machine Operator: When directed, EXECUTE Seismic Operating Basis Earthquake with Feedwater Pump Trip.

Indications available:

61C21 – SEISMIC RECORDING SYSTEM ACTIVATION
61C22 – OPERATING BASIS EARTHQUAKE (OBE) ACCELERATION
61C03 – SPENT FUEL POOL LEVEL HI/LO
64A26(29) – CCW SURGE TANK TRAIN A(B) LEVEL HI/LO
61A01 – FIREWATER TANK LEVEL HI/LO
99B49 – TURBINE VIBRATION HI
99A11 – TPCW SURGE TANK LEVEL HI/LO
53B58 – CONDENSATE TANK LEVEL T120 HI/LO
50A54 – CEDMCS MG OUTPUT CONTACTOR OPEN
58A25(35) – BAMU TANK T072 (T071) LEVEL HI/LO
57A16 – RWST T006 LEVEL HI/LO
57B16 – RWST T005 LEVEL HI/LO
63B50 – DIESEL GEN 2G002 STORAGE TANK LEVEL HI/LO
63C50 – DIESEL GEN 2G003 STORAGE TANK LEVEL HI/LO
53A03 – MFWP TURBINE K006 TRIP
53A27 – MFWP P062 DISCH PRESS LO
53A28 – MFWP P062 FLOW LO

+1 min	CREW	REFER to Annunciator Response Procedures.
	CO/ACO	RECOGNIZE Operating Basis Earthquake and INFORM the CRS AOI SO23-13-3 and SO23-13-24 entry required.
	ACO	RECOGNIZE Main Feedwater Pump P-062 trip.
	CRS	DIRECT performance of SO23-13-3, Earthquake and SO23-13-24, Feedwater Malfunction.
	CRS	DIRECT EFAS initiation to restore SG level.
+3 min	ACO	DEPRESS EFAS pushbuttons per SRO direction.

Floor Cue: PRESENT Cue Card for Seismic Event located at the back of this scenario.

Op Test No.: NRC Scenario # 2 Event # 5 Page 14 of 23

Event Description: Seismic Event With Feedwater Pump Trip

Time	Position	Applicant's Actions or Behavior
	CRS	VERIFY the following occurred:
		<ul style="list-style-type: none"> Valid activation of any of the following alarms or Seismic Instrument Panel indications:
		<ul style="list-style-type: none"> 2UA61C21, Seismic Recording System Activated alarm – illuminated, (SO123-V111-1, Tab E1)
		<ul style="list-style-type: none"> Strong Motion Acceleration System Activation (light indication on 2UA-8020, actuates at 0.019g)
		<ul style="list-style-type: none"> Event 2ZLH-8020G (light indication on 2SXY-8020), AND
		<ul style="list-style-type: none"> Ground motion that is readily felt by a consensus of Control Room personnel.
Floor Cue: REPORT as Shift Manager that there was ground motion.		
	CRS	DETERMINE Operating Basis Earthquake occurred.
	ACO	2UA61C22, Operating Basis Earthquake Acceleration alarm – ILLUMINATED (actuates at 0.33g), AND
	ACO	OBE alarms (both white lamps: Containment Base OBE <u>AND</u> Containment Operating Level OBE) on Seismic Instrumentation Panel ILLUMINATED.
+10 min	ACO	INITIATE Attachment 1 of SO23-13-3.
M.O. Cue: When directed, CLEAR the Seismic alarms on Control Board Annunciator Panel 61C.		
When SO23-13-3, Attachment 1 is initiated, or at Lead Evaluator's discretion, PROCEED to Events 6, 7, 8 & 9.		

Op Test No.:	<u>NRC</u>	Scenario #	<u>2</u>	Event #	<u>6, 7, 8, & 9</u>	Page	<u>15</u>	of	<u>23</u>
Event Description:		Bus 2A06 Overcurrent Trip; LOCA @ ~500 GPM; Loss of All Feedwater; HPSI Pump P018 Start Failure, Manual Start Required							
Time	Position	Applicant's Actions or Behavior							

Machine Operator: When directed, EXECUTE ED03B, Loss Of Bus 2A06, RC03, LOCA @ 500 GPM, FW09A, FW09B, FW25, Loss Of All Feedwater and RP01B, HPSI Pump start failure.

Indications available:

63C05 – 2A06 VOLTAGE LO

63C06 – 2B06 VOLTAGE LO

63C25 – 2A06 SUPPLY BREAKER 2A0618 OC

+1 min	CO/ACO	RECOGNIZE Reactor trip and INFORM the CRS SO23-12-11 entry required.
	CRS	DIRECTS entry to SO23-12-1, Standard Post Trip Actions.
	CRS	INITIATE Administrative Actions:
		<ul style="list-style-type: none"> RECORD time of Reactor trip _____. ANNOUNCE Reactor trip via PA System. INITIATE Attachment 4, WORKSHEET. INITIATE Attachment 5, ADMINISTRATIVE ACTIONS.
+15 min	CO	VERIFY Reactivity Control criteria satisfied:
		<ul style="list-style-type: none"> VERIFY Reactor Trip Circuit Breakers (8) – open. VERIFY maximum of one full length CEA – NOT fully inserted. VERIFY Reactor power – lowering AND Startup rate – negative.
	ACO	VERIFY Vital Auxiliaries functioning properly:
		<ul style="list-style-type: none"> VERIFY Main Turbine tripped: HP and LP Stop and Governor Valves – closed. MWe output – lowering. VERIFY both Unit Output Breakers – open.

Op Test No.:	<u>NRC</u>	Scenario #	<u>2</u>	Event #	<u>6, 7, 8, & 9</u>	Page	<u>16</u>	of	<u>23</u>
Event Description:		Bus 2A06 Overcurrent Trip; LOCA @ ~500 GPM; Loss of All Feedwater; HPSI Pump P018 Start Failure, Manual Start Required							
Time	Position	Applicant's Actions or Behavior							

		<ul style="list-style-type: none"> VERIFY Main Turbine speed - less than 2000 RPM or lowering.
		<ul style="list-style-type: none"> DETERMINE CCW Pump NOT aligned to Non-Critical Loop (NCL) and Letdown Heat Exchanger.
		<ul style="list-style-type: none"> DETERMINE one 1E 4 kV Buses de-energized (2A06).
		<ul style="list-style-type: none"> DETERMINE 1E 480 V Bus B06 de-energized.
		<ul style="list-style-type: none"> VERIFY all 6.9 kV and Non-1E Buses – energized.
		<ul style="list-style-type: none"> VERIFY all Class 1E DC Buses – energized.
	CO	DETERMINE RCS Inventory Control criteria NOT satisfied:
		<ul style="list-style-type: none"> DETERMINE PZR level NOT between 10% and 70% and NOT trending to between 30% and 60%.
		<ul style="list-style-type: none"> VERIFY Core Exit Saturation Margin – greater than or equal to 20°F:
		<ul style="list-style-type: none"> QSPDS page 611
		<ul style="list-style-type: none"> CFMS page 311.
CRITICAL TASK		ESTABLISH minimum design Safety Injection flowrate.
		<ul style="list-style-type: none"> Manually START HPSI Pump P-018.
	CO	DETERMINE RCS Pressure Control criteria NOT satisfied:
		<ul style="list-style-type: none"> DETERMINE PZR pressure (WR and NR) NOT between 1740 PSIA and 2380 PSIA and NOT Controlled AND NOT trending to between 2025 PSIA and 2275 PSIA.
	CO	VERIFY Core Heat Removal criteria satisfied:
		<ul style="list-style-type: none"> VERIFY at least one RCP – operating.
		<ul style="list-style-type: none"> VERIFY core loop ΔT ($T_H - T_C$) – less than 10°F.
		<ul style="list-style-type: none"> VERIFY Core Exit Saturation Margin – greater than or equal to 20°F:
		QSPDS page 611

Op Test No.: NRC Scenario # 2 Event # 6, 7, 8, & 9 Page 17 of 23

Event Description: Bus 2A06 Overcurrent Trip; LOCA @ ~500 GPM; Loss of All Feedwater; HPSI Pump P018 Start Failure, Manual Start Required

Time	Position	Applicant's Actions or Behavior
		CFMS page 311.
	ACO	DETERMINE RCS Heat Removal criteria NOT satisfied:
		<ul style="list-style-type: none"> DETERMINE both SGs level – NOT greater than 21% NR.
		<ul style="list-style-type: none"> VERIFY both SGs level – less than 80% NR.
		<ul style="list-style-type: none"> DETERMINE the following:
		<ul style="list-style-type: none"> Auxiliary feedwater NOT available to restore both SGs level – between 40% NR and 80% NR.
		AND
		<ul style="list-style-type: none"> Main feedwater NOT available to restore both SGs level – between 40% NR and 80% NR with flow to each SG:
		<ul style="list-style-type: none"> NO MFW Pumps – operating.
		<ul style="list-style-type: none"> RTO – actuated to both SGs.
		<ul style="list-style-type: none"> PREVENT SG high level:
		<ul style="list-style-type: none"> CLOSE MFW Block Valves:
		<u>E-088</u> <u>E-089</u>
		HV-4047 HV-4051
		<ul style="list-style-type: none"> VERIFY heat removal adequate:
		<ul style="list-style-type: none"> T_C – less than 555°F.
		<ul style="list-style-type: none"> SG pressures – approximately 1000 PSIA.
		<ul style="list-style-type: none"> VERIFY T_C - greater than 545°F OR controlled.
		<ul style="list-style-type: none"> VERIFY SG pressures – greater than 740 PSIA.
	CO	DETERMINE Containment Isolation criteria NOT satisfied:
		<ul style="list-style-type: none"> VERIFY Containment pressure – greater than 1.5 PSIG.
		<ul style="list-style-type: none"> DETERMINE Containment Area Radiation Monitors
		– energized AND alarming or trending to alarm.

Op Test No.:	<u>NRC</u>	Scenario #	<u>2</u>	Event #	<u>6, 7, 8, & 9</u>	Page	<u>18</u>	of	<u>23</u>
Event Description:		Bus 2A06 Overcurrent Trip; LOCA @ ~500 GPM; Loss of All Feedwater; HPSI Pump P018 Start Failure, Manual Start Required							
Time	Position	Applicant's Actions or Behavior							

		<ul style="list-style-type: none"> VERIFY Secondary Plant Radiation Monitors
		- energized and NOT alarming or trending to alarm.
	CO	DETERMINE Containment Temperature, Pressure and Combustible Gas Control criteria NOT satisfied:
		<ul style="list-style-type: none"> DETERMINE Containment average temperature – greater than 120°F.
		<ul style="list-style-type: none"> DETERMINE Containment pressure – greater than 1.5 PSIG.
	CRS	DIAGNOSE Event in Progress:
		<ul style="list-style-type: none"> DETERMINE all safety function criteria are NOT met per Attachment 4, WORKSHEET.
		<ul style="list-style-type: none"> COMPLETE Attachment 1, Recovery Diagnostic.
		<ul style="list-style-type: none"> DIAGNOSE loss of all feedwater and LOCA inside Containment.
		<ul style="list-style-type: none"> NOTIFY personnel of event in progress.
		<ul style="list-style-type: none"> DESIGNATE SRO-in-charge.
		<ul style="list-style-type: none"> DIRECT initiation of Steps 11 through 14.
	CO	ENSURE all RCPs are stopped.
	CRS	DIRECT performance of SO23-12-9, Functional Recovery.
	CRS	RECORD time of EOI entry.
	CRS	VERIFY LOFW and LOCA diagnosis:
		<ul style="list-style-type: none"> INITIATE SO23-12-10, Safety Function Status Checks.
		<ul style="list-style-type: none"> INITIATE Foldout Page.
		<ul style="list-style-type: none"> FS-11, Reset P-140 Overspeed Trip.

Op Test No.:	<u>NRC</u>	Scenario #	<u>2</u>	Event #	<u>6, 7, 8, & 9</u>	Page	<u>19</u>	of	<u>23</u>
Event Description:		Bus 2A06 Overcurrent Trip; LOCA @ ~500 GPM; Loss of All Feedwater; HPSI Pump P018 Start Failure, Manual Start Required							
Time	Position	Applicant's Actions or Behavior							

		<ul style="list-style-type: none"> Attachment 22, Non-Qualified Load Restoration.
		<ul style="list-style-type: none"> INITIATE FR-5, HR-1 Step 4 Success path of SO23-12-9, Functional Recovery.
M.O. Cue: REMOVE malfunction FW25 and REPORT as the Primary Operator that the overspeed trip on P-140 has been reset. When directed, THROTTLE OPEN feedwater using Remote Function FW103, P-140 Throttle Valve MU122 (S21305MU122).		
+30 min	CRS	ESTABLISH Auxiliary Feedwater flow to available SGs.
	ACO	VERIFY P-140 NOT tripped on overspeed.
	ACO	CLOSE AFW Pump Discharge valves.
	ACO	START AFW Pump P-140.
	ACO	ENSURE at least one AFW to SG Isolation valve to each SG open.
	ACO	OVERRIDE and OPEN available AFW Pump Discharge Bypass valves to 35% open.
CRITICAL TASK	ACO	RESTORE feedwater flow to at least one Steam Generator.
	ACO	MAINTAIN reduced AFW flow for 5 minutes.
	ACO	RAISE total AFW flow to greater than 400 gpm.

Op Test No.: NRC Scenario # 2 Event # 6, 7, 8, & 9 Page 20 of 23

Event Description: Bus 2A06 Overcurrent Trip; LOCA @ ~500 GPM; Loss of All Feedwater; HPSI Pump P018 Start Failure, Manual Start Required

Time	Position	Applicant's Actions or Behavior
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M.O. Cue: If directed to sample SGs, WAIT 10 minutes and then REPORT that E088 and E089 both have activity near background, and normal boron levels. If the SG sample valves are closed, REPORT unable to establish sample flow.

	CRS	INITIATE Administrative Actions:
		<ul style="list-style-type: none"> NOTIFY Shift Manager/Operations Leader of SO23-12-9, Functional Recovery.
		<ul style="list-style-type: none"> ENSURE Emergency Plan is initiated.
		<ul style="list-style-type: none"> IMPLEMENT Placekeeper.
	CO	VERIFY ESF actuation:
		<ul style="list-style-type: none"> VERIFY SIAS actuation required.
		<ul style="list-style-type: none"> PZR pressure less than SIAS setpoint OR Containment pressure > 3.4 PSIG.
		<ul style="list-style-type: none"> ENSURE the following actuated:
		<ul style="list-style-type: none"> SIAS/CCAS/CRIS/CIAS
	ACO	STOP unloaded Diesel Generators.
	ACO	INITIATE SO23-12-11, Attachment 22, Non-Qualified Load Restoration.

M.O. Cue: When directed to restore Non-Qualified Loads, WAIT 3 minutes, then CALL the Control Room and state that you are ready to restore. When directed, EXECUTE Remote Function ED85, Non-Qualified Loads Restoration. When complete, INFORM the Control Room that you have restored Non-Qualified Loads.

	CO	ESTABLISH Optimum SI Alignment:
		<ul style="list-style-type: none"> ESTABLISH two train operation:
		<ul style="list-style-type: none"> VERIFY all Charging Pumps operating.

Op Test No.: NRC Scenario # 2 Event # 6, 7, 8, & 9 Page 21 of 23

Event Description: Bus 2A06 Overcurrent Trip; LOCA @ ~500 GPM; Loss of All Feedwater; HPSI Pump P018 Start Failure, Manual Start Required

Time	Position	Applicant's Actions or Behavior
		<ul style="list-style-type: none"> DETERMINE one HPSI Train and one LPSI Train operating.
		<ul style="list-style-type: none"> VERIFY all Cold leg flow paths aligned.
		<ul style="list-style-type: none"> VERIFY SI flow required:
		<ul style="list-style-type: none"> SI flow indicated.
		<ul style="list-style-type: none"> RCS pressure greater than 1250 psia, OR VERIFY FS-7, Verify HPSI Throttle/Stop criteria satisfied.
	CRS	EVALUATE Immediate Safety Function Recovery Actions:
		<ul style="list-style-type: none"> VERIFY any Safety Function Recovery Attachments (FR-1 through FR-8) indicated by any optimal EOI.
		<ul style="list-style-type: none"> IMPLEMENT precautionary actions:
		<ul style="list-style-type: none"> DIRECT Boration at greater than 40 gpm.
		<ul style="list-style-type: none"> ENSURE one RCP in each loop stopped.
	CO/ACO	VERIFY SI Throttle/Stop Criteria:
		<ul style="list-style-type: none"> VERIFY at least one SG operating.
		<ul style="list-style-type: none"> DETERMINE SBSCS and Feedwater available.
	CO	<ul style="list-style-type: none"> VERIFY PZR level >30% and NOT lowering.
	CO	<ul style="list-style-type: none"> VERIFY Core Exit Saturation Margin greater than or equal to 20°F.
		<ul style="list-style-type: none"> QSPDS page 611.
		<ul style="list-style-type: none"> CFMS page 311.
	CO	<ul style="list-style-type: none"> VERIFY Reactor Vessel level greater than or equal to 100% (Plenum).
		<ul style="list-style-type: none"> QSPDS page 622.
		<ul style="list-style-type: none"> CFMS page 312.
		<ul style="list-style-type: none"> Attachment 4.
	CO/ACO	<ul style="list-style-type: none"> DETERMINE RCS Cooldown is in progress.

Op Test No.: NRC Scenario # 2 Event # 6, 7, 8, & 9 Page 22 of 23

Event Description: Bus 2A06 Overcurrent Trip; LOCA @ ~500 GPM; Loss of All Feedwater; HPSI Pump P018 Start Failure, Manual Start Required

Time	Position	Applicant's Actions or Behavior
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	CRS	DETERMINE SI Pumps not operating to meet RC-3 Success Path.
	CO/ACO	THROTTLE HPSI flow as necessary to maintain RCS inventory.
	CO	MAINTAIN boration at least 40 gpm.
	CO	ENSURE all RCPs are stopped.
<i>When feedwater is restored to both Steam Generators, TERMINATE the scenario.</i>		

Appendix D		Operator Action		Form ES-D-2	
Op Test No.:	<u>NRC</u>	Scenario #	<u>2</u>	Event #	<u>6, 7, 8, & 9</u>
				Page	<u>23</u> of <u>23</u>
Event Description:		Bus 2A06 Overcurrent Trip; LOCA @ ~500 GPM; Loss of All Feedwater; HPSI Pump P018 Start Failure, Manual Start Required			
Time	Position	Applicant's Actions or Behavior			

CUE CARD FOR SEISMIC EVENT

HAND TO OPERATOR AT SEISMIC PANEL

As operator dispatched to the seismic panel the following indications exist at the 2UA-8020, Seismic Panel:

Strong Motion Acceleration System Activation light (0.019g) - ON

2ZLH-8020G, Event Light Indication, (0.019g) power panel - ON

Containment Base OBE (0.33g) - ON

Containment operating Level OBE (0.33g) - ON

Facility:	San Onofre	Scenario No.:	3	Op Test No.:	NRC
Examiners:	_____	Operators:	_____		
	_____		_____		
	_____		_____		
Initial Conditions: <ul style="list-style-type: none"> 30% power – RCS Boron is 1237 ppm by Chemistry Sample Train A Component Cooling Water Pump (P-025) in service Train A Auxiliary Feedwater Pump (P-141) OOS Train A High Pressure Safety Injection (P-017) OOS Condenser Air Ejector Low Range Radiation Monitor (RM-7818) OOS 					
Turnover: Boration and downpower as directed by Operations Management.					
Critical Tasks: <ul style="list-style-type: none"> Energize at least one vital electrical AC bus and associated 480 V 1E bus. Restore flow to the Component Cooling Water Non-Critical Loop (RCPs operating). 					
Event No.	Malf. No.	Event Type*	Event Description		
1 + 15 min		R (CO) N (ACO, CRS)	Boration and downpower at 10%/hr.		
2 + 20 min	NI08B	I (CO, CRS) TS (CRS)	NI Channel B Upper Detector failure.		
3 +30 min	PG22 PG23	C (ACO, CRS) TS (CRS)	Degraded grid voltage to Sustained Degraded Voltage Setpoint.		
4 +45 min		I (CO, CRS)	Letdown Pressure instrument fails low (2PIC-0201 B-CR58-MOI).		
5 +55 min	FW18A	I(ACO, CRS)	SG E089 Feed Flow Transmitter fails high.		
6 + 65 min	PG24 TU08	M (ALL)	Loss of Offsite Power. Turbine trip.		
7 + 66 min	ED03A	M (ALL)	2A04 Bus Fault.		
8 +67 min	EG08B	C (ACO)	EDG 2G003 mechanical failure.		
9 +70 min	PG57	M (ALL)	Loss of SDG&E Switchyard.		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS) Technical Specifications					

SCENARIO SUMMARY NRC #3

The crew will assume the watch with a boration requested by Reactor Engineering (to obtain calorimetric data at 25% power) per SO23-5-1.7, Power Operations.

After the crew has demonstrated control of the power change, a Nuclear Instrument Upper Detector failure will occur. The crew will respond per the Annunciator Response Procedures (ARP) and Abnormal Operating Instruction (AOI) SO23-13-18, Reactor Protection System Failure. The CRS will evaluate Technical Specifications.

This is followed by a frequency drop and grid voltage decrease to the Sustained Degraded Voltage Signal (SDVS) for 110 seconds that will require crew response and entry into AOI SO23-13-4, Operation during Major System Disturbances. The ACO will be required to adjust Main Generator MVARs and restart a CCW Pump. The CRS will evaluate Technical Specifications.

With the plant stable, the crew will respond to a Letdown Pressure Instrument failure. This will require action per the Annunciator Response Procedures and SO23-3-2.1, CVCS Charging and Letdown Operations.

Once Letdown is restored, a feed flow transmitter will fail high on SG E089. The crew will regain control of feedwater flow per Annunciator Response Procedures and AOI SO23-13-24, Feedwater Malfunctions.

When the crew has stabilized feedwater flow, a Loss of Offsite Power will occur along with a mechanical failure of 2G003 and 2A04 Bus fault. The crew will perform SO23-12-1, Standard Post Trip Actions and during the SPTAs the ACO will take action associated with the mechanical failure of EDG 2G003. The crew will then transition to SO23-12-8, Station Blackout and attempt to restore offsite power.

Event termination will occur once an offsite line is restored and aligned to Bus A03 or A07 with plant conditions stable.

Risk Significance:

- Risk important components out of service: HPSI P-017, AFW P-141
- Failure of risk important system prior to trip: Loss of CCW Pump
- Risk significant core damage sequence: LOOP with loss of EDGs
- Risk significant operator actions: Restore Non-Critical Loop
Recover Offsite Power in 60 minutes

Scenario Event Description

NRC Scenario 3

SONGS

2005 Facility NRC Initial License Examination

Simulator Scenario Setup

Scenario 3

MACHINE OPERATOR'S INSTRUCTIONS

SETUP

IC: Use IC #24 and see attached Event File for NRC Scenario #3.
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STEPS	TYPE	MALF #	DESCRIPTION	DEMAND VALUE	INITIATING PARAMETER

Op Test No.:	<u>NRC</u>	Scenario #	<u>3</u>	Event #	<u>1</u>	Page	<u>4</u>	of	<u>21</u>
Event Description:		Boration and Downpower at 10%/hr							
Time	Position	Applicant's Actions or Behavior							

Machine Operator: EXECUTE IC #24 and NRC Scenario #3 SETUP file to align components.
 ENSURE Control Board Tags are hung on P-017 and P-141.
 ENSURE procedures in progress are on the CO desk.

- Copy of SO23-5-1.7 (open to Step 6.5, Guidelines for Power Descension)
- Copy of SO23-3-2.2 (check off Steps 6.6.1 through 6.6.5)
- Copy of SO23-3-1.10 (open to Section 6.2, Forcing Pressurizer Sprays)
- Reset Tcold on ASI Curve to 545°F (ACO desk).

Control Room Annunciators in Alarm at 30%:

57A58 – SI/ECW SYS TRAIN A INOPERABLE
 56A30/40/50/60 – LOSS OF LOAD CHANNEL 1/2/3/4 TRIP DISABLED
 50A07 – SBCS DEMAND PRESENT
 53A20 – MFWP MINI FLOW VALVE OPEN
 53B01 – CONDENSATE PUMP P053 AUTO START
 53A49 – 5TH POINT HEATER LEVEL HI/LO
 53A50 – 6TH POINT HEATER LEVEL HI/LO

+1 min	CRS	REFER to SO23-5-1.7, Section for Power Reduction.
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	CRS	NOTIFY GCC of the power reduction.
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NOTE: The crew may perform a manual calculation for amount of boron required or use the Plant Monitoring System and access the “Reactor Coolant System Calculation” page under MAIN MENU/USER FUNCTION. Either method is acceptable.

	CRS	ENSURE SO23-5-1.7, Section 6.5, Preparations for Power Descension has been completed.
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	CRS	MAINTAIN the guidelines of Section 6.6, Guidelines During Power Descension.
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Op Test No.:	<u>NRC</u>	Scenario #	<u>3</u>	Event #	<u>1</u>	Page	<u>5</u>	of	<u>21</u>
Event Description:		Boration and Downpower at 10%/hr							
Time	Position	Applicant's Actions or Behavior							

	CO	DETERMINE boration/CEA position requirements.
	CRS	NOTIFY Chemistry Foreman of the planned power reduction.
	CRS	CONTACT Reactor Engineering for ASI control recommendations.
M.O. Cue: If contacted as Reactor Engineering, DIRECT crew to maintain ASI at the initial equilibrium value.		
	CO	INITIATE ASI monitoring.
	CO	COMMENCE forcing Pressurizer Spray flow:
		• PLACE both Spray Valve Controllers in AUTO.
		• PLACE PZR Proportional Heaters ON.
		• PLACE Backup Heaters in AUTO or ON as necessary to maintain desired Spray Valve position.
		• LOWER PIC-100, PZR pressure controller setpoint as required maintaining RCS pressure as directed by CRS.
	ACO	REDUCE Main Turbine load as necessary to maintain Tcold on program.
	CO	INITIATE boration in accordance with SO23-32.2, Makeup Operations.
+5 min	CO	DETERMINE the difference between the existing and the desired RCS boron concentration.
	CO	DETERMINE amount of boric acid to be added.

Op Test No.:	<u>NRC</u>	Scenario #	<u>3</u>	Event #	<u>1</u>	Page	<u>6</u>	of	<u>21</u>
Event Description:		Boration and Downpower at 10%/hr							
Time	Position	Applicant's Actions or Behavior							

	CO	COMMENCE periodically changing Boronometer setpoints to (+50, -25 ppm) of existing boron concentration.
	CO	POSITION FIC-0210Y, BAMU Flow Controller, to AUTOMATIC and set to the required flowrate (~3.4 gpm).
	CO	SET FQIS-0210Y, BAMU to VCT T-077, Borate Batching Counter, to the required volume.
	CO	SELECT the BAMU Pump associated with the BAMU Tank used.
	CO	BORATE the Charging Pump suction:
		<ul style="list-style-type: none"> • VERIFY closed FV-9253, Blended Makeup to VCT isolation.
		<ul style="list-style-type: none"> • PLACE HV-9257, BAMU to Charging Pump Suction Block Valve, in AUTOMATIC.
	CO	SELECT HS-0210, Makeup Mode Selector, to BORATE.
+15 min	CO/ACO	MONITOR plant parameters.
<i>When power has been reduced 3-5%, or at Lead Evaluator's discretion, PROCEED to Event 2.</i>		

Op Test No.: NRC Scenario # 3 Event # 2 Page 7 of 21

Event Description: NI Channel B Upper Detector Failure

Time	Position	Applicant's Actions or Behavior
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Machine Operator: When directed, EXECUTE NI08B, NI Channel B Upper Detector Linear Amp failure.

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****56B11 – LINEAR POWER DEVIATION CHANNEL 2 HI/LO****56B16 – PPS CHANNEL 2 TROUBLE****56C11 – CPC CHANNEL 2 SENSOR FAILURE****Linear Power Range Channel B Recorder failing high (2JR000A2)**

+1 min	CO	REFER to Annunciator Response Procedures.
	CO	RECOGNIZE Power Range Channel failure and INFORM the CRS AOI SO23-13-18 entry required.
	CRS	DIRECT performance of AOI SO23-13-18, Reactor Protection System Failure/Loss of Vital Bus.
	CO	DETERMINE failure by observing instrumentation for the affected channel and alternate redundant indications monitoring the same parameter.
+3 min	CO	IDENTIFY Linear Power Channel B Upper Detector failure and REFER to SO23-3-2.13, CPC/CEAC Operation.
	CO	VERIFY that the same bistable is not in bypass on any other channel.

M.O. Cue: When directed, EXECUTE RP51, 53A, 53C, 53D, and 53N to bypass the associated Linear Power Channel trips.

	CO	UNLOCK and OPEN the Bistable Control Panel.
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Op Test No.: NRC Scenario # 3 Event # 2 Page 8 of 21

Event Description: NI Channel B Upper Detector Failure

Time	Position	Applicant's Actions or Behavior
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	CO	DEPRESS the Bypass pushbutton on the Bistable Control Panel corresponding to the trip channel to be bypassed.
		<ul style="list-style-type: none"> High Linear Power.
		<ul style="list-style-type: none"> High Local Power.
		<ul style="list-style-type: none"> Low DNBR.
		<ul style="list-style-type: none"> Loss of Load.
+5 min	CO	VERIFY that the Trip Bypass white light is illuminated.
	CO	VERIFY the switch remains latched after being depressed.
	CO	VERIFY the Trip Channel Bypassed Annunciator alarms.
		<ul style="list-style-type: none"> 56A39 – PPS CHANNEL 2 TRIP BYPASSED
	CO	LOG the bypass and the reason for the bypass in the Control Operator's Log.
	CRS	INITIATE a LCOAR or follow guidelines of SO123-0-A5.
+10 min	CRS	EVALUATE Technical Specifications
		<ul style="list-style-type: none"> LCO 3.3.1.A is applicable (1 hour ACTION).
		<ul style="list-style-type: none"> PLACE Channel in Bypass or Trip.
When Channel B trips have been placed in bypass, or at Lead Evaluator's discretion, PROCEED to Event 3.		

Op Test No.:	<u>NRC</u>	Scenario #	<u>3</u>	Event #	<u>3</u>	Page	<u>9</u>	of	<u>21</u>
Event Description:		Degraded Grid Voltage to Sustained Degraded Voltage Setpoint							
Time	Position	Applicant's Actions or Behavior							

Machine Operator: When directed, EXECUTE PG22 @ 58.5 Hz and PG23 @ 90%, Degraded Grid Frequency and Voltage to the Sustained Degraded Voltage Signal (SDVS) setpoint.

Indications available:

63B01 – UNIT 2 DIGITAL FAULT RECORDER INITIATED

63B05 – 2A04 VOLTAGE LO

63C05 – 2A06 VOLTAGE LO

63B51 – OFFSITE POWER TROUBLE (on low frequency)

	ACO	REFER to Annunciator Response Procedures.
	ACO	RECOGNIZE low grid voltage and frequency and INFORM the CRS AOI SO23-13-4 entry required.
+1.5 min	CRS	DIRECT performance of SO23-13-4, Operation During Major System Disturbances.
	ACO	DETERMINE System Voltage is \leq 218 kV.
CRITICAL TASK	ACO	Restore flow to the Component Cooling Water Non-Critical Loop (RCPs operating).
		When SDVS initiates, START CCW Pump P-025 and VERIFY SWC Pump P-112 starts.
	ACO	VERIFY Generator AVR is in AUTO.
+4 min	ACO	RAISE Exciter output to maintain rated Generator terminal voltage.
M.O. Cue: If contacted as GCC, DIRECT SONGS to maximize MVARs on the Main Generators.		

Op Test No.: NRC Scenario # 3 Event # 3 Page 10 of 21

Event Description: Degraded Grid Voltage to Sustained Degraded Voltage Setpoint

Time	Position	Applicant's Actions or Behavior
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	ACO	MAXIMIZE Generator MVARs for the current power level to assist in raising voltage:
		<ul style="list-style-type: none"> • JI-2990, Generator Megavars < 500 MVARs.
		<ul style="list-style-type: none"> • II-2916, Field Current < 4680 Amps.
		<ul style="list-style-type: none"> • EI-2917, Field Volts < 550 Volts.
+15 min	CRS	EVALUATE Technical Specifications.
		<ul style="list-style-type: none"> • LCO 3.8.1.C is applicable (24 hour ACTION).
		<ul style="list-style-type: none"> • Both off-site lines are <i>inoperable</i> per SO23-3-3.23, Attachment 7, AC Sources Verification due to the EDGs powering the Vital 4 kV Buses.
		<ul style="list-style-type: none"> • Restore one required off-site circuit to OPERABLE status.
<i>When Technical Specifications are addressed, or at Lead Evaluator's discretion, PROCEED to Event 4.</i>		

Op Test No.: NRC Scenario # 3 Event # 4 Page 11 of 21

Event Description: Letdown Pressure Instrument Fails Low

Time	Position	Applicant's Actions or Behavior
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Machine Operator: When directed, EXECUTE Event for Letdown Temperature Instrument failure (2PIC-0201 B-CR58-MOI).

Indications available:**58A21 – LETDOWN BACKPRESSURE HI/LO****61B11 – RELIEF VALVE LEAKING**

+10 sec	CO	REFER to Annunciator Response Procedures.
	CO	RECOGNIZE temperature instrument failure and INFORM the CRS.
+3 min	CRS	DIRECT isolation of Letdown.
	CO	ISOLATES Letdown by closing 2TV-0221 or 2HV-9204.
	CO	ENSURE 2TV-0224B has automatically bypassed the Purification Ion Exchangers.
	CO	ENSURE 2TV-0224A, Boronometer Isolation Valve has automatically closed.
	CO	CHECK Regenerative Heat Exchanger Outlet Temperature at 2TI-0221.
	CO	VERIFY Letdown Flow isolated at 2FT-0202.
	CO	CHECK the output of 2TIC-0223 and 2TV-0223 Open/Close indication on Page 2 of controller 2TIC-0223 to verify that 2TV-0223 is responding correctly.
M.O. Cue: IF directed, EXECUTE CV51A to unisolate Letdown Backpressure Valve PV-0201A and CV51B to isolate Letdown Backpressure Valve PV-0201B.		

Op Test No.: NRC Scenario # 3 Event # 4 Page 12 of 21

Event Description: Letdown Pressure Instrument Fails Low

Time	Position	Applicant's Actions or Behavior
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	CO	REDUCE the setpoint or PLACE 2TIC-0223 in MANUAL to OPEN 2TV-0223.
M.O. Cue: When appropriate, EXECUTE WD56, Relief Valve Alarm Reset.		
	CO	ENSURE the CCW Critical Loop A Letdown HX ME-062 Supply/Return Valve HV-6293 B/A is OPEN.
+10 min	CO	IF Letdown Heat Exchanger Outlet Temperature is > 130°F take MANUAL Control of 2TIC-0223, CCW to Letdown HX Flow, and SLOWLY RAISE CCW flow to the Letdown Heat Exchanger.
Floor CUE: DO NOT wait for restoration of Letdown to proceed to the next event.		
<i>When Letdown is isolated, or at Lead Evaluator's discretion, PROCEED to Event 5.</i>		

Op Test No.: NRC Scenario # 3 Event # 5 Page 13 of 21

Event Description: Steam Flow Transmitter failure

Time	Position	Applicant's Actions or Behavior
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Machine Operator: When directed, EXECUTE FW18A, SG E089 FT-1111 failure.**Indications available:****53B23 – CONDENSATE FLOW BALANCE TROUBLE****52A06 – SG1 E089 LEVEL HI/LO****Feedwater Regulating Valve position modulates closed****Actual SG E089 level trending down**

+1 min	ACO	REFER to Annunciator Response Procedures.
	ACO	RECOGNIZE Feed Flow Transmitter failure and INFORM the CRS AOI SO23-13-24 entry required.
	CRS	DIRECT performance of SO23-13-24, Feedwater Control System malfunction.
	ACO	DIRECT use of SO23-13-24, Attachment 1 for initial action.
	ACO	DETERMINE SG E089 level is lowering.
	ACO	DETERMINE Master Controller Output is NOT rising.
+5 min	ACO	PLACE SG E-089 Master Controller in MANUAL and RAISE output to stabilize SG level.
	ACO	REFER to flowchart to determine if other failures are present.
+10 min	ACO	Continue to MONITOR and ADJUST SG E089 Level Control as necessary.

When SG E089 level is controlled, or at Lead Evaluator's discretion, PROCEED to Events 6, 7, and 8.

Op Test No.: NRC Scenario # 3 Event # 6, 7, and 8 Page 14 of 21

Event Description: Turbine Trip / Loss of Offsite Power / EDG Mechanical Failure / 2A04 Bus Fault

Time	Position	Applicant's Actions or Behavior
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Machine Operator: When directed, EXECUTE TU08, Turbine Trip, PG24 Loss of Offsite Power (+5 secs), ED03A, 2A04 Bus Fault (+1 min), EG08B, 2G003 EDG Mechanical Failure (+2 min) and PG57, Loss of SDGE Switchyard (+5 min) trip.

Indications available:

99A24 – TURBINE TRIP RELAY TRIPPED
Numerous Loss Of Offsite Power Related Alarms

+10 secs	CO/ACO	RECOGNIZE Reactor trip, Turbine trip, and Loss of Offsite Power and INFORM the CRS SO23-12-11 entry required.
	CRS	DIRECT performance of SO23-12-1, Standard Post Trip Actions.
	CRS	INITIATE Administrative Actions:
		<ul style="list-style-type: none"> RECORD time of Reactor trip _____.
		<ul style="list-style-type: none"> ANNOUNCE Reactor trip via PA System.
		<ul style="list-style-type: none"> INITIATE Attachment 4, WORKSHEET.
		<ul style="list-style-type: none"> INITIATE Attachment 5, ADMINISTRATIVE ACTIONS.
	CO	VERIFY Reactivity Control criteria satisfied:
		<ul style="list-style-type: none"> VERIFY Reactor Trip Circuit Breakers (8) – open.
		<ul style="list-style-type: none"> VERIFY maximum of one full length CEA – NOT fully inserted.
		<ul style="list-style-type: none"> VERIFY Reactor power – lowering AND Startup rate – negative.
	ACO	DETERMINE Vital Auxiliaries NOT functioning properly:
		<ul style="list-style-type: none"> VERIFY Main Turbine tripped:
		<ul style="list-style-type: none"> HP and LP Stop and Governor Valves – closed.
		<ul style="list-style-type: none"> Mwe output – lowering.
		<ul style="list-style-type: none"> VERIFY both Unit Output Breakers – open.

Op Test No.: NRC Scenario # 3 Event # 6, 7, and 8 Page 15 of 21

Event Description: Turbine Trip / Loss of Offsite Power / EDG Mechanical Failure / 2A04 Bus Fault

Time	Position	Applicant's Actions or Behavior
		<ul style="list-style-type: none"> • VERIFY Main Turbine speed - less than 2000 RPM and lowering.
		<ul style="list-style-type: none"> • DETERMINE CCW Pump NOT aligned to Non-Critical Loop (NCL) and Letdown Heat Exchanger.
		<ul style="list-style-type: none"> • DETERMINE both 1E 4 kV Buses de-energized.
		<ul style="list-style-type: none"> • DETERMINE both 1E 480 V Buses B04 and B06 de-energized.
		<ul style="list-style-type: none"> • DETERMINE all 6.9 kV and Non-1E Buses de-energized.
		<ul style="list-style-type: none"> • VERIFY all Class 1E DC Buses – energized.
M.O. Cue: If directed to investigate 2G003, WAIT 3 minutes and REPORT it is shutdown and there is a large amount of oil on the DG room floor. If directed to investigate 2G002, WAIT 3 minutes and REPORT it is shutdown and that it appears to have tripped electrically.		
	CO	VERIFY RCS Inventory Control criteria satisfied:
		<ul style="list-style-type: none"> • VERIFY PZR level between 10% and 70% and trending to between 30% and 60%.
		<ul style="list-style-type: none"> • VERIFY Core Exit Saturation Margin – greater than or equal to 20°F:
		<ul style="list-style-type: none"> • QSPDS page 611.
		<ul style="list-style-type: none"> • CFMS page 311.
	CO	VERIFY RCS Pressure Control criteria satisfied:
		<ul style="list-style-type: none"> • VERIFY PZR pressure (WR and NR) between 1740 PSIA and 2380 PSIA and controlled AND trending to between 2025 PSIA and 2275 PSIA.
	CO	DETERMINE Core Heat Removal criteria is NOT satisfied:
		<ul style="list-style-type: none"> • DETERMINE no RCPs are operating.
		<ul style="list-style-type: none"> • RECORD time of all RCPs off.
		<ul style="list-style-type: none"> • VERIFY operating loop Delta T (Th-Tc) less than 58°F.
		<ul style="list-style-type: none"> • VERIFY Th and Tc not rising.

Op Test No.: NRC Scenario # 3 Event # 6, 7, and 8 Page 16 of 21

Event Description: Turbine Trip / Loss of Offsite Power / EDG Mechanical Failure / 2A04 Bus Fault

Time	Position	Applicant's Actions or Behavior
		<ul style="list-style-type: none"> • VERIFY operating loop Th and REP CET within 16°F.
		<ul style="list-style-type: none"> • QSPDS page 611.
		<ul style="list-style-type: none"> • CFMS page 311.
		<ul style="list-style-type: none"> • VERIFY Core Exit Saturation Margin $\geq 20^{\circ}\text{F}$.
		<ul style="list-style-type: none"> • QSPDS page 611.
		<ul style="list-style-type: none"> • CFMS page 311.
		<ul style="list-style-type: none"> • VERIFY Reactor Vessel level $\geq 100\%$ (plenum).
		<ul style="list-style-type: none"> • QSPDS page 622.
		<ul style="list-style-type: none"> • CFMS page 312.
NOTE: It is acceptable for CO to report only "Monitoring for Natural Circulation."		
	ACO	VERIFY RCS Heat Removal criteria satisfied:
		<ul style="list-style-type: none"> • VERIFY both SGs level – greater than 21% NR.
		<ul style="list-style-type: none"> • VERIFY both SGs level – less than 80% NR.
		<ul style="list-style-type: none"> • VERIFY the following:
		<ul style="list-style-type: none"> • Auxiliary feedwater available to restore both SGs level – between 40% NR and 80% NR.
		<ul style="list-style-type: none"> • PREVENT SG high level:
		<ul style="list-style-type: none"> • CLOSE MFW Block Valves:
		<u>E-088</u> <u>E-089</u>
		HV-4047 HV-4051
		<ul style="list-style-type: none"> • VERIFY heat removal adequate:
		<ul style="list-style-type: none"> • T_C – less than 555°F.
		<ul style="list-style-type: none"> • SG pressures – approximately 1000 PSIA.
		<ul style="list-style-type: none"> • VERIFY T_C - greater than 545°F or controlled.
		<ul style="list-style-type: none"> • VERIFY SG pressures – greater than 740 PSIA.

Op Test No.: NRC Scenario # 3 Event # 6, 7, and 8 Page 17 of 21

Event Description: Turbine Trip / Loss of Offsite Power / EDG Mechanical Failure / 2A04 Bus Fault

Time	Position	Applicant's Actions or Behavior
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	CO	VERIFY Containment Isolation criteria satisfied:
		<ul style="list-style-type: none"> VERIFY Containment pressure – less than 1.5 PSIG.
		<ul style="list-style-type: none"> DETERMINE some Containment Area Radiation Monitors energized and NOT alarming or trending to alarm.
		<ul style="list-style-type: none"> DETERMINE some Secondary Plant Radiation Monitors energized and NOT alarming or trending to alarm.
	CO	DETERMINE Containment Temperature, Pressure and Combustible Gas Control criteria NOT satisfied:
		<ul style="list-style-type: none"> DETERMINE Containment average temperature – greater than 120°F.
		<ul style="list-style-type: none"> VERIFY Containment pressure – less than 1.5 PSIG.
+15 min	CRS	DIAGNOSE Event in Progress:
		<ul style="list-style-type: none"> DETERMINE all safety function criteria are NOT met per Attachment 4, WORKSHEET.
		<ul style="list-style-type: none"> COMPLETE Attachment 1, Recovery Diagnostic.
		<ul style="list-style-type: none"> DIAGNOSE Station Blackout.
		<ul style="list-style-type: none"> NOTIFY personnel of event in progress.
		<ul style="list-style-type: none"> DESIGNATE SRO-in-charge.
		<ul style="list-style-type: none"> DIRECT initiation of Steps 11 through 14.
M.O. Cue: If GCC is contacted for grid status, REPORT that cause of grid loss is unknown and field crews are investigating. No estimate on time to restore a line.		
M.O. Cue: If Unit 3 status is requested, REPORT that Bus 3A04 is energized from EDG 3G002. Bus 3A06 is de-energized and has an electrical fault.		
	CRS	DIRECT performance of SO23-12-8, Station Blackout.

Op Test No.: NRC Scenario # 3 Event # 6, 7, and 8 Page 18 of 21

Event Description: Turbine Trip / Loss of Offsite Power / EDG Mechanical Failure / 2A04 Bus Fault

Time	Position	Applicant's Actions or Behavior
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M.O. Cue: When foldout page for SO23-12-8 is initiated, CALL as SDG&E GCC and REPORT that SONGS Switchyard appears to have no faults. SDG&E GCC can energize San Luis Rey line (TL23010) to SONGS when SONGS is ready. SONGS may restore power per Station Emergency Orders.

	CRS	VERIFY Station Blackout diagnosis:
		<ul style="list-style-type: none"> INITIATE SO23-12-10, Safety Function Status Checks.
		<ul style="list-style-type: none"> INITIATE Foldout Page.
		<ul style="list-style-type: none"> DIRECT performance of FS-3, Monitor Natural Circulation.
		<ul style="list-style-type: none"> DIRECT performance of SO23-12-11, Attachment 8, Restoration of Offsite Power.
		<ul style="list-style-type: none"> DIRECT transfer of Q0612 to Emergency Source.
		<ul style="list-style-type: none"> DIRECT performance of FS-18, Secondary Plant Protection.
		<ul style="list-style-type: none"> EVALUATE 4 kV Bus cross tie per SO23-12-11, Attachment 24 (Cannot perform).
		<ul style="list-style-type: none"> DIRECT performance of SO23-12-11, Attachment 6, Diesel Generator Failure Follow-up Actions.
		<ul style="list-style-type: none"> DIRECT Chemistry to sample both SGs for radioactivity and boron.

M.O. Cue: When directed to transfer Q0612 to the Emergency Source, WAIT 4 minutes, then REPORT you are ready for transfer. When directed, EXECUTE Remote Function ED81, Transfer Q0612 to Emergency Source.

M.O. Cue: If directed to sample SGs, WAIT 10 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.

	CRS	DIRECT initiation SO23-12-11, Attachment 8, Restoration of Off-Site Power.
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Op Test No.: NRC Scenario # 3 Event # 6, 7, and 8 Page 19 of 21

Event Description: Turbine Trip / Loss of Offsite Power / EDG Mechanical Failure / 2A04 Bus Fault

Time	Position	Applicant's Actions or Behavior
	ACO	VERIFY Annunciators for Reserve Auxiliary Transformers clear/reset.
	ACO	VERIFY any 220kV Section Bus de-energized.
	ACO	VERIFY System Separation alarm clear/reset.
	ACO	ESTABLISH communication with SDG&E Grid Control Center within 5 minutes.
	ACO	VERIFY SONGS Switchyard status.
		<ul style="list-style-type: none"> VERIFY all four 220 kV Section Buses de-energized.
	ACO	ISOLATE 220kV Switchyard.
		<ul style="list-style-type: none"> ENSURE all SCE controlled 220 kV CBs open OR switched out.
	ACO	DETERMINE both 1E 4 kV buses NOT energized.
	ACO	DISPATCH an operator to open TS-2 DC knife switches 127F1 through 127F4 at DG Bus PT cubicle for Bus 2A06.
M.O. Cue: When directed to open Bus A06 127F DC Knife switches, WAIT 3 minutes, then EXECUTE Remote Function EG61. REPORT that the Bus 2A06 127F DC knife switches are open.		
	ACO	ALIGN 1E 4 kV buses for restoration.
		<ul style="list-style-type: none"> ENSURE 1E 4 kV Bus Tie Breaker AUTO/MANUAL transfer switches selected to MANUAL.
		<ul style="list-style-type: none"> A04 – HS-1660B1
		<ul style="list-style-type: none"> A06 – HS-1639B2

Op Test No.: NRC Scenario # 3 Event # 6, 7, and 8 Page 20 of 21

Event Description: Turbine Trip / Loss of Offsite Power / EDG Mechanical Failure / 2A04 Bus Fault

Time	Position	Applicant's Actions or Behavior
	ACO	ALIGN all de-energized 6.9 kV buses on affected unit for restoration.
		<ul style="list-style-type: none"> ENSURE all 6.9 kV supply breakers and AUTO/MANUAL switches are aligned.
	ACO	ALIGN all de-energized Non-1E 4 kV buses on affected unit for restoration.
		<ul style="list-style-type: none"> ENSURE all Non-1E 4 kV bus supply breakers and AUTO/MANUAL switches are aligned.
	ACO	ENSURE breakers open to the following de-energized Non-1E 4 kV loads.
		<ul style="list-style-type: none"> Heater Drain Pumps
		<ul style="list-style-type: none"> Main Condensate Pumps
		<ul style="list-style-type: none"> Main Condenser Vacuum Pump
		<ul style="list-style-type: none"> Turbine Plant Cooling Water Pumps
		<ul style="list-style-type: none"> Main Circulating Water Pumps
	CRS	When SO23-12-11, Attachment 8, Restoration of Off-Site Power lineup is complete, REQUEST GCC energizes San Luis Rey Line.
M.O. Cue: When directed to energize the San Luis Rey Line, EXECUTE Remote Function PG56E then REPORT the line is energized.		
M.O. Cue: When directed to energize East Section A, EXECUTE Remote Function PG58I to close Breaker 4182 then REPORT the Bus Section is energized.		
	ACO	VERIFY 220 kV Bus Section A energized from the San Luis Rey Line.

Op Test No.: NRC Scenario # 3 Event # 6, 7, and 8 Page 21 of 21

Event Description: Turbine Trip / Loss of Offsite Power / EDG Mechanical Failure / 2A04 Bus Fault

Time	Position	Applicant's Actions or Behavior
	ACO	ENERGIZE Unit 3 Reserve Auxiliary Transformer.
	ACO	ENERGIZE adjacent 220 kV Section A.
	ACO	ENERGIZE Unit 2 Reserve Auxiliary Transformer.
	ACO	ENERGIZE CR63 220 kV metering.
	ACO	VERIFY 1E 4 kV bus status.
		<ul style="list-style-type: none"> DETERMINE both 1E 4 kV buses NOT energized.
	ACO	ENSURE breakers open to the NOT OPERATING 4 kV loads.
		<ul style="list-style-type: none"> Emergency Chillers
		<ul style="list-style-type: none"> Containment Spray Pumps
		<ul style="list-style-type: none"> HPSI Pumps
		<ul style="list-style-type: none"> LPSI Pumps
		<ul style="list-style-type: none"> AFW Pumps
		<ul style="list-style-type: none"> CCW Pumps
		<ul style="list-style-type: none"> SWC Pumps
CRITICAL TASK	ACO	Energize at least one vital electrical AC bus and associated 480 V 1E bus.
+30 min		ENERGIZE Bus 2A06 from the Reserve Auxiliary Transformer.
	ACO	ENSURE associated 480 V 1E Bus 2B06 is energized.
	ACO	ENERGIZE 2A08, 2A07, 2A03, and 2A09.
When power is restored to Bus 2A06, TERMINATE the scenario.		

Facility:	San Onofre	Scenario No.:	4	Op Test No.:	NRC
Examiners:	_____	Operators:	_____		
	_____		_____		
	_____		_____		
Initial Conditions:	<ul style="list-style-type: none"> Reactor Critical at $\sim 3 \times 10^{-4}\%$ power – RCS Boron is 1335 ppm by Chemistry Sample Train A Component Cooling Water Pump (P-025) in service Train A High Pressure Safety Injection (P-017) OOS Condenser Air Ejector Low Range Radiation Monitor (RM-7818) OOS 				
Turnover:	Power increase in progress at 1% per hour.				
Critical Tasks:	<ul style="list-style-type: none"> Restore flow to the Component Cooling Water Non-Critical Loop (RCPs operating). Stabilize RCS temperature/pressure following loss of heat removal from the faulted Steam Generator. 				

Event No.	Malf. No.	Event Type*	Event Description
1 +15 min		R (CO) N (ACO, CRS)	Rod withdrawal and power increase in progress.
2 + 20 min	CV16A	C (CO, CRS)	VCT Level Transmitter LT-0226 fails low.
3 + 35 min	RPK624A	C (ACO, CRS) TS (CRS)	ESFAS partial actuation.
4 + 45 min	CC06B	C (ACO, CRS) TS (CRS)	CCW Pump overcurrent trip.
5 + 55 min	CV02C CV03C CV04C	C (CO, CRS)	RCP P-003 lower, middle, & upper seal failures.
6 +60 min	MS01A MS01B	M (ALL)	ESDE on E088 outside Containment (2 MSSVs open on trip).
7 +60 min	RC03	M (ALL)	LOCA @ 430 gpm due to vapor seal failure.
8 + 70 min	RP01D	C (ACO)	LPSI Pump P-015 fails to start.

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

SCENARIO SUMMARY NRC #4

The crew will assume the watch with the Reactor critical at $\sim 3 \times 10^{-4}\%$ power. The crew will raise power using rod withdrawal per SO23-5-1.3.1, Plant Startup from Hot Standby to Minimum Load.

During the power increase the VCT Level Transmitter will fail low. The crew will secure VCT makeup per the Annunciator Response Procedures and SO23-3-2.1, CVCS Charging and Letdown Operations.

When the plant is stable a Partial ESFAS Actuation will occur. The crew will restore AFW per Annunciator Response Procedures and/or AOI SO23-13-24, Feedwater Malfunctions. The CRS will evaluate Technical Specifications.

When the plant is stable, a CCW Pump will trip. The crew may respond per AOI SO23-13-7, Loss of Component Cooling Water (CCW) / Saltwater Cooling (SWC). The crew will align SWC & CCW Trains per pump configuration requirements. The SRO will review Technical Specifications for applicability.

The next event is a loss of three (3) RCP seals. The crew will enter AOI SO23-13-6, Reactor Coolant Pump Seal Failure and determine that a plant trip is required and the crew will perform SO23-12-1, Standard Post Trip Actions.

Shortly after the plant trip, a LOCA will occur due to loss of the vapor seal on RCP P-003. Additionally, an ESDE will occur when two Main Steam Safety Valves open on the trip. The CRS will evaluate a LOCA and an ESDE and transition to SO23-12-9, Functional Recovery.

Following the trip, a LPSI pump fails to start and the CO will be required to manually start P-015. The scenario is terminated when RCS temperature and pressure are stabilized while in the Functional Recovery procedure and associated Floating Steps.

Risk Significance:

- Risk important components out of service: HPSI P-017
- Failure of risk important system prior to trip: Loss of CCW Pumps
- Risk significant core damage sequence: LOCA and ESDE
- Risk significant operator actions: Restore Non-Critical Loop

Scenario Event Description

NRC Scenario 4

SONGS

2005 Facility NRC Initial License Examination

Simulator Scenario Setup

Scenario 4

MACHINE OPERATOR'S INSTRUCTIONS

SETUP

IC: Use IC #177 and see attached Event File for NRC Scenario #4.

STEPS	TYPE	MALF #	DESCRIPTION	DEMAND VALUE	INITIATING PARAMETER

Op Test No.:	<u>NRC</u>	Scenario #	<u>4</u>	Event #	<u>1</u>	Page	<u>4</u>	of	<u>19</u>
Event Description:		Rod Withdrawal and Power Increase in Progress							
Time	Position	Applicant's Actions or Behavior							

Machine Operator: EXECUTE IC #177 and NRC Scenario #4 SETUP file to align components.

ENSURE Control Board Tags are hung on P-017.

ENSURE procedures in progress are on the CO desk.

- Copy of SO23-5-1.3.1 (completed through Step 6.4)

ENSURE that Control Rods are in the appropriate position.

Control Room Annunciators in Alarm at $3 \times 10^{-4}\%$:

50A02 – COLSS ALARM
 50A07 – SBCS DEMAND PRESENT
 53A03 – MFWP TURBINE K006 TRIP
 53A49 – 5TH POINT HEATER LEVEL HI/LO
 53A50 – 6TH POINT HEATER LEVEL HI/LO
 53B03 – MFWP TURBINE K005 TRIP
 53B23 – CONDENSATE FLOW BALANCE TROUBLE
 56A30/40/50/60 – LOSS OF LOAD CHANNEL 1/2/3/4 TRIP DISABLED
 63E10 – SCE CB TRIP
 99B01 – GENERATOR TRIP
 99B17 – VACUUM LO PRETRIP
 99B19 – VACUUM PROTECTION PLC TROUBLE

+1 min	CRS	DIRECT performance of SO23-5-1.3.1, Plant Startup from Hot Standup to Minimum Load.
	CO	REFER to LCS Figure 3.1.102-1 and commence maintaining the Control Rods in the proper sequence of overlap.
	CO	POSITION Group Select switch to the CEA Group 6.
	CO	POSITION Mode Select Switch to MG (Manual Group) or MS (Manual Sequential).
	CO/CRS	When directed by the CRS, WITHDRAW Control Rods as required.

Op Test No.:	<u>NRC</u>	Scenario #	<u>4</u>	Event #	<u>1</u>	Page	<u>5</u>	of	<u>19</u>
Event Description:		Rod Withdrawal and Power Increase in Progress							
Time	Position	Applicant's Actions or Behavior							

	CO	When CEA positioning is complete, PLACE the Mode Select Switch to OFF.
+15 min	ACO	MAINTAIN Tcold within required band by monitoring the Steam Bypass Control System operation.
<i>When power has been raised to ~2%, or at Lead Evaluator's discretion, PROCEED to Event 2.</i>		

Op Test No.: NRC Scenario # 4 Event # 2 Page 6 of 19

Event Description: VCT Level Transmitter LT-0226 Fails Low

Time	Position	Applicant's Actions or Behavior
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Machine Operator: When directed, EXECUTE CV16A, VCT LT-0226 fails low.**Indications available:****58A04 – VCT LEVEL HI/LO****VCT Level Indicator LI-0226A lowering****VCT Auto Makeup initiation**

+1 min	CO	REFER to Annunciator Response Procedures.
	CO	DETERMINE that VCT Auto Makeup has started and INFORM the CRS.
	CO	CHECK VCT Level indicator LI-0227 on PMS and determine that level is normal (~ 40%) and trending up due to Auto Makeup initiation.
	CO	IDENTIFY that VCT level indicator LI-0226 has failed low.
	CO	PLACE Makeup Mode Selector, HS-0210, to MANUAL.
NOTE: When Makeup Control is placed in MANUAL, the following alarms will illuminate: 58A07 – DEMIN WATER TO VCT FLOW HI/LO (45 secs later) 58A06 – BORIC ACID TO VCT FLOW HI/LO (100 secs later)		
+5 min	CRS	REQUEST I&C assistance
When VCT Makeup is in manual, or at Lead Evaluator's discretion, PROCEED to Event 3.		

Op Test No.: NRC Scenario # 4 Event # 3 Page 7 of 19

Event Description: ESFAS Partial Actuation

Time	Position	Applicant's Actions or Behavior
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Machine Operator: When directed, EXECUTE Partial ESFAS Actuation per the Event File.

Indications available:**57A11 – ESFAS TRAIN A PARTIAL ACTUATION****Increase in AFW flow due to AFW Valve 2HV-4713 failing open****AFW Flow indication is off-scale high on E089****SG E089 level increase due to the Partial ESFAS**

+1 min	CO/ACO	REFER to Annunciator Response Procedure.
	CO/ACO	REFER to Plant Monitoring System Alarm Page.
	CO/ACO	DETERMINE that a Partial ESFAS Actuation has occurred and INFORM the CRS.
	CRS	DIRECT CO to override and close AFW Valves and/or STOP P-141.
	ACO	OVERRIDES and CLOSES AFW Valve HV-4731 and/or STOPS P-141 by DEPRESSING the STOP pushbutton.
	CRS	DIRECT performance of SO23-3-2.22, Engineering Safety Features Actuation System Operation to determine valves that may have operated.
	CRS/CO	RESTORE feedwater flow as required.

Op Test No.: <u> NRC </u> Scenario # <u> 4 </u> Event # <u> 3 </u> Page <u> 8 </u> of <u> 19 </u>		
Event Description: ESFAS Partial Actuation		
Time	Position	Applicant's Actions or Behavior

+15 min	CRS	EVALUATE Technical Specifications.
		<ul style="list-style-type: none"> LCO 3.7.5.H is applicable (4 hour ACTION).
		<ul style="list-style-type: none"> An automatic valve incapable of closing upon receipt of an MSIS, then close the affected valve or its block valve.
<i>When feedwater flow is controlled, or at Lead Evaluator's discretion, PROCEED to Event 4.</i>		

Op Test No.:	<u>NRC</u>	Scenario #	<u>4</u>	Event #	<u>4</u>	Page	<u>9</u>	of	<u>19</u>
Event Description:		CCW Pump Trip							
Time	Position	Applicant's Actions or Behavior							

Machine Operator: When directed, EXECUTE CC06B, CCW Pump P-025 OC trip.

Indications available:

64A21 – CCW PUMP TRAIN A OC

64A10 – CCW NON-CRITICAL LOOP RETURN FLOW LO

+1 min	ACO	REFER to Annunciator Response Procedures.
	ACO	RECOGNIZE the CCW Pump P-025 has tripped and INFORM the CRS AOI SO23-13-7 entry required.
	CRS	REFER to AOI SO23-13-7, Loss of CCW/SWC.
	ACO	ENSURE at least one CCW Loop and its associated Saltwater Cooling Pump operating.
CRITICAL TASK	ACO	Restore flow to the Component Cooling Water Non-Critical Loop (RCPs operating).
		START CCW Pump P-024 and VERIFY SWC Pump P-112 starts.
	ACO	ENSURE aligned to the operating train:
		<ul style="list-style-type: none"> Non-Critical Loop
		<ul style="list-style-type: none"> Letdown Heat Exchanger
	ACO	VERIFY E-335/E-336, Emergency Chillers, aligned to the operating Loop.

Op Test No.: <u> NRC </u> Scenario # <u> 4 </u> Event # <u> 4 </u> Page <u> 10 </u> of <u> 19 </u>		
Event Description: <u> CCW Pump Trip </u>		
Time	Position	Applicant's Actions or Behavior

+10 min	CRS	EVALUATE Technical Specifications.
		<ul style="list-style-type: none"> 3.7.7.A is applicable (72 hour ACTION).
		<ul style="list-style-type: none"> Restore CCW Train to OPERABLE status.
<p><i>When Technical Specifications are addressed, or at Lead Evaluator's discretion, PROCEED to Event 5.</i></p>		

Op Test No.: NRC Scenario # 4 Event # 5 Page 11 of 19

Event Description: RCP P-003 Lower, Middle, & Upper Seal Failures

Time	Position	Applicant's Actions or Behavior
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Machine Operator: When directed, EXECUTE CV04C/CV03C/CV02C, RCP P-003 Lower, Middle, and Upper Seal failures.

Indications available:**56C26 – RCP P003 SEAL PRESS HI/LO****56B57 – RCP BLEED-OFF FLOW HI/LO**

+10 sec	CO	REFER to Annunciator Response Procedures.
	CO	RECOGNIZE RCP P-003 Seal failures and INFORM the CRS SO23-13-6 entry required.
	CRS	DIRECT performance of SO23-13-6, Reactor Coolant Pump Seal Failure.
+3 min	CO	DETERMINE P003 lower, middle, and upper seal failures based on seal cavity pressure readings in accordance with Attachment 1.
	CO	DETERMINE no other RCP operating parameters are out of normal range per Attachment 2.
	CRS	DIRECT performance of a Reactor Trip per SO23-12-1 based upon determination that 2 seal stages have failed.
+5 min	CO	STOP P-003 5 seconds after all Control Rods are inserted.

When Reactor is tripped, or at Lead Evaluator's discretion, PROCEED to Events 6, 7 and 8.

Op Test No.: NRC Scenario # 4 Event # 6, 7, and 8 Page 12 of 19

Event Description: ESDE on E088 Outside Containment (2 MSSVs Open on Trip); LOCA @ 430 GPM Due to Vapor Seal Failure; LPSI Pump P015 Fails to Start

Time	Position	Applicant's Actions or Behavior
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Machine Operator: When directed, EXECUTE RC03, RCS Leak into Containment, and MS01A & MS01B, Main Steam Safety Valves open (+5 min).

Indications available:

60A02 – CONTAINMENT HUMIDITY HIGH

60A12 – REACTOR CAVITY TEMP HI

60A03 – CONTAINMENT / FHB TEMP HI

57C43 – RCS LEAKAGE ABNORMAL / RECIRC SYS VV MISALIGNED

57C20 – RCS LEAKAGE DETECTION ACTIVITY HI

+1 min	CRS	DIRECTS performance of SO23-12-1, Standard Post Trip Actions.
	CRS	INITIATE Administrative Actions:
		<ul style="list-style-type: none"> RECORD time of Reactor trip _____.
		<ul style="list-style-type: none"> ANNOUNCE Reactor trip via PA System.
		<ul style="list-style-type: none"> INITIATE Attachment 4, WORKSHEET.
		<ul style="list-style-type: none"> INITIATE Attachment 5, ADMINISTRATIVE ACTIONS.
	CO	VERIFY Reactivity Control criteria satisfied:
		<ul style="list-style-type: none"> VERIFY Reactor Trip Circuit Breakers (8) – open.
		<ul style="list-style-type: none"> VERIFY maximum of one full length CEA – NOT fully inserted.
		<ul style="list-style-type: none"> VERIFY Reactor power – lowering and Startup rate – negative.
	ACO	VERIFY Vital Auxiliaries functioning properly:
		<ul style="list-style-type: none"> VERIFY Main Turbine tripped:
		<ul style="list-style-type: none"> HP and LP Stop and Governor Valves – closed.
		<ul style="list-style-type: none"> MWe output – lowering.
		<ul style="list-style-type: none"> VERIFY both Unit Output Breakers – open.

Op Test No.: NRC Scenario # 4 Event # 6, 7, and 8 Page 13 of 19

Event Description: ESDE on E088 Outside Containment (2 MSSVs Open on Trip); LOCA @ 430 GPM Due to Vapor Seal Failure; LPSI Pump P015 Fails to Start

Time	Position	Applicant's Actions or Behavior
		<ul style="list-style-type: none"> • VERIFY Main Turbine speed less than 2000 RPM or lowering.
		<ul style="list-style-type: none"> • VERIFY CCW Pump aligned to Non-Critical Loop (NCL) and Letdown Heat Exchanger – operating.
		<ul style="list-style-type: none"> • VERIFY both 1E 4 kV Buses – energized.
		<ul style="list-style-type: none"> • VERIFY both 1E 480 V buses B04 and B06 – energized.
		<ul style="list-style-type: none"> • VERIFY all 6.9 kV and Non-1E Buses – energized.
		<ul style="list-style-type: none"> • VERIFY all Class 1E DC Buses – energized.
M.O. Cue: When directed to check Main Steam Safety Valve status, REPORT as the 24 that there is a lot of steam coming from the MSIV roof.		
	CO	DETERMINE RCS Inventory Control criteria NOT satisfied:
		<ul style="list-style-type: none"> • DETERMINE PZR level NOT between 10% and 70% and NOT trending to between 30% and 60%.
		<ul style="list-style-type: none"> • VERIFY Core Exit Saturation Margin – greater than or equal to 20°F:
		<ul style="list-style-type: none"> • QSPDS page 611
		<ul style="list-style-type: none"> • CFMS page 311.
	CO	DETERMINE RCS Pressure Control criteria NOT satisfied:
		<ul style="list-style-type: none"> • DETERMINE PZR pressure (WR and NR) NOT between 1740 PSIA and 2380 PSIA and NOT controlled, and NOT trending to between 2025 PSIA and 2275 PSIA.
	CO	DETERMINE LPSI Pump did NOT start and START P-015.
	CO	DETERMINE Core Heat Removal criteria NOT satisfied:
		<ul style="list-style-type: none"> • VERIFY at least one RCP – operating.
		<ul style="list-style-type: none"> • VERIFY core loop ΔT ($T_H - T_C$) – less than 10°F.

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Event Description: ESDE on E088 Outside Containment (2 MSSVs Open on Trip); LOCA @ 430 GPM Due to Vapor Seal Failure; LPSI Pump P015 Fails to Start

Time	Position	Applicant's Actions or Behavior
		<ul style="list-style-type: none"> VERIFY Core Exit Saturation Margin – NOT greater than or equal to 20°F:
		<ul style="list-style-type: none"> QSPDS page 611
		<ul style="list-style-type: none"> CFMS page 311.
	ACO	DETERMINE RCS Heat Removal criteria NOT satisfied:
		<ul style="list-style-type: none"> VERIFY both SGs level – greater than 21% NR.
		<ul style="list-style-type: none"> VERIFY both SGs level – less than 80% NR.
		<ul style="list-style-type: none"> VERIFY the following:
		<ul style="list-style-type: none"> Auxiliary feedwater available to restore both SGs level – between 40% NR and 80% NR.
		<ul style="list-style-type: none"> PREVENT SG high level:
		<ul style="list-style-type: none"> VERIFY MFW Block Valves CLOSED
		<u>E-088</u> <u>E-089</u>
		HV-4047 HV-4051
		<ul style="list-style-type: none"> DETERMINE heat removal inadequate:
		<ul style="list-style-type: none"> T_C – less than 555°F.
		<ul style="list-style-type: none"> SG pressures NOT approximately 1000 PSIA.
		<ul style="list-style-type: none"> DETERMINE T_C less than 545°F and NOT controlled.
		<ul style="list-style-type: none"> DETERMINE SG E088 pressure – less than 740 PSIA.
	CRS	DIRECT initiation of EFAS 1 & 2.
	CO	DETERMINE Containment Isolation criteria NOT satisfied:
		<ul style="list-style-type: none"> DETERMINE Containment pressure – greater than 1.5 PSIG.
		<ul style="list-style-type: none"> DETERMINE Containment Area Radiation Monitors energized and alarming or trending to alarm.
		<ul style="list-style-type: none"> VERIFY Secondary Plant Radiation Monitors energized and NOT alarming or trending to alarm.

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Event Description: ESDE on E088 Outside Containment (2 MSSVs Open on Trip); LOCA @ 430 GPM Due to Vapor Seal Failure; LPSI Pump P015 Fails to Start

Time	Position	Applicant's Actions or Behavior
	CO	DETERMINE Containment Temperature, Pressure and Combustible Gas Control criteria NOT satisfied:
		<ul style="list-style-type: none"> DETERMINE Containment average temperature – greater than 120°F.
		<ul style="list-style-type: none"> VERIFY Containment pressure – less than 1.5 PSIG.
	CREW	DETERMINE LOCA and ESDE in progress.
+15 min	CRS	DIAGNOSE event in progress:
		<ul style="list-style-type: none"> DETERMINE all safety function criteria are NOT met per Attachment 4, Worksheet.
		<ul style="list-style-type: none"> COMPLETE Attachment 1, Recovery Diagnostic.
		<ul style="list-style-type: none"> DIAGNOSE ESDE on SG E088 outside Containment and LOCA inside Containment.
		<ul style="list-style-type: none"> NOTIFY personnel of event in progress.
		<ul style="list-style-type: none"> DESIGNATE SRO in Charge.
		<ul style="list-style-type: none"> DIRECT initiation of Steps 11 through 14.
	CRS	DIRECT performance of SO23-12-9, Functional Recovery.
	CRS	RECORD time of EOI entry.
	CRS/CO	ENSURE RCPs in each loop stopped as required.
	CRS	VERIFY ESDE and LOCA diagnosis:
		<ul style="list-style-type: none"> INITIATE SO23-12-10, Safety Function Status Checks.
		<ul style="list-style-type: none"> INITIATE Foldout Page.
		<ul style="list-style-type: none"> FS-7, SI Throttle/Stop Criteria.
		<ul style="list-style-type: none"> Attachment 28, Isolation of SG with ESDE.

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Event Description: ESDE on E088 Outside Containment (2 MSSVs Open on Trip); LOCA @ 430 GPM Due to Vapor Seal Failure; LPSI Pump P015 Fails to Start

Time	Position	Applicant's Actions or Behavior
		<ul style="list-style-type: none"> Attachment 22, Non-Qualified Load Restoration.
		<ul style="list-style-type: none"> FS-30, Establish Stable RCS Temperature During ESDE.
M.O. Cue: If directed to sample SGs, WAIT 10 minutes and then REPORT that E088 and E089 both have activity near background, and normal boron levels. If the SG sample valves are closed, REPORT unable to establish sample flow.		
	CRS	INITIATE Administrative Actions:
		<ul style="list-style-type: none"> NOTIFY Shift Manager/Operations Leader of SO23-12-9, Functional Recovery.
		<ul style="list-style-type: none"> ENSURE Emergency Plan is initiated.
		<ul style="list-style-type: none"> IMPLEMENT Placekeeper.
	CO	VERIFY ESF actuation:
		<ul style="list-style-type: none"> VERIFY SIAS actuation required.
		<ul style="list-style-type: none"> PZR pressure less than SIAS setpoint OR Containment pressure > 3.4 PSIG.
		<ul style="list-style-type: none"> ENSURE the following actuated:
		<ul style="list-style-type: none"> SIAS/CCAS/CRIS/CIAS
	ACO	STOP unloaded Diesel Generators.
	ACO	INITIATE SO23-12-11, Attachment 22, Non-Qualified Load Restoration.
M.O. Cue: When directed to restore Non-Qualified Loads, WAIT 3 minutes, then CALL the Control Room and state that you are ready to restore. When directed, EXECUTE Remote Function ED85, Non-Qualified Loads Restoration. When complete, INFORM the Control Room that you have restored Non-Qualified Loads.		

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Event Description: ESDE on E088 Outside Containment (2 MSSVs Open on Trip); LOCA @ 430 GPM Due to Vapor Seal Failure; LPSI Pump P015 Fails to Start

Time	Position	Applicant's Actions or Behavior
	CO	VERIFY RCP NPSH requirements of are satisfied.
	CO	ESTABLISH Optimum SI Alignment:
		<ul style="list-style-type: none"> ESTABLISH two train operation:
		<ul style="list-style-type: none"> VERIFY all Charging Pumps operating.
		<ul style="list-style-type: none"> DETERMINE two HPSI Trains and two LPSI Trains operating.
		<ul style="list-style-type: none"> VERIFY all Cold leg flow paths aligned.
		<ul style="list-style-type: none"> VERIFY SI flow required:
		<ul style="list-style-type: none"> SI flow indicated.
		<ul style="list-style-type: none"> RCS pressure greater than 1250 psia, OR VERIFY FS-7, Verify HPSI Throttle/Stop criteria satisfied.
	CRS	EVALUATE Immediate Safety Function Recovery Actions:
		<ul style="list-style-type: none"> VERIFY any Safety Function Recovery Attachments (FR-1 through FR-8) indicated by any optimal EOI.
		<ul style="list-style-type: none"> IMPLEMENT precautionary actions:
		<ul style="list-style-type: none"> DIRECT Boration at greater than 40 gpm.
		<ul style="list-style-type: none"> ENSURE one RCP in each loop stopped.
	CO/ACO	VERIFY SI Throttle/Stop Criteria:
		<ul style="list-style-type: none"> VERIFY at least one SG operating.
		<ul style="list-style-type: none"> DETERMINE SBCS and Feedwater available.
	CO	<ul style="list-style-type: none"> DETERMINE PZR level < 30% and NOT rising.
	CO	<ul style="list-style-type: none"> VERIFY Core Exit Saturation Margin greater than or equal to 20°F.
		<ul style="list-style-type: none"> QSPDS page 611.

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Event Description: ESDE on E088 Outside Containment (2 MSSVs Open on Trip); LOCA @ 430 GPM Due to Vapor Seal Failure; LPSI Pump P015 Fails to Start

Time	Position	Applicant's Actions or Behavior
		<ul style="list-style-type: none"> CFMS page 311.
	CO	<ul style="list-style-type: none"> VERIFY Reactor Vessel level greater than or equal to 100% (Plenum).
		<ul style="list-style-type: none"> QSPDS page 622.
		<ul style="list-style-type: none"> CFMS page 312.
		<ul style="list-style-type: none"> Attachment 4.
	CO/ACO	<ul style="list-style-type: none"> DETERMINE RCS Cooldown is in progress.
	CRS	DETERMINE SI Throttle Stop criteria not met.
	CO	MAINTAIN boration at least 40 gpm.
	CRS	DIRECT performance of FS-30, Establish Stable RCS Temperature during ESDE.
	ACO	VERIFY SG E089, NOT isolated for SGTR.
CRITICAL TASK	ACO	Stabilize RCS temperature/pressure following loss of heat removal from the faulted Steam Generator.
		OPERATE ADV on SG E089 to stabilize RCS temperatures as faulted SG level lowers.
		<ul style="list-style-type: none"> SG E088 at 10% WR, position SG E089 ADV, HV-8421 to 10% open.
		<ul style="list-style-type: none"> SG E088 at 5% WR, set SG E089 ADV, HV-8421, at P_{sat} for lowest T_c.
		<ul style="list-style-type: none"> SG E088 initial dryout, adjust SG E089 ADV, HV-8421, at P_{sat} for lowest T_c attained as SG boils dry.

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Event Description: ESDE on E088 Outside Containment (2 MSSVs Open on Trip); LOCA @ 430 GPM Due to Vapor Seal Failure; LPSI Pump P015 Fails to Start

Time	Position	Applicant's Actions or Behavior
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	ACO	STABILIZE least affected SG E089 pressure.
		<ul style="list-style-type: none">• OPERATE ADV in automatic.
		<ul style="list-style-type: none">• STABILIZE AFW flow.
<i>When RCS temperature is stabilized, TERMINATE the scenario.</i>		