WRITTEN QUESTION DATA SHEET

Question Number: 1

K/A: 000007 EK3.01
Reactor Trip - Stabilization - Recovery
Knowledge of the reasons for the following as the(y) apply to a reactor trip: Actions contained in EOP for reactor trip.

Tier:	1	**RO Imp:**	4.0	**RO Exam:**	Yes	**Cognitive Level:**	High
Group:	1	**SRO Imp:**	4.6	**SRO Exam:**		**Source:**	NEW

Applicable 10CFR55 Section: 41.5/41.10/45.6/45.13

Learning Objective: 3-OT-EOP0000 Objective 9: Discuss the basis for monitoring RCS temp using T-cold when no RCPs are running as directed by ES-0.1.

References: ES-0.1 Rev. 21.

Question:

Given the following plant conditions:

- A reactor trip has occurred.
- Off-Site power is lost.
- All other equipment has functioned as designed.
- The crew is entering ES-0.1, REACTOR TRIP RESPONSE.

Upon entering ES-0.1, Step 3 directs the operators to monitor for RCS temperature trending to 557°F. Which temperature indication will the operators use and why?

A. Tavg, to ensure adequate RCS heat removal is occurring.

B. Tavg, to check for natural circulation established.

C. Tcold, to ensure adequate RCS heat removal is occurring.

D. Tcold, to check for natural circulation established.

DISTRACTOR ANALYSIS

a. Incorrect. Plausible, since Tavg is a commonly used indication for many aspects of transients, but in this case, with a loss of offsite power, there is no power to the RCPs, and therefore Tavg is not a reliable indication. Candidate correctly recognizes the reason for monitoring RCS temperature at 557° F is to ensure adequate heat removal is occurring.
b. Incorrect. Plausible, since Tavg is a commonly used indication for many aspects of transients, but in this case, with a loss of offsite power, there is no power to the RCPs, and therefore Tavg is not a reliable indication. Checking for natural circulation is plausible since this is a goal of the procedure, but only towards the end, and is not the specific reason.
c. CORRECT. Tcold is the correct indication to use, per ES-0.1, and because of no RCPs in service, Tcold is the most accurate indication.
d. Incorrect. Plausible, since Tcold is the correct indication to use, since there are no RCPs in service. Checking for natural circulation is plausible since this is a goal of the procedure, but only towards the end, and is not the specific reason..

WRITTEN QUESTION DATA SHEET

Question Number: 2

K/A: 000009 EK2.03
Knowledge of the interrelations between the small break LOCA and the following: S/Gs.

Tier:	1	**RO Imp:**	3.0	**RO Exam:**	Yes	**Cognitive Level:**	High
Group:	1	**SRO Imp:**	3.3	**SRO Exam:**		**Source:**	DC Cook 2006, Significant Mod

Applicable 10CFR55 Section: 41.7/45.7
Learning Objective: 3-OT-EOP0001 Objective 12: Discuss the purpose of ES-1.2 Post LOCA Cooldown and Depressurization.

References: ES-1.2, Rev. 14.

Question:

Given the following plant conditions:

- A 200 gpm RCS leak is in progress.
- Containment pressure is stable at 3 psig.

Under these circumstances, what is the MINIMUM S/G water level required in at least one S/G and why?

A. 29%. Ensures adequate feedwater flow or S/G inventory to ensure a secondary heat sink.

B. 39%. Ensures S/G tubes are covered in order to promote reflux cooling.

C. 29%. Ensures S/G tubes are covered in order to promote reflux cooling.

D. 39%. Ensures adequate feedwater flow or S/G inventory to ensure a secondary heat sink.

DISTRACTOR ANALYSIS

a. Incorrect. Candidate correctly understands that a Small Break LOCA is in progress (based on the given RCS leak rate). Candidate also realizes that for this size LOCA, the S/G is important because it provides the needed heat sink. However, candidate fails to recognize that containment is in the adverse condition, and apply this knowledge to conclude that 29% is too low to ensure an adequate heat sink.
b. Incorrect. Candidate correctly recognizes the correct minimum level for adverse containment, but incorrectly believes that reflux cooling is needed for heat removal.
c. Incorrect. Candidate fails to realize that containment conditions are adverse, and selects the incorrect required S/G level. Also incorrectly believes that reflux cooling is the heat removal mechanism for a LOCA this size.
d. CORRECT. Candidate realizes that a containment pressure of 3.0 psig means adverse conditions (which requires 39% minimum level in the S/G), and that the mechanism for heat removal is via the S/G.

Question Number: 3

K/A: 000015/17 AK1.03
Knowledge of the operational implications of the following concepts as they apply to Reactor Coolant Pump Malfunctions (Loss of RC Flow): The basis for operating at a reduced power level when one RCP is out of service.

Tier:	1	**RO Imp:** 3.0	**RO Exam:** Yes	**Cognitive Level:**	High
Group:	1	**SRO Imp:** 4.0	**SRO Exam:**	**Source:**	NEW

Applicable 10CFR55 Section: 41.8/41.10/45.3

Learning Objective: LP AOI2400, Rev 6 Objective 9 Identify the parameters listed in AOI-24 that require the RCP to be shutdown.

References: AOI-24 Rev. 28, FSAR 15.2.

Question:

Given the following:

- Unit 1 operating at 12% power.
- At 1030 - Reactor Coolant Pump (RCP) #3 trips
- At 1245 it is determined that the pump can be restarted following an inspection of a junction box on the pump motor.
- The planned restart time is 1500.

Which ONE of the following identifies the actions required due to the trip of the pump and the basis for the maximum power level the plant can be maintained to complete the inspection and the restart of the inactive loop?

	Action required	Basis for power level required
A.	Trip the Reactor.	To ensure there will be no significant reactivity insertion when the pump is restarted.
B.	Trip the Reactor.	To allow entry inside the polar crane wall.
C.	Reduce power to less than 10%.	To ensure there will be no significant reactivity insertion when the pump is restarted.
D.	Reduce power to less than 10%.	To allow entry inside the polar crane wall.

DISTRACTOR ANALYSIS

a. CORRECT, AOI-24 requires the reactor to be tripped if an RCP is tripped and the FSAR identifies the maximum power level to be 0 MWt prior to the restart of an inactive loop.
b. Incorrect. Tripping the reactor is correct but the trip is not required to make entry inside the polar crane wall. The entry can be made with the proper approvals at power levels greater than 0%. Plausible because the first part is correct and polar crane wall entries are not normal made at power.
c. Incorrect. Reducing power to less than 10% is not correct. Plausible because a previous revision of the AOIs would allow the restarting of the pump at less than 10% power and the basis for the power level is correct.
d. Incorrect. Reducing power to less than 10% is not correct; Plausible because a previous revision of the AOIs would allow the restarting of the pump at less than 10% power and polar crane wall entries can be made with the proper approvals at low power levels in Mode 1.

WRITTEN QUESTION DATA SHEET

Question Number: 4

K/A: 000022 G2.4.31
Loss of Reactor Coolant Makeup
Knowledge of annunciator alarms, indications, or response procedures.

Tier:	1	**RO Imp:**	4.2	**RO Exam:**	Yes	**Cognitive Level:**	High
Group:	1	**SRO Imp:**	4.1	**SRO Exam:**		**Source:**	DC Cook 2006, Significant Mod.

Applicable 10CFR55 Section: 41.10/45.3

Learning Objective: Lesson Plan 3-OT-SYS062A, Objectives 10 Explain the VCT level program, and 12. 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: ARI 109-A VCT LEVEL HI/LO, Rev. 15.

Question:

Given the following plant conditions:

- The Unit is at 45%.
- Letdown is in service at 120 gpm per Chemistry request.

The OAC observes the following indications on 1-M-6:

- VCT level is 38% and decreasing.
- Annunciator Window 109-A, VCT LEVEL HI/LO, is LIT.
- 1-LCV-62-118 indicating light is LIT for Divert to Holdup Tank.

Based on these indications, actual VCT level will lower to ...

A. a level which will cause eventual loss of CCP suction.

B. a level which will cause a swapover to the RWST.

C. 20% and cause auto makeup flow to maintain 20% level.

D. 20% and cause auto makeup flow to return level to 41%.

DISTRACTOR ANALYSIS

a. CORRECT. A failure of 1-LT-62-130 high causes letdown to divert to the Holdup Tank. Auto VCT makeup will attempt to control VCT level between 20% and 41% (makeup will not keep up with 120 gpm letdown). Eventually, the VCT level lowers to the RWST switchover setpoint of 7%. With 1-LT-62-130 failed high, the coincidence for switchover will not be made up and level continues lowering to 0%. At this time suction is lost to the charging pump and it will trip.

b. Incorrect. The auto swapover signal requires multiple inputs. With 1-LT-62-130 failed high, swapover does not occur. Plausible if candidate does not remember swapover logic.

c. Incorrect. VCT Makeup is not sufficient to replace the 120 gpm lost through diversion to the Holdup Tank. Plausible if candidate does not remember that auto makeup flowrate is approximately 70 gpm plus any boron. Distractor implies that makeup flow is sufficient to stabilize level once it started.

d. Incorrect. VCT Makeup is not sufficient to replace the 120 gpm lost through diversion to the Holdup Tank. Plausible if candidate does not remember that auto makeup flowrate is approximately 70 gpm plus any boron. Distractor implies that the makeup flow is greater than the 120 gpm, causing VCT level to rise.

WRITTEN QUESTION DATA SHEET

Question Number: 5

K/A: 000025 AK3.02
Knowledge of the reasons for the following responses as they apply to the Loss of Residual Heat Removal System: Isolation of RHR low-pressure piping prior to pressure increase above specified level.

Tier:	1	**RO Imp:**	3.3	**RO Exam:**	Yes	**Cognitive Level:**	HIGH
Group:	1	**SRO Imp:**	3.7	**SRO Exam:**		**Source:**	NEW

Applicable 10CFR55 Section: 41.5/41.10/45.6/45.13

Learning Objective: 3-OT-AOI1400, Objective 7Demonstrate ability/knowledge of AOI, to correctly: a. Respond to Action steps, b. Respond to Notes & Cautions.

References: AOI-14, Rev. 34; Tech Spec 3.4.11 COMS.

Question:

Unit is in Mode 4 on RHR cooling with Train A in service.

RCS conditions initially are:

- Temperature at 220° F.
- Pressure at 330 psig.
- Pressurizer level at 30%.
- A transient occurs causing the crew to enter AOI-14, Loss of Shutdown Cooling, due to high pressure in the RCS.

Section 3.4, RCS High Pressure during RHR Shutdown Cooling, requires _____ prior to closing 1-FCV-74-1 and 1-FCV-74-2 if RCS greater is greater than 370 psig. The reason for this requirement is _____.

A. ONE pressurizer PORV to be operable;
For COMS protection

B. BOTH pressurizer PORVs to be operable;
For COMS protection

C. At least ONE CCP to be stopped;
To ensure relief path when RCS pressure is less than or equal to 450 psig.

D. BOTH CCPs to be stopped;
To ensure relief path when RCS pressure is less than or equal to 450 psig.

DISTRACTOR ANALYSIS

a. Incorrect. Two PORVs are required to be available if the RHR suction relief is not available.
b. CORRECT. Per AOI-14 Section 3.4, Step 6 both PORVs must be operable for COMS protection OR the RCS must be depressurized before the Loop 4 isolation valves are closed.
c. Incorrect. Plausible since stopping charging pumps is required if the plant is in water solid conditions.
d. Incorrect. Plausible since stopping charging pumps is required if the plant is in water solid conditions.

WRITTEN QUESTION DATA SHEET

Question Number: 6

K/A: 000026 AA1.02
Ability to operate and/or monitor the following as they apply to the Loss of Component Cooling Water: Loads on the CCWS in the control room.

Tier:	1	**RO Imp:**	3.2	**RO Exam:**	Yes	**Cognitive Level:**	LOW
Group:	1	**SRO Imp:**		**SRO Exam:**		**Source:**	NEW

Applicable 10CFR55 Section: 41.7, 45.5

Learning Objective: 3-OT-AOI1500 Objective 4 Describe Action if Surge Tank Level is not maintained.

References: AOI-15, Rev. 31, ARI-241-253, Rev 9.

Question:

While monitoring the CCS surge tank during unanticipated level changes, which ONE of the following describes the surge tank level that the operator would expect the Sample Heat Exchanger to isolate?

A. 85%.

B. 60%.

C. 52%.

D. 10%.

DISTRACTOR ANALYSIS

a. Incorrect. Plausible, since candidate may believe that a high level condition in the surge tank will isolate a potential leak source.
b. Incorrect. Plausible, since this is the level that will cause the makeup valve to open to the surge tank.
c. CORRECT. When level drops to 52%, 1-FCV-70-183 will close. This will in turn cause 1-FCV-70-215 to close.
d. Incorrect. Plausible since this is the level at which the operators would determine that loss of CCS level is imminent and would trip the CCS pumps

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Question Number: 7

K/A: 000027 AA2.02
Ability to determine and interpret the following as they apply to the Pressurizer Pressure Control Malfunctions: Normal values for RCS pressure.

Tier:	1	**RO Imp:**	3.8	**RO Exam:**	Yes	**Cognitive Level:**	High
Group:	1	**SRO Imp:**	3.9	**SRO Exam:**		**Source:**	NEW

Applicable 10CFR55 Section: 43.5/45.13

Learning Objective: Lesson Plan 3-OT-SYS068C, Objective 8. Describe the operation of the master pressure controller.

Lesson Plan 3-OT-SYS099A, Objective 17 Identify the Reactor trips and give setpoints and list logic required for the Reactor trips.

References: AOI-18, Rev. 21.

Question:

Given the following plant conditions:

- A power escalation is in progress.
- Plant is currently holding power at 30% for secondary chemistry hold.
- Pressurizer Pressure Channel Selector Switch 1-XS-68-340D is in the "PT-68-340 & 334" position.
- Pressurizer Pressure Transmitter 1-PT-68-340 fails high.

(1) What action is required to stabilize RCS pressure at its normal value and (2) if that action was unsuccessful, what will ensure that adequate RCS subcooling margin is maintained?

A. (1) Manually increasing the master controller output.
(2) Automatic Reactor trip when Pressurizer pressure lowers to SI initiation setpoint.

B. (1) Manually increasing the master controller output.
(2) Automatic Reactor trip when Pressurizer pressure lowers to RPS trip setpoint.

C. (1) Manually decreasing the master controller output.
(2) Automatic Reactor trip when Pressurizer pressure lowers to SI initiation setpoint.

D. (1) Manually decreasing the master controller output.
(2) Automatic Reactor trip when Pressurizer pressure lowers to RPS trip setpoint.

DISTRACTOR ANALYSIS

a. Incorrect. Increasing the master controller output maintains the spray valves open, worsening the transient. Second part is correct. With power at 5%, (which is implied by stem stating that the Mode change from Mode 2 to Mode 1 had just occurred), the low Pressurizer pressure trip is not enabled. Pressure would have to decrease to the SI actuation setpoint for a trip to occur.
b. Incorrect. Plausible if the candidate does not recall P-7 relationship with low pressure trips. Low pressure trip is enabled by P-7, with reactor power > 10% (P-10) or turbine load > 10% (P-13).
c. Incorrect. Manually decreasing the output of the master controller closes the spray valves and turns on PZR heaters, stopping the pressure reduction. For these conditions, with P-7 enabled, pressure would have to decrease to the RPS actuation setpoint (not SI) in order for a trip to occur.
d. CORRECT. Manually decreasing the output of the master controller closes the spray valves and turns on PZR heaters, stopping the pressure reduction. Low pressure trip is enabled by P-7, with reactor power > 10% (P-10) or turbine load > 10% (P-13).

Question Number: 8

K/A: 000038 G2.2.40
Steam Generator Tube Rupture
Ability to apply Technical Specifications for a system.

Tier:	1	**RO Imp:**	3.4	**RO Exam:**	Yes	**Cognitive Level:**	HIGH
Group:	1	**SRO Imp:**	4.7	**SRO Exam:**		**Source:**	New

Applicable 10CFR55 Section: 41.10/43.2/43.5/45.3

Learning Objective: 3-OT-TS0307. Objective 3.Given plant conditions and parameters, correctly determine the OPERABILITY of components associated with different Plant Systems in Section 7 of Technical Specifications.

References: E-3, Rev. 22; WBN Tech Spec Section 3.4 Reactor Coolant System; 3.7 Plant Systems.

Question:

Given the following plant conditions:

- A steam generator tube rupture is in progress.
- The Chemistry Lab has just informed the crew that the activity levels in #1 S/G are high, and that sample values have been confirmed.
- The crew is implementing E-3, STEAM GENERATOR TUBE RUPTURE.

As a result of actions directed by E-3, which one of the following requires entry into a Tech Spec Action statement?

A. Adjusting the #1 SG PORV controller setpoint to 90%.

B. Closing the #1 SG MSIV.

C. Closing the TD AFW pump steam supply valve from #1 SG.

D. Cooling down to target incore temperature of 479°F at the maximum rate.

DISTRACTOR ANALYSIS

a. Incorrect. Plausible, since the action is taken in E-3, but adjusting the setpoint on the SG PORV controller to 90% does not render the PORV inoperable.
b. Incorrect. Plausible, since the action is taken in E-3, but closing the MSIV does not render the MSIV inoperable
c. CORRECT. The closure of the TD AFWP steam supply valve requires LCO 3.7.5 entry.
d. Incorrect. Plausible, since the initial cooldown is not greater than 100°F in an hour, but it is accomplished at maximum rate.

Question Number: 9

K/A: 000040 (W/E12) EA2.2
Ability to determine and interpret the following as they apply to the (Uncontrolled Depressurization of all Steam Generators): Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.

Tier:	1	**RO Imp:**	3.4	**RO Exam:**	Yes	**Cognitive Level:**	High
Group:	1	**SRO Imp:**	3.9	**SRO Exam:**		**Source:**	NEW

Applicable 10CFR55 Section: 43.5/45.13

Learning Objective: 3-OT-ECA0201, Objective Describe the major actions of ECA-2.1, Uncontrolled Depressurization of all Steam generators.

References: ECA-2.1, Rev. 9.

Question:

The following conditions exist:

- Unit 1 initially in mode 3 preparing for a reactor startup.
- A steam leak downstream of the MSIVs requiring safety injection has occurred.
- Operators are unable to close any MSIV from the Control Room.
- The applicable EOP has directed MSIV closure.

Which ONE of the following describes (1) the appropriate action to take, and (2) when that action has been taken, how will the control room operator know it was successful?

A. (1) Dispatch operator to locally isolate control air to the MSIVs.
(2) Local operator notifies control room that AMBER light above handswitch in Auxiliary Control Room is LIT.

B. (1) Dispatch operator to locally isolate control air to the MSIVs.
(2) Main control room operator notes GREEN light above MSIV control switches is LIT.

C. (1) Dispatch operator to attempt MSIV closure from Auxiliary Control Room.
(2) Local operator notifies control room that AMBER light above handswitch in Auxiliary Control Room is LIT.

D. (1) Dispatch operator to attempt MSIV closure from Auxiliary Control Room.
(2) Main control room operator notes GREEN light above MSIV control switches is LIT.

DISTRACTOR ANALYSIS

a. Incorrect. Plausible, since candidate may think that, as with various other valves in the plant, isolating control air causes the valve to close. However, in this case, the MSIVs have an accumulator which maintains the valves in position. Also plausible since there is an AMBER light on the Auxiliary Control Room panel, but it only indicates that the panel has been activated. Additionally, this is not the prescribed action per the appropriate procedure in use for these conditions.
b. Incorrect. Plausible, since candidate may think that, as with various other valves in the plant, isolating control air causes the valve to close. However, in this case, the MSIVs have an accumulator which maintains the valves in position. Further plausibility is due to the correct method of determining the local action was successful (GREEN light lit in main control room).
c. Incorrect . Plausible, since the action is correct, and because there is an AMBER light associated with the Auxiliary Control Room panel, but it indicates only that the panel has been activated, and does not provide assurance of MSIV position.
d. CORRECT. This is the correct action per the procedure, and the GREEN light above each handswitch in the main control room will indicate actual MSIV position.

Question Number: 10

K/A: 000055 EA1.01
Ability to operate/monitor the following as they apply to a Station Blackout: In-core thermocouple temperatures.

Tier:	1	**RO Imp:**	3.7	**RO Exam:**	Yes	**Cognitive Level:**	Low
Group:	1	**SRO Imp:**	3.9	**SRO Exam:**		**Source:**	NEW

Applicable 10CFR55 Section: 41.7/45.5/45.6

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, Rev. 19.

Question:

During the performance of ECA-0.0, LOSS OF SHUTDOWN POWER, the operators monitor core exit thermocouples readings to determine if they need to transition to...

A. FR-P.1 Pressurized Thermal Shock due to excessive cooldown.

B. Severe Accident Management Guidelines due to loss of heat removal capability.

C. ECA-0.1, RECOVERY FROM LOSS OF SHUTDOWN POWER WITHOUT SI REQUIRED.

D. ECA-0.2, RECOVERY FROM LOSS OF SHUTDOWN POWER WITH SI REQUIRED.

DISTRACTOR ANALYSIS

a. Incorrect. Plausible since ECA-0.0 does address maintaining Tcold greater than 270°F to avoid PTS concerns.
b. CORRECT. Core exit temperatures are monitored less than 1200°F to determine if entry conditions to SACRG-1 are met.
c. Incorrect. Plausible since one of the criteria for transition from ECA-0.0 is RCS subcooling greater than 65°F [85°F].
d. Incorrect. Plausible since one of the criteria for transition from ECA-0.0 is RCS subcooling greater than 65°F [85°F].

Question Number: 11

K/A: 000057 AK3.01
Knowledge of the reasons for the following responses as they apply to the Loss of Vital AC Instrument Bus: Actions contained in EOP for loss of vital ac electrical instrument bus.

Tier:	1	**RO Imp:** 4.1	**RO Exam:**	**Yes**	**Cognitive Level:**	**High**
Group:	1	**SRO Imp:** 4.4	**SRO Exam:**		**Source:**	**NEW**

Applicable 10CFR55 Section: 41.5/41.10/45.6/45.13

Learning Objective: Lesson Plan 3-OT-AOI2500, Objective1," Demonstrate ability to recognize a loss of any 120V AC Vital Power Bd, including effects on equipment and controls (SOER 81-02)."

References: AOI-25.01, LOSS OF 120V AC VITAL INSTRUMENT POWER BOARDS 1-I AND 2-I, Rev. 27, Appendix A and C.

Question:

Given the following plant conditions:

- Unit 1 is at 100% power.
- Alarms received indicate a failed electrical board.
- All trip status lights are OFF on 1-XX-55-5 Panel (1-M-5).
- Low seal flow to RCPs due to FCV-62-89 failing open.
- High charging flow due to FCV-62-93 failing open.

Which ONE of the following identifies (1) which electrical board was lost and (2) what actions are required to regain control of charging and seal injection flow, in accordance with the procedure in effect?

	(1)	(2)
A.	120 VAC Vital Instrument Board 1-I.	Transfer controls for 1-FCV-62-93 Charging Header Flow Control and 1-FCV-62-89 CVCS Charging Header –Seals Flow Control to AUX and control from the Aux Control Room.
B.	120 VAC Vital Instrument Board 1-II.	Select Manual on 1-FIC-62-93, Charging Flow Controller to regain control of charging flow.
C.	120 VAC Vital Instrument Board 1-I.	Select Manual on 1-FIC-62-93 Charging Flow Controller to regain control of charging flow.
D.	120 VAC Vital Instrument Board 1-II.	Transfer controls for 1-FCV-62-93 Charging Header Flow Control and 1-FCV-62-89 CVCS Charging Header –Seals Flow Control to AUX and control from the Aux Control Room.

DISTRACTOR ANALYSIS

a. CORRECT. All of the status lights being off on the 1-XX-55-5 panel is a direct symptom of 120 VAC Vital Instrument Board 1-1 failing. Additionally, the need to transfer controls for 1-FCV-62-93 and 1-FCV-62-89 to AUX are steps required by AOI-25.01, Appendix C.
b. Incorrect. Plausible, but would not result in all of the status lights being off on the 1-XX-55-5 panel.
c. Incorrect. Plausible since this is the correct board loss, but states an incorrect action for regaining control of 1-FCV-63-93.
d. Incorrect. Plausible, wrong board but correct action.

Question Number: 12

K/A: 000058 AK1.01
Knowledge of the operational implications of the following concepts as they apply to Loss of DC Power: Battery charger equipment and instrumentation.

Tier:	1	**RO Imp:**	2.8	**RO Exam:**	Yes	**Cognitive Level:**	High
Group:	1	**SRO Imp:**	3.1	**SRO Exam:**		**Source:**	SQN modified

Applicable 10CFR55 Section: 41.8/41.10/45.3

Learning Objective: 3-OT-SYS057P, Objective 1.Describe the 125v Vital, 250v, 48v and 24v battery systems in terms of the following:
d. Location and normal and alternate supplies to associated battery chargers.
f. Normal and alternate supplies to battery boards.
g. Typical feeds from battery boards.

References: 45W700-1, Rev 24.

Question:

Given the following plant conditions:

- Unit 1 is at 100% power with No Tech Spec LCO Actions in effect.
- The 125 V DC Power System is normally aligned with the exception of the 6-S Vital Battery Charger being aligned to the 125v Vital Battery Board II due to scheduled maintenance on the 125v Vital Charger II.
- Offsite power is lost.
- All diesel generators start and load except for the 1B-B diesel generator which fails to start.

Which ONE of the following statements identifies the condition of the 125V Vital DC batteries II and IV? (Assume NO operator action is taken.)

A. Battery II is being maintained at normal voltage.
Battery IV is discharging.

B. Battery IV is being maintained at normal voltage.
Battery II is discharging.

C. Both batteries are being maintained at normal voltage.

D. Both batteries are discharging.

DISTRACTOR ANALYSIS

a. Incorrect. Battery Board II has no power from an AC source and therefore Battery II is discharging. Battery IV has power from 2B-B DG, and therefore is not discharging.
b. CORRECT. Based on 1-45W700-1, the 6-S charger receives power from 480V RX MOV board 1B2-B. The failure of 1B-B DG results in a loss of power to the charger, and Battery II is discharging. Battery IV is powered from 2B-B DG through its normal feed and normal charger.
c. Incorrect. Battery Board II has no power from an AC source, and therefore Battery II is discharging. Battery IV has power from 2B-B DG, and therefore is not discharging.
d. Incorrect. Battery Board II has no power from an AC source and therefore Battery II is discharging. Battery IV has power from 2B-B DG, and therefore is not discharging.

Question Number: 13

K/A: 000062 AA2.02
Ability to determine and interpret the following as they apply to the Loss of Nuclear Service Water: The cause of possible SWS loss.

Tier:	1	**RO Imp:**	2.9	**RO Exam:**	Yes	**Cognitive Level:**	High
Group:	1	**SRO Imp:**	3.6	**SRO Exam:**		**Source:**	WBN Bank

Applicable 10CFR55 Section: 43.5/45.13

Learning Objective: 3-OT-AOI1300, Objective 5: Identify the general location of a rupture given a Lo hdr pressure coincident with NO strainer high ΔP.

References: AOI-13, LOSS OF ESSENTIAL RAW COOLING WATER, Rev. 35.

Question:

Given the following plant conditions:

- The Unit is at 100% power.
- ERCW system is in normal alignment.
- ERCW headers 1A and 2A are indicating low flow.
- The following MCR alarms are LIT on 1-M-27A:
  - Window 223-A, "ERCW HDR A SUP PRESS LO".
  - Window 223-C, "ERCW HDR 1A STRAINER ΔP HI ".
  - Window 223-B, "ERCW PMP A-A Discharge Pressure Low".
  - Window 226-B, "ERCW PMP D-A Discharge Pressure Low".

Which ONE of the following describes what has occurred in the ERCW system?

A. 1A supply header has ruptured in the Auxiliary Building.

B. 1A discharge header has ruptured in the Auxiliary Building.

C. 1A supply header has ruptured upstream of the 1A strainer.

D. 1A supply header has ruptured between the IPS and Auxiliary Bldg.

DISTRACTOR ANALYSIS

a. Incorrect. Plausible if the candidate confuses the diagnostics for a break in the Auxiliary Building. Per AOI-13, symptoms of a supply line break in the Auxiliary Building include a building flooded alarm, which is not present in the stem.
b. Incorrect. Plausible if the candidate confuses the diagnostics for a break in the Auxiliary Building. Per AOI-13, symptoms of a discharge line break in the Auxiliary Building include a building flooded alarm, which is not present in the stem
c. Incorrect. Plausible if the candidate confuses the diagnostics for a break in the Auxiliary Building. Per AOI-13, symptoms of a supply line break in the Intake Pumping Station (IPS) include an IPS flooded alarm, which is not present in the stem. Additionally, a break in the IPS is characterized by the lack of the strainer ΔP high alarm.
d. CORRECT. All indications provided in the stem support the diagnosis of an ERCW break in the yard.

WRITTEN QUESTION DATA SHEET

Question Number: 14

K/A: 000065 AK3.04
Knowledge of the reasons for the following response as they apply to the Loss of Instrument Air: Cross-over to backup air supplies.

Tier:	1	**RO Imp:**	3.0	**RO Exam:**	Yes	**Cognitive Level:**	Low
Group:	1	**SRO Imp:**	3.2	**SRO Exam:**		**Source:**	NEW

Applicable 10CFR55 Section: 41.5/41.10/45.6/45.13

Learning Objective: 3-OT-SYS001A, Objective 22. Explain the operation of the atmospheric relief valve in auto, manual, and with loss of air pressure.

References: AOI-30.2, Plant Fires Pg. 8 of 1291; WBN N3-1-4002, Rev.14, page 75 of 117.

Question:

Complete the following statement:

The reason a backup nitrogen supply is provided to the SG PORVs is to ensure that during _____(1)_____ the crew has the capability to operate them for a minimum number of cycles, and the alignment is initiated _____(2)_____.

	(1)	(2)
A.	an Appendix R Fire	automatically on low control air pressure.
B.	a Loss of Offsite Power	manually.
C.	an Appendix R Fire	manually.
D.	a Loss of Offsite Power	automatically on low control air pressure.

DISTRACTOR ANALYSIS

a. Incorrect. Plausible, since the Appendix R Fire is the correct plant condition. However, the backup nitrogen function is not initiated automatically. This aspect is plausible because there are various other plant components that have automatic backup functions, but not this one.
b. Incorrect. Plausible if candidate does not differentiate between a complete loss of AC power and a loss of offsite power. Candidate correctly recognizes that the nitrogen backup must be manually aligned.
c. CORRECT. Per the supporting reference, this backup is for an Appendix R Fire, and it is initiated manually.
d. Incorrect. Plausible if candidate does not differentiate between a complete loss of AC power and a loss of offsite power. The auto backup aspect is plausible because there are various other plant components that have automatic backup functions, but not this one.

Question Number: 15

K/A: W/E04 EK3.3
Knowledge of the reasons for the following responses as they apply to the (LOCA Outside Containment) Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations.

Tier:	1	**RO Imp:**	**RO Exam:**	**Yes**	**Cognitive Level:**	**HIGH**
Group:	1	**SRO Imp:**	**SRO Exam:**		**Source:**	**SQN BANK**

Applicable 10CFR55 Section: 41.5/41.10/45.6/45.13

Learning Objective: 3-OT-ECA0101, Objective 1 Identify and explain the major actions of procedures ECA-1.1 and 1.2.

References: ECA-1.2, Rev 4. WOG ERG Background Document ECA-1.2.

Question:

Given the following plant conditions:

- Unit 1 was initially at 100% power (normal lineup).
- The crew is responding to a LOCA into the Auxiliary Building.
- The reported leakage is from the 1A RHR Heat Exchanger Room.
- ALL Control Room valves are actually in their demanded position, with no seat leakage, following trip and SI.

Which ONE of the following statements correctly describes the valve(s) which, when closed in ECA-1.2 LOCA Outside Containment, is most likely to stop the leakage under these conditions?

A. RHR Hot Leg Injection Valve FCV-63-172.

B. RHR Suction from RCS valves FCV-74-1 and 2.

C. Normal letdown isolation valves FCV-62-69 and 70.

D. RHR Train A/B Cold Leg Injection Valve(s) 1-FCV-63-93 and 1-FCV-63-94.

DISTRACTOR ANALYSIS

a. Incorrect. This flowpath is normally isolated at power. Plausible if the candidate does not recall the full power alignment of the RHR system.
b. Incorrect. This flowpath with double isolation valves is normally isolated at power. Plausible since this section of pipe has a 600 psig design pressure and if exposed to RSC pressure would likely be the leakage point.
c. Incorrect. This flowpath is normally in service at power and has a high design pressure associated with it, reducing its likelihood as the leak source.
d. CORRECT. If check valve leakage occurs, this section of piping would be exposed to RCS pressure. Since the pressure rating of this portion of the system is 600 psig, exposure to normal RCS pressure of 2235 psig would cause leakage.

Question Number: 16

K/A: W/E11 EA1.3
Ability to operate and / or monitor the following as they apply to the (Loss of Emergency Coolant Recirculation): Desired operating results during abnormal and emergency situations.

Tier:	1	**RO Imp:**	3.7	**RO Exam:**	Yes	**Cognitive Level:**	Low
Group:	1	**SRO Imp:**	4.2	**SRO Exam:**		**Source:**	WBN BANK

Applicable 10CFR55 Section: 43.5/45.13

Learning Objective: 3-OT-ECA0101, Objective 1 Identify and explain the major actions of procedures ECA-1.1 and 1.2.

References: ECA-1.1, Rev. 11

Question:

Given the following plant conditions:

- A Large Break LOCA has occurred.
- Containment pressure =10.5 psig.
- RWST level = 20%.
- Containment sump level = 68%.
- 1A RHR pump tripped due to severe damage to its motor.
- 1-FCV-63-73, CNTMT SUMP TO RHR PMP B SUCT failed to open automatically and attempts to open it manually have failed.

Which ONE of the following describes the proper alignment of the Containment Spray (CS) pumps for the existing plant conditions while the CS pumps suction is aligned to the RWST?

A. Stop both CS pumps and place the control switches in P-T-L (Pull-To- Lock).

B. Stop both CS pumps and place the control switches in A-Auto.

C. Stop ONE CS pump and place its control switch in P-T-L (Pull-To- Lock).

D. Stop ONE CS pump and place its control switch in A-auto.

DISTRACTOR ANALYSIS

a. Incorrect. Plausible since Step 4.C. RNO directs the operator to place any CS pump not required in P-T-L position.
b. Incorrect. Plausible since the procedure will have the handswitches placed in A-UTO under different circumstances at Step 7.
c. CORRECT. With containment pressure at 10.5 psig, ECA-1.1 requires only one CS pump in service. Step 4.C. RNO directs the operator to place any CS pump not required in P-T-L position.
d. Incorrect. Plausible since the procedure will have the handswitches placed in A-UTO under different circumstances at Step 7.

Question Number: 17

K/A: W/E05 EA2.2
Ability to determine and interpret the following as they apply to the (Loss of Secondary Heat Sink): Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.

Tier:	1	**RO Imp:**	3.7	**RO Exam:**	Yes	**Cognitive Level:**	Low
Group:	1	**SRO Imp:**	4.3	**SRO Exam:**		**Source:**	WBN BANK

Applicable 10CFR55 Section: 43.5/45.13

Learning Objective: FRH0001, Loss of Secondary Heat Sink
16. List the 2 conditions that define a "dry" S/G in the contexts of procedures FR-H.1 and FR-H.5.
22. Explain the purpose for and basis of each step in FR-H.1, FR-H.2, FR-H.3, FR-H.4 and FR-H.5.

References: FR-H.1, Rev. 17.

Question:

Which ONE of the following is an adverse consequence of delaying feed and bleed cooling if the conditions for initiating feed and bleed are met in FR-H.1, "Response to Loss of Secondary Heat Sink"?

A. High temperature induced failure of S/G U-tube bends.

B. An overpressurization challenge to the reactor vessel.

C. Inability to refill the S/Gs without damage from high thermal stresses.

D. Inability to provide sufficient injection for core cooling due to high RCS pressure.

DISTRACTOR ANALYSIS

a. Incorrect. Plausible, if candidate concludes that a loss of secondary heat sink means that the S/G tubes are exposed to such high temperatures that a failure of the tube bends will occur from thermal induced failure.
b. Incorrect. Plausible, if candidate believes since there is no heat removal mechanism for RCS heat removal, that pressure will rise high enough to challenge vessel integrity. Pressure does rise, but the real concern for delaying feed and bleed core cooling is the pressure being high enough to prevent adequate safety injection.
c. Incorrect. Plausible, since candidate could correctly recognize conditions in a dry S/G which will cause a concern for thermal shocking of the S/G components when refilling.
d. CORRECT. If the S/Gs are allowed to dry out with no charging pumps available, then the RCS pressure will increase to a point above the shutoff head of the safety injection pumps. Pressure will remain high until core uncovery occurs due to loss of inventory via the PORVs and other RCS vent paths or until the restoration of secondary heat sink. Due to the threat of core damage from this situation, the operator is directed to initiate RCS Bleed and Feed while secondary heat sink is still available.

Question Number: 18

K/A: 000077 G2.1.20
Generator Voltage and Electric Grid Disturbances
Ability to interpret and execute procedure steps.

Tier:	1	**RO Imp:**	4.6	**RO Exam:**	Yes	**Cognitive Level:**	Low
Group:	1	**SRO Imp:**	4.6	**SRO Exam:**		**Source:**	NEW

Applicable 10CFR55 Section: 41.10/43.5/45.12

Learning Objective: 3-OT-SYS057A, Objective 14 Describe the generator Capability Curve, and how it is used; Objective 15 Discuss how generator excitation affects reactive load.

References: TI-12.15, Rev. 22; 1-PI-OPS-1-MCR, Section 5.4, (Monitoring Generator Loading), Rev. 39.

Question:

Given the following:

- Plant is at 100% power.
- All systems normally aligned.
- The Transmission Operator has notified the plant that system grid voltage is high and forecast to go higher.

If the Transmission Operator requests the plant to take in the maximum value of MVARs to help stabilize the grid, what is the maximum allowed MVAR incoming value, and how is the adjustment made per 1-PI-OPS-1-MCR, Main Control Room?

	MAX INCOMING VALUE	METHOD OF ADJUSTMENT
A.	100 MVARs	Exciter Voltage Adjuster
B.	100 MVARs	Exciter Base Adjuster
C.	200 MVARs	Exciter Voltage Adjuster
D.	200 MVARs	Exciter Base Adjuster

DISTRACTOR ANALYSIS

a. CORRECT. The first step of 1-PI-OPS-1-MCR, Section 5.4 for Monitoring Generator Loading, specifies the Exciter Voltage Adjuster as the means for voltage control on the Northeast Area Dispatcher (NEAD) schedule. In the next step, negative Mvar loading is restricted to less than 100 Mvars.

b. Incorrect. Candidate correctly recognizes the lower limit on Mvars in, but incorrectly believes the base adjuster is the procedurally specified method of making the adjustment. Plausible, since use of the base adjuster is allowed, but ONLY if you are already selected to the base adjuster. The conditions in the stem, "all systems normally aligned", requires the candidate to understand that the Exciter Voltage Adjuster is the selected method.

c. Incorrect. Candidate fails to recall that 200 Mvars is twice the allowed value for Mvars in, per the procedure. The correct value is - 100 Mvars. This distractor is plausible since the Exciter Voltage Adjuster is the specified method of making vars adjustments for the given conditions.

d. Incorrect. Candidate fails to recall that 200 Mvars is twice the allowed value for vars in, per the procedure. The correct value is - 100 Mvars. Distractor is plausible since the Exciter Base Adjuster is the correct method, but ONLY if you are already selected to the base adjuster. The conditions in the stem, "all systems normally aligned", requires the candidate to understand that the Exciter Voltage Adjuster is the selected method.

Question Number: 19

K/A: 000001 AK2.01
Knowledge of the interrelations between the Continuous Rod Withdrawal and the following: Rod bank step counters.

Tier:	1	**RO Imp:**	2.9	**RO Exam:**	Yes	**Cognitive Level:**	High
Group:	2	**SRO Imp:**	3.2	**SRO Exam:**		**Source:**	SQN Bank

Applicable 10CFR55 Section: 41.7/45.7

Learning Objective: 3-OT-SYS085A, Objective 23 Given a failure of the controlling input instrumentation for rod control and no operator action, describe the effects of rod motion on the plant, if any.

References: FSAR Section 7.7.1

Question:

Given the following:

- Unit 1 is at 50% power.
- Rod control in AUTO with Bank D at 176 steps.
- Tavg auctioneering unit fails LOW.

As a result, Rods will _____, and the Step Counters will change at _____ Steps/Min.

A. Insert, 72

B. Insert, 64

C. Withdraw, 72

D. Withdraw, 64

DISTRACTOR ANALYSIS

a. Incorrect. With the Tavg Auctioneering Unit failed low, the rod control system sees a large error between Tref-Tavg, causing rods to withdraw, not insert. Rods will move at the highest speed which is 72 steps per min. Plausible if the candidate confuses the direction of rod movement.

b. Incorrect. With the Tavg Auctioneering Unit failed low, the rod control system sees a large error between Tref-Tavg, causing rods to withdraw, not insert. Rods will move at the highest speed which is 72 steps per min. Plausible if the candidate confuses the manual rod motion speed of 64 steps per minute for the correct auto highest speed.

c. CORRECT. With the Tavg Auctioneering Unit failed low, the rod control system sees a large error between Tref-Tavg, causing rods to withdraw. Rods will move at the highest speed which is 72 steps per min.

d. Incorrect. With the Tavg Auctioneering Unit failed low, the rod control system sees a large error between Tref-Tavg causing rods to withdraw. Rods will move at the highest speed which is 72 steps per min.

Question Number: 20

K/A: 000028 AK1.01
Knowledge of the operational implications of the following concepts as they apply to Pressurizer Level Control Malfunctions: PZR reference leak abnormalities.

Tier:	1	**RO Imp:**	2.8	**RO Exam:**	Yes	**Cognitive Level:**	High
Group:	2	**SRO Imp:**	3.1	**SRO Exam:**		**Source:**	Comanche Peak SigMod

Applicable 10CFR55 Section: 41.8/41.10/45.3

Learning Objective: 3-OT-SYS068C, Objective 15, Describe the response to a deviation from pressurizer level program.

References: 1-47W611-68-2, Rev. 7

Question:

Given the following plant conditions:

- 1-XS-68-339E PRZ LVL CTRL CHAN SELECT is in the 339 /335 position.
- With actual pressurizer level at 50%, 1-LT-68-339 Pressurizer Level Transmitter develops a slow leak in the reference leg.

What is the effect on Pressurizer level and charging flow?

A. Actual level in the Pressurizer will be increasing, causing charging flow to lower.

B. Actual level in the Pressurizer will be decreasing, causing charging flow to rise.

C. Indicated level on 1-LT-68-339 will be increasing, causing charging flow to lower.

D. Indicated level on 1-LT-68-339 will be decreasing, causing charging flow to rise.

DISTRACTOR ANALYSIS

a. Incorrect. LT-68-339 is the controlling level channel. As far as the circuit is concerned, level will be increasing in the pressurizer. This results in a level error signal causing a drop in actual pressurizer level. Plausible if the candidate confuses ACTUAL with INDICATED level.
b. Incorrect. LT-68-339 is the controlling level channel. As far as the circuit is concerned, level will be increasing in the pressurizer. This results in a level error signal causing a drop in actual pressurizer level. Plausible if the candidate confuses ACTUAL with INDICATED level. Actual level cannot be seen by the circuit due to the failure in progress.
c. CORRECT. Level indicated on 1-LT-68-339 will be increasing. Since the transmitter is selected for control, charging flow will be decreasing, attempting to control level on program.
d. Incorrect. Plausible since this is the response that would be expected of 1-LT-68-339 and charging flow if the variable leg of 1-LT-68-339 were to develop a leak. With the reference leg developing the leak the plant response is opposite.

WRITTEN QUESTION DATA SHEET

Question Number: 21

K/A: 000032 AK2.01
Knowledge of the interrelations between the Loss of Source Range Nuclear Instrumentation and the following: Power supplies, including proper switch positions.

Tier:	1	**RO Imp:**	2.7	**RO Exam:**	Yes	**Cognitive Level:**	High
Group:	2	**SRO Imp:**	3.1	**SRO Exam:**		**Source:**	WBN Bank

Applicable 10 CFR 55 Section: 41.7, 45.7
Learning Objective: 3-OT-SYS092A, Objective 31: Describe the distribution of Instrument and Control Power in the Nuclear Instrumentation System, including the effects of a loss of one or both supplies under various plant conditions.

References: 3-OT-SYS092A; 1-47W611-99-2, Rev. 12

Question:

Which ONE of the following describes the Reactor Protection System response if a CONTROL POWER fuse blows on SRM N-131, with the Source Range Monitor "TRIP BYPASS SWITCH" in the position indicated?

	SRM BYPASS: NORMAL	SRM BYPASS: BYPASS
A.	NO TRIP	NO TRIP
B.	REACTOR TRIP	NO TRIP
C.	NO TRIP	REACTOR TRIP
D.	REACTOR TRIP	REACTOR TRIP

DISTRACTOR ANALYSIS

a. Incorrect. Loss of either instrument power or control power results in a trip of the Source range channel with the TRIP BYPASS switch in NORMAL. With the TRIP BYPASS switch in NORMAL, a loss of instrument power does not result in a reactor trip.
b. Incorrect. Loss of either instrument power or control power results in a trip of the Source range channel with the TRIP BYPASS switch in NORMAL. With the TRIP BYPASS switch in NORMAL, a loss of instrument power does not result in a reactor trip
c. Incorrect. Loss of either instrument power or control power results in a trip of the Source range channel with the TRIP BYPASS switch in NORMAL. With the TRIP BYPASS switch in NORMAL, a loss of instrument power does not result in a reactor trip.
d. CORRECT. Loss of control power results in a reactor trip regardless of the SRM BYPASS switch position.

WRITTEN QUESTION DATA SHEET

Question Number: 22

K/A: 000059 AK3.01
Knowledge of the reasons for the following responses as they apply to the Accidental Liquid Radwaste Release: Termination of a release of radioactive liquid.

Tier:	1	**RO Imp:**	3.5	**RO Exam:**	Yes	**Cognitive Level:**	Low
Group:	2	**SRO Imp:**	3.9	**SRO Exam:**		**Source:**	WBN Bank

Applicable 10CFR55 Section: 41.5 , 41.10 / 45.6 / 45.13

Learning Objective: 3-OT-AOI3100, Rev 6, Objective 3. Explain Operator Actions on Abnormal Release of Radioactive

References: SOI-14.03 Rev 0045, AOI-31 Rev 22, ARI-180-187 Rev 30

Question:

Given the following conditions:

- Operators are responding to an unexpected annunciator, 182-B "TB SUMP DISCH 0-RM-212 LIQ RAD HI.
- The station sump pumps discharge is currently aligned to the Low volume Waste Pond.

Which ONE of the following identifies the effect the high radiation condition has on the Station Sump pumps and how the pumps discharge should be aligned as a result of the alarm in accordance with AOI-31, Abnormal Release of Radioactive Material?

	Effect on Station Sump Pumps	Station Sump Pump Discharge Aligned to
A.	Pumps stop Automatically	Unlined Chemical Holdup Pond
B.	Pumps stop Automatically	Lined Chemical Holdup Pond
C.	Require Operator action to MANUALLY stop pumps	Unlined Chemical Holdup Pond
D.	Require Operator action to MANUALLY stop pumps	Lined Chemical Holdup Pond

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DISTRACTOR ANALYSIS

a. Incorrect, Pumps are not automatically stopped but the discharge is aligned to the Unlined pond. Plausible because some HI RAD signals on release points to auto terminate the release and the alignment of the discharge is correct.
b. Incorrect, Pumps are not automatically stopped and the discharge is not aligned to the Lined pond. Plausible because some HI RAD signals on release points to auto terminate the release and the discharge could be aligned Lined pond under different conditions.
c. CORRECT, the HI RAD alarms but will not automatically stop the pumps, AOI-31 will direct the pumps will be stopped and will direct the alignment to the Unlined Chemical Holdup Pond. The alarm will refer the operator to AOI-31.
d. Incorrect, Pumps will require manual action to stop but the discharge is not aligned to the Lined pond. Plausible because the candidate may know that manual action is required to stop the pumps and the discharge could be aligned Lined pond under different conditions.

Question Number: 23

K/A: 000067 AA1.07
Ability to operate and / or monitor the following as they apply to the Plant Fire on Site: Fire alarm reset panel.

Tier:	1	**RO Imp:**	2.9	**RO Exam:**	Yes	**Cognitive Level:**	High
Group:	2	**SRO Imp:**	3.0	**SRO Exam:**		**Source:**	NEW

Applicable 10CFR55 Section: 41.7, 45.5, 45.6

Learning Objective: 3-OTAOI3000, Objective 2, When a VALID fire is reported to the Main Control Room (MCR), describe the information obtained from the person reporting the fire.

References: SOI-13, Fire Detection System, Rev 22; AOI-30.1, Plant Fires, Rev 9.

Question:

Given the following plant conditions:

- Unit 1 is at 100% power.
- Notification of a fire is received by the MCR operator via the Fire/Emergency phone.
- The MCR operator obtained the required information associated with the fire and initiates the plant fire alarm.
- After the fire alarm is initiated, a System 13 alarm indicates a cross zone detection of a fire.

Which ONE of the following identifies the actions and/or requirements for resetting the fire alarm in accordance with AOI-30.1, PLANT FIRES?

A. The System 13 alarm must be reset before the plant fire alarm can be reset, due to electrical interlocks. The fire alarm will sound for a minimum of 3 minutes before it can be reset.

B. The System 13 alarm must be reset before the plant fire alarm can be reset, due to electrical interlocks. Shift Manager or Incident Commander must direct resetting of the alarm.

C. NO reset of the System 13 alarm is required before the plant fire alarm can be reset. The fire alarm will sound for a minimum of 3 minutes before it can be reset.

D. NO reset of the System 13 alarm is required before the plant fire alarm can be reset. Shift Manager or Incident Commander must direct resetting of the alarm.

DISTRACTOR ANALYSIS

a. Incorrect. The fire alarm can be reset by the operator with an alarm on system 13. Plausible because the candidate may conclude that the System 13 alarm has to be reset prior to resetting the fire alarm and there is a three minute timer on the evacuation alarm but not on the fire alarm.
b. Incorrect. The fire alarm can be reset by the operator with an alarm on System 13. Plausible because the candidate may conclude that the System 13 alarm has to be reset and correctly identifies that the Shift Manager or Incident Commander must direct resetting of the fire alarm.
c Incorrect. While the fire alarm can be reset by the operator without resetting the System 13 alarm, there is no minimum time the alarm will sound. Plausible because the candidate may correctly conclude that the system 13 alarm would not have to be reset but relate the three minute timer on the evacuation alarm to the fire alarm.
d. CORRECT. The fire alarm can be reset by the operator with an alarm on system 13 because the is no input to System 13 from the fire alarm. AOI-30.1 directs the fire alarm is to continue until the Shift Manager or Incident Commander approves resetting the alarm.

WRITTEN QUESTION DATA SHEET

Question Number: 24

K/A: 000069 (W/E14) EA2.1
Ability to determine and interpret the following as they apply to the (High Containment Pressure):
Facility conditions and selection of appropriate procedures during abnormal and emergency operations.

Tier:	1	**RO Imp:**	3.3	**RO Exam:**	Yes	**Cognitive Level:**	High
Group:	2	**SRO Imp:**	3.8	**SRO Exam:**		**Source:**	NEW

Applicable 10CFR55 Section: 43.5, 45.13

Learning Objective: 3-OT-FRZ0001, Objective 1 Given a set of plant conditions, use the FR-Z status tree to determine which, if any, Containment Function Restoration Procedure should be implemented.

References: FR-0, Rev. 13, FR-Z.1, Rev. 10, FR-Z.2 Rev. 6, TI-12.04, Rev. 6

Question:

A large break LOCA is in progress. Which one of the following identifies conditions that would require entry into FR-Z.1 High Containment Pressure?

	Containment Pressure	Containment Spray Pumps
A.	3.0 psig	No pumps running
B.	6.0 psig	1 pump running
C.	9.0 psig	1 pump running
D.	12.0 psig	2 pumps running

DISTRACTOR ANALYSIS

a. CORRECT. Per FR-0 Containment Status Tree, with containment pressure above the Phase B isolation setpoint of 2.8 psig one containment spray pump is required to be in service. Containment pressure at 3 psig and NO pumps running would require entry into FR-Z.1 due to an ORANGE status.
b. Incorrect. Plausible since prior revision to FR-0 and FR-Z.1 would require entry into FR-Z.1 if pressure was above Phase B setpoint regardless of the number of spray pumps in service.
c. Incorrect. . Plausible since prior revision to FR-0 and FR-Z.1 would require entry into FR-Z.1 if pressure was above Phase B setpoint regardless of the number of spray pumps in service.
d. Incorrect. Plausible if the candidate believes that a RED path condition exists with containment pressure at 12 psig.

Question Number: 25

K/A: 000076 G2.2.38
High Reactor Coolant Activity
Knowledge of conditions and limitations in the facility license.

Tier:	1	**RO Imp:**	3.6	**RO Exam:**	Yes	**Cognitive Level:**	Low
Group:	2	**SRO Imp:**	4.5	**SRO Exam:**		**Source:**	SQN Bank

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

Learning Objective: 3-OT-T/S0304, Objective 4.Given plant conditions and parameters correctly determine the applicable Limiting Conditions for Operations or Technical Requirements for the various components of the RCS.

References: WBN Tech Spec 3.4.16

Question:

Assuming Unit 1 is at 100% power, which ONE of the following is the HIGHEST value for Dose Equivalent Iodine -131 (I-131) activity that meets the Tech Spec 3.4.16, RCS Specific Activity, limit without relying on ACTIONS in the LCO?

A. 0.1 μCi/gm

B. 0.2 μCi/gm

C. 0.3 μCi/gm

D. 0.4 μCi/gm

DISTRACTOR ANALYSIS

a. Incorrect. Plausible since the value is less than the Limit, but is not the highest value as required by the stem.
b. CORRECT. Activity level must return to below the limit of 0.265 μCi/gm to meet the LCO without relying on the Action statement.
c. Incorrect. A continuance of the numerical sequence (1,2,3,4) maintains the low cognitive level of the question. This forces the candidate to recognize the correct value.
d. Incorrect. A continuance of the numerical sequence (1,2,3,4) maintains the low cognitive level of the question. This forces the candidate to recognize the correct value.

Question Number: 26

K/A: W/E02 EK3.2
Knowledge of the reasons for the following responses as they apply to the (SI Termination): Normal, abnormal and emergency operating procedures associated with (SI Termination).

Tier:	1	**RO Imp:**	3.3	**RO Exam:**	Yes	**Cognitive Level:**	Low
Group:	2	**SRO Imp:**	3.8	**SRO Exam:**		**Source:**	VC Summer

Applicable 10CFR55 Section: 41.5/41.10/45.6/45.13

Learning Objective: 3-OT-EOP0100, Objective 10. Determine the correct procedure transition if during the SI termination steps of ES-1.1 it is determined that PZR level cannot be maintained using the normal charging flowpath.

References: ES-1.1, Rev. 15, WOG Background Document ES-1.1

Question:

Given the following plant conditions:

- The Unit was at full power when a Small Break LOCA occurred.
- The crew has transitioned to ES-1.1, "SI TERMINATION."
- The crew has just stopped one of the charging pumps.

What is the reason for checking RCS pressure stable or rising at this point in ES-1.1?

A. To determine if the RHR pumps should be secured.

B. To confirm that a secondary heat sink still exists.

C. To confirm that flow from one charging pump is adequate to maintain pressure.

D. To determine that plant conditions support continued operation of RCPs.

DISTRACTOR ANALYSIS

a. Incorrect. Plausible, since a later step in ES-1.1 will perform an evaluation of RHR pump status.
b. Incorrect. RCS pressure increases if the heat sink is lost with or without the charging pump in service.
c. CORRECT. Per the WOG ES-1.1 Background Document "RCS pressure stable or increasing confirms that SI flow is adequate for the operator to maintain control using one charging/SI pump. The operator will then be ready to align the charging /SI pump to the normal charging flowpath. If RCS pressure is decreasing, then the operator will go to ES-1.2, Post LOCA Cooldown and Depressurization for further actions."
d. Incorrect. Plausible, pressure is used to determine if RCPs are removed from service during certain conditions related to EOP performance.

WRITTEN QUESTION DATA SHEET

Question Number: 27

K/A: W/E13 EK2.1
Knowledge of the interrelations between the (Steam Generator Overpressure) and the following: Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Tier:	1	**RO Imp:**	3.0	**RO Exam:**	Yes	**Cognitive Level:**	High
Group:	2	**SRO Imp:**	3.1	**SRO Exam:**		**Source:**	WBN Bank

Applicable 10CFR55 Section: 41.7/45.7

Learning Objective: 3-OT-SYS001A, Objective12 Given a loss of instrument air/control power, determine the effect on the following valves: b. Steam Generator PORVs

References: 3-OT-SYS001A, Page 11, 12; Logic Diagram 1-47W611-1-1.

Question:

The minimum pressure in a SG when entry conditions for FR-H.2, "Steam Generator Overpressure" are FIRST met is ...

REFERENCE PROVIDED

A. above the PORV opening setpoint from the controller, but below the PORV trip open setpoint.

B. above the PORV trip open setpoint, but below the lowest SG safety setpoint.

C. above the lowest SG safety setpoint, but lower than the highest SG safety setpoint.

D. above the highest SG safety setpoint.

DISTRACTOR ANALYSIS

a. Incorrect. Entry into FR-H.2 is based on SG pressure of 1220, which is above the lift setpoints for all SG safety valves EXCEPT for the highest (1224 psig) . Plausible if the candidate is not aware of the actual entry level setpoint, but concludes the entry level setpoint at a pressure above the pressure the PORV should control at and if the pressure exceeded the PORV controller pressure, then the controller could be malfunctioning and the high pressure condition should be addressed.

b. Incorrect. Entry into FR-H.2 is based on SG pressure of 1220, which is above the lift setpoints for all SG safety valves EXCEPT for the highest. Plausible if the candidate is not aware of the actual entry level setpoint or the safety valve setpoints, but concludes the entry level setpoint is above the pressure the PORV should control at, but the procedure should be used to prevent opening the safety valves.

c. CORRECT. Entry into FR-H.2 is based on SG pressure of 1220, which is above the lift setpoints for all SG safety valves EXCEPT for the highest.

d. Incorrect. Entry into FR-H.2 is based on SG pressure of 1220, which is above the lift setpoints for all SG safety valves EXCEPT for the highest . This implies that all of the SG PORVs and the safety valves cannot reduce SG pressure.

Provide FR-0 Heat Sink Status Tree

Question Number: 28

K/A: 003 K3.04
Reactor Coolant Pump
Knowledge of the effect that a loss or malfunction of the RCPS will have on the following: RPS.

Tier:	2	**RO Imp:**	3.9	**RO Exam:**	Yes	**Cognitive Level:**	LOW
Group:	1	**SRO Imp:**	4.2	**SRO Exam:**		**Source:**	SQN BANK

Applicable 10CFR55 Section: 41.7/45.6

Learning Objective: 3-OT-SYS099A, Objective 17. Identify the Reactor trips and give setpoints and list logic required for the Reactor trips.

References: System Description N3-99-4003, Rev. 21, Page 87 of 106.

Question:

Which ONE (1) of the following RCS flow conditions should cause a reactor trip signal?

A. Low flow on 2 of 3 detectors in 1 of 4 loops when operating at 50% reactor power.

B. Low flow on 1 of 3 detectors in 1 of 4 loops when operating at 5% reactor power.

C. Low flow on 2 of 3 detectors in 2 of 4 loops when operating at 5% reactor power.

D. Low flow on 1 of 3 detectors in 2 of 4 loops when operating at 50% reactor power.

DISTRACTOR ANALYSIS

a. CORRECT. With power above the P-8 Permissive setpoint of 48%, 2 of 3 detectors on 1 of 4 loops will cause a reactor trip.
b. Incorrect. Plausible, since a low flow condition on 2 of 4 loops between P-7 and P-8 would cause a reactor trip. Low flow logic is not met by 1 of 3 flow transmitters.
c. Incorrect. Plausible, since a low flow condition on 2 of 4 loops between P-7 and P-8 would cause a reactor trip. Power is less than P-7, so no low flow trips are enabled.
d. Incorrect. Plausible, since a low flow condition on 2 of 4 loops above P-8 would cause a reactor trip. Low flow logic is not met by 1 of 3 flow transmitters.

WRITTEN QUESTION DATA SHEET

Question Number: 29

K/A: 004 K4.14
Chemical and Volume Control
Knowledge of CVCS design feature(s) and/or interlock(s) which provide for the following: Control interlocks on letdown system (letdown tank bypass valve).

Tier:	2	**RO Imp:**	2.8	**RO Exam:**	Yes	**Cognitive Level:**	Low
Group:	1	**SRO Imp:**	3.2	**SRO Exam:**		**Source:**	WBN Bank

Applicable 10CFR55 Section: 41.7

Learning Objective: 3-OT-SYS062A, Objective 9 Explain the function and operation of the three way divert valve LCV-62-118.

References: 3-OT-SYS062A; 1-47W611-62-; ARI 109-A, Rev. 15.

Question:

Which ONE of the following is the lowest Volume Control Tank (VCT) level at which you will expect to see BOTH the VCT diverting to the CVCS Hold Up Tank (HUT) and the VCT HIGH LEVEL alarm actuated?

A. 41%

B. 63%

C. 75%

D. 93%

DISTRACTOR ANALYSIS

a. Incorrect. This level corresponds to the termination point for Auto Makeup. Plausible since it corresponds to the high level stop for auto makeup.
b. Incorrect. This is the point at which the 1-LCV-62-118 valve begins to divert to the HUT. Plausible if operator confuses the high level alarm setpoint of 93% for this control setpoint.
c. Incorrect. This value corresponds to a high pressure condition in the VCT. Plausible since the value is associated with the VCT.
d. CORRECT. This is the high level alarm setpoint, and it corresponds to the control point where the 1-LCV-62-118 valve is fully diverting to the HUT.

Question Number: 30

K/A: 005 K5.09
Residual Heat Removal
Knowledge of the operation implications of the following concepts as they apply (to) the RHRS: Dilution and boration considerations.

Tier:	2	**RO Imp:**	3.2	**RO Exam:**	Yes	**Cognitive Level:**	High
Group:	1	**SRO Imp:**	3.4	**SRO Exam:**		**Source:**	NEW

Applicable 10CFR55 Section: 41.5 / 45.7

Learning Objective: 3-OT-SYS074A, Objective 3 State the plant conditions including reactivity effects that must be met prior to placing the RHR System in service in accordance with SOI-74.01.

References: SOI-68.02, Reactor Coolant Pumps, Step 5, Rev 33.

Question:

Given the following:

- The plant is on RHR cooling following a natural circulation cooldown.
- RCS temperature is 150° F.
- Pressurizer pressure is 340 psig.
- Pressurizer level is 25%.
- Preparations for returning to MODE 4 are in progress.

Which ONE of the following will require an action plan to be developed with Reactor Engineering prior to starting the first RCP?

A. Shutdown and control rods have been withdrawn 5 steps to ensure no thermal binding.

B. Pressurizer boron concentration is 45 ppm less than RCS boron.

C. Steam Generator metal temperature is 105° F.

D. Boration occurred during the cooldown.

DISTRACTOR ANALYSIS

a. Incorrect. Plausible, since rods could be in this position, and candidate incorrectly applies a reactivity associated manipulation with this concern.
b. Incorrect . Plausible, since there is a limit associated with delta boron between PZR and RCS; however, the limit is 50 ppm.
c. Incorrect . Plausible, since there can be a concern with initiation of forced flow with a S/G significantly colder than RCS. However, in this case, the temperature is not of concern.
d. CORRECT. Per SOI-68.02, this is the correct condition which requires evaluation and a plan with Reactor Engineering.

Question Number: 31
K/A: 006 K6.02
Emergency Core Cooling
Knowledge of the effect of a loss or malfunction on the following will have on the ECCS: Core flood tanks (accumulators).

Tier:	2	**RO Imp:**	3.4	**RO Exam:**	Yes	**Cognitive Level:**	High
Group:	1	**SRO Imp:**	3.9	**SRO Exam:**		**Source:**	NEW

Applicable 10CFR55 Section: 41.7/45.7

Learning Objective: 3-OT-SYS063A. Objective 13: Describe the cold leg accumulators, include capacity, boron concentration, type of charging agent, and pressure at which they inject.

References: LCO 3.5.1, Emergency Core Cooling Systems, Accumulators; ARI-133-B, Rev. 20; ARI-133-A, Rev. 20.

Question:

During a power escalation following a refueling outage, the plant is at 35% power when the following conditions are noted:

- Cold Leg Accumulator (CLA) 3 Nitrogen pressure is at 580 psig.
- Cold Leg Accumulator (CLA) 3 is at 7550 gallons.

Under these conditions, which ONE of the following describes the Emergency Core Cooling System's capability to provide adequate inventory to prevent significant melting of the fuel cladding during a Large Break LOCA on the RCS Cold Leg 3 concurrent with a Loss of Offsite power?

A. Remains capable, since the contents of (2) operable CLA is all that is required for core reflood to meet the ECCS acceptance criteria.

B. Remains capable, since the three remaining operable CLAs are available to provide an adequate inventory of borated water to meet the ECCS acceptance criteria.

C. CLA-3 contains an inadequate inventory of borated water. Therefore, the ECCS is not capable of preventing significant fuel clad melting for the given conditions.

D. CLA 3 contains inadequate nitrogen pressure to ensure full injection. Therefore the ECCS is not capable of preventing significant clad melting for the given conditions.

DISTRACTOR ANALYSIS

a. Incorrect. Plausible, if candidate believes 2 CLAs are required to meet ECCS acceptance criteria. Candidate could infer that 2 trains of ECCS systems are required per TS would mean only 2 CLA would be required.
b. CORRECT. Per LCO 3.5.1, Emergency Core Cooling Systems (ECCS), Accumulators, CLA-3 is inoperable, both for pressure, and level. However, the basis for LCO 3.5.1 specifies that only three (3) of the (4) accumulators are needed to perform the given function assuming one goes out the break.
c. Incorrect. Plausible, since CLA-3 does contain an inadequate inventory of borated water, and is also inoperable for that reason. However, candidate fails to recognize that for the given accident (LBLOCA), 3 accumulators (which does not go out the break) are needed for providing enough borated water to cover the core such that significant fuel clad melting is prevented.
d. Incorrect. Plausible, since the nitrogen pressure in CLA-3 is not high enough to ensure full injection. However, candidate fails to recognize that for the given accident (LBLOCA), only 3 accumulators are needed which does not go out the break to prevent significant clad melting for the given conditions .

Question Number: 32

K/A: 007 A1.02
Pressurizer Relief/Quench Tank
Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PRTS controls including: Maintaining quench tank pressure.

Tier:	2	**RO Imp:**	2.7	**RO Exam:**	Yes	**Cognitive Level:**	High
Group:	1	**SRO Imp:**	2.9	**SRO Exam:**		**Source:**	NEW

Applicable 10CFR55 Section: 41.5/45.5

Learning Objective: 3-OT-SYS068C, Objective 21: Describe the flow path of sources of supply, discharges, vents, drains, leakoff, and connections/penetrations that intertie this system to other systems.

References: ARI 88-C, Rev.19.

Question:

With Unit 1 at full power, the following conditions are given:

- It has been determined that 1-PCV-68-304, PRT N2 Pressure Regulator, is leaking by.
- 1-PCV-68-304 indicates CLOSED.
- Pressurizer Relief Tank pressure is slowly increasing.

To ensure that PRT pressure does not exceed prescribed limits, which ONE of the following is correct?

A. If PRT level is 66%, the operator has the option to initiate PRT draining to reduce pressure. This method also avoids over-pressurizing the vent header.

B. If PRT pressure exceeds 8 psig, an alarm will annunciate. The operator will manually vent the PRT, and manually terminate venting if vent header pressure cannot be maintained.

C. 1-PCV-68-301, PRT Vent, automatically opens when PRT pressure exceeds 8 psig. The operator will manually terminate venting if vent header pressure exceeds 8 psig.

D. 1-PCV-68-301, PRT Vent, automatically opens when PRT pressure exceeds 2 psig. Venting is automatically stopped when vent header pressure exceeds 8 psig.

DISTRACTOR ANALYSIS

a. Incorrect. Plausible, since per ARI 88-B, if a high level condition existed in the PRT, then a level reduction could result in a pressure drop sufficient to control pressure. Since the level given is low, this action would not be used to control pressure.
b. CORRECT. Per ARI 88-C, PRT pressure will be reduced to approximately 6.5 psig by stationing an AUO at panel 0-L-2 to monitor vent header pressure and start a Waste Gas Compressor if necessary, then holding 1-HS-68-301A in the OPEN position as long as Vent Header pressure is controlled and maintained and PRT pressure is greater than 6.5 psig.
c. Incorrect. Plausible, if candidate confuses the action of 1-PCV-68-301 on high pressure.
d. Incorrect. Plausible if candidate confuses the action of 1-PCV-68-301 at 2 psig. The 2 psig number is valid with respect to the vent header.

Question Number: 33

K/A: 008 A2.02
Component Cooling Water
Ability to (a) predict the impacts of the following malfunctions or operations on the CCWS, and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: High/low surge tank level.

Tier:	2	**RO Imp:**	3.2	**RO Exam:**	Yes	**Cognitive Level:**	High
Group:	1	**SRO Imp:**	3.5	**SRO Exam:**		**Source:**	WBN Bank

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

Learning Objective: 3-OT-AOI15000, Objective 10. Give 3 sources of potential In-leakage to the CCS.

References: Reference AOI-15, Rev. 31.

Question:

Given the following conditions:

- The Unit is at 100% power.
- 1-M-27C, Annunciator 249A "U1 SURGE TANK LEVEL HI/LO" is in alarm.
- The CRO reports that Surge Tank level is 73% on both 1-LI-70-63A and 1-LI-70-99A and level is rising.
- The CRO reports that 1-LCV-70-63, U1 SURGE TANK MAKEUP LCV, is closed.
- 1-FCV-70-66A U1 Surge Tank Vent is closed.
- 1-PT-70-24A, CCS HX A SUP PRESS, indicates 100 psig and stable.
- All systems are in normal operational alignment.

For the above conditions, a leak in which ONE of the following components accounts for the above conditions, and what is the effect of isolating that component?

A. CVCS regenerative heat exchanger.
Manual isolation of normal letdown flow results in loss of cleanup and leads to exceeding RCS chemistry limits.

B. RCP seal water return heat exchanger.
Manual isolation of RCP seal return line results in lifting of the seal return relief valve to the PRT.

C. CVCS letdown heat exchanger.
Manual isolation of normal letdown flow results in loss of cleanup and leads to exceeding RCS chemistry limits.

D. RCP thermal barrier.
Manual isolation of the thermal barrier heat exchangers results in lifting of the relief valve.

DISTRACTOR ANALYSIS

a. Incorrect. Plausible, since candidate may confuse regenerative heat exchanger with the non-regenerative heat exchanger. Regenerative heat exchanger is not directly cooled by the CCS system.
b. Incorrect. RCP seal return pressure is less than the CCS pressure of 100 psig stated in the stem. Plausible, since isolation of the flow path causes the relief valve to lift.
c. CORRECT. Letdown is in service and at a pressure greater than the CCS pressure of 100 psig stated in the stem.
d. Incorrect. The thermal barrier automatically isolates on differential flow, and will not cause a continuous rise in CCS Surge Tank level.

Question Number: 34

K/A: 010 A3.01
Pressurizer Pressure Control
Ability to monitor automatic operation of the PZR PCS, including: PRT temperature and pressure during PORV testing.

Tier:	2	**RO Imp:** 3.0	**RO Exam:**	Yes	**Cognitive Level:**	Low
Group:	1	**SRO Imp:** 3.2	**SRO Exam:**		**Source:**	New

Applicable 10CFR55 Section: 41.7 / 45.5

Learning Objective: 3-OT-SYS068C Objective 11 Describe the indication an operator has that a PORV is open or leaking through.

References: 1-SI-68-901-A, Valve Full Stroke Exercising During Plant Operation: Reactor Coolant A-Train, Rev 7

Question:

Given the following:

- Unit 1 at 100% power
- Surveillance Instruction 1-SI-68-901-A, Valve Full Stroke Exercising During Plant Operation: Reactor Coolant A-Train, is in progress.
- 1-FCV-68-333A, Block Valve for PORV 340A, has been closed and the stroke time recorded.
- When the block valve is reopened, an increase is seen in PRT pressure and temperature.

Which ONE of the following identifies a condition that would cause the change in PRT conditions and the action to be taken to prevent/correct in accordance with 1-SI-68-901-A?

A. A PORV opened due to the rapid pressure RISE between the PORV and the block valve when the block valve was reopened;

Place the PORV control handswitch to CLOSE prior to opening the block valve, then return to AUTO after the block valve has been opened.

B. A PORV opened due to the rapid pressure RISE between the PORV and the block valve when the block valve was reopened;

Place the PORV Block Valve control handswitch to CLOSE.

C. The PORV opened due to the pressure REDUCTION which occurred between the PORV and the block valve while the block valve was closed;

Place the PORV control handswitch to CLOSE prior to opening the block valve, then return to AUTO after the block valve has been opened.

D. The PORV opened due to the pressure REDUCTION which occurred between the PORV and the block valve while the block valve was closed;

Place the PORV Block Valve control handswitch to CLOSE.

DISTRACTOR ANALYSIS

a. INCORRECT. Plausible because the first part of the distractor is correct and the second part details taking an action to prevent the valve from opening by placing the control switch in closed then returning it to automatic.
b. CORRECT. The Precautions and Limitations B of 1-SI-68-901-A. states "Closing a PORV block valve could allow pressure between the PORV and block valve to decrease due to small acceptable leaks across the PORV. When the block valve is opened, the sudden pressure rise

Question Number: 35

K/A: 010 K1.08
Pressurizer Pressure Control
Knowledge of the physical connections and/or cause-effect relationships between the PZR PCS and the following systems: PZR LCS.

Tier:	**2**	**RO Imp:3.2**	**RO Exam:**	**Yes**	**Cognitive Level:**	**High**
Group:	**1**	**SRO Imp:3.5**	**SRO Exam:**		**Source:**	**NEW**

Applicable 10CFR55 Section: 41.2 to 41.9/45.7 to 45.8

Learning Objective: 3-OT-SYS068C, Objective 12 Identify the program setpoints, and describe any automatic actions relative to the pressurizer level program.

References: 1-47W611-68-2, -3. AOI-20, MALFUNCTION OF PRESSURIZER LEVELCONTROL SYSTEM, Rev. 29.

Question:

Given the following plant conditions:

- The unit is at 100% power.
- Pressurizer Level Control is selected to 1-LT-68-339/335 on 1-XS-68-339E.

If 1-LT-68-335 fails low, what is the impact on the Pressurizer Pressure Control System?

A. Pressurizer Heaters de-energize and Letdown isolates.

B. Pressurizer Heaters de-energize and Letdown does **NOT** isolate.

C. Pressurizer Heaters remain available and Letdown isolates.

D. Pressurizer Heaters remain available and Letdown does **NOT** isolate.

DISTRACTOR ANALYSIS

a. CORRECT. 1-LT-68-339/335 position identifies 339 as the controlling channel with 335 as the backup. Even though 335 is the backup failing low would deenergize pressurizer heaters and close selected CVCS letdown isolation valves thus isolating letdown.
b. Incorrect. First part correct . Second part plausible if the student believes only 339 (Selected) channel failing low would cause letdown to isolate and since 335 was the failing channel letdown would remain in service.
c. Incorrect. First part incorrect, plausible if the student believes only 339 (Selected) channel failing low would cause heaters to deenergize and since 335 was the failing channel heaters would remain in service. Second part correct.
d. Incorrect. Both parts incorrect. Plausible if the student believes only 339 (Selected) channel failing low would cause heaters to deenergize and letdown to isolate and since 335 was the failing channel heaters and letdown would remain in service.

WRITTEN QUESTION DATA SHEET

Question Number: 36

K/A: 012 G2.4.31
Reactor Protection System
Knowledge of annunciator alarms, indications, or response procedures.

Tier:	**2**	**RO Imp: 4.2**	**RO Exam:**	**Yes**	**Cognitive Level:**	**HIGH**
Group:	**1**	**SRO Imp: 4.1**	**SRO Exam:**		**Source:**	**NEW**

Applicable 10CFR55 Section: 41.10/45.3

Learning Objective: 3-OT-SYS099A Objective 18: Given the condition/status of the Reactor Protection 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, Objective 30: Given the condition/status of the Emergency Core Cooling system and the appropriate sections of Tech Specs, determine if operability requirements are met and what actions, if any, are required.
References: WBN Tech Specs. Table 3.3.1-1; Table 3.3.2-1.

Question:

Which ONE of the following, if removed from service per Technical Specifications, causes 1-M-4 Window 69-D, "PROT SET IV BYPASS" to be LIT?

A. 1-PT-68-322, PZR Press Transmitter.

B. 1-FT-68-71D, Loop 4 RCS Flow Transmitter.

C. 1-LT-68-183, Containment Sump Level Transmitter.

D. 1-PT-1-30, SG4 Main Steam Header Pressure Transmitter.

DISTRACTOR ANALYSIS

a. Incorrect. The removal of 1-PT-68-322 requires the associated Reactor Trip Instrumentation bistables to be placed in the tripped position to comply with Tech Specs. Bistable status lights will be lit, and annunciators will be lit, indicating the channel was removed from service. Plausible if the candidate believes that bypassing the failed channel is appropriate.
b. Incorrect. Loop 4 flow transmitter is actually a Protection Set III device. Plausible if the candidate believes that the channel is associated with Protection Set IV, and that the bistables would be placed in the tripped position to comply with Tech Specs. Bistable status lights would be lit, and annunciators would be lit, indicating the channel was removed from service. Plausible if the candidate believes that bypassing the failed channel is appropriate.
c. CORRECT. Since this is an energize-to-trip function, the removal process requires that the function be placed in BYPASS, which brings in 1-M-4 Window 69-D, "PROT SET IV BYPASS".
d. Incorrect. The removal of 1-PT-1-30 requires that the associated reactor trip and safety injection bistables be placed in the tripped position to comply with Tech Specs. Bistable status lights would be lit, and annunciators would be lit indicating the channel was removed from service. Plausible if the candidate believes that bypassing the failed channel is appropriate.

Question Number: 37

K/A: 013 A4.02
Engineered Safety Features Actuation
Ability to manually operate and/or monitor in the control room: Reset of ESFAS channels.

Tier:	**2**	**RO Imp: 4.3**	**RO Exam:**	**Yes**	**Cognitive Level:**	**High**
Group:	**1**	**SRO Imp: 4.4**	**SRO Exam:**		**Source:**	**NEW**

Applicable 10CFR55 Section: 41.7/45.5 to 45.8

Learning Objective:3-OT-SYS063A, Objective 23: Identify each system that is automatically activated from a safety injection signal; Objective 25: Describe how to reset the safety injection signal, include P-4 interlock, also how and when to block the SI signal; 3-OT-SYS001A, Objective 21: List the automatic closure signals for the MSIVs.

References: 1-47W611-63-1; 1-47W611-1-1

Question:

Given the following plant conditions:

- An inadvertent Safety Injection (SI) has occurred on Unit 1, and the crew is terminating the Safety Injection.
- The OAC has pressed the SI Reset pushbuttons, and the SI Actuated alarm on 1-M-4 has cleared.

Assuming no additional operator action, what is the status of the following ESF signals?

	Automatic SI	**Hi Hi Containment Press. Main Steam Isolation Signal**
A.	Enabled	Disabled
B.	Disabled	Enabled
C.	Disabled	Disabled
D.	Enabled	Enabled

DISTRACTOR ANALYSIS

a. Incorrect. The automatic SI is not enabled until the reactor trip breakers are closed. Plausible since the low steam line pressure MSIV closure signal is blocked, but the High-High Containment pressure MSIV closure signal is enabled.
b. CORRECT. The automatic SI is not enabled until the reactor trip breakers are closed. The High-High Containment pressure MSIV closure signal is functional and is enabled.
c. Incorrect. The automatic SI is not enabled until the reactor trip breakers are closed. Plausible since the low steam line pressure MSIV closure signal is blocked but the High-High Containment pressure MSIV closure signal is enabled.
d. Incorrect. The automatic SI is disabled until the reactor trip breakers are closed. The High-High Containment pressure MSIV closure signal is functional and is enabled.

Question Number: 38

K/A: 022 A3.01
Containment Cooling
Ability to monitor automatic operation of the CCS, including: Initiation of safeguards mode of operation.

Tier:	2	**RO Imp:**	4.1	**RO Exam:**	Yes	**Cognitive Level:**	Low
Group:	1	**SRO Imp:**	4.3	**SRO Exam:**		**Source:**	New

Applicable 10CFR55 Section: 41.7/45.5

Learning Objective: 3-OT-SYS030C, Containment Air Cooling, Purge, & Continuous Vent Systems
6/8. Describe the Lower/Upper Compartment Air Cooling system including: c. Automatic starts of the fans; d. Fan trips; e. Number of fans required for normal operation.

References: System Description N3-30RB-4002, REACTOR BUILDING VENTILATION SYSTEM
WBN Logic Diagrams 1-47W611-30-3, -4.

Question:

Given the following conditions:

- A main steam line rupture has occurred inside containment.
- Containment pressure peaked at 3.6 psig.
- All engineered safety features have actuated per design.

What is the expected status of the Upper Containment Cooling Fans (UCCF) and Lower Compartment Cooling Fans (LCCF) 10 minutes after the event?

	UCCF	LCCF
A.	Running	Tripped
B.	Tripped	Running
C.	Running	Running
D.	Tripped	Tripped

DISTRACTOR ANALYSIS

a. Incorrect. Plausible, since upper compartment fans trip on a Phase B containment isolation signal. The candidate may confuse the air return fans, which start roughly 9 minutes after a Phase B signal, with the upper compartment fans.
b. Incorrect. Plausible, since lower compartment fans are required to be manually started between 1.5 and 4 hours after a main steam line break to ensure that no localized hot spots develop which would interfere with PAM instrumentation response.
c. Incorrect. Plausible if candidate does not recall Phase B impact on both the upper and lower compartment cooling fans.
d. CORRECT. The Phase B isolation causes all fans to trip and ERCW flow to related coolers to isolate. Candidates may believe that the lower compartment cooling fans must be restarted this soon after a main steam line break and discount the answer as incorrect.

Question Number: 39

K/A: 025 A2.05
Ice Condenser
Ability to (a) predict the impacts of the following malfunctions or operations on the ice condenser system; correct, control, or mitigate the consequences of those malfunctions or operations: Abnormal glycol expansion tank level.

Tier:	2	**RO Imp:**	2.5	**RO Exam:**	Yes	**Cognitive Level:**	High
Group:	1	**SRO Imp:**	2.7	**SRO Exam:**		**Source:**	NEW

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

Learning Objective: 3-OT- SYS061A., Objective 18: Discuss what provisions have been made for glycol expansion after the glycol system is isolated from the containment.

References: ARI-138-144, Rev 18; 1-47W611-61-1, Rev. 4; 1-47W611-61-2, Rev 6; SOI-61.01, Rev. 27

Question:

Which ONE of the following Glycol Expansion Tank levels will cause the containment glycol supply and return valves 1-FCV-61-191, GLYCOL SUPPLY TO AHUS CONTAINMENT ISOLATION, and 1-FCV-61-193, GLYCOL RETURN AUX BUILDING ISOLATION to AUTO CLOSE, and after the isolation how are the Glycol Pumps and Chillers affected?

	Tank Level	After the isolation
A.	Lo-Lo level	Glycol Circ Pumps and Chillers will TRIP.
B.	Lo-Lo level	Glycol Circ Pumps and Chillers will continue to RUN.
C.	Hi-Hi level	Glycol Circ Pumps and Chillers will TRIP.
D.	Hi-Hi level	Glycol Circ Pumps and Chillers will continue to RUN.

DISTRACTOR ANALYSIS

a. CORRECT. Lo-Lo Expansion tank level causes the isolation, and then the circ pumps trip (on low suction pressure or high discharge pressure) and the chillers then trip as identified in ARI- 143-B.
b. Incorrect. Lo-Lo Expansion tank level causes the isolation, and then the circ pumps trip (on low suction pressure or high discharge pressure) and the chillers then trip as identified in ARI-143-B. Lo-Lo level being the condition that causes the isolation and that a containment flow path still exists for the floor cooling system makes leaving the circ pumps running plausible.
c. Incorrect. Hi-Hi Expansion tank level does NOT cause the isolation, but the circ pumps trip (on low suction pressure or high discharge pressure) and the chillers then trip as identified in ARI-143-B if the containment supply and return valves are isolated. Plausible because the circ pumps and chiller will trip following the containment supply and return valve isolation and if the level were going high the isolation is plausible to prevent overflowing the tank inside containment.
d. Incorrect. Hi-Hi Expansion tank level does NOT cause the isolation, but the circ pumps trip (on low suction pressure or high discharge pressure) and the chillers then trip as identified in ARI-143-B. Plausible because if the level were going high, the isolation would prevent overflowing the tank inside containment and a containment flow path still exists for the floor cooling system, making leaving the circ pumps running plausible.

WRITTEN QUESTION DATA SHEET

Question Number: 40

K/A: 026 A1.03
Containment Spray
Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CSS controls including: Containment sump level.

Tier:	2	**RO Imp:**	3.5	**RO Exam:**	Yes	**Cognitive Level:**	LOW
Group:	1	**SRO Imp:**	3.5	**SRO Exam:**		**Source:**	NEW

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

Learning Objective: 3-OT-SYS072A, Objective 16: Given a set of plant conditions, determine the correct response of the Containment Spray System.

References: ES-1.3, Rev. 17; ECA-1.1, Rev. 11.

Question:

While performing ES-1.3 Transfer to Containment Sump, the Containment Spray Pump handswitches are required to be placed in Stop-PULL-TO-LOCK at which one of the following setpoints?

A. Containment Sump level rises to 83%.

B. Containment Sump level rises to 34%.

C. Refueling Water Storage Tank level drops to 16.1%.

D. Refueling Water Storage Tank level drops to 8%.

DISTRACTOR ANALYSIS

a. Incorrect. Plausible since the candidate may believe that stopping the containment spray pumps will reduce containment flooding.
b. Incorrect. Plausible since the value provided is related to RWST level for sump swapover.
c. Incorrect. Plausible since the value provided is related to containment sump level for swapover.
d. CORRECT. When RWST level is less than 8% the containment spray pumps will be placed in Stop-PULL-TO-LOCK position regardless of containment pressure. The suction will be aligned to the containment sump and then the pumps will be restarted.

Question Number: 41

K/A: 039 K5.08
Main and Reheat Steam
Knowledge of the operational implications of the following concepts as the(y) apply to the MRSS: Effect of steam removal on reactivity.

Tier:	2	**RO Imp:**	3.6	**RO Exam:**	Yes	**Cognitive Level:**	High
Group:	1	**SRO Imp:**	3.6	**SRO Exam:**		**Source:**	Braidwood 2001 Significant Mod.

Applicable 10CFR55 Section: 41.5/45.7

Learning Objective: 3-OT-GO0200, Objective 8: Given conditions indicative of an erroneous Estimated Critical Position (ECP) calculation during the initial pull to critical, describe what steps should be taken by the operator and why. 3-OT-SIP1100, Objective 2: Describe the six variables which affect the Estimated Critical Condition.

References: 3-OT-GO0200, Rev. 6; 1-SI-0-11 Rev. 12.

Question:

Given the following plant conditions:

- A reactor startup is in progress following a late cycle, 6-day outage.
- The Reactor Engineer has provided an ECP which predicts the reactor going critical at 120 steps on Control Bank D.

Which ONE of the following conditions will result in the critical rod height being HIGHER than the value predicted by the ECP?

A. A dilution of 500 gallons is performed.

B. Feedwater flow is increased to all SGs due to a controller malfunction.

C. Steam Dump Controller 1-PIC-1-33 fails, resulting in a pressure decrease of 50 psig.

D. An improperly performed step in the Post Maintenance Test procedure results in the closure of all MSIVs.

DISTRACTOR ANALYSIS

a. Incorrect. A dilution results in a POSITIVE reactivity addition. This causes the critical rod height to be lower than the ECP.
b. Incorrect. An increase in feedwater flow results in a drop in RCS temperature. The drop in RCS temperature results in a positive reactivity addition. This causes critical rod height to be lower than the ECP.
c. Incorrect. A drop in pressure resulting from the failure of 1-PIC-1-33 causes a drop in RCS temperature. The drop in RCS temperature results in a positive reactivity addition. This causes critical rod height to be lower than the ECP.
d. CORRECT. The closure of the MSIVs results in an increase in steam pressure, and causes the SG PORVs to lift. This results in an increase in RCS temperature, which results in a negative reactivity addition. This causes critical rod height to be HIGHER than the ECP.

Question Number: 42
K/A: 039 A2.03
Main and Reheat Steam
Ability to (a) predict the impacts of the following malfunctions or operations on the MRSS; and (b) based on predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Indications and alarms for main steam and area radiation monitors (during SGTR).

Tier:	2	**RO Imp:**	3.4	**RO Exam:**	Yes	**Cognitive Level:**	HIGH
Group:	1	**SRO Imp:**	3.7	**SRO Exam:**		**Source:**	NEW

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

Learning Objective: 3-OT-SYS090A, Objective 14 State the purpose of the Main Steam Line Radiation Monitors.
References: 3-OT-SYS090A, Rev.13; AOI-33 Rev 32.

Question:

Given the following:

- The unit has been at 100% power.
- Unidentified leakage is 0.03 gpm
- Steam Generator #3 has a 17 gpm/day tube leak
- AOI-33, Steam Generator Tube Leakage, Appendix A for Steam Generator Tube Leak Monitoring is in progress.
- Subsequently, the activity in the RCS increased significantly due to fuel failures

NOTE: Radiation Monitor Identification Numbers:
1-RM-90-106 - Lower Containment Radiation Monitor
1-RM-90-119 - Condenser Vacuum Pump Exhaust
1-RM-90-423 - #3 Steam Line Radiation Monitor

Which ONE of the following identifies how 1-RM-90-106 and 1-RM-90-423 would respond as a result of the failed fuel without a change in the amount of steam generator tube leakage and action directed in AOI-33, Appendix A, for using radiation monitors to quantify tube leakage?

	RAD Monitor Response	Action to Quantify
A.	1-RM-90-106 and 1-RM-90-423 would increase.	Recalculate values for correlating 1-RM-90-119 to SG tube leakage.
B.	1-RM-90-106 and 1-RM-90-423 would increase.	Stop using 1-RM-90-119 and begin using 1-RM-90-423 to correlate radiation to SG tube leakage.
C.	1-RM-90-106 would remain constant 1-RM-90-423 would increase.	Recalculate values for correlating 1-RM-90-119 to SG tube leakage.
D.	1-RM-90-106 would remain constant 1-RM-90-423 would increase.	Stop using 1-RM-90-119 and begin using 1-RM-90-423 to correlate radiation to SG tube leakage.

DISTRACTOR ANALYSIS

a. CORRECT, as identified in caution in AOI-33 Lower containment rad monitor rising concurrently with secondary rad monitors may indicate a developing duel defect, which could give an indication of a SGTL. The threshold values for correlating RM-90-119 count rate to SG tube leakage must be recalculated if RCS activity has changed significantly. A note in the AOI identifies 1-RM-90-119 as the preferred indication for leak rate monitoring and other secondary rad monitors should be used for confirmation.
b. Incorrect, the rad monitor response is correct, but use of 1-RM-90-119 would not stopped. Plausible because the first part is correct and 1-RM-90-423 could be used to confirm, but use of 1-RM-90-119 would not be stopped, its threshold values would be calculated.

c. Incorrect, the rad monitor response is NOT correct, but the action required are correct, Plausible because recalculating values 1-RM-90-119 threshold values is correct and candidate may NOT relate a rise in the lower containment background activity due to the increased activity in the RCS.
d. Incorrect, the rad monitor response is NOT correct and the use of 1-RM-90-119 would not be stopped, Plausible because the candidate may NOT relate a rise in the lower containment background activity due to the increased activity in the RCS and may determine that the main steam line radiation monitor would be use d to calculate the leak rate.

Question Number: 43

K/A: 059 K4.05
Main Feedwater
Knowledge of MFW design feature(s) and/or interlock(s) which provide for the following: Control of speed of MFW pump turbine.

Tier:	2	**RO Imp:**	2.5	**RO Exam:**	Yes	**Cognitive Level:**	HIGH
Group:	1	**SRO Imp:**	2.8	**SRO Exam:**		**Source:**	WBN Bank

Applicable 10CFR55 Section: 41.7

Learning Objective: 3-OT-SYS0003D, Objective 10: For a given input parameter failure to the steam generators level control system, determine the effect on steam generator level; Objective 14: For a given input parameter failure to the Main Feedwater Pump speed control, determine the effect on main feed pump speed.

References: 1-47W611-3-2, Rev. 20.

Question:

Given the following plant conditions:

- The Unit is at 50% load, steady state.
- All Feedwater valves/pumps are in automatic.
- Both Main Feedwater Pumps are running.
- Standby Feed Pump is off with its control handswitch in "auto".
- The controlling steam flow transmitter on #1 S/G fails LOW.

Which ONE of the following describes the response of the Feedwater Control System to the given conditions?

A. MFP speed rises; the #1 S/G FW regulating valve closes initially to match the low failure of the SF transmitter.

B. MFP speed rises; the #1 S/G FW regulating valve closes initially to prevent S/G overfill.

C. MFP speed lowers; #1 S/G Feedwater regulating valve closes initially to match feedwater flow to the failed SF input.

D. MFP speed lowers; #1 S/G Feedwater regulating valve opens initially in response to low feedwater pressure.

DISTRACTOR ANALYSIS

a. Incorrect. Plausible since the failure of the controlling steam flow transmitter low causes an immediate steam flow-feed flow mismatch. This causes the feed reg valve to close. The failure of the steam flow from one SG causes the DP program to change, reducing the DP required. This causes MFP speed to decrease.
b. Incorrect. Plausible since the failure of the controlling steam flow transmitter low causes an immediate steam flow-feed flow mismatch. This causes the feed reg valve to close, but not to prevent overfill. The failure of the steam flow from one SG causes the DP program to change, reducing the DP required. This causes MFP speed to decrease.
c. CORRECT. The failure of the controlling steam flow transmitter low causes an immediate steam flow-feed flow mismatch. This causes the feed reg valve to close, but not to prevent overfill. The failure of the steam flow from one SG causes the DP program to change, reducing the DP required. This causes MFP speed to decrease.
d. Incorrect. Plausible since the failure of the controlling steam flow transmitter low causes an immediate steam flow-feed flow mismatch. This causes the feed reg valve to close, not open. The failure of the steam flow from one SG causes the DP program to change, reducing the DP required. This causes MFP speed to decrease.

Question Number: 44

K/A: 061 K3.02
Auxiliary/Emergency Feedwater
Knowledge of the effect that a loss or malfunction of the AFW will have on the following: S/G.

Tier:	**2**	**RO Imp: 4.2**	**RO Exam:**	**Yes**	**Cognitive Level:**	**HIGH**
Group:	**1**	**SRO Imp: 4.4**	**SRO Exam:**		**Source:**	**WBN Bank**

Applicable 10CFR55 Section: 41.7/45.6

Learning Objective: 3-OT-SYS003B, Objective 4: Identify the steam generators that each AFW pump supplies. Objective 11: Describe the automatic actuations that occur when an AFW pump is started.

References: 1-47W611-3-3 Rev. 10, -4 Rev. 17; 1-47W611-1-3, Rev. 9

Question:

Given the following conditions:

- The unit is at 100% power.
- The TD AFW pump is out of service to repair the Trip-and-Throttle valve linkage.
- 6.9 KV Shutdown Board 1B trips due to a differential relay actuation.
- An inadvertent Safety Injection occurs.

Which ONE of the following describes the SGs that are receiving AFW flow and which SG blowdown isolation valves are closed, as a result of the above conditions? (Assume no operator action.)

	SGs Receiving AFW flow	SG BLOWDOWN Isolated
A.	SG 1 and 2	ALL SGs
B.	SG 1 and 2	SG 1 and 3
C.	SG 1 and 3	SG 1 and 2
D.	SG 1 and 3	ALL SGs

DISTRACTOR ANALYSIS

a. CORRECT. The stem of the question describes a situation during which the 1A-A MDAFWP will start, but the 1B-B MDAFWP and the TDAFWP are unavailable. Only #1 and #2 SGs are receiving AFW flow from the 1A MDAFWP. The SI caused a Containment Phase A isolation signal, which in turn caused all of the SG blowdown isolation valves to close.
b. Incorrect. The 1A-A MDAFWP will feed the #1 and #2 SGs, and under a normal start sequence would cause the #1 and #3 SG blowdown valves to isolate.
c. Incorrect. Plausible, since the SGs receiving water from the 1A-A MDAFWP and the SG blowdown valves that isolate on a normal start are reversed.
d. Incorrect. Plausible, since the SGs receiving water from the 1A-A MDAFWP and the SG blowdown valves that close on a Containment Phase A isolation are reversed.

WRITTEN QUESTION DATA SHEET

Question Number: 45

K/A: 062 K2.01
AC Electrical Distribution
Knowledge of bus power supplies to the following: Major system loads.

Tier:	**2**	**RO Imp: 3.3**	**RO Exam:**	**Yes**		**Cognitive Level:**	**LOW**
Group:	**1**	**SRO Imp: 3.4**	**SRO Exam:**			**Source:**	**NEW**

Applicable 10CFR55 Section: 41.7

Learning Objective: 3-OT-SYS002A, Objective 22 Describe the condensate booster pumps as to type, capacity, and power supply.

References: 1-45W760-2-1, Rev. 20, -2-2, Rev. 8; 1-45W760-3-2, Rev. 14; 1-47W760-6-1, Rev. 13.

Question:

Given the following plant conditions:

- The unit is at 100% power.
- All secondary condensate and feedwater pumps are in service.
- The 1D Unit Board develops a fault and trips due to relay operation.

Which ONE of the following pumps is lost as a result of this failure?

A. 1B Hotwell Pump.

B. 1A Condensate Booster Pump.

C. 1B #3 Heater Drain Tank Pump.

D. Standby Main Feed Pump.

DISTRACTOR ANALYSIS

a. Incorrect. The 1B Hotwell pump is powered from the 1C Unit Board.
b. Incorrect. The 1A Condensate Booster Pump is powered from the 1A Unit Board.
c. Incorrect. The 1B #3 HDT Pump is powered from the 1B Unit Board.
d. CORRECT. The Standby Main Feed pump is powered from 1D Unit Board.

Question Number: 46

K/A: 063 K1.02
DC Electrical Distribution
Knowledge of the physical connections and/or cause-effect relationships between the DC electrical system and the following systems: AC electrical system.

Tier:	**2**	**RO Imp: 2.7**	**RO Exam:**	**Yes**	**Cognitive Level:**	**HIGH**
Group:	**1**	**SRO Imp: 3.2**	**SRO Exam:**		**Source:**	**WBN Bank**

Applicable 10CFR55 Section: 41.2 to 41.9/45.7 to 45.8

Learning Objective: 3-OT-SYS057C, Objective 3: Explain the 480V breaker in terms of the following:
b. Mechanical and electrical interlocks.

References: 1-45W760-63-1, Rev. 10.

Question:

Given the following:

- 1A-A and 1B-B SI Pump breakers are "Racked Up".
- A fuse blows in the NORMAL DC Trip circuit for the 1A-A SI pump.
- A safety injection (SI) actuation occurs.

Which ONE of the following describes the response of the SI Pumps to the SI signal?

A. 1B-B SI Pump will auto start, but 1A-A SI Pump will not auto start until the control power supply is transferred.

B. 1B-B SI Pump will auto start, but 1A-A SI Pump will not auto start and must be started from the MCR handswitch.

C. Both SI Pumps will auto start, but the 1A-A SI Pump cannot be stopped from the MCR.

D. Both SI Pumps will auto start, but the 1A-A SI Pump cannot be stopped mechanically at the breaker.

DISTRACTOR ANALYSIS

a. Incorrect. Candidate may believe that the pump will not start with fuse blown in the trip circuit. They may believe it is the same dc power is supplied to the pump start circuit.
b. Incorrect. Candidate may confuse the control power supplies to the pump and the start logic.
c. CORRECT. Both pumps start automatically, however with fuses blown in the trip circuit the pump breaker cannot be opened from any electrical control handswitch.
d. Incorrect. Both pumps start automatically. Candidate may believe that with a blown fuse in the trip circuit it cannot be stopped locally since the trip fuses are in the same compartment with the breaker and mechanical trip switch.

WRITTEN QUESTION DATA SHEET

Question Number: 47

K/A: 064 K2.02
Emergency Diesel Generator
Knowledge of bus power supplies to the following: Fuel oil pumps.

Tier:	2	**RO Imp:**	2.8	**RO Exam:**	Yes	**Cognitive Level:**	Low
Group:	1	**SRO Imp:**	3.1	**SRO Exam:**		**Source:**	NEW

Applicable 10CFR55 Section: 41.7

Learning Objective: 3-OT-SYS-082A, Objective 5: Describe the Operation of the DG Support Systems.

References: 1-45W760-82-2B Rev. 8; 1-45W760-82-4B Rev. 6.

Question:

Which ONE of the following is the power supply for the 2A-A Diesel Generator Fuel Oil Priming pump?

A. 480v AC from Diesel Generator Auxiliary Board 2A1-A.

B. 480v AC from Diesel Generator Auxiliary Board 2A2-A.

C. 125v DC from the 125v DC Vital Battery Board 2-I.

D. 125v DC from the 125v DC 2A-A Diesel Battery Distribution Panel.

DISTRACTOR ANALYSIS

a. Incorrect. Plausible because some of the 2A-A Diesel Generator auxiliary equipment is powered from this board.
b. Incorrect. Plausible because some of the 2A-A Diesel Generator auxiliary equipment is powered from this board.
c. Incorrect. Plausible because this board supplies power for the 2A-A DG output breaker control and for relays in its start circuit and the actual power supplies are from a supply feeding the control circuit on the DG.
d. CORRECT. The priming pump is powered from the 125v Diesel Generator battery system.

WRITTEN QUESTION DATA SHEET

Question Number: 48

K/A: 064 K4.05
Emergency Diesel Generator
Knowledge of ED/G system design feature(s) and/or interlock(s) which provide for the following:
Incomplete-start relay.

Tier:	2	**RO Imp:**	2.8	**RO Exam:**	Yes	**Cognitive Level:**	HIGH
Group:	1	**SRO Imp:**	3.2	**SRO Exam:**		**Source:**	WBN BANK

Applicable 10CFR55 Section: 41.7

Learning Objective: 3-OT-SYS082A, Objective 10 Given a set of plant conditions, determine the correct response of the Diesel Generator or Diesel Generator Support Systems.

References: 1-45W760-82-2thru -6,

Question:

After a reactor trip and safety injection on Unit 1, the following conditions are observed for 1A-A Diesel Generator (DG):

- 1-M-26A, Window 198A, "DG START/RUN FAILURE" alarm - LIT.
- Green "DG Run" light - ON.
- Red "DG run" lights - OFF.
- Red "DG Above 40 rpm" light - ON.
- Diesel Generator 6.9 KV breaker - OPEN.
- Diesel Generator voltage - ZERO.

From the above indications, the operating crew knows that 1A-A Diesel Generator started and ...

A. shutdown after 10 seconds.

B. engine speed did not rise above 550 rpm.

C. engine speed exceeded 550 rpm but did not rise above 850 rpm.

D. shutdown due to insufficient air in the receiver to cause the diesel to crank.

DISTRACTOR ANALYSIS

a. Incorrect. If DG speed had exceeded 550 rpm the generator field would have flashed. The information in the stem does not indicate that this has happened.
b. CORRECT. Based on the information provided, the engine is running but since there is no indication that the field flashed, it can be assumed that speed did not reach 550 rpm.
c. Incorrect. Indicating lights show that the diesel is still running.
d. Incorrect. The stem states that an emergency start was generated, and the indicating lights show that the diesel attempted to start.

WRITTEN QUESTION DATA SHEET

Question Number: 49

K/A: 073 K3.01
Process Radiation Monitoring
Knowledge of the effect that a loss or malfunction of the PRM system will have on the following: Radioactive effluent releases.

Tier:	2	**RO Imp:**	3.6	**RO Exam:**	Yes	**Cognitive Level:**	LOW
Group:	1	**SRO Imp:**	4.2	**SRO Exam:**		**Source:**	WBN Bank

Applicable 10CFR55 Section: 41.7/45.6

Learning Objective: 3-OT-SYS015A Objective 5 Describe the automatic response of the Steam Generator Blowdown System to a high radiation signal detected by the blowdown radiation monitor (RM-90-120, 121).

References: 1-47W611-15-1 Rev. 14, ARI-173-179 Rev 38

Question:

The Turbine Building AUO has placed 1-HS-15-44, SG Blowdown Disch to CTBD, (Cooling Tower Blowdown), in **OPEN** per SOI-15.01, in order to direct SGBD flow to CTBD.

Which ONE of the following will occur if radiation monitor 1-RM-90-120 loses flow through the monitor?

A. Blowdown would be isolated to the CTBD resulting in loss of blowdown flow due the Instrument malfunction.

B. Blowdown would be isolated to the CTBD and automatically redirected to the condensate header.

C. Blowdown would continue to the CTBD but would isolate if 1-RM-90-121 reached the HI RAD setpoint.

D. Blowdown would continue to the CTBD and would be unable to isolate if 1-RM-90-121 reached the HI RAD setpoint.

DISTRACTOR ANALYSIS

a. Incorrect. Blowdown flow path to the CTBD would not be isolated but an instrument malfunction alarm would be generated.
b. Incorrect. Blowdown flow path to the CTBD would not be isolated thus redirection to the condensate header would not occur.
c. CORRECT. The loss of flow would cause an instrument malfunction alarm, but the flow to the CTBD would continue. If 1-RM-90-121 sensed a hi rad condition the CTBD flow path would be isolated and the SGBD redirected to the condensate header.
d. Incorrect. Blowdown flow path to the CTBD would continue however while it takes both blowdown radiation monitors normal to open the valve, either one in High RAD will cause isolation.

Question Number: 50

K/A: 073 G2.4.35
Process Radiation Monitoring
Knowledge of local auxiliary operator tasks during an emergency and the resultant operational effects.

Tier:	2	**RO Imp:**	3.8	**RO Exam:**	Yes	**Cognitive Level:**	Low
Group:	1	**SRO Imp:**	4.0	**SRO Exam:**		**Source:**	NEW

Applicable 10CFR55 Section: 41.10 / 43.5 / 45.13

Learning Objective: 3-OT-SYS088A, Objective 9: Given a set of plant conditions, determine the correct response of the Containment Isolation System.; 3-OT-SYS090A, Objective 7: Determine Interlocks and/or cause-effect relationships between the Rad Monitoring Systems (ARM & Process) and the areas they monitor. Include HVAC systems and area isolations.

References: SOI-90.02, Gaseous Process Radiation Monitors, Rev 45, Precaution C.
ARI-173-179, U-I Radiation Detectors, Rev 44.
SOI-88.01, Containment Isolation System, Rev 16.
1-47W611-88-1 r23.

Question:

Given the following:

- Unit 1 experienced a Reactor Trip/Safety Injection due to a LOCA inside containment.
- When checking annunciators following the trip and SI, the CRO notes that the following annunciators are in alarm:
  - 173B, LWR CNTMT AIR 1-RM-106 RAD HI.
  - 173E, LWR CNTMT AIR 1-RM-106 INSTR MALF.

Assuming all components respond as designed, which ONE of the following is the correct direction the CRO will provide to the NAUO relative to the radiation monitor due to the above conditions?

A. Reopen the radiation monitor isolation valve which restores flow through the monitor to restore Tech Spec operability.

B. Restart the radiation monitor pump which restores flow through the monitor to restore Tech Spec operability.

C. Stop the radiation monitor pump to prevent damage to the pump due to the monitor being isolated as a result of the safety injection.

D. Close the radiation monitor isolation valves to isolate monitor due to the pump being tripped as a result of the safety injection.

DISTRACTOR ANALYSIS

a. Incorrect. The valves automatically isolated due to the CVI signal, however they should not be reopened. The pumps need to be stopped as identified in SOI-90.01 Precaution C and in ARI 173D to prevent damage to the pumps. Plausible because opening the valves restores flow and the monitor is a Tech Spec required monitor.
b. Incorrect. The pump will be running. The valves automatically isolated due to the CVI signal, however the pump does not auto stop. The pumps need to be manually stopped as identified in SOI-90.01 Precaution C and in ARI 173D to prevent damage to the pumps. Plausible, because if starting the pumps were to re-establish flow, the Tech Spec monitor could be restored.
c. Correct. The radiation monitor is isolated due to the CVI signal generated by the safety injection. The pumps do not stop and are running with no flow. The pumps need to be stopped as identified in SOI-90.01 Precaution C and in ARI 173D to prevent damage to the pumps.
d. Incorrect. The pumps need to be stopped as identified in SOI-90.01 Precaution C and in ARI 173D to prevent damage to the pumps. The valves automatically isolate due to the CVI signal.

Question Number: 51

K/A: 076 K4.03
Service Water
Knowledge of SWS design feature(s) and/or interlock(s) which provide for the following: Automatic opening features associated with SWS isolation valves to CCW heat exchangers.

Tier:	2	**RO Imp:**	2.9	**RO Exam:**	Yes	**Cognitive Level:**	Low
Group:	1	**SRO Imp:**	3.4	**SRO Exam:**		**Source:**	WBN Bank

Applicable 10CFR55 Section: 41.7

Learning Objective: 3-OT-SYS067A, Objective 13. Given a loss of power, determine the correct response of the ERCW System including: a. "C" CCS Heat Exchanger outlet valves.

References: 3-OT-SYS067A, Rev. 10. 1-47W611-67-5, E-0 Appendix A. Rev. 27

Question:

Reactor trip and safety injection signals have been manually initiated. You are the Control Room Operator and are performing E-0, Appendix A, Equipment Verification. Which of the following describes the required positions for the listed ERCW valves?

	0-FCV-67-144, "CCS Heat Exchanger 'C' Disch to Hdr A"	0-FCV-67-152, "CCS Heat Exchanger 'C' Alt Disch to Hdr B"
A.	CLOSED	OPEN to Position A
B.	THROTTLED	CLOSED
C.	THROTTLED	OPEN to Position A
D.	OPEN	CLOSED

DISTRACTOR ANALYSIS

a. CORRECT. Under normal conditions 0-FCV-67-152 is closed with power on the valve. Upon the receipt of an SI signal 0-FCV-67-152 strokes to the 35% position automatically. During performance of E-0, Appendix A the operator places the 0-FCV-67-152 handswitch for the valve in the Position A. 0-FCV-67-144 is normally open and is closed by manual operator action during performance of E-0, Appendix A.
b. Incorrect. Plausible since the valve positions are reversed.
c. Incorrect. Plausible since the operator may confuse listed valves with others with similar numbers.
d. Incorrect. Plausible since the operator may confuse listed valves with others with similar numbers.

WRITTEN QUESTION DATA SHEET

Question Number: 52

K/A: 076 A1.02
Service Water
Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the SWS controls including: Reactor and turbine building closed cooling water temperatures.

Tier:	2	**RO Imp:**	2.6	**RO Exam:**	Yes	**Cognitive Level:**	HIGH
Group:	1	**SRO Imp:**	2.6	**SRO Exam:**		**Source:**	NEW

Applicable 10CFR55 Section: 41.5/45.5

Learning Objective: 3-OT-SYS067A, Objective 8: State the ERCW System normal discharge path and given a failure of the path, discuss the alternate discharge paths.

References: AOI-13, LOSS OF ESSENTIAL RAW COOLING WATER, Rev. 35.

Question:

Given the following:

- The plant is operating at 100% power with 1A CCP in service.
- The Control Room Operator shutdowns down the C-A ERCW pump in preparation for a test on the 2A 6.9 KV Shutdown Board.

Which ONE of the following describes the impact of shutting down the pump on the listed parameters?

	1A CCP Oil Temperature	**Seal Water Return Heat Exchanger Temperature**
A.	Rises	Rises
B.	Rises	Remains constant
C.	Remains constant	Rises
D.	Remains constant	Remains constant

DISTRACTOR ANALYSIS

a. CORRECT. The C-A ERCW pump supplies flow to the A header. When the pump is stopped, flow to both the 1A and 2A ERCW headers is decreased. This causes a decrease in flow through the seal water heat exchangers. A reduction in flow to the 1A CCS heat exchanger will cause the A ESF header to heat up as well as the Reactor Building and Miscellaneous Equipment Headers to heat up. The 1A CCP which would normally be in service would show an increase in oil temperature. The Seal Water Heat Exchanger, supplied off the Miscellaneous Equipment Header would also heat up.

b. Incorrect. Plausible, because oil temperature does rise, however, Seal Water Return Heat Exchanger temperature also rises.

c. Incorrect. Plausible, since Seal Water Return Heat Exchanger temperature does rise, however, candidate incorrectly believes the CCP oil temperature remains constant.

d. Incorrect. Plausible, since candidate incorrectly recalls cooling water supply to this component.

Question Number: 53

K/A: 078 K1.01
Instrument Air
Knowledge of the physical connections and/or cause-effect relationships between the IAS and the following systems: Sensor air.

Tier:	2	**RO Imp:** 2.8	**RO Exam:**	Yes		**Cognitive Level:**	HIGH
Group:	1	**SRO Imp:** 2.7	**SRO Exam:**			**Source:**	NEW

Applicable 10CFR55 Section: 41.2 to 41.9/45.7 to 45.8

Learning Objective: 3-OT-SYS032A, Objective 16, List the events and their corresponding set points that take place on decreasing control air pressure.

References: 1-47W611-32-2 rev 4, SOI-32.02 rev 19 Note on page 12.

Question:

Which ONE of the following identifies both of the following?

(1) The **lowest** of the listed containment pressures that results in 1-FCV-32-80, Aux Air to Rx Bldg Train B, being automatically isolated , and

(2) The **lowest** of the listed air pressures sensed downstream of the valve that allows the valve to REMAIN OPEN after the valve was opened and the control switch on 1-M-15 was placed to A-Auto after the isolation signal was reset.

	(1)	(2)
A.	2.0 psid	68 psig
B.	2.0 psid	78 psig
C.	3.0 psid	68 psig
D.	3.0 psid	78 psig

DISTRACTOR ANALYSIS

a. Incorrect. Containment pressure is not high enough to cause the isolation and the sensor downstream of the valve will not allow the valve to remain open with the pressure at 68psig, but plausible because with the containment pressure above 1.5, a Phase A isolation would have occurred and many paths would have isolated.
b. Incorrect. Containment pressure is not high enough to cause the isolation, but since it is above 1.5, then a Phase A isolation would have occurred and many paths would have isolated and the downstream pressure is high enough to allow, but plausible because with the containment pressure above 1.5 then a Phase A isolation would have occurred and many paths would have isolated and 78 psig is high enough for the downstream sensor to allow air to open the valve.
c. Incorrect. Containment pressure is high enough to cause the isolation, but the pressure sensed downstream of the valve is not high enough to allow operating air pressure to maintain the valve open after the switch is placed in A-Auto, but plausible because with the containment pressure above 3.0 psig then a Phase B isolation would have occurred causing isolation of the valve.
d. CORRECT. With containment pressure greater than 2.8 psig, a phase B isolation will automatically occur, and the sensor downstream of the isolation valve must detect greater than 75 psig to allow the valve to remain open after the control switch was placed to the A-Auto position.

Question Number: 54

K/A: 103 A2.05
Containment
Ability to (a) predict the impacts of the following malfunctions or operations on the containment system-and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Emergency containment entry.

Tier:	**2**	**RO Imp: 2.9**	**RO Exam:**	**Yes**		**Cognitive Level:**	**HIGH**
Group:	**1**	**SRO Imp: 3.9**	**SRO Exam:**			**Source:**	**NEW**

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

Learning Objective: 3-OT -SYS088A, Objective 10, Describe the containment and penetration testing required and the acceptance criteria.

References: 3-OT -SYS088A, Technical Specification 3.6.2.

Question:

Given the following:

- Unit 1 is in MODE 4 with RCS heat-up in progress following a refueling outage.
- Work is ongoing on an Ice Condenser Air Handling Unit when one of the workers becomes ill.
- Following the Medical Response Team entry into upper containment, the air lock outer door seal is damaged and the interlocks are broken but the inner door is closed with its seal intact.

Which ONE of the following identifies the impact of the status of the Upper Containment Air Lock?

A. No Tech Spec entry is required in the current Mode because the inner door is closed, but Mode 3 entry is prohibited.

B. Tech Spec entry is required due to the damaged outer door seal, but the damaged interlock mechanism does not require a Tech Spec entry.

C. Tech Spec entry is required due to the interlock mechanism being damaged, but the damaged outer door seal does not require a Tech Spec entry.

D. Tech Specs entries are required due to both the damaged interlock mechanism and damaged outer door seal.

DISTRACTOR ANALYSIS

a. Incorrect. Tech Spec 3.6.2 entry is required with the Plant in Mode 4. Plausible because the candidate could conclude Tech Spec 3.6.2 is not applicable in Mode 4, but would be applicable in Mode 3.
b. Incorrect. Tech Spec 3.6.2 entry is required for both the damaged interlock mechanism and outer door seal. Plausible because the candidate could conclude Tech Spec 3.6.2 is applicable due to the outer door seal being damaged, but not applicable for the damaged interlock mechanism.
c. Incorrect. Tech Spec 3.6.2 entry is required for both the damaged interlock mechanism and outer door seal. Plausible because the candidate could conclude Tech Spec 3.6.2 is applicable due to the damaged interlock mechanism, but not applicable for the damaged outer door seal being damaged.
d. CORRECT. Tech Spec 3.6.2 entry is required for both the damaged interlock mechanism and outer door seal being damaged.

WRITTEN QUESTION DATA SHEET

Question Number: 55

K/A: 103 A4.09
Containment
Ability to manually operate and/or monitor in the control room: Containment vacuum system.

Tier:	**2**	**RO Imp:**	**3.1**	**RO Exam:**	**Yes**	**Cognitive Level:**	**High**
Group:	**1**	**SRO Imp:**	**3.7**	**SRO Exam:**		**Source:**	**NEW**

Applicable 10CFR55 Section: 41.7/45.5 to 45.8

Learning Objective: 3-OT-SYS065A, Objective 5: Describe how the EGTS and Annulus Vacuum Systems maintain annulus pressure.

References: SOI-65.01, Annulus Vacuum System, Rev. 18.

Question:

Which ONE of the following identifies the NORMAL pressure band controlled by the Containment Annulus Vacuum System and the action that would be required if 1-M-27B Window 232-B, ANNULUS ΔP LO/DAMPER SWAPOVER is LIT?

	Annulus Pressure	Method of Controlling Pressure
A.	-6.0 to -6.2" WC	Dispatch an AUO to RESET the dampers locally.
B.	-6.0 to -6.2" WC	Swap the dampers using handswiches on 1-M-27B
C.	-4.3 to -4.5" WC	Dispatch an AUO to RESET the dampers locally.
D.	-4.3 to -4.5" WC	Swap the dampers using handswiches on 1-M-27B

DISTRACTOR ANALYSIS

a. CORRECT. The correct pressure band of -6.0 to -6.2 "WC is provided and the correct response to Window 232-B is provided.
b. Incorrect. Plausible, since the correct pressure band of -6.0 to -6.2 "WC is provided but incorrect actions to restore alignment are stated.
c. Incorrect. Plausible since the 4.3 to -4.5 "WC range is associated with the swapover of the dampers and the correct response to Window 232-B is provided.
d. Incorrect. Incorrect damper sequence, and the local action of the AUO is described correctly.

Question Number: 56

K/A: 014 A2.02
Rod Position Indication
Ability to (a) predict the impacts of the following malfunctions or operations on the RPIS; and (b) based on those on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of power to the RPIS.

Tier:	2	**RO Imp:**	3.1	**RO Exam:**	Yes	**Cognitive Level:**	HIGH
Group:	2	**SRO Imp:**	3.6	**SRO Exam:**		**Source:**	NEW

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

Learning Objective: 3-OT-SYS085A, Objective 25, Explain the bases, input, alarms, and operator actions relative to the rod insertion limits.

References: 3-OT-SYS085A, Attachment 7 Engineering Evaluation of Westinghouse Information Regarding Computer Enhanced Rod Position Indication (CERPI) Displays.

Question:

Given the following plant conditions:

- The unit is at 100% power.
- 1-M-1B, Window 17-D, 120 AC VITAL PWR BD 1-I UV/CKT TRIP, is LIT.
- One CERPI display on 1-M-4 has gone DARK.

Based on these conditions, what is the impact on rod position indication to the loss of the CERPI display, and what is required for ensuring that Rod Group Alignment Limits of Tech Specs are met?

	Rod position indication	Actions Required for Rod Group alignment
A.	Available	Use the "ALL RODS" function on the operating display.
B.	NOT Available	Flux map will be required to confirm rod position
C.	Available	Flux map will be required to confirm rod position
D.	NOT Available	Use the "ALL RODS" function on the operating display.

DISTRACTOR ANALYSIS

a. CORRECT. The power loss described in the stem results in only the left side CERPI display going dark. The right side CERPI display remains powered, and the operator can select "All Rods" on the display to determine positions.
b. Incorrect. The right hand display remains powered, with capability to monitor all rods. No flux map is required.
c. Incorrect. The power loss described in the stem results in only the left side CERPI display going dark. The right side CERPI display remains powered, and the operator can select "All Rods" on the display to determine positions. No flux map is required.
d. Incorrect. The right hand display remains powered, with capability to monitor all rods. No flux map is required.

Question Number: 57

K/A: 028 A1.02
Hydrogen Recombiner and Purge Control
Ability to predict and/or monitor changes in parameter (to prevent exceeding design limits) associated with operating the HRPS controls including: Containment pressure.

Tier:	2	**RO Imp:3.4**	**RO Exam:**	**Yes**	**Cognitive Level:**	**Low**
Group:	2	**SRO Imp:3.7**	**SRO Exam:**		**Source:**	**NEW**

Applicable 10CFR55 Section: 41.5/45.5

Learning Objective: 3-OT-SYS083A, Objective 8.Describe the major components and operating principle of the Hydrogen Recombiners.

References: Ref: SOI-83.01 Rev 15, TI-83.01 Rev 1, and TS 3.6.7 Basis

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Question:

Which ONE identifies BOTH of the following for Hydrogen Recombiner operations?

(1) The MAXIMUM Hydrogen Recombiner temperature allowed when operating?

AND

(2) The design limit of hydrogen concentration for a Design Base Accident?

	Maximum Temperature	H2 Concentration
A.	1150°F	6%
B.	1150°F	4%
C.	1400°F	6%
D.	1400°F	4%

DISTRACTOR ANALYSIS

a. Incorrect. Plausible due to 1150°F is the temperature above which the Hydrogen Recombiners will remove hydrogen, and 6% is the limit (Without taking into account instrument accuracy) where Hydrogen Recombiners shall NOT be placed in service IAW SOI-83.01.
b. Incorrect. Plausible due to 1150°F is the temperature above which the Hydrogen Recombiners will remove hydrogen. The hydrogen concentration is correct.
c. Incorrect: The maximum temperature value is correct. Plausible due to 6% is the limit (Without taking into account instrument accuracy) where Hydrogen Recombiners shall NOT be placed in service IAW SOI-83.01.
d. Correct. The maximum temperature value is correct, and 4% is the correct hydrogen concentration, per the given reference.

Question Number: 58

K/A: 033 G2.2.36
Spent Fuel Pool Cooling
Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations.

Tier:	2	**RO Imp:**	3.1	**RO Exam:**	Yes	**Cognitive Level:**	HIGH
Group:	2	**SRO Imp:**	3.2	**SRO Exam:**		**Source:**	NEW

Applicable 10CFR55 Section: 41.10/43.2/45.13

Learning Objective: 3-OT-SYS078A, Objective 8: Describe the Spent Fuel Pit pumps including: c. Power supplies; Objective 4: Given plant conditions and parameters, correctly determine the Conditions for Operation or Technical Requirements for various components listed in Section 7 of Tech. Specs.

References: SOI-78.01, Spent Fuel Pool Cooling and Cleaning System, Rev. 52.

Question:

Following a refueling outage, these conditions are given:

- Unit 1 is in MODE 3 preparing for MODE 2 entry.
- Fuel shuffles are being conducted in the Spent Fuel Pit.
- Maintenance is conducting relay testing on the 6.9kv Shutdown Board 2A-A.
- Spent Fuel Pool Cooling pump A is the only Spent Fuel Pool Cooling pump in service.

If the shutdown board normal feeder breaker is inadvertently opened during testing, which ONE of the following describes the initial effect on the Spent Fuel Pool Cooling system, and the required action, if any, per Spent Fuel Pool/Pit Tech Specs?

A. The Spent Fuel Cooling Pump strips from the board, and then sequences on after the DG recovers the shutdown board.
Spent Fuel Pool/Pit Tech Specs requires that movement of irradiated fuel assemblies in the fuel storage pool be immediately suspended.

B. The Spent Fuel Cooling Pump strips from the board, and then sequences on after the DG recovers the shutdown board.
Spent Fuel Pool/Pit Tech Specs does **NOT** require that movement of irradiated fuel assemblies in the fuel storage pool be suspended.

C. The Spent Fuel Cooling Pump strips from the board, and remains off after the DG recovers the shutdown board.
Spent Fuel Pool/Pit Tech Specs requires that movement of irradiated fuel assemblies in the fuel storage pool be immediately suspended.

D. The Spent Fuel Cooling Pump strips from the board, and remains off after the DG recovers the shutdown board.
Spent Fuel Pool/Pit Tech Specs does **NOT** require that movement of irradiated fuel assemblies in the fuel storage pool be suspended.

DISTRACTOR ANALYSIS

a. Incorrect. While it is correct that the pump strips from the board due to the blackout relays, the pump is sequenced back on after the diesel generator recovers the board. It is also correct that no action is required to immediately suspend the movement of radiation fuel. Plausible because the pump could be confused with other pumps that do sequence back on.

b. Incorrect. While it is correct that the pump strips from the board due to the blackout relays, the pump is not sequenced back on after the diesel generator recovers the board and there is no requirement to suspend the movement of radiation fuel. Plausible because the pump could be confused with other pumps that do sequence back on and because the immediate suspension of irradiated fuel movement is required for other conditions associated with the spent fuel pit/cooling system.

Question Number: 59

K/A: 045 K5.17
Main Turbine Generator
Knowledge of the operational implications of the following concepts as the(y) apply to the MT/B(G) System: Relationship between moderator temperature coefficient and boron concentration in RCS as T/G load increases.

Tier:	2	**RO Imp:**	2.5	**RO Exam:**	Yes	**Cognitive Level:**	High
Group:	2	**SRO Imp:**	2.7	**SRO Exam:**		**Source:**	SQN Bank

Applicable 10CFR55 Section: 41.5/45.7

Learning Objective: 3-OT-GO0400, Objective 6: Explain the average coolant temperature (Tavg) program utilized during power increase or decrease. Objective 7: Explain why reactor would "follow" the turbine up in power during a load increase.

References: Nuclear Parameter and Operations Package (NuPOP) Cycle 9.

Question:

Which ONE of the following identifies how (a) main steam header pressure responds as turbine load is raised from 25% to 65%, and (b) which method of maintaining Tavg matched with Tref results in the value for MTC being the MOST negative as turbine load is raised?

A. (a) Main steam header pressure lowers.
(b) Rods are withdrawn to maintain Tavg on program, with Boron concentration held constant.

B. (a) Main steam header pressure raises.
(b) Rods are withdrawn to maintain Tavg on program, with Boron concentration held constant.

C. (a) Main steam header pressure lowers.
(b) Rod position is held constant, while Boron concentration is lowered to maintain Tavg on program.

D. (a) Main steam header pressure raises.
(b) Rod position is held constant, while Boron concentration is lowered to maintain Tavg on program.

DISTRACTOR ANALYSIS

a. Incorrect. Main Steam Header pressure lowers as turbine load is raised. Plausible since candidate could conclude that withdrawing rods makes MTC more negative. It actually makes it less negative. However a competing affect of Tavg rising has a negative affect on MTC.
b. Incorrect. Main Steam Header pressure lowers as turbine load is raised. Plausible since candidate could conclude that withdrawing rods makes MTC more negative. It actually makes it less negative. However, a competing affect of Tavg rising has a negative affect on MTC.
c. CORRECT. Main Steam Header pressure lowers as turbine load is raised. Reduction of boron concentration results in more negative MTC. Tavg rising has a negative affect on MTC. This additive negative effect is the most negative of all choices given.
d. Incorrect. Main Steam Header pressure lowers as turbine load is raised. Reduction of boron concentration results in more negative MTC. Tavg rising has a negative affect on MTC. This additive negative effect is the most negative of all choices given.

Question Number: 60

K/A: 055 G2.4.3
Condenser Air Removal
Ability to identify post-accident instrumentation.

Tier:	2	**RO Imp:**	3.7	**RO Exam:**	Yes	**Cognitive Level:**	LOW
Group:	2	**SRO Imp:**	3.9	**SRO Exam:**		**Source:**	NEW

Applicable 10CFR55 Section: 41.6/45.4

Learning Objective: 3-OT-SYS090A, Objective 16 Identify where Post Accident Monitors are used & read out.

References: SOI-90.05, POST-ACCIDENT RAD MONITORS, Rev 12; 1-47W610-90-5 R40.

Question:

Which ONE of the following describes the radiation monitors on the Condenser Vacuum Pump discharge header, in accordance with SOI-90.05, Post Accident Radiation Monitors?

A. Both 1-RM-90-119 and 1-RM-90-404 are Post Accident Radiation Monitors.

B. Neither 1-RM-90-119 nor 1-RM-90-404 is a Post Accident Radiation Monitor.

C. 1-RM-90-119 is a Post Accident Radiation Monitor, but 1-RM-90-404 is NOT a Post Accident Radiation Monitor.

D. 1-RM-90-404 is a Post Accident Radiation Monitor, but 1-RM-90-119 is NOT a Post Accident Radiation Monitor.

DISTRACTOR ANALYSIS

a. Incorrect. SOI-90.05 identifies1-RM-90-404 as a Post Accident Rad Monitor, but 1-RM-90-119 is NOT identified as a Post Accident Rad Monitor. Both being Post Accident Rad Monitors is plausible because 1-RM-90-119 is used during a SGTR event as an indication of the accident.
b. Incorrect. SOI-90.05 identifies1-RM-90-404 as a Post Accident Rad Monitor, but 1-RM-90-119 is NOT identified as a Post Accident Rad Monitor. Neither being Post Accident Rad Monitors is plausible because neither is listed in the Tech Spec for Accident Monitoring Instrumentation.
c. Incorrect. SOI-90.05 identifies1-RM-90-404 as a Post Accident Rad Monitor, but 1-RM-90-119 is NOT identified as a Post Accident Rad Monitor. Plausible because the 1-RM-90-119 is used during a SGTR event as an indication of the accident and the candidate may know one of the monitoring is a Post Accident Rad Monitor.
d. CORRECT. 1-RM-90-404 is identified in SOI-90.05 as a Post Accident Rad Monitor, but 1-RM-90-119 is NOT identified as a Post Accident Rad Monitor.

Question Number: 61

K/A: 056 K1.03
Condensate
Knowledge of the physical connections and/or cause-effect relationships between the Condensate System and the following systems: MFW.

Tier:	**2**	**RO Imp: 2.6**	**RO Exam:**	**Yes**		**Cognitive Level:**	**LOW**
Group:	**2**	**SRO Imp: 2.6**	**SRO Exam:**			**Source:**	**NEW**

Applicable 10CFR55 Section: 41.2 to 41.9/45.7 to 45.8

Learning Objective: 3-OT-SYS002A Objective 16 List the conditions which will cause the main feed pump turbine condenser valves to automatically close.

References: 1-47W611-2-1; AOI-16, Rev. 30.

Question:

Given the following plant conditions:

- Unit 1 at 100% power.
- Both Main Feedwater Pumps are in service.

Which ONE of the following occurs automatically if the "B" MFP trips due to thrust bearing wear?

A. The motor driven AFW Pumps start.

B. The Condensate DI pumps trip if feedwater flow drops to <80%.

C. The "B" MFPT condensers Condensate inlet and outlet valves go closed.

D. The short cycle valve, 1-FCV-2-35, modulates open to dump excessive condensate flow.

DISTRACTOR ANALYSIS

a. Incorrect. The AFW pumps start on the loss of both MFPs and other conditions that are not described in the stem of the question. Loss of one MFP at the stated power level starts the standby MFP.
b. Incorrect. Suction pressure <20 psig causes the Condensate DI pumps to trip.
c. CORRECT. Since MFW flow is greater than 40%, the condensate inlet and outlet valves for the MFP turbine condensers go closed.
d. Incorrect. Plausible since a differential pressure is developed across a flow element (FE-2-35). This ΔP is converted to a flow signal which is used to control Short Cycle Valve (FCV-2-35) to ensure a minimum of 5500 gpm condensate flow.

WRITTEN QUESTION DATA SHEET

Question Number: 62

K/A: 068 K6.10
Liquid Radwaste
Knowledge of the effect of a loss or malfunction on the following will have on the Liquid Radwaste System: Radiation monitors.

Tier:	2	**RO Imp:**	2.5	**RO Exam:**	Yes	**Cognitive Level:**	HIGH
Group:	2	**SRO Imp:**	2.9	**SRO Exam:**		**Source:**	NEW

Applicable 10CFR55 Section: 41.7 / 45.7

Learning Objective: 3-OT-SYS090A, Objective 7 Determine Interlocks and/or cause-effect relationships between the Rad Monitoring Systems (ARM & Process) and the areas they monitor. Include HVAC systems and area isolations.

References: 1-47W611-77-2 R5, ARI-180-187 Rev 30

Question:

Which ONE of the following identifies a condition that would cause an Instrument Malfunction alarm on 0-RM-90-122, WDS Liquid release, radiation monitor and the effect the Instrument Malfunction alarm would have on valve 0-RCV-77-43, CT BLDN LN RAD RELEASE CNTL?

A. Loss of signal from detector — Auto close 0-RCV-77-43 if the valve was open.

B. Loss of signal from detector — Prevent 0-RCV-77-43 from opening if the valve's local control handswitch was placed to OPEN.

C. Loss of flow through the monitor — Auto close 0-RCV-77-43 if the valve was open.

D. Loss of flow through the monitor — Prevent 0-RCV-77-43 from opening if the valve's local control handswitch was placed to OPEN.

DISTRACTOR ANALYSIS

a. CORRECT. As identified in ARI-181-C, a loss of signal from the detector would cause an Instrument Malfunction alarm and if 0-RCV-77-43 was open it would be automatically closed as identified on 1-47W611-77-2.
b. Incorrect. As identified in ARI-181-C, a loss of signal from the detector would cause an Instrument Malfunction alarm and if 0-RCV-77-43 handswitch was placed to open the valve would open but would reclose when the switch was released as identified on 1-47W611-77-2.
c. Incorrect. A loss of flow through the detector is not identified in ARI-181-C as a condition that would cause an Instrument Malfunction alarm but if 0-RCV-77-43 handswitch was open it would be automatically closed due to the low flow condition as identified on 1-47W611-77-2.
d. Incorrect. A loss of flow through the detector is not identified in ARI-181-C as a condition that would cause an Instrument Malfunction alarm and if 0-RCV-77-43 handswitch was placed to open the valve would open but would reclose when the switch was released as identified on 1-47W611-77-2.

Question Number: 63

K/A: 075 K1.02
Circulating Water
Knowledge of the physical connections and/or cause-effect relationships between the circulating water system and the following systems: Liquid radwaste discharge.

Tier:	2	**RO Imp:**	2.9	**RO Exam:**	Yes	**Cognitive Level:**	LOW
Group:	2	**SRO Imp:**	3.1	**SRO Exam:**		**Source:**	Bank

Applicable 10CFR55 Section: 41.2 to 41.9/45.7 to 45.8

Learning Objective: 3-OT-SYS0077A, Objective 20: Correctly locate the local and MCR controls for the Liquid Radwaste System; 3-OT-SYS027A, Objective 16: Explain the minimum cooling tower blowdown flow rate interlock with Radwaste, S/G Blowdown, and Cond Demin discharge valves.

References: SOI-77.01, Liquid Waste Disposal, Rev 57.

Question:

A release of the Monitor Tank is in progress through the Liquid Radwaste System. Which ONE of the following conditions results in automatic closure of 0-FCV-77-43, Liquid Radwaste Release Flow Control Valve?

A. High radiation signal on 0-RM-90-225, Condensate Demineralizer Release Liquid Radiation Monitor.

B. High radiation signal on 0-RM-90-212, Turbine Building Sump Discharge Liquid Radiation Monitor.

C. Cooling Tower Blowdown flow drops below 25,000 gpm.

D. SG Blowdown flow exceeds 150 gpm.

DISTRACTOR ANALYSIS

a. Incorrect. Plausible, since the candidate may believe that this high radiation condition causes termination of a release.
b. Incorrect. Plausible since the operator must ensure Turbine Building Sumps Pumps aligned to the LVWT pond and the LVWT isolated from the diffuser pond.
c. CORRECT.
d. Incorrect. Plausible. SG Blowdown flow exceeding 150 gpm will extend the time by 1.5 to 2 hours for a release due to increased backpressure on the release line.

WRITTEN QUESTION DATA SHEET

Question Number: 64

K/A: 079 A4.01
Station Air
Ability to manually operate and/or monitor in the control room: Cross-tie valves with IAS.

Tier:	2	**RO Imp:**	2.7	**RO Exam:**	Yes	**Cognitive Level:**	HIGH
Group:	2	**SRO Imp:**	27	**SRO Exam:**		**Source:**	WBN Bank

Applicable 10CFR55 Section: 41.7 / 45.5 to 45.8

Learning Objective: 3-OT-SYS032A, Objective 2 Describe Auto Actions for Loss of Control Air per AOI-10.

References: ARI-36-42, Heaters, Turb Seal, & Air, Rev 16

Question:

Given the following:

- Unit 1 operating at power when control air pressure starts to drop.
- Annunciator 42-F, SERVICE AIR PCV-33-4 CLOSED, alarms.
- The CRO responds in accordance with the Annunciator Response Instruction (ARI).

Which ONE of the following identifies the decreasing Control Air system pressure that would cause this alarm to occur and whether the Auxiliary Air compressors would have started if the air pressure dropped low enough to cause the alarm but then recovered without dropping any lower?

	Pressure to Cause Alarm	Aux Air Compressors
A.	83 psig	Would have started
B.	83 psig	Would NOT have started
C.	80 psig	Would have started
D.	80 psig	Would NOT have started

DISTRACTOR ANALYSIS

a. Incorrect. The isolation pressure is 80 psig not 83 psig. Plausible because 83 psig is the pressure where the aux air compressor start making the second part of the distractor correct. This pressure setpoint could be misapplied to the station service air isolation pressure

b. Incorrect. The isolation pressure is 80 psig not 83 psig. Plausible because the 83 psig setpoint could be misapplied to the station service air isolation pressure and for the aux air compressor start, the candidate recalls the pressure at which the aux air compressors load (79.5 psig) and applies this pressure as the starting pressure

c. Correct. The service air isolates at 80 psig and the aux air compressors would have started at 83 psig.

d. Incorrect. The isolation pressure is correct, but the aux air compressors would have started. Plausible if the candidate recalls the pressure at which the aux air compressors load which is 79.5 psig and applies this pressure as the starting pressure.

Question Number: 65

K/A: 086 K3.01
Fire Protection
Knowledge of the effect that a loss or malfunction of the Fire Protection System will have on the following: Shutdown capability with redundant equipment.

Tier:	**2**	**RO Imp: 2.7**	**RO Exam:**	**Yes**	**Cognitive Level:**	**High**
Group:	**2**	**SRO Imp: 3.2**	**SRO Exam:**		**Source:**	**Bank, modified**

Applicable 10CFR55 Section: 41.7 / 45.6

Learning Objective: 3-OT-AOI3000 Objective 10 State the two primary limiting safety conditions which must be maintained following a postulated Appendix R fire as specified in AOI-30.2.

References: AOI-30.2, Safe Shutdown, rev 27.

Question:

Given the following:
- Unit 1 is currently at 100%.
- A fire occurs in the Cable Spreading Room.
- The crew was unable to start the HPFP pumps.
- The incident Commander also reports that due to multiple fire damper failures the fire is spreading quickly.
- The crew has entered AOI-30.2, Fire Safe Shutdown.

In accordance with AOI-30.2, which ONE of the following failures results in a loss of a Control Function required to place the Plant in Hot Standby?

REFERENCE PROVIDED

A. Motor Driven AFW Pumps will not start.

B. RCS Thermal Barrier Booster Pumps trip.

C. One Main Steam Isolation Valve fails to close.

D. Letdown Isolation Valve 1-FCV-62-69 fails closed.

DISTRACTOR ANALYSIS

a. Incorrect. The TD AFW Pump is required for the Safe Shutdown. Plausible since the candidate may incorrectly assume that ALL AFW pumps are required.
b. Incorrect. The trip of the thermal barrier booster pumps does not impact the Safe Shutdown capabilities of the plant. Plausible if the candidate assumes that forced circulation is a concern.
c. Incorrect. Per the Safe Shutdown Logic Diagram, the failure of the MSIV does not impact the ability to place the plant in Hot Standby. Plausible, if the candidate misapplied the diagram.
d. CORRECT. Letdown is required by the Safe Shutdown Logic Diagram to place the plant in Hot Standby.

NOTE: This question requires the candidate to use the following reference:
AOI-30.2 Section 4.5, Safe Shutdown Logic Diagram

Question Number: 66

K/A: G2.1.5
Ability to use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc.

Tier:	3	**RO Imp:** 2.9	**RO Exam:**	**Yes**	**Cognitive Level:**	**HIGH**
Group:		**SRO Imp:** 3.9	**SRO Exam:**		**Source:**	**Bank Mod**

Applicable 10CFR55 Section: 41.10/43.5/45.12

Learning Objective: 3-OT-SPP1000, Objective 6 Describe shift staffing requirements.

References: OPDP-1 CONDUCT OF OPERATIONS, Section 3.1.3; Tech Spec 5.2.2 Shift Staffing.

Question:

Given the following:

- Unit 1 is in Mode 1.

In addition to the two Licensed Senior Reactor Operators, which ONE (1) of the following describes the MINIMUM number of Licensed Reactor Operator positions to man a shift, AND the MAXIMUM time requirement to restore if the Minimum shift manning for Licensed Reactor Operators is not met per OPDP-1, Conduct of Operations and Tech Spec 5.2.2, Unit Staff?

	Minimum Shift Manning	Time Requirement
A.	2 ROs	Restore within 2 hours
B.	2 ROs	Restore within 1 hour
C	1 RO	Restore within 2 hours
D.	1 RO	Restore within 1 hour

DISTRACTOR ANALYSIS

a. Correct per OPDP-1 and TS 5.2.2. 2 RO required and 2 Hour time limit per TS 5.2.2

b Incorrect. 2 ROs required is correct. 1 hour time limit is incorrect. Plausible due to TS does have one hour time requirements and if minimum shift manning is not met student may conclude this is important enough to require a 1 hour time requirement.

c. Incorrect. 1 RO is incorrect. Plausible due to in modes 5 and 6 the minimum requirement is only 1 RO. The 2 hour time requirement is correct.

d. Incorrect. 1 RO is incorrect. Plausible due to in modes 5 and 6 the minimum requirement is only 1 RO. Second part is also incorrect. Plausible due to TS does have one hour time requirements and if minimum shift manning is not met student may conclude this is important enough to require a 1 hour time requirement.

Question Number: 67

K/A: G2.1.28
Knowledge of the purpose and function of major system components and controls.

Tier:	3	**RO Imp:**	4.1	**RO Exam:**	Yes	**Cognitive Level:**	LOW
Group:		**SRO Imp:**	4.1	**SRO Exam:**		**Source:**	WBN Bank

Applicable 10CFR55 Section: 41.7

Learning Objective: 3-OT-SYS001B, Objective 9 Identify which controller is in service when Tavg is selected with the unit at power.

References: 1-47W611-1-2

Question:

With the Steam Dump Mode switch in the Tavg mode, what determines whether the load rejection controller or the Rx trip controller will be in service?

A. Loss of Load (C-7) Interlock.

B. LO-LO Tavg Interlock (550°F).

C. "A" Train Reactor Trip breaker position.

D. "B" Train Reactor Trip breaker position.

DISTRACTOR ANALYSIS

a. Incorrect. Plausible, since the Loss of Load interlock will arm the steam dumps, but does not determine which controller output will position the dump valves.
b. Incorrect. Plausible, since the LO-LO Tavg Interlock will close all of the steam dumps if temperature drops to below 550°F
c. Incorrect. The A train Reactor Trip breaker is used to ARM the steam dumps on a reactor trip.
d. CORRECT. The B train reactor trip breaker is used to select the controller in service. With NO reactor trip, the Load Rejection Controller is selected. Once the B train reactor trip breaker opens, the Reactor Trip controller is selected.

Question Number: 68

K/A: G2.1.36
Knowledge of procedures and limitations involved in core alterations.

Tier:	3	**RO Imp:**	3.0	**RO Exam:**	Yes	**Cognitive Level:**	Low
Group:		**SRO Imp:**	4.1	**SRO Exam:**		**Source:**	SQN Bank Sig Mod

Applicable 10CFR55 Section: 41.10/43.7

Learning Objective: 3-OT-GO0700, Objective 5: Describe the major steps that the operator must take when unloading fuel per this instruction.

References: FHI-7, Rev. 31

Question:

Given the following plant conditions:

- Unit is in Mode 6.
- 15 fuel assemblies have been reloaded after a complete core off-load.
- Source Range N-131 indicates 10 cps and is selected for audible count rate indication.
- Source Range N-132 indicates 5 cps.

In accordance with FHI-7, "Fuel Handling and Movement", which ONE of the following unanticipated changes in count rate requires suspension of core alterations?

A. N131 indicates 25 cps and N132 indicates 8 cps.

B. N131 indicates 15 cps and N132 indicates 20 cps.

C. N131 indicates 40 cps and N132 indicates 8 cps.

D. N131 indicates 20 cps and N132 indicates 15 cps.

DISTRACTOR ANALYSIS

a. Incorrect. Plausible since N131 has increased by greater than a factor of 2, but N132 has not changed by a factor of 2.
b. Incorrect. Plausible since N131 has not increased by greater than a factor of 2, but N132 has changed by a factor of 4 but has not exceeded the factor of 5 which would require suspension of core alterations.
c. Incorrect. Plausible, since N131 has increased by a factor of 4, but has not exceeded the factor of 5 which would require suspension of core alterations.
d. CORRECT. Both source range channels have doubled, which would require suspension of core alterations.

WRITTEN QUESTION DATA SHEET

Question Number: 69

K/A: G2.2.12
Knowledge of surveillance procedures.

Tier:	3	**RO Imp:**	3.7	**RO Exam:**	Yes	**Cognitive Level:**	LOW
Group:		**SRO Imp:**	4.1	**SRO Exam:**		**Source:**	WBN Bank

Applicable 10CFR55 Section: 41.10/45.13

Learning Objective: 3-OT-SPP0802, Objective 2 Explain the difference between the surveillance due date and the WBN extension date for both Tech Spec and Non Tech Spec surveillances.

References: SPP-8.2, Rev. 3

Question:

A Power Range channel has failed requiring the crew to implement AOI-4. NIS Malfunctions. The US has entered the appropriate Technical Specifications and states that a flux map will be required per Surveillance Requirement 3.2.4.2.

SR 4.2.4.2 states *"Verify QPTR is within limits using moveable incore detectors once within 12 hours and 12 hours thereafter."*

What is the maximum time for the initial performance of the flux map and the maximum time for subsequent performances?

	Initial Performance	Subsequent Performances
A.	12 hours	12 hours
B.	15 hours	12 hours
C.	12 hours	15 hours
D.	15 hours	15 hours

DISTRACTOR ANALYSIS

a. Incorrect. Plausible since the first performance must be accomplished within the specified time with NO extension. An extension is allowed for subsequent performances.
b. Incorrect. Plausible since an extension is allowed for subsequent performances, but the first performance must be accomplished within the specified time with NO extension. .
c. CORRECT. There is no extension allowed for the first performance, and an extension of 25% of the allowed time may be granted for subsequent performances
d. Incorrect. Plausible since an extension is allowed for subsequent performances, but the first performance must be accomplished within the specified time with NO extension.

Question Number: 70

K/A: G2.2.44
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:	3	**RO Imp:**	4.2	**RO Exam:**	Yes	**Cognitive Level:**	High
Group:		**SRO Imp:**	4.4	**SRO Exam:**		**Source:**	New

Applicable 10CFR55 Section: 41.5/43.5/45.12

Learning Objective: 3-OT-SYS003B, Objective 23: Using plant drawings, determine the effect of a loss of instrument air/control power on the following valves/components: a. MDAFWP regulating valve (main and bypass), b TDAFWP regulating valve, c. AFW pumps.

References: AOI-10, LOSS OF CONTROL AIR, Rev. 38; SOI-3.02, Auxiliary Feedwater System, Section 8.5.1.

Question:

Given the following:

- Unit 1 is at 100% power with the TDAFW pump out of service when a Reactor trip occurs.
- Following the trip, a loss of essential control air on Train A occurs.
- The operator observes the following conditions on AFW pump 1A-A:
  - Reduced amps.
  - High discharge pressure.
  - NO flow to SGs 1 and 2.

Which ONE of the following describes the status of the Train A AFW system and the directions the operator needs to give the NAUO in order to restore and control flow to Steam Generator 1 and 2 in accordance with SOI-3.02?

A. There is NO flow because the MD AFW pump discharge PCV has failed CLOSED even though the SG bypass LCVs have failed open.
Direct the NAUO to fail open the LCVs, manually adjust pump PCV, then to control SG LCVs locally using manual isolation valves.

B. There is NO flow because the MD AFW pump discharge PCV has failed CLOSED even though the SG bypass LCVs have failed open.
Direct the NAUO to leave the bypass LCVs open and to throttle the pump PCV open manually to control SG levels.

C. While the MD AFW pump discharge PCV has failed OPEN, there is no flow because the SG LCVs have failed CLOSED.
Direct the NAUO to fail open the LCVs, manually adjust pump PCV, then to control SG LCVs locally using manual isolation valves.

D. While the MD AFW pump discharge PCV has failed OPEN, there is no flow because the SG LCVs have failed CLOSED.
Direct the NAUO to fail the LCVs open and to throttle the pump PCV open manually to control SG levels.

DISTRACTOR ANALYSIS

a. CORRECT. The PCV fails closed to isolate the flow path and the bypass LCV does fail open. SOI - 3.02 section 8.5.1 directs the actions to fail open the LCVs manually adjust the PCV and then to use manually valves to control level.

b. Incorrect. The PCV fails closed to isolate the flow path and the bypass LCV does fail open. Actions for the NAUO are not in accordance with the SOI. Plausible because the valve fail positions are correct and the action for the NAUO would result flow to the SGs

WRITTEN QUESTION DATA SHEET

Question Number: 71

K/A: G2.3.7
Ability to comply with radiation work permit requirements during normal or abnormal conditions.

Tier:	3	**RO Imp:**	3.5	**RO Exam:**	Yes	**Cognitive Level:**	Low
Group:		**SRO Imp:**	3.6	**SRO Exam:**		**Source:**	NEW

Applicable 10CFR55 Section: 41.12 / 45.10

Learning Objective: 3-OT-RAD0003, Objective 8: Identify the responsibilities of the following concerning the ALARA program: a. Radiation Protection Manager/Radiation Safety Officer, b. TVA NPG Organization, c. Employee

References: RCI-153, Radiation Work Permits (RWPs) Rev 0000; RCI-100, Control of Radiological Work, Rev 32.

Question:

An individual enters a Radiological Controlled Area (RCA) covered by a General RWP to perform equipment inspections.

Which ONE of the following identifies an area within the RCA where a Job Specific RWP is required before entry is allowed, in accordance with RCI-153, Radiation Work Permits?

A. Area where whole body dose rates exceeds 10 mrem/hr.

B. Area posted as Hot Particle Area.

C. Area with general contamination levels greater than 200 dpm/100cm^2.

D. Area where dose expected exceeds 5 mrem.

DISTRACTOR ANALYSIS

a. Incorrect. Required if >1,000mrem/hr.
b. CORRECT. Required for area posted as Hot Particle Area.
c. Incorrect. Required if > 50,000 dpm/100cm^2.
d. Incorrect. Required if dose rate exceeds 50 mrem.

WRITTEN QUESTION DATA SHEET

Question Number: 72

K/A: G2.3.14
Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.

Tier:	3	**RO Imp:**	3.4	**RO Exam:**	Yes	**Cognitive Level:**	LOW
Group:		**SRO Imp:**	3.8	**SRO Exam:**		**Source:**	NEW

Applicable 10CFR55 Section: 41.12 / 43.4 / 45.10

Learning Objective: 3-OT-SYS031A, Objective 3. Describe the ventilation flow path provided by the control building ventilation system during normal and emergency operation.

References: ARI-180-187 rev 30, 1-47W866-4 R39

Question:

Given the following conditions:

- Following an accident, both Trains of Control Room Isolation have been initiated.
- Several Auxiliary Building Area Radiation Monitors rise to the alarm setpoint.

Which ONE of the following MCR air intake radiation monitors would detect and alert the crew of a radiation hazard entering the control room and what actions the ARI would direct the crew to perform?

A. 0-RM-90-125, Stop MCR Emergency Pressurization Fans

B. 0-RM-90-125, Align Emergency Pressurization Fan suction to alternate source.

C. 0-RM-90-205, Stop MCR Emergency Pressurization Fans

D. 0-RM-90-205, Align Emergency Pressurization Fan suction to alternate source.

DISTRACTOR ANALYSIS

a. Incorrect, 0-RM-90-125 is in an isolated flow path due to the CRI. Plausible because the rad monitor is the incorrect monitor it would be in the flow path after the supply was realigned and the stopping the fans would could be a way of stopping the intake of radiation.
b. Incorrect, 0-RM-90-125 is in an isolated flow path due to the CRI. Plausible because the rad monitor is the incorrect monitor it would be in the flow path after the supply was realigned and Annunciator 187-A directs the action to align the Emergency Pressurization Fan suction to alternate source.
c. Incorrect, 0-RM-90-205 will cause annunciator 187-A to alarm and the ARI directs the action to ALIGN Emergency Pressurization Fan suction to alternate source not to stop the Emergency Pressurization Fan. Plausible because the rad monitor is the correct monitor and stopping the fans would could be a way of stopping the intake of radiation.
d. CORRECT, 0-RM-90-205 will cause annunciator 187-A to alarm . 0-RM-90-125 is in an isolated flow path due to the CRI. Annunciator 187-A directs the action to align the Emergency Pressurization Fan suction to alternate source.

WRITTEN QUESTION DATA SHEET

Question Number: 73

K/A: G2.4.13
Knowledge of crew roles and responsibilities during EOP usage.

Tier:	3	**RO Imp:**	4.0	**RO Exam:**	Yes	**Cognitive Level:**	LOW
Group:		**SRO Imp:**	4.6	**SRO Exam:**		**Source:**	SQN Bank

Applicable 10CFR55 Section: 41.10/45.12

Learning Objective: 3-OT-TI1204, Objective 13 Apply the rules of usage which relate to performing steps of an EOP in a specified sequence to determine when steps may/must be performed.

References: TI-12.04, Rev. 7, Page 31 thru 34.

Question:

The Operator-at-the-Controls (OAC/RO) is responding to an accident. He recognizes that he must take actions which are NOT contained in the emergency operating procedure in effect and are NOT covered by prudent operator actions. Which ONE of the following describes the proper action that he should take?

A. The OAC should take no action until a procedure is developed or revised.

B. The OAC shall obtain approval from a licensed SRO prior to taking action.

C. The OAC should obtain concurrence from another licensed RO prior to taking action.

D. The OAC should immediately take appropriate actions necessary and inform the SRO when time permits.

DISTRACTOR ANALYSIS

a. Incorrect. Plausible, since under normal circumstances, the operator would stop a task in progress and wait until a new procedure was written before taking any additional actions. The operator must stop actions long enough to get approval from the SRO. The SRO would have to address the situation using 10CFR50.54(x) criteria.
b. CORRECT. The operator must stop actions long enough to get approval from the SRO. The SRO would have to address the situation using 10CFR50.54(x) criteria.
c. Incorrect. Plausible if the candidate confuses the actions required by a PEER CHECK with actions in b.
d. Incorrect. Plausible, since Prudent Operator Actions do allow the RO to take manual compensatory actions which are within the guidelines of an existing procedure.

WRITTEN QUESTION DATA SHEET

Question Number: 74

K/A: G2.4.37
Knowledge of the lines of authority during implementation of the emergency plan.

Tier:	3	**RO Imp:**	3.0	**RO Exam:**	Yes	**Cognitive Level:**	Low
Group:		**SRO Imp:**	4.1	**SRO Exam:**		**Source:**	WBN Bank

Applicable 10CFR55 Section: 41.10 / 45.13

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

References: EPIP15, Emergency Exposure Guidelines, Rev 13.

Question:

Given the following:

- A Site Area Emergency (SAE) has been declared on Unit 1.
- Two hours after the SAE declaration, an individual is to be authorized to receive an Emergency Exposure radiation dose above the TVA whole body dose limit during the mitigation of the emergency situation.

In accordance with EPIP-15, Emergency Exposure Guidelines, whose approval is required for the individual to receive the dose?

A. TSC Radcon Manager.

B. Onshift Shift Manager.

C. Site Emergency Director.

D. Site Vice President.

DISTRACTOR ANALYSIS

a. Incorrect. Per EPIP-15, the Radiation Protection group is responsible for completing necessary paperwork and obtaining SED's approval
b. Incorrect. Plausible, if the Shift Manager was in the role of the SED. The 2 hour time frame stated in the stem allows for the TSC to be manned and therefore the SED duties would have been assumed from the Shift Manager.
c. CORRECT. The SED is the ONLY individual responsible for authorizing emergency dose limits.
d. Incorrect. Plausible, since the Site VP may be acting as the SED. However the Site VP by title does not have responsibility for authorizing emergency dose limits.

WRITTEN QUESTION DATA SHEET

Question Number: 75

K/A: G2.4.42
Knowledge of emergency response facilities.

Tier:	3	**RO Imp:**	2.6	**RO Exam:**	Yes	**Cognitive Level:**	Low
Group:		**SRO Imp:**	3.8	**SRO Exam:**		**Source:**	NEW

Applicable 10CFR55 Section: 41.10 / 45.11

Learning Objective: 3-OT-PDC-048C, Objective 20 Use the Satellite Phone to make calls during emergencies.

References: SOI-100.01, rev 22.

Question:

Which ONE of the following identifies where a Portable Satellite Telephone, available for use during an emergency, is located?

A. Main Control Room

B. Technical Support Center

C. Joint Information Center

D. Operations Support Center

DISTRACTOR ANALYSIS

a. Incorrect. Plausible because the Main Control Room does have Satellite phone capabilities, however the capability is to selected phones via the Stationary Satellite Telephone (SST) system.
b. CORRECT. The Portable Satellite Telephone (PST) is located in a cabinet in the Technical Support Center.
c. Incorrect. Plausible because the other 3 locations do have selected phones that can be connected to the Stationary Satellite Telephone (SST) system, and the JIC does not that capability.
d. Incorrect. Plausible because the Operations support Center does have Satellite phone capabilities, however, the capability is to selected phones via the Stationary Satellite Telephone (SST) system.