

**WRITTEN QUESTION DATA SHEET**

Question Number: 1

K/A: 000007 EA2.05

Reactor Trip - Stabilization - Recovery

Ability to determine or interpret the following as they apply to a reactor trip: Reactor trip first-out indication.

Tier:	1	RO Imp:	RO Exam:	Cognitive Level:	High
Group:	1	SRO Imp:	3.9	SRO Exam:	Yes
				Source:	New

Applicable 10CFR55 Section: 41.7 / 45.5 / 45.6

Learning Objective: 3-OT-SYS099A, Objective 13: Describe the causes of "General Warning" on SSPS.

Objective 14: Identify where "General Warning" indications can be found.

References: SPP-3.5, Rev. 19; 1-SI-99-10B, Rev. 42

**Question:**

Given the following conditions:

Unit 1 is at 100% power. Solid State Protection System (SSPS) Train 'B' Actuation Logic testing is being performed via 1-SI-99-10B with:

- Train 'B' SSPS Mode Selector switch in the 'TEST' position.
- Train 'B' SSPS Input Error Inhibit switch in the "INHIBIT" position.

A unit trip occurs due to the loss of one of the two 48v DC power supplies on TRAIN 'A' SSPS. The following "First Out" annunciators are lit:

**1-XA-55-4C, Turbine Trip First**

Window 73C - "RX TRIP BKRS RTA &amp; BYA OPEN"

Window 74C - "RX TRIP BKRS RTB &amp; BYB OPEN"

Window 74B - "MFPT A&amp;B TRIPPED"

**1-XA-55-4D Reactor Trip First Out**

Window 76B "TURBINE TRIP"

Which ONE of the following identifies both the sequence of events of the unit trip, and the time allowed to make the required NRC 50.72 notification?

Sequence of Events	Notification Required Within
A. Turbine trip caused the Reactor trip.	Four Hours
B. Turbine trip caused the Reactor trip.	Eight Hours
C. Reactor trip caused the Turbine trip.	Four Hours
D. Reactor trip caused the Turbine trip.	Eight Hours

**DISTRACTOR ANALYSIS**

- Incorrect. The conditions stated in the stem result in a general warning on both trains of the SSPS which causes the reactor trip and bypass breakers to open (but no reactor first out annunciator will be lit). Thus the turbine trips as a result of the reactor trip. The four hour notification to NRC for a reactor trip is correct. Plausible due to the notification time being correct and no other reactor trip first out annunciator will be lit except the turbine first out annunciator.
- Incorrect. The conditions stated in the stem result in a general warning on both trains of the SSPS which causes the reactor trip and bypass breakers to open (but no reactor first out annunciator will be lit), thus the turbine trips as a result of the reactor tripping. The notification to NRC for a reactor trip is a four hour notification, not an eight hour notification. Plausible due to the notification time being correct and no other reactor trip first out annunciator lit except the turbine first out annunciator; and that the notification time could be misapplied since the ESF actuation required time is 8 hours and an ESF actuation of AFW does occur on a reactor trip.
- CORRECT. The conditions stated in the stem result in a general warning on both trains of the SSPS which causes the reactor trip and bypass breakers to open (but no reactor first out annunciator will be lit), thus the reactor trip causing the turbine trip is correct. The four hour notification to NRC for a reactor trip is correct.

---

**WRITTEN QUESTION DATA SHEET**

---

- d. Incorrect. The conditions stated in the stem result in a general warning on both trains of the SSPS which causes the reactor trip and bypass breakers to open (but no reactor first out annunciator will be lit), thus the reactor trip causing the turbine trip is correct. The notification to NRC for a reactor trip is a four hour notification, not an eight hour notification. Plausible because the notification time could be misapplied since an ESF actuation requires an 8 hour notification and an ESF actuation of AFW does occur on the reactor trip.
- 
-

**WRITTEN QUESTION DATA SHEET**

Question Number: 2

K/A: 000022 G2.1.7

Loss of Reactor Coolant Makeup

Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.

Tier:	1	RO Imp:	RO Exam:	Cognitive Level:	High
Group:	1	SRO Imp: 4.7	SRO Exam: Yes	Source:	NEW

Applicable 10CFR55 Section: 41.5, 43.5

Learning Objective: 3-OT-SYS062A Explain the automatic actuation logic and interlocks associated with the VCT outlet valves, FCV-62-132 and 133 and the CCP suction valves from the RWST, FCV-62-135 and 136.

References: SOI-62.02, Rev. 47; ARI-109-115, rev. 16, SPP-10.4, 5.0, rev. 5.

**Question:**

Given the following plant conditions:

- Core burnup is 1200 MWD/MTU.
- Indicated reactor power is stable at 100%.
- VCT low level alarm annunciates.
- Auto makeup has failed.
- Actual VCT level had lowered to 5% before the crew completed appropriate corrective action.
- Reactor power has stabilized at approximately 97% power.

If this event had occurred with core burnup at 16600 MWD/MTU, the magnitude of the change in reactor power would be \_\_\_\_\_(1)\_\_\_\_\_, and the significance level of the Reactivity Management Event classification would be recorded on the PER (Problem Evaluation Report) by \_\_\_\_\_(2)\_\_\_\_\_.

- |    | (1)     | (2)                          |
|----|---------|------------------------------|
| A. | less    | Reactor Engineering.         |
| B. | greater | Reactor Engineering.         |
| C. | less    | Management Review Committee. |
| D. | greater | Management Review Committee. |

**DISTRACTOR ANALYSIS**

- Incorrect. Plausible if candidate confuses the change in boron worth with time in core life to be less, instead of more. In this case, candidate incorrectly concludes that the power change response is at a lower magnitude. Correctly recognizes that Reactor Engineering records the significance level of the event on the PER.
- CORRECT. Since boron worth is greater at EOL, injection of RWST inventory results in a higher magnitude of change in reactor power. Per the appropriate references, Reactor Engineering records the significance level of the reactivity event on the PER.
- Incorrect. Plausible if candidate confuses the change in boron worth with time in core life to be less, instead of more. In this case, candidate incorrectly concludes that the power change response is at a lower magnitude. Further plausible, since Management Review Committee is involved with many plant PERs, but not the ones associated with reactivity.
- Incorrect. Plausible, since the candidate correctly recognizes EOL conditions, and applies the knowledge that boron worth is higher. Further plausible, since Management Review Committee is involved with many plant PERs, but not the ones associated with reactivity.

Question Number: 3

K/A: 000025 AA2.01

Loss of RHR System

Ability to determine and interpret the following as they apply to the Loss of Residual Heat Removal System:  
Proper amperage of running LPI/decay heat removal/RHR pump(s).

Tier: 1 RO Imp: RO Exam: Cognitive Level: High  
Group: 1 SRO Imp: 2.9 SRO Exam: Yes Source: NEW

Applicable 10CFR55 Section: 43.5 / 45.13

Learning Objective: 3-OT-AOI1400, Rev. 6, Objective 7: Demonstrate ability/knowledge of AOI, to correctly: a. Recognize entry conditions, b. Respond to Action steps, c. Respond to Contingencies, d. Respond to Notes and Cautions. 3-OT-GO1000, Rev. 5, Objective 5: Identify the procedure to which the operator is referred if Residual Heat Removal cooling is lost while in during Reduced Inventory/Mid-Loop operations. (SOER 88-3 & SOER 85-4).

References: GO-10, Rev. 37

Question:

Given the following:

- Unit 1 is in Mode 5 following a refueling outage.
- RHR pump 1A-A is in service.
- The operating crew is drawing vacuum on the Reactor Coolant System in accordance with GO-10, Reactor Coolant System Drain and Fill Operations.
- Currently the vacuum is 21"Hg and rising.
- The RHR pump begins to cavitate and the operating crew performs the following:
  - Lowers RHR pump flow to 2000 gpm.
  - Raises RCS level to 718' 9".
- The Unit Supervisor then directs the Vacuum Pump operator to start slowly reducing vacuum.

Which ONE of the following identifies both how the RHR pump motor amps are affected when the pump is cavitating, and the mitigating strategy in accordance with GO-10 that will be implemented if the cavitation cannot be terminated by the above actions?

<u>Motor Amps</u>	<u>Mitigating Strategy</u>
A. Unstable and fluctuating.	Break vacuum per GO-10, then implement AOI-14, Loss of RHR Shutdown Cooling.
B. Unstable and fluctuating.	Implement AOI-14, Loss of RHR Shutdown Cooling, then break vacuum as directed by the AOI.
C. Stable but reduced.	Break vacuum per GO-10, then implement AOI-14, Loss of RHR Shutdown Cooling.
D. Stable but reduced.	Implement AOI-14, Loss of RHR Shutdown Cooling, then break vacuum as directed by the AOI.

#### DISTRACTOR ANALYSIS

- a. CORRECT. GO-10 describes cavitation and amps being unsteady and directs the breaking of vacuum prior to implementing AOI-14.
- b. Incorrect. While GO-10 describes cavitation and amps as stated in the distractor, the GO requires the vacuum break prior to the transition to AOI-14.
- c. Incorrect. Amps would not be "stable but reduced" if the pump was cavitating; however the mitigating strategy is correct.
- d. Incorrect. Amps would not be "stable but reduced" if the pump was cavitating. The GO requires the vacuum break prior to the transition to AOI-14.

Question Number: 4

K/A: 000027 G2.4.6

Pressurizer Pressure Control System Malfunction  
Knowledge of EOP mitigation strategies.

Tier:	1	RO Imp:	RO Exam:	Cognitive Level:	High
Group:	1	SRO Imp: 4.7	SRO Exam: Yes	Source:	NEW

**Applicable 10CFR55 Section:** 41.10 / 43.5 / 45.13

**Learning Objective:** 3-OT-EOP0000, Objective 23: Cite the immediate action steps including RNO for E-0.

**References:** E-0, Rev.27.

**Question:**

Given the following:

- Unit 1 is at 4% reactor power with a startup in progress.
- A pressurizer spray valve inadvertently opens due to a controller failure and cannot be closed.
- The OAC reports that Pressurizer pressure is 1960 psig and dropping, and that he is going to open the reactor trip breakers.
- After the reactor trip switch on 1-M-4 is placed to TRIP the reactor trip breakers fail to open, but after the reactor trip switch 1-M-6 is placed to TRIP the reactor trip breakers do open.

Which ONE of the following identifies the condition of the unit relative to the reactor trip breakers prior to the operator's actions to trip the reactor and the required actions after the reactor trip switches have been placed to TRIP?

- A. An ATWS condition exists prior to the manual actions, and since the reactor was tripped manually from the 1-M-6 switch, E-0, Reactor Trip or Safety Injection, should be entered and performed without a transition to FR-S.1, Power Generation/ATWS.
- B. An ATWS condition exists prior to the manual actions, and since the reactor could NOT be tripped manually from the 1-M-4 switch, E-0, Reactor Trip or Safety Injection, should be entered and a transition made to FR-S.1, Power Generation/ATWS.
- C. An ATWS condition does NOT exist prior to the manual actions, but since the reactor failed to trip manually from the switch on 1-M-4 control board, E-0, Reactor Trip or Safety Injection, should be entered and a transition made to FR-S.1, Power Generation/ATWS.
- D. An ATWS condition does NOT exist prior to the manual actions, but since the reactor was tripped manually from the 1-M-6 switch, E-0, Reactor Trip or Safety Injection, should be entered and performed without a transition to FR-S.1, Power Generation/ATWS.

**DISTRACTOR ANALYSIS**

- a. Incorrect. Plausible if the candidate does not realize that an ATWS condition did not exist since there was no legitimate reactor trip signal generated with the plant at 4% (below P-7, so "At Power" trips are not in service yet). The procedure flow path described is correct for the event described in the stem.
- b. Incorrect. Plausible if the candidate does not realize that an ATWS condition did not exist since there was no legitimate reactor trip signal generated with the plant at 4% (below P-7, so "At Power" trips are not in service yet). The procedure flow path described is incorrect for the event described in the stem. No entry into FR-S.1 is needed since the manual trip from M-6 was successful.
- c. Incorrect. Plausible since an ATWS condition did not exist since there was no valid reactor trip signal generated with the plant at 4% (plant is below P-7, so "At Power" trips are not in service yet). The procedure flow path described is incorrect for the event described in the stem. No entry into FR-S.1 is needed since the manual trip from M-6 was successful.
- d. CORRECT. An ATWS did not occur, and the procedural flow path described is correct for the conditions described in the stem.

Question Number: 5

K/A: 000058 AA2.01

Loss of DC Power

Ability to determine and interpret the following as they apply to the Loss of DC Power: That a loss of dc power has occurred; verification that substitute power sources have come on line

Tier:	1	RO Imp:	RO Exam:	Cognitive Level:	High
Group:	1	SRO Imp: 3.1	SRO Exam: Yes	Source:	New

Applicable 10CFR55 Section: 43.5

**Learning Objective:** 3-OT-SYS057P Objective 6 Explain how the operator can tell if the 125v Vital Charger or the 125v Vital Battery is supplying power to the 125v Vital Battery Boards.

**References:** Tech Spec 3.8.4 Bases Rev 87

**Question:**

Given the following:

- The plant has experienced a Loss of Offsite Power.
- The 125 V DC VITAL CHGR I fails and its output breaker opens.
- No other events are occurring.

Which ONE of the following indicates that Battery 1 is supplying the load, AND per the Tech Spec basis what is the design of Battery 1 capacity during this event?

	<u>Supplying Load indication</u>	<u>Battery Design Basis</u>
A.	Batt BD I AMPS is indicating downscale from zero.	Carry required loads for 4 hours assuming non-required loads are shed.
B.	Batt BD I AMPS is indicating downscale from zero.	Carry required loads for 30 minutes considering a single failure.
C.	Batt BD I AMPS is indicating upscale from zero.	Carry required loads for 4 hours assuming non-required loads are shed.
D.	Batt BD I AMPS is indicating upscale from zero.	Carry required loads for 30 minutes considering a single failure.

**DISTRACTOR ANALYSIS**

- Incorrect. Plausible, since load indication is exactly opposite, and design basis time is correct.
- Incorrect. Candidate incorrectly believes indication would be downscale.
- CORRECT. Per given reference and design of system.
- Incorrect. Plausible since indication is correct, but design time is incorrect.

Question Number: 6

K/A: W/E11 G2.2.22

Loss of Emergency Coolant Recirc.

Knowledge of limiting conditions for operations and safety limits.

Tier:	1	RO Imp:	RO Exam:	Cognitive Level:	High
Group:	1	SRO Imp: 4.7	SRO Exam: Yes	Source:	NEW

Applicable 10CFR55 Section: 41.5, 43.2

Learning Objective: Given the condition/status of the Emergency Core Cooling system/component and the appropriate sections of Tech Specs, determine if operability requirements are met and what actions, if any, are required. 3-OT-SYS063A, Rev. 10, Objective 30.

References: LCO 3.3.2, Action K, including basis.

**Question:**

With the plant at full power, and during the Shift Turnover for the 1900 shift, the Unit Supervisor is informed of the following:

- 1-LS-63-50A (RWST Low Level) was declared inoperable at 1000 that day.
- It was placed in the configuration required by Technical Specifications at 1400, and is expected to remain inoperable until 2300.
- A required surveillance instruction on 1-LS-63-51A (RWST Low Level) must be performed by 2330 today to prevent being out of frequency due to exceeding the NRC late date.
- The surveillance involves having 1-LS-63-51A in the required configuration for 2 hours.

If the surveillance is performed at the above time, which ONE of the following describes the expected effect on the automatic switchover to containment sump function while 1-LS-63-51A is out of service?

- Functional. Even though two level switches are TRIPPED and are inoperable, the remaining operable level switches are sufficient for switchover to be functional.
- Functional. Even though two level switches are BYPASSED, the remaining level switches are sufficient for switchover to be functional.
- Not functional, because two level switches are TRIPPED and at least three level switches are required for switchover to be functional.
- Not functional, because two level switches are BYPASSED, and at least three level switches are required for switchover to be functional.

**DISTRACTOR ANALYSIS**

- Incorrect. Plausible, since there are other components in the plant that are placed to trip when discovered inoperable. However, candidate fails to recognize that when one of these level switches is inoperable, it is bypassed, not tripped. Further plausibility is added by the conditions given; i.e., there TWO switches affected, and the remaining two are sufficient for actuation capability.
- CORRECT. Per LCO 3.3.2, Action K, one inoperable channel of "Automatic Switchover to Containment Sump" must be bypassed within 6 hours. Another channel may also be bypassed for surveillance testing, leaving only two channels. However, the remaining two channels are sufficient for functionality of actuation.
- Incorrect. Candidate incorrectly believes that these conditions require tripping of the two channels, and uses that incorrect information to conclude that actuation capability is rendered not functional. Plausible, since candidate may believe at least three channels are required to be operable at all times, for Mode 1.
- Incorrect. Candidate correctly recognizes that these conditions require bypassing the two channels. However, candidate fails to realize that this does not disable emergency coolant recirculation actuation capability. Plausible, since some plant equipment requires at least three of four channels to be operable; however, the candidate misapplies that concept for these conditions.

Question Number: 7

K/A: 000059 AA2.03

Accidental Liquid RadWaste Rel.

Ability to determine and interpret the following as they apply to the Accidental Liquid Radwaste Release: Failure modes, their symptoms, and the causes of misleading indications on a radioactive-liquid monitor.

Tier:	1	RO Imp:	RO Exam:	Cognitive Level:	Low
Group:	2	SRO Imp: 3.6	SRO Exam: Yes	Source:	NEW

Applicable 10CFR55 Section: 43.5, 45.13

Learning Objective: 3-OT-SYS077A, Objective 19. Discuss how processed water is released.

References: SOI-77.01, Rev. 0058; ARI 180-187, rev. 30.

---

**Question:**

Given the following:

A planned Cask Decontamination Collector Tank Release is in progress.

Which ONE of the following will require a new release permit to be issued prior to resuming the release of the tank to prevent an accidental release, in accordance with SOI-77.01, Liquid Waste Disposal?

- A. The liquid release is terminated due to a High Radiation signal on the radiation element (RE 0-90-122).
  - B. The release is terminated for 30 minutes to allow the operator to perform other additional tasks.
  - C. The release is terminated due to Loss of Cooling Tower Blowdown for 55 minutes.
  - D. 0-RM-122 instrument malfunction alarm occurs and clears while transferring electrical boards.
- 

**DISTRACTOR ANALYSIS**

- a. CORRECT. Per the reference, this condition requires issuing a new release permit.
  - b. Incorrect. Would be correct if the time were greater than two hours.
  - c. Incorrect. Would be correct if the time were greater than two hours.
  - d. Incorrect. Plausible, since this alarm does isolate the release, but a new release permit is not required.
-

**WRITTEN QUESTION DATA SHEET**

Question Number: 8

K/A: 000068 G2.4.8

Control Room Evac.

Knowledge of how abnormal operating procedures are used in conjunction with EOPs.

Tier:	1	RO Imp:	RO Exam:	Cognitive Level:	High
Group:	2	SRO Imp: 4.5	SRO Exam: Yes	Source:	SQN Bank

Applicable 10CFR55 Section: 43.b (5)

Learning Objective: Describe the conditions for entry into the EOP network. 3-OT-TI-1204, Rev. 1.

References: AOI-30.2, Fire Safe Shutdown, Rev 27; Note at beginning of Section 3.0; TI-12.04, Rev. 7.

**Question:**

Given the following plant conditions:

- Unit 1 was at 100% power when a fire developed in the Main Control Room (MCR) requiring the crew to enter AOI-30.2, FIRE SAFE SHUTDOWN, and evacuate the MCR.
- After tripping the reactor, but prior to leaving the MCR, a spurious Safety Injection occurred.

Which ONE of the following is the hierarchy of the Emergency Operating Procedures (EOP) and AOI-30.2 usage required when the crew establishes control from the Auxiliary Control Room?

- AOI-30.2 usage will be suspended until the Immediate Operator Actions in Emergency Operating Procedure E-0, REACTOR TRIP OR SAFETY INJECTION are verified complete.
- AOI-30.2 usage will be suspended until the safety injection is terminated in accordance with the Emergency Operating Procedures.
- AOI-30.2 will be continued and the Emergency Operating Procedures will be entered to terminate the safety injection with the EOP directed actions having precedence over AOI-30.2 actions.
- AOI-30.2 will be continued with the AOI-30.2 directed actions having precedence over the Emergency Operating Procedures.

**DISTRACTOR ANALYSIS**

- Incorrect. Plausible, since for most plant conditions, post reactor trip, the Emergency Operating Procedures take precedence over most AOIs.
- Incorrect. Plausible, since for most plant conditions, post reactor trip, the Emergency Operating Procedures take precedence over most AOIs.
- Incorrect. Plausible since candidate recognizes the importance of the actions directed by AOI-30.2 for these conditions. However, candidate incorrectly concludes that terminating the Safety Injection takes precedence over AOI-30.2 actions.
- CORRECT. Both AOI-30.2 and TI-12.04 support concurrent performance of the AOI and EOPs during this type of event, with the actions of AOI-30.2 taking precedence over the Emergency Operating Procedures.

**WRITTEN QUESTION DATA SHEET**

Question Number: 9

K/A: W/E13 EA2. 1

Steam Generator Over-pressure

Ability to determine and interpret the following as they apply to the (Steam Generator Overpressure) Facility conditions and selection of appropriate procedures during abnormal and emergency operations.

Tier:	1	RO Imp:	RO Exam:	Cognitive Level:	High
Group:	2	SRO Imp: 3.4	SRO Exam: Yes	Source:	NEW

Applicable 10CFR55 Section: 43.5 / 45.13

Learning Objective: 3-OT-TI1204, Rev. 1, Objective 25: Describe when a Function Restoration Instruction can be exited or transitioned out of.

References: FR-H.2, Steam Generator Overpressure, Rev 5 page 3  
FR-H.3, Steam Generator High Level, Rev 6 page 3

**Question:**

Given the following

- The crew is performing FR-H.2, Steam Generator Overpressure, for an overpressure condition on SG #2.
- When the step is addressed to check affected S/Gs NR level it is noted that the SG #2 level is 94% narrow range.

Which ONE of the following identifies the correct crew actions as a result of the SG level being 94%?

- A. Continue in FR-H.2, but do not initiate any steam release until TSC evaluation is complete
- B. Continue in FR-H.2, steam release may continue unless NR level exceeds 100%.
- C. Transition to FR-H.3, Steam Generator High Level, but do not initiate any steam release until TSC evaluation is complete
- D. Transition to FR-H.3, Steam Generator High Level, steam release may continue unless NR level exceeds 100%.

**DISTRACTOR ANALYSIS**

- a. Incorrect. The transition to FR-H.2 is required however candidate may correctly conclude that FR-H.3 is lower in priority on the FR-H status tree and not recall the transition. Plausible for the reason stated and because the candidate may know that with level 94% then steam release is restricted.
- b. Incorrect. The transition to FR-H.2 is required however candidate may correctly conclude that FR-H.3 is lower in priority on the FR-H status tree and not recall the transition. Plausible for the reason stated and because the candidate may know that with high level restricts steam release but not recall the value.
- c. CORRECT. The RNO for the step directs the transition to FR-H.3 and FR-H.3 restricts the release of steam until a TSC evaluation is complete.
- d. Incorrect. The RNO for the step directs the transition to FR-H.3 and the release of steam is restricted until a TSC evaluation is complete if the level exceeds 93%, therefore with the level at 100%, the release would be restricted. Plausible because FR-H.2 could be entered from the status trees at a lower level and the steam release would not be restricted.

**WRITTEN QUESTION DATA SHEET**

Question Number: 10

K/A: W/E08 G2.4.18

RCS Overcooling - PTS

Knowledge of the specific bases for EOPs.

Tier:	1	RO Imp:	RO Exam:	Cognitive Level:	High
Group:	2	SRO Imp: 4.0	SRO Exam: Yes	Source:	NEW

Applicable 10CFR55 Section: 41.10 / 43.1 / 45.13

Learning Objective: None available.

References: FR-P.1, Pressurized Thermal Shock, Rev 14.

**Question:**

Given the following:

- Unit 1 experienced a Reactor Trip and Safety Injection.
- The crew was performing E-1, Loss of Reactor or Secondary Coolant, when a transition to FR-Z.1, High Containment Pressure, due to an Orange Path was required.
- While FR-Z.1 was being performed, the crew transitioned to FR-P.1, Pressurized Thermal Shock, due to a RED path.

During performance of FR-P.1, the crew performs the following step:

<b>CHECK</b> RCS pressure greater than 150 psig	<b>IF</b> RHR pump injecting greater than 1350 gpm to RCS, <b>THEN</b> <b>RETURN TO</b> instruction in effect.
--	---

The crew determines that RCS pressure is 120 psig and both RHR pumps are delivering 1800 gpm flow to the RCS. As this step is completed, the STA reports the containment pressure has dropped and the containment status tree is GREEN and that no other RED or ORANGE paths exist.

Which ONE of the following identifies the basis of the FR-P.1 step above and the procedure the crew will implement as the transition is made from FR-P.1?

- Prevent performance of FR-P.1 actions since pressurized thermal shock is not a serious concern for a large-break LOCA;  
Transition is made back to E-1.
- Prevent performance of FR-P.1 actions since pressurized thermal shock is not a serious concern for a large-break LOCA;  
Transition is made back to FR-Z.1.
- Prevent performance of FR-P.1 actions since the procedure has potential to prematurely reduce the ECCS flow being used for core cooling;  
Transition is made back to E-1.
- Prevent performance of FR-P.1 actions since the procedure has potential to prematurely reduce the ECCS flow being used for core cooling;  
Transition is made back to FR-Z.1.

**DISTRACTOR ANALYSIS**

- Incorrect. Plausible, since basis is correct, but transition path is incorrect.
- CORRECT. Per given reference.
- Incorrect. Plausible, due to various steps in procedure which candidate may incorrectly apply.
- Incorrect. Plausible, since transition path is correct.

**Question Number:** 11

**K/A:** 003 A2.05

Reactor Coolant Pump

Ability to (a) predict the impacts of the following malfunctions or operations on the RCPS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Effects of VCT pressure on RCP seal leakoff flows.

**Tier:** 2    **RO Imp:**    **RO Exam:**    **Cognitive Level:** High  
**Group:** 1    **SRO Imp:** 2.8    **SRO Exam:** Yes    **Source:** NEW

**Applicable 10CFR55 Section:** 41.5 / 43.5/ 45.3 / 45/13

**Learning Objective:** 3-OT-EOP0000, Objective 15 Explain the purpose for and basis of each step in E-0, ES-0.0, ES-0.1, ES-0.2, ES-0.3, and ES-0.4.

**References:** ES-0.2, Natural Circulation Cooldown, Rev 20; SOI-68.02, Reactor Coolant Pumps, Rev 33.

**Question:**

Given the following:

- Unit 1 was in Mode2 with startup in progress when a loss of off-site power occurred.
- The decision was made to place the plant in MODE 5.
- The crew implemented ES-0.2, Natural Circulation Cooldown and started cooling the plant down.
- Four hours after the cooldown was started both trains of offsite power were restored to the plant.
- The crew determines all criteria to restart the RCPs are met except for the #1 seal leakoff flow on RCP #2 which is lower than the normal operating band.

Which ONE of the following identifies a change that causes an increase in the #2 RCP seal leakoff flow and the actions to be taken and procedure to be used if the seal leakoff flow cannot be established within the normal operating band?

- A. Lower PRT pressure;  
Leave RCPs off until RCP #2 can be started. Continue in ES-0.2.
- B. Lower PRT pressure;  
Start the other 3 RCPs and transition from ES-0.2 to GO-6, Unit Shutdown From Hot Standby To Cold Shutdown.
- C. Lower VCT pressure;  
Leave RCPs off until RCP #2 can be started. Continue in ES-0.2.
- D. Lower VCT pressure;  
Start the other 3 RCPs and transition from ES-0.2 to GO-6, Unit Shutdown From Hot Standby To Cold Shutdown.

**DISTRACTOR ANALYSIS**

- a. Incorrect. Lowering the PRT pressure affects the #1 seal leakoff flow, but only if the leakoff flow path, which is routed to the VCT, is isolated. Plausible because the candidate could conclude the PRT affects the leakoff, and, with RCP #2 ability to provide spray flow, conclude that RCP#2 needs to be started before terminating the natural circ cooldown.
- b. Incorrect. Lowering the PRT pressure affects the #1 seal leakoff flow, but only if the leakoff flow path, which is routed to the VCT, is isolated. Starting the other RCPs pumps is correct. Plausible because the other 3 pumps would be started and transition made to GO-6 and the candidate could conclude the PRT affects the leakoff.
- c. Incorrect. Lowering the VCT pressure raises the #2 RCP #1 seal leakoff flow is correct, however the other pumps would be started if RCP #2 could not be started. Plausible because lowering the VCT pressure is correct and with RCP #2 ability to provide spray flow conclude that RCP #2 needs to be started before terminating the natural circ cooldown.
- d. CORRECT. Lowering the VCT pressure raises the #2 RCP #1 seal leakoff flow, and if RCP #2 could not be started then, the other 3 RCPs would be started and a transition to GO-6 would be made.

Question Number: 12

K/A: 012 G2.2.44

Reactor Protection

Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions.

Tier: 2 RO Imp: RO Exam: Cognitive Level: High  
 Group: 1 SRO Imp: 4.4 SRO Exam: Yes Source: NEW

Applicable 10CFR55 Section: 41.5 / 43.5 / 45.12

Learning Objective: None available.

References: AOI-21.01, Loss of 125v DC Vital Battery Bd I, Rev 21; 45W600-99-1 R6.

Question:

Given the following:

- Unit 1 is at 100% power.
- 1-SI-99-10B, 31 Day Functional Test of SSPS Train B and Reactor Trip Breaker B, is in progress with Reactor Trip bypass breaker (BYB) closed.
- Appendix F, Reactor Breaker Replacement, of 1-SI-99-10-B is in progress with Reactor Trip Breaker B (RTB) racked out.
- A transient occurs, resulting in the MCR operator MANUALLY tripping the reactor due to FW regulating valves failing closed.

When the plant is stabilized post trip, the following conditions are observed:

- All Feedwater regulating valves automatically closed.
- All MSIVs automatically closed.
- All 4 Diesel Generators running but NOT connected to the shutdown boards.
- All Reactor Trip Breaker and Reactor Trip Bypass breaker indicating lights on 1-M-4 are DARK except for the GREEN light on the Reactor Trip Bypass Breaker (BYB) which is LIT.

Which ONE of the following identifies both the position of Reactor Trip Breaker A (RTA) and the direction the SRO will give the crew to recover from the condition that caused the transient?

	<b>RTA Position</b>	<b>SRO Direction to Crew</b>
A.	Closed	Restore power using AOI-21.01, Loss of 125v DC Vital Battery Bd I.
B.	Closed	Restore power using AOI-21.01, Loss of 125v DC Vital Battery Bd II.
C.	Tripped	Restore power using AOI-21.01, Loss of 125v DC Vital Battery Bd I.
D.	Tripped	Restore power using AOI-21.01, Loss of 125v DC Vital Battery Bd II.

**DISTRACTOR ANALYSIS**

- Incorrect. Plausible, since candidate incorrectly applies SRO direction to believe that RTA position would be closed.
- Incorrect. Candidate incorrectly recalls appropriate direction to crew.
- CORRECT. Per given reference.
- Incorrect. Plausible, since RTA position is correct, however, crew direction is incorrect.

Question Number: 13

K/A: 061 A2.09

Auxiliary/Emergency Feedwater

Ability to (a) predict the impacts of the following malfunctions or operations on the AFW; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Total loss of feedwater.

Tier: 2 RO Imp: RO Exam: Cognitive Level: High  
 Group: 1 SRO Imp: TBD SRO Exam: Yes Source: NEW

Applicable 10CFR55 Section: 41.5, 43.5

Learning Objective: 3-OT-SYS003B Auxiliary Feedwater System, Objective 26. Identify the steps to gain local control of the Turbine-Driven Auxiliary Feedwater pump and SG levels.

References: FRH.1, rev. 17.

Question:

Given the following

- Following a reactor trip the crew experienced a total loss of feedwater.
- The condition caused the crew to initiate RCS bleed and feed.
- Subsequently the TDAFW pump was restored to service and the crew is ready to establish AFW flow to the selected steam generator.
- Selected SG conditions are:
  - Wide Range level 4%.
  - RCS loop hot leg temperature 558°F.
  - Core exit thermocouple temperatures are rising

In accordance with FR-H.1, Loss of Secondary Heat Sink, the SRO will direct that feedwater flow be re-established at ...

- A. the minimum detectable flow gpm.
- B. less than 100 gpm until WR level >15%.
- C. a rate that causes wide range level to rise and RCS hot leg to drop.
- D. a maximum rate.

#### DISTRACTOR ANALYSIS

- a. Incorrect. Plausible, since the feedwater flow would be correct for the conditions where a steam generator was being fed to prevent dryout.
- b. Incorrect. Plausible, since the feedwater flow would be correct for the condition which meets the "hot, dry" conditions and core exit thermocouples are not rising.
- c. Incorrect. Plausible, since the feedwater flow would be correct for the condition where Core Exit thermocouples were stable or lowering.
- d. CORRECT. The maximum flow rate is only used if the steam generator meets the wide range level is <15% and RCS temperature is >550°F and core exit thermocouples are rising.

**WRITTEN QUESTION DATA SHEET**

Question Number: 14

K/A: 064 G2.2.37

Emergency Diesel Generator

Ability to determine operability and/or availability of safety related equipment.

Tier: 2 RO Imp: RO Exam: Cognitive Level: High  
 Group: 1 SRO Imp: 4.6 SRO Exam: Yes Source: NEW

Applicable 10CFR55 Section: 41.7, 43.5

Learning Objective: 3-OT-SYS082A, Obj. 13: State the Technical Specification requirements associated with AC Sources &amp; DG Support Systems.

References: LCO 3.8.4, DC Sources Operating, including Basis. LCO 3.8.6, Table 3.8.6-1, incl. Basis.

**Question:**

Given the following conditions:

- The plant is at full power.
- During the performance of surveillance 0-SI-215-21-A, DIESEL GENERATOR 1A-A BATTERY QUARTERLY INSPECTION, it is reported that the Float Voltage values for three (3) connected cells are as follows:
  - Cell 17 = 2.09 v
  - Cell 34 = 2.10 v
  - Cell 39 = 2.12 v
- ALL other connected cells have Float Voltage values greater than 2.13 v.
- ALL other parameters measured during the above surveillance are normal.

Which ONE of the following describes the status of D/G 1A-A battery AND of the D/G 1A-A?

**REFERENCE PROVIDED**

<u>Status of Battery</u>	<u>Status of D/G 1A-A</u>
A. Battery is degraded but it can be considered operable for 31 days.	Operable
B. Battery must be considered inoperable even though it has sufficient capacity to perform its intended function.	Operable
C. Battery must be considered inoperable because it does NOT have sufficient capacity to perform its intended function.	Available but NOT Operable
D. Battery must be considered inoperable because it does NOT have sufficient capacity to perform its intended function.	NOT Available or Operable

**DISTRACTOR ANALYSIS**

- a. Incorrect. Plausible, since candidate misapplies operability criteria, and improperly interprets Table 3.8.6-1, by concluding that several cell parameters out of specification is enough to declare the battery inoperable, and that the inoperable battery renders the D/G inoperable.
- b. Incorrect. Plausible, since the candidate correctly recognizes that the battery is degraded, but misapplies the effect on D/G, since per the Tech Spec basis, the battery is still capable of performing its design function for a prescribed period of time, and therefore does not degraded functionality or operability of the D/G .
- c. Incorrect. Candidate recognizes that the D/G is NOT rendered inoperable by a battery with out of specification parameters, adding to the plausibility of this distractor. However, candidate misinterprets the given battery cell parameters and incorrectly uses Table 3.8.6-1 for a Category B condition, to conclude that the battery is therefore inoperable. Per the Tech Spec basis a Category B condition means the battery is "degraded", but still operable.

---

**WRITTEN QUESTION DATA SHEET**

---

- d. CORRECT. The three cells with float voltage less than 2.13 v constitute Condition B, per Tech Spec Table 3.8.6-1, which the candidate will determine by using the table. The candidate must then recognize (from knowledge of the Tech Spec basis) that a Condition B does NOT render the battery inoperable, but it is degraded. With that conclusion, it is one more step to understand the effect of a degraded battery on the D/G itself. Per Tech Spec 3.8.4, DC Sources Operating, the D/G is considered fully operable until Tech Spec 3.8.4, Condition D is entered, meaning that the battery has been inoperable beyond the required Completion Time.

**Provide LCO 3.8.6.**

---

---

**WRITTEN QUESTION DATA SHEET****Question Number:** 15**K/A:** 076 A2.01

Service Water

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

<b>Tier:</b>	2	<b>RO Imp:</b>		<b>RO Exam:</b>		<b>Cognitive Level:</b>	High
<b>Group:</b>	1	<b>SRO Imp:</b>	3.7	<b>SRO Exam:</b>	Yes	<b>Source:</b>	NEW

**Applicable 10CFR55 Section:** 41.5, 43.5**Learning Objective:** None available.

**References:** TI-124, Equipment To Plant Risk Matrix, Rev 14.  
AOI-13, Loss of Essential Raw Cooling Water, Rev 35.

**Question:**

Given the following conditions:

- Unit 1 is operating at 100% power.
- ERCW strainer 2B-B ruptures and isolation of the strainer is required.

Which ONE of the following identifies the PSA-risk status the plant would be in due to the strainer isolation and the action directed by AOI-13, Loss of Essential Raw Cooling Water, to mitigate the isolation of the 2B strainer and header?

	<u>PSA-risk</u>	<u>AOI-13 actions</u>
A.	ORANGE	Realign cooling water to the B train diesel generators.
B.	ORANGE	Crosstie the 2B header with the 1A header until strainer is repaired.
C.	RED	Realign cooling water to the B train diesel generators.
D.	RED	Crosstie the 2B header with the 1A header until strainer is repaired.

**DISTRACTOR ANALYSIS**

- Incorrect. Plausible, since the action listed involves realignment of cooling water.
- Incorrect. Plausible, since crosstie is done for various other situations, but not this one.
- Incorrect. Plausible, since PSA risk is correct, but action is incorrect.
- CORRECT. Per given reference.

**WRITTEN QUESTION DATA SHEET**

Question Number: 16

K/A: 011 G2.1.32

Pressurizer Level Control

Ability to explain and apply system limits and precautions.

Tier:	2	RO Imp:	RO Exam:	Cognitive Level:	High
Group:	2	SRO Imp: 4.0	SRO Exam: Yes	Source:	NEW
Applicable 10CFR55 Section:	41.10, 43.2				
Learning Objective:	None available				
References:	LCO 3.4.9				

**Question:**

Given the following plant conditions:

- During a startup, the plant is in Mode 4.
- GO-1, Appendix C, Mode 4-to-Mode-3 Review and Approval, has been completed up to the last step, Operations Superintendent Hold Point, for granting approval to enter Mode 3.
- During scaffolding removal activities, a worker contacts the air line to 1-FCV-62-93, Charging Flow Control Valve, resulting in pulling the air line loose from the valve operator, such that the air system remains intact, due to crimping of the line on the air supply side of the break.

Which LCO 3.4.9, Pressurizer, Action Statement is of concern, and what procedures will the Unit Supervisor use to preclude the need to enter the action statement?

- A. Condition A, "Pressurizer water level not within limit". The Unit Supervisor will use AOI-10, Loss of Control Air to direct actions to prevent Pressurizer level from exceeding 92%.
- B. Condition C, "Required action and associated completion time of Condition B not met". The Unit Supervisor will use AOI-10, Loss of Control Air, to direct actions to prevent lockout of all Pressurizer heaters when Pressurizer level lowers to less than 17%.
- C. Condition C, "Required action and associated completion time of Condition B not met". The Unit Supervisor will use SOI-62.01, CVCS-Charging and Letdown, to direct actions to prevent lockout of all Pressurizer heaters when Pressurizer level lowers to less than 17%.
- D. Condition A, "Pressurizer water level not within limit". The Unit Supervisor will use SOI-62.01, CVCS-Charging and Letdown, to direct actions to prevent Pressurizer level from exceeding 92%.

**DISTRACTOR ANALYSIS**

- a. Incorrect. Plausible, since Condition A may be entered if a failed open charging flow control valve condition is not mitigated.
- b. Incorrect. Plausible since it contains the correct procedure. Candidate incorrectly concludes that when 1-FCV-62-93, Charging Flow Control Valve, loses air it fails CLOSED. Using this incorrect conclusion, it is logical to see why a candidate would then conclude that Pressurizer level will lower. Candidate correctly recalls that there is a lower limit for Pressurizer level of 17%, and applies it to arrive at the concern for losing all banks of Pressurizer heaters.
- c. Incorrect. Plausible since it contains a procedure with a title similar to the conditions given in the stem. Candidate incorrectly concludes that when 1-FCV-62-93, Charging Flow Control Valve, loses air it fails CLOSED. Using this incorrect conclusion, it is logical to see why a candidate would then conclude that Pressurizer level will lower. Candidate correctly recalls that there is a lower limit for Pressurizer level of 17%, and applies it to arrive at the concern for losing all banks of Pressurizer heaters.
- d. CORRECT. When 1-FCV-62-93 loses operating air, it fails OPEN, resulting in significant more charging flow. If this is allowed to continue, Pressurizer level will exceed 92%, which exceeds the specification. SOI-62.01 contains detailed action steps for isolating and bypassing 1-FCV-62-93, which will restore charging flow control to the control room, even with the normal flow control valve failed open.

Question Number: 17

K/A: 075 A2.03

Circulating Water

Ability to (a) predict the impacts of the following malfunctions or operations on the circulating water system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Safety features and relationship between condenser vacuum, turbine trip, and steam dump.

Tier: 2 RO Imp: RO Exam: Cognitive Level: High  
 Group: 2 SRO Imp: 2.7 SRO Exam: Yes Source: NEW

Applicable 10CFR55 Section: 41.5, 43.5

Learning Objective: 3-OT-SYS027A, Objective 11: Describe the main condenser. 3-OT-AOI1700, Objective 1: Demonstrate knowledge of the Purpose/Goal of AOI, Rev. 9.

References: AOI-11, Loss of Condenser Vacuum, Rev. 27.

**Question:**

Given the following:

- Unit 1 was operating in Mode 1 at 14% reactor power with the generator connected to the grid and the A MFP in service.
- The Main Control Room crew was preparing to transfer station electrical service to the USSTs when a loss of condenser vacuum occurred, resulting in an automatic turbine trip.
- Condenser vacuum is at 4" Hg and continuing to lower.

Which ONE of the following identifies both how the circulating water box delta T will be affected and which procedure will be in effect when the plant is stabilized?

(Assume all required operator actions are performed and equipment responds correctly.)

	<u>Water Box delta T</u>	<u>Procedure in effect</u>
A.	Rises	ES-0.1, Reactor Trip Response
B.	Rises	AOI-17, Turbine Trip
C.	Lowers	AOI-17, Turbine Trip
D.	Lowers	ES-0.1, Reactor Trip Response

**DISTRACTOR ANALYSIS**

- Incorrect. Steam dumps are prevented from opening due to loss of vacuum. Therefore, no steam is entering the condenser. Plausible if candidate fails to recall the condenser vacuum interlock with steam dump operation. Candidate fails to realize that for the given power level, no reactor trip occurs, and believes that ES-0.1 will be used.
- Incorrect. Plausible since candidate recognizes the correct procedure which will be used. However, candidate fails to recognize conditions which prevent operation of the steam dumps.
- CORRECT. When condenser vacuum drops to less than 6.5", steam dump operation is blocked. Therefore, no steam is entering the condenser, resulting in lower circulating water temperature, and a lower delta T across the condenser waterbox. AOI-17 will be used once the plant is stabilized.
- Incorrect. Plausible because the waterbox delta T response is correct. However, candidate fails to recognize that the given power level will not require a reactor trip, and does not require use of ES-0.1.

**WRITTEN QUESTION DATA SHEET**

Question Number: 18

K/A: 086 G2.4.9

Fire Protection

Knowledge of low power/shutdown implications in accident (e.g., loss of coolant accident or loss of residual heat removal) mitigation strategies.

Tier:	2	RO Imp:	RO Exam:	Cognitive Level:	High
Group:	2	SRO Imp:	4.2	SRO Exam:	Yes
				Source:	NEW

Applicable 10CFR55 Section: 45.5

Learning Objective: 3-OT-AOI-700, Rev. 10, Explain the 2 modes of maintaining the core cool & stable during flood mode operation.

References: AOI-7.01, Rev. 16.

**Question:**

Given the following:

- At 0100 Unit 1 entered MODE 3 during shutdown for a refueling outage.
- At 0200 AOI-7.01, Maximum Probable Flood, was implemented due to extremely heavy rainfall in the upstream watershed.
- At 1100 The unit is in Mode 4 on RHR with cooldown in progress with the RCS pressure 320 psig and temperature 220 degrees F.
- At 1200 River System Operations (RSO) confirms the flood level at the plant is predicted to crest at El. 730' within the next 36 hours.

Which ONE of the following identifies both the Flood Stage Preparation level(s) that is/are required to be completed, and how the cooling of the core will be maintained in accordance with AOI-7 after the preparations are complete?

- A. Only the procedure for Stage 1 Preparations is required to be completed.  
Core cooling will be maintained by the steam generators with water being supplied by high pressure fire protection with the RHR system removed from service.
- B. Only the procedure for Stage 1 Preparations is required to be completed.  
Core cooling will be maintained by the Spent Fuel Pool cooling system crosstied with the RHR system.
- C. Both Stage 1 and Stage II Preparations procedures are required to be completed.  
Core cooling will be maintained by the steam generators with water being supplied by high pressure fire protection with the RHR system removed from service.
- D. Both Stage 1 and Stage II Preparations procedures are required to be completed.  
Core cooling will be maintained by the Spent Fuel Pool cooling system crosstied with the RHR system.

**DISTRACTOR ANALYSIS**

- a. Incorrect. Plausible, since method of maintaining core cooling is correct.
- b. Incorrect. Plausible, since Stage 1 preparation is part of the correct action.
- c. CORRECT. Per given reference.
- d. Incorrect. Plausible, since the first part is correct.

---

**WRITTEN QUESTION DATA SHEET**

---

Question Number: 19

K/A: G2.1.23

Ability to perform specific system and integrated plant procedures during all modes of plant operation.

Tier:	3	RO Imp:	RO Exam:	Cognitive Level:	Low
Group:		SRO Imp: 4.4	SRO Exam: Yes	Source:	NEW

Applicable 10CFR55 Section: 41.10, 43.5

Learning Objective: 3-OT-SYS079A, Rev. 6, Objective 4: Identify the maximum quantity of fuel that shall be out of approved storage locations during fuel handling operations.

References: FHI-7, Fuel Handling and Movement, Rev 0034

---

---

**Question:**

Which ONE of the following satisfies the requirement of FHI-7 for the maximum number of fuel assemblies allowed outside of approved storage?

- A. Two unirradiated assemblies within the fuel-handling area.
  - B. Two irradiated assemblies within the spent fuel storage pool boundary.
  - C. One assembly in the SFP upender, two assemblies in the RCA fixture and one assembly in the refueling machine mast over its proper location in the reactor vessel.
  - D. One assembly in the SFP upender, two assemblies in the RCA fixture and one assembly in the refueling machine mast over the reactor side upender.
- 
- 

**DISTRACTOR ANALYSIS**

- a. Incorrect. Candidate may incorrectly believe this is correct since it mentions less than three assemblies, which is part of the procedure limit, but for the incorrect area.
  - b. Incorrect. Plausible, because it deals with less than three assemblies, though incorrectly applied for the wrong area.
  - c. CORRECT. Per FHI-7, the assembly in the mast and over its proper location in the reactor vessel is allowed beyond the three allowed within the refueling canal; i.e., this answer specifies that three assemblies are within the refueling canal, and the one in the mast is another part of the FHI-7 allowance.
  - d. Incorrect. Plausible, since this distractor is similar to the correct answer in several respects, but it is clearly incorrect since an assembly in the mast, but still over the upender exceeds the three allowed in the refueling canal area.
- 
-

**WRITTEN QUESTION DATA SHEET****Question Number:** 20**K/A:** G2.1.34

Knowledge of primary and secondary plant chemistry limits.

<b>Tier:</b>	<b>3</b>	<b>RO Imp:</b>	<b>RO Exam:</b>	<b>Cognitive Level:</b>	<b>Low</b>
<b>Group:</b>		<b>SRO Imp: 3.5</b>	<b>SRO Exam: Yes</b>	<b>Source:</b>	<b>NEW</b>

**Applicable 10CFR55 Section:** 41.10, 43.5**Learning Objective:** None available**References:** CM-3.01, "System Chemistry Specifications", Appendix A, pp. 1, 2, 25, and 26; rev 72.  
Tech Requirement 3.4.4, Chemistry.**Question:**

With the plant at full power, the Chemistry Lab has just informed the Unit Supervisor that the RCS chloride level is 1650 ppb and that the SG chloride level is 200 ppb. The source of any impurity ingress has NOT yet been identified.

Based on the reported values, (1) what is the MOST restrictive Action Level that must be entered and (2) the impact on plant operations caused by the Action Level entry?

- |  | (1) | (2)  |
|--|-----|--|
| A. Action Level 3 for RCS chloride level |     | Initiate actions to take the reactor sub-critical as quickly as practicable in a controlled manner and reduce RCS temperature to < 250° F. |
| B. Action Level 3 for SG chloride level  |     | Initiate actions to take the reactor sub-critical as quickly as practicable in a controlled manner and reduce RCS temperature to < 250° F. |
| C. Action Level 2 for RCS Chloride level |     | Restore parameter to below Action Level 1 within 24 hours or reduce reactor power to less than 5%.   |
| D. Action Level 2 for SG Chloride level  |     | Restore parameter to below Action Level 1 within 24 hours or reduce reactor power to less than 5%.   |

**DISTRACTOR ANALYSIS**

- CORRECT. Action Level 3, which is the most restrictive (requiring plant shutdown), applies due to RCS chloride exceeding 1500 ppb.
- Incorrect. Candidate incorrectly believes that Action Level 3 applies for SG chloride levels, when it is actually Action Level 2 (SG chloride exceeds 50 ppb, but does not exceed 250 ppb. Plausible because the impact on plant operations of a chemistry parameter being out-of-specification is correct.
- Incorrect. Candidate fails to recognize Action Level 3 conditions for RCS chloride. However, the distractor has plausibility because there is similar impact on plant operations if there were Action Level 2 conditions for RCS chloride.
- Incorrect. Plausible, since the Action Level for the given SG chloride value is correct. Further plausibility is added since there is a time value given to restore the parameter. However, it differs from the correct time (within 100 hours) by a factor of 4. The requirement to be at less than 5% power is incorrect.

---

**WRITTEN QUESTION DATA SHEET**

---

**Question Number:** 21**K/A:** G2.2.40

Ability to apply Technical Specifications for a system.

<b>Tier:</b>	3	<b>RO Imp:</b>	RO Exam:	<b>Cognitive Level:</b>	High
<b>Group:</b>	SRO Imp: 4.7	<b>SRO Exam:</b>	Yes	<b>Source:</b>	NEW

**Applicable 10CFR55 Section:** 41.10/43.2/43.5/45.3**Learning Objective:** None available.**References:** TS 3.7.5.

---

---

**Question:**

Given the following:

- Unit 1 is operating at 50% power.
- The Turbine Driven AFW pump was taken OOS 12 hours ago for bearing replacement.
- A fire occurred 30 minutes ago which damaged both Motor Driven AFW pump motors to the point where neither motor will operate.
- No other plant damage occurred in the fire.

Which ONE of the following actions is required?

- A. Immediately initiate action to restore one AFW train to operable status.
  - B. Restore 2 AFW trains to service within 1 hour.
  - C. Restore at least 1 AFW train to service within 1 hour.
  - D. Enter LCO 3.0.3.
- 
- 

**DISTRACTOR ANALYSIS**

- a. CORRECT. Per given reference.
  - b. Incorrect. Candidate incorrectly applies TS 3.7.5 for given conditions.
  - c. Incorrect. Plausible, since candidate believes that one train of AFW is all that is required.
  - d. Incorrect. Candidate incorrectly applies the requirements of LCO 3.0.3.
- 
-

Question Number: 22

K/A: G2.3.6

Ability to approve release permits.

Tier:	3	RO Imp:	RO Exam:	Cognitive Level:	Low
Group:	SRO Imp: 3.8	SRO Exam:	Yes	Source:	NEW

Applicable 10CFR55 Section: 41.13 / 43.4 / 45.10

Learning Objective: None available.

References: SOI-77.02, Waste Gas Disposal System, Rev 0034

**Question:**

Which ONE of the following identifies BOTH the minimum decay time required to allow the contents of a Gas Decay tank to decay prior to release and who can waive the minimum time in accordance with SOI-77.02, Waste Gas Disposal system?

	<u>Decay Time Required</u>	<u>Who Can Waive</u>
A.	60 days	Chemistry Duty Manager
B.	60 days	Radiation Protection Manager
C.	8 days	Chemistry Duty Manager
D.	8 days	Radiation Protection Manager

**DISTRACTOR ANALYSIS**

- CORRECT. The procedure requires a 60 day decay time and does provide for waiving of the time by the Chemistry Duty Manager.
- Incorrect. The decay time required is time is 60 days but the Radiation Protection Manager is not the position that can waive the requirement if earlier release is required. Plausible because the required time is for radioactive decay which could be addressed by RadCon.
- Incorrect. The decay time required is 60 days, not 8 days, but the waiving of the requirement by the Chemistry Duty Manager is allowed by the procedure. Plausible because 8 days is identified in the ODCM for Gaseous Effluents as being the half life of certain radionuclides that set dose rate limits at and beyond the Unrestricted Area Boundary.
- Incorrect. The decay time required is 60 days, not 8 days and the waiving of the requirement by the Radiation Protection Manager is not allowed by the procedure. Plausible because 8 days is identified in the ODCM for Gaseous Effluents as being the half life of certain radionuclides that set dose rate limits at and beyond the Unrestricted Area Boundary and because the required time is for radioactive decay which could be addressed by RadCon.

**WRITTEN QUESTION DATA SHEET**

Question Number: 23

K/A: G2.3.15

Knowledge of radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.

Tier:	3	RO Imp:	RO Exam:	Cognitive Level:	High
Group:		SRO Imp: 3.1	SRO Exam: Yes	Source:	NEW

Applicable 10CFR55 Section: 41.12, 43.4

**Learning Objective:** 3-OT-SYS090A, Rev. 13, Objective 8: Regarding Technical Specifications and Technical Requirements for this system: Explain the Limiting Conditions for Operation, Applicability, and Bases.

**References:** SOI-90.04, Section 3.0.B, and Section 5.1.[3], Rev. 6.  
LCO 3.3.8, Table 3.3.8-1, including Basis.

**Question:**

Given the following plant conditions:

- Unit 1 is in Mode 4 with preparations being made for fuel moves.
- As part of performing the Channel Operational Test (COT) for 0-RM-90-102, Spent Fuel Pool Pit Area Monitor, a source check is to be performed.

What is the effect of performing the source check portion of this test, and what is the SRO's responsibility for Tech Spec/LCO Tracking Sheet entry?

- This will result in an automatic actuation of the associated train of ABGTS. The SRO will make an entry on the LCO Tracking Sheet that one train of ABGTS is inoperable.
- Since RM-90-102 output will be blocked for the source check, the SRO will make an entry on the LCO Tracking Sheet that one train of ABGTS is inoperable.
- Since RM-90-102 output will be blocked for the source check, the SRO will make an entry on the LCO Tracking Sheet that RM-90-102 is inoperable.
- This will result in an automatic actuation of the associated train of ABGTS. The SRO will make an entry on the LCO Tracking Sheet that RM-90-102 is inoperable.

**DISTRACTOR ANALYSIS**

- Incorrect. Both parts are incorrect, but plausible, because of the close link between ABGTS (Auxiliary Building Gas Treatment System) operation and RM-90-102 (causes actuation of ABGTS). However, candidate incorrectly believes that the COT causes an automatic actuation of ABGTS.
- Incorrect. Candidate correctly understands that the COT requires blocking of the output of RM-90-102, which prevents it from actuating ABGTS, and concludes therefore, that the associated train of ABGTS is inoperable. This adds to the plausibility of this distractor, but it is incorrect, since a different LCO (LCO 3.7.12) governs the operability of the ABGTS train itself.
- CORRECT. This test requires blocking of the output of RM-90-102, which prevents it from auto actuating the associated train of ABGTS. This is done on purpose, to prevent inadvertent/undesired actuation of ABGTS. Further, this blocking renders the RM-90-102 inoperable.
- Incorrect. Candidate correctly concludes that this test renders RM-90-102 inoperable, but for the wrong reason. It is plausible, since there are other components in the plant, that if running, or actuated, are considered inoperable. However, candidate incorrectly believes that this test causes an auto actuation of the associated train of ABGTS.

**WRITTEN QUESTION DATA SHEET**

Question Number: 24

K/A: G2.4.23

Knowledge of the bases for prioritizing emergency procedure implementation during emergency operations.

Tier:	3	RO Imp:	RO Exam:	Cognitive Level:	Low
Group:		SRO Imp: 4.4	SRO Exam: Yes	Source:	Bank

Applicable 10CFR55 Section: 41.10, 43.5, 45.13

Learning Objective: 3-OT-ECA0000, Objective 08. Given a set of plant conditions, use ECA-0.0, ECA-0.1, and ECA-0.2 to correctly diagnose and implement: Action Steps, RNOs, Notes and Cautions.

References: ECA-0.0, Loss of Shutdown Power, Rev 19

Question:

Given the following

- Unit 1 experiences a loss of offsite power and both 1A-A and 1B-B diesel generators fail to start.
- 2A-A and 2B-B diesel generator start and restore power to the respective shutdown boards
- Following the manual trip of the reactor, the TD AFW pump overspeeds and trips.
- All steam generator levels are at 32% narrow range and dropping.
- Containment pressure is +2.9 psig and rising

Which ONE of the following describes the procedure flowpath the operating crew will implement and the basis for the implementation path for the above conditions?

- ECA-0.0, Loss of Shutdown Power, and remain in ECA-0.0 because the stated conditions have not reached a RED path for FR-H.1, Loss of Secondary Heat Sink.
- ECA-0.0, Loss of Shutdown Power, and remain in ECA-0.0 because Functional Restoration Guidelines should not be implemented with the stated conditions.
- E-0, Reactor Trip or Safety Injection, and remain in E-0 because two (2) Shutdown Boards have power restored and the stated conditions have not reached a RED path for FR-H.1, Loss of Secondary Heat Sink.
- E-0, Reactor Trip or Safety Injection, and then transition to FR-H.1, Loss of Secondary Heat Sink, because two (2) Shutdown Boards have power restored and the stated conditions have reached a RED path for FR-H.1.

**DISTRACTOR ANALYSIS**

- Incorrect. ECA-0.0 is the procedure to be entered because there is no power on the 1A-A and 1B-B shutdown boards, but the reason is not because no RED path exists (a RED path to FR-H.1 does exist.) Plausible because the procedure path is correct and the candidate may conclude a RED path does not exist if the adverse containment pressure is not addressed.
- CORRECT. ECA-0.0 is the procedure to be entered because there is no power on the 1A-A and 1B-B shutdown boards and rules of usage state the Functional Restoration Guidelines are not to be implemented while in ECA-0.0 because the FRGs are written assuming power is available
- Incorrect. E-0 is not the procedure to be entered. ECA-0.0 is the procedure to be entered because there is no power on the 1A-A and 1B-B shutdown boards and also a RED path does exist to FR-H.1. Plausible because the candidate may misapply the Unit 2 shutdown boards being energized and not requiring entry into ECA-0.0 and may conclude a RED path does not exist if the adverse containment pressure is not addressed.
- Incorrect. E-0 is not the procedure to be entered, ECA-0.0 is the procedure to be entered because there is no power on the 1A-A and 1B-B shutdown boards and also a red path does exist to FR-H.1. Plausible because the candidate may misapply the Unit 2 shutdown boards being energized and not requiring entry into ECA-0.0 and may recognize the RED path to FR-H.1 and conclude correctly that there is a transition to FR-H.1 for the stated conditions.

**WRITTEN QUESTION DATA SHEET**

Question Number: 25

K/A: G2.4.29

Knowledge of the emergency plan.

Tier: 3	RO Imp:	RO Exam:	Cognitive Level: High
Group:	SRO Imp: 4.4	SRO Exam: Yes	Source: NEW

Applicable 10CFR55 Section: 43.5, 45.11

Learning Objective: 3-OT-PCD-048C, Objective 7, Rev. 11: Identify Operation's responsibilities for the following emergency response positions: Site Emergency Director (who is initially the SM).

References: EPIP-1, 3.3.7, rev. 29, SPP-3.5, Appendix A, 3.1, Rev. 19.

**Question:**

Given the following conditions:

- The plant is at full power.
- A report was received of a tornado being sighted over the Watts Bar Training Center moving in a northwest direction. The tornado continued to move across Highway 68 and then dissipated without touching down on onsite.
- The MCR crew has just entered AOI-8, Tornado Watch or Warning.
- Confirmation was received that no visible damage had been received to any structures or equipment on site.
- The Shift Manager evaluates the Radiological Emergency Plan (REP) and determines the conditions for an NOUE were met but are now fully resolved.

Which ONE of the following identifies the ODS and NRC notification requirements in accordance with the REP?

	<u>ODS notification</u>	<u>NRC notification</u>
A.	Report but not declare the event	Is required within 1 hour
B.	Report but not declare the event	Is required within 4 hours
C.	Declare and terminate the event at the same clock time	Is required within 1 hour
D.	Declare and terminate the event at the same clock time	Is required within 4 hours

**DISTRACTOR ANALYSIS**

- a. CORRECT. Per EPIP-1, for events that are totally resolved prior to declaration, no declaration shall be made; however, a report to the NRC within one hour is required.
- b. Incorrect. Plausible, since a declaration is not made, and a report is required, but candidate incorrectly believes that it only needs to be made within four hours.
- c. Incorrect. Plausible, since the notification to the NRC time is correct. Candidate fails to recognize that these conditions have totally resolved prior to declaration, and therefore that NO declaration should be made.
- d. Incorrect. Plausible, since the NRC must be notified, and since candidate may fail to recognize conditions have totally resolved and therefore no declaration is to be made.