

Question Number: 76

K/A: 000008 G2.1.20 Pressurizer Vapor Space Accident.
Ability to interpret and execute procedure steps.

Tier:	1	RO Imp:	n/a	RO Exam:	n/a	Cognitive Level:	High
Group:	1	SRO Imp:	4.6	SRO Exam:	76	Source:	New

Applicable 10CFR55 Section: (CFR: 41.10 / 43.5 / 45.12)

Learning Objective: 3-OT-EOP0100, Rev. 11, Objective 12, Discuss the purpose of ES-1.2 Post LOCA Cooldown and Depressurization.

References: LCO 3.4.10, Pressurizer Safety Valves, Action B

Question:

With the plant initially at 100% power, the following conditions are given:

- 89-B, "PZR Safety Line Temp HI" is received.
- A Pressurizer safety valve is leaking by.
- The leak rate is determined to be 0.9 gpm.
- One hour later, Engineering reports that a review of the lab data has determined that the lift setpoint of the safety valve had been set lower than the allowed Tech. Spec. limit, and the valve appears to be simmering.

The SRO enters AOI-6, "Small Reactor Coolant System Leak" and directs the crew to begin reducing power per GO-4, "Normal Power Operation", for compliance with Technical Specifications. When the plant is at 60% power, it is determined that the Pressurizer safety valve has RESEATED and remains closed.

What actions will the SRO direct and why?

- a. Continue the plant shutdown to Mode 3 and then to Mode 5, due to having exceeded the specification for RCS operational leakage.
- b. Continue the plant shutdown to Mode 3 and then to Mode 4 due to the operability status of the safety valve.
- c. Stop the power reduction since the safety valve is now closed. Request a functional evaluation of the safety valve from engineering.
- d. Stop the power reduction, since RCS operational leakage is now within allowable limits. Request a functional evaluation of the safety valve from engineering.

DISTRACTOR ANALYSIS

- a. Incorrect. This distractor is plausible if candidate misapplies a common Required Action (go to Mode 5) that is found throughout Technical Specifications. The reason for continuing the plant shutdown is plausible if candidate misapplies leakage limits and leakage definitions, incorrectly believing this is pressure boundary leakage.
- b. CORRECT. LCO 3.4.10, "Pressurizer Safety Valves", requires a specific lift setting for operability, and allows 15 minutes (Action A) to restore the valve to operability. If that completion time is exceeded (as given in the stem), Action B requires the plant to be in Mode 3 within 6 hours and Mode 4 within 12 hours.
- c. Incorrect. Plausible if candidate misapplies LCO 3.0.2 applicability rule and believes the Required Action does not need to be completed if the valve has reclosed. The candidate may also believe that because the valve was simmering, that it has failed in a "conservative direction"; i.e., it is operating at a lower pressure than what is needed to protect the RCS integrity, and that this somehow supercedes the engineer's report. Believing this, it is plausible that a further evaluation is appropriate. Candidate fails to recognize that the most significant aspect of the conditions given in the stem is that the lift settings have been shown to be outside of acceptable limits, and the valve is therefore inoperable, requiring completion of the Required Action.

- d. Incorrect. Plausible if candidate misapplies LCO 3.0.2 applicability rule and believes the Required Action does not need to be completed if the valve has reclosed, and that leakage limits (though incorrectly arrived at in the candidate's thought process) are now back to within limits. The candidate may also believe that because the valve was simmering, and has stopped, that an evaluation is appropriate, in order to determine the next course of action. Candidate fails to recognize that the most significant aspect of the conditions given in the stem is that the lift settings have been shown to be outside of acceptable limits, and the valve is therefore inoperable, requiring completion of the Required Action.
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K/A Match and SRO only:

The conditions given represent a Pressurizer vapor space leak/accident, since a Pressurizer safety valve is spuriously simmering and passing inventory from the RCS. Further match with the "accident" aspect is that the SRO implements an abnormal operating instruction for an RCS leak.

"Executing" procedure steps is the determining which mitigating strategy (also the SRO aspect) to take, and the "interpreting" aspect is a combination of why the strategy is required, and any further action.

High Cognitive Level:

Candidate must apply knowledge from various aspects of plant operation, including definitions of types of leakages, significance of alarm conditions, diagnosing the type of event in progress, and Tech. Spec. required actions., and then apply this knowledge to determine the appropriate a course of action, and then to explain why the action is appropriate.

Question Number: 77

K/A: 000011 EA2.01

Ability to determine or interpret the following as they apply to a Large Break LOCA:

Actions to be taken, based on RCS temperature and pressure - saturated and superheated.

Tier:	RO Imp:	n/a	RO Exam:	n/a	Cognitive Level:	High
Group:	SRO Imp:	4.7	SRO Exam:	77	Source:	WBN Bank

Applicable 10CFR55 Section: (CFR 43.5 / 45.13)

Learning Objective: 3-OT-FRC0001, Rev. 7, 3, Given a set of plant conditions, use FR-C.1, C.2, and C.3 to correctly diagnose and implement Action Steps, RNOs, Foldout Pages, Notes and Cautions.

References: FR-C.1, Inadequate Core Cooling, Rev. 15.

Question:

Given the following plant conditions:

- The crew is implementing FR-C.1, "Inadequate Core Cooling".
- Attempts to establish high pressure safety injection flow have been unsuccessful.
- RVLIS level is 28% and dropping slowly.
- Core exit thermocouples are indicating 820°F and rising slowly.
- RCPs have been stopped.

Which one of the following statements describes the NEXT evolution to be performed to mitigate the core cooling challenge?

- a. Restart one RCP in a loop with an intact SG to provide forced two-phase flow for initiating RCS depressurization.
- b. Open available PZR PORVs to depressurize the RCS to allow Cold Leg Accumulators and RHR pumps to inject.
- c. Transition to the Severe Accident Management Guidelines (SAMGs) for guidance on RCP restart to initiate RCS depressurization.
- d. Depressurize all intact SGs using steam dumps or SG PORVs to depressurize the RCS and allow Cold Leg Accumulators and RHR pumps to inject.

DISTRACTOR ANALYSIS

- a. Incorrect. Plausible, since this action is taken, but only if other more conservative actions are unsuccessful in reducing RCS temperature.
- b. Incorrect. Plausible, since this action would be accomplished if a transition to FR-P.1 "Pressurized Thermal Shock" were made.
- c. Incorrect. Plausible, since abnormally high temperatures on the core exit thermocouples (>1200°F) require implementation of the Severe Accident Management Guidelines, but candidate uses the incorrect temperature (given in the stem) to conclude SAMGs are needed.
- d. CORRECT. These actions are described in FR-C.1, PRIOR to those which address restarting RCPs.

K/A Match:

SRO Only Perspective:

Requires candidate to evaluate Large Break LOCA conditions, and determine if conditions are saturated or superheated, and from the SRO only perspective, to diagnose the effective mitigation strategy, based on the diagnosed severity of the event.

High Cognitive Level:

Candidate must diagnose the condition of the RCS, and then apply this to determine required actions, including determining what the effectiveness of these actions will be, AND further, why they are important.

Question Number: 78

K/A: 000025 AA2.06

Ability to determine and interpret the following as they apply to the Loss of Residual Heat Removal System:
Existence of proper RHR overpressure protection.

Tier:	1	RO Imp:	n/a	RO Exam:	n/a	Cognitive Level:	High
Group:	1	SRO Imp:	3.4	SRO Exam:	78	Source:	New

Applicable 10CFR55 Section: (CFR: 43.5 / 45.13)

Learning Objective: 3-OT-AOI1400, Rev. 7, Objective 7, Demonstrate ability/knowledge of AOI, to correctly: a. Recognize Entry conditions. b. Respond to Action steps. Respond to Contingencies (RNO column). d. Respond to Notes & Cautions.

References: AOI-14, Loss of RHR Shutdown Cooling, Rev. 34; Tech Spec 3.4.12, Cold Overpressure Mitigation System (COMS); ARI-113E, Rev. 16

Question:

Given the following plant conditions:

- The plant is in Mode 5.
- RHR cooling with Train A is in service in normal alignment.
- Pressurizer level is 30%.
- RCS pressure is initially at 200 psig.
- Pressurizer PORV 1-PCV-68-334 is INOPERABLE and ISOLATED by its block valve.
- A transient occurs, causing RCS pressure to rise.
- 113E, RHR SUCT FCV-74-1, 2, 8, 9 OPEN & HI PRESS annunciator is LIT.
- The crew enters AOI-14, "Loss of RHR Shutdown Cooling".
- The crew has stopped the RHR pump and inadvertently closed 1-FCV-74-1 and 1-FCV-74-2.

LCO 3.4.12, "Cold Overpressure Mitigation System", entry is required because _____(1)_____, and the Required Action Completion Time to restore required operability is ____ (2) ____.

(Fill in the blanks from one of the selections below.)

- | | <u>(1)</u> | <u>(2)</u> |
|---|------------|------------|
| a. even though adequate relief capacity does exist, the required redundancy has been lost | | 24 hours |
| b. even though adequate relief capacity does exist, the required redundancy has been lost | | 7 days |
| c. only one PORV does NOT provide adequate relief capacity to prevent overpressurization | | 24 hours |
| d. only one PORV does NOT provide adequate relief capacity to prevent overpressurization | | 7 days |

DISTRACTOR ANALYSIS

- a. CORRECT. With the other Pressurizer PORV still available, adequate overpressure still exists. However, LCO 3.4.12 requires two relief paths for redundancy, either two PORVs available, OR one PORV and one RHR suction relief. With the given conditions, only one relief path is available.
- b. Incorrect. Plausible since the assessment of relief capacity is correct, but candidate incorrectly believes that a lower mode condition has a shorter completion time for the required action.

- c. Incorrect. Plausible since the completion time comparison is correct, however candidate misinterprets the effect of an isolated PORV and a closed suction relief path on RHR and could confuse the train components to incorrectly conclude that no relief path exists.
 - d. Incorrect. If the candidate misinterprets the effect of an isolated PORV and a closed suction relief path on RHR and confuses the train components, it is plausible to incorrectly conclude that no relief path exists. Candidate also believes that a lower mode required action completion time is shorter than for a higher mode plant condition.
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K/A Match and SRO Only:

The candidate is presented with a plant condition involving various equipment that either has been out of service, or otherwise rendered incapable of its design function. The intent of this K/A lends itself to reinforcing the SRO only perspective for the following reasons: 1.) "Determining" if proper RHR overpressure protection exists requires the candidate to assess the conditions, and then to apply the understanding of Tech. Spec. basis on insights regarding what is adequate for overpressure protection, and then to understand that even though adequate protection exists, there is still a Required Action, and WHY there is still a Required Action; i.e., loss of redundancy (this is the "interpret" aspect of the K/A). The SRO aspect is further enhanced by using these conclusions to determine which completion time is appropriate.

High Cognitive Level:

Given numerous plant conditions, candidate must diagnose the cumulative effect on RHR overpressure protection, and then apply that knowledge, in combination with recalling Tech. Spec. basis knowledge, and combining and applying those to conclude that a required action is necessary, and then to determine the completion time required.

Question Number: 79

K/A: 000056 G2.4.45 Loss of Offsite Power

Ability to prioritize and interpret the significance of each annunciator or alarm.

Tier:	RO Imp:	n/a	RO Exam:	n/a	Cognitive Level:	High
Group:	SRO Imp:	4.3	SRO Exam:	Yes	Source:	New

Applicable 10CFR55 Section: (CFR: 41.10 / 43.5 / 45.3 / 45.12)

Learning Objective: 3-OT-AOI-3500, Rev. 7, Objective 8 - Given a set of plant conditions, use AOI-35 to correctly diagnose and implement: Action Steps, RNO's, Notes and Cautions.

References: ECA-0.0, step 19; ARI 41-A, 41-B, 128-A.

Question:

With the plant initially at full power, the following conditions are given:

- A complete loss of all offsite power occurs.
- The plant has tripped.
- Due to various failures, NO diesel generators are currently available.
- Efforts to restore DG 1B-B have been initiated.
- Numerous alarms are in, including:
 - * 41-B, "CST A LEVEL LO-LO"
 - * 128-A, "SFP LEVEL HI/LO"
- CST "A" level indicates there is 5,000 gallons in the tank, and slowly dropping.
- SFP level indicates 1 foot below the low level alarm setpoint and slowly dropping.

Which one of the above alarm conditions will the SRO address first, and what procedure provides the needed guidance to address the condition?

	<u>Highest Priority Alarm</u>	<u>Procedure</u>
a.	41-B, "CST A LEVEL LO-LO"	SOI-2&3.01, "Condensate and Feedwater System"
b.	41-B, "CST A LEVEL LO-LO"	ECA-0.0, "Loss of Shutdown Power"
c.	128-A, "SFP LEVEL HI/LO"	ECA-0.0, "Loss of Shutdown Power"
d.	128-A, "SFP LEVEL HI/LO"	AOI-45, "Loss of Spent Fuel Pool Level or Cooling"

DISTRACTOR ANALYSIS

- a. Incorrect. It is plausible to believe that the System Operating Instruction would provide guidance to refill a tank that has a low level. In fact, the Alarm Response Instruction for low level in this tank directs refilling the tank using the given SOI; however, in this case, with the level already so low, the ECA-0.0 takes precedence to promptly ensure AFW has a suction source.
- b. CORRECT. The alarm setpoint for low-low level in the Condensate Storage Tank corresponds to 116,000 gallons in the tank. With the given inventory in the stem (5,000 gallons) the SRO must recognize that loss of suction to the turbine driven AFW pump (the only one available) is imminent. ECA-0.0 directs dispatching operators to manually transfer the suction source of AFW from CST to Emergency Raw Cooling Water.
- c. Incorrect. It is plausible to believe that low level in the Spent Fuel Pool is a paramount concern, given the potential for radiological release due to loss of heating, combined with loss of inventory in the pool. Further urgency (and plausibility) is added to this distractor by stating that the level is continuing to drop. However, the drop is slow and there is plenty of inventory above the top of the fuel before prompt action must be taken, in comparison to the imminent loss of AFW suction source. The procedure (ECA-0.0) is plausible, since that procedure will be in use by the crew.

- d. Incorrect. It is plausible to believe that low level in the Spent Fuel Pool is a paramount concern, given the potential for radiological release due to loss of heating, combined with loss of inventory in the pool. Further urgency (and plausibility) is added to this distractor by stating that the level is continuing to drop. However, the drop is slow and there is plenty of inventory above the top of the fuel before prompt action must be taken, in comparison to the imminent loss of AFW suction source. The procedure (AOI-45) is correct, adding further plausibility to this distractor.
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K/A Match and SRO Only:

Candidate is presented with two alarm conditions, both of which seem important, and then must recall and apply knowledge of design features of the Spent Fuel Pool and what approximate water level is effective for shielding, and how that may be affected by given conditions. Knowledge of Condensate Storage Tank level requirements must be applied, in conjunction with diagnosing the plant event and which procedure is in effect, and how that procedure's requirements impact strategies regarding maintenance of level in the Condensate Storage Tank.

High Cognitive Level:

Candidate must synthesize a multitude of plant conditions, understanding of system design features, diagnose of the event in progress, and the procedure usage, to arrive a course of action based on assessment of priorities, including a final determination of which procedure guides these actions.

Question Number: 80

K/A: 000065 AA2.03

Ability to determine and interpret the following as they apply to the Loss of Instrument Air:
Location and isolation of leaks.

Tier:	1	RO Imp:	n/a	RO Exam:	n/a	Cognitive Level:	High
Group:	1	SRO Imp:	2.9	SRO Exam:	80	Source:	New

Applicable 10CFR55 Section: (CFR: 41.5 / 43.5 / 45.3 / 45.13)

Learning Objective: 3-OT-SYS033A, Rev. 3, Objective 4, State the control air pressure at which service air isolates.

References: AOI-10, Loss of Control Air; ARI-134-A; SOI-32.01, Control Air System; Drawing 1-47848-9, Control Air.

Question:

Given the following conditions:

- Unit 1 is at 100% power.
- 134-A, "CL Accum 4 Level HI/LO" has annunciated.
- 1-LI-63-119, CL Accum Level (for CLA 4) is indicating 7610 gallons.
- An air leak has developed immediately upstream of 1-32-3531, the manual isolation valve for the air supply to FCV-63-70 (Makeup to CL Accum 4).
- 1-FCV-63-70 has gone to its failed position.
- The containment air supply isolation valve has auto closed due to low header pressure.

Which section of AOI-10, "Loss of Control Air" will the SRO use to address these conditions, and what action is required?

AOI-10 Section

Requirements when Air Leak is Isolated

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|----|---|---|
| a. | Section 3.2, "Auxiliary Air is lost (one or both trains)." | If air is not restored to 1-FCV-63-70 in less than one hour, conditions will exist that require placing the plant in Mode 3 within 6 hours. |
| b. | Section 3.3, "Nonessential Control Air is lost while in Mode 1,2 or 3." | If air is not restored to 1-FCV-63-70 in less than one hour, conditions will exist that require placing the plant in Mode 3 within 6 hours. |
| c. | Section 3.2, "Auxiliary Air is lost (one or both trains)." | Enter LCO 3.0.3 immediately, since more than one Cold Leg Accumulator is now inoperable. |
| d. | Section 3.3, "Nonessential Control Air is lost while in Mode 1,2 or 3." | Enter LCO 3.0.3 immediately, since more than one Cold Leg Accumulator is now inoperable. |

DISTRACTOR ANALYSIS

- a. Incorrect. Plausible, since maintaining Cold Leg Accumulator parameters is important, and the Auxiliary Air header provides control air to numerous safety-related (important) components. Candidate misapplies this however, and extends it to the CLAs, and associated makeup valves and vent valves, which are actually supplied by non-essential control air. Also plausible since the second part is correct.
- b. CORRECT. Per AOI-10, Loss of Control Air, the appropriate section is Section 3.3, "Nonessential Control Air is lost while in Mode 1,2, or 3." LCO 3.5.1, "Accumulators", requires placing the plant in Mode 3 within 6 hours if an inoperable accumulator is not restored within one hour.

- c. Incorrect. Plausible, since maintaining Cold Leg Accumulator parameters is important, and the Auxiliary Air header provides control air to numerous safety-related (important) components. Candidate misapplies this however, and extends it to the CLAs, and associated makeup valves and vent valves, which are actually supplied by non-essential control air. LCO 3.0.3 is plausible if candidate misapplies design of the system to be that all four CLAs receive operating air from only one header, and that by isolating this air leak results in isolation of operating air for all four CLAs.
- d. Incorrect. Plausible since the first part is correct. LCO 3.0.3 is plausible per description in paragraph immediately above this one.
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K/A Match and SRO Only:

Candidate must determine the portion of the air system which has been lost, by applying SRO level ability and knowledge of the applicable procedure, and then predict the significance of this condition and its impact on Tech. Spec. requirements, including assessing the need for plant shutdown.

Higher Cognitive Level:

Application of plant design, Tech. Spec. requirements, and system response, including alarm conditions; and then to arrive at a conclusion on the overall effect on the plant, and which part of Tech. Specs. applies for deciding on required actions.

Question Number: 81

K/A: E04 G2.4.21 LOCA Outside Containment

Knowledge of the parameters and logic used to assess the status of safety functions, such as reactivity control, core cooling and heat removal, reactor coolant system integrity, containment conditions, radioactivity release control, etc.

Tier:	1	RO Imp:	n/a	RO Exam:	n/a	Cognitive Level:	High
Group:	1	SRO Imp:	4.6	SRO Exam:	81	Source:	New

Applicable 10CFR55 Section: (CFR: 41.7 / 43.5 / 45.12)

Learning Objective: 3-OT-TI1204, Rev. 1, Objective 23 List the priority for evaluation and performance of the function restoration procedures (FR-S,C,H,P,Z,I); and 3-OT-FRC0001, Rev. 7, Objective 1, Given a set of plant conditions, use the FR-O Core Cooling Status Tree to identify and implement the correct procedure.

References: FR-0, Status Trees, Rev. 13; WOG Background Document FR-0, Rev 2

Question:

Given the following plant conditions:

- The crew is responding to a LOCA outside containment per ECA-1.2, "LOCA Outside Containment".
- Attempts to isolate the leak have been unsuccessful.
- RWST level is 70% and dropping.
- RCS subcooling is 58°F.
- RCS pressure is 800 psig.
- RVLIS is 33% and dropping.
- Total AFW flow is 380 gpm.
- Steam Generator narrow range levels are as follows:
 - #1 SG - 22% and stable.
 - #2 SG - 20% and stable.
 - #3 SG - 31% and stable.
 - #4 SG - 27% and rising.

Based on the above conditions, which one of the following is the appropriate procedure to implement?

- a. ECA-1.1, "Loss of RHR Sump Recirculation".
- b. FR-H.1. "Loss of Secondary Heat Sink".
- c. FR-C.1, "Inadequate Core Cooling".
- d. FR-C.2, "Degraded Core Cooling".

DISTRACTOR ANALYSIS

- a. Incorrect. Plausible, since a transition from ECA-1.2 to ECA-1.1 would normally be done in order to add inventory to the RWST to prolong core heat removal during the LOCA outside containment.
- b. Incorrect. Plausible, since the combination of AFW flow and SG levels given require the candidate to determine that implementation of FR-H.1 is NOT REQUIRED for the listed conditions (but would be if adverse containment conditions existed).
- c. Incorrect. Plausible, since the candidate may assume that the pressure value provided is an indication used to determine core cooling status. Candidate must also realize that with RCS pressure at 800 psig, NO RCPs are running.
- d. CORRECT. Subcooling is less than 65°F, RVLIS is less than 33% and it can be inferred that core exit temperatures are less than 727°F. The combination of parameter values require FR-C.2, "Degraded Core Cooling" to be implemented.

K/A Match:

The candidate is presented with numerous parameters for assessing the status of safety functions, including subcooling, steam generator levels, AFW flow, RCS pressure, and so forth. Further, there is at least one aspect of the "logic" mentioned in the K/A: at least one steam generator with level greater than 29% is a decision point for the SRO candidate to assess the safety function, and then to determine a success path.

SRO Only:

This K/A lends itself easily to SRO Only, and the question is written such that an extensive array of plant conditions is presented, which the candidate must evaluate, and apply various knowledges, such as procedure usage, flow of Status Tree procedure, and operating limits (subcooling, RCS pressure, etc.) to determine the appropriate effective course of accident mitigation.

Higher Cognitive Level:

The discussion in both "SRO Only" and "K/A Match" should explain most of this; however, a more detailed look may be desired. As discussed in the Distractor Analysis for the correct answer ("D"), the SRO candidate must use the given values for subcooling and RCS pressure to determine temperature, a key parameter which is then used for making a decision on which path is appropriate. In this same vein, the candidate must assess the given parameters for steam generators and also make a similar decision, and then blend these together to arrive at a final appropriate path through the procedures for mitigation of the event.

Question Number: 82

K/A: 028 AA2.01

Ability to determine and interpret the following as they apply to the Pressurizer Level Control Malfunctions: PZR level indicators and alarms

Tier:	1	RO Imp:	n/a	RO Exam:	n/a	Cognitive Level:	High
Group:	1	SRO Imp:	3.6	SRO Exam:	82	Source:	NEW

Applicable 10CFR55 Section: (CFR: 43.5 / 45.13)

Learning Objective: 3-OT-AOI200, Rev. 7, Objective 6, Demonstrate ability to determine causes for pressurizer level malfunctions.

References: AOI-20, "Malfunction of Pressure Level Control System", Rev. 31; ARI 88-94, REACTOR COOLANT SYSTEM, Rev. 19; LCO 3.4.9., "Pressurizer".

Question:

With the plant initially at steady state full power conditions, the following conditions are given:

- Selector Switch 1-XS-68-339E, PZR Level Control Channel Select, is selected to "1-68-339 & 335".
- A failure occurs of 1-LT-68-320, Pressurizer Level.

The OAC now reports the following indications for Pressurizer level:

- 1-LI-68-339A, Pressurizer Level, indicates 60%.
- 1-LI-68-335A, Pressurizer Level, indicates 60%.
- 1-LI-68-320, Pressurizer Level, indicates 100%.

The SRO has begun implementation of AOI-20, "Malfunction of Pressurizer Level Control System". Which one of the following describes what action the SRO will take, and what is the controlling document for it?

- a. Direct the OAC to take manual control of the charging valve controller and restore Pressurizer level to program, using the guidance in SOI-62.01, "CVCS - Charging and Letdown".
- b. Direct the OAC to ensure that letdown is in service and to maintaining adequate RCP seal flow rates, using the guidance in SOI-62.01, "CVCS - Charging and Letdown".
- c. Place the failed channel in BYPASS within 12 hours, per LCO 3.3.1, "RTS Instrumentation".
- d. Place the failed channel to TRIP within 72 hours, per LCO 3.3.1, "RTS Instrumentation".

DISTRACTOR ANALYSIS

- a. Incorrect. There are actions in AOI-20, "Malfunction of Pressurizer Level Control" to take manual control of charging, using the System Operating Instruction guidance, but only for certain failures, which makes this distractor plausible. If either of the controlling instruments had failed, depending on the failure mode, then this action may be appropriate. However, in this case, the failure was of the protection (reactor protection) channel. Its failure does not require manual actions to control charging or letdown, since neither of these is affected for the given failure.
- b. Incorrect. There are steps in AOI-20, "Malfunction of Pressurizer Level Control" to ensure letdown is in service, and to check adequate RCP seal flows, using the System Operating Instruction guidance, making this distractor plausible. As detailed in "a" explanation above, the nature of the failure makes the choice incorrect.
- c. Incorrect. Candidate recognizes that this failure requires entry into an LCO, and is plausible that a candidate would make this selection. Bypassing a failed instrument is plausible, since this is the action for certain instrument failures, but this instrument is an input to the reactor protection function; a failure requires placing the channel to TRIP within a certain time frame. Further plausibility is provided in this distractor since bypassing for up to 12 hours is allowed, but only for testing of the other channels.

- d. CORRECT. LCO 3.3.1 contains table of required instrumentation, one of which is the inputting instrument to the high pressurizer level reactor trip. If this instrument fails high, the LCO (Condition X) requires placing the associated channel to TRIP within 72 hours.
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K/A Match:

The candidate is presented with 3 indicators associated with Pressurizer level control, and must determine which of these is of what significance in the context of their function, resulting effects on the plant, and of any required compensatory actions.

SRO Only:

Candidate must assess plant conditions involving a failure of one of the Pressurizer level instruments, and determine which written guidance applies, and what is the required action, including completion time.

Higher Cognitive Level:

Candidate must apply knowledge of various Pressurizer level instruments, including their function, and use that to make a decision on the effect of the failure (i.e., the failed instrument is an input to RPS, and means that it cannot be bypassed). Candidate must understand this effect on the RPS circuitry and conclude that placing it to trip is the only correct decision.

Question Number: 83

K/A: 000076 AA2.02

Ability to determine and interpret the following as they apply to the High Reactor Coolant Activity: Corrective actions required for high fission product activity in RCS.

Tier:	1	RO Imp:	n/a	RO Exam:	n/a	Cognitive Level:	Low
Group:	2	SRO Imp:	3.4	SRO Exam:	8	Source:	New

Applicable 10CFR55 Section: (CFR: 43.5 / 45.13)

Learning Objective: 3-OT-AOI2800, Rev. 8, Objective 7, Given a set of plant conditions, use the AOI to correctly: a. Recognize Entry Conditions. b. Identify Required Actions. c. Respond to Contingencies (RNO),d. Observe and Interpret Cautions and Notes.

References: AOI-28, "High Activity in Reactor Coolant", Rev. 21; Technical Specification 3.4.16, "RCS Specific Activity".

Question:

What 10 CFR Part(s) (is) are the RCS Specific Activity Tech. Spec. limits based on, and what action does the Shift Manager request from Reactor Engineering during implementation of AOI-28, "High Activity in Reactor Coolant"?

<u>Related 10 CFR Part(s)</u>	<u>Reactor Engineering Action</u>
a. 10 CFR 100 for the General Public <u>only</u> .	Implement TI-7.004, "Fuel Integrity Assessment Program".
b. 10 CFR 50 for Control Room personnel <u>and</u> 10 CFR 100 for the General Public.	Implement TI-7.004, "Fuel Integrity Assessment Program".
c. 10 CFR 100 for the General Public <u>only</u> .	Perform TI-41, "Incore Flux Mapping".
d. 10 CFR 50 for Control Room personnel <u>and</u> 10 CFR 100 for the General Public.	Perform TI-41, "Incore Flux Mapping".

DISTRACTOR ANALYSIS

- a. Incorrect. Plausible since the required Reactor Engineering action is correct, and because 10 CFR 100 dose limits are of concern; however, candidate fails to recognize that dosage to Control Room personnel also is an important part of the basis for activity limits.
 - b. CORRECT. Per T.S. Basis 3.4.16 "RCS Activity", T.S. limits are based on ensuring that the doses specified in both 10 CFR 100 and 10 CFR 50 are not exceeded. AOI-28, "High Activity in Reactor Coolant" includes directions for the SRO to have Reactor Engineering perform a systematic assessment of fuel integrity, per TI-7.004.
 - c. Incorrect. Plausible since 10 CFR 100 limits DO apply, however candidate fails to recognize/recall that Control Room personnel dosage is also of concern. Perform Incore Flux Mapping is plausible, since the incores are used to determine peak Kw/ft. and enthalpy rise hot channel factors. Exceeding either of these parameters could result in fuel damage. Further, this procedure checks for improperly loaded fuel assemblies, which could also result in fuel damage.
 - d. Incorrect. Perform Incore Flux Mapping is plausible, since the incores are used to determine peak Kw/ft. and enthalpy rise hot channel factors. Exceeding either of these parameters could result in fuel damage. Further, this procedure checks for improperly loaded fuel assemblies, which could also result in fuel damage.
-

K/A Match and SRO Only:

Candidate is presented with procedures relating to high activity in the RCS and potential associated fuel damage and must determine which is the appropriate guidance to use. The "interpret" aspect is also related to the "SRO Only" aspect: the basis for the procedure guidance that applies for High Activity in Reactor Coolant, specifically the 10 CFR sections which apply.

Lower Cognitive Level:

Candidate recalls which procedure is appropriate, and the 10 CFR sections which it is based on.

Question Number: 84

K/A: W/E03 G2.4.30 LOCA Cooldown - Depressurization

Knowledge of events related to system operation/status that must be reported to internal organizations or external agencies, such as the State, the NRC, or the transmission system operator.

Tier:	1	RO Imp:	n/a	RO Exam:	n/a	Cognitive Level:	Low
Group:	2	SRO Imp:	4.1	SRO Exam:	84	Source:	NEW

Applicable 10CFR55 Section: (CFR: 41.10 / 43.5 / 45.11)

Learning Objective: 3-OT-SPP0305, Rev. 7, Obj 10, Given a set of normal or abnormal plant conditions, determine whether the event requires reporting to the NRC, the FAA, or TEMA.

References: SPP-3.5, "Regulatory Reporting Requirements", Rev 20; EPIP-1, "Emergency Plan Classification Flowchart", Rev. 29. ECM-8, "Spill Prevention and Countermeasure (SPCC) Plan", Rev 27.

Question:

During the performance of ES-1.2, "Post LOCA Cooldown and Depressurization", the SRO must notify the Technical Support Center (TSC) for which one of the following?

- Containment hydrogen concentration is 5.4%.
- To evaluate when optimal RCS depressurization point is reached.
- Auxiliary air pressure drops and stabilizes at 40 psig.
- To determine upper head soak time prior to depressurizing RCS.

DISTRACTOR ANALYSIS

- CORRECT.** If containment hydrogen concentration reaches or exceeds 5%, the SRO is directed to notify the TSC for additional guidance, per ES-1.2.
- Incorrect.** This selection sounds plausible because there is significant and somewhat complex direction given in ES-1.2 for when to stop the RCS depressurization, primarily relating to PZR level, and how that is affected by depressurization and the resulting increased safety injection flow. Candidate may misapply this information and incorrectly believe additional guidance is needed from the TSC. Though the direction on when to stop RCS depressurization is extensive, it is also clear, and does NOT require the SRO to notify the TSC for additional guidance.
- Incorrect.** Plausible, since auxiliary air supplies safety related loads which are needed during accidents for safe shutdown of the plant. Candidate may believe that the crew needs assistance in troubleshooting this problem and regaining normal pressure. However, ES-1.2 provides clear guidance on what the CREW should do to address this condition, and does not require notifying the TSC for any assistance or guidance.
- Incorrect.** Plausible to notify TSC for this aspect of a cooldown, since head voiding is a plausible concern during a cooldown following a LOCA. However, this guidance is from ES-0.2, "Natural Circulation Cooldown", and is not required by ES-1.2, which is designed for a cooldown with at least one RCP to provide adequate PZR spray for the cooldown and depressurization.

K/A Match:

Candidate is presented with a set of conditions, all of which are related to the given event in the K/A, and must recognize which one of these requires notification to an internal organization, the Technical Support Center.

SRO Only and Lower Cognitive Level:

Though this is a recognition / recall level question, it is nevertheless the responsibility of the SRO to use the procedure guidance, and during implementation of it, to recognize plant conditions which require notifications, whether they be for assistance, or simply for transmitting information.

Question Number: 85

K/A: E10 G2.2.37

Natural Circulation with Steam Void in Vessel with/without RVLIS

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

Tier: 2 RO Imp: n/a RO Exam: n/a Cognitive Level: High
 Group: 1 SRO Imp: 4.6 SRO Exam: 85 Source: WBN Bank Sig. Mod

Applicable 10CFR55 Section: 41.7 / 43.5 / 45.12

Learning Objective: 3-OT-EOP0000, Rev. 14, Objective 16, Explain the purpose of procedures ES-0.3 and ES-0.4, including when their use might be required.

References: ES-0.2, "Natural Circulation Cooldown", Rev. 20; ES-0.3, "Natural Circulation Cooldown with Steam Voids in Vessel (With RVLIS)", Rev. 10; Tech. Spec. 3.7.6, "Condensate Storage Tank"; Step Description Table for ES-0.2 WOG Background Document.

Question:

Given the following plant conditions:

- A reactor trip has occurred due to a loss of all RCPs.
- Two (2) CRDM fans have lost power.
- Operators have implemented ES-0.2, "Natural Circulation Cooldown".
- A cooldown rate of 24°F/hour has been established.
- RCS depressurization has been initiated while maintaining required subcooling.
- The OAC reports that the "A" Condensate Storage Tank level on 1-LI-2-230A is at 170,000 gallons and continues to drop.

Which one of the following describes (1) the status of the Condensate Storage Tank, and (2) the appropriate procedural actions in response to the event in progress?

	(1)	(2)
	<u>Status of Condensate Storage Tank</u>	<u>Actions</u>
a.	OPERABLE	Stop the cooldown and remain in ES-0.2.
b.	INOPERABLE	Raise the cooldown rate and remain in ES-0.2.
c.	OPERABLE	Transition to ES-0.3, "Natural Circulation Cooldown with Steam Voids in Vessel (With RVLIS)" and LOWER the cooldown rate.
d.	INOPERABLE	Transition to ES-0.3, "Natural Circulation Cooldown with Steam Voids in Vessel (With RVLIS)" and RAISE the cooldown rate.

DISTRACTOR ANALYSIS

- a. Incorrect. Plausible, since candidate may believe stopping cooldown is appropriate to conserve inventory.
- b. Incorrect. Plausible, since candidate may believe raising cooldown rate is appropriate in order to reach RHR conditions sooner. However ES-0.2 does not provide instruction to do this. Also plausible since the Condensate Storage Tank is inoperable (T.S. 3.7.6 requires a minimum of 200,000 gallons).
- c. Incorrect. Loss of CST inventory is an appropriate condition to require transition to ES-0.3 since more rapid cooldown rate is allowed while addressing voids in the RCS. Examinee may believe it is necessary to lower cooldown rate to conserve inventory.
- d. CORRECT. T.S. 3.7.6 requires a minimum of 200,000 for CST operability. Loss of CST inventory is an appropriate condition to require transition to ES-0.3 since a more rapid cooldown rate is allowed while addressing voids in the RCS.

K/A Match:

Candidate is presented with plant conditions involving a natural circulation cooldown, and must determine the operability of the Condensate Storage Tank by assessing given plant conditions and parameters.

SRO Only:

Candidate is presented with an array of plant conditions and tasked with making decisions, particularly regarding which procedure and mitigation strategy to implement.

Higher Cognitive Level:

One of the keys to this being a higher cognitive level question lies in making the determination on whether the cooldown rate should be raised or lowered, and, inherent to the question, why it should be raised or lowered. To answer this the candidate must assess the given parameters, including the significance of the Condensate Storage Tank level, and decide how the cooldown rate should be adjusted.

Question Number: 86

K/A: 005 A2.03

Ability to (a) predict the impacts of the following malfunctions or operations on the RHRS, and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: RHR pump/motor malfunctions.

Tier: 2 RO Imp: n/a RO Exam: n/a Cognitive Level: High
Group: 1 SRO Imp: 3.1 SRO Exam: 86 Source: New

Applicable 10CFR55 Section: 41.5 / 43.5 / 45.3 / 45.13

Learning Objective: 3-OT-GOI0700, Rev. 9, Objective 14, State when a motor can be operated above "Red Line" amps.

References: GOI-7, "Generic Equipment Operating Guidelines", Rev. 33; ES-1.3, "Transfer to Containment Sump", Rev. 17; ECA-1.1, "Loss of RHR Sump Recirculation", Rev. 11; Alarm Response Instruction 113-D.

Question:

Given the following initial plant conditions:

- Unit 1 is at full power.
- 1B RHR Pump is tagged out for maintenance.

A Large Break LOCA then occurs, with the following conditions noted:

- Sump recirculation swapover has occurred, per ES-1.3, "Transfer to Containment Sump".
- Due to fuel failures, Containment radiation is 25R/hr.
- 113-D RHR PUMP A/B MECH SEAL HX TEMP HI/HI-HI has just annunciated:

The crew observes the following indication on 1-EI-74-5A, and notes that the indicated value is slowly rising:



What is the impact of these conditions, and what procedural guidance will the Unit Supervisor use for mitigation?

- a. Sump blockage is occurring. Remain in ES-1.3, and using Appendix D, "Monitoring for Containment Sump Blockage", request the TSC to evaluate these conditions and provide required actions.
- b. 1A RHR Pump is in distress and should be tripped. Remain in ES-1.3, contact the TSC and recommend refilling the VCT in order to use Charging Pumps to continue core injection flow.
- c. Sump blockage is occurring. Enter ECA-1.1, "Loss of RHR Sump Recirculation", contact the TSC and recommend that the RWST be refilled.
- d. 1A RHR Pump is in distress and should be tripped. Enter ECA-1.1, "Loss of RHR Sump Recirculation", contact the TSC and recommend that the RWST be refilled.

DISTRACTOR ANALYSIS

- a. Incorrect. Plausible, since sump blockage conditions does affect pump amps, however candidate incorrectly believes sump blockage is occurring. Amps would indicate LOWER than normal, not HIGHER. Further, candidate fails to recognize conditions for imminent or actual loss of RHR sump recirculation due to the only available RHR pump being in distress.
- b. Incorrect. Candidate correctly recognizes pump distress conditions, but incorrectly believes that ES-1.3 is the appropriate procedure for mitigation. Further plausibility is because the method is one method listed in ECA-1.1; i.e., candidate confuses which procedure contains the required method of ensuring core flow.

- c. Incorrect. Plausible, since sump blockage conditions does affect pump amps, however candidate incorrectly believes sump blockage is occurring. Also, plausible since ECA-1.1 is the correct procedure.
 - d. CORRECT. High amps in combination with high pump seal temperatures indicates a pump that is in distress, most likely due to thermal expansion and developing binding of the shaft. This represents a condition for imminent loss of RHR sump recirculation, since the RHR pump cannot be operated with the given conditions. ECA-1.1 is implemented, with further recommendation that the RWST be refilled using the method given.
-

K/A Match and SRO Only:

Candidate is presented with a malfunction of the RHR pump/motor and must predict the impact on the RHRS, particularly in the context of this being the only available RHR pump. This K/A, being an A2 category, lends itself easily to the SRO Only aspect since the candidate must then apply this knowledge and assess the overall impact of plant conditions, including what is causing this malfunction, and how that affects implementation of the appropriate procedure for mitigation.

Higher Cognitive Level:

Candidate must understand the given indication on amps, and determine from that, what is the problem, and also understand and apply the significance of the fact that sump swapover has occurred, and what that means for the importance of this only remaining (however in distress) pump.

Question Number: 87

K/A: 008G2.4.41

Knowledge of the emergency action level thresholds and classifications.

Tier:	2	RO Imp:	n/a	RO Exam:	n/a	Cognitive Level:	High
Group:	1	SRO Imp:	4.6	SRO Exam:	87	Source:	New

Applicable 10CFR55 Section: (CFR: 41.10 / 43.5 / 45.11)

Learning Objective: 3-OT-SYS070A, Rev. 10, Objective 19, Given a set of plant conditions, determine the correct response of the CCS system.

References: AOI-15, "Loss of Component Cooling Water (CCS)"; AOI-14, "Loss of RHR Shutdown Cooling", Rev. 34; WBN EPIP-1, "Emergency Plan Classification Flowchart", Rev. 29.

Question:

Given the following plant conditions:

- Unit 1 is in Mode 5.
- RCS temperature is 175°F.
- RCS pressure is 325 psig.
- Train "A" RHR is in service.
- Train "B" RHR pump is tagged out for repairs due to motor winding damage.
- A large leak develops in Train "A" of the Component Cooling System.

If actions taken in response to the listed events are UNSUCCESSFUL, at what point (parameter value, setpoint, etc.) will the Shift Manager FIRST implement the Radiological Emergency Plan?

- a. Incore thermocouple temperatures rise above 200°F.
- b. Incore thermocouple temperatures rise above 350°F.
- c. RHR capability has been lost for greater than 15 minutes.
- d. Immediately upon discovery of the large CCS leak.

DISTRACTOR ANALYSIS

- a. CORRECT. Per EAL 6.1, "Loss of Shutdown Systems", an ALERT is declared if both RHR capability for core cooling is lost, AND RCS temperature is greater than 200°F.
- b. Incorrect. Plausible, since the temperature value given is a significant number in general plant operations (associated with a mode change).
- c. Incorrect. Plausible, since a loss of power for greater than 15 minutes requires entry into the Radiological Emergency Plan per EAL 6.2 "Loss of AC (Shutdown)".
- d. Incorrect. Plausible, since the candidate may think the leak requires immediate and anticipatory implementation of the Radiological Emergency Plan before the consequences of the leak can cause RHR capability to degrade.

K/A Match:

In the context of RHR, the candidate must make a determination of applicability of the Radiological Emergency Plan.

SRO Only:

This topic lends itself to an SRO only question, and this question tests that knowledge, by requiring the candidate to assess a group of conditions relating to RHR plant conditions and determining when implementation of the Radiological Emergency Plan should occur.

Higher Cognitive Level:

At first glance this question may seem to be a lower cognitive level (recognition of parameters, etc.); however, to discriminate at least two of the distractors (c and d) requires a higher cognitive thought process

by applying knowledge of plant operation to realize the effect of a large leak on the CCS, how that affects RHR, and what that means for REP implementation.

Question Number: 88

K/A: 026 G2.2.38 Containment Spray.
Knowledge of conditions and limitations in the facility license.

Tier:	2	RO Imp:	n/a	RO Exam:	n/a	Cognitive Level:	Low
Group:	1	SRO Imp:	4.5	SRO Exam:	88	Source:	New

Applicable 10CFR55 Section: (CFR: 41.7 / 41.10 / 43.1 / 45.13)

Learning Objective: 3-OT-SYS072A, Rev. 7, Objective 1, Explain the design basis of the Containment Spray System in accordance with FSAR section 6.2.2.

References: N3-72-4001, "Containment Heat Removal Spray System", Rev. 18, Page 67 of 105; N3-63-4001, "Safety Injection System", Rev. Page 89 of 150; AOI-14, "Loss of RHR Shutdown Cooling", Rev. 35, Page 43 of 79; E-1 WOG Background Document, page 60.

Question:

Given the following conditions:

- The Unit is in Mode 4 with RHR in service.
- A small break LOCA occurs.
- AOI-14, "Loss of RHR Shutdown Cooling" has been entered.

For these conditions, which one of the following describes the requirements for the containment spray system?

- a. Containment spray flow will be terminated and the spray pump controls returned to A-AUTO to preserve inventory in the RWST for long-term core cooling requirements.
- b. Containment spray will continue to operate during the event until containment pressure has been reduced to less than 1.5 psid, to preclude unnecessary SI reinitiation due to high containment pressure.
- c. Containment spray flow will be reduced by stopping one containment spray pump, to ensure that containment pressure is maintained below the accident pressure of 15.0 psig while preserving RWST inventory.
- d. Containment spray flow will be terminated and the spray pump controls placed in STOP PULL-TO-LOCK to preserve inventory in the RWST for long-term core cooling requirements.

DISTRACTOR ANALYSIS

- a. CORRECT. N3-72-4001, Page 67, states "In the event of a Mode 4 LOCA, the CS pumps must be stopped to limit RWST drawdown rate". This action is necessary to assure that adequate time exists for cooldown of the RHR suction piping prior to the initiation of the recirculation mode. N3-63-4001, Page 89 of 150 lists actions to mitigate a Shutdown LOCA. Item 2 states "The CS pumps must be stopped for a Mode 4 LOCA to limit the RWST drawdown rate". AOI-14, Section 3.7, Step 18, monitors containment normal. If it is not, the RNO actions direct the operator to determine if containment spray is in service and if it is, to reset the spray signals, shutdown the spray pumps and place them in A-AUTO.
- b. Incorrect. Plausible, since after entry is made into the E-series procedures, direction is given to shutdown the spray system when containment pressure drops below a certain value. However, candidate fails to realize that it is not 1.5 psid, but this is plausible since 1.5 is the setpoint for SI initiation.
- c. Incorrect. Plausible, since this direction is contained in ECA-1.1, "Loss of RHR Sump Recirc.". During a Mode 4 LOCA, peak containment pressure would not be approached, due to the lower temperature fluid escaping the RCS.
- d. Incorrect. Plausible, since these actions are consistent with procedural guidance provided in ES-1.3, "Transfer to RHR Containment Sump".

K/A Match:

A specific limitation is placed on the containment spray system for the given plant condition. This question tests that knowledge.

SRO Only:

SRO candidate must assess the given plant conditions and decide not only what limitation of the spray system operation applies, per the procedure, but also the basis for it, in the context of accident analysis.

Lower Cognitive Level:

Candidate recalls/recognizes a specific basis and limitation placed on system operation and accident mitigation.

Question Number: 89

K/A: 062 A2.06 AC Electrical Distribution System

Ability to (a) predict the impacts of the following malfunctions or operations on the ac distribution system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Keeping the safeguards buses electrically separate.

Tier: 2 RO Imp: n/a RO Exam: n/a Cognitive Level: High
Group: 1 SRO Imp: 3.9 SRO Exam: 89 Source: New

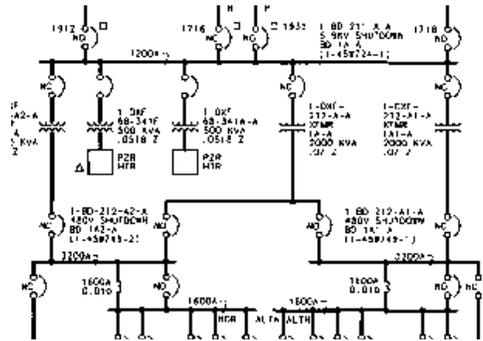
Applicable 10CFR55 Section: 41.5 / 43.5 / 45.3 / 45.13

Learning Objective: 3-OT-SYS203A, Rev. 7, Objective 17, Given the condition /status of a 480V ac Shutdown Power System/Component and the appropriate Tech Specs, determine if operability requirements are met and what actions are required.

References: SOI-212.01, "480V Shutdown Board 1A1-A", Precautions and Limitations Sect. 3.0.F.

Question:

During a forced outage, the plant is in Mode 3. A request has been made to provide alternate power to 480V Shutdown Board 1A2-A from its alternate feed, XFMR 1A-A. Refer to drawing excerpt below.



Which one of the following describes TWO (2) procedural requirements which must BOTH be considered by the SRO prior to authorizing this operation?

- 1.) Establish hourly monitoring of loading on XFMR 1A-A.
2.) Maintain electrical separation and redundancy of the 480V Shutdown Boards by ensuring that any request to provide alternate power also to 480V Shutdown Board **1A1-A** does NOT receive authorization.
- 1.) Prevent overloading XFMR 1A-A by ensuring that any request to provide alternate power also to 480V Shutdown Board **1A1-A** does NOT receive authorization.
2.) Address Appendix R concerns for loads on 480V Shutdown Board 1A2-A by referring to the Fire Protection Report for potential compensatory actions.
- 1.) Maintain electrical separation and redundancy of the 480V Shutdown Boards by ensuring that any request to provide alternate power also to 480V Shutdown Board **1A1-A** does NOT receive authorization.
2.) Address Appendix R concerns for loads on 480V Shutdown Board 1A2-A by referring to the Fire Protection Report for potential compensatory actions.
- 1.) Establish hourly monitoring of loading on XFMR 1A-A.
2.) Prevent overloading XFMR 1A-A by ensuring that any request to provide alternate power also to 480V Shutdown Board **1A1-A** does NOT receive authorization.

DISTRACTOR ANALYSIS

- a. Incorrect. Plausible, since hourly monitoring of various equipment is one of several potential compensatory measures used when equipment is operated in out of normal configurations.
 - b. CORRECT. Per SOI-212.01, "480V Shutdown Board 1A1-A", there is a concern for overloading XFMR 1A-A if it is supplying alternate power to more than one Shutdown Board at the same time. The other Shutdown Board which could be aligned is the 480V Shutdown Board 1A2-A. Therefore, the transformer should not be aligned to 1A2-A at the same time it is providing alternate power to 1A1-A shutdown board. Further, when XFMR 1A-A is aligned to provide alternate power to one or the other of the above shutdown boards, it is not rated for Appendix R; therefore, the Fire Protection Report must be consulted to determine if any compensatory measures are required for the equipment powered by this alternate power source(that is not rated for Appendix R).
 - c. Incorrect. Plausible because the second half of the distractor is correct. The first half of the distractor, "Maintaining electrical separation and redundancy...." is plausible since that is a basic design feature of safety related electrical systems in the plant. However, in this case, candidate misapplies the concept and the concern for the incorrect reason (i.e., NOT to maintain electrical separation, but to protect the transformer from overloading conditions).
 - d. Incorrect. Plausible, since hourly monitoring of various equipment is one of several potential compensatory measures used when equipment is operated in out of normal configurations. Further plausible because the second half is correct.
-

K/A Match and SRO Only:

Candidate must assess the applicability of the concept of "safeguards buses electrically separate", and decided if that is the basis for the given restriction on providing alternate power, as detailed in the stem conditions.

This A2 K/A lends itself well to an SRO Only. This question meets that by presenting the candidate with a situation involving a request to authorize an alternate power supply lineup. Candidate must not only determine whether to authorize it or not, but what the resulting impacts are on the ac distribution system. A further SRO Only aspect is in determining whether Appendix R requirements apply, and if that should be used when deciding whether to authorize the proposed lineup.

Higher Cognitive:

Candidate must recall knowledge of the system, including an examination of the provided drawing, and apply that to make a decision on whether the proposed lineup presents any issues with the various aspects of the distractors, and then make the decision on authorization.

Question Number: 90

K/A: 063 G2.2.37DC Electrical Distribution

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

Tier:	2	RO Imp:	n/a	RO Exam:	n/a	Cognitive Level:	High
Group:	1	SRO Imp:	4.5	SRO Exam:	90	Source:	NEW

Applicable 10CFR55 Section: 41.7 / 41.10 / 43.1 / 45.13

Learning Objective: 3-OT-SYS057P, Rev. 8, Objective 11, State the 125V DC Vital system parameters governed by TS.

References: LCO 3.8.4, "DC Sources - Operating"; SR 3.0.3.

Question:

At 1800 on May 15 SR 3.8.4.3 (verifies required vital battery charger alternate feeder breaker is open - specified frequency of 7 days) was performed satisfactorily.

On May 25 at 1700, it is discovered by the Shift Manager that SR 3.8.4.3 was last performed on May 15.

Which one of the following is correct regarding the status of the vital batteries and requirements for SR 3.8.4.3 performance?

- They are inoperable now because the delay period beyond the maximum extension time has been exceeded. SR 3.8.4.3 must be completed satisfactorily by May 25 at 1900.
- They are operable. If a risk evaluation is performed to determine risk impact, then SR 3.8.4.3 completion can be extended at the latest, to May 29 at 1800.
- They are operable. If a risk evaluation is performed to determine risk impact, then SR 3.8.4.3 completion can be extended at the latest, to June 1 at 1700.
- They are operable since the delay period beyond the maximum extension time has not been exceeded. However, SR 3.8.4.3 must be completed satisfactorily by May 25 at 1900.

DISTRACTOR ANALYSIS

- Incorrect. The SRO must consider the original specified frequency of 1.25 X 7 days = 8 days and 18 hours. That frequency has been exceeded, and the candidate incorrectly believes the batteries are now inoperable. Candidate may also mistakenly apply the LCO 3.8.4, Condition A Completion Time of 2 hours to the time of discovery and believe that the surveillance must be performed no later than time of discovery plus the 2 hours; i.e., discovered late on May 25 at 1700 plus two hours = May 25 at 1900.
- Incorrect. While it is true that the batteries can be considered operable (as explained in "c" below), and that a risk evaluation can allow a completion time extension of up to the specified frequency (7 days), the given completion is incorrect. Candidate incorrectly calculates the 7 day frequency from the original 7 day frequency expiration; i.e., May 15 + 7 days = May 22 + 7 days = May 29. The correct time is from the time of discovery, plus 7 days (specified frequency), per SR 3.0.3.
- CORRECT. SR 3.0.3, "Surveillance Requirement Applicability", permits delaying the requirement to declare the LCO not met, from the time of discovery, up to 24 hours or up to the limit of the specified frequency, whichever is greater. However, if the surveillance is delayed greater than the 24 hour period, a risk impact must be performed to determine scope of any risk. Since the SR was last performed on May 15 at 1800, it should have been performed by May 24 at 1200 (specified frequency = 7 days + .25 maximum extension time = 8 days and 18 hours). The discovery (29 hours later) that it had not been performed does not exceed the specified frequency of the surveillance if a risk assessment is performed. The required completion time is calculated by adding the specified frequency (7 days) to the time of discovery; i.e., May 25 at 1700 + 7 days = June 1 at 1700.
- Incorrect. Plausible since the delay period beyond the maximum extension time has not been exceeded, however the candidate believes that the LCO completion time (2 hours) applies upon discovery (May 25 at 1700).

K/A Match and SRO Only:

Candidate is presented with a plant condition involving an overdue surveillance and how that affects operability of the equipment.

The SRO Only aspect is in understanding and applying Tech. Spec. Completion Time Extension rules.

Higher Cognitive Level:

Higher cognitive level since candidate must recall a rule, and then apply it to make a determination on operability of equipment, and what action, including required time frame, is required.

Question Number: 91

K/A: 028 G2.4.49 Hydrogen Recombiner and Purge Control

Ability to perform without references to procedures those actions that require immediate operation of system components and controls.

Tier:	2	RO Imp:	n/a	RO Exam:	n/a	Cognitive Level:	Low
Group:	2	SRO Imp:	4.4	SRO Exam:	91	Source:	New

Applicable 10CFR55 Section: 41.10 / 43.2 / 45.6)

Learning Objective: State the major actions of AOI-30.1, "Plant Fires".

References: TI-12.04; SOI-13.01, "Fire Detection System"

Question:

Given the following conditions:

- The plant has been shutdown for a refueling outage and has just entered Mode 5.
- Train 1A of Containment Purge is in service aligned to upper containment.
- A report is confirmed of smoke detected in Unit 1 Auxiliary Building air intake. A small smoldering fire was the source, and was extinguished by workers at the scene.
- ABI (Auxiliary Building Isolation) Train A and Train B windows are LIT.
- The OAC notes that the RED indicating light for 1A Purge Exhaust fan is LIT.

Which one of the following describes the prompt manual action the operator needs to take, and a subsequent step to be taken by the SRO for these conditions?

- a. To determine any additional ventilation requirements, use SOI-13.01, "Fire Detection System". Re-initiate ABI.
- b. To determine the required notifications for this event, use AOI-30.1, "Plant Fires". Re-initiate ABI.
- c. To determine any additional ventilation requirements, use SOI-13.01, "Fire Detection System". Manually shut off Train 1A Purge fans and shut dampers.
- d. To determine the required notifications for this event, use AOI-30.1, "Plant Fires". Manually shut off Train 1A Purge fans and shut dampers.

DISTRACTOR ANALYSIS

- a. Incorrect. Plausible, since the procedure is correct, and candidate may believe that reinitiating ABI would be prudent for containing and dispositioning smoke, etc.
- b. Incorrect. Plausible, since there are several notifications detailed in the given procedure, however candidate incorrectly believes that ABI should be reinitiated.
- c. CORRECT. The reference includes a table which details potential additional ventilation requirements. The action required is correct is also required per the reference.
- d. Incorrect. Plausible since there are several notifications mentioned in the given procedure, but these are for a different purpose

K/A: 028 G2.4.49 Hydrogen Recombiner and Purge Control

Ability to perform without references to procedures those actions that require immediate operation of system components and controls.

K/A Match and SRO Only:

Candidate is presented with plant conditions involving Purge Control and must assess the given conditions to determine a course of action, including appropriate procedure selection, for mitigation.

Lower Cognitive Level:

Recognition of which procedure applies and recall of actions needed.

Question Number: 92

K/A: 055 G2.1.19 Condenser Air Removal.

Ability to use plant computers to evaluate system or component status.

Tier:	2	RO Imp:	n/a	RO Exam:	n/a	Cognitive Level:	Low
Group:	2	SRO Imp:	3.8	SRO Exam:	92	Source:	New

Applicable 10CFR55 Section: (CFR: 41.10 / 45.12)

Learning Objective:

References: EPIP-1, Table 7-1, "Effluent Radiation Monitor EALs"; AOI-33, "Steam Generator Tube Leak", Appendix A, Step 4; ARI-173-179, Appendix B (lists 1-RM-90-404 as a PAM Radiation Monitor).

Question:

With the plant at 100% power, the Unit Supervisor has just entered AOI-33, "Steam Generator Tube Leak". The following radiation monitors' number and nomenclature are given:

1-RM-90-119	Condenser Vacuum Pump Exhaust Radiation Monitor
1-RM-90-404 A/B	U1 Condenser Vacuum Exhaust

Which one of the following identifies which radiation monitor is used:

- 1.) to calculate the steam generator tube leak rate on the Integrated Computer System (ICS), and
- 2.) in Effluent Radiation Monitor EALs for classifying an event?

	<u>ICS</u>	<u>Event Classification</u>
a.	1-RM-90-119	1-RM-90-404 A/B
b.	1-RM-90-119	1-RM-90-119
c.	1-RM-90-404 A/B	1-RM-90-119
d.	1-RM-90-404 A/B	1-RM-90-404 A/B

DISTRACTOR ANALYSIS

- a. CORRECT. Per AOI-33, 1-RM-90-119 is the monitor to use for calculating and monitoring the steam generator tube leak rate for the Integrated Computer System. 1-RM-90-404A/B is a post-accident radiation monitor, and is specified in EPIP-1, "Emergency Plan Classification Flowchart" as the radiation monitor used for determining potential radiation releases during an event. There is a table in the back of the EPIP (Table 7-1) which identifies 1-RM-90-404A/B as the monitors to use for EAL determination.
- b. Incorrect. ICS radiation monitor is correct, and it is plausible to believe that the data provided by radiation monitor which feeds into the computer used to calculate the actual leak rate, would also be qualified to use for classifying the event.
- c. Incorrect. Both selections are plausible for either application, since each monitor is used (and qualified) for specific aspects of the event; i.e., calculating and monitoring the actual leak rate (which is then used for making decisions on appropriate operator actions per the procedure), and for providing an independent value to be used for a separate purpose (classifying the event). Both of these functions are important to mitigating the event. It is plausible that a candidate mistakenly switches the two, and in the process fails to recognize that the post-accident monitor (1-RM-90-404A/B) is the one used to classify the event.
- d. Incorrect. Plausible since 1-RM-90-404 A/B is a post-accident monitor, and candidate incorrectly applies this knowledge in believing the post-accident monitor would be used during the tube leak to determine the leak rate. Candidate correctly recognizes that the monitor is used for event classification.

K/A Match and SRO Only:

Candidate is tested on knowledge of two radiation monitors which input to plant computers and how they are used to assess plant conditions, including the SRO level ability of which one is appropriate during event classification.

Lower Cognitive Level:

Recognition and recall of radiation monitors, and where they provide input.

Question Number: 93

K/A: 079 A2.01

Ability to (a) predict the impacts of the following malfunctions or operations on the SAS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Cross-connection with IAS

Tier:	2	RO Imp:	n/a	RO Exam:	n/a	Cognitive Level:	High
Group:	2	SRO Imp:	2.9	SRO Exam:	93	Source:	New

Applicable 10CFR55 Section: (CFR: 43.5 / 45.13)

Learning Objective: 3-OT-AOI100, Rev. 7, Objective 7, Given a set of plant conditions, use AOI-10 to correctly: a. Recognize Entry Conditions. b. Identify Required Actions. c. Respond to Contingencies (RNO). d. Observe and Interpret Cautions and Notes.

References: AOI-10, "Loss of Control Air", Rev. 38; E-3, "Steam Generator Tube Rupture", Rev. 22.

Question:

Given the following plant conditions:

- A tube rupture has occurred on Steam Generator (SG) #4.
- While performing E-3, "Steam Generator Tube Rupture" cooldown actions, the #2 RCP developed a seal problem and had to be stopped.
- Due to an air leak, 136-B, AUX AIR TR-A PRESS LO annunciator is lit.

Which one of the following describes (1) how the required RCS depressurization will be performed and (2) the impact of the events on plant ventilation systems?

RCS Depressurization

Plant Ventilation System

- | | |
|--|---|
| a. Auxiliary Spray will be used to perform the RCS depressurization. | ABGTS and EGTS Train A must be manually shutdown 30 minutes after start to preserve a filter bank. |
| b. Auxiliary Spray will be used to perform the RCS depressurization. | ABGTS and EGTS Train A fans must be de-energized manually to prevent operation with dampers isolated. |
| c. One PZR PORV will be used to perform the RCS depressurization. | ABGTS and EGTS Train A must be manually shutdown 30 minutes after start to preserve a filter bank. |
| d. One PZR PORV will be used to perform the RCS depressurization. | ABGTS and EGTS Train A fans must be de-energized manually to prevent operation with dampers isolated. |

DISTRACTOR ANALYSIS

- a. Incorrect. Plausible, since use of the Auxiliary Spray to reduce pressure is a viable method for depressurization per E-3, if the normal sprays AND neither PZR PORV is available. After the trip and SI, AOI-17, "Turbine Trip" directs that one train of both EGTS and ABGTS be shutdown after 30 minutes.
- b. Incorrect. Plausible, since use of the Auxiliary Spray to reduce pressure is a viable method for depressurization per E-3, if the normal sprays AND neither PZR PORV is available. Per AOI-10, ABGTS and EGTS Train A fans must be shutdown to prevent operation with associated dampers closed.

- c. Incorrect. Plausible, since use of one PZR PORV will be used to perform the RCS depressurization. After the trip and SI, AOI-17, "Turbine Trip" directs that one train of both EGTS and ABGTS be shutdown after 30 minutes.
 - d. CORRECT. One PZR PORV will be used to perform the RCS depressurization, since the normal sprays are not available, and the RNO directs use of the PORV before auxiliary spray. Per AOI-10, ABGTS and EGTS Train A fans must be shutdown to prevent operation with associated dampers closed.
-
-

K/A Match and SRO Only:

Candidate must assess plant conditions involving various events, including the impacts of auxiliary air connections, and how that affects pressurizer spray, and then determine the effect that has on mitigation.

Higher Cognitive Level:

Application of knowledge of the effects of air system connections, and loss of air, for pressurizer spray, and on dampers, including implied knowledge of why that is important, and then determining the appropriate action.

Question Number: 94

K/A: G2.1.8

Ability to coordinate personnel activities outside the control room.

Tier:	3	RO Imp:	n/a	RO Exam:	n/a	Cognitive Level:	High
Group:	n/a	SRO Imp:	4.1	SRO Exam:	94	Source:	New

Applicable 10CFR55 Section: (CFR: 41.10 / 45.5 / 45.12 / 45.13)

Learning Objective: 3-OT-AOI0800, Rev.6, Objective 7, Demonstrate ability/knowledge of AOI, by: a. Recognizing Entry conditions. b. Responding to Action steps. c. Responding to Contingencies (RNO), d. Responding to Notes/Cautions.

References: AOI-8, "Tornado Watch or Warning", Rev.44

Question:

Assume the outside air temperature (measured at 10 meters) is 58° F, and that the SRO has entered "AOI-8, Tornado Watch or Warning".

During a Tornado ____ (1) ____, the SRO must direct the Outside AO to ____ (2) ____.

- | | (1) | (2) |
|----|---------|--|
| a. | Warning | ensure all D/G Exhaust Fans are running. |
| b. | Watch | ensure all D/G Exhaust Fans are running. |
| c. | Warning | D/Gs are idle started. |
| d. | Watch | D/Gs are idle started. |

DISTRACTOR ANALYSIS

- CORRECT. This direction is in AOI-8, "Tornado Watch or Warning", Attachment 7. The SRO must ensure this is performed in order to prevent the possibility of a negative pressure on the D/G room during a tornado. The Outside AO is used to perform this function.
- Incorrect. It is plausible to think this would be done during a tornado watch, and in fact, AOI-8 allows it, but does not require it. The question is clear in testing what MUST the SRO direct?
- Incorrect. Plausible, since Tornado Warning is correct, and also because some plants consider it a prudent action to have D/Gs "at the ready" for a tornado event, due to the potential for loss of offsite power. However, this action is not allowed per the AOI-8, since outside air temperature must be below 52° F before the D/Gs are idle started. The D/Gs are idle started at colder conditions to prevent overcooling the room, and rendering the batteries inoperable. These conditions do NOT apply in the stem of this question since outside air temperature is given at 58° F.
- Incorrect. Plausible for similar reasons as explanation for "c" above.

K/A Match and SRO Only:

Matches the K/A because the candidate must determine what direction to give the Outside AO when dispatching to the D/G building. SRO Only aspect is the usage of the given procedure to assess which action is required for the given condition (watch vs. warning).

Higher Cognitive Level:

Candidate must apply the given air temperature to the tornado condition(s) given (warning or watch) and make a conclusion about which action applies. In making this determination, there is more to it than

recalling a fact; candidate must not only apply the given air temperature, but understand the basis for the action, in the context of the warning vs. watch, and for the air temperature.

Question Number: 95

K/A: G2.2.15

Ability to determine the expected plant configuration using design and configuration control documentation, such as drawings, line-ups, tag-outs, etc.

Tier:	3	RO Imp:	n/a	RO Exam:	n/a	Cognitive Level:	Low
Group:	n/a	SRO Imp:	4.3	SRO Exam:	95	Source:	New

Applicable 10CFR55 Section: (CFR: 41.10 / 43.3 / 45.13)

Learning Objective: 3-OT-SPP1001, Rev. 3, Objective 8, Identify when EQUIPMENT ALIGNMENT CHECKLISTS are required.

References: SOI-30.07, "Shutdown Board Rooms HVAC el 757 & 772, Appendix A; Technical Requirement 3.7.5, "Area Temperature Monitoring".

Question:

With the unit at 100% power, 480V Shutdown Board Room A/C 1A-A has failed. The Unit Supervisor has made the determination to provide temporary room cooling to prevent exceeding Technical Requirement 3.7.5, "Area Temperature Monitoring".

How long can the temporary cooling remain in place, and is a breaching permit required for the door between 1A-A and 2A-A rooms?

	<u>Maximum Temporary Cooling Time</u>	<u>Breaching Permit Required for Door</u>
a.	14 days	YES
b.	30 days	YES
c.	14 days	NO
d.	30 days	NO

DISTRACTOR ANALYSIS

- Incorrect. 14 days is plausible, especially if candidate believes that the shorter time is more appropriate for a door being open between two trains of equipment. 14 days is also a Required Action completion time for ice condenser doors in Tech. Specs. Overall distractor is more plausible also because the second part is correct.
- CORRECT. SOI-30.07, Appendix A specifies a maximum time of 30 days for this temporary cooling to be in place, and requires a breaching permit for the door between the two rooms being blocked open.
- Incorrect. 14 days is plausible, especially if candidate believes that the shorter time is more appropriate for a door being open between two trains of equipment. Breach permit not being required is also plausible since candidate may believe that a 14 day maximum time is an adequate control method for the door being open. 14 days is also a Required Action completion time for ice condenser doors in Tech. Specs.
- Incorrect. Plausible since the 30 day limit is correct. Breach permit not being required is also plausible if candidate misinterprets the 30 day limit as the control method for minimizing and controlling the door being open.

K/A Match and SRO Only:

Candidate must evaluate the importance of a proposed lineups involving temporary room cooling, in the context of configuration control (whether a breaching permit is required for tracking the lineup). This is also the SRO only aspect of this question.

Lower Cognitive Level:

Recognition of conditions and recall of requirements.

Question Number: 96

K/A: G2.2.42

Ability to recognize system parameters that are entry-level conditions for Technical Specifications.

Tier:	3	RO Imp:	n/a	RO Exam:	n/a	Cognitive Level:	High
Group:	n/a	SRO Imp:	4.6	SRO Exam:	96	Source:	WBN Bank

Applicable 10CFR55 Section: (CFR: 41.7 / 41.10 / 43.2 / 43.3 / 45.3)

Learning Objective: 3-OT-T-0305, Rev. 2, Objective 5, Given plant conditions and parameters determine applicable Action Conditions, Required Actions, and Completion Times associated with the ECCS.

References: LCO 3.5.4, "Refueling Water Storage Tank"; Tech Req. 3.1.5, "Borated Water Sources, Shutdown".

Question:

Given the following plant conditions:

- An RCS heatup is in progress on Unit 1 in preparation for a Mode change following refueling.
- Tav_g is 195°F.
- The previous shift Outside AUO reported that the breaker which supplies the RWST heat trace circuit was tripped, and is unable to be re-closed.
- Outside air temperature is 12°F.
- RWST water temperature is 57°F.

Which one of the following describes the correct response of the operating crew?

- a. Continue the heatup and change modes, then enter the appropriate Required Action.
- b. Continue the heatup, and change modes using the provisions of LCO 3.0.4.a.
- c. Terminate the heatup prior to the mode change, and restore the RWST to operable status prior to changing modes.
- d. Terminate the heatup prior to the mode change, and restore the RWST to operable status within 1 hour.

DISTRACTOR ANALYSIS

- a. Incorrect. Plausible, since the conditions of the stem place the unit in Mode 5, and the RWST is required to be operable to satisfy TR3.1.5, "Borated Water Sources, Shutdown" only if the Boric Acid Storage System is not operable. Mode 4 entry with the RWST inoperable is not allowed by Technical Specifications.
- b. Incorrect. Plausible, since the candidate may assume that the conditions of 3.0.4.a. contain the provision for a risk assessment to be performed to allow a mode change.
- c. CORRECT. Termination of the heatup prevents an inappropriate mode change. TS 3.5.4, CONDITION A is applicable and an 8 hour allowance for recovery is given.
- d. Incorrect. Plausible, since TS 3.5.4, CONDITION B states that "RWST inoperable for reasons other than Condition A, restore the RWST to OPERABLE status within 1 hour". Since the RWST temperature is out of limits, TS 3.5.4, CONDITION A is applicable and an 8 hour allowance for recovery is given.

K/A Match and SRO Only:

Candidate is presented with a system parameter and then is to determine the effect of the resultant operability of whether the heatup may continue (SRO level knowledge, since it is application of Tech. Spec. rules for mode changes).

Higher Cognitive Level:

Application of operability parameter knowledge to arrive at a conclusion on operation of the plant.

Question Number: 97

K/A: G2.3.4

Knowledge of radiation exposure limits under normal or emergency conditions.

Tier:	3	RO Imp:	n/a	RO Exam:	n/a	Cognitive Level:	High
Group:	n/a	SRO Imp:	3.7	SRO Exam:	97	Source:	2007 Seabrook

Applicable 10CFR55 Section: (CFR: 41.12 / 43.4 / 45.10)

Learning Objective: 3-OT-RAD0003, Rev.3, Obj 6, List the extreme emergency exposure guidelines.

References: SPP-5.1, "Radiological Controls", Rev. 6, Page 14 of 46, TABLE 1; Page 20 of 46, 3.4.2.B Emergency Exposure Guidance and Planned Special Exposures (PSE). EPIP-15, "Emergency Exposure Limits", Rev. 13 Appendix D, DEFINITIONS.

Question:

Given the following plant conditions:

- A tube rupture on Steam Generator (SG) #1 occurred five days ago.
- During the performance of E-3, "Steam Generator Tube Rupture", failed fuel was detected.
- While sampling SG #1, the chemistry technician reports that the sample valve has completely failed and that the area is being abandoned due to high radiation levels.
- It has been determined that it will take one individual to cut and cap the sample line.
- The expected dose to the individual performing this task is 6.5 Rem TEDE.
- It has been determined that performance of this task by this individual will reduce the doses of personnel making subsequent entries into the sample valve room.

The dose associated with the repairs constitutes a(an) _____(1)_____, and requires authorization by the _____(2)_____.

(1)

(2)

- | | |
|-----------------------------|---------------------|
| a. Planned Special Exposure | RP Shift Supervisor |
| b. Planned Special Exposure | Plant Manager |
| c. Emergency Exposure | RP Shift Supervisor |
| d. Emergency Exposure | Plant Manager |

DISTRACTOR ANALYSIS

- a. Incorrect. Plausible, since this does constitute a Planned Special Exposure per SPP-5.1 Table 1; however, the RP Shift Supervisor cannot authorize the exposure, but is plausible due to the nature of the title of this position.
- b. CORRECT. This is a Planned Special Exposure per SPP-5.1 Table 1, and EPIP-15, Definitions section. Per Table 1, the Site Vice President must authorize the exposure.
- c. Incorrect. Plausible, since it is true that the plant event started out as an "emergency", and this selection is therefore plausible. However, an Emergency Exposure is defined as an exposure immediately needed to save a life or to reduce dose to large numbers of the population. The RP Shift Supervisor CANNOT authorize the exposure, but is plausible due to the nature of the title of this position.
- d. Incorrect. Plausible, since the exposure is somewhat related to the event in progress, but is not an Emergency Exposure. The SED must authorize any Emergency Exposure.

K/A Match, SRO Only, High Cognitive Level:

Candidate must evaluate a condition involving a proposed radiation and apply knowledge of exposure limits to determine the category of exposure and who must authorize it.

Question Number: 98

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:	n/a	RO Exam:	n/a	Cognitive Level:	High
Group:	n/a	SRO Imp:	3.1	SRO Exam:	98	Source:	New

Applicable 10CFR55 Section: (CFR: 41.12 / 43.4 / 45.9)

Learning Objective: 3-OT-SYS014A, Rev. 4, Obj 4, Given plant conditions, determine if a radioactive release would be possible from the Cond Demin to the Cooling Tower blowdown.

References: EPIP-1, Section 1.3 "Containment Barrier", including Note 5.

Question:

During the implementation of EPIP-1, "Emergency Plan Classification Flowchart", 1-RE-90-273 and 274, Upper Containment Radiation Monitors are used.

Which one of the following describes both:

1. how many fission product barriers have a loss or a potential loss if a valid increase to above 200 R/hour is seen on these monitors, and
2. a condition that, for a short period of time, affects the monitors' ability to provide reliable information?

Fission Product Barriers

Condition Affecting Upper Containment Radiation Monitors

- | | | |
|----|---|---|
| a. | 1 | Rapid change in containment temperature |
| b. | 1 | Rapid increase in containment pressure |
| c. | 2 | Rapid change in containment temperature |
| d. | 2 | Rapid increase in containment pressure |

DISTRACTOR ANALYSIS

- Incorrect. Plausible, because the containment radiation monitors are temperature sensitive, being affected by either a rapid increase or decrease in containment temperature. However, candidate fails to conclude that not only is the containment fission product barrier potentially affected, but also these monitors function to provide indication of failed fuel; a second fission product barrier.
- Incorrect. Many sensors and instruments not only in containment, but throughout the plant, are affected by pressure in their environment. Plausible, if student thinks that containment pressure affects these monitors.
- CORRECT. EPIP-1, "Emergency Plan Classification Flowchart", Section 1.3 "Containment Barrier" contains a note explaining the affect that containment temperature has on the containment radiation monitors. Further, the associated foldout page provides guidance for determining that if these monitors indicate the value given in the stem (200R/hr), this means a loss of fuel cladding barrier, and a potential loss of the containment fission product barrier.
- Incorrect. Plausible because the given readings on these monitors is indicative of loss or potential loss of two fission product barriers. Second part is also plausible, but incorrect, because many sensors and instruments not only in containment, but throughout the plant, are affected by pressure in the environment they are in. Plausible, if student thinks that containment pressure affects these monitors.

K/A Match:

Candidate is tested on and must apply knowledge of the radiation monitors for containment.

SRO Only and High Cognitive Level:

Candidate must apply the knowledge of the radiation monitors on how they are used in the Emergency Plan Classification Flowchart when determining event classification. Higher cognitive level aspect is applying the knowledge of the effect of containment parameters on the monitors and concluding how that is used in the Emergency Plan Classification Flowchart.

Question Number: 99

K/A: G2.4.35

Knowledge of local auxiliary operator tasks during an emergency and the resultant operational effects.

Tier:	3	RO Imp:	n/a	RO Exam:	n/a	Cognitive Level:	High
Group:	n/a	SRO Imp:	4.0	SRO Exam:	99	Source:	New

Applicable 10CFR55 Section: (CFR: 41.10 / 43.5 / 45.13)

Learning Objective: 3-OT-AOI3000, Rev. 5, Objective 12, Demonstrate ability/knowledge of AOI-30.1 and 30.2 by: a. Recognizing entry conditions b. Responding to required actions of the AOI c. Responding to contingencies (RNO) d. Responding to Notes/Cautions

References: AOI-30.2, C.69, "Fire Safe Shutdown Control Bldg"., Rev. 0, page 8, 10, and 35; Drawing 1-47W611-68-2, Rev. 7; Emergency Plan Implementing Procedure -1.

Question:

Given the following conditions:

- A fire has been reported in the Control Building.
- AOI-30.2, "Fire Safe Shutdown" has been implemented.
- The initial REP declaration for the fire has been made and reported.
- The Shift Manager orders a Control Room evacuation.
- The Auxiliary Control Room (ACR) is manned at 0200.
- Checklists have just been assigned to the Assistant Unit Operators.

With respect to performance of AOI-30.2 CHECKLIST 30.2-2 "Local Operator (AUO) #2 Actions";

- (1) What is the impact on the Emergency Plan if CHECKLIST 30.2-2, Local Operator (AUO) #2 Actions, is not completed until 0220, AND
- (2) What is the impact on pressurizer heater control after CHECKLIST 30.2-2 is complete?

	(1)	(2)
a.	Upgrade from Notification of Unusual Event to Alert.	Only manual control is available.
b.	Upgrade from Alert to Site Area Emergency.	Only manual control is available.
c.	Upgrade from Notification of Unusual Event to Alert.	Automatic control is available, if desired.
d.	Upgrade from Alert to Site Area Emergency.	Automatic control is available, if desired.

DISTRACTOR ANALYSIS

- a. Incorrect. Plausible, because some fires are classified as an Unusual Event, depending on location, duration, and the area affected. A fire can be classified as an Unusual Event, even if it threatens the Control Building. However, the fire given in the stem is actually IN the Control Building, and therefore must be classified as an Alert. Automatic cycling of A-A and B-B heaters is available between 2210 - 2218 psig..
- b. Incorrect. Per Emergency Plan Implementing Procedure - 1, a fire in the Control Building is classified as an Alert. However, per the abnormal procedure for AOI-30.2, "Fire Safe Shutdown", Appendix C.69, "Control Building", if it takes more than 15 minutes to make the Auxiliary Control Room fully functional, then the existing REP call must be upgraded to a Site Area Emergency.

- c. Incorrect. Plausible, because some fires are classified as an Unusual Event, depending on location, duration, and the area affected. A fire can be classified as an Unusual Event, even if it threatens the Control Building. However, the fire given in the stem is actually IN the Control Building, and therefore must be classified as an Alert.
 - d. CORRECT. Upgrade from an Alert to a Site Area Emergency is correct. The second part of this distractor (method of pressurizer heater control) is plausible because auxiliary control circuits do exist, and because the operators are placing the Auxiliary Control Room in service for this event.
-

K/A Match and SRO Only:

Candidate is tested on the nature of auxiliary operator tasks when performing a checklist and resulting effects of that, not only on the plant itself, but on the implementation of the emergency plan (SRO aspect).

Higher Cognitive Level:

Candidate is required to apply understanding of operator actions during an emergency and then conclude the effect of that on the plant, in the higher level context of how much more significant this effect is (i.e., the effect on the emergency plan).

Question Number: 100

K/A: G2.4.38

Ability to take actions called for in the facility emergency plan, including supporting or acting as emergency coordinator if required.

Tier:	3	RO Imp:	n/a	RO Exam:	n/a	Cognitive Level:	Low
Group:	n/a	SRO Imp:	4.4	SRO Exam:	100	Source:	Palisades 2007

Applicable 10CFR55 Section: (CFR: 41.10 / 43.5 / 45.11)

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

References: "Radiological Emergency Plan", Rev. 86; EPIP-6, "Activation and Operation of the TSC"; EPIP-8, "Personnel Accountability and Evacuation".

Question:

Which one of the following lists contains Site Emergency Director responsibilities all of which can **NOT** be delegated?

- Conduct evacuation of site non-emergency personnel.
Declare the appropriate Emergency Classification.
Authorize exceeding 10CFR20 dose limits for emergency workers.
- Declare the appropriate Emergency Classification.
Authorize exceeding 10CFR20 dose limits for emergency workers.
Make recommendations for protective actions to the State.
- Conduct evacuation of site non-emergency personnel.
Authorize exceeding 10CFR20 dose limits for emergency workers.
Approve the decision to conduct Assembly and Accountability.
- Approve the decision to conduct Assembly and Accountability.
Make recommendations for protective actions to the State.
Conduct evacuation of site non-emergency personnel.

DISTRACTOR ANALYSIS

- Incorrect. Plausible, since the SED does approve the decision on whether to conduct evacuation; however, EPIP-8, Appendix G clearly provides leeway for the SED to delegate the actual conducting of the evacuation. A similar plausibility also applies for Assembly and Accountability. Further plausibility is added to this distractor because the last item (exceeding dose limits) is correct.
- CORRECT. Per EPIP-6 and EPIP-8, all the listed items cannot be delegated by the SED. Note: For the last item in this distractor/correct answer, the SRO candidate must recognize the importance of the given information in the stem that the CECC has not yet been manned. This is key to understanding that making protective action recommendations to the State CAN be delegated by the SED, but ONLY until the CECC is fully manned and operational.
- Incorrect. Plausible, since the SED does approve the decision on whether to conduct evacuation; however, EPIP-8, Appendix G clearly provides leeway for the SED to delegate the actual conducting of the evacuation. Plausibility to this distractor is enhanced by the fact that authorizing exceeding dose limits cannot be delegated by the SED, and likewise for the last item in the distractor.
- Incorrect. Plausible because the first item is correct, and because the second item would be true IF the CECC was already manned and operational, but per the information in the stem, it is not.

Ability to take actions called for in the facility emergency plan, including supporting or acting as emergency coordinator if required.

K/A Match and SRO Only:

The nature of this K/A lends itself to SRO only: knowledge of SED responsibilities, including execution of them (what cannot be delegated). K/A is matched also because the question tests what are the emergency coordinator's duties and actions.

Lower Cognitive Recall:

Recall of specific facts regarding SED duties and requirements for which of those cannot be delegated.