EXAMINATION ANSWER KEY

Salem ILOT 17-01 RO NRC Exam – (**APPROVED**)

1 **Points: 1.00**

Given:

- Unit 2 is in MODE 5
- **ALL** RCPs are stopped
- The crew is preparing to start 23 RCP in accordance with S2.OP-SO.RC-0001 (REACTOR COOLANT PUMP OPERATION)

Considering **ONLY** the following plant conditions below:

1. Pressurizer level is less than 92%
2. **ALL** Steam Generator secondary side temperatures are less than 50°F above any RCS Cold Leg temperature

Which ONE of the following completes the statement below?

With one or more RCS Cold Leg temperatures less than or equal to 312°F, ___(1)___ conditions shall be met before starting 23 RCP.

Starting 23 RCP when the start criteria are **NOT** met will result in ___(2)___.

A. **(1)** **BOTH**
   (2) degradation of the RCP motor due to a larger motor starting current

B. **(1)** **BOTH**
   (2) an RCS pressure transient caused by energy addition from the secondary system

C. **(1)** at least one of the
   (2) degradation of the RCP motor due to a larger motor starting current

D. **(1)** at least one of the
   (2) an RCS pressure transient caused by energy addition from the secondary system

Answer: D

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. For Part 1, the candidate could incorrectly conclude that both conditions must be met to start the 23 RCP. For Part 2, protecting the RCP motor is a valid concern and there are design features of the RCPs and starting duty requirements which protect the RCP motor. Consequently, the candidate could incorrectly conclude that starting 23 RCP when the start criteria are NOT met will result in degradation of the RCP motor due to a larger motor starting current.

B. Incorrect but plausible. For Part 1, the candidate could incorrectly conclude that both conditions must be met to start the 23 RCP. Part 2 is correct.

C. Incorrect but plausible. Part 1 is correct. For Part 2, protecting the RCP motor is a valid concern and there are design features of the RCPs and starting duty requirements which protect the RCP motor. Consequently, the candidate could incorrectly conclude that starting 23 RCP when the start criteria are NOT met will result in degradation of the RCP motor due to a larger motor starting current.

D. **Correct.** IAW S2.OP-SO.RC-0001 (REACTOR COOLANT PUMP OPERATION) Limitations, with one or more RCS Cold Leg temperatures less than or equal to 312°F, at least one of conditions shall be met before starting 23 RCP. Starting 23 RCP when the start criteria are NOT met will result in an RCS pressure transient caused by energy addition from the secondary system.

Question Number: 1

Tier: 2 Group 1

K/A: 003 Reactor Coolant Pump System (RCPS)-K6.14

Knowledge of the effect of a loss or malfunction on the following will have on the RCPS: Starting requirements

Importance Rating: 2.6

10 CFR Part 55: 41.7 / 45.5

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know RCP starting criteria and the effect on the RCP / RCS when attempting to start the RCP when starting criteria is NOT met.

SRO Justification: N/A

Technical References: S2.OP-SO.RC-0001

Proposed references to be provided: None

Learning Objective: NOS05RCPUMP-13 (REACTOR COOLANT PUMP)

13 Discuss the procedural requirements associated with the Reactor Coolant Pump, including an explanation of major precaution and limitations in the Reactor Coolant Pump procedures

Cognitive Level:

Higher	
Lower	X

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

2 **Points: 1.00**

Given:

- Unit 1 is at 100% Reactor Power and stable
- The crew is performing S1.OP-AB.RC-0002 (High Activity In Reactor Coolant System)
- 11 Charging Pump is in service
- 1CV4 (75 GPM ORIFICE) is in service
- Chemistry has just reported that the confirmatory sample has confirmed increasing activity in the RCS but below LCO 3.4.9 (Specific Activity) limits

In accordance with S1.OP-AB.RC-0002, which ONE of the following completes the statements below?

The crew ___(1)___ required to place the 13 Charging Pump in service and then secure the 11 Charging Pump.

In addition to 1CV4, the crew will also place ___(2)___ in service.

	(1)	**(2)**
A.	is	1CV3 (45 GPM ORIFICE)
B.	is	1CV5 (75 GPM ORIFICE)
C.	is **NOT**	1CV3 (45 GPM ORIFICE)
D.	is **NOT**	1CV5 (75 GPM ORIFICE)

Answer: C

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. For Part 1, the candidate could incorrectly conclude that the 13 Charging pump must be placed in service when performing S1.OP-AB.RC-0002. Part 2 is correct.

B. Incorrect but plausible. For Part 1, the candidate could incorrectly conclude that the 13 Charging pump must be placed in service when performing S1.OP-AB.RC-0002. For Part 2, the candidate could know that letdown will be maximized in S1.OP-AB.RC-0002 Step 3.16 but incorrectly conclude that BOTH 75 gpm orifices will be placed in service.

C. **Correct.** For Part 1 and IAW S1.OP-AB.RC-0002 Step 3.14, the crew is required to have a Centrifugal Charging Pump (CCP) in service. Consequently, the crew is NOT required to place the 13 Charging Pump (PDP) in service then secure the 11 Charging Pump. For Part 2 and IAW S1.OP-AB.RC-0002 Step 3.16, the crew is required to maximize letdown flow. Consequently, in addition to 1CV4, the crew is required to also place 1CV3 (45 GPM ORIFICE) in service.

D. Incorrect but plausible. For Part 2, the candidate could know that letdown will be maximized in S1.OP-AB.RC-0002 Step 3.16 but incorrectly conclude that BOTH 75 gpm orifices will be placed in service.

Question Number: 2

Tier: 2 Group 1

K/A: 004 Chemical and Volume Control System-A2.09

Ability to (a) predict the impacts of the following malfunctions or operations on the CVCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: High primary and/or secondary activity

Importance Rating: 3.0

10 CFR Part 55: 41.5/ 43/5 / 45/3 / 45/5

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must how the CVC system will be reconfigured during high primary activity (IAW S1.OP-AB.RC-0002 (High Activity In Reactor Coolant System)).

SRO Justification: N/A

Technical References: S1.OP-AB.RC-0002 (High Activity In Reactor Coolant System)

Proposed references to be provided: None

Learning Objective: NOS05ABRC02-05 (HIGH ACTIVITY IN REACTOR COOLANT SYSTEM)

3 Describe, in general terms, the actions taken in S2.OP-AB.RC-0002 and the bases for the actions in accordance with the Technical Bases Document.

Cognitive Level:

Higher	
Lower	X

Question Source

New	
Modified Bank	X
Bank	

Question History: Modified from ILOT 1601 NRC RO Q69

Comments:

3 **Points: 1.00**

Given:

- Unit 1 is 90% Reactor Power and stable
- The Rod Bank Selector Switch is in AUTOMATIC

At Time 07:00

- An AUTOMATIC RCS Makeup starts

At Time 07:01

- 125 VDC power to 1CV179 (PRIMARY WATER FLOW) has been lost
- The Primary Water Flow Deviation Alarm actuates

At Time 07:02

- 1CV185 (MAKEUP FLOWPATH) fails to AUTOMATICALLY close

Which ONE of the following completes the statements below?

The Primary Water Flow Deviation Alarm actuates when primary water flow is greater than a **MINIMUM** of ±___(1)___ gpm above the setpoint.

Control Rods are expected to step ___(2)___ as the makeup continues with 1CV179 in its failed position.

	(1)	**(2)**
A.	5.0	out
B.	5.0	in
C.	0.8	out
D.	0.8	in

Answer: A

Answer Explanation

DISTRACTOR ANALYSIS:

A. **Correct.** For Part 1 and IAW S2.OP-AR-ZZ-0012, the Primary Water Flow Deviation Alarm actuates when primary water flow is greater than a MINIMUM of ± 5.0 gpm above the setpoint. For Part 2, 1CV179 fails closed. Consequently, actual boron flow out of the boric acid blender will higher than the predetermined setpoint for the auto makeup (based on current RCS Boron concentration). This will cause actual RCS boron concentration to rise since the boron concentration of auto makeup flow is higher than the setpoint for the existing RCS Boron concentration. An increase in actual RCS Boron concentration will insert negative reactivity which will cause Tavg to lower. As Tavg lowers, control rods will step out to restore Tavg to program temperature.

B. Incorrect but plausible. Part 1 is correct. For Part 2, the candidate could incorrectly conclude that 1CV179 fails open. With 12CV179 fully open during an automatic RCS makeup, actual RCS Boron Concentration will lower. Lowering actual RCS Concentration will add positive reactivity which will cause the Tavg to rise. As Tavg rises, control rods will step in to restore Tavg to program temperature.

C. Incorrect but plausible. For Part 1, the Boric Acid Flow Deviation actuates when boric acid flow is greater than a MINIMUM of ± 0.8 gpm above the setpoint. Consequently, the candidate could incorrectly conclude that the Primary Water Flow Deviation Alarm actuates when primary water flow is greater than a MINIMUM of ± 0.8 gpm above the setpoint. Part 2 is correct.

D. Incorrect but plausible. For Part 1, the Boric Acid Flow Deviation actuates when boric acid flow is greater than a MINIMUM of ± 0.8 gpm above the setpoint. Consequently, the candidate could incorrectly conclude that the Primary Water Flow Deviation Alarm actuates when primary water flow is greater than a MINIMUM of ± 0.8 gpm above the setpoint. For Part 2, the candidate could incorrectly conclude that 1CV179 fails open. With 1CV179 fully open during an automatic RCS makeup, actual RCS Boron Concentration will lower. Lowering actual RCS Concentration will add positive reactivity which will cause the Tavg to rise. As Tavg rises, control rods will step in to restore Tavg to program temperature.

Question Number: 3

Tier: 2 Group 1

K/A: 004 Chemical and Volume Control System-K3.01

Knowledge of the effect that a loss or malfunction of the CVCS will have on the following: CRDS (automatic)

Importance Rating: 2.5

10 CFR Part 55: 41. 7/ 45.6

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must determine how control rods will automatically respond following a malfunction of CVCS which causes a boration of the RCS.

SRO Justification: N/A

Technical References: Drawing 224443
S2.OP-AR-ZZ-0012

Proposed references to be provided: None

Learning Objective: NOS05CVCS00-17 (Chemical and Volume Control System)

11 Given a Chemical and Volume Control System failure, predict the effect of the Chemical and Volume Control System failure on the following:

- Reactor Coolant System

Cognitive Level:

Higher X
Lower _____

Question Source

New _____
Modified Bank X
Bank _____

Question History: Modified from ILOT 1601 NRC RO Q31

Comments:

4 **Points: 1.00**

Given:

- Unit 2 is in MODE 5 with solid plant pressure control
- **BOTH** Trains of RHR are in service providing RCS cooling
- 2CV8 (RHR Purification Flow Control Valve) is throttled open
- RCS pressure is being controlled at 300 psig with 2CV18 (Low Pressure Letdown Control Valve) in MANUAL

At time 19:00

- The NCO manually adjusts the following RHR valves:
  - 22RH18 (RHR HX Outlet Valve) is throttled **MORE CLOSED**
  - 2RH20 (RHR HX Bypass Valve) is throttled **MORE OPEN**
  - 21/22SJ49 flow remains constant

Which ONE of the following completes the statements below?

As RCS temperature responds to the RHR system adjustments, RCS pressure will **INITIALLY** ___(1)___.

The NCO will then manually throttle 2CV18 **MORE** ___(2)___ to restore RCS pressure to 300 psig.

	(1)	**(2)**
A.	rise	CLOSED
B.	rise	OPEN
C.	lower	CLOSED
D.	lower	OPEN

Answer: B

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. Par 1 is correct. For Part 2, the candidate could have a misunderstanding how solid plant pressure control works and incorrectly conclude that throttle 2CV-18 more closed will restore RCS pressure to 300 psig.

B. **Correct.** For Part 1 and since flow through 22 RHR HX is lowered (when 22RH18 is throttled more closed), RCS temperature will rise. With the plant water solid, this will cause RCS pressure to initially rise (since water is incompressible). For Part 2, solid plant pressure control is maintained by holding charging flow constant and adjusting let down flow. To lower RCS pressure during solid plant operations, letdown flow must be raised (with a constant charging flow). Consequently, the operator must throttle 2CV-18 more open to restore RCS pressure to 300 psig.

C. Incorrect but plausible. For Part 1, the candidate could incorrectly conclude that RCS temperature will initially lower (which will also cause RCS pressure to lower) based on the adjustment to the RHR System. Part 2 would be correct if RCS pressure had actually lowered.

D. Incorrect but plausible. For Part 1, the candidate could incorrectly conclude that RCS temperature will initially lower (which will also cause RCS pressure to lower) based on the adjustment to the RHR System. For Part 2, the candidate could have a misunderstanding how solid plant pressure control works and incorrectly conclude that throttle 2CV-18 more open will restore RCS pressure to 300 psig (when RCS pressure was too low).

Question Number: 4

Tier: 2 Group 1

K/A: 005 Residual Heat Removal System (RHRS)-K5.05

Knowledge of the operational implications of the following concepts as they apply the RHRS: Plant response during "solid plant": pressure change due to the relative incompressibility of water

Importance Rating: 2.7

10 CFR Part 55: 41.5 / 45.7

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know how RCS Pressure will respond during solid plant operations when RHR flow through 22 RHR HX is lowered.

SRO Justification: N/A

Technical References: NOS05RHR000-16 (RESIDUAL HEAT REMOVAL SYSTEM)
NOS05CVCS00-17 (CHEMICAL AND VOLUME CONTROL SYSTEM)

Proposed references to be provided: None

Learning Objective: NOS05CVCS00-17 (Chemical and Volume Control System)

11 Describe the function and how their normal and abnormal operations affects the Chemical and Volume Control System

- RHR Flow Control Valve, CV8
- Low Pressure Letdown Control Valve, CV18.

Cognitive Level:

Higher X
Lower _____

Question Source

New X
Modified Bank _____
Bank _____

Question History:

Comments:

5 **Points: 1.00**

Given:

- Unit 2 is at 100% Reactor Power
- 21 and 22 CCW Pumps are in service

At time 12:00

- A Reactor Trip and Safety Injection have occurred coincident with a LOOP

Which ONE of the following completes the statements below?

At **12:01**, the SECs are operating in ___(1)___.

After the SECs have completed their loading, 21 and 22 CCW Pumps will be ___(2)___.

	(1)	**(2)**
A.	Mode II	running
B.	Mode II	stopped
C.	Mode III	running
D.	Mode III	stopped

Answer: D

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. For Part 1, the SECs have 4 modes of operation. SEC Mode 2 operation is only for a Station Blackout. Given there is a Station Blackout as part of the questions stem, the candidate could incorrectly conclude that the SECs are operating in Mode 3. For Part 2, CCW cools several ECCS components (RHR Pumps, RHR HX and SI Pumps). Consequently, the candidate could incorrectly conclude that with a SI and LOOP in progress, the SECs will automatically restart the CCW Pumps.

B. Incorrect but plausible. For Part 1, the SECs have 4 modes of operation. SEC Mode 2 operation is only for a Station Blackout. Given there is a Station Blackout as part of the questions stem, the candidate could incorrectly conclude that the SECs are operating in Mode 3. Part 2 is correct.

C. Incorrect but plausible. Part 1 is correct. For Part 2, CCW cools several ECCS components (RHR Pumps, RHR HX and SI Pumps). Consequently, the candidate could incorrectly conclude that with a SI and LOOP in progress, the SECs will automatically restart the CCW Pumps.

D. **Correct.** For Part 1, the SECs will be operating in Mode 3 (SI + Blackout) following a Reactor Trip and Safety Injection coincident with a LOOP. For Part 2, the CCW Pumps will not automatically start as part of SEC Mode 3 loading.

Question Number: 5

Tier: 2 Group 1

K/A: 006 Emergency Core Cooling System (ECCS)-K1.11

Knowledge of the physical connections and/or cause-effect relationships between the ECCS and the following systems: CCWS

Importance Rating: 2.8

10 CFR Part 55: 41.5 / 45.7

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know the cause-effect relationship between ECCS and CCWS. Specifically, even though CCWS cools several ECCS components, CCW Pumps will not be automatically started after a Safety injection coincident with a Station Blackout (a plant transient that will start all of the ECCS pumps).

SRO Justification: N/A

Technical References: NOS05RHR000-16 (RESIDUAL HEAT REMOVAL SYSTEM)
NOS05CVCS00-17 (CHEMICAL AND VOLUME CONTROL SYSTEM)

Proposed references to be provided: None

Learning Objective: NOS05ECCS00-09 (EMERGENCY CORE COOLING SYSTEM)

15 Given plant conditions, relate the Emergency Core Cooling System with the following:

i.. Component Cooling Water System

Cognitive Level:

Higher X
Lower _____

Question Source

New X
Modified Bank _____
Bank _____

Question History:

Comments:

6 **Points: 1.00**

Given:

- Unit 2 is at 100% Power
- PRT Temperature and Level are slowly rising

At time 15:00

- The Crew initiates performance of S2.OP-SO.PZR-0003 (PRESSURIZER RELIEF TANK OPERATION) Section 5.3, "Reducing PRT Temperature by Feed and Bleed"

Which ONE of the following completes the statements below concerning cooling of the PRT?

Leakage from the Reactor ___(1)___ is causing PRT temperature to rise.

When performing S2.OP-SO.PZR-0003 Section 5.3, the liquid in the PRT will be pumped to the ___(2)___.

	(1)	**(2)**
A.	Head Vents	RCDT
B.	Head Vents	CVCS HUT
C.	Flange Leakoff	RCDT
D.	Flange Leakoff	CVCS HUT

Answer: B

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. Part 1 is correct. For Part 2, the drain of the PRT is physically connected to the RCDT. However, a check valve is situated in between the PRT drain and the RCDT. Consequently, the candidate could incorrectly recall the piping and pump layout between the PRT and RCDT and incorrectly conclude that during performance of S2.OP-SO.PZR-0003 Section 5.3, the liquid in the PRT will be pumped to the RCDT.

B. **Correct.** For Part 1, the Reactor head vents drain to the PRT and will cause PRT temperature to rise (with the Reactor is at power). For Part 2, during the performance of S2.OP-SO.PZR-0003 Section 5.3, the liquid in the PRT will be pumped to the CVCS HUT using a RCDT Pump.

C. Incorrect but plausible. For Part 1, Reactor Flange Leakoff is directed to the RCDT. The candidate could incorrectly conclude that Reactor Flange Leakoff actually drains to the PRT which would cause PRT temperature to rise. For Part 2, the drain of the PRT is physically connected to the RCDT. However, a check valve is situated in between the PRT drain and the RCDT. Consequently, the candidate could incorrectly recall the piping and pump layout between the PRT and RCDT and incorrectly conclude that during performance of S2.OP-SO.PZR-0003 Section 5.3, the liquid in the PRT will be pumped to the RCDT

D. Incorrect but plausible. For Part 1, Reactor Flange Leakoff is directed to the RCDT. The candidate could incorrectly conclude that Reactor Flange Leakoff actually drains to the PRT which would cause PRT temperature to rise. Part 2 is correct.

Question Number: 6

Tier: 2 Group 1

K/A: 007 Pressurizer Relief Tank/Quench Tank System (PRTS)-A1.03

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

Importance Rating: 2.6

10 CFR Part 55: 41.5 / 45.5

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know what could cause PRT temperature to rise and how the PRT is cooled to prevent exceeding its design limits.

SRO Justification: N/A

Technical References: NOS05PZRPRT-06 (PRESSURIZER AND PRESSURIZER RELIEF TANK)

Proposed references to be provided: None

Learning Objective: NOS05PZRPRT-06 (PRESSURIZER AND PRESSURIZER RELIEF TANK)

3 Identify and describe the Control Room controls, indications, and alarms associated with the Pressurizer and Pressurizer Relief Tank, including:

a. The Control Room location of Pressurizer and Pressurizer Relief Tank control bezels and indications. (Licensed Operator & STA only)

b. The function of each Pressurizer and Pressurizer Relief Tank Control Room control and indication. (Licensed Operator & STA only)

c. The effect each Pressurizer and Pressurizer Relief Tank control has upon Pressurizer and Pressurizer Relief Tank components and operation. (Licensed Operator & STA only)

Cognitive Level:

Higher	
Lower	X

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

7 **Points: 1.00**

Given:

- Unit 2 Pressurizer is water solid

At time 12:00

- The crew is performing a Pressurizer heatup in accordance with S2.OP-SO.RC-0002 (VACUUM REFILL OF THE RCS) Section 5.4, "Establishing Pressurizer Steam Bubble Without A Vacuum In RCS"

At time 13:00

- The crew has opened 2PR1 (PZR PORV) for Pressurizer degassing in accordance with S2.OP-SO.RC-0002 Section 5.4

Which ONE of the following completes the statements below?

In accordance with LCO 3.4.10.2 (Pressurizer), the **MAXIMUM** allowable Pressurizer heatup rate is ___(1)___ °F per hour.

During the Pressurizer degassing, the crew will open and close 2PR1 to maintain PRT pressure less than a **MAXIMUM** of ___(2)___ psig.

	(1)	**(2)**
A.	100	10
B.	100	25
C.	200	10
D.	200	25

Answer: A

Answer Explanation

DISTRACTOR ANALYSIS:

A. **Correct.** For Part 1 and IAW LCO 3.4.10.2, the MAXIMUM allowable Pressurizer heatup rate is 100 °F per hour. For Part 2 and IAW S2.OP-SO.RC-0002 Section 5.4, during the Pressurizer degassing, the crew will open and close 2PR1 to maintain PRT pressure less than a MAXIMUM of 10 psig.

B. Incorrect but plausible. Part 1 is correct. For Part 2, 25 psig is a pressure that is below the PRT ruptured disc setpoint of 100 psig and close to the actual limit. Consequently, the candidate could incorrectly conclude that S2.OP-SO.RC-0002 Section 5.4 requires PRT pressure to be maintained less than a maximum of 25 psig.

C. Incorrect but plausible. For Part 1. LCO 3.4.10.2 allows a maximum pressurizer cooldown of 200 °F per hour. Consequently, the candidate could incorrectly conclude that LCO 3.4.10.2 allows a maximum pressurizer heatup of 200 °F per hour. Part 2 is correct.

D. Incorrect but plausible. For Part 1. LCO 3.4.10.2 allows a maximum pressurizer cooldown of 200 °F per hour. Consequently, the candidate could incorrectly conclude that LCO 3.4.10.2 allows a maximum pressurizer heatup of 200 °F per hour. For Part 2, 25 psig is a pressure that is below the PRT ruptured disc setpoint of 100 psig and close to the actual limit. Consequently, the candidate could incorrectly conclude that S2.OP-SO.RC-0002 Section 5.4 requires PRT pressure to be maintained less than a maximum of 25 psig.

Question Number: 7

Tier: 2 Group 1

K/A: 007 Pressurizer Relief Tank/Quench Tank System (PRTS)-K5.02

Knowledge of the operational implications of the following concepts as the apply to PRTS: Method of forming a steam bubble in the PZR

Importance Rating: 3.1

10 CFR Part 55: 41.5 / 45.7

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know what pressure the PRT will be maintained at when establishing a steam bubble in the pressurizer (an operational implication)).

SRO Justification: N/A

Technical References: LCO 3.4.10.2
S2.OP-SO.RC-0002 Section 5.4

Proposed references to be provided: None

Learning Objective: NOS05CVCS00-17 (Chemical and Volume Control System)

12 Discuss the procedural requirements associated with the Pressurizer and Pressurizer Relief Tank, including an explanation of major precaution and limitations in the Pressurizer and Pressurizer Relief Tank procedures

Cognitive Level:

Higher	
Lower	X

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

8 **Points: 1.00**

Given:

- Unit 2 is in MODE 3

At time 15:00:00

- **BOTH** 2R17A/B (Component Cooling Process Monitors) have just come into HI alarm

At time 15:01:00

- The crew initiates S2.OP-AB.CC-0001 (Component Cooling Abnormality) and S2.OP-AB.RAD-0001 (Abnormal Radiation)

At time 15:15:00

- Chemistry has verified a rise in Component Cooling activity

Which ONE of the following completes the statements below?

At **15:00:30**, 2CC149 (Surge Tank Vent Valve) is ___(1)___.

If CCW Surge Tank overflows, then the in-service Waste Holdup Tank ___(2)___ will become contaminated.

	(1)	**(2)**
A.	open	and the 22 ABV Exhaust Filter Unit
B.	open	**ONLY**
C.	closed	and the 22 ABV Exhaust Filter Unit
D.	closed	**ONLY**

Answer: C

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. Form Part 1, 2CC149 is normally open and the candidate could not recall that 2CC149 closes when 2R17A/B being in alarm. Consequently at 15:00:30, the candidate could incorrectly conclude that 2CC149 is open. Part 2 is correct.

B. Incorrect but plausible. Form Part 1, 2CC149 is normally open and the candidate could not recall that 2CC149 closes when 2R17A/B being in alarm. Consequently at 15:00:30, the candidate could incorrectly conclude that 2CC149 is open. For Part 2, the candidate could fail to recognize the 22 ABV Exhaust Filter Unit will also become contaminated when the CCW Surge Tank overflows.

C. **Correct.** For Part 1, 2CC149 automatically closes on high radiation alarm on 2R17A/B. For Part 2, IAW S2.OP-AB.CC-0001 Step 3.8 NOTE, "Allowing CCW Surge Tank to overflow will contaminate the in-service Waste Holdup Tank and the 22 ABV Exhaust Filter Unit".

D. Incorrect but plausible. Part 1 is correct. For Part 2, the candidate could fail to recognize the 22 ABV Exhaust Filter Unit will also become contaminated when the CCW Surge Tank overflows.

Question Number: 8

Tier: 2 Group 1

K/A: 008 Component Cooling Water System (CCWS)-A2.04

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: PRMS alarm.

Importance Rating: 3.3

10 CFR Part 55: 41.5 / 43.5 / 45.3 / 45.13

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must be able to predict how the CCWS will respond when 2R17A/B (Component Cooling Process Monitors) come into alarm. Additionally, the candidate must also know what components will be contaminated if the CCWS Surge Tank Overflows IAW S2.OP-AB.CC-0001 (Component Cooling Abnormality) and S2.OP-AB.RAD-0001 (Abnormal Radiation).

SRO Justification: N/A

Technical References: NOS05CCW000-11 (COMPONENT COOLING WATER)

Proposed references to be provided: None

Learning Objective: NOS05CCW000-11 (COMPONENT COOLING WATER)

3 Describe how the following components impact the Component Cooling Water System during normal and abnormal conditions:

- CC-149, Surge Tank Vent Valve

Cognitive Level:

Higher	
Lower	X

Question Source

New	
Modified Bank	
Bank	X

Question History: ILOT NRC 1601 RO Q7

Comments: # 1 OF 4 ALLOWABLE RO QUESTIONS randomly sampled from exam bank that was used on the last two Salem ILOT NRC Exams (ES-401-6 #4 Requirements).

9 **Points: 1.00**

Given:

- Unit 2 is at 100% Reactor Power and stable
- 2LT-459 (Channel I PZR Level) is the controlling PZR Level channel

At time 15:00

- The **VARIABLE LEG** on the D/P cell for 2LT-459 develops a large leak

Which ONE of the following completes the statements below?

INDICATED PZR **LEVEL** (from 2LT-459) will indicate off scale ___(1)___.

PZR B/U Heaters ___(2)___ energize as ACTUAL PZR PRESSURE lowers below the setpoint.

	(1)	**(2)**
A.	high	will
B.	high	will **NOT**
C.	low	will **NOT**
D.	low	will

Answer: C

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. For Part 1, many of the licensed operators have demonstrated a misunderstanding on how PZR level instrumentation works (D/P = 0 psid = hi pressurizer level) as demonstrated on the 2018 LOR Bi-Annual Written Exams. Consequently, the ILOT candidate could incorrectly determine that with a variable leg leak on 2LT-459, indicated PZR level will indicate off scale high. Part 1 is correct.

B. Incorrect but plausible. For Part 1, many of the licensed operators have demonstrated a misunderstanding on how PZR level instrumentation works (D/P = 0 psid = hi pressurizer level) as demonstrated on the 2018 LOR Bi-Annual Written Exams. Consequently, the ILOT candidate could incorrectly determine that with a variable leg leak on 2LT-459, indicated PZR level will indicate off scale high. For Part 2, the candidate could fail to recall that PZR B/U heaters automatically cut off when PZR level indicates less than 17%.

C. **Correct.** For Part 1, the variable leg for 2LT-459 is the low side of the D/P cell. Accordingly, as D/P across 2LT-459 PSID gets larger then indicated PZR level lowers (or as D/P across 2LT-459 goes to 0, then indicated level will be at its maximum). Therefore, with a leak of the variable leg of 2LT-459, D/P will get larger and indicated PZR level will indicate off scale low. Additionally, PZR inventory is also being lost, so actual PZR level and indicated level are both lowering. NOTE, as PZR pressure lowers due to the variable leg leak, this change in pressure is felt on both sides of 2LT-459. Indicated level due to the PZR pressure change will not affect PZR indicated level. For Part 2, the variable leg is connected to the pressurizer. Consequently, when the variable leg develops a leak, actual PZR pressure will lower but since the controlling channel has failed low, the B/U eaters will not energize (indicated level is below 17% which is the low level PZR B/U cut off setpoint.

D. Incorrect but plausible. Part 1 is correct. For Part 2, the candidate could fail to recall that PZR B/U heaters automatically cut off when PZR level indicates less than 17%.

Question Number: 9

Tier: 2 Group 1

K/A: 010 Pressurizer Pressure Control System (PZR PCS)-K1.08

Knowledge of the physical connections and/or cause-effect relationships between the PZR PCS and the following systems: PZR LCS

Importance Rating: 3.2

10 CFR Part 55: 41.2 to 41.9 / 45.7 to 45.8

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know that the variable leg of 2LT-459 (part of PZR LCS) is physically connected to the PZR liquid space and that a low indicated PZR level will automatically de-energize the PZR B/U heaters.

SRO Justification: N/A

Technical References: NOS05PZRP&L-10 (PRESSURIZER PRESSURE AND LEVEL CONTROL)

Proposed references to be provided: None

Learning Objective: NOS05CCW000-11 (COMPONENT COOLING WATER)

3 Draw a one-line diagram of the Pressurizer Pressure and Level Control System which indicates the following:

a) Major Pressurizer Pressure and Level Control system components
   i. Pressure Control Channel
   ii. Pressure Alarm Channel
   iii. Level Control Channel
   iv. Level Alarm Channel

Cognitive Level:

Higher X
Lower _____

Question Source

New _____
Modified Bank X
Bank _____

Question History: Modified from ILOT NRC 1601 RO 32

Comments:

10 **Points: 1.00**

Given:

- A Unit 2 shutdown is in progress
- Pressurizer pressure is 415 psig and slowly lowering
- There is a suspected leak by of 2PR1 (PZR PORV)
- PRT pressure is 0 psig

Which ONE of the following completes the statements below?

If 2PR1 is leaking by, then the expected PORV tailpipe temperature will be approximately _____ °F.

A. 212

B. 280

C. 330

D. 450

Answer: C

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. Since the Mollier Diagram is very complex to read and interpret then any temperature between 212 and 450 °F is plausible. 212 °F is the boiling point for water / steam at 0 psig and 450 °F is boiling point for water / steam at 515 psig.

B. Incorrect but plausible. Since the Mollier Diagram is very complex to read and interpret then any temperature between 212 and 450 °F is plausible. 212 °F is the boiling point for water / steam at 0 psig and 450 °F is boiling point for water / steam at 515 psig.

C. **Correct.** Leak by of 2PR1 is a constant enthalpy expansion process through a valve. Using steam stables and with PZR pressure at 415 psig (430 psia), the h_g is approximately 1205 BTU / lbm. Using the Mollier diagram, the throttling process will go from 415 psig to 0 psig with h_g (1205 BTU / lbm) remaining constant. This will correspond to a tailpipe temperature of approximately 330 °F

D. Incorrect but plausible. Since the Mollier Diagram is very complex to read and interpret then any temperature between 212 and 450 °F is plausible. 212 °F is the boiling point for water / steam at 0 psig and 450 °F is boiling point for water / steam at 515 psig.

Question Number: 10

Tier: 2 Group 1

K/A: 010 Pressurizer Pressure Control System (PZR PCS)-K5.02

Knowledge of the operational implications of the following concepts as the apply to the PZR PCS: Constant enthalpy expansion through a valve

Importance Rating: 2.6

10 CFR Part 55: 41.5 / 45.7

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must determine the downstream temperature of a valve (PZR PORV) experiencing a constant enthalpy expansion through the valve.

SRO Justification: N/A

Technical References: GFES Bank

Proposed references to be provided: None

Learning Objective: NOS05PZRPRT-046 (PRESSURIZER AND PRESSURIZER RELIEF TANK)

16. Given any of the following and appropriate control room reference material, evaluate and determine the effect on the Pressurizer and Pressurizer Relief Tank:
    a. Valve failures
    b. Failure of sensors and detectors
    c. Degraded pumps
    d. Motor failures
    e. Failure of breakers, relays and disconnect

Cognitive Level:

Higher X
Lower _____

Question Source

New _____
Modified Bank _____
Bank X

Question History: From GFES Bank - Thermodynamic Processes P677

Comments:

11 **Points: 1.00**

Given:

- Unit 2 is at 100% Reactor Power
- Containment Pressure **Channel II** has failed high and it has been removed from service in accordance with the applicable procedure

At time 15:00

- Power is lost to Containment Pressure **Channel III**

At **15:01**, which ONE of the following completes the statements below?

A Reactor Trip and Safety Injection ___(1)___ AUTOMATICALLY actuated.

Containment Spray ___(2)___ AUTOMATICALLY actuated.

	(1)	**(2)**
A.	have	has **NOT**
B.	have	has
C.	have **NOT**	has **NOT**
D.	have **NOT**	has

Answer: A

Answer Explanation

DISTRACTOR ANALYSIS:

A. **Correct.** When Containment Pressure Channel II was removed from service, the logic for Safety Injection and Reactor Trip (on Hi CTMT Pressure) went from 2/3 to 1/2 and the logic for Containment Spray (on Hi CTMT Pressure) went from 2/4 to 2/3. For Part 1, Containment Channels II, III and IV provide the input for the Safety Injection Logic (and Reactor Trip). Additionally, bi-stables for Safety Injection and Reactor Trip are de-energize to actuate. Consequently, when Containment Pressure Channel III loses power at 15:00, Safety Injection will actuate (1/2 logic is met). For Part 2, when Containment Pressure Channel III loses power, Containment Spray will not actuate (2/3 logic is not met).

B. Incorrect but plausible. Part 1 is correct. For Part 2 the candidate could incorrectly conclude that based on plant conditions, the logic for Containment Spray is met and Containment Spray has actuated.

C. Incorrect but plausible. For Part 1, the candidate could incorrectly conclude that after Containment Pressure II was removed from service that the coincidence for SI went to 2/2. Consequently, the candidate would then incorrectly conclude that SI has not actuated. Part 2 is correct.

D. Incorrect but plausible. For Part 1, the candidate could incorrectly conclude that after Containment Pressure II was removed from service that the coincidence for SI went to 2/2. Consequently, the candidate would then incorrectly conclude that SI has not actuated. For Part 2 the candidate could incorrectly conclude that based on plant conditions, the logic for Containment Spray is met and Containment Spray has actuated.

Question Number: 11

Tier: 2 Group 1

K/A: 012 Reactor Protection System – A3.03

Ability to monitor automatic operation of the RPS, including: Power Supply

Importance Rating: 3.4

10 CFR Part 55: 41.7 / 45.5

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must understand how RPS and ESF will respond to a power loss to Containment Pressure Channel III (after Containment Pressure Channel II had already been removed from service).

SRO Justification: N/A

Technical References: NOS05ESF000-02 (INTRODUCTION TO ENGINEERED SAFETY FEATURES AND DESIGN CRITERIA)

DWG 221057

Proposed references to be provided: None

Learning Objective: NOS05ESF000-02 (INTRODUCTION TO ENGINEERED SAFETY FEATURES AND DESIGN CRITERIA)

21. State the setpoints for automatic actuations associated with the Engineered Safety Features

Cognitive Level:

Higher X
Lower _____

Question Source

New _____
Modified Bank X
Bank _____

Question History: Modified from ILOT 1601 AUDIT RO 16

Comments:

12 **Points: 1.00**

Given:

At time 10:00:00

- A Reactor Trip and Safety Injection have occurred coincident with a LOOP at Unit 2
- EDG 2C can **NOT** be started

At **10:15:00**, which ONE of the following completes the statement below?

22 RHR Pump is ___(1)___ and 22 SI Pump is ___(2)___.

	(1)	**(2)**
A.	stopped	running
B.	stopped	stopped
C.	running	running
D.	running	stopped

Answer: D

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. For Part 1, the candidate could incorrectly conclude that 22 RHR pump is powered from 2C 4KV Vital Bus. This would result in the candidate incorrectly deducing that at 10:15:00, the 22 RHR Pump is stopped. For Part 2, the candidate could incorrectly conclude that 22 SI pump is powered from 2B 4KV Vital Bus. This would result in the candidate incorrectly deducing that at 10:15:00, the 22 SI Pump is running.

B. Incorrect but plausible. For Part 1, the candidate could incorrectly conclude that 22 RHR pump is powered from 2C 4KV Vital Bus. This would result in the candidate incorrectly deducing that at 10:15:00, the 22 RHR Pump is stopped. Part 2 is correct.

C. Incorrect but plausible. Part 1 is correct. For Part 2, the candidate could incorrectly conclude that 22 SI pump is powered from 2B 4KV Vital Bus. This would result in the candidate incorrectly deducing that at 10:15:00, the 22 SI Pump is running.

D. **Correct.** 22 RHR pump is powered from 2**B** 4KV Vital Bus and 22 SI Pump is powered from 2**C** 4KV Vital Bus. Additionally, 2**C** EDG can not be started after the LOOP occurs. Consequently, 15 minutes after a reactor trip and safeguards have occurred (coincident with the loop), 2**A** and 2**B** Vital Busses are being powered from EDG 2A and EDG 2B and all of the appropriate ECCS loads have been loaded onto the running EDGs. Therefore, at 10:15:00, 22 RHR Pump is running and 22 SI Pump is stopped.

Question Number: 12

Tier: 2 Group 1

K/A: 013 Engineered Safety Features Actuation System (ESFAS)-K2.01

Knowledge of bus power supplies to the following: ESFAS/safeguards equipment control

Importance Rating: 3.6

10 CFR Part 55: 41.7

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know the status of 22 RHR Pump and 22 SI pump (safeguards equipment control) following a Safety Injection coincident with a LOOP and EDG 2C inoperable

SRO Justification: N/A

Technical References: NOS054KVAC0-08 (4160 ELECTRICAL SYSTEM)

Proposed references to be provided: None

Learning Objective: NOS054KVAC0-08 (4160 ELECTRICAL SYSTEM)

9 State the setpoints, coincidence, blocks and permissives for automatic actuations associated with the 4160 Electrical System

Cognitive Level:

Higher	X
Lower	

Question Source

New	
Modified Bank	X
Bank	

Question History: Modified from ILOT NRC 1601 RO 22

Comments:

13 **Points: 1.00**

Given:

- A Reactor Trip and Safety Injection have occurred at Unit 1
- 1A 4KV Vital Bus is de-energized

Which ONE of the following completes the statement below?

ONLY _____ CFCU(s) is / are stopped.

A. 11 and 12

B. 11

C. 15

D. 14 and 15

Answer: B

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. Since there are 5 CFCUs powered from 3 vital busses, any distractor that has one or two CFCUs stopped is plausible.

B. **Correct.** With 1A 4KV Vital bus de-energized, ONLY 11 CFCU is stopped

C. Incorrect but plausible. Since there are 5 CFCUs powered from 3 vital busses, any distractor that has one or two CFCUs stopped is plausible.

D. Incorrect but plausible. Since there are 5 CFCUs powered from 3 vital busses, any distractor that has one or two CFCUs stopped is plausible.

Question Number: 13

Tier: 2 Group 1

K/A: 022 Containment Cooling System (CCS)-K2.01

Knowledge of power supplies to the following: Containment cooling fans

Importance Rating: 3.0

10 CFR Part 55: 41.7

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know the power supply to CFCUs by determining which CFCUs are stopped following 1A 4KV Vital bus being de-energized coincident with a Safety Injection.

SRO Justification: N/A

Technical References: NOS054KVAC0-08 (4160 ELECTRICAL SYSTEM)

Proposed references to be provided: None

Learning Objective: NOS05CONTMT-15 (CONTAINMENT AND CONTAINMENT SUPPORT SYSTEMS)

17. State the power supply to the following Containment and Containment Support Systems components, including voltage level and 1E/Non 1E.
    a. Containment Fan Cooling Units, including breaker alignment for Fast and Slow speed.

Cognitive Level:

Higher X
Lower _____

Question Source

New X
Modified Bank _____
Bank _____

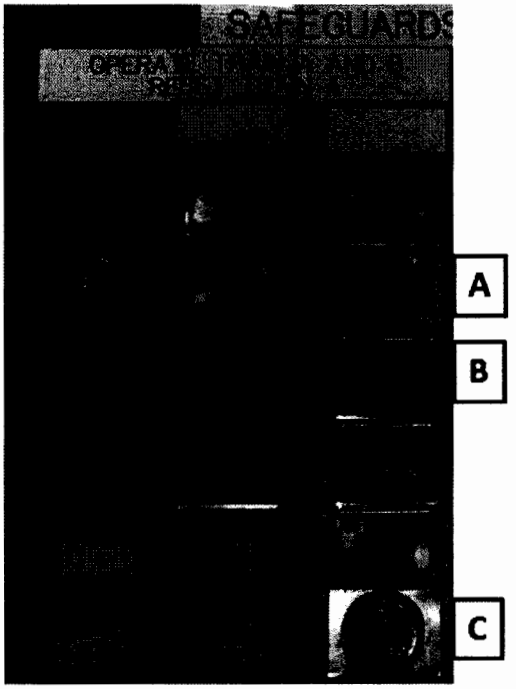
Question History:

Comments:

14 **Points: 1.00**

Given:

- An **AUTOMATIC** Safety Injection and Containment Spray Actuation have occurred
- A **MANUAL** backup of the Containment Spray Actuation has **NOT** been performed
- The crew is preparing to reset Containment Spray in accordance with 2-EOP-LOCA-1 (LOSS OF REACTOR COOLANT)



Which ONE of the following completes the statement below?

The NCO will reset one train of Containment Spray by _____.

A. depressing bezel button **B ONLY**

B. turning key switches **A AND C** in the clockwise direction 180 degrees **ONLY**

C. depressing bezel button **B** then turning key switches **A AND C** in the clockwise direction 180 degrees

D. turning key switches **A AND C** in the clockwise direction 180 degrees and then pressing bezel button **B**

Answer: A

Answer Explanation

DISTRACTOR ANALYSIS:

A. **Correct.** Resetting one train of Containment Spray is accomplished by depressing bezel button B.

B. Incorrect but plausible. Not all bezel buttons in the control room actually perform an action. Consequently, the candidate could incorrectly conclude that rotating key switches A and C only will reset one train of Containment Spray.

C. Incorrect but plausible. The candidate could incorrectly conclude that resetting one train of Containment Spray requires a combination of key switch and bezel button actuations.

D. Incorrect but plausible. The candidate could incorrectly conclude that resetting one train of Containment Spray requires a combination of key switch and bezel button actuations.

Question Number: 14

Tier: 2 Group 1

K/A: 026 Containment Spray System (CSS)-K4.05

Ability to manually operate and/or monitor in the control room: Containment spray reset switches

Importance Rating: 3.5

10 CFR Part 55: 41.7 / 45.5 to 45.8

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know how to properly reset containment spray inside the control room.

SRO Justification: N/A

Technical References: NOS05CSPRAY-06 (CONTAINMENT SPRAY SYSTEM)

Proposed references to be provided: None

Learning Objective: NOS05CSPRAY-06 (CONTAINMENT SPRAY SYSTEM)

18. Identify and describe the Control Room controls, indications, and alarms associated with the Containment Spray System, including:
    a. The Control Room location of Containment Spray System control bezels and indications.
    b. The function of each Containment Spray System Control Room control and indication.
    c. The effect each Containment Spray System control has upon Containment Spray System components and operation.

Cognitive Level:

Higher	X
Lower	

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

15 **Points: 1.00**

REFERENCE PROVIDED

Given:

- The crew is performing 2-EOP-LOCA-5 (LOSS OF EMERGENCY RECIRCULATION) Step 6
- 2B 4KV Vital Bus is de-energized and locked out
- Containment Sump Level is 55%
- 21SJ44 (SUMP VALVE) and 22SJ44 (SUMP VALVE) are **BOTH** closed
- RWST Level is 10 Feet and lowering
- Containment Pressure is 19 psig

In accordance with 2-EOP-LOCA-5, which ONE of the following completes the statement below?

The crew's **NEXT** action will be to _____.

A. add makeup to the RWST

B. stop **BOTH** Containment Spray Pumps

C. stop **ONLY ONE** Containment Spray Pump

D. **IMMEDIATELY** RETURN TO PROCEDURE IN EFECT

Answer: B

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. The candidate could correctly analyze Table B and then incorrectly analyze Table C to determine that both CS Spray Pumps are required. This would then cause the candidate to incorrectly conclude that the crew's NEXT action will be to add makeup to the RWST (2-EOP-LOCA-5 Step 10).

B. **Correct.** IAW 2-EOP-LOCA-5 Step 6 Table B, NO TRAINS of Emergency Recirculation are available. Consequently, the candidate must analyze 2-EOP-LOCA-5 Steps 6.1 through 9 and Table C to determine if any of the CS Pumps are required to be stopped. Based on Table C and Step 9 with Containment Pressure = 19 psig, RWST Level equal to 10 feet, and only 3 CFCUs running in slow speed (with 2B 4KV Vital Bus de-energized and locked out, ONLY 3 CFCUs are running in slow speed), 0 CS Pumps are required. Consequently, the crew will stop BOTH Containment Spray Pumps.

C. Incorrect but plausible. The candidate could correctly analyze Table B and then incorrectly analyze Table C to determine that only one CS Spray Pump is required. This would then cause the candidate to incorrectly conclude that the crew's NEXT action will be to stop ONLY ONE containment Spray Pump (2-EOP-LOCA-5 Step 9).

D. Incorrect but plausible. The candidate could incorrectly analyze Table B. This would then cause the candidate to incorrectly conclude that the crew's NEXT action will be to IMMEDIATELY RETURN TO PROCEDURE IN EFECT (2-EOP-LOCA-5 Step 6).

Question Number: 15

Tier: 2 Group 1

K/A: 026 Containment Spray System (CSS) - G2.1.25

Ability to interpret reference materials, such as graphs, curves, tables, etc

Importance Rating: 3.9

10 CFR Part 55: 41.10 / 43.5 / 45.12

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must interpret / analyze two Tables from 2-EOP-LOCA-5 (LOSS OF EMERGENCY RECIRCULATION) to determine the number of Containment Spray pumps required to be running.

SRO Justification: N/A

Technical References: 2-EOP-LOCA-5 (LOSS OF EMERGENCY RECIRCULATION)

Proposed references to be provided: 2-EOP-LOCA-5 (LOSS OF EMERGENCY RECIRCULATION) Steps 6-9 and Tables B & C

Learning Objective: NOS05LOCA05-04 (LOSS OF EMERGENCY RECIRCULATION)

7. Determine a discrete path through the EOP for LOSS OF EMERGENCY RECIRCULATION.

Cognitive Level:

Higher X
Lower _____

Question Source

New X
Modified Bank _____
Bank _____

Question History:

Comments:

16 **Points: 1.00**

Given:

- Unit 2 is at 100% Reactor Power
- **ALL** AFW Pump Controllers are in the "LOCAL MANUAL" alignment

At time 12:00

- A Reactor Trip and Safety Injection occurs

Which ONE of the following completes the statement below?

At **12:05**, _____ AFW Pump(s) is / are running.

A. **ALL**

B. **NO**

C. **ONLY** 21 and 22

D. **ONLY** 23

Answer: C

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. The candidate could correctly determine that with ALL of the AFW Pump Controllers in LOCAL Remote, all automatic AFW starts are disabled except those starts initiated from by the SECs. The candidate could then incorrectly conclude that ALL of the AFW pumps receive an automatic start signal from the SECs which would then cause the candidate to incorrectly conclude at 12:05, ALL AFW Pumps are running.

B. Incorrect but plausible. The candidate could incorrectly conclude that with ALL of the AFW Pump Controllers in LOCAL Remote, all automatic AFW starts are disabled (including those starts initiated from by the SECs). This would then cause the candidate to incorrectly conclude at 12:05, NO AFW Pumps are running.

C. **Correct.** With ALL of the AFW Pump Controllers in LOCAL Remote, all automatic AFW starts are disabled except those starts initiated from by the SECs. At 12:00 when the Safety injection occurs, the SECs will actuate in Mode 1 which will send an automatic start signal to ONLY 21 and 22 AFW pumps. Consequently, at 12:05, ONLY 21 and 22 AFW pumps are running.

D. Incorrect but plausible. The candidate could correctly determine that with ALL of the AFW Pump Controllers in LOCAL Remote, all automatic AFW starts are disabled except those starts initiated from by the SECs. The candidate could then incorrectly conclude that ONLY 23 AFW pumps receive an automatic start signal from the SECs which would then cause the candidate to incorrectly conclude at 12:05, ONLY 23 AFW Pump is running.

Question Number: 16

Tier: 2 Group 1

K/A: 039 Main and Reheat Steam System (MRSS)-A4.04

Ability to manually operate and/or monitor in the control room: Emergency feedwater pump turbines

Importance Rating: 3.8

10 CFR Part 55: 41.7 / 45.5 to 45.8

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must analyze plant conditions and understand the start circuitry for 23 AFW Pump (TDAFW Pump) to determine if the 23 AFW has automatically started.

SRO Justification: N/A

Technical References: DWG 221064

Proposed references to be provided: None

Learning Objective: NOS05AFW000-16 (AUXILIARY FEEDWATER SYSTEM)

8. Identify and describe the Control Room controls, indications, and alarms associated with the Auxiliary Feedwater System, including:
    a. The Control Room location of Auxiliary Feedwater System control bezels and indications.
    b. The function of each Auxiliary Feedwater System Control Room control and indication.
    c. The effect each Auxiliary Feedwater System control has upon Auxiliary Feedwater System components and operation.
    d. The plant conditions or permissives required for Auxiliary Feedwater System Control Room controls to perform their intended function.
    e. The setpoints associated with the Auxiliary Feedwater System control room alarms.

Cognitive Level:

Higher	X
Lower	

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

17 **Points: 1.00**

Given:

- Unit 2 is at 100% Reactor Power and stable

At time 09:00:00

- 22 SGFP trips

At time 09:00:15 (15 seconds later)

- The crew enters S2.OP-AB.CN-0001 (MAIN FEEDWATER/CONDENSATE SYSTEM ABNORMALITY)
- Unit 2 is at 100% Reactor Power

In accordance with S2.OP-AB.CN-0001, which ONE of the following completes the statement below?

The crew will initiate a MANUAL Main Turbine load reduction until less than or equal to a **MAXIMUM** of ___(1)___ % Turbine Power at a rate less than or equal to a **MAXIMUM** of ___(2)___ % / MIN.

	(1)	**(2)**
A.	50	30
B.	50	15
C.	66	30
D.	66	15

Answer: D

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. For Part 1, there are only two SGFPs. The candidate could incorrectly conclude that each SGFP provides 50% total flow. Consequently when 22 SGFP trips, the candidate could incorrectly conclude that S2.OP-AB.CN-0001 requires a load reduction to 50% Turbine Power. For Part 2, a loss of stator cooling water will cause an automatic turbine runback at 30% / minute. Consequently, the candidate could incorrectly conclude that the maximum turbine load ramp in S2.OP-AB.CN-0001 is 30% / MIN.

B. Incorrect but plausible. For Part 1, there are only two SGFPs. The candidate could incorrectly conclude that each SGFP provides 50% total flow. Consequently when 22 SGFP trips, the candidate could incorrectly conclude that S2.OP-AB.CN-0001 requires a load reduction to 50% Turbine Power. Part 2 is correct.

C. Incorrect but plausible. Part 1 is correct. For Part 2, a loss of stator cooling water will cause an automatic turbine runback at 30% / minute. Consequently, the candidate could incorrectly conclude that the maximum turbine load ramp in S2.OP-AB.CN-0001 is 30% / MIN.

D. **Correct.** IAW S2.OP-AB.CN-0001, The crew will initiate a Main Turbine load reduction until less than or equal to a MAXIMUM of 66 % Turbine Power at a less rate less than or equal to a MAXIMUM of 15 % / MIN.

Question Number: 17

Tier: 2 Group 1

K/A: 059 Main Feedwater (MFW) System-AA2.06

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

Importance Rating: 2.7

10 CFR Part 55: 41.5 / 43.5 / 45.3 / 45.13

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know the immediate actions of S2.OP-AB.CN-0001 (MAIN FEEDWATER/CONDENSATE SYSTEM ABNORMALITY) following a 22 SGFP trip (a loss of steam flow to the MFW Feed Pump) with Reactor Power > 70%

SRO Justification: N/ A

Technical References: NOS05ABCN01-06 (MAIN FEEDWATER/CONDENSATE SYSTEM ABNORMALITY)

Proposed references to be provided: None

Learning Objective: NOS05ABCN01-06 (MAIN FEEDWATER/CONDENSATE SYSTEM ABNORMALITY)

2. State the immediate actions of AB.CN-0001

Cognitive Level:

Higher	
Lower	X

Question Source

New	
Modified Bank	X
Bank	

Question History: Modified from ILOT 1601 NRC RO Q17

Comments:

18 **Points: 1.00**

Which ONE of the following completes the statement below?

The Steam Generator Feed Pumps have a Turbine Overspeed Trip that prevents the turbine from exceeding a **MAXIMUM** of _____ rpm.

A. 1944

B. 1980

C. 5500

D. 6080

Answer: D

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. The main turbine has a 108% overspeed trip (1944 RPM).

B. Incorrect but plausible. The main turbine has a 110% overspeed trip (1980 RPM).

C. Incorrect but plausible. 5500 RPM is the design capacity for a SGFP.

D. **Correct.** The Steam Generator Feed Pumps have a Turbine Overspeed interlock that prevents the turbine from exceeding a MINIMUM of 6080 rpm.

Question Number: 18

Tier: 2 Group 1

K/A: 059 Main Feedwater (MFW) System-K4.05

Knowledge of MFW design feature(s) and/or interlock(s) which provide for the following: Control of speed of MFW pump turbine

Importance Rating: 2.5

10 CFR Part 55: 41.7

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know the overspeed interlock (trip) associated with the SGFPs.

SRO Justification: N/A

Technical References: S2.OP-SO.CN-0002 (STEAM GENERATOR FEED PUMP OPERATION)

Proposed references to be provided: None

Learning Objective: NOS05CN&FDW-16 (CONDENSATE AND FEEDWATER SYSTEM)

8. Identify and describe the Control Room controls, indications, and alarms associated with the Condensate and Feedwater System, including:
   a. The Control Room location of Condensate and Feedwater System control bezels and indications.
   b. The function of each Condensate and Feedwater System Control Room control and indication.
   c. The effect each Condensate and Feedwater System control has upon Condensate and Feedwater System components and operation.
   d. The plant conditions or permissives required for Condensate and Feedwater System Control Room controls to perform their intended function.
   e. The setpoints associated with the Condensate and Feedwater System control room alarms.

Cognitive Level:

Higher	
Lower	X

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

19 **Points: 1.00**

Given:

At time 16:00

- Unit 2 is at 15% Reactor Power
- 21 SGFP is running

At time 16:01

- 2B 4KV Vital Bus de-energizes and 2B SEC starts its blackout sequencing
- A Reactor Trip occurs

The following parameters vary over time:

Time	**16:00**	**16:01**	**16:02**	**16:04**	**16:05**
21 SG NR Level (%)	33.1	20.7	21.5	22.7	23.7
22 SG NR Level (%)	33.3	20.6	21.3	22.4	23.5
23 SG NR Level (%)	33.1	19.6	17.6	15.5	14.4
24 SG NR Level (%)	33.0	19.6	18.2	16.1	14.6
21 SGFP Status	Running	Running	Running	Running	Running

Which ONE of the following completes the statement below?

At **16:05**, _____ AFW Pump(s) is / are running.

A. **NO** Motor Driven

B. **BOTH** Motor Driven

C. **ONLY** 22

D. **ONLY** 21

Answer: C

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. Because ALL SG NR levels are above 14%, the candidate could incorrectly conclude that NO Motor Driven AFW Pumps are running at 16:05

B. Incorrect but plausible. Since 2 out of 4 SG NR levels are below 16% (Reactor Trip Setpoint for LO-LO SG NR Level), the candidate could incorrectly conclude that BOTH motor Driven AFW Pumps are running at 16:05.

C. **Correct.** MDAFW Pumps will automatically start under the following situations:
- SG Level lo-lo (2/3 on 1/4 SG's <14%)
- Both SGFP trip
- AMSAC (associated train)
- SEC (all modes)

Since 2B SEC has actuated in Mode 2 and 22 AFW Pump is powered from 2B 4K Vital Bus, the 22 AFW will be running at 16:05. (SEC loading should be completed by 16:01)

D. Incorrect but plausible. The candidate could correctly determine that the SEC operating in Mode 2 will start an AFW pump. The candidate could incorrectly conclude that 21 AFW Pump is powered from 2B Vital Bus and that ONLY 21 AFW Pump is running at 16:05.

Question Number: 19

Tier: 2 Group 1

K/A: 061 Auxiliary / Emergency Feedwater (AFW) System-K2.02

Knowledge of bus power supplies to the following: AFW electric drive pumps

Importance Rating: 3.7

10 CFR Part 55: 41.7

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know the power supply to the 22 Motor Driven AFW Pump and under what circumstances does the pump start.

SRO Justification: N/A

Technical References: NOS05AFW000-16 (AUXILIARY FEEDWATER SYSTEM)

Proposed references to be provided: None

Learning Objective: NOS05AFW000-16 (AUXILIARY FEEDWATER SYSTEM)

5. State the power supply to the following Auxiliary Feedwater System components:
    a. Motor-driven AFW Pumps

Cognitive Level:

Higher X
Lower _____

Question Source

New X
Modified Bank _____
Bank _____

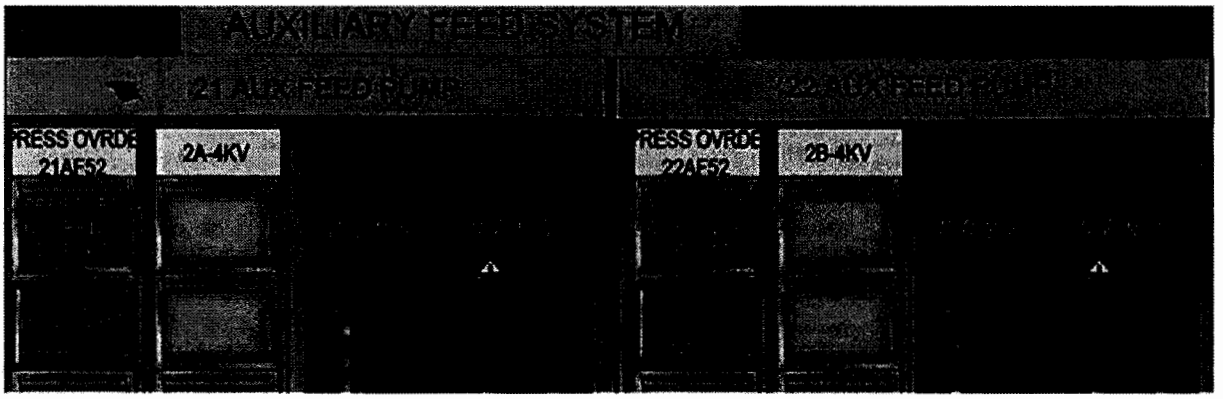
Question History:

Comments:

20 **Points: 1.00**

Given:

- Unit 2 is at 4% Reactor Power
- 21 and 22 AFW Pumps are feeding **ALL** SGs using 21-24AF21 with the following bezel indications:



= PRESSURE OVERRIDE NORMAL LIGHT is illuminated

At time 12:00

- 21 AFW Pump trips

Which ONE of the following describes the **INITIAL** response of the AFW System?

NOTE:

- 21-24**AF21** = STEAM GENERATOR INLET VALVEs
- 21-24**AF11** = STEAM GENERATOR INLET VALVEs

A. 23-24**AF21** will remain in its current position and AFW flow to 23 and 24 SGs will lower to 0 LBM / HR

B. 23-24**AF21** will **AUTOMATICALLY** close and AFW flow to 23 and 24 SGs will lower to 0 LBM / HR

C. 23 AFW will **IMMEDIATELY** start and will now provide feed flow to 23 and 24 SGs through 23-24**AF21**

D. 23-24**AF21** will **AUTOMATICALLY** close, 23 AFW will **IMMEDIATELY** start and will now provide feed flow to 23 and 24 SGs through 23-24**AF11**

Answer: B

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. If the "Pressure Override Defeat" light had been illuminated for 21 AFW Pump, then when 21 AFW Pump tripped at 1200, 23-24AF21 would not move and AFW flow to 23 and 24 SGs would go to 0 LBM / HR.

B. **Correct.** Since the "Pressure Override Normal Light" for 21 AFW Pump is illuminated, 21 AFW Pump Runout protection is enabled. With runout protection enabled, 23AF21 and 24AF21 will go closed (and be prevented from being opened if the valves are already closed) when 21 AFW Pump discharge pressure is below 1085 psig. Consequently, when 21 AFW Pump Trips at 1200, 21 AFW discharge pressure will go to 0 psig. The result is that 23AF21 and 24AF21 will AUTOMATICALLY close and AFW flow to 23 and 24 SGs will go to 0 LBM / HR.

C. Incorrect but plausible. 23 AFW pump does have an AUTOMATIC start feature. However, trip of a MDAFW pump will not cause the 23AFW to immediately start.

D. Incorrect but plausible. This distractor is partially correct. 23-24AF21 will automatically close when 21 AFW pump trips. Additionally, 23 AFW pump does have an AUTOMATIC start feature. However, trip of a MDAFW pump will not cause the 23AFW to immediately start.

Question Number: 20

Tier: 2 Group 1

K/A: 061 Auxiliary / Emergency Feedwater (AFW) System-K6.02

Knowledge of the effect of a loss or malfunction of the following will have on the AFW components: Pumps

Importance Rating: 2.6

10 CFR Part 55: 41.7 / 45.7

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know how 23-24AF21 will respond following a malfunction of 21 AFW Pump (with the 21 AFW Pump Pressure Override in Normal)

SRO Justification: N/A

Technical References: NOS05AFW000-16 (AUXILIARY FEEDWATER SYSTEM)

Proposed references to be provided: None

Learning Objective: NOS05AFW000-16 (AUXILIARY FEEDWATER SYSTEM)

6. **LOR NCT** Outline the interlocks associated with the following Auxiliary Feedwater System components:
    a. Auxiliary Feedwater Pump Automatic Start
    b. Motor-driven AFW Pump Recirculation Flow Control Valves
    c. Motor-driven AFW Pump Discharge Flow Control Valves

Cognitive Level:

Higher	X
Lower	

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

21 **Points: 1.00**

Given:

- Unit 2 is MODE 3
- 2A 4KV Vital Bus is powered from 23 SPT
- 2B and 2C 4KV Vital Busses are powered from 24 SPT

Subsequently

- 23ASD (23 SPT Supply Breaker to 2A 4KV Vital Bus) SPURIOUSLY opens

Which ONE of the following completes the statement below?

After the electrical transient is complete, the 2A 4KV Vital Bus will be _____.

A. de-energized

B. powered from 2A EDG with the blackout loads loaded by the 2A SEC

C. powered from the 24 SPT and the 2A EDG will **NOT** start

D. powered from the 24 SPT and the 2A EDG will start and remained unloaded

Answer: B

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. Since the 23SPT transfer relay remains energized, the operator may incorrectly determine that the 24 SPT and 2A EDG transfer scheme is defeated causing the 2A 4KV Bus to remain de-energized.

B. **Correct.** With 23 SPT at normal voltage when 23ASD spuriously opens, the 23SPT transfer relay remains energized and an AUTOMATIC transfer of the 2A 4KV Vital Bus to the 24 SPT will not occur. Consequently, the 2A 4KV Bus will de-energize and the 2A EDG will start and power the bus in accordance with the 2A SEC operating in Mode II*.

C. Incorrect but plausible. This is the expected result if the 23 SPT transfer relay had de-energized.

D. Incorrect but plausible. This would be partially correct if the 23 SPT transfer relay had de-energized.

Question Number: 21

Tier: 2 Group 1

K/A: 062 A.C. Electrical Distribution-K3.01

Knowledge of the effect that a loss or malfunction of the ac distribution system will have on the following: Major system loads

Importance Rating: 3.5

10 CFR Part 55: 41.7 / 45.6

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know how a malfunction 23ASD (23 SPT Supply Breaker to 2A 4KV Vital Bus) will affect 2A 4KV Vital Bus (a major AC load).

SRO Justification: N/A

Technical References: NOS054KVACO-08 (4160 ELECTRIC SYSTEM)

Proposed references to be provided: None

Learning Objective: NOS054KVACO-08 (4160 ELECTRIC SYSTEM)

16. Given a 4160 Electrical System failure, predict the effect of the 4160 Electrical System failure on the following: (License Operator and STA only)
    a. Off-site power sources
    b. Emergency Diesel Generators

Cognitive Level:

Higher	X
Lower	

Question Source

New	
Modified Bank	
Bank	X

Question History:

Comments:

22 **Points: 1.00**

Which ONE of the following completes the statement below?

During a STATION BLACKOUT and with the vital batteries discharging at their **MAXIMUM** rate, the vital batteries will supply DC power to emergency equipment for **AT LEAST** _____ hour(s).

A. 1

B. 2

C. 4

D. 6

Answer: B

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. All of the distractors are time frames that are close to 2 hours. Therefore, all of the distractors are plausible.

B. **Correct.** During a STATION BLACKOUT, the vital batteries will supply DC power to emergency equipment for AT LEAST 2 hours.

C. Incorrect but plausible. All of the distractors are time frames that are close to 2 hours. Therefore, all of the distractors are plausible.

D. Incorrect but plausible. All of the distractors are time frames that are close to 2 hours. Therefore, all of the distractors are plausible.

Question Number: 22

Tier: 2 Group 1

K/A: 063 DC Electrical Distribution System-A1.01

Ability to predict and/or monitor changes in parameters associated with operating the DC electrical system controls including: Battery capacity as it is affected by discharge rate

Importance Rating: 2.5

10 CFR Part 55: 41.5 / 45.5

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must how long the vital batteries will supply DC power following a STATION BLACKOUT with the batteries discharging at the maximum rate.

SRO Justification: N/A

Technical References: NOS05DCELEC-09 (DC ELECTRICAL SYSTEMS)

Proposed references to be provided: None

Learning Objective: NOS05DCELEC-09 (DC ELECTRICAL SYSTEMS)

3. Describe the design bases of the DC Electrical System

Cognitive Level:

Higher	
Lower	X

Question Source

New	
Modified Bank	
Bank	X

Question History: ILOT 1601 NRC RO Q28

Comments: # 2 OF 4 ALLOWABLE RO QUESTIONS randomly sampled from exam bank that was used on the last two Salem ILOT NRC Exams (ES-401-6 #4 Requirements).

23 **Points: 1.00**

Given

- Unit 1 is at 100% Reactor Power
- **ALL** AC and DC power to the 1RP4 panel has been lost
- **ALL** 1RP4 indication lights are OFF

At time 12:00

- A Reactor Trip and Safety Injection occurs

Which ONE of the following completes the statement below?

At **12:00**, The SECs will _____.

A. **NOT** AUTOMATICALLY actuate

B. AUTOMATICALLY actuate in Mode 3

C. AUTOMATICALLY actuate in Mode 2

D. AUTOMATICALLY actuate in Mode 1

Answer: D

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. If DC power had been lost to a control room Bezel (e.g. AFW Control Bezel), then the components controlled by that Bezel could not been operated using the Bezel (manual and automatic functions). The candidate could apply this same logic to 1RP4 and incorrectly conclude that with DC power lost to 1RP4, then all equipment associated with 1RP4 can not be operated.

B. Incorrect but plausible. The distractor is partially correct and the SECs can operate in Modes 1 through 4. However, for the given plant conditions, the SECs will not operate in Mode 3.

C. Incorrect but plausible. The distractor is partially correct and the SECs can operate in Modes 1 through 4. However, for the given plant conditions, the SECs will not operate in Mode 2.

D. **Correct.** 1RP4 is the main panel in the control room that gives a visual status of all safety related equipment including the Safeguard Equipment Controllers (SECs). Since 1RP4 is not safety related, the interface between the SECs and 1RP4 is isolated. Consequently, when a Reactor Trip and Safety Injections occurs, the SECs will automatically actuate in Mode 1.

Question Number: 23

Tier: 2 Group 1

K/A: 063 DC Electrical Distribution System-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.

Importance Rating: 2.5

10 CFR Part 55: 41.5 / 45.5

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must that a loss of DC Power to 1 RP4 (which causes all 1RP4 indication lights to be off) will not affect operation of the Safeguard Equipment Controllers (SECs).

SRO Justification: N/A

Technical References: Notification 20787762

Proposed references to be provided: None

Learning Objective: NOS05SEC000-07 (SAFEGUARDS EQUIPMENT CONTROL SYSTEM)

13. Identify and describe the Control Room controls, indications, and alarms associated with the Safeguards Equipment Control System, including:
    a. The Control Room location of Safeguards Equipment Control System control bezels and indications.
    b. The function of each Safeguards Equipment Control System Control Room control and indication.
    c. The effect each Safeguards Equipment Control System control has upon Safeguards Equipment Control System components and operation.
    d. The plant conditions or permissives required for Safeguards Equipment Control System Control Room controls to perform their intended function.
    e. The setpoints associated with the Safeguards Equipment Control System control room alarms.

Cognitive Level:

Higher	X
Lower	

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

24 **Points: 1.00**

Which ONE of the following completes the statements below concerning the 2A EDG?

The 2A EDG can be run at a **MAXIMUM** of ___(1)___ KW for 2000 hours.

During operation of the 2A EDG, the Diesel Area Ventilation will ensure the 2A EDG Room does not exceed a **MAXIMUM** of ___(2)___ °F.

	(1)	**(2)**
A.	2750	120
B.	2750	90
C.	2600	120
D.	2600	90

Answer: A

Answer Explanation

DISTRACTOR ANALYSIS:

A. **Correct.** For Part 1, the 2A EDG can be run at a MAXIMUM of 2750 KW for 2000 hours. For Part 2, during operation of the 2A EDG, the Diesel Area Ventilation will ensure the 2A EDG Room does not exceed a MAXIMUM of 120 °F.

B. Incorrect but plausible. Part 1 is correct. For Part 2, 90 °F is close to the actual limit and is a reasonable distractor given the importance of the EDGs.

C. Incorrect but plausible. For Part 1, 2600 KW is the continuous rating of the 2A EDG. Part 1 is correct.

D. Incorrect but plausible. For Part 1, 2600 KW is the continuous rating of the 2A EDG. For Part 2, 90 °F is close to the actual limit and is a reasonable distractor given the importance of the EDGs.

Question Number: 24

Tier: 2 Group 1

K/A: 064 Emergency Diesel Generator (ED/G) System-A1.05

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

Importance Rating: 2.5

10 CFR Part 55: 41.5 / 45.5

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know the maximum expected EDG Room temperature during operation of an EDG.

SRO Justification: N/A

Technical References: NOS05EDG000-12 (EMERGENCY DIESEL GENERATORS)

Proposed references to be provided: None

Learning Objective: NOS05EDG000-12 (EMERGENCY DIESEL GENERATORS)

6. Outline the interlocks associated with the following Emergency Diesel Generator components:
   a. Pre-lube pumps
   b. Lube Oil Heaters
   c. Starting Air Solenoids/Motors
   d. Jacket Water Heater
   e. Fuel Oil transfer Pumps
   f. Generator Breaker
   g. EDG Ventilation System

Cognitive Level:

Higher	
Lower	X

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

25 **Points: 1.00**

Given:

- A LBLOCA has occurred on Unit 2
- The crew is evaluating the Plant Vent Effluent display to determine if a radiological release is in progress:

Which ONE of the following completes the statement below?

2R41 _____ is the **ONLY** control room indication that reads out in µCi / sec and can be used to determine if a radiological release is in progress.

A. Channel A

B. Channel B

C. Channel C

D. Channel D

Answer: D

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. Since there is 4 Channels for 2R41, the candidate could select Channels A, B or C.

B. Incorrect but plausible. Since there is 4 Channels for 2R41, the candidate could select Channels A, B or C.

C. Incorrect but plausible. Since there is 4 Channels for 2R41, the candidate could select Channels A, B or C.

D. **Correct.** 2R41 Channel D is the ONLY control room indication that reads out in µCi / sec and can be used to determine if a radiological release is in progress for notification to State and Local Agencies.

Question Number: 25

Tier: 2 Group 1

K/A: 073 Process Radiation Monitoring (PRM) System-A4.01

Ability to manually operate and/or monitor in the control room: Effluent release

Importance Rating: 3.9

10 CFR Part 55: 41.7 / 45.5 to 45.8

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know which Channel of 2R41 can be used to determine if there is an effluent release from the plant ventilation stack in progress following a LBLOCA.

SRO Justification: N/A

Technical References: NOS05RMS000-17 (RADIATION MONITORING SYSTEM)

Proposed references to be provided: None

Learning Objective: NOS05RMS000-17 (RADIATION MONITORING SYSTEM)

7. Identify and describe the Control Room controls, indications, and alarms associated with the Radiation Monitoring System, including:
   a. The Control Room location of Radiation Monitoring System control bezels and indications.
   b. The function of each Radiation Monitoring System Control Room control and indication.
   c. The effect each Radiation Monitoring System control has upon Radiation Monitoring System components and operation.
   d. The plant conditions or permissives required for Radiation Monitoring System Control Room controls to perform their intended function.

Cognitive Level:

Higher	
Lower	X

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

26 **Points: 1.00**

Considering **ONLY** the following plant conditions below:

1. A loss of control air to 21SW122 (21 CC Hx Control Valve)
2. SEC Mode III Operation
3. A loss of 125 VDC power to 21SW122 (21 CC Hx Control Valve)

Which ONE of the following completes the statement below?

Condition(s) _____ will cause 21SW122 to go **FULLY OPEN**.

A. 1 **ONLY**

B. 2 **ONLY**

C. 2 and 3 **ONLY**

D. 1 and 3 **ONLY**

Answer: A

Answer Explanation

DISTRACTOR ANALYSIS:

A. **Correct.** ONLY a loss of control air to 21SW122 will cause 21SW122 to go FULLY OPEN.

B. Incorrect but plausible. ALL 3 possible conditions listed in the question stem will cause 21SW122 to either go fully closed or fully open. Consequently, all of the distractors are plausible.

C. Incorrect but plausible. ALL 3 possible conditions listed in the question stem will cause 21SW122 to either go fully closed or fully open. Consequently, all of the distractors are plausible.

D. Incorrect but plausible. ALL 3 possible conditions listed in the question stem will cause 21SW122 to either go fully closed or fully open. Consequently, all of the distractors are plausible.

Question Number: 26

Tier: 2 Group 1

K/A: 076 Service Water System (SWS)-K4.03

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 exchanges

Importance Rating: 3.9

10 CFR Part 55: 41.7 / 45.5 to 45.8

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know what plant conditions will cause 21SW122 (an SWS isolation valve to CCW heat exchange) to go fully open.

SRO Justification: N/A

Technical References: NOS05SW0NUC-14 (SERVICE WATER – NUCLEAR HEADER)

Proposed references to be provided: None

Learning Objective: NOS05SW0NUC-14 (SERVICE WATER – NUCLEAR HEADER)

4. Describe the function of the following components and how their normal and abnormal operation affects the Service Water – Nuclear Header System:
   a. Nuclear Service Water Headers and SW17, 22/24SW20, SW21, SW22, SW23, SW50
   b. Containment Fan Coil Units and SW58, SW72, SW223
   c. SW Accumulators and SW534/535
   d. Diesel Generator Coolers and SW39/42
   e. Safety Related Chillers and SW92 and SW102
   f. Component Cooling Heat Exchangers and SW122, SW127, SW380/383, SW376/379
   g. Safety Related Pump Room Coolers
   h. Safety Related Pump Oil Coolers
   i. AFW Supply
   j. Emergency Control Air Compressor

Cognitive Level:

Higher	
Lower	X

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

27 **Points: 1.00**

Which ONE of the following completes the statement below?

In accordance with LCO 3.6.3 (Containment Isolation Valves), the **21**CA330 (Control Air Isolation Valve) and **22**CA330 (Control Air Isolation Valve) are required to be OPERABLE in ___(1)___.

The 21CA330 and 22CA330 will automatically close when Containment Pressure **FIRST** exceeds ___(2)___ psig.

	(1)	**(2)**
A.	**ALL** MODES	4
B.	**ALL** MODES	15
C.	MODES 1-4 **ONLY**	4
D.	MODES 1-4 **ONLY**	15

Answer: C

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. For Part 1, there are other LCOs that are applicable in ALL MODES. Consequently, the candidate could incorrectly conclude that LCO 3.6.3 is applicable in ALL MODES. Part 1 is correct.

B. Incorrect but plausible. For Part 1, there are other LCOs that are applicable in ALL MODES. Consequently, the candidate could incorrectly conclude that LCO 3.6.3 is applicable in ALL MODES. For Part 2, 15 psig is the setpoint for a Phase B Containment Isolation Signal. The candidate could incorrectly conclude that the CA330s close on a Phase B Containment Isolation Signal.

C. **Correct.** For Part 1 and IAW LCO (3.6.3), the CA330s (Control Air Isolation Valves) are required to be OPERABLE in MODES 1-4 ONLY. For Part 2, The CA330s will automatically close on a Phase A Containment Isolation. A Phase A Containment Isolation signal is generated when Containment Pressure FIRST exceeds 4 psig.

D. Incorrect but plausible. Part 1 is correct. For Part 2, 15 psig is the setpoint for a Phase B Containment Isolation Signal. The candidate could incorrectly conclude that the CA330s close on a Phase B Containment Isolation Signal.

Question Number: 27

Tier: 2 Group 1

K/A: 078 Instrument Air System (IAS)-G2.2.38

Knowledge of conditions and limitations in the facility license

Importance Rating: 3.6

10 CFR Part 55: 41.7 / 41.10 / 43.1 / 45.13

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know when the Control Air Isolation Valves are require to be operable IAW Technical Specifications (part of the facility license).

SRO Justification: N/A

Technical References: LCO 3.6.3
NOS05CONAIR-12 (CONTROL AIR SYSTEM)

Proposed references to be provided: None

Learning Objective: NOS05CONAIR-12 (CONTROL AIR SYSTEM)

10. Given a situation dealing with Control Air System operability, examine the situation and apply the appropriate Technical Specification action.

Cognitive Level:

Higher _____
Lower X

Question Source

New X
Modified Bank _____
Bank _____

Question History:

Comments:

28 **Points: 1.00**

In accordance with LCO 3.6.1.3 (Containment Air Locks), which ONE of the following completes the statements below?

The Containment Airlock interlock mechanisms for **BOTH** Containment Airlocks are required to be OPERABLE when Unit 2 is in ___(1)___.

If a Containment Airlock with only the Containment Airlock interlock mechanism is inoperable, then the crew must verify an OPERABLE door is ___(2)___ in the affected air lock **WITHIN 1 hour**.

	(1)	**(2)**
A.	MODES 1-4 **ONLY**	closed **ONLY**
B.	MODES 1-4 **ONLY**	closed and locked
C.	**ALL** MODES	closed **ONLY**
D.	**ALL** MODES	closed and locked

Answer: A

Answer Explanation

DISTRACTOR ANALYSIS:

A. **Correct.** For Part 1 and in accordance with LCO 3.6.1.3 (Containment Air Locks), the Containment Airlock interlock mechanisms for BOTH Containment Airlocks are required to be OPERABLE when Unit 2 is in MODES 1-4 ONLY. For Part 2 and in accordance with LCO 3.6.1.3 (Containment Air Locks) REQUIRED ACTION B.1, if a containment air lock with only the containment air lock interlock mechanism is inoperable, then verify an OPERABLE door is closed only in the affected air lock within 1 hour.

B. Incorrect but plausible. Part 1 is correct. For Part 2, LCO 3.6.1.3 REQUIRED ACTION B.2 has a requirement to lock an OPERABLE door closed in the affected air lock within 24 hours.

C. Incorrect but plausible. For Part 1, the candidate could incorrectly conclude that the), the Containment Airlock interlock mechanisms for BOTH Containment Airlocks are required to be OPERABLE when Unit 2 is in ALL MODES. Part 2 is correct.

D. Incorrect but plausible. For Part 1, the candidate could incorrectly conclude that the), the Containment Airlock interlock mechanisms for BOTH Containment Airlocks are required to be OPERABLE when Unit 2 is in ALL MODES. For Part 2, LCO 3.6.1.3 REQUIRED ACTION B.2 has a requirement to lock an OPERABLE door closed in the affected air lock within 24 hours.

Question Number: 28

Tier: 2 Group 1

K/A: 103 Containment System-K4.04

Knowledge of containment system design feature(s) and/or interlock(s) which provide for the following: Personnel access hatch and emergency access hatch

Importance Rating: 2.5

10 CFR Part 55: 41.7

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know when the Containment Airlock interlock mechanisms for BOTH Containment Airlocks are required to be OPERABLE IAW LCO 3.6.1.3.

SRO Justification: N/A

Technical References: LCO 3.6.1.3

Proposed references to be provided: None

Learning Objective: NOS05CONTMT-15 (CONTAINMENT AND CONTAINMENT SUPPORT SYSTEMS)

1. Describe the purpose and design basis for the following Containment and Containment Support Systems subsystems:
   a. Containments
   b. Containment Airlocks
   c. Containment Isolation System
   d. Containment Fan Cooler System
   e. Containment Iodine Removal System

Cognitive Level:

Higher	
Lower	X

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

29 **Points: 1.00**

Given:

- Unit 1 is 100% Reactor Power

At time 1900

- An AUTOMATIC Turbine Runback occurs

At time 1905

- The crew starts a rapid RCS boration in order to raise the control rods above the Rod Insertion Limit
- The Rod Bank Selector Switch is in AUTO

At time 1910

- The Rod Control Summing Unit has calculated that the magnitude of the TOTAL TEMPERATURE ERROR is 4 °F

Which ONE of the following completes the statement below?

At **1910** Control Rods are stepping out at _____ steps per minute.

A. 72

B. 40

C. 24

D. 8

Answer: B

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. Since rod control speed can vary from 8 SPM to 72 SPM with Rod Control in automatic, all distractors are plausible

B. **Correct.** With Rods in auto, control speed varies based on the total temperature error. With a temperature error of 1.5 °F to 3 °F, rod will move at 8 spm. With a temperature error of 3 °F to 5 °F, rods will move from 8 spm to 72 spm (linearly). This corresponds of an increase of 32 spm / °F. Consequently, with a TOTAL TEMPERATURE ERROR of 4 °F, rods will move 40 spm (8 spm + (32 spm / °F x 1 °F)).

C. Incorrect but plausible. Since rod control speed can vary from 8 SPM to 72 SPM with Rod Control in automatic, all distractors are plausible

D. Incorrect but plausible. Since rod control speed can vary from 8 SPM to 72 SPM with Rod Control in automatic, all distractors are plausible

Question Number: 29

Tier: 2 Group 2

K/A: 001 Control Rod Drive System-K4.05

Knowledge of CRDS design feature(s) and/or interlock(s) which provide for the following: Boration and dilution

Importance Rating: 3.9

10 CFR Part 55: 41.7

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know the CRDS design feature (rods stepping out at variable speeds) due to an RCS boration

SRO Justification: N/A

Technical References: NOS05RODS00-12

Proposed references to be provided: None

Learning Objective: NOS05RODS00-12 (ROD CONTROL AND POSITION INDICATION SYSTEMS)

5. Draw a one–line diagram of the Reactor Control Unit which indicates the following major Reactor Control Unit components: (Licensed Operator & STA only)
    a. Temperature Error Circuit
    b. Power Mismatch Circuit
    c. Rate Comparator
    d. Non–Linear Gain Unit
    e. Variable Gain Unit
    f. Summer

Cognitive Level:

Higher X
Lower _____

Question Source

New X
Modified Bank _____
Bank _____

Question History:

Comments:

30 **Points: 1.00**

Given:

- Unit 2 is 100% Reactor Power

At time 1900:00

- 2N41 (Power Range NI) fails high

At time 1900:30 (30 seconds later)

- The crew enters S2.OP-AB.NIS-0001 (NUCLEAR INSTRUMENTATION SYSTEM MALFUNCTION)

At time 1945:00

- 2N41 is placed in tripped condition in accordance with S2.OP-SO.RPS-0001 (NUCLEAR INSTRUMENTATION CHANNEL TRIP / RESTORATION)

Which ONE of the following completes the statements below?

In accordance with S2.OP-AB.NIS-0001 and prior to placing 2N41 in tripped condition, the crew ___(1)___ **REQUIRED** to place the Rod Bank Selector Switch in MAN.

After **1945:00**, the coincidence for the PR High Neutron Flux Reactor Trip (based on the remaining functional PR NI Channels) is now ___(2)___.

	(1)	**(2)**
A.	is **NOT**	1 out of 3
B.	is **NOT**	2 out of 3
C.	is	1 out of 3
D.	is	2 out of 3

Answer: C

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. For Part 1, when 2PR41 fails high, this will cause the overpower rod stop block to be enabled (which stops all automatic and manual rod withdrawl). Consequently, the candidate could incorrectly conclude that placing rods in Manual is not required IAW S2.OP-AB.NIS-0001). Part 2 is correct.

B. Incorrect but plausible. For Part 1, when 2PR41 fails high, this will cause the overpower rod stop block to be enabled (which stops all automatic and manual rod withdrawl). Consequently, the candidate could incorrectly conclude that placing rods in Manual is not required IAW S2.OP-AB.NIS-0001). For Part 2, the candidate could incorrectly determine that when 2PR41 is removed from service IAW S2.OP-SO.RPS-0001, this removes the channel from the PR High Neutron Flux Reactor Trip logic. This would then cause the candidate to incorrectly conclude that the logic for the remaining operable channels is 2 out of 3.

C. **Correct.** For Part 1 and IAW S2.OP-AB.NIS-0001, the crew is REQUIRED to place the Rod Bank Selector Switch in MAN. For Part 2 and IAW DWG 221052, after the bi-stable for 2PR41 is tripped (IAW S2.OP-SO.RPS-0001), the coincidence for the PR High Neutron Flux Reactor Trip (based on the remaining functional PR NI Channels) is now 1 out of 3.

D. Incorrect but plausible. Part 1 is correct. For Part 2, the candidate could incorrectly determine that when 2PR41 is removed from service IAW S2.OP-SO.RPS-0001, this removes the channel from the PR High Neutron Flux Reactor Trip logic. This would then cause the candidate to incorrectly conclude that the logic for the remaining operable channels is 2 out of 3.

Question Number: 30

Tier: 2 Group 2

K/A: 015 Nuclear Instrumentation System (NIS)-A4.03

Ability to manually operate and/or monitor in the control room: Trip bypasses

Importance Rating: 3.8

10 CFR Part 55: 41.7

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must monitor the PR High Neutron Flux Reactor Trip after 2PR41 bi-stabled is tripped.

SRO Justification: N/A

Technical References: S2.OP-AB.NIS-0001
S2.OP-SO.RPS-0001
DWG 221052

Proposed references to be provided: None

Learning Objective: NOS05RXPROT-13 (REACTOR PROTECTION SYSTEM)

12. State the setpoints, coincidence, blocks and permissives for all Reactor Trips and Safety Injections actuations

Cognitive Level:

Higher X
Lower _____

Question Source

New X
Modified Bank _____
Bank _____

Question History:

Comments:

31 **Points: 1.00**

Given

- Unit 2 is at 45% Reactor Power

At time 14:00

- A malfunction within AMSAC causes **ONLY** Train A of AMSAC to actuate

Which ONE of the following completes the statement below?

The actuation of Train A of AMSAC will send an AUTOMATIC start signal to _____ AFW Pump(s).

A. **ALL**

B. **ONLY** 21

C. **ONLY** 21 and 22

D. **ONLY** 21 and 23

Answer: D

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. The candidate could not understand how AMSAC circuitry works and incorrectly conclude that ALL AFW pumps receive an AUTOMATIC start signal.

B. Incorrect but plausible. The candidate could not understand how AMSAC circuitry works and incorrectly conclude that ONLY 21 pump receives an AUTOMATIC start signal.

C. Incorrect but plausible. The candidate could not understand how AMSAC circuitry works and incorrectly conclude that ONLY 21 and 22 AFW pumps receive an AUTOMATIC start signal.

D. **Correct.** The 21 AFW receives an AUTOMATIC start signal when AMSAC Train A actuates. The 22 AFW receives an AUTOMATIC start signal when AMSAC Train B actuates. The 23 AFW receives an AUTOMATIC start signal when either train of AMSAC actuates. Consequently, when ONLY Train A of AMSAC actuates, 21 and 23 AFW Pumps received an AUTOMATIC start signal.

Question Number: 31

Tier: 2 Group 2

K/A: 016 Non-Nuclear Instrumentation System (NNIS)-K1.06

Knowledge of the physical connections and/or cause-effect relationships between the NNIS and the following systems: AFW system

Importance Rating: 3.6

10 CFR Part 55: 41.2 to 41.9 / 45.7 to 45.8

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know the cause-effect relationship between the NNIS (AMSAC circuitry) and the AFW system. Specifically, how does a spurious actuation of AMSAC Train A affect the auto start feature of the AFW Pumps

SRO Justification: N/A

Technical References: NOS05AFW000-16 (AUXILIARY FEEDWATER SYSTEM)

Proposed references to be provided: None

Learning Objective: NOS05RXPROT-13 (REACTOR PROTECTION SYSTEM)

12. Outline the interlocks associated with the following Auxiliary Feedwater System components:
    a. Auxiliary Feedwater Pump Automatic Start
    b. Motor-driven AFW Pump Recirculation Flow Control Valves
    c. Motor-driven AFW Pump Discharge Flow Control Valves

Cognitive Level:

Higher	X
Lower	

Question Source

New	
Modified Bank	
Bank	X

Question History: ILOT 1601 AUDIT RO Q19

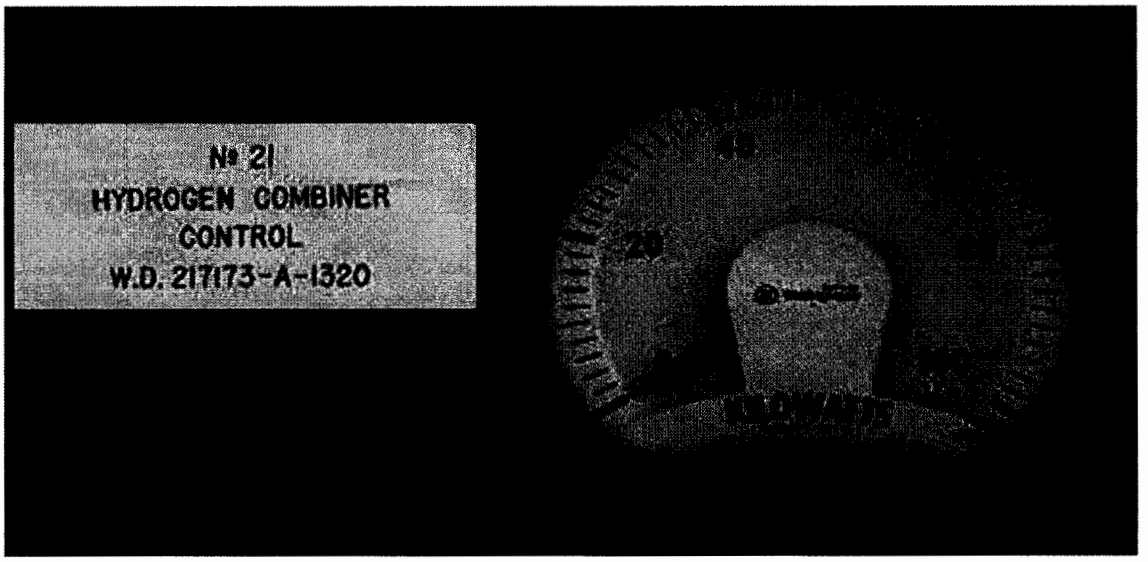
Comments:

32 **Points: 1.00**

REFERENCES PROVIDED

Given

- A LOCA has occurred
- 22 Hydrogen Recombiner is inoperable
- The crew is preparing to place 21 Hydrogen Recombiner in service
  - Containment Temperature **PRIOR** to the LOCA was 90 °F
  - **CURRENT** Containment Temperature is 120 °F
  - **CURRENT** Containment pressure as indicated on 2PI-948A is 4.0 psig



Which ONE of the following completes the statement below?

The crew will set the 21 Recombiner Power setting to _____ KW.

A. 56

B. 54

C. 52

D. 50

Answer: B

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. 56 KW is the calculated setting if the candidate correctly used the 21 Hydrogen Recombiner Reference Power (43.68 KW) and incorrectly read Attachment 2 to determine a Power Correction Factor (Cp) of 1.24.

B. **Correct.** IAW S2.OP-SO.CAN-0001 Attachment 1 and Attachment 2:
- Reference Power for 21 Hydrogen Recombiner is 43.68 KW
- Power Correction Factor (Cp) per Attachment 2 (RECOMBINER POWER CORRECTION FACTOR CURVE) is 1.21

Power setting = Reference Power X Power Correction Factor (Cp)
Power setting = 43.68 X 1.21 = 52.85 which is rounded to 54 KW

C. Incorrect but plausible. 52 KW is the calculated setting if the candidate incorrectly used the 22 Hydrogen Recombiner Reference Power (42.63 KW) and correctly read Attachment 2 to determine a Power Correction Factor (Cp) of 1.21

D. Incorrect but plausible. 50 KW is the calculated setting if the candidate correctly used the 21 Hydrogen Recombiner Reference Power (43.68 KW) and incorrectly read Attachment 2 to determine a Power Correction Factor (Cp) of 1.15.

Question Number: 32

Tier: 2 Group 2

K/A: 028 Hydrogen Recombiner and Purge Control System – K5.04

Knowledge of the operational implications of the following concepts as they apply to the HRPS: The selective removal of hydrogen

Importance Rating: 2.6

10 CFR Part 55: 41.5 / 45.7

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must calculate Hydrogen Recombiner power setting following a LOCA.

SRO Justification: N/A

Technical References: S2.OP-SO.CAN-0001 Attachment 1 and Attachment 2

Proposed references to be provided: S2.OP-SO.CAN-0001 Attachment 1 and Attachment 2

Learning Objective: NOS05CONTMT-15 (CONTAINMENT AND CONTAINMENT SUPPORT SYSTEMS)

3. Describe how the following components impact the Containment and Containment Support Systems during normal and abnormal conditions
   a) Containment Fan Cooler System
   b) Containment Iodine Removal System
   c) Rod Drive Ventilation System
   d) Reactor Nozzle Support Ventilation System
   e) Reactor Shield Ventilation System
   f) Containment Pressure – Vacuum Relief System
   g) Hydrogen Recombiner System

Cognitive Level:

Higher X
Lower _____

Question Source

New _____
Modified Bank X
Bank _____

Question History:

Comments:

33 **Points: 1.00**

Given:

- Fuel Handling activities are in progress in the Fuel Handling

At time 0900

- 2R32A (Fuel Handling Crane Radiation Monitor) fails high and the High Radiation Alarm for 2R32A actuates

Considering **ONLY** the following actions:

1. **ALL** crane motion is locked out
2. **ALL** crane motion other than downward movement of suspended load is locked out
3. FHB ventilation is transferred to HEPA and Charcoal Filters and FHB Exhaust Fans are started

Which ONE of the following completes the statement below?

With 2R32A failed high, **ONLY** Action(s) _____ will AUTOMATICALLY occur.

A. 1 and 3

B. 2 and 3

C. 2

D. 1

Answer: C

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. FHB Ventilation will automatically on a high radiation on 2R5 and 2R9. The candidate could incorrectly conclude that a high radiation within the FHB as read by 2R32A would also cause the FHB ventilation to automatically shift. Action 1 is partially correct as discussed in Distractor 'D'

B. Incorrect but plausible. FHB Ventilation will automatically on a high radiation on 2R5 and 2R9. The candidate could incorrectly conclude that a high radiation within the FHB as read by 2R32A would also cause the FHB ventilation to automatically shift (Action 3). Action 2 will automatically occur.

C. **Correct.** With 2R32A failed high, ONLY Action 2 will AUTOMATICALLY occur.

D. Incorrect but plausible. This distractor is partially correct. Consequently, the candidate could incorrectly conclude With 2R32A failed high, ONLY Action 1 will AUTOMATICALLY occur.

Question Number: 33

Tier: 2 Group 2

K/A: 034 Fuel Handling Equipment System-K6.02

Knowledge of the effect of a loss or malfunction on the following will have on the Fuel Handling System : Radiation monitoring systems

Importance Rating: 2.6

10 CFR Part 55: 41.5 / 45.7

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know how the FHS is affected when 2R32A (a Radiation Monitor) malfunctions

SRO Justification: N/A

Technical References: S2.OP-AB.RAD-0001

Proposed references to be provided: None

Learning Objective: NOS05ABRAD1-06 (ABNORMAL RADIATION)

1. Describe the operation of radiation monitors as applied to S2.OP-AB.RAD-0001(Q):
   A. Radiation monitor response to high radiation; including actions that occur as a result of the channel in warning or alarm.

Cognitive Level:

Higher	
Lower	X

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

34 **Points: 1.00**

Which ONE of the following completes the statement below?

The Steam Dump I/P converters are powered by ___(1)___ and a loss of power to the Steam Dump I/P converters will cause the Steam Dumps to fail ___(2)___.

	(1)	(2)
A.	C / D 115 VAC Instrument Bus	closed
B.	C / D 115 VAC Instrument Bus	as-is
C.	A / B 125 VDC Bus	closed
D.	A / B 125 VDC Bus	as-is

Answer: A

Answer Explanation

DISTRACTOR ANALYSIS:

A. **Correct.** The Steam Dump I/P converters are powered by 115 VAC and a loss of power to the Steam Dump I/P converters will cause the Steam Dumps to fail closed.

B. Incorrect but plausible. Part1 is correct. For Part 2, other components in the plant fail as-is when power is lost. Consequently, the candidate could incorrectly conclude that the Steam Dumps fail as-is when power is lost to the I/P converters.

C. Incorrect but plausible. For Part 1, Steam Dump blocking solenoids are powered from 125 VDC. Consequently, the candidate could incorrectly conclude that the Steam Dump I/P converters are also powered by 125 VDC. Part 2 is correct.

D. Incorrect but plausible. For Part 1, Steam Dump blocking solenoids are powered from 125 VDC. Consequently, the candidate could incorrectly conclude that the Steam Dump I/P converters are also powered by 125 VDC. For Part 2, other components in the plant fail as-is when power is lost. Consequently, the candidate could incorrectly conclude that the Steam Dumps fail as-is when power is lost to the I/P converters.

Question Number: 34

Tier: 2 Group 2

K/A: 041 Steam Dump System (SDS) and Turbine Bypass Control-K2.02

Knowledge of bus power supplies to the following: ICS, normal and alternate power supply

Importance Rating: 2.6

10 CFR Part 55: 41.5 / 45.7

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know the power supply to the Steam Dump I/P converters.

SRO Justification: N/A

Technical References: NOS05STDUMP-12

Proposed references to be provided: None

Learning Objective: NOS05STDUMP-12 (STEAM DUMP SYSTEM)

5. State the power supply to the following Steam Dump System components:
   a. Steam Dump System Electro-pneumatic (I/P) converters
   b. Steam Dump Valve Solenoids

Cognitive Level:

Higher	
Lower	X

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

35 **Points: 1.00**

Given:

- A 24 Gas Decay Tank (GDT) release is in progress in accordance with S2.OP-SO.WG-0011 (DISCHARGE OF 24 GAS DECAY TANK TO PLANT VENT)

At time 12:00

- 2R41 Channel A and Channel D High Radiation Alarms are received in the Control Room

Which ONE of the following completes the statement below?

At **12:00**, _____ will AUTOMATICALLY close which will terminate the 24 GDT release.

A. 24WG34 (GDT STOP TO PLNT)

B. 2WG39 (GDT TO VENT HDR STOP V)

C. 2WG38 (GDT VENT CONTROL VALVE)

D. 2WG41 (GDT VENT CONT V)

Answer: D

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. All of the distractors are valves that are open during a 24 GDT release. Consequently, the candidate could incorrectly conclude that any one of the given WG valves would automatically close when 2R41 Channel D High Radiation Alarm actuates.

B. Incorrect but plausible. All of the distractors are valves that are open during a 24 GDT release. Consequently, the candidate could incorrectly conclude that any one of the given WG valves would automatically close when 2R41 Channel D High Radiation Alarm actuates.

C. Incorrect but plausible. All of the distractors are valves that are open during a 24 GDT release. Consequently, the candidate could incorrectly conclude that any one of the given WG valves would automatically close when 2R41 Channel D High Radiation Alarm actuates.

D. **Correct.** 2WG41 will automatically close when the 2R41 Channel D High Radiation Alarm actuates.

Question Number: 35

Tier: 2 Group 2

K/A: 071 Waste Gas Disposal System - A3.03

Ability to monitor automatic operation of the Waste Gas Disposal System including: Radiation monitoring system alarm and actuating signals

3.6 2.6

10 CFR Part 55: 41.7 / 45.5

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must monitor automatic WG system response when 2R41 Channel D comes into alarm

SRO Justification: N/A

Technical References: NOS05WASGAS-10 (Radioactive Waste Gas)

Proposed references to be provided: None

Learning Objective: NOS05WASGAS-10 (Radioactive Waste Gas)

5. Outline the interlocks associated with the following Radioactive Waste Gas System components:
   a) Waste Gas Compressors
   b) Waste Gas Decay Tank Inlet Valves (21-24WG29)
   c) Waste Gas Decay Tank Sample Isolation Valves (21-24WG42)
   d) Radioactive Gaseous Waste Release Valve 2WG41

Cognitive Level:

Higher	
Lower	X

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

36 **Points: 1.00**

Given

- 21 Fuel Handling Area Exhaust Fan is in service
- 22 Fuel Handling Area Exhaust Fan is in standby
- 21 HEPA ONLY Filter Unit is in service
- HEPA 22 PLUS CHAR is in standby

At time 17:00

- 2R9 (Fuel Storage Area Monitor) goes into alarm

Which ONE of the following completes the statement below?

Five Minutes later at **17:05**, ___(1)___ Fuel Handling Area Exhaust Fan(s) and ___(2)___ Filter Unit(s) is / are in service.

	(1)	**(2)**
A.	**ONLY** 21	**ONLY** HEPA 22 PLUS CHAR
B.	**ONLY** 21	21 HEPA ONLY AND HEPA 22 PLUS CHAR
C.	21 and 22	**ONLY** HEPA 22 PLUS CHAR
D.	21 and 22	21 HEPA ONLY AND HEPA 22 PLUS CHAR

Answer: C

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. For Part 1, the candidate could incorrectly conclude that only the running fan (21) will be in service at 17:05. Part 2 is correct.

B. Incorrect but plausible. For Part 1, the candidate could incorrectly conclude that only the running fan (21) will be in service at 17:05. For Part 2, the candidate could incorrectly conclude that BOTH HEPAs will be in service at 17:05.

C. **Correct.** When 2R9 goes into alarm, BOTH Fuel Handling Area Fans receive an auto start signal and 21 HEPA ONLY Filter Unit Isolates while 22 HEPA PLUS CHAR filter unit automatically aligns. Consequently, at 17:05, 21 and 22 Fuel Handling Area Fans and ONLY HEPA 22 PLUS CHAR Filter Unit are in service.

D. Incorrect but plausible. Part 1 is correct. For Part 2, the candidate could incorrectly conclude that BOTH HEPAs will be in service at 17:05.

Question Number: 36

Tier: 2 Group 2

K/A: 072 Area Radiation Monitoring (ARM) System-G2.4.31

Knowledge of annunciator alarms, indications, or response procedures

Importance Rating: 4.2

10 CFR Part 55: 41.10 / 45.3

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know how the FHB ventilation system will respond when 2R9 ARM indications show the ARM in alarm condition.

SRO Justification: N/A

Technical References: S2.OP-AR.ZZ-0001 Alarm A-6

Proposed references to be provided: None

Learning Objective: NOS05FHVENT-09 (FUEL HANDLING AREA VENTILATION)

7: Describe the interlocks associated with the following Fuel Handling Area Ventilation System components:

a) Supply Fan Unit

b) Exhaust Fan Controls

c) Exhaust Filter Units.

Cognitive Level:

Higher X
Lower _____

Question Source

New _____
Modified Bank _____
Bank X

Question History: ILOT 1601 AUDIT EXAM RO Q37

Comments:

37 **Points: 1.00**

Given

- Unit 2 is at 25% Reactor Power and rising as part of plant startup

At time 15:00

- The Circulating Water Intake Structure becomes damaged resulting in four of the Circulators becoming out of service

At time 15:01

- The crew enters S2.OP-AB.CW-0001 (CIRCULATING WATER SYSTEM MALFUNCTION)

Which ONE of the following completes the statement below?

In accordance with S2.OP-AB.CW-0001, the crew is **REQUIRED** to _____.

A. **INITIATE** a Rapid Load Reduction until condenser vacuum stabilizes within operational limits

B. **COMMENCE** an IMMEDIATE controlled plant shutdown

C. **TRIP** the Turbine

D. **TRIP** the Reactor

Answer: D

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. When 4 of the 6 circulators become nonfunctional, condenser backpressure will degrade. S2.OP-AB.CW-0001 CAS contains guidance to perform a Rapid Power to stabilize condenser backpressure. Consequently, the candidate could incorrectly conclude that given the current plant conditions, a rapid load reduction is required.

B. Incorrect but plausible. S2.OP-AB.CW-0001 Attachment 7 contains guidance to perform an immediate controlled turbine shutdown. Consequently, the candidate could incorrectly conclude that given the current plant conditions, a controlled plant shutdown is required.

C. Incorrect but plausible. S2.OP-AB.CW-0001 CAS contains guidance to trip the turbine if condenser backpressure is outside the allowable operating region and Reactor Power is less than P-9 (49%). Consequently, the candidate could incorrectly conclude that given the current plant conditions, a Turbine trip is required.

D. **Correct.** IAW S2.OP-AB.CW-0001 CAS, with 4 or more circulators are out of service AND Reactor Power greater than or equal to P-10 (10%), then the crew is required to TRIP the Reactor.

Question Number: 37

Tier: 2 Group 2

K/A: 075 Circulating Water System - A2.01

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

Importance Rating: 4.2

10 CFR Part 55: 41.10 / 45.3

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know the procedural guidance of S2.OP-AB.CW-0001 (CIRCULATING WATER SYSTEM MALFUNCTION) following damage to the CW intake structure with Reactor Power initially at 25%.

SRO Justification: N/A

Technical References: S2.OP-AB.CW-0001

Proposed references to be provided: None

Learning Objective: NOS05ABCW01-11 (CIRCULATING WATER SYSTEM (MALFUNCTION)

5. Given a set of initial plant conditions
   - A. Determine the appropriate abnormal procedure.
   - B. Describe the plant response to actions taken in the abnormal procedure
   - C. Describe the final plant condition that is established by the abnormal procedure

Cognitive Level:

Higher X
Lower _____

Question Source

New X
Modified Bank _____
Bank _____

Question History:

Comments:

38 **Points: 1.00**

Given

- Firefighting activities are in progress
- Fire Water Header pressure had lowered to a **MINIMUM** of 80 psig and it is now slowly rising.

Which ONE of the following completes the statements below?

Fire Pump #1 ___(1)___ is / are running.

After firefighting activities are complete, the running Fire Pump(s) can be shutdown LOCALLY ___(2)___.

	(1)	**(2)**
A.	**ONLY**	or REMOTELY
B.	**ONLY**	**ONLY**
C.	and Fire Pump #2	or REMOTELY
D.	and Fire Pump #2	**ONLY**

Answer: B

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. Part 1 is correct. For Part 2, since the fire water pumps can be started locally or remotely, the candidate could incorrectly conclude that the running Fire Pump(s) can be shutdown locally or remotely.

B. **Correct.** For Part 1, Fire Pump #1 starts when Fire Water Header pressure lowers to 85 psig. Fire Pump #2 will start when Fire Water Header pressure lowers to 75 psig (following a time delay). Consequently, ONLY Fire Pump #1 is running. For Part 2, After firefighting activities are complete, the running Fire Pump(s) can be shutdown LOCALLY ONLY.

C. Incorrect but plausible. For Part 1, the candidate could incorrectly conclude that BOTH Fire Water Pumps start when fire water header pressure falls below 85 psig.

D. Incorrect but plausible. For Part 1, the candidate could incorrectly conclude that BOTH Fire Water Pumps start when fire water header pressure falls below 85 psig.

Question Number: 38

Tier: 2 Group 2

K/A: 086 Fire Protection System (FPS) – A1.05

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with Fire Protection System operating the controls including: FPS lineups

Importance Rating: 2.9

10 CFR Part 55: 41.5 / 45.5

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know how the FPS lineup changes during firefighting activities when fire water pressure lowers to a minimum of 80 psig.

SRO Justification: N/A

Technical References: NOS05FIRPRO-09 (FIRE PROTECTION SYSTEM)

Proposed references to be provided: None

Learning Objective: NOS05FIRPRO-09 (FIRE PROTECTION SYSTEM)

7. Identify and describe the local controls, indications, and alarms associated with the Fire Protection System, including:
   a. The location of Fire Protection System local controls and indications.
   b. The function of Fire Protection System local controls and indications.
   c. The plant and conditions or permissives required Fire Protection System local controls to perform their intended function.
   d. The setpoints associated with the Fire Protection System local alarms.

Cognitive Level:

Higher	X
Lower	

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

39 **Points: 1.00**

Given:

- A Temporary Administrative requirement needs to be implemented for the next 30 days

In accordance with OP-AA-102-104 (PERTINENT INFORMATION PROGRAM), which ONE of the following completes the statement below?

The ___(1)___ or their designees will prepare and approve a ___(1)___ Order to address the Temporary Administrative requirement .

.

	(1)	**(2)**
A.	Operations Manager	Standing
B.	Operations Manager	Daily
C.	Shift Manager	Standing
D.	Shift Manager	Daily

Answer: A

Answer Explanation

DISTRACTOR ANALYSIS:

A. **Correct.** IAW OP-AA-102-104 (PERTINENT INFORMATION PROGRAM), Operations Management will issue a Standing Order to address the Temporary Administrative requirement. This is because the Temporary Administrative Requirement will last for 30 days. Daily Orders are typically valid for one day, weekend or holiday period.

B. Incorrect but plausible. Part 1 is correct. For Part 2, the candidate could incorrectly conclude that a requirement with a relative short finite date will be controlled as a Daily Order.

C. Incorrect but plausible. For Part 1, the SM has responsibilities per the PERTINENT INFORMATION PROGRAM. Consequently, the candidate could incorrectly conclude that the SM does have the responsibility to prepare and approve Standing and Daily Orders. Part 2 is correct.

D. Incorrect but plausible. For Part 1, the SM has responsibilities per the PERTINENT INFORMATION PROGRAM. Consequently, the candidate could incorrectly conclude that the SM does have the responsibility to prepare and approve Standing and Daily Orders. For Part 2, the candidate could incorrectly conclude that a requirement with a relative short finite date will be controlled as a Daily Order.

Question Number: 39

Tier: 3 Group _____

K/A: G2.1.15

Knowledge of administrative requirements for temporary management directives, such as standing orders, night orders, Operations memos, etc.

Importance Rating: 2.7

10 CFR Part 55: 41.10 / 45.12

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know the requirement for a standing order IAW OP-AA-102-104 (PERTINENT INFORMATION PROGRAM)

SRO Justification: N/A

Technical References: OP-AA-102-104 (PERTINENT INFORMATION PROGRAM)

Proposed references to be provided: None

Learning Objective: None

Cognitive Level:

Higher _____
Lower X

Question Source

New X
Modified Bank _____
Bank _____

Question History:

Comments:

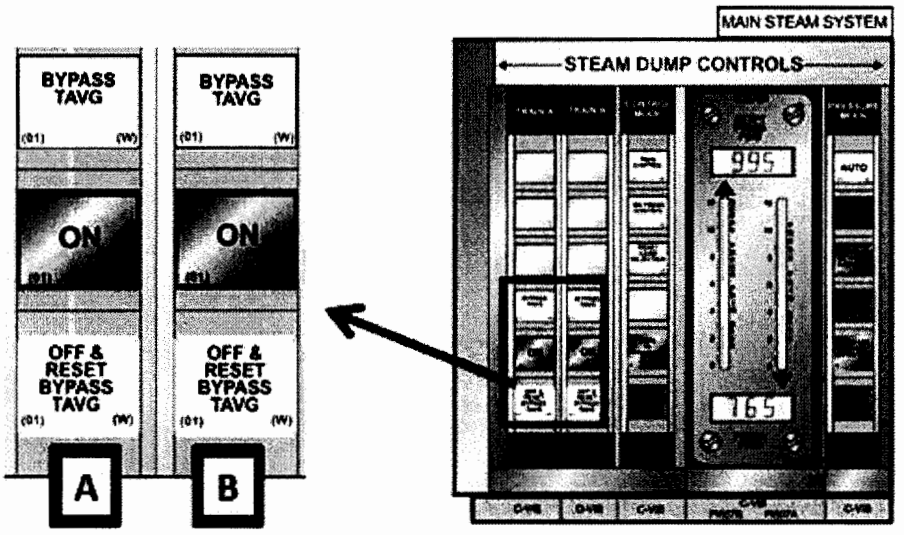
40 **Points: 1.00**

Given:

- Unit 2 is at 60% Reactor Power and stable

At time 10:00:00

- 23TB40 (Turbine Bypass Valve) goes fully open



Which ONE of the following completes the statements below?

With 23TB40 open, Reactor power will rise ___(1)___ 60% power.

Considering **ONLY** the Steam Dump system design, 23TB40 will **FIRST** close when depressing BEZEL "OFF & RESET BYPASS TAVG" Pushbutton(s) ___(2)___.

	(1)	**(2)**
A.	and stabilize above	A **and** B
B.	and stabilize above	A **or** B
C.	then stabilize back at	A **and** B
D.	then stabilize back at	A **or** B

Answer: B

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. Part 1 is correct. For Part 2, if the Steam Dump Train A and Train B Arming / Blocking solenoids were in parallel, depressing BEZEL Pushbutton(s) A AND B would be the minimum pushbutton manipulation(s) required to close 23TB40. Additionally, for safety systems, only 1 train is required to be operating for the safety system to perform its safety function. Consequently, the operator could apply this logic to the steam dumps and incorrectly conclude that BOTH Trains of Steam Dumps need to be taken to OFF for 23TB40 to close.

B. **Correct.** For Part 1, ALL TB40 Turbine Valves are rated for 5.33% flow each. Consequently, when 23TB40 fails open, steam flow from the SGs will increase by 5.33% and reactor Power will follow SG steam flow. Reactor power will then rise to approximately 65.33%. For Part 2, since the Steam Dump Train A and Train B Arming / Blocking solenoids are in series, depressing BEZEL Pushbutton(s) A OR B will remove air pressure to 23TB40 which will cause the valve to close.

C. Incorrect but plausible. For Part 1, the candidate could incorrectly determine that with the turbine controls initially set at 60% that the turbine control valves will automatically throttle to maintain reactor power / turbine load at 60%. Consequently, the candidate would then incorrectly conclude that when 23TB40 opens that the turbine control valves will automatically throttle more closed which would return reactor power back to the original setting of 60%. For Part 2, if the Steam Dump Train A and Train B Arming / Blocking solenoids were in parallel, depressing BEZEL Pushbutton(s) A AND B would be the minimum pushbutton manipulation(s) required to close 23TB40. Additionally, for safety systems, only 1 train is required to be operating for the safety system to perform its safety function. Consequently, the operator could apply this logic to the steam dumps and incorrectly conclude that BOTH Trains of Steam Dumps need to be taken to OFF for 23TB40 to close.

D. Incorrect but plausible. For Part 1, the candidate could incorrectly determine that with the turbine controls initially set at 60% that the turbine control valves will automatically throttle to maintain reactor power / turbine load at 60%. Consequently, the candidate would then incorrectly conclude that when 23TB40 opens that the turbine control valves will automatically throttle more closed which would return reactor power back to the original setting of 60%. Part 2 is correct.

Question Number: 40

Tier: 3 Group _____

K/A: G2.1.28

Knowledge of the purpose and function of major system components and controls.

Importance Rating: 4.1

10 CFR Part 55: 41.7

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know the function of the Steam Dump OFF & Reset Bypass TAVG push buttons on the Steam Dump controller.

SRO Justification: N/A

Technical References: NOS05STDUMP-12 (STEAM DUMP SYSTEM)

Proposed references to be provided: None

Learning Objective: NOS05STDUMP-12 (STEAM DUMP SYSTEM)

10. Identify and describe the Control Room controls, indications, and alarms associated with the Steam Dump System, including:
    a. The Control Room location of Steam Dump System control bezels and indications.
    b. The function of each Steam Dump System Control Room control and indication.
    c. The effect each Steam Dump System control has upon Steam Dump System components and operation.
    d. The plant conditions or permissives required for Steam Dump System Control Room controls to perform their intended function.
    e. The setpoints associated with the Steam Dump System control room alarms.

Cognitive Level:

Higher	X
Lower	

Question Source

New	
Modified Bank	
Bank	X

Question History: LOR 2018 BI-ANNUAL WRITTEN EXAM

Comments:

41 **Points: 1.00**

Given:

- Unit 2 is at 100% Reactor Power
- Troubleshooting activities are in progress on CVCS
- Per the troubleshooting plan, some CVCS valves will be manipulated in order to gather data

In accordance with MA-AA-716-004 (CONDUCT OF TROUBLESHOOTING), which ONE of the following completes the statements below?

Manipulation of CVCS valves to support the troubleshooting plan is considered a(n) ___(1)___ activity.

___(2)___ is responsible for ensuring the Troubleshooting Log adequately addresses the potential to affect core reactivity.

	(1)	**(2)**
A.	Intrusive	Operations
B.	Intrusive	Engineering
C.	Non-Intrusive	Operations
D.	Non-Intrusive	Engineering

Answer: A

Answer Explanation

DISTRACTOR ANALYSIS:

A. **Correct.** For Part 1 and IAW MA-AA-716-004 (CONDUCT OF TROUBLESHOOTING), Manipulation of CVCS valves to support the troubleshooting plan is considered a(n) Intrusive activity. For Part 2 and IAW MA-AA-716-004 (CONDUCT OF TROUBLESHOOTING), Operations is responsible for ensuring the Troubleshooting Log adequately addresses the potential to affect core reactivity.

B. Incorrect but plausible. Part 1 is correct. For Part 2, Engineering has responsibilities per MA-AA-716-004 and Engineering performs Unreviewed Safety Questions screenings. Consequently, the candidate could incorrectly conclude that Engineering would do a USQ screening as part of the troubleshooting plan and the USQ screening would include a reactivity analysis.

C. Incorrect but plausible. For Part1, since the valve manipulations do not include breaking into the system, the candidate could incorrectly conclude that manipulation of valves is considered a Non-Intrusive Activity. Part 1 is correct.

D. Incorrect but plausible. For Part1, since the valve manipulations do not include breaking into the system, the candidate could incorrectly conclude that manipulation of valves is considered a Non-Intrusive Activity. For Part 2, Engineering has responsibilities per MA-AA-716-004 and Engineering performs Unreviewed Safety Questions screenings. Consequently, the candidate could incorrectly conclude that Engineering would do a USQ screening as part of the troubleshooting plan and the USQ screening would include a reactivity analysis.

Question Number: 41

Tier: 3 Group _____

K/A: G2.2.20

Knowledge of the process for managing troubleshooting activities.

Importance Rating: 2.6

10 CFR Part 55: 41.10 / 43.5 / 45.13

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know Troubleshooting requirements in accordance with MA-AA-716-004 (CONDUCT OF TROUBLESHOOTING)

SRO Justification: N/A

Technical References: MA-AA-716-004 (CONDUCT OF TROUBLESHOOTING)

Proposed references to be provided: None

Learning Objective: None

Cognitive Level:

Higher	
Lower	X

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

42 **Points: 1.00**

In accordance with Unit 2 LCO 3.7.1.1 (TURBINE CYCLE SAFETY VALVES), which ONE of the following completes the statements below?

The Main Steam Line Code Safety Valves will start to open when main steam line pressure **FIRST** exceeds ___(1)___ psig.

The purpose of LCO 3.7.1.1 is to limit the secondary system pressure to within 110% of its design pressure ___(2)___.

A. **(1)** 1100
(2) **ONLY**

B. **(1)** 1100
(2) and to protect against overpressurization of the Reactor Coolant Pressure boundary

C. **(1)** 1070
(2) **ONLY**

D. **(1)** 1070
(2) and to protect against overpressurization of the Reactor Coolant Pressure boundary

Answer: D

Answer Explanation

DISTRACTOR ANALYSIS:

A. For Part 1, MSSVs have 5 different setpoints and 1100 psig is the second lowest setpoint for 21-24MS14s. For Part 2, the candidate could not recognize that the MSSVs also protect against overpressurization of the Reactor Coolant Pressure boundary.

B. Incorrect but plausible. For Part 1, MSSVs have 5 different setpoints and 1100 psig is the second lowest setpoint for 21-24MS14s . Part 2 is correct.

C. Incorrect but plausible. Part 1 is correct. For Part 2, the candidate could not recognize that the MSSVs also protect against overpressurization of the Reactor Coolant Pressure boundary.

D. **Correct.** For Part 1 and IAW LCO 3.7.1.1, the Main Steam Line Code Safety Valves will start to open when main steam line pressure FIRST exceeds 1070 psig. For Part 2 and IAW LCO 3.7.1.1, The purpose of LCO 3.7.1.1 is to limit the secondary system pressure to within 110% of its design pressure and to protect against overpressurization of the Reactor Coolant Pressure boundary.

Question Number: 42

Tier: 3 Group _____

K/A: G2.2.25

Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits

Importance Rating: 3.2

10 CFR Part 55: 41.5 / 41.7 / 43.2

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know LCO 3.7.1.1 bases information.

SRO Justification: N/A

Technical References: Technical Specifications (LCO 3.7.1.1)

Proposed references to be provided: None

Learning Objective: NOS05MSTEAM-12 (MAIN STEAM SYSTEM)

11. Given a Technical Specification Limiting Condition for Operation (LCO), explain its basis.

Cognitive Level:

Higher	
Lower	X

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

43 **Points: 1.00**

Given:

At time 11:45

- 21 CVCS MT is being released in accordance with S2.OP-SO.WL-0001 (RELEASE OF RADIOACTIVE LIQUID WASTE FROM 21 CVCS MONITOR TANK)

At time 12:00

- 2FR1064 (RADWASTE OVERBOARD DISCH FLOW RECORDER) becomes inoperable

Which ONE of the following completes the statements below?

The release will be via ___(1)___.

At **12:00**, the crew ___(2)___ REQUIRED to stop the release of 21 CVCS MT.

	(1)	**(2)**
A.	SW **ONLY**	is
B.	SW **ONLY**	is **NOT**
C.	SW to CW	is
D.	SW to CW	is **NOT**

Answer: C

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. For Part 1, the candidate could incorrectly that the release will be via SW ONLY. Part 2 is correct.

B. Incorrect but plausible. For Part 1, the candidate could incorrectly that the release will be via SW ONLY. For Part 2, the candidate could fail to recognize that 2FR1064 (RADWASTE OVERBOARD DISCH FLOW RECORDER) is required for the liquid waste release. Consequently, the candidate could incorrectly conclude that at 1200, the crew is NOT required to stop the release

C. **Correct.** For Part 1 and IAW S2.OP-SO.WL-0002, during the release, 21 CVCS MT is being released via SW to CW. For Part 2 and IAW S2.OP-SO.WL-0001 Step 5.5.8, the crew is required to stop the release when 2FR1064 (RADWASTE OVERBOARD DISCH FLOW RECORDER) becomes inoperable.

D. Incorrect but plausible. Part 1 is correct. For Part 2, the candidate could fail to recognize that 2FR1064 (RADWASTE OVERBOARD DISCH FLOW RECORDER) is required for the liquid waste release. Consequently, the candidate could incorrectly conclude that at 1200, the crew is NOT required to stop the release.

Question Number: 43

Tier: 3 Group _____

K/A: G2.3.11

Ability to control radiation releases

Importance Rating: 3.2

10 CFR Part 55: 41.11 / 43.4 / 45.10

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must be able to control a radioactive liquid release IAW S2.OP-SO.WL-0001 (RELEASE OF RADIOACTIVE LIQUID WASTE FROM 21 CVCS MONITOR TANK).

SRO Justification: N/A

Technical References: S2.OP-SO.WL-0001 (RELEASE OF RADIOACTIVE LIQUID WASTE FROM 21 CVCS MONITOR TANK)

Proposed references to be provided: None

Learning Objective: NOS05WASLIQ-09 (RADIOACTIVE LIQUID WASTE SYSTEM)

5. Draw a one-line diagram of the Radioactive Liquid Waste System which indicates the following:
   a. Major Radioactive Liquid Waste System Components
   b. Major Radioactive Liquid Waste System Flowpaths
   c. Waste liquid overboard through WL51

Cognitive Level:

Higher	
Lower	X

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

44 **Points: 1.00**

Given:

- An NEO has signed onto the appropriate RWP to perform work inside a **HIGH** Radiation Area

In accordance with RP-AA-4000 (Personnel Conduct in Radiologically Controlled Areas), which ONE of the following completes the statements below?

In order to ensure the dose limits of the RWP are not exceeded, RP-AA-4000 states that self-reading dosimeters should be read approximately every ___(1)___ minutes while working in a **HIGH** Radiation Area.

If an unexpected self-reading dosimeter comes into alarm, the NEO is **REQUIRED** to ___(2)___ and notify RP personnel.

	(1)	**(2)**
A.	30	go to a low dose area within the HRA
B.	30	exit the HRA immediately
C.	15	go to a low dose area within the HRA
D.	15	exit the HRA immediately

Answer: D

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. For Part 1, RP-AA-4000 states that self-reading dosimeters should be read approximately every 30 minutes while working in a Radiation Area. Consequently, the candidate could incorrectly conclude that self-reading dosimeters should always be read every 30 minutes. For Part 2, the candidate could incorrectly conclude that exiting the RA is not required until RP has verified the alarm is valid. Consequently, the candidate could incorrectly conclude that going to a low dose area and notifying RP is the required response IAW RP-AA-4000.

B. Incorrect but plausible. For Part 1, RP-AA-4000 states that self-reading dosimeters should be read approximately every 30 minutes while working in a Radiation Area. Consequently, the candidate could incorrectly conclude that self-reading dosimeters should always be read every 30 minutes. Part 2 is correct.

C. Incorrect but plausible. Part 1 is correct. For Part 2, the candidate could incorrectly conclude that exiting the RA is not required until RP has verified the alarm is valid. Consequently, the candidate could incorrectly conclude that going to a low dose area and notifying RP is the required response IAW RP-AA-4000.

D. **Correct.** For Part 1, RP-AA-4000 states that self-reading dosimeters should be read approximately every 15 minutes while working in a High Radiation Area. For Part 2, If an unexpected self-reading dosimeter comes into alarm, the NEO is REQUIRED to exit the area and notify RP personnel.

Question Number: 44

Tier: 3 Group _____

K/A: G2.3.7

Ability to comply with radiation work permit requirements during normal or abnormal conditions

Importance Rating: 3.6

10 CFR Part 55: 41.7 / 41.10 / 43.1 / 45.13

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know the requirements of working in a High Radiation Area in order to comply with an RWP IAW RP-AA-4000 (Personnel Conduct in Radiologically Controlled Areas).

SRO Justification: N/A

Technical References: NOS05RADCON-05 (RADIATION PROTECTION PROGRAM)

Proposed references to be provided: None

Learning Objective: NOS05RADCON-05 (RADIATION PROTECTION PROGRAM)

6. In accordance with applicable station procedures:
   - b) Describe the following posting requirements, as well as any applicable restrictions:
     - i) Contaminated Area
     - ii) High Contamination Area
     - iii) Airborne Radioactivity Area
     - iv) Radiation Area
     - v) High Radiation Area
     - vi) Locked High Radiation Area
     - vii) Exclusion Area
     - viii) Very High Radiation Area

Cognitive Level:

Higher	
Lower	X

Question Source

New	
Modified Bank	
Bank	X

Question History: ILOT 1601 NRC RO Q44

Comments: # 3 OF 4 ALLOWABLE RO QUESTIONS randomly sampled from exam bank that was used on the last two Salem ILOT NRC Exams

45 **Points: 1.00**

Given:

- John Doe has received 1000 mrem routine cumulative TEDE this year
- A **SITE AREA EMERGENCY** has just been declared
- John Doe is preparing to go into an area to mitigate the casualty
    - The area has a general dose rate of 1000 mrem / hour

In accordance with RP-AA-203 (Exposure Control and Authorization) and NC.EP-EP.ZZ-0304 (OPERATIONAL SUPPORT CENTER (OSC) RADIATION PROTECTION RESPONSE), which ONE of the following completes the statement below?

John Doe can work in the area for a **MAXIMUM** of _____ minutes without exceeding his ADMINISTRATIVE dose limits for the year.

A. 60

B. 180

C. 210

D. 240

Answer: C

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. 60 Minutes would be the stay time if the candidate used the normal administrative limit of 2000 mrem.

B. Incorrect but plausible. 180 Minutes would be the stay time if the candidate incorrectly concluded that the administrative dose limit is automatically raised to 4000 mrem.

C. **Correct.** IAW RP-AA-203, the Administrative Dose Limit for routine work is 2000 mrem TEDE. When the Site Area Emergency is declared, then IAW NC.EP-EP.ZZ-0304, the administrative dose limit is automatically raised to 4500 mrem. Consequently, the worker can work (4500 – 1000) / 1000 = 3.5 hours or 210 minutes in the area.

D. Incorrect but plausible. 240 Minutes would be the stay time if the candidate incorrectly concluded that the administrative dose limit is automatically raised to 5000 mrem.

Question Number: 45

Tier: 3 Group _____

K/A: G2.3.4

Knowledge of radiation exposure limits under normal or emergency conditions

Importance Rating: 3.9

10 CFR Part 55: 41.7 / 41.10 / 43.2 / 45.13

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know the administrative dose limit during a Site Area Emergency to calculate a stay time.

SRO Justification: N/A

Technical References: RP-AA-203
NC.EP-EP.ZZ-0304

Proposed references to be provided: None

Learning Objective: NOS05RADCON-05 (RADIATION PROTECTION PROGRAM)

2. List the following external radiation exposure limits, in accordance with Station Procedures, 10CFR20, and Reg. Guide 8.13:

   a) 10CFR20 dose limits for external, internal, and total whole body, skin, extremities, and eyes, as well as extension limits and requirements

   b) Administrative dose control levels for Radiation Workers, as well as extension limits and requirements

   c) Reg. Guide 8.13 limits and administrative dose control levels for Declared Pregnant Women

   d) 10CFR20 and Administrative limits for members of the general public and minors

Cognitive Level:

Higher X
Lower _____

Question Source

New X
Modified Bank _____
Bank _____

Question History:

46 **Points: 1.00**

Given:

- The crew is monitoring the Critical Safety Functions
- The following parameters are observed:
  - Containment Pressure is 5.8 psig
  - Power Range NI is 2.1 % with an IR SUR of (+) 0.1 DPM
  - RCS Subcooling is (-) 15 °F
  - **ALL** RCPs are stopped
  - 8 CETs are reading 750 °F
  - RVLIS Full Range is 41%
  - 21 SG NR Level is 10%, 22 SG NR Level is 7%, 22 SG NR Level is 8% and 24 SG NR Level is 9%
  - Total AFW flow to SGs is 0 LB / HR
  - **BOTH** Containment Spray Pumps are stopped
  - Containment Sump is 63%
  - R-44 Radiation is reading 5 R / HR

Which ONE of the following completes the statements below?

Based on the Functional Restoration Implementation Priority, the crew is required to **FIRST** address the challenge to _____.

A. Containment Environment

B. Shutdown Margin

C. Core Cooling

D. Heat Sink

Answer: D

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. The candidate could incorrectly analyze plant conditions and incorrectly determine Containment Environment must first be addressed.

B. Incorrect but plausible. The candidate could incorrectly analyze plant conditions and incorrectly determine Shutdown Margin must first be addressed.

C. Incorrect but plausible. The candidate could incorrectly analyze plant conditions and incorrectly determine Core Cooling.

D. **Correct.** IAW OP-AA-101-111-1003, CSF Hierarchy (high to low) is SHUTDOWN MARGIN, CORE COOLING, HEAT SINK, THERMAL SHOCK, CONTAINMENT ENVIRONMENT and COOLANT INVENTORY. Additionally, CFST Color Hierarchy (high to low) is red, purple, yellow, and green. Based on the plant conditions and IAW 2-EOP-CFST-1 the status trees are: Shutdown Margin (Purple), Core Cooling (Purple), Core Cooling (Red) and Containment Environment (Green). Consequently, the crew is required to FIRST address the challenge to Heat Sink.

Question Number: 46

Tier: 3 Group _____

K/A: G2.4.22

Knowledge of the bases for prioritizing safety functions during abnormal/emergency operations

Importance Rating: 3.6

10 CFR Part 55: 41.7 / 41.10 / 43.5 / 45.12

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know the bases of how to prioritize implementing Functional Restoration Procedures (part of the EOP network) by actually prioritizing FRP implementation IAW OP-AA-101-111-1003 (Use Of Procedures).

SRO Justification: N/A

Technical References: NOS05PROCED-08 (USE AND CONTROL OF PROCEDURES)
2-EOP-CFST-1 (CRITICAL SAFETY FUNCTION STATUS TREES)

Proposed references to be provided: None

Learning Objective: NOS05PROCED-08 (USE AND CONTROL OF PROCEDURES)

5. Implement Rules Of Usage For Emergency Operating Procedures

Cognitive Level:

Higher X
Lower _____

Question Source

New X
Modified Bank _____
Bank _____

Question History:

Comments:

47 **Points: 1.00**

Which ONE of the following completes the statements below?

In accordance with Unit 2 LCO 3.3.3.7 (ACCIDENT MONITORING INSTUMENTATION), 2PT-403 (RCS Pressure) and 2PT-405 (RCS Pressure) ___(1)___ credited as accident monitoring instrumentation.

2PT-403 and 2PT-405 provide input to the Pressurizer Overpressure Protection System (POPS) ___(2)___.

	(1)	(2)
A.	are	**ONLY**
B.	are	and to the RVLIS Electronics Cabinets
C.	are **NOT**	**ONLY**
D.	are **NOT**	and to the RVLIS Electronics Cabinets

Answer: B

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. Part 1 is correct. For part 2, the candidate could incorrectly conclude that 2PT-403 and 2PT-405 provide input to the Pressurizer Overpressure Protection System (POPS) ONLY.

B. **Correct.** For Part 1and IAW LCO 3.3.3.7 (ACCIDENT MONITORING INSTUMENTATION), 2PT-403 (RCS Narrow Range Pressure) and 2PT-405 (RCS Wide Range Pressure) are credited as accident monitoring instrumentation. For Part 2, 2PT-403 and 2PT-405 provide input to the Pressurizer Overpressure Protection System (POPS) and to the RVLIS Electronics Cabinets.

C. Incorrect but plausible. The candidate could incorrectly conclude that In accordance with Unit 2 LCO 3.3.3.7 (ACCIDENT MONITORING INSTUMENTATION), 2PT-403 (RCS Pressure) and 2PT-405 (RCS Pressure) are not credited as accident monitoring instrumentation. For part 2, the candidate could incorrectly conclude that 2PT-403 and 2PT-405 provide input to the Pressurizer Overpressure Protection System (POPS) ONLY.

D. Incorrect but plausible. The candidate could incorrectly conclude that In accordance with Unit 2 LCO 3.3.3.7 (ACCIDENT MONITORING INSTUMENTATION), 2PT-403 (RCS Pressure) and 2PT-405 (RCS Pressure) are not credited as accident monitoring instrumentation. Part 2 is correct.

Question Number: 47

Tier: 3 Group _____

K/A: G2.4.3

Ability to identify post-accident instrumentation

Importance Rating: 3.7

10 CFR Part 55: 41.6 / 45.4

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must be able to identify post-accident instrumentation IAW Technical Specifications.

SRO Justification: N/A

Technical References: Technical Specifications (LCO 3.3.3.7)

Proposed references to be provided: None

Learning Objective: NOS05TECHSPEC-12 (TECHNICAL SPECIFICATIONS)

10. Describe the general component and parameter categories that are addressed by Technical Specification Sections 3/4.1 through 3/4.12.

Cognitive Level:

Higher	
Lower	X

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

48 **Points: 1.00**

Given:

- Unit 2 is at 100% Reactor Power and stable

At time 02:00:00

- The crew enters S2.OP-AB.CR-0001 (Control Room Evacuation)
- The Reactor Trip has been confirmed
- The Turbine has been successfully tripped

In accordance with S2.OP-AB.CR-0001, which ONE of the following completes the statements below?

S2.OP-AB.CR-0001 (Control Room Evacuation) is implemented when the Control Room is evacuated as the result of a(n) ___(1)___.

If Control Room conditions permit, the crew ___(2)___ **INITIATE** a Main Steam Isolation prior to evacuating the Control Room.

	(1)	**(2)**
A.	security event	will
B.	security event	will **NOT**
C.	uncontrolled fire in the Control Room	will
D.	uncontrolled fire in the Control Room	will **NOT**

Answer: A

Answer Explanation

DISTRACTOR ANALYSIS:

A. **Correct.** For Part 1, S2.OP-AB.CR-0001 (Control Room Evacuation) is implemented when the Control Room is evacuated as the result of a security event. For Part 2 and IAW S2.OP-AB.CR-0001, the crew will initiate a Main Steam Isolation as part of the immediate actions.

B. Incorrect but plausible. Part 1 is correct. For Part 2, EOP-TRIP-1 only requires initiating a Main Steam Line Isolation if the turbine can not be tripped. Since the Turbine was successfully tripped, the candidate could incorrectly conclude that initiating a Main Steam isolation is not required per S2.OP-AB.CR-0001.

C. Incorrect but plausible. For Part 1, there is another Abnormal Procedure that deals with a control evacuation due to a fire. Consequently, the candidate could incorrectly conclude that S2.OP-AB.CR-0001 (Control Room Evacuation) is implemented when the Control Room is evacuated as the result of an uncontrolled fire in the control room. Part 2 is correct.

D. Incorrect but plausible. For Part 1, there is another Abnormal Procedure that deals with a control evacuation due to a fire. Consequently, the candidate could incorrectly conclude that S2.OP-AB.CR-0001 (Control Room Evacuation) is implemented when the Control Room is evacuated as the result of an uncontrolled fire in the control room. For Part 2, EOP-TRIP-1 only requires initiating a Main Steam Line Isolation if the turbine can not be tripped. Since the Turbine was successfully tripped, the candidate could incorrectly conclude that initiating a Main Steam isolation is not required per S2.OP-AB.CR-0001.

Question Number: 48

Tier: 3 Group _____

K/A: G2.4.11

Knowledge of abnormal condition procedures

Importance Rating: 4.0

10 CFR Part 55: 41.10 / 43.5 / 45.13

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must be have knowledge of the immediate actions of an Abnormal Procedure (S2.OP-AB.CR-0001 (Control Room Evacuation)).

SRO Justification: N/A

Technical References: S2.OP-AB.CR-0001

Proposed references to be provided: None

Learning Objective: NOS05ABCR01-05 (Control Room Evacuation)

2 Describe, in general terms, the actions taken in S1/S2.OP-AB.CR-0002(Q) and the bases for the actions

Cognitive Level:

Higher	
Lower	X

Question Source

New	
Modified Bank	X
Bank	

Question History: Modified from ILOT 1601 AUDIT RO Q69

Comments:

49 **Points: 1.00**

Given:

- Unit 1 is at 100% Reactor Power and stable

At time 10:00:00

- A valid AUTOMATIC reactor trip signal is generated by RPS but the Reactor Trip Breakers do **NOT** open

At time 10:00:03

- The Immediate Actions of 1-EOP-TRIP-1 (Reactor Trip Or Safety Injection) have been initiated

In accordance with 1-EOP-TRIP-1, which ONE of the following completes the statements below?

At **10:00:03**, the RO will attempt to manually trip the Reactor by **FIRST** actuating the ___(1)___ .

If the Reactor can **NOT** be tripped using the Trip Breaker BEZELS or the Reactor Trip Switches, the crew's **NEXT** action will be to ___(2)___.

	(1)	**(2)**
A.	Trip Breaker BEZELS	initiate Rod Insertion
B.	Trip Breaker BEZELS	open Breakers 1E6D and 1G6D
C.	Reactor Trip Switches (Pistol Grips)	initiate Rod Insertion
D.	Reactor Trip Switches (Pistol Grips)	open Breakers 1E6D and 1G6D

Answer: D

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. For Part 1 and IAW EOP-TRIP-1, actuating the Reactor Trip BEZELS is the second option to trip the reactor manually. Consequently, the candidate could incorrectly conclude that using the BEZELS is the actual first required immediate action. For Part 2, initiating Rod Insertion is part of the Immediate Actions of EOP-TRIP-1 (Step 2.2). Consequently, given the plant conditions, the candidate could incorrectly the crew's NEXT action is to initiate Rod insertion.

B. Incorrect but plausible. For Part 1 and IAW EOP-TRIP-1, actuating the Reactor Trip BEZELS is the second option to trip the reactor manually. Consequently, the candidate could incorrectly conclude that using the BEZELS is the actual first required immediate action. Part 2 is correct.

C. Incorrect but plausible. Part 1 is correct. For Part 2, initiating Rod Insertion is part of the Immediate Actions of EOP-TRIP-1 (Step 2.2). Consequently, given the plant conditions, the candidate could incorrectly the crew's NEXT action is to initiate Rod insertion.

D. **Correct.** 1-EOP-TRIP-1 IMMEDIATE ACTIONS are expected to be performed from memory and in order. For Part 1and IAW 1-EOP-TRIP-1 Step 1, the RO will attempt to trip the Reactor manually by FIRST actuating the Reactor Trip Switches. For Part 2 and IAW 1-EOP-TRIP-1 Step 1, if the Reactor can NOT be tripped using the Trip Breaker BEZELS or the Reactor Trip Switches, the crew's NEXT action will be to open Breakers 1E6D and 1G6D.

Question Number: 49

Tier: 1 Group 1

K/A: EPE: 007 Reactor Trip-EK2.02

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

Importance Rating: 2.6

10 CFR Part 55: 41.7 / 45.7

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know the procedural guidance of EOP-TRIP-1 (Reactor Trip Or Safety Injection) when the Reactor Trip Breakers fail to open.

SRO Justification: N/A

Technical References: 1-EOP-TRIP-1 (Reactor Trip Or Safety Injection)

Proposed references to be provided: None

Learning Objective: NOS05TRP001-08 (REACTOR TRIP OR SAFETY INJECTION)

16 State the Immediate Actions of EOP-TRIP-1

Cognitive Level:

Higher	
Lower	X

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

50 **Points: 1.00**

Given:

- Unit 2 is at 100% Reactor Power
- 23 Charging Pump is in service
- Charging Flow is 88 GPM

At time 11:25:00

- Pressurizer pressure starts to lower due to 2PR3 (PZR SAFET VLV) seat leakage

At time 11:27:00 (2 Minutes Later)

- Pressurizer pressure is 2100 psig and lowering

At time 11:29:00 (4 Minutes Later)

- Pressurizer pressure is 1910 psig and lowering
- An AUTOMATIC Reactor Trip occurs

Which ONE of the following completes the statement below?

At **11:27**, Charging Flow is _____ 88 GPM.

At **11:29**, the FIRST- OUT alarm indicates that the Reactor tripped on ___(2)___.

	(1)	**(2)**
A.	greater than	O**T**ΔT
B.	greater than	O**P**ΔT
C.	less than	O**T**ΔT
D.	less than	O**P**ΔT

Answer: A

Answer Explanation

DISTRACTOR ANALYSIS:

A. **Correct.** For Part 1, with seat leakage of the PZR Safety Valve, actual PZR level will lower below program level. Consequently, the master flow controller will automatically raise charging flow in an effort to raise PZR level. Consequently, at 11:27, Charging Flow is greater than 88 GPM (the original charging flow prior to the malfunction). For Part 2, the OTΔT Reactor Trip setpoint is variable and will be automatically lowered as RCS pressure lowers. Consequently, at 11:29, the FIRST- OUT alarm indicates that the Reactor tripped on OTΔT.

B. Incorrect but plausible. Part 1 is correct. For Part 2, OPΔT is also a variable Reactor Trip setpoint that changes as AFD changes. Consequently, the candidate could incorrectly conclude that the OPΔT Reactor Trip setpoint changes as RCS pressure changes. This would then cause the candidate to incorrectly conclude that at 11:29, the FIRST- OUT alarm indicates that the Reactor tripped on OPΔT.

C. Incorrect but plausible. For Part 1, since the PZR Safety Valves are located on top of the PZR, the candidate could incorrectly conclude that PZR level actually rises due to the PZR Safety Valve seat leakage. When PZR level rises above program level, the master flow controller will actually lower charging flow below 88 GPM (the original charging flow prior to the malfunction). Part 2 is correct.

D. Incorrect but plausible. For Part 1, since the PZR Safety Valves are located on top of the PZR, the candidate could incorrectly conclude that PZR level actually rises due to the PZR Safety Valve seat leakage. When PZR level rises above program level, the master flow controller will actually lower charging flow below 88 GPM (the original charging flow prior to the malfunction). For Part 2, OPΔT is also a variable Reactor Trip setpoint that changes as AFD changes. Consequently, the candidate could incorrectly conclude that the OPΔT Reactor Trip setpoint changes as RCS pressure changes. This would then cause the candidate to incorrectly conclude that at 11:29, the FIRST- OUT alarm indicates that the Reactor tripped on OPΔT.

Question Number: 50

Tier: 1 Group 1

K/A: APE: 008 Pressurizer (PZR) Vapor Space Accident-AK2.03

Knowledge of the interrelations between the Pressurizer Vapor Space Accident and the following: Controllers and positioners

Importance Rating: 2.5

10 CFR Part 55: 41.7 / 45.7

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must understand how the master flow controller responds at the initial stages of a Vapor Space LOCA

SRO Justification: N/A

Technical References: NOS05FLUNCY-09 (LICENSED OPERATOR FLUENCY LIST)

NOSO5CVCS00-16 (CHEMICAL AND VOLUME CONTROL SYSTEM)

Proposed references to be provided: None

Learning Objective: NOSO5CVCS00-16 (CHEMICAL AND VOLUME CONTROL SYSTEM)

Given plant conditions, relate the Chemical and Volume Control System and the following:

a. Pressurizer Level Control System

Cognitive Level:

Higher X
Lower _____

Question Source

New X
Modified Bank _____
Bank _____

Question History:

Comments:

51 **Points: 1.00**

Given

- A Reactor Trip and Safety Injection has occurred due to a Small Break LOCA on Unit 1
- The crew is controlling SG Levels in accordance with 1-EOP-LOCA-1 (Loss Of Reactor Coolant) Step 3.
- Containment Pressure is 2.5 psig and slowly rising

In accordance with 1-EOP-LOCA-1, which ONE of the following completes the statement below?

The crew is REQUIRED to maintain Total Feed Flow greater than 22E04 LB / HR until_____.

A. **ALL** SG NR Levels are greater than a **MINIMUM** of 9%

B. **ALL** SG NR Levels are greater than a **MINIMUM** of 15%

C. **AT LEAST ONE** SG NR Level is greater than a **MINIMUM** of 9%

D. **AT LEAST ONE** SG NR Level is greater than a **MINIMUM** of 15%

Answer: C

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. The candidate correctly determine containment as NOT adverse but then incorrectly conclude 1-EOP-LOCA-1 Step 3 requires Total Feed Flow greater than 22E04 LB / HR until ALL SG NR Levels are greater than the non-adverse limit of 9%.

B. Incorrect but plausible. The candidate incorrectly determine containment as adverse and also incorrectly conclude 1-EOP-LOCA-1 Step 3 requires Total Feed Flow greater than 22E04 LB / HR until ALL SG NR Levels are greater than the MINIMUM adverse limit of 15%.

C. **Correct.** Per 1-EOP-LOCA-1 Step 3, "MAINTAIN TOTAL FEED FLOW GREATER THAN 22E04 LB/HR LEVEL UNTIL AT LEAST ONE SG NR IS GREATER THAN 9% (15% ADVERSE)". Based on containment pressure, containment is NOT considered adverse. Consequently, the crew is REQUIRED to maintain Total Feed Flow greater than 22E04 LB / HR until AT LEAST ONE SG NR Level is greater than a MINIMUM of 9%.

D. Incorrect but plausible. The candidate incorrectly determine containment as adverse but then correctly recall that 1-EOP-LOCA-1 Step 3 requires Total Feed Flow greater than 22E04 LB / HR until AT LEAST ONE SG NR Level is greater than the MINIMUM adverse limit of 15%.

Question Number: 51

Tier: 1 Group 1

K/A: EPE: 009 Small Break LOCA-EK2.03

Knowledge of the interrelations between the small break LOCA and the following: S/Gs

Importance Rating: 3.0

10 CFR Part 55: 41.7 / 45.7

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must understand feed flow requirements to the SGs during a small break LOCA (1-EOP-LOCA-1)

SRO Justification: N/A

Technical References: 1-EOP-LOCA-1

Proposed references to be provided: None

Learning Objective: NOS05LOCA01-05 (LOSS OF REACTOR COOLANT AND LOSS OF COOLANT ACCIDENT ANALYSIS)

8. Determine the indications that are monitored to ensure proper system/component operation for each step in EOP-LOCA-1.

Cognitive Level:

Higher X
Lower _____

Question Source

New X
Modified Bank _____
Bank _____

Question History:

Comments:

52 **Points: 1.00**

Given:

- A LBLOCA is in progress at Unit 2

At time 10:00

- The crew has just reset SI and **ALL** SECs in accordance with 2-EOP-LOCA-3 (Transfer To Cold Leg Recirculation)

At time 10:05

- 2A 4KV Vital Bus de-energizes due to a **SPURIOUS** isolation from off-site power

In accordance with 2-EOP-LOCA-3, which ONE of the following completes the statements below?

At **10:00** and after resetting **ALL** of the SECs, the crew ___(1)___ **REQUIRED** to ensure that the 230V control centers are reset.

After the 2A EDG loading is completed, the ECCS pumps on 2A 4KV Vital Bus ___(2)___.

	(1)	**(2)**
A.	is	will start AUTOMATICALLY
B.	is	must be MANUALLY started
C.	is **NOT**	must be MANUALLY started
D.	is **NOT**	will start AUTOMATICALLY

Answer: B

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. Part 1 is correct. For Part 2, the candidate could incorrectly conclude that after the blackout loading is completed, the ECCS pumps and safeguards equipment on 2A 4KV Vital Bus will start AUTOMATICALLY (since a LBLOCA is in progress).

B. **Correct.** For Part 1, at 10:00 and after resetting ALL of the SECs, the crew is required to MANUALLY reset the 230V control centers (even though at 20 minutes after SEC actuation, this lockout is automatically removed). For Part 2, if a blackout loading sequence occurs on any 4 KV vital bus with SI previously reset, then ECCS pumps and other safeguards equipment will not automatically start and must be manually operated if required since different equipment is started on a SEC blackout loading than on a safeguards loading.

C. Incorrect but plausible. For Part 1, the candidate may fail to recognize that after resetting ALL of the SECs, the crew is required to MANUALLY reset the 230V control centers. Part 2 is correct.

D. Incorrect but plausible. For Part 1, the candidate may fail to recognize that after resetting ALL of the SECs, the crew is required to MANUALLY reset the 230V control centers. For Part 2, the candidate could incorrectly conclude that after the blackout loading is completed, the ECCS pumps and safeguards equipment on 2A 4KV Vital Bus will start AUTOMATICALLY (since a LBLOCA is in progress).

Question Number: 52

Tier: 1 Group 1

K/A: EPE: 011 Large Break LOCA-EK2.02

Knowledge of the interrelations between the following and a Large Break LOCA: Pumps

Importance Rating: 2.6

10 CFR Part 55: 41.7 / 45.7

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know the interrelationship between a LBLOCA and the ECCS pumps following SI being reset and a blackout on one 4KV Vital Bus (IAW 2-EOP-LOCA-3)

SRO Justification: N/A

Technical References: 2-EOP-LOCA-3 (Transfer To Cold Leg Recirculation)

Proposed references to be provided: None

Learning Objective: NOS05LCA3U2-04 (TRANSFER TO COLD LEG RECIRCULATION)

4 Determine the indications that are monitored to ensure proper system/component operation for each step in 2-EOP-LOCA-3.

Cognitive Level:

Higher X
Lower _____

Question Source

New _____
Modified Bank _____
Bank X

Question History: ILOT 1601 AUDIT RO Q51

Comments:

53 **Points: 1.00**

Given:

- Unit 1 is at 25% Reactor Power and rising due to a plant startup

At time 17:00:00

- 13 RCP shaft shears

Which ONE of the following completes the statements below?

13 RCS Loop ΔT will ___(1)___ and 13 SG NR Level will **INITIALLY** ___(2)___.

	(1)	**(2)**
A.	lower	shrink
B.	lower	swell
C.	rise	shrink
D.	rise	swell

Answer: A

Answer Explanation

DISTRACTOR ANALYSIS:

A. **Correct.** When 13 RCP shaft shears, Loop 13 RCS flow will go to minimum and 13 SG steam flow will lower significantly. This will cause 13 RCS Loop ΔT to lower and 13 SG NR level will initially shrink.

B. Incorrect but plausible. Part 1 is correct. For Part 2, the candidate could not understand the shrink / swell concept and incorrectly conclude that 13 SG will initially swell.

C. Incorrect but plausible. For Part 1, the candidate could misunderstand the thermodynamic processes in play with unbalance flow in an RCS loop and incorrectly determine that 13 RCS Loop ΔT will rise. Part 2 is correct.

D. Incorrect but plausible. For Part 1, the candidate could misunderstand the thermodynamic processes in play with unbalance flow in an RCS loop and incorrectly determine that 13 RCS Loop ΔT will rise. For Part 2, the candidate could not understand the shrink / swell concept and incorrectly conclude that 13 SG will initially swell.

Question Number: 53

Tier: 1 Group 1

K/A: APE : 015/017 Reactor Coolant Pump (RCP) Malfunctions-AK1.04

Knowledge of the operational implications of the following concepts as they apply to Reactor Coolant Pump Malfunctions (Loss of RC Flow): Basic steady state thermodynamic relationship between RCS loops and S/Gs resulting from unbalanced RCS flow

Importance Rating: 2.9

10 CFR Part 55: 41.8 / 41.10 / 45.3

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know the operational implications (RCS Loop ΔT and SG Shrink / Swell) as they apply to a loss of 13 RCP with the Reactor at 25% power.

SRO Justification: N/A

Technical References: NOS05RCPUMP-13
NOS05STMGEN-14

Proposed references to be provided: None

Learning Objective: NOS05RCPUMP-13 (REACTOR COOLANT PUMP)

4 Given plant conditions, relate the Reactor Coolant Pump with the following:

a. Chemical and Volume Control System

b. Component Cooling Water System

c. Service Water System

d. Containment Isolation Signal

e. Reactor Coolant Drain Tank

f. Reactor Coolant System

NOS05STMGEN-14

11: Summarize the differences between Unit 1 and Unit 2 Steam Generator, Steam Generator Blowdown and Drains System components, parameters, and operation

Cognitive Level:

Higher X
Lower _____

Question Source

New X
Modified Bank _____
Bank _____

Question History:

Comments:

54 **Points: 1.00**

Given:

- Unit 2 is at 100% Reactor Power and stable

At time 09:00

- 2LT-112 (VCT Level Transmitter) fails to 50%

At time 09:10

- An RCS leak of 15 gpm is observed

Which ONE of the following completes the statements below?

ACTUAL VCT level will lower _____.

A. and **CYCLE** between **14**% and **24**% due to the operation of the AUTOMATIC RCS Make-up controls

B. and **CYCLE** between **11**% and **24**% due to the operation of the AUTOMATIC RCS Make-up controls

C. and **STABILIZE** at approximately 3.57% as the Charging Pump suction AUTOMATICALLY swaps to the RWST

D. to **BELOW** 3.57% with the running Charging Pump eventually losing suction

Answer: D

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. This would be the correct answer if 2LT-114 had failed to 50% with an observed 15 gpm RCS leak.

B. Incorrect but plausible. This would be the correct answer if 2LT-114 had failed to 50% with an observed 15 gpm RCS leak and the candidate had incorrectly conclude that the AUTOMATIC Make-up started at 11% VCT Level (the VCT low level alarm setpoint)

C. Incorrect but plausible. This would be the correct answer if the candidate incorrectly concluded that the Charging Pump suction AUTOMATICALLY swaps to the RWST when 2LT-112 OR 2LT-114 read 3.57%.

D. **Correct.** With 2LT-112 failed at 50% and an observed 15 gpm RCS leak, the running charging pump will eventually lose suction as actual VCT lowers below 3.57%. There are two level transmitters on the VCT (LT-112 and LT-114). LT-112 controls the automatic make-up controls (starts at 14% and stops at 24%). With LT-112 failed at 50%, no automatic RCS Make-up is possible. Additionally, the Charging Pump suction AUTOMATICALLY swaps to the RWST only when BOTH LT-112 and LT-114 read 3.57%.

Question Number: 54

Tier: 1 Group 1

K/A: APE: 022 Loss of Reactor Coolant Makeup-AA1.08

Ability to operate and / or monitor the following as they apply to the Loss of Reactor Coolant Makeup: VCT level

Importance Rating: 3.4

10 CFR Part 55: 41.7 / 45.5 / 45.6

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know how VCT level will change when LT-112 Fails to 50% (causing a loss of RCS Make-up) coupled with an observed 15 gpm RCS leak.

SRO Justification: N/A

Technical References: NOS05CVCS00-17 (CHEMICAL AND VOLUME CONTROL SYSTEM)

Proposed references to be provided: None

Learning Objective: NOS05CVCS00-17 (CHEMICAL AND VOLUME CONTROL SYSTEM)

7: Identify and describe the local controls, indications, and alarms associated with the Chemical and Volume Control System, including:

a. The location of Chemical and Volume Control System local controls and indications.

b. The function of Chemical and Volume Control System local controls and indications.

c. The plant conditions or permissives required for Chemical and Volume Control System local controls to perform their intended function.

d. The setpoints associated with the Chemical and Volume Control System local alarms.

Cognitive Level:

Higher X
Lower _____

Question Source

New X
Modified Bank _____
Bank _____

Question History:

Comments:

55 **Points: 1.00**

Given:

- Unit 2 is at 100% Reactor Power

At time 15:00

- 2CC131 Console Alarm, "Discharge Flow Hi", actuates

At time 15:01

- The crew has completed the Alarm Response Procedure for the 2CC131 Console Alarm and has transitioned to S2.OP-AB.RCP-0001 (Reactor Coolant Pump Abnormality)

Which ONE of the following completes the statements below?

2CC131 (RCP THERMAL BARRIER VALVE) AUTOMATICALLY closed when CC flow from the RCP Thermal Barrier reached a **MINIMUM** of ___(1)___ gpm .

In accordance with S2.OP-AB.RCP-0001 CAS, the crew ___(2)___ required to secure **ALL** RCPs within 2 minutes.

	(1)	**(2)**
A.	145	is **NOT**
B.	145	is
C.	175	is **NOT**
D.	175	is

Answer: C

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. For Part 1, 145 gpm is lo flow alarm set point if CC131. Consequently, the candidate could incorrectly conclude that CC131 will automatically close when flow reaches a minimum of 145 gpm. Part 2 is correct.

B. Incorrect but plausible. For Part 1, 145 gpm is lo flow alarm set point if CC131. Consequently, the candidate could incorrectly conclude that CC131 will automatically close when flow reaches a minimum of 145 gpm. For Part 2, the candidate could incorrectly determine that RCP seal cooling has been lost and determine that in accordance with S2.OP-AB.RCP-0001 CAS, the crew is required to secure ALL RCPs within 2 minutes.

C. **Correct.** For Part 1, 2CC131 (RCP THERMAL BARRIER VALVE) AUTOMATICALLY closed when CC flow from the RCP Thermal Barrier reached a MINIMUM of 175 gpm. For Part 2 and IAW S2.OP-AB.RCP-0001 CAS, with only Thermal Barrier Component Cooling flows lost (RCP Injection Flow is normal), the crew is NOT required to secure ALL RCPs within 2 minutes.

D. Incorrect but plausible. Part 1 is correct. For Part 2, the candidate could incorrectly determine that RCP seal cooling has been lost and determine that in accordance with S2.OP-AB.RCP-0001 CAS, the crew is required to secure ALL RCPs within 2 minutes.

Question Number: 55

Tier: 1 Group 1

K/A: APE: 026 Loss of Component Cooling Water (CCW)-AA1.07

Ability to operate and / or monitor the following as they apply to the Loss of Component Cooling Water: Flow rates to the components and systems that are serviced by the CCWS; interactions among the components

Importance Rating: 2.9

10 CFR Part 55: 41.7 / 45.5 / 45.6

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must monitor (and determine) the CC Flow rate from RCP Thermal Barriers which causes CC131 to close (causing a loss of CC to the RCP Thermal barriers).

SRO Justification: N/A

Technical References: S2.OP-AR.ZZ-0011 Bezel 2CC131 ARP
S2.OP-AB.RCP-0001

Proposed references to be provided: None

Learning Objective: NOS05CCW000-12 (COMPONENT COOLING WATER)

16 Describe how the following components impact the Component Cooling Water System during normal and abnormal conditions:

d. Isolation/Control Valves

xi) CC-131, RCP Thermal Barrier Discharge Flow Control Valve

Cognitive Level:

Higher X
Lower _____

Question Source

New X
Modified Bank _____
Bank _____

Question History:

Comments:

56 **Points: 1.00**

Given:

- The crew is preparing to trip the reactor locally in accordance with 2-EOP-FRSM-1 (RESPONSE TO NUCLEAR POWER GENERATION) Step 8

Considering **ONLY** the following breakers:

1. Reactor Trip Breakers
2. Rod Drive MG Set Motor Breakers
3. Rod Drive MG Set Generator Breakers

Which ONE of the following completes the statements below?

When directed from the Control Room to locally TRIP the Reactor, the NEO will open _____.

A. 1 **ONLY**

B. 1 and 2 **ONLY**

C. 2 and 3 **ONLY**

D. 1, 2 and 3

Answer: D

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. Since opening any one set of breakers (1, 2 or 3) will trip the reactor, any combination of 1,2 or 3 is plausible.

B. Incorrect but plausible. Since opening any one set of breakers (1, 2 or 3) will trip the reactor, any combination of 1,2 or 3 is plausible.

C. Incorrect but plausible. Since opening any one set of breakers (1, 2 or 3) will trip the reactor, any combination of 1,2 or 3 is plausible.

D. **Correct.** IAW 2-EOP-FRSM-1 Step 8, the crew will direct the NEOs to open the Reactor Trip Breakers, the Rod Drive MG Set Motor Breakers and the Rod Drive MG Set Generator Breakers.

Question Number: 56

Tier: 1 Group 1

K/A: 029 Anticipated Transient Without Scram (ATWS)-G2.4.35

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

Importance Rating: 3.8

10 CFR Part 55: 41.10 / 43.5 / 45.13

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know what local AO actions will be performed to trip the reactor during an ATWS.

SRO Justification: N/A

Technical References: 2-EOP-FRSM-1

Proposed references to be provided: None

Learning Objective: NOS05FRSM00-04 (EOP-FRSM-1 AND 2 RESPONSE TO NUCLEAR POWER GENERATION)

5 Describe the basis for each step, caution, and note in procedures:

A. Response To Nuclear Power Generation

Cognitive Level:

Higher	
Lower	X

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

57 **Points: 1.00**

Given:

- Unit 1 is at 8% Reactor Power
- 11 SGFP is in service
- 11 CN Pump and 12 CN Pump are in service

At time 18:00

- 11 SGFP Trips
- ALL SG NR levels are 33% and lowering
- The crew enters S1.OP-AB.CN-0001 (MAIN FEEDWATER/CONDENSATE SYSTEM ABNORMALITY)

In accordance with S1.OP-AB.CN-0001, which ONE of the following completes the statements below?

The crew will _____.

A. TRIP the Reactor AND GO TO 1-EOP-TRIP-1 (Reactor Trip or Safety Injection)

B. REDUCE Reactor Power to less than 4%. then START 11 and 12 AFW Pumps

C. REDUCE Reactor Power to less than 4%. then START 12 SGFP

D. IMMEDIATELY start 12 SGFP

Answer: B

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. There are multiple criteria in the S1.OP-AB.CN-0001 CAS that required a reactor trip. Consequently, the candidate could misapply the plant conditions to the CAS and incorrectly conclude that a Reactor Trip is required.

B. **Correct.** Since Reactor Power is less than P-10 (10% Power), then IAW S1.OP-AB.CN-0001 Steps 3.2, 3.3, 3.14, 3.15, 3.16 and 3.17, the crew will REDUCE Reactor Power to less than 4%, then START 11 and 12 AFW Pump.

C. Incorrect but plausible. Since 12 SGFP is available and has a greater feed capacity than the AFW system, the candidate could incorrectly conclude that the 12 SGFP should be started once Reactor power is lowered below 4%.

D. Incorrect but plausible. Since 12 SGFP is available and has a greater feed capacity than the AFW system and SG levels are lowering, the candidate could incorrectly conclude that the 12 SGFP should be started immediately.

Question Number: 57

Tier: 1 Group 1

K/A: APE: 054 Loss of Main Feedwater (MFW)- AA2.03

Ability to determine and interpret the following as they apply to the Loss of Main Feedwater (MFW): Conditions and reasons for AFW pump startup

Importance Rating: 4.1

10 CFR Part 55: 43.5 / 45.13

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must analyze plant conditions and determine when to start the AFW pumps following a 11 SGFP trip (when Reactor Power is less than P-10) IAW S1.OP-AB.CN-0001 (MAIN FEEDWATER/CONDENSATE SYSTEM ABNORMALITY)

SRO Justification: N/A

Technical References: S1.OP-AB.CN-0001

Proposed references to be provided: None

Learning Objective: NOS05ABCN01-06 (MAIN FEEDWATER/CONDENSATE SYSTEM ABNORMALITY)

1. Describe the operation of the following system as applied to AB.CN-0001:
    a. Full flow demineralizer operation
    b. Heater string bypass valve operation (CN-47)
    c. Feedwater control valves (BF-19 and BF-40)
    d. Main feed pump trips
    e. Main feed pump speed control
        1) Include effects on discharge pressure
    f. ADFWCS system

Cognitive Level:

Higher	X
Lower	

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

58 **Points: 1.00**

Given:

- Unit 2 is in MODE 3 preparing to do a plant startup
- The Electrical Systems Operator has notified Unit 2 that the Orchard 500 KV Line (5021) and the New Freedom 500KV Line (5024) will be unavailable starting at 15:00 for a duration of 6 hours

At time 15:00

- Unit 2 has been isolated from the Orchard 500 KV Line (5021) and the New Freedom 500KV Line (5024)
- The 500 KV Salem-Hope Creek Tie-Line (5037) is still available to Unit 2

Considering **ONLY** the following actions below:

1. Demonstrate the OPERABILITY of the remaining independent A.C. circuit by performing Surveillance Requirement 4.8.1.1.1.a **within 1 hour**
2. Demonstrate the OPERABILITY of three diesel generators by performing Surveillance Requirement 4.8.1.1.2.a.2 **within 1 hour**
3. **Immediately** suspend all operations involving positive reactivity changes

Which ONE of the following completes the statements below?

At **15:00** and in accordance with Unit 2 LCO 3.8.1.1 (A.C. Sources – Operating), the crew must perform action(s) _____.

A. 1 **ONLY**

B. 2 **ONLY**

C. 2 and 3 **ONLY**

D. 1, 2 and 3

Answer: A

Answer Explanation

DISTRACTOR ANALYSIS:

A. **Correct.** Based on the question stem and at 1500, the crew must perform LCO 3.8.1.1 Required Action A (With an independent A.C. circuit of the above required A.C. electrical power sources inoperable). The only 1 hour or less required action per LCO 3.8.1.(a.1) is to demonstrate the OPERABILITY of the remaining independent A.C. circuit by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour.

B. Incorrect but plausible. LCO 3.8.1.1 and LCO 3.8.1 2 (ELECTRICAL POWER SYSTEMS SHUTDOWN) have required actions that are consistent with Actions 2 and 3 contained in the question stem. Action 2 would be required within 8 hours if two of the above required independent A.C. circuits inoperable (LCO 3.8.1.1(D)). Action 3 would be required if the Unit was in Mode 5 & 6 and with one of the above minimum required A.C. electrical power sources not OPERABLE. Consequently, any distractor containing Action 2 or Action 3 is plausible.

C. Incorrect but plausible. See B Distractor Analysis

D. Incorrect but plausible. See B Distractor Analysis

Question Number: 58

Tier: 1 Group 1

K/A: APE: 056 Loss of Offsite Power-G2.2.39

Knowledge of less than or equal to one hour Technical Specification action statements for systems

Importance Rating: 3.9

10 CFR Part 55: 41.7 / 41.10 / 43.2 / 45.13

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate know the 1 hour or less T.S. action statements during a partial loss of offsite power to Unit 2 while in MODE 3.

SRO Justification: N/A

Technical References: Unit 2 LCO 3.8.1.1

Proposed references to be provided: None

Learning Objective: NOS05500KV-12(500KV ELECTRICAL SYSTEM)

10. Given a situation dealing with 500KV Electrical System operability, examine the situation and apply the appropriate Technical Specification action.

Cognitive Level:

Higher	
Lower	X

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

59 **Points: 1.00**

Given:

- Unit 2 is at 100% Reactor Power

At time 16:00

- OHA B-2, "2A 125 VDC CNTRL BUS VOLT LO" actuates
- 2A Vital 125 VDC Bus voltage is reading 0 VDC on 2RP9

Considering **ONLY** the following equipment malfunctions below:

1. #1 SGFP Emergency Oil Pump loses power
2. Main Turbine Emergency Oil Pump loses power
3. 2A EDG is **NOT** available for start

Which ONE of the following completes the statements below?

With a confirmed 2A Vital 125 VDC Bus voltage of 0 VDC, Unit 2 will experience equipment malfunction(s) _____.

A. 2 **ONLY**

B. 3 **ONLY**

C. 1 and 2 **ONLY**

D. 2 and 3 **ONLY**

Answer: B

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. All of the equipment malfunctions can be caused by a loss of a portion of the DC Power System (250 VDC, 125 VDC or 28 VDC). Consequently, all of the distractors are plausible.

B. **Correct.** When OHA B-2, "2A 125 VDC CNTRL BUS VOLT LO" actuates, the only affected malfunction is that 2A EDG is not available for start.

C. Incorrect but plausible. All of the equipment malfunctions can be caused by a loss of a portion of the DC Power System (250 VDC, 125 VDC or 28 VDC). Consequently, all of the distractors are plausible.

D. Incorrect but plausible. All of the equipment malfunctions can be caused by a loss of a portion of the DC Power System (250 VDC, 125 VDC or 28 VDC). Consequently, all of the distractors are plausible.

Question Number: 59

Tier: 1 Group 1

K/A: APE: 058 Loss of DC Power - AA2.03

Ability to determine and interpret the following as they apply to the Loss of DC Power: DC loads lost; impact on ability to operate and monitor plant systems

Importance Rating: 3.5

10 CFR Part 55: 43.5 / 45.13

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must be able to determine the DC Loads lost / impact on plant equipment following a Loss of 2A 125 VDC Bus.

SRO Justification: N/A

Technical References: S2.OP-AR.ZZ-0002, Alarm B-2

Proposed references to be provided: None

Learning Objective: NOS05DCELEC-09 (DC ELECTRICAL SYSTEMS)

14. Given a DC Electrical System failure, predict the effect of the DC Electrical System failure on the following: (License Operator and STA only)

    a. Emergency Diesel Generators

    b. Components using DC control power.

Cognitive Level:

Higher X
Lower _____

Question Source

New X
Modified Bank _____
Bank _____

Question History:

Comments:

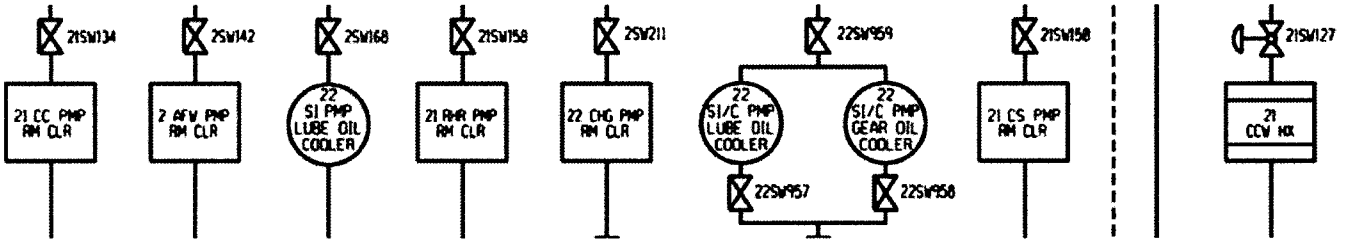
60 **Points: 1.00**

Given:

- Unit 2 is at 100% Reactor Power with Service Water in its normal summer alignment

At time 16:00

- Service Water pressure to the following Service Water loads are lowering:



Which ONE of the following completes the statements below?

Assuming there is a leak on the piping **CLOSEST** to the affected Service Water loads (causing the low Service Water pressure), then the leak is _____.

A. downstream of 2SW26 (TURB AREA SW MOV)

B. downstream of **22**SW22 (NUCLEAR HEADER)

C. downstream of **21**SW22 (NUCLEAR HEADER)

D. between **21**SW23 (NUCLEAR HEADER TIE VLV) an **22**SW23 (NUCLEAR HEADER TIE VLV)

Answer: C

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. Since all of the distractors contain piping associated with the SW system, then all of the distractors are plausible.

B. Incorrect but plausible. Since all of the distractors contain piping associated with the SW system, then all of the distractors are plausible.

C. **Correct.** The affected SW loads are all cooled from the 21 SW Nuclear Header. Consequently, the leak is downstream 21SW22.

D. Incorrect but plausible. Since all of the distractors contain piping associated with the SW system, then all of the distractors are plausible.

Question Number: 60

Tier: 1 Group 1

K/A: APE: 062 Loss of Nuclear Service Water- A2.02

Ability to determine and interpret the following as they apply to the Loss of Nuclear Service Water: The cause of possible SWS loss

Importance Rating: 2.9

10 CFR Part 55: 43.5 / 45.13

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must analyze lowering pressure in the SW system and then determine the cause of the loss of SW.

SRO Justification: N/A

Technical References: 205342-SIMP

Proposed references to be provided: None

Learning Objective: NOS05SW0NUC-14 (SERVICE WATER – NUCLEAR HEADER)

14. Draw a one-line diagram of the Service Water – Nuclear Header System which indicates the following:

    a. Major Service Water – Nuclear Header System Components

    i) Nuclear Service Water Headers

    ii) Containment Fan Coil Units

    iii) Diesel Generator Jacket Water and Lube Oil Coolers

    iv) Safety Related Chillers

    v) Component Cooling Heat Exchangers

    vi) Safety Related Pump Room Coolers

    vii) Safety Related Pump Oil Coolers

    viii) Emergency Control Air Compressors

    ix) CFCU/SW Accumulators

    x) Header isolation valves and major component control valves.

Cognitive Level:

Higher	X
Lower	

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

61 **Points: 1.00**

Given:

- Unit 1 and Unit 2 are **BOTH** at 100% Reactor Power

At time 20:00

- S1.OP-AB.CA-0001 (LOSS OF CONTROL AIR) and S2.OP-AB.CA-0001 (LOSS OF CONTROL AIR) are entered due to a large Station Air leak

In accordance with S1.OP-AB.CA-0001 and S2.OP-AB.CA-0001, which ONE of the following completes the statements below?

The crews will MANUALLY start the 1 Emergency Control Air Compressor and 2 Emergency Control Air Compressor when the 1A/1B/2A/2B Control Air Headers lower to a **MAXIMUM** of ___(1)___ psig.

Ensuring proper operation of the BF19s (Main Feedwater Control Valves) ___(2)___ a reason for MANUALLY starting the Emergency Air Compressors in S1.OP-AB.CA-0001 and S2.OP-AB.CA-0001.

	(1)	**(2)**
A.	100	is **NOT**
B.	100	is
C.	88	is **NOT**
D.	88	is

Answer: C

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. For Part 1, 100 psig is CA pressure at which the remaining Station Air Compressor is started IAW S1/S2.OP-AB.CA-0001. Consequently, the candidate could incorrectly conclude that the crews will MANUALLY start the 1 Emergency Control Air Compressor and 2 Emergency Control Air Compressor when the 1A/1B/2A/2B Control Air Headers lower to a MINIMUM of 100 psig. Part 2 Is correct.

B. Incorrect but plausible. For Part 1, 100 psig is CA pressure at which the remaining Station Air Compressor is started IAW S1/S2.OP-AB.CA-0001. Consequently, the candidate could incorrectly conclude that the crews will MANUALLY start the 1 Emergency Control Air Compressor and 2 Emergency Control Air Compressor when the 1A/1B/2A/2B Control Air Headers lower to a MINIMUM of 100 psig. For Part 2, proper operation of AOVs is a reason to start the ECACs. However, check valves in the CA system prevent the ECACs from supplying the BF19s. Consequently, the candidate could incorrectly conclude that the reason for MANUALLY starting the Emergency Air Compressors is to ensure proper operation of the BF19s.

C. **Correct.** For Part 1 and IAW S1.OP-AB.CA-0001 and S2.OP-AB.CA-0001, the crews will MANUALLY start the 1 Emergency Control Air Compressor and 2 Emergency Control Air Compressor when the 1A/1B/2A/2B Control Air Headers lower to a MINIMUM of 88 psig. For Part 1 and IAW S1.OP-AB.CA-0001 and S2.OP-AB.CA-0001, ensuring proper operation of the BF19s (Main Feedwater Control Valves) is NOT a reason for MANUALLY starting the Emergency Air Compressors in S1.OP-AB.CA-0001 and S2.OP-AB.CA-0001

D. Incorrect but plausible. Part 1 is correct. For Part 2, proper operation of AOVs is a reason to start the ECACs. However, check valves in the CA system prevent the ECACs from supplying the BF19s. Consequently, the candidate could incorrectly conclude that the reason for MANUALLY starting the Emergency Air Compressors is to ensure proper operation of the BF19s.

Question Number: 61

Tier: 1 Group 1

K/A: APE: 065 Loss of Instrument Air-AK3.04

Knowledge of the reasons for the following responses as they apply to the Loss of Instrument Air: Cross-over to backup air supplies

Importance Rating: 3.0

10 CFR Part 55: 41.5,41.10 / 45.6 / 45.13

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know the reason for starting the ECACs (a source of backup air supply) during a Loss of Station / Control Air IAW S1.OP-AB.CA-0001 (LOSS OF CONTROL AIR) and S2.OP-AB.CA-0001 (LOSS OF CONTROL AIR)

SRO Justification: N/A

Technical References: S1.OP-AB.CA-0001 (LOSS OF CONTROL AIR) and S2.OP-AB.CA-0001 (LOSS OF CONTROL AIR)

Proposed references to be provided: None

Learning Objective: NOS05ABCA01-07 (LOSS OF CONTROL AIR)

3. Given a set of initial plant conditions:
   - A. Determine the appropriate abnormal procedure.
   - B. Describe the plant response to actions taken in the abnormal procedure.
   - C. Describe the final plant condition that is established by the abnormal procedure

Cognitive Level:

Higher	
Lower	X

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

62 **Points: 1.00**

Given:

- Unit 2 is MODE 3
- The crew is performing S2.OP-AB.GRID-0001 (ABNORMAL GRID)
- The voltages on the 500 KV Lines are as follows:

Orchard (5021)	New Freedom (5024)	Salem-Hope Creek Tie (5037)
492 KV	494 KV	497 KV

Which ONE of the following completes the statements below?

In accordance with S2.OP-AB.GRID-0001 CAS _____.

A. **ONLY** the Orchard and New Freedom 500 KV Lines are inoperable

B. **ONLY** the Orchard 500 KV Line is inoperable

C. **ALL** of the 500 KV Lines are inoperable

D. **ALL** of the 500 KV Lines are OPERABLE

Answer: B

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. The candidate could misinterpret the 500 KV Voltages with the standard and incorrectly determine that ONLY the Orchard and New Freedom 500 KV Lines are inoperable.

B. **Correct.** IAW S2.OP-AB.GRID-0001 CAS, "IF AT ANY TIME one of the following conditions for the 500KV Switchyard exists OR is predicted to occur by PJM/ESOC upon the loss of either Salem Unit 1 OR Unit 2 Main Generator:

- Salem 500KV Switchyard voltage is less than 493KV, or
- Salem 500KV Switchyard voltage drops by greater than 2%.

THEN DECLARE the associated A.C. Circuit (Off-Site Power Source) inoperable. Based on the given plant conditions, ONLY the Orchard 500 KV Line is NOT OPERABLE.

C. Incorrect but plausible. The candidate could misinterpret the 500 KV Voltages with the standard and incorrectly determine that ALL 500 KV Lines are inoperable.

D. Incorrect but plausible. The candidate could misinterpret the 500 KV Voltages with the standard and incorrectly determine that ALL 500 KV Lines are OPERABLE .

Question Number: 62

Tier: 1 Group 1

K/A: 077 Generator Voltage and Electric Grid Disturbances-G2.2.37

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

Importance Rating: 3.6

10 CFR Part 55: 41.7 / 43.5 / 45.12

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must determine which A.C. Circuits (Safety-Related Off-Site Power Source) are inoperable per S2.OP-AB.GRID-0001 (ABNORMAL GRID)

SRO Justification: N/A.

Technical References: S2.OP-AB.GRID-0001

Proposed references to be provided: None

Learning Objective: NOS05ABGRID-12 (ABNORMAL GRID)

2. Describe, in general terms, the actions taken in S2.OP-AB.GRID-0001(Q) and the bases for the actions.

Cognitive Level:

Higher X
Lower _____

Question Source

New X
Modified Bank _____
Bank _____

Question History:

Comments:

63 **Points: 1.00**

Given:

- The crew has just transitioned to 1-EOP-LOCA-6 (LOCA Outside Containment)

In accordance with 1-EOP-LOCA-6, which ONE of the following completes the statements below?

As part of the leak isolation strategy, the crew is **MOST** concerned with the piping connecting the ___(1)___ System to the RCS.

The crew will monitor rising ___(2)___ to determine when the leak has been successfully isolated.

	(1)	**(2)**
A.	RHR	RCS pressure
B.	RHR	Pressurizer level
C.	SI	RCS pressure
D.	SI	Pressurizer level

Answer: A

Answer Explanation

DISTRACTOR ANALYSIS:

A. **Correct.** For Part 1 and IAW 1-EOP-LOCA-6, as part of the leak isolation strategy, the crew is MOST concerned with the piping connecting the RHR System to the RCS, since this piping is only rated to 600 psig (compared to the RCS Piping being rated to 2500 psig). For Part 2 and IAW 1-EOP-LOCA-6, the crew will monitor rising RCS Pressure to determine when the leak has been successfully isolated.

B. Incorrect but plausible. Part 1 is correct. For Part 2, since ECCS flow is injecting water into the core during performance of 1-EOP-LOCA-6, RCS inventory will increase once the leak has been isolated. An increase in RCS inventory can be measured by rising PZR level. Consequently, the candidate could incorrectly conclude that 1-EOP-LOCA-6 monitors rising PZR level as a determination that the leak has been successfully isolated.

C. Incorrect but plausible. For Part 1, since the SI Piping / pumps are also outside of containment and connected to the RCS, the candidate could incorrectly conclude that LOCA-6 is most concerned with the piping connecting the SI system to the RCS. Part 1 is correct.

D. Incorrect but plausible. For Part 1, since the SI Piping / pumps are also outside of containment and connected to the RCS, the candidate could incorrectly conclude that LOCA-6 is most concerned with the piping connecting the SI system to the RCS. For Part 2, since ECCS flow is injecting water into the core during performance of 1-EOP-LOCA-6, RCS inventory will increase once the leak has been isolated. An increase in RCS inventory can be measured by rising PZR level. Consequently, the candidate could incorrectly conclude that 1-EOP-LOCA-6 monitors rising PZR level as a determination that the leak has been successfully isolated.

Question Number: 63

Tier: 1 Group 1

K/A: WE04 LOCA Outside Containment

Knowledge of the reasons for the following responses as they apply to the (LOCA Outside Containment): RO or SRO function within the control room team as appropriate to the assigned position, in such a way that procedures are adhered to and the limitations in the facilities license and amendments are not violated

Importance Rating: 3.6

10 CFR Part 55: 41.5 / 41.10, 45.6, 45.13

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know the reason for the leak isolation strategy IAW 1-EOP-LOCA-6 (LOCA Outside Containment). Implementing the leak isolation strategy contained in LOCA-6 is an RO function within the control room which assures LOCA-6 is adhered to and the limitations in the facilities license and amendments are not violated.

SRO Justification: N/A

Technical References: 1-EOP-LOCA-6 (LOCA OUTSIDE CONTAINMENT)

Proposed references to be provided: None

Learning Objective: NOS05LOCA06-03 (LOSS OF CONTROL AIR)

6. Given any step, caution, note, or Continuous Action Summary item for LOCA OUTSIDE CONTAINMENT, describe the basis

Cognitive Level:

Higher	
Lower	X

Question Source

New	
Modified Bank	X
Bank	

Question History: Modified from ILOT 1601 NRC RO 63

Comments:

64 **Points: 1.00**

Given:

- The crew is performing the Bleed and Feed Initiation Steps of 1-EOP-FRHS-1 (Response To Loss Of Secondary Heat Sink)
- 11 Charging Pump and 12 Charging Pump are the **ONLY** ECCS pumps running

Which ONE of the following completes the statements below?

The crew ___(1)___ proceed in 1-EOP-FRHS-1 and establish the required RCS Bleed Path.

If the crew can proceed in 1-EOP-FRHS-1 to establish an RCS Bleed path, then the crew will open ___(2)___.

	(1)	(2)
A.	can	**BOTH** PORVs **ONLY**
B.	can	**BOTH** PORVs **AND** all Reactor Head Vents simultaneously
C.	can **NOT**	**BOTH** PORVs **ONLY**
D.	can **NOT**	**BOTH** PORVs **AND** all Reactor Head Vents simultaneously

Answer: C

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. For Part 1, the candidate could misinterpret plant conditions and incorrectly determine that with the given conditions, FRHS-1 allows the crew to proceed and establish the required RCS Bleed Path. Part 2 is correct.

B. Incorrect but plausible. For Part 1, the candidate could misinterpret plant conditions and incorrectly determine that with the given conditions, FRHS-1 allows the crew to proceed and establish the required RCS Bleed Path. For Part 2, the Reactor Head Vents and the PORVs will both vent the RCS to the PRT. Consequently, the candidate could incorrectly conclude that 1-EOP-FRHS-1 requires ALL Reactor head Vents and BOTH PORVs to be opened as part of the RCS Bleed Path.

C. Incorrect but plausible. Part 1 is correct. For Part 2, the Reactor Head Vents and the PORVs will both vent the RCS to the PRT. Consequently, the candidate could incorrectly conclude that 1-EOP-FRHS-1 requires ALL Reactor head Vents and BOTH PORVs to be opened as part of the RCS Bleed Path.

D. **Correct.** For Part 1 and IAW 1-EOP-FRHS-1 Step 23, as long as 1 Charging Pump and 1 SI Pump are running, the crew will continue attempts to start the other Charging Pump and the SI Pump while establishing an RCS Bleed Path. Given the current plant conditions, the crew can NOT proceed in 1-EOP-FRHS-1 and establish the required RCS Bleed Path. For Part 2 and IAW 1-EOP-FRHS-1 Step 24, opening BOTH PORV ONLY is an allowable Bleed Path in accordance with 1-EOP-FRHS-1.

Question Number: 64

Tier: 1 Group 1

K/A: WE05 Loss of Secondary Heat Sink-EK1.3

Knowledge of the operational implications of the following concepts as they apply to the (Loss of Secondary Heat Sink): Annunciators and conditions indicating signals, and remedial actions associated with the (Loss of Secondary Heat Sink).

Importance Rating: 3.9

10 CFR Part 55: 41.8 / 41.10, 45.3

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know the operational implications (whether or not to establish an RCS Bleed Path) IAW 1-EOP-FRHS-1 (Response To Loss Of Secondary Heat Sink) based on the ECCS pump indications.

SRO Justification: N/A

Technical References: EOP-FRHS-1 (Response To Loss Of Secondary Heat Sink)

Proposed references to be provided: None

Learning Objective: NOS05FRHS00-02 (HEAT SINK FUNCTIONAL RESTORATION)

5 Describe the EOP mitigation strategy for the following:

A. Response to Loss of Secondary Heat Sink

Cognitive Level:

Higher	X
Lower	

Question Source

New	
Modified Bank	X
Bank	

Question History: Modified from ILOT 1601 NRC RO 64

Comments:

65 **Points: 1.00**

Given:

- The crew is preparing to perform the RCS Depressurization To Minimize Subcooling Steps of 1-EOP-LOCA-5 (Loss Of Emergency Recirculation)
- **ALL** RCPs are stopped
- PZR Level is 10%
- RCS Subcooling is 35 °F

At time 16:15:**00**

- The RCS depressurization has started

At time 16:15:**30** (30 seconds later)

- PZR Level is 45% and rising
- RCS Subcooling is 25 °F

In accordance with 1-EOP-LOCA-5, which ONE of the following completes the statements below?

At **16:15:00**, the crew used ___(1)___ to depressurize the RCS.

At **16:15:30**, there ___(2)___ indications that voiding is occurring in the upper head region.

	(1)	**(2)**
A.	AUX SPRAY	are **NOT**
B.	AUX SPRAY	are
C.	a PZR PORV	are **NOT**
D.	a PZR PORV	are

Answer: D

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. For Part 1, depressurizing the RCS using a PZR PORV will result in a loss of RCS inventory. The candidate may conclude that losing RCS inventory is not desirable and incorrectly conclude that the RCS will be depressurized using AUX SPRAY. For Part 2, the candidate may not understand the expected indications associated with voiding in the upper head region. Consequently, the candidate could incorrectly conclude that at 10:00:30, there are not indications that voiding is occurring in the upper head region.

B. Incorrect but plausible. For Part 1, depressurizing the RCS using a PZR PORV will result in a loss of RCS inventory. The candidate may conclude that losing RCS inventory is not desirable and incorrectly conclude that the RCS will be depressurized using AUX SPRAY. Part 2 is correct.

C. Incorrect but plausible. Part 1 is correct. For Part 2, the candidate may not understand the expected indications associated with voiding in the upper head region. Consequently, the candidate could incorrectly conclude that at 10:00:30, there are not indications that voiding is occurring in the upper head region.

D. **Correct.** For Part 1, IAW 1-EOP-LOCA-5 Step 24, with normal spray not available, the crew will depressurize the RCS using a PZR PORV. For Part 2, IAW 1-EOP-LOCA-5 Step 24, voiding in the upper head region will result in rapidly rising PZR Level. Since RCS Level has risen 35% in 30 seconds, there are indications that voiding is occurring in the upper head region.

Question Number: 65

Tier: 1 Group 1

K/A: W/E11 Loss of Emergency Coolant Recirculation-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.

Importance Rating: 3.7

10 CFR Part 55: 41.7 / 45.5 / 45.6

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know how to operate the PZR PORVs to properly depressurize the RCS to minimize subcooling (desired operating results) IAW 1-EOP-LOCA-5 (Loss Of Emergency Recirculation).

SRO Justification: N/A

Technical References: 1-EOP-LOCA-5 (Loss Of Emergency Recirculation)

Proposed references to be provided: None

Learning Objective: NOS05LOCA05-04 (LOSS OF EMERGENCY RECIRCULATION)

5 Determine the indications that are monitored to ensure proper system/component operation for each step in the EOP for LOSS OF EMERGENCY RECIRCULATION

Cognitive Level:

Higher X
Lower _____

Question Source

New _____
Modified Bank _____
Bank X

Question History: ILOT NRC 1601 RO 65

Comments: # 4 OF 4 ALLOWABLE RO QUESTIONS randomly sampled from exam bank that was used on the last two Salem ILOT NRC Exams (ES-401-6 #4 Requirements)

66 **Points: 1.00**

Given:

- A Reactor Trip and Safety Injection Actuation have occurred
- The 1C 4KV VITAL BUS is de-energized due to an electrical fault on the bus
- The 11 AFW Pump will **NOT** start
- The crew has just transitioned to 1-EOP-LOSC-2 (Multiple Steam Generator Depressurization)
- The RCS cooldown rate is 120 °F / HR

In accordance with 1-EOP-LOSC-2, which ONE of the following completes the statements below?

The crew ___(1)___ isolate steam to the 13 AFW Pump.

AFW flow will be controlled / reduced to ___(2)___.

	(1)	(2)
A.	will	maintain SG NR Levels less than 33%
B.	will	no less than 1.0E04 LB / HR to each SG
C.	will **NOT**	maintain SG NR Levels less than 33%
D.	will **NOT**	no less than 1.0E04 LB / HR to each SG

Answer: B

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. Part 1 is correct. For Part 2, if the RCS cooldown rate was less than 100 °F / HR, the crew will control AFW flow to maintain SG NR Levels less than 33%. Consequently, the candidate could incorrectly conclude that with the given plant conditions, AFW flow will be controlled to maintain SG NR Levels less than 33%.

B. **Correct.** For Part 1 and based on the question stem, ONLY 11 MDAFW Pump is not available. IAW 1-EOP-LOSC-2 Step 1, since the 13 AFW Pump is NOT the only source of AFW flow, steam will be isolated to the 13 AFW pump. For Part 2 and IAW 1-EOP-LOSC-2 Step 5, with RCS cooldown rate greater than 100 °F / HR, AFW flow will be reduced to no less than 1.0E04 LB / HR to each SG.

C. Incorrect but plausible. For Part 1, if NO MDAFW Pump was available, then 1-EOP-LOSC-2 requires steam to be isolated the 13 AFW Pump. Based on the plant conditions, the candidate could not recognize that 12 AFW Pump is available. This would cause the candidate to incorrectly deduce that steam will be isolated to the 13 AFW Pump. For Part 2, if the RCS cooldown rate was less than 100 °F / HR, the crew will control AFW flow to maintain SG NR Levels less than 33%. Consequently, the candidate could incorrectly conclude that with the given plant conditions, AFW flow will be controlled to maintain SG NR Levels less than 33%.

D. Incorrect but plausible. For Part 1, if NO MDAFW Pump was available, then 1-EOP-LOSC-2 requires steam to be isolated the 13 AFW Pump. Based on the plant conditions, the candidate could not recognize that 12 AFW Pump is available. This would cause the candidate to incorrectly deduce that steam will be isolated to the 13 AFW Pump. Part 2 is correct.

Question Number: 66

Tier: 1 Group 1

K/A: W/E12 Uncontrolled Depressurization of all Steam Generators-EK3.3

Knowledge of the reasons for the following responses as they apply to the (Uncontrolled Depressurization of all Steam Generators): Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations

Importance Rating: 3.5

10 CFR Part 55: 41.5 / 41.10, 45.6, 45.13

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know that the reason steam to the 13 AFW Pump is isolated IAW 1-EOP-LOSC-2 (Multiple Steam Generator Depressurization) is because at least one MDAFW Pump is available.

SRO Justification: N/A

Technical References: 1-EOP-LOSC-2 (Multiple Steam Generator Depressurization)

Proposed references to be provided: None

Learning Objective: NOS05LOCS02-03 (MULTIPLE SG DEPRESSURIZATION)

5 Given EOP-LOSC-2 and a set of plant conditions:

A. Determine a discrete path through the EOP

Cognitive Level:

Higher X
Lower _____

Question Source

New _____
Modified Bank X
Bank _____

Question History: Modified from ILOT 1601 NRC EXAM - RO Q66

Comments:

67 **Points: 1.00**

Which ONE of the following completes the statement below?

S2.OP-AB.ROD-0003 (CONTINUOUS ROD MOTION) entry conditions are met when rods withdraw ___(1)___ a **MINIMUM** of ___(1)___ steps at steady step conditions.

	(1)	**(2)**
A.	or insert	3
B.	or insert	2
C.	**ONLY**	3
D.	**ONLY**	2

Answer: A

Answer Explanation

DISTRACTOR ANALYSIS:

A. **Correct.** S2.OP-AB.ROD-0003 (CONTINUOUS ROD MOTION) entry conditions are met when rods withdraw or insert a MINIMUM of 3 steps at steady step conditions

B. Incorrect but plausible. Part 1 is correct. For Part 2, S2.OP-AB.ROD-0003 basis discusses that rods can step up to 2 steps as a result of process noise. Consequently, the candidate could incorrectly conclude that S2.OP-AB.ROD-0003 entry conditions are met when rods step a MINIMUM of 2 steps at steady step conditions.

C. Incorrect but plausible. For part 1, the candidate could incorrectly conclude that S2.OP-AB.ROD-0003 (CONTINUOUS ROD MOTION) entry conditions are met when rods withdraw ONLY. Part 2 is correct.

D. Incorrect but plausible. For part 1, the candidate could incorrectly conclude that S2.OP-AB.ROD-0003 (CONTINUOUS ROD MOTION) entry conditions are met when rods withdraw ONLY. For Part 2, S2.OP-AB.ROD-0003 basis discusses that rods can step up to 2 steps as a result of process noise. Consequently, the candidate could incorrectly conclude that S2.OP-AB.ROD-0003 entry conditions are met when rods step a MINIMUM of 2 steps at steady step conditions.

Question Number: 67

Tier: 1 Group 2

K/A: APE: 001 Continuous Rod Withdrawal-AA1.07

Ability to operate and / or monitor the following as they apply to the Continuous Rod Withdrawal: RPI

Importance Rating: 3.3

10 CFR Part 55: 41.7 / 45.5 / 45.6

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must monitor RPI to determine when S2.OP-AB.ROD-0003 (Continuous Rod Motion) entry conditions are met.

SRO Justification: N/A

Technical References: S2.OP-AB.ROD-0003 (Continuous Rod Motion)

Proposed references to be provided: None

Learning Objective: NOS05ABROD3-05 (Continuous Rod Motion)

2 Describe, in general terms, the actions taken in S2.OP-AB.ROD-0003(Q), in accordance with the Technical Bases Document

Cognitive Level:

Higher	
Lower	X

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

68 **Points: 1.00**

Given:

- The crew is performing S2.OP-AB.FUEL-0001 (FUEL HANDLING INCIDENT) due to a fuel incident inside containment
- The canal gate valve is open

In accordance with S2.OP-AB.FUEL-0001, which ONE of the following completes the statement below?

The crew ___(1)___ required to close the canal gate valve.

The canal gate valve can **ONLY** be **FULLY** closed with the fuel transfer cart ___(2)___.

	(1)	**(2)**
A.	is **NOT**	inside containment
B.	is **NOT**	in the Fuel handling Building
C.	is	inside containment
D.	is	in the Fuel handling Building

Answer: C

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. For Part 1, since the FHB ventilation and containment ventilation are designed to handle a fuel handling incident, the candidate could incorrectly conclude that S2.OP-AB.FUEL-0001 does not require the canal gate valve to be closed. Part 2 is correct.

B. Incorrect but plausible. For Part 1, since the FHB ventilation and containment ventilation are designed to handle a fuel handling incident, the candidate could incorrectly conclude that S2.OP-AB.FUEL-0001 does not require the canal gate valve to be closed. For Part 2, the candidate could incorrectly determine that the canal gate valve can ONLY be FULLY closed with the fuel transfer cart is inside the Fuel Handling Building.

C. **Correct.** For Part 1 and IAW S2.OP-AB.FUEL-0001, the canal gate valve will be closed for any fuel handling incident (Step 3.16). For Part 2, there is a mechanical interlock that allows the canal gate valve to be fully closed only when the fuel transfer cart is inside containment.

D. Incorrect but plausible. Part 1 is correct. For Part 2, the candidate could incorrectly determine that the canal gate valve can ONLY be FULLY closed with the fuel transfer cart is inside the Fuel Handling Building.

Question Number: 68

Tier: 1 Group 2

K/A: APE 036 Fuel Handling Incidents-AK3.02

Knowledge of the reasons for the following responses as they apply to the Fuel Handling Incidents: Interlocks associated with fuel handling equipment

Importance Rating: 2.9

10 CFR Part 55: 41.5/ 41.10 / 45.6 / 4

10 CFR 55.43.b N/A

K/A Match: K/A is matched because during a fuel handling incident, the canal gate valve must be closed and the valve has a mechanical interlock which only allows the valve to be fully closed when the cart is inside containment.

SRO Justification: N/A

Technical References: S2.OP-AB.FUEL-0001 (FUEL HANDLING INCIDENT)

Proposed references to be provided: None

Learning Objective: NOS05REFUEL-11 (REFUELING SYSTEM)

5 Outline the interlocks associated with the following Refueling System components:

a. Manipulator Crane Bridge and Trolley
b. Manipulator Crane Hoist and Gripper
c. Fuel Transfer System Conveyor Car
d. Fuel Transfer System Upender
e. Fuel Handling Crane

Cognitive Level:

Higher	
Lower	X

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

69 **Points: 1.00**

Given:

- The crew is performing S2.OP-AB.SG-0001 (STEAM GENERATOR TUBE LEAK) Step 3.37.B, "DEPRESSURIZE the RCS concurrently with cooldown AND MAINTAIN 20 to 40°F subcooling"
- The subcooling monitor is **NOT** functional

At time 15:00

- TAVG is 530 °F
- The Hottest CET is 540 °F
- RCS Pressure is 1200 psig

Based on information contained in Steam Tables, which ONE of the following completes the statement below?

At **15:00**, the RCS is subcooled by approximately _____ °F.

A. 25

B. 29

C. 35

D. 39

Answer: B

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. 25 is plausible if the candidate incorrectly determines TSAT for 1200 psig to be 565 °F and correctly uses the CET reading to calculate subcooling.. This would be done by incorrectly entering the steam tables at 1185 PSIA (1200 – 15 = 1185). Subcooling would then be calculated at 565 – 540 = 25 °F.

B. **Correct.** The candidate must first determine TSAT for 1200 psig. Since the steam tables are in PSIA, 1200 psig must be converted to PSIA. = (1200 + 15) = 1215 PSIA. Using steam tables (and interpolating) TSAT of 1200 PSIG is approximately 569 °F. Subcooling is based on the Hottest CET which is 540 °F. Subcooling = TSAT – Hottest CET = 569 – 540 = 29 °F.

C. Incorrect but plausible. 25 is plausible if the candidate incorrectly determines TSAT for 1200 psig to be 565 °F and incorrectly uses TAVG to calculate subcooling. This would be done by incorrectly entering the steam tables at 1185 PSIA (1200 – 15 = 1185). Subcooling would then be calculated at 565 – 530 = 35 °F.

D. Incorrect but plausible. 39 is plausible if the candidate correctly determines TSAT for 1200 psig = 569 °F bur use TAVG to calculate subcooling (569 – 530) = 39 °F.

Question Number: 69

Tier: 1 Group 2

K/A: APE: 037 Steam Generator (S/G) Tube Leak-AK1.01

Knowledge of the operational implications of the following concepts as they apply to Steam Generator Tube Leak: Use of steam tables

Importance Rating: 2.9

10 CFR Part 55: 41.8 / 41.10 / 45.3

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must use the steam tables to correctly calculate RCS subcooling IAW S2.OP-AB.SG-0001 (STEAM GENERATOR TUBE LEAK)

SRO Justification: N/A

Technical References: Steam Tables

Proposed references to be provided: None

Learning Objective: NOS05ABSGTL-05 (STEAM GENERATOR TUBE LEAK)

4 Given a set of initial plant conditions:

A. Determine the appropriate abnormal procedure

B. Describe the plant response to actions taken in the abnormal procedure

C. Describe the final plant condition that is established by the abnormal procedure

Cognitive Level:

Higher X
Lower _____

Question Source

New X
Modified Bank _____
Bank _____

Question History:

Comments:

70 **Points: 1.00**

Given:

- Unit 2 is at 100% Reactor Power

At time 15:00

- The crew is reducing turbine load at 2 % / min in an attempt to stabilize condenser backpressure in accordance with S2.OP-AB.COND-0001 (LOSS OF CONDENSER VACUUM)

In accordance with S2.OP-AB.COND-0001, which ONE of the following completes the statement below?

_____ is the **MINIMUM** load reduction rate at which a reactor trip is required.

A. 15

B. 10

C. 7.5

D. 5

Answer: D

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. Load reductions up to 15% / min are all within of the capability of rod control and steam dumps. Consequently, all of the distractors are plausible.

B. Incorrect but plausible. Load reductions up to 15% / min are all within of the capability of rod control and steam dumps. Consequently, all of the distractors are plausible.

C. Incorrect but plausible. Load reductions up to 15% / min are all within of the capability of rod control and steam dumps. Consequently, all of the distractors are plausible.

D. **Correct.** IAW S2.OP-AB.COND-0001 CAS, if the turbine load reduction rate needs to increase to a MINIMUM of 5 % / min to stabilize condenser backpressure, then the crew is REQUIRED to TRIP the Reactor.

Question Number: 70

Tier: 1 Group 2

K/A: APE: 051 Loss of Condenser Vacuum-AA2.02

Ability to determine and interpret the following as they apply to the Loss of Condenser Vacuum: Conditions requiring reactor and/or turbine trip

Importance Rating: 3.9

10 CFR Part 55: 43.5 / 45.13

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know the Reactor trip criteria during a Loss of Condenser Vacuum event (IAW S2.OP-AB.COND-0001)

SRO Justification: N/A

Technical References: S2.OP-AB.COND-0001

Proposed references to be provided: None

Learning Objective: NOS05ABCOND-05 (LOSS OF CONDENSER VACUUM)

4 Given a set of initial plant conditions:

A. Determine the appropriate abnormal procedure

B. Describe the plant response to actions taken in the abnormal procedure

C. Describe the final plant condition that is established by the abnormal procedure

Cognitive Level:

Higher	
Lower	X

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

71 **Points: 1.00**

Given:

- Unit 2 is at 100% Reactor Power and stable

At time 15:00:00

- The crew enters S2.OP-AB.CR-0001 (Control Room Evacuation)
- The Reactor Trip has been confirmed
- The Turbine has been successfully tripped

In accordance with S2.OP-AB.CR-0001, which ONE of the following completes the statements below?

If Control Room conditions permit, the crew will ___(1)___ until total flow drops to 22E04 LB/HR.

After the Control Room has been evacuated and in accordance with S2.OP-AB.CR-0001 Attachment 6 (Plant Operator), RCS pressure will be maintained by cycling PZR Heaters ___(2)___.

A. **(1) LOWER** 23 AFW Pump speed
(2) and PZR Spray Valves

B. **(1) LOWER** 23 AFW Pump speed
(2) ONLY

C. **(1) THROTTLE** 21 and 22 AFW Pump Steam Generator Inlet Valves
(2) and PZR Spray Valves

D. **(1) THROTTLE** 21 and 22 AFW Pump Steam Generator Inlet Valves
(2) ONLY

Answer: B

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. Part 1 is correct. For Part 2, PZR Heaters and Spray are the normal methods to maintain RCS pressure. Consequently, the candidate could incorrectly conclude that after the control room has been evacuated that RCS pressure will be maintained by cycling PZR Heaters and PZR Spray Valves

B. **Correct.** IAW S2.OP-AB.CR-0001 Immediate Actions, if Control Room conditions permit, the crew will LOWER 23 AFW Pump speed until total flow drops to 22E04 LB/HR.

C. Incorrect but plausible. For Part 1, ALL of the AFW pumps will automatically start following a Reactor Trip from 100% Power. Consequently, the candidate could incorrectly conclude that the crew will throttle AFW flow from the MDAFW Pumps (21 and 22 AFW Pimps). For Part 2, PZR Heaters and Spray are the normal methods to maintain RCS pressure. Consequently, the candidate could incorrectly conclude that after the control room has been evacuated that RCS pressure will be maintained by cycling PZR Heaters and PZR Spray Valves.

D. Incorrect but plausible. For Part 1, ALL of the AFW pumps will automatically start following a Reactor Trip from 100% Power. Consequently, the candidate could incorrectly conclude that the crew will throttle AFW flow from the MDAFW Pumps (21 and 22 AFW Pimps). Part 2 is correct.

Question Number: 71

Tier: 1 Group 2

K/A: APE: 068 Control Room Evacuation-AA2.06

Ability to determine and interpret the following as they apply to the Control Room Evacuation: RCS pressure

Importance Rating: 4.1

10 CFR Part 55: 43.5 / 45.13

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must how RCS pressure will be maintained following a Control Room evacuatioin.

SRO Justification: N/A

Technical References: S2.OP-AB.CR-0001 (CONTROL ROOM EVACUATION)

Proposed references to be provided: None

Learning Objective: NOS05ABCR01-05 (CONTROL ROOM EVACUATION)

3 Given a set of initial plant conditions:

A. Determine the appropriate abnormal procedure

B. Describe the plant response to actions taken in the abnormal procedure

C. Describe the final plant condition that is established by the abnormal procedure

Cognitive Level:

Higher	
Lower	X

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

72 **Points: 1.00**

Given:

- The crew is performing 1-EOP-FRCC-1 (RESPONSE TO INADEQUATE CORE COOLING) Step 3, "Safeguards Valve Alignment"
- The SECs are operating in Mode 1
- The current position of the following valves are:

1SJ4 BIT INLET	1SJ5 BIT INLET	1SJ12 BIT OUTLET	1SJ13 BIT OUTLET	11SW122 SW TO 11 CC HX
OPEN	CLOSED	OPEN	OPEN	OPEN

In accordance with 1-EOP-FRCC-1, which ONE of the following completes the statement below?

The crew ___(1)___ attempt to open 1SJ5 and ___(2)___ attempt to close 11SW122.

	(1)	**(2)**
A.	will	will **NOT**
B.	will	will
C.	will **NOT**	will **NOT**
D.	will **NOT**	will

Answer: A

Answer Explanation

DISTRACTOR ANALYSIS:

A. **Correct.** With SECs operating in Mode 1 and IAW -EOP-FRCC-1 (RESPONSE TO INADEQUATE CORE COOLING) Step 3, the crew is required to open 1SJ5 and is NOT required to close 11SW122.

B. Incorrect but plausible. Part 1 is correct. For Part 2, 11SW122 is required to be closed when the SECs are in MODE 3. The candidate could incorrectly determine the SECs are in MODE 3 and conclude that 11SW122 is required to be closed.

C. Incorrect but plausible. For Part 1, 1SJ4 is open and only 1SJ4 or 1SJ5 must be open for ECCS flow into the BIT to be initiated. Consequently, the candidate could incorrectly conclude that FRCC-1 only requires 1SJ4 or 1SJ5 to be open. Part 2 is correct.

D. Incorrect but plausible. For Part 1, 1SJ4 is open and only 1SJ4 or 1SJ5 must be open for ECCS flow into the BIT to be initiated. Consequently, the candidate could incorrectly conclude that FRCC-1 only requires 1SJ4 or 1SJ5 to be open. For Part 2, 11SW122 is required to be closed when the SECs are in MODE 3. The candidate could incorrectly determine the SECs are in MODE 3 and conclude that 11SW122 is required to be closed.

Question Number: 72

Tier: 1 Group 2

K/A: EPE: 074 Inadequate Core Cooling-EA1.27

Ability to operate and monitor the following as they apply to an Inadequate Core Cooling: ECCS valve control switches and indicators

Importance Rating: 4.2

10 CFR Part 55: 41.7 / 45.5 / 45.6

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must interpret the position of ECCS valves during performance of 1-EOP-FRCC-1 (RESPONSE TO INADEQUATE CORE COOLING) and determine what valves must be operated (opened or closed).

SRO Justification: N/A

Technical References: 1-EOP-FRCC-1 (RESPONSE TO INADEQUATE CORE COOLING)

Proposed references to be provided: None

Learning Objective: NOSO5FRCC00-04 (CORE COOLING FUNCTIONAL RESTORATION)

8 Given EOP-FRCC-1, 2, and 3 and a set of plant conditions:

a. Determine a discrete path through the EOP.

b. Determine an appropriate transition out of the EOP

Cognitive Level:

Higher X
Lower _____

Question Source

New X
Modified Bank _____
Bank _____

Question History:

Comments:

73 **Points: 1.00**

Given:

- The crew has just completed the SI Pump Reduction and Charging Pump Reduction steps of 2-EOP-LOCA-2 (POST LOCA COOLDOWN AND DEPRESSURIZATION)
- Containment Pressure is 2.4 psig

Considering **ONLY** the following plant conditions below:

1. RCS SUBCOOLING 0°F
2. PZR LEVEL CAN NOT BE MAINTAINED GREATER THAN 11%

Which ONE of the following completes the statement below?

In accordance with 2-EOP-LOCA-2 CAS, the crew is required to start ECCS Pumps as necessary to restore the required plant parameter(s) when _____ is / are met.

A. **ONLY** Condition 1

B. **ONLY** Condition 2

C. **EITHER** Condition

D. **ONLY BOTH** Conditions

Answer: C

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. Since all of the distractors contain a portion of the correct answer, all distractors are plausible.

B. Incorrect but plausible. Since all of the distractors contain a portion of the correct answer, all distractors are plausible.

C. **Correct.** IAW 2-EOP-LOCA-2 CAS, 1. RCS SUBCOOLING 0°F or PZR LEVEL CAN NOT BE MAINTAINED GREATER THAN 11% will require the crew to start ECCS Pumps as necessary to restore the required plant parameter(s).

D. Incorrect but plausible. Since all of the distractors contain a portion of the correct answer, all distractors are plausible.

Question Number: 73

Tier: 1 Group 2

K/A: WE03 LOCA Cooldown and Depressurization-EK2.2

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

Importance Rating: 3.7

10 CFR Part 55: 41.7 / 45.7

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must understand how the ECCS pumps (a heat removal system) will be properly operated based on plant parameters IAW 2-EOP-LOCA-2 (POST LOCA COOLDOWN AND DEPRESSURIZATION).

SRO Justification: N/A

Technical References: 2-EOP-LOCA-2 (POST LOCA COOLDOWN AND DEPRESSURIZATION)

Proposed references to be provided: None

Learning Objective: NOSO5LOCA02-03 (POST LOCA COOLDOWN AND DEPRESSURIZATION)

8 Determine the indications that are monitored to ensure proper system/component operation for each step in the EOP for POST LOCA COOLDOWN AND DEPRESSURIZATION

Cognitive Level:

Higher	
Lower	X

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

74 **Points: 1.00**

Given:

- The crew is preparing to perform an RCS soak in accordance with 2-EOP-FRTS-1 (RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITIONS)

In accordance with 2-EOP-FRTS-1, which ONE of the following completes the statement below?

During the RCS soak, the crew must maintain RCS temperature stable ___(1)___.

The RCS soak is designed to reduce the temperature stresses present in the ___(2)___.

	(1)	(2)
A.	and **NOT** raise RCS pressure	Reactor Vessel
B.	and **NOT** raise RCS pressure	RCS piping and pressurizer
C.	**ONLY**	Reactor Vessel
D.	**ONLY**	RCS piping and pressurizer

Answer: A

Answer Explanation

DISTRACTOR ANALYSIS:

A. **Correct.** For part 1 and IAW 2-EOP-FRTS-1 Step 29, during the RCS soak, the crew must maintain RCS stable and NOT raise RCS pressure. For Part 2 and IAW 2-EOP-FRTS-1, the RCS soak is designed to reduce the temperature stresses present in the Reactor Vessel.

B. Incorrect but plausible. Part 1 is correct. For Part 2, the RCS piping and the pressurizer are components that will be affected an RCS soak. Consequently, the candidate could incorrectly conclude that the RCS soak is designed to reduce the temperature stresses present in the RCS piping And pressurizer.

C. Incorrect but plausible. For Part 1, since the RCS soak is designed to reduce thermal stresses, the candidate could incorrectly conclude that during the RCS soak, ONLY RCS temperature is required to remain stable. Part 2 Is correct.

D. Incorrect but plausible. For Part 1, since the RCS soak is designed to reduce thermal stresses, the candidate could incorrectly conclude that during the RCS soak, ONLY RCS temperature is required to remain stable. For Part 2 and IAW 2-EOP-FRTS-1, the RCS soak is designed to reduce the temperature stresses present in the Reactor Vessel.

Question Number: 74

Tier: 1 Group 2

K/A: WE08 Pressurized Thermal Shock-EK3.1

Knowledge of the reasons for the following responses as they apply to the (Pressurized Thermal Shock) - Facility operating characteristics during transient conditions, including coolant chemistry and the effects of temperature, pressure, and reactivity changes and operating limitations and reasons for these operating characteristics.

Importance Rating: 3.4

10 CFR Part 55: 41.5 / 41.10, 45.6, 45.13

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must know the reason for performing an RCS soak IAW 2-EOP-FRTS-1 (RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITIONS)

SRO Justification: N/A

Technical References: 2-EOP-FRTS-1 (RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITIONS)

Proposed references to be provided: None

Learning Objective: NOSO5FRTS00-02 (Response To Pressurized Thermal Shock Conditions)

7 Describe the basis for each step, caution, and note in 2-EOP-FRTS-1 & 2, and EOP-CFST-1, Figure 4 & 4A

Cognitive Level:

Higher _____
Lower X

Question Source

New X
Modified Bank _____
Bank _____

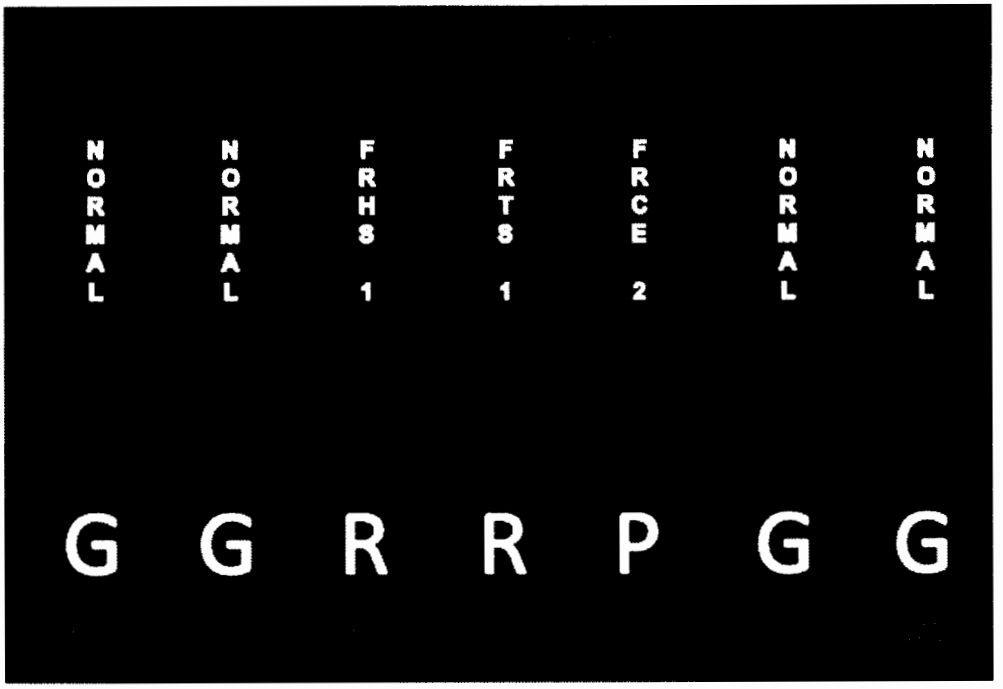
Question History:

Comments:

75 **Points: 1.00**

Given:

- The crew is implementing the Critical Safety Function Status Trees
- SPDS indicates the follow:



Assuming the Critical Safety Function Status Trees have been verified, which ONE of the following completes the statement below?

SPDS indicates that **CONTAINMENT** _____.

A. Pressure is ≥ 47 psig

B. Radiation is ≥ 2 R / HR

C. Sump is level is ≥ 78% (75% ADVERSE)

D. Pressure is ≥ 15 psig and < 47 psig and **AT LEAST** one Containment Spray Pump is running

Answer: C

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. Containment Pressure, Containment Sump Pump status and Containment Radiation are parameters that can cause entry conditions to FRCE-1 (Red), FRCE-1 (Purple) and FRCE-3 (Yellow) to be met. Consequently, all of the distractors are plausible.

B. Incorrect but plausible. Containment Pressure, Containment Sump Pump status and Containment Radiation are parameters that can cause entry conditions to FRCE-1 (Red), FRCE-1 (Purple) and FRCE-3 (Yellow) to be met. Consequently, all of the distractors are plausible.

C. **Correct.** IAW EOP-CFST-1 and SPDS, FRCE-2 entry conditions are met. FRCE-2 is performed when Containment Sump is level is ≥ 78% (75% ADVERSE).

D. Incorrect but plausible. Containment Pressure, Containment Sump Pump status and Containment Radiation are parameters that can cause entry conditions to FRCE-1 (Red), FRCE-1 (Purple) and FRCE-3 (Yellow) to be met. Consequently, all of the distractors are plausible.

Question Number: 75

Tier: 1 Group 2

K/A: W E15 Containment Flooding-G2.1.19

Ability to use plant computers to evaluate system or component

Importance Rating: 3.9

10 CFR Part 55: 41.10 / 45.12

10 CFR 55.43.b N/A

K/A Match: K/A is matched because the candidate must use SPDS (a computer system) to determine that flooding is occurring inside containment.

SRO Justification: N/A

Technical References: 2-EOP-CFST-1 (CRITICAL SAFETY FUNCTION STATUS TREES)

Proposed references to be provided: None

Learning Objective: NOS05TRP001-08 (REACTOR TRIP OR SAFETY INJECTION AND INTRODUCTION TO THE USE OF EOPs)

6 Describe how applicable CFST parameters are monitored, in accordance with EOP-CFST-1:

A. Core Exit Thermocouples

B. SPDS Top Level Display

C. Subcooling Margin Monitor (SMM)

D. Control Room 1E Instruments

Cognitive Level:

Higher X
Lower _____

Question Source

New X
Modified Bank _____
Bank _____

Question History:

Comments:

EXAMINATION ANSWER KEY

Salem ILOT 17-01 SRO NRC Exam – (**APPROVED**)

1 **Points: 1.00**

REFERENCE PROVIDED

Given:

- 2PR3 (PZR SAFETY VALVE) is fully open and will **NOT** reseat
- The crew is performing 2-EOP-LOCA-2 (POST LOCA COOLDOWN AND DEPRESSURIZATION) Step 22, "Charging Pump Reduction"
- 21 and 22 Charging Pumps are running
- 21 and 22 SI Pumps are running
- 21 and 22 RHR Pumps are stopped but available
- Containment Pressure is 2.5 psig
- **ONLY** 23 RCP is running
- RCS Subcooling is 50 °F
- PZR Level is 30%
- RCS T-HOTs are reading as follows:

21 T-HOT	22 T-HOT	23 T-HOT	24 T-HOT
375 °F	370 °F	364 °F	368 °F

Which ONE of the following completes the statement below?

The crew **NEX**T Action(s) will to be _____.

A. GO TO 2-EOP-LOCA-2 POST STEP 34

B. STOP 21 or 22 CHARGING Pump **ONLY** PER 2-EOP-LOCA-2 Step 22.4

C. RETURN TO 2-EOP-LOCA-2 POST STEP 14

D. RUN AT LEAST ONE RHR PUMP IN SI MODE THEN STOP 21 or 22 CHARGING Pump PER 2-EOP-LOCA-2 Steps 22.2 and 22.4

Answer: B

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. GOING TO 2-EOP-LOCA-2 POST STEP 34 is an option for 2-EOP-LOCA-2 (POST LOCA COOLDOWN AND DEPRESSURIZATION) Step 22, "Charging Pump Reduction". This would require the candidate to incorrectly perform Step 22.1 (Is RCS Subcooling Greater Than Required By Table C) and then correctly perform 22.2 (Are At Least Two T-Hots less than 365 °F).

B. **Correct.** Containment Conditions are NORMAL since Containment Pressure is less than 4.0 psig. IAW 2-EOP-LOCA-2 POST Step 22 Table C, Required Subcooling with 2 SI Pumps Running, 1 RCP Running and NORMAL Containment Conditions is 38 °F. Actual subcooling is 50 °F. Since the subcooling requirement is met, PZR level must be greater than 25% for NORMAL Containment Conditions. Actual PZR Level is 30%. Since the RCS subcooling and PZR Level requirements are BOTH met, the crew's next action (IAW 2-EOP-LOCA-2 POST Step 22) is to stop 21 or 22 Charging Pump.

C. Incorrect but plausible. RETURNING TO 2-EOP-LOCA-2 POST STEP 14 is an option for 2-EOP-LOCA-2 (POST LOCA COOLDOWN AND DEPRESSURIZATION) Step 22, "Charging Pump Reduction". This would require the candidate to correctly perform Step 22.1 (Is RCS Subcooling Greater Than Required By Table C) and then to incorrectly perform Step 22.4 (Is PZR Level Greater Than 25% (33% Adverse).

D. Incorrect but plausible. RUNNING AT LEAST ONE RHR PUMP IN SI MODE THEN STOP 21 or 22 CHARGING Pump is an option for 2-EOP-LOCA-2 (POST LOCA COOLDOWN AND DEPRESSURIZATION) Step 22, "Charging Pump Reduction". This would require the candidate to incorrectly perform Step 22.1 (Is RCS Subcooling Greater Than Required By Table C) and then incorrectly perform 22.2 (Are At Least Two T-Hots less than 365 °F).

Question Number: 1

Tier: 1 Group 1

K/A: 008 Pressurizer (PZR) Vapor Space Accident – AA2.23

Ability to determine and interpret the following as they apply to the Pressurizer Vapor Space Accident: Criteria for throttling high-pressure injection after a small LOCA

Importance Rating: 4.3

10 CFR Part 55: 43.5

10 CFR 55.43.b 5

K/A Match: K/A is matched because the candidate must analyze plan conditions to determine if high pressure injection should be throttled (by stopping a Charging Pump) after a small break vapor space LOCA IAW 2-EOP-LOCA-2 POST (LOCA COOLDOWN AND DEPRESSURIZATION)

SRO Justification: The question meets the SRO requirements as described in NUREG 1021 ES-401 Attachment 2. The question is SRO Only because it requires the candidate to **have knowledge of diagnostic steps and decision points in 2-EOP-LOCA-2 POST (LOCA COOLDOWN AND DEPRESSURIZATION) to determine if event-specific-steps should be performed (specifically stopping a Charging Pumps).**

Technical References: 2-EOP-LOCA-2 POST Step 22

Proposed references to be provided: 2-EOP-LOCA-2 POST Step 22

Learning Objective: NOSO5LOCA02-03 (EOP-LOCA-2, POST LOCA COOLDOWN AND DEPRESSURIZATION)

7. Determine a discrete path through the EOP for POST LOCA COOLDOWN AND DEPRESSURIZATION

Cognitive Level:

Higher	X
Lower	

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

2 **Points: 1.00**

Given:

- The crew is performing 2-EOP-LOCA-1 (LOSS OF REACTOR COOLANT)

At time 11:00

- The RWST LEVEL LO alarm has actuated
- RCS Pressure is 125 psig and slowly lowering
- Containment Pressure is 20 psig and slowly rising
- ALL T-COLDS are 325 °F and slowly lowering

In accordance with 2-EOP-LOCA-1, which ONE of the following completes the statements below?

The crew will _____.

A. **REMAIN** in 2-EOP-LOCA-1

B. **PERFORM** 2-EOP-LOCA-1 and S2.OP-SO.CVC-0006 Section 5.8 (Makeup to RWST Using CVCS Makeup System) **CONCURRENTLY**

C. **GO TO** 2-EOP-LOCA-4 (TRANSFER TO HOT LEG RECIRCULATION)

D. **GO TO** 2-EOP-LOCA-3 (TRANSFER TO COLD LEG RECIRCULATION)

Answer: D

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. The candidate could incorrectly determine that remaining in 2-EOP-LOCA-1 (LOSS OF REACTOR COOLANT) is correct and the lowering RWST level will not be addressed until the "RWST LEVEL LO-LO" ALARM actuates

B. Incorrect but plausible. For Part 1, since the "RWST LEVEL LO" ALARM has actuated, the candidate could incorrectly conclude that the crew is required to perform 2-EOP-LOCA-1 and S2.OP-SO.CVC-0006 Section 5.8 (Makeup to RWST Using CVCS Makeup System) CONCURRENTLY.

C. Incorrect but plausible. The candidate could correctly identify the need to swap ECCS pump suctions to the containment sump when the "RWST LEVEL LO" ALARM actuates, but incorrectly conclude that performance of 2-EOP-LOCA-4 (TRANSFER TO HOT LEG RECIRCULATION) is required.

D. **Correct.** IAW 2-EOP-LOCA-1, the crew will go to 2-EOP-LOCA-3 (TRANSFER TO COLD LEG RECIRCULATION) when the "RWST LEVEL LO" ALARM actuates.

Question Number: 2

Tier: 1 Group 1

K/A: EPE: 011 Large Break LOCA-G2.1.27

Knowledge of system purpose and/or function

Importance Rating: 3.9

10 CFR Part 55: 41.7

10 CFR 55.43.b 5

K/A Match: K/A is matched because the candidate must know the purpose of ECCS Recirculation by knowing when to place ECCS in Cold Leg Recirculation IAW 2-EOP-LOCA-1 (LOSS OF REACTOR COOLANT).

SRO Justification: The question meets the SRO requirements as described in NUREG 1021 ES-401 Attachment 2. The question is SRO Only because it requires the candidate **to perform an assessment of plant conditions (normal, abnormal, or emergency) and then selection of a procedure or section of a procedure to mitigate or recover, or with which to proceed.**

Specifically, the candidate will analyze the RWST Bezel (shows RWST level and alarm status) and then determine what procedure should be performed in accordance with 2-EOP-LOCA-1 (LOSS OF REACTOR COOLANT).

Technical References: 2-EOP-LOCA-1

Proposed references to be provided: None

Learning Objective: NOS05LOCA01-05 (EOP-LOCA-01, LOSS OF REACTOR COOLANT)

5. Describe the EOP mitigation strategy for a Loss of Coolant Accident.

6. Describe the plant response to actions taken in the following EOP step sequence(s): 1, 2, 5, 6, 8, 13, 20, 22, 23, 24

Cognitive Level:

Higher X
Lower _____

Question Source

New X
Modified Bank _____
Bank _____

Question History:

Comments:

3 **Points: 1.00**

Given:

- Unit 2 is in MODE 4
- 21 RHR Loop is in service
- PZR Level is 10% and stable

At time 17:00

- The crew enters S2.OP-AB.RHR-0001 (Loss Of RHR) due to a malfunction of 21RH18 (RHR HX FLOW CONT VALVE)

At time 17:05 (5 minutes later)

- PZR level is 9% and lowering
- 2R11A (Containment Particulate Monitor) reading is rising

In accordance with S2.OP-AB.RHR-0001, which ONE of the following completes the statement below?

At **17:05**, the crew will ___(1)___.

A. **IMMEDIATELY** GO TO S2.OP-AB.LOCA-0001 (Shutdown LOCA)

B. **PERFORM** S2.OP-AB.RHR-0001 Attachment 9 (Steam Generator Reflux Cooling)

C. **IMMEDIATELY** GO TO S2.OP-AB.RHR-0002 (Loss of RHR at Reduced Inventory)

D. **CONTINUE** in the main body of S2.OP-AB.RHR-0001 (Loss Of RHR)

Answer: A

Answer Explanation

DISTRACTOR ANALYSIS:

A. **Correct.** IAW S2.OP-AB.RHR-0001 (Loss Of RHR) CAS, going to S2.OP-AB.LOCA-0001 (Shutdown LOCA) is correct since the Unit is in MODE 4 when the RCS Inventory was lost.

B. Incorrect but plausible. Performing S2.OP-AB.RHR-0001 Attachment 9 (Steam Generator Reflux Cooling) would have been correct if at any time a complete loss of all vital buses occurs, NOT as a result of a Beyond- Design-Basis-External-Event (IAW S2.OP-AB.RHR-0001 CAS).

C. Incorrect but plausible. Going to S2.OP-AB.RHR-0002 (Loss of RHR at Reduced Inventory) would have been correct if RCS had been aligned for operation <101 ft. elevation (S2.OP-AB.RHR-0001 Steps 3.3 and 3.4

D. Incorrect but plausible. "START Safety Injection and Charging Pumps as required and CONTROL Pressurizer level between 5% and 50% while maintaining RHR System in service" would have been correct if the Unit was in MODE 5 or 6

Question Number: 3

Tier: 1 Group 1

K/A: APE: 025 Loss of Residual Heat Removal System (RHRS)-G2.1.27

Knowledge of system purpose and/or function.

Importance Rating: 3.8

10 CFR Part 55: 43.5 / 45.13

10 CFR 55.43.b 5

K/A Match: K/A is matched because the candidate must know the function of RHR, since restoration alone of the RHR system can not mitigate a simultaneous loss of RHR and a loss of RCS inventory.

SRO Justification: The question meets the SRO requirements as described in NUREG 1021 ES-401 Attachment 2. **The question is SRO Only because it requires the candidate to perform an assessment of plant conditions (normal, abnormal, or emergency) and then selection of a procedure or section of a procedure to mitigate or recover, or with which to proceed.**

Specifically, the candidate must analyzing lowering PZR level during a malfunction of the RHR systems and determine which procedure must be performed.

Technical References: S2.OP-AB.RHR-0001 (Loss Of RHR)

Proposed references to be provided: None

Learning Objective: NOS05ABRHR1-05 (LOSS OF RHR)

4. Given a set of initial plant conditions:
   - A. Determine the appropriate abnormal procedure
   - B. Describe the plant response to actions taken in the abnormal procedure.
   - C. Describe the final plant condition that is established by the abnormal procedure.

Cognitive Level:

Higher	X
Lower	

Question Source

New	
Modified Bank	X
Bank	

Question History: MODIFIED FROM ILOT 16-01 NRC SRO EXAM Q12

Comments:

4 **Points: 1.00**

Given:

- Unit 2 is in MODE 4 during a plant startup

At time 01:00

- A LOOP occurs

At time 02:00

- EDG 2A Engine Lube Oil Header Low Pressure local alarm and EDG 2A Engine Generator Tripped local alarm actuate

At time 02:10

- EDG 2A is declared inoperable

At time 04:00

- Offsite power has been restored
- **ALL** independent AC circuits between the offsite transmission network and the onsite Class 1E distribution system are OPERABLE
- Maintenance estimates that the 2A EDG will be repaired within the next 24 hours

Which ONE of the following completes the statement below?

At **02:00**, 2A EDG tripped when Engine Lube Oil Header Low Pressure **FIRST** lowered below ___(1)___ psig.

In accordance with Technical Specifications, Unit 2 ___(2)___.

	(1)	**(2)**
A.	40	can go to MODE 3 **ONLY** if a risk assessment is performed
B.	40	can **NOT** go to MODE 3 until 2A EDG is restored to OPERABLE status
C.	60	can go to MODE 3 **ONLY** if a risk assessment is performed
D.	60	can **NOT** go to MODE 3 until 2A EDG is restored to OPERABLE status

Answer: B

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. Part 1 is correct. For Part 2, the candidate could incorrectly interpret LCO 3.8.1.1 to allow a MODE change if a risk assessment is performed.

B. **Correct.** For Part 1 and IAW S2.OP-AR.DG-0001, 2A EDG tripped when Engine Lube Oil Header Low Pressure FIRST lowered below 40 psig. For Part 2: At 01:00, the crew is in LCO 3.8.1.1 REQUIRED ACTION d. However, at 04:00, LCO 3.8.1.1 REQUIRED ACTION d is no longer applicable and LCO 3.8.1.1 REQUIRED ACTION b and h are now applicable. LCO 3.8.1.1 REQUIRED ACTION h states has LCO 3.0.4.b is not applicable to DGs. Since LCO 3.0.4.b is not applicable to the DGs, Unit 2 can NOT go to MODE 3 until 2A EDG is restored to OPERABLE status.

C. Incorrect but plausible. For Part 1, the EDG ENGINE LUBE OIL HEADER LOW PRESSURE ALARM actuates when pressure lowers to 60 psig. Consequently, the candidate could incorrectly conclude the EDG will trip when Engine Lube Oil Header Low Pressure FIRST lowered below 60 psig. For Part 2, the candidate could incorrectly interpret LCO 3.8.1.1 to allow a MODE change if a risk assessment is performed.

D. Incorrect but plausible. For Part 1, the EDG ENGINE LUBE OIL HEADER LOW PRESSURE ALARM actuates when pressure lowers to 60 psig. Consequently, the candidate could incorrectly conclude the EDG will trip when Engine Lube Oil Header Low Pressure FIRST lowered below 60 psig. Part 2 is correct.

Question Number: 4

Tier: 1 Group 1

K/A: 056 Loss of Offsite Power – AA2.22

Ability to determine and interpret the following as they apply to the Loss of Offsite Power: Emergency lube oil pump indicators and low-pressure alarms on ED/G

Importance Rating: 3.6

10 CFR Part 55: 43.5 / 45.13

10 CFR 55.43.b 2

K/A Match: K/A is matched because the candidate must know 2A EDG Low Lube Oil Pressure Trip Setpoint and the apply LCO 3.8.1.1 and LCO 3.0.4 following a Loss of Offsite Power.

SRO Justification: The question meets the SRO requirements as described in NUREG 1021 ES-401 Attachment 2. **The question is SRO Only because it requires the candidate to apply generic LCO requirements (LCO 3.0.1 through 3.0.7 and SR 4.0.1 through 4.0.4)**

Technical References: S2.OP-AR.DG-0001
LCO 3.8.1.1
LCO 3.0.4.b

Proposed references to be provided: None

Learning Objective: NOS05TECHSPEC-12 (TECHNICAL SPECIFICATIONS)

12. Describe the general requirements associated with Specifications 3.0.1 through 3.0.6 relating to implementation of the Technical Specifications.

Cognitive Level:

Higher X
Lower _____

Question Source

New X
Modified Bank _____
Bank _____

Question History:

Comments:

5 **Points: 1.00**

Given:

- Unit 2 is in MODE 3 during a plant startup
- 22 Charging Pump is in service
- TAVG is 547 °F
- Control Air Pressure is 84 psig and lowering
- PZR level is 25% and rising

Which ONE of the following completes the statement below?

Any time Pressurizer Level approaches a **MINIMUM** of ___(1)___ %, then the crew is required to commence an RCS Cooldown to 350 °F using guidance contained in ___(2)___.

	(1)	**(2)**
A.	70	S2.OP-AB.CA-0001 (LOSS OF CONTROL AIR)
B.	70	S2.OP-IO.ZZ-0006 (HOT STANDBY TO COLD SHUTDOWN)
C.	90	S2.OP-AB.CA-0001 (LOSS OF CONTROL AIR)
D.	90	S2.OP-IO.ZZ-0006 (HOT STANDBY TO COLD SHUTDOWN)

Answer: C

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. For Part 1, 70% is the PZR LEVEL HI Bezel Alarm. Consequently, the candidate could incorrectly conclude a cooldown to 350 °F is required any time PZR Level approaches 70%. Part 2 is correct.

B. Incorrect but plausible. For Part 1, 70% is the PZR LEVEL HI Bezel Alarm. Consequently, the candidate could incorrectly conclude a cooldown to 350 °F is required any time PZR Level approaches 70%. For Part 2, the candidate could incorrectly conclude that S2.OP-AB.CA-0001 send the crew to IOP S2.OP-IO.ZZ-0006 (HOT STANDBY TO COLD SHUTDOWN) for the cooldown.

C. **Correct.** Any time Pressurizer Level approaches a MINIMUM of 90 %, then the crew is required to commence an RCS Cooldown to 350 °F using guidance contained in S2.OP-AB.CA-0001.

D. Incorrect but plausible. Part 1 I correct. For Part 2, the candidate could incorrectly conclude that S2.OP-AB.CA-0001 send the crew to IOP S2.OP-IO.ZZ-0006 (HOT STANDBY TO COLD SHUTDOWN) for the cooldown.

Question Number: 5

Tier: 1 Group 1

K/A: 065 Loss of Instrument Air – G2.1.28

Knowledge of the purpose and function of major system components and controls

Importance Rating: 4.1

10 CFR Part 55: 41.7

10 CFR 55.43.b 5

K/A Match: K/A is matched because the candidate must know that during performance of S2.OP-AB.CA-0001 (LOSS OF CONTROL AIR), pressurizer level controls can be compromised resulting in a high pressurizer level. The candidate must also know when an RCS cooldown is required to help alleviate the high pressurizer level.

SRO Justification: The question meets the SRO requirements as described in NUREG 1021 ES-401 Attachment 2. **The question is SRO Only because it requires the candidate to perform an assessment of plant conditions (normal, abnormal, or emergency) and then selection of a procedure or section of a procedure to mitigate or recover, or with which to proceed.**

Specifically, the candidate must analyze lowering Control Air Pressure and rising PZR level and determine when the plant must be cooled down and what procedure to use when cooling down the plant.

Technical References: S2.OP-AB.CA-0001 (LOSS OF CONTROL AIR)

Proposed references to be provided: None

Learning Objective: NOS05ABCA01-07 (LOSS OF CONTROL AIR)

3. Given a set of initial plant conditions:
   - A. Determine the appropriate abnormal procedure.
   - B. Describe the plant response to actions taken in the abnormal procedure.
   - C. Describe the final plant condition that is established by the abnormal procedure.

Cognitive Level:

Higher	
Lower	X

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

6 **Points: 1.00**

Given:

- The crew has just transitioned to 2-EOP-LOCA-6 (LOCA Outside Containment)

In accordance with 2-EOP-LOCA-6, which ONE of the following completes the statements below?

If the crew is **NOT** successful in finding and isolating the leak during performance of the 2-EOP-LOCA-6, the crew will transition to ___(2)___.

A. 2 EOP-LOCA-**1** (LOSS OF REACTOR COOLANT)

B. 2-EOP-LOCA-**5** (LOSS OF EMERGENCY RECIRCULATION)

C. 2 EOP-LOCA-**2** (POST LOCA COOLDOWN AND DEPRESSURIZATION)

D. S2.OP-AB.LOCA-0001 (SHUTDOWN LOCA)

Answer: B

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. Transitioning to 2-EOP-LOCA-1 from 2-EOP-LOCA-6 would be correct if the crew had isolated the leak during performance of the 2-EOP-LOCA-6.

B. **Correct.** IAW 2-EOP-LOCA-6, if the crew is NOT successful in finding and isolating the leak during performance of the 2-EOP-LOCA-6, the crew will transition to 2-EOP-LOCA-5 (LOSS OF EMERGENCY RECIRCULATION).

C. Incorrect but plausible. 2-EOP-LOCA-2 is another procedure that deals with a loss of RCS inventory. Consequently, the candidate could incorrectly conclude that transitioning to 2-EOP-LOCA-2 from 2-EOP-LOCA-6 is appropriate.

D. Incorrect but plausible. S2.OP-AB.LOCA-0001 is another procedure that deals with a loss of RCS inventory. Consequently, the candidate could incorrectly conclude that transitioning to S2.OP-AB.LOCA-0001 from 2-EOP-LOCA-6 is appropriate.

Question Number: 6

Tier: 1 Group 1

K/A: WE04 LOCA Outside Containment – EA2.1

Ability to determine and interpret the following as they apply to the (LOCA Outside Containment: Facility conditions and selection of appropriate procedures during abnormal and emergency operations

Importance Rating: 4.3

10 CFR Part 55: 43.5 / 45.13

10 CFR 55.43.b 5

K/A Match: K/A is matched because the candidate must know what procedure to transition to if the crew is not successful in finding and isolating the leak during performance of the 2-EOP-LOCA-6 (LOCA Outside Containment)

SRO Justification: The question meets the SRO requirements as described in NUREG 1021 ES-401 Attachment 2. **The question is SRO Only because it requires the candidate to perform an assessment of plant conditions (normal, abnormal, or emergency) and then selection of a procedure or section of a procedure to mitigate or recover, or with which to proceed.**

Specifically, what procedure must be performed after performance of 2-EOP-LOCA-6 (LOCA Outside Containment) fails to locates and isolate the leak.

Technical References: EOP-LOCA-6 (LOCA Outside Containment)

Proposed references to be provided: None

Learning Objective: NOS05LOCA06-03 (LOCA OUTSIDE CONTAINMENT)

1 Describe the EOP mitigation strategy during LOCA OUTSIDE CONTAINMENT

Cognitive Level:

Higher	
Lower	X

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

7 **Points: 1.00**

Given:

- Unit 2 is at 100% Reactor Power
- 21 Charging Pump is in service
- 21 and 22 Group Backup PZR Heaters are in AUTOMATIC
- The RO notices the following parameters at 09:00 and 09:40:

Time	**09:00**	**09:40**
Charging Master Flow Controller Flow Demand	36%	75%
Charging Flow	88 GPM	99 GPM
PZR Level	59.0%	64.3%
PZR Pressure	2235 psig	2236 psig
21-24 RCP Seal Injection Flow	7.9 GPM	8.9 GPM

Which ONE of the following completes the statements below?

At **09:40**, 21 and 22 Group Backup PZR heaters are ___(1)___.

The crew will reduce charging flow in accordance with ___(2)___.

	(1)	**(2)**
A.	ON	S2.OP-SO.CVC-0001 (CHARGING, LETDOWN AND SEAL INJECTION)
B.	ON	S2.OP-AB.CVC-0001 (LOSS OF CHARGING)
C.	OFF	S2.OP-SO.CVC-0001 (CHARGING, LETDOWN AND SEAL INJECTION)
D.	OFF	S2.OP-AB.CVC-0001 (LOSS OF CHARGING)

Answer: A

Answer Explanation

DISTRACTOR ANALYSIS:

A. **Correct.** For Part 1 and based on plant parameters at 09:40, 21 and 22 Group PZR Backup Heaters are ON (Actual PZR level is 5% or more greater than Program PZR level (64.3 – 59.0 = Δ +5.3%)). For Part 2, with charging flow demand, charging flow and PZR level ALL rising, this is an indication of a failure of Charging Master Flow Controller. Additionally, at 09:40 the only control room alarms present in the control (associated with the failed Charging Master Flow Controller) are OHA E-20 (PZR HTR ON LVL HI) and Control Console Bezel 3-18 PZR LEVEL HI Alarm. In accordance with S2.OP-AR.ZZ-00005 OHA E-20 ARP, the crew will REDUCE charging IAW S2.OP-SO.CVC-0001 (CHARGING, LETDOWN AND SEAL INJECTION). Control Console Bezel 3-18 PZR LEVEL Alarm Response Procedure refers the crew to OHA E-20 ARP.

B. Incorrect but plausible. Part 1 is correct. For Part 2, S2.OP-AB.CVC-0001 (LOSS OF CHARGING) would correctly address a failure of Charging Master Flow Controller in which charging flow is REDUCED. Consequently, the candidate could incorrectly conclude that the crew will reduce charging flow in accordance with S2.OP-AB.CVC-0001 (LOSS OF CHARGING).

C. Incorrect but plausible. For Part 1, actual PZR Pressure is normal at 09:40. Consequently, the candidate could incorrectly conclude that the Backup heaters are OFF. Part 2 is correct.

D. Incorrect but plausible. For Part 1, actual PZR Pressure is normal at 09:40. Consequently, the candidate could incorrectly conclude that the Backup heaters are OFF. For Part 2, S2.OP-AB.CVC-0001 (LOSS OF CHARGING) would correctly address a failure of Charging Master Flow Controller in which charging flow is REDUCED. Consequently, the candidate could incorrectly conclude that the crew will reduce charging flow in accordance with S2.OP-AB.CVC-0001 (LOSS OF CHARGING).

Question Number: 7

Tier: 1 Group 2

K/A: 028 Pressurizer (PZR) Level Control Malfunction – A2.03

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

Importance Rating: 4.2

10 CFR Part 55: 41.10 / 43.5 / 45.3

10 CFR 55.43.b	5
K/A Match:	K/A is matched because the candidate must analyze Charging the flow indicator versus PZR level to determine the status of the Charging Master Flow Controller.
SRO Justification:	The question meets the SRO requirements as described in NUREG 1021 ES-401 Attachment 2. **The question is SRO Only because it requires the candidate to perform an assessment of plant conditions (normal, abnormal, or emergency) and then selection of a procedure or section of a procedure to mitigate or recover, or with which to proceed.** Specifically, the candidate must assess changes in Charging Master Flow Controller Flow Demand, Charging Flow, PZR Level, and PZR Pressure and then select what procedure will address the plant abnormality.
Technical References:	S2.OP-AR.ZZ-00005 S2.OP-AB.CVC-0001 (LOSS OF CHARGING)
Proposed references to be provided:	None
Learning Objective:	NOS05ABCVC1-04 (AB.CVC-1: LOSS OF CHARGING) 3. Given a set of initial plant conditions: a. Determine the appropriate abnormal procedure. b. Describe the plant response to actions taken in the abnormal procedure. c. Describe the final plant condition that is established by the abnormal procedure.

Cognitive Level:

Higher	X
Lower	

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

8 **Points: 1.00**

Given:

- Unit 2 is at 100% Reactor Power
- 2B EDG is supplying 2B 4KV Vital Bus in parallel with 23 SPT for a surveillance run

At time 09:30 on January 7th

- The crew evacuates the control room

At time 09:50 on January 7th

- The crew is successfully proceeding through S2.OP-AB.CR-0001 (CONTROL ROOM EVACUATION when Local alarm "LUBE OIL HI TEMP" and "ENGINE GENERATOR TRIPPED" alarms in the EDG Control Room

At time 10:00 on January 7th

- The CRS declares 2B EDG inoperable and LCO 3.8.1.1 (A.C. SOURCES OPERATING) REQUIRED ACTION b is entered

At time 10:30 on January 7th

- LCO 3.8.1.1 REQUIRED ACTION b.1 (Demonstrate the OPERABILITY of the independent A.C. circuits by performing Surveillance Requirement 4.8.1.1.1.a) is completed for the **FIRST** time

Which ONE of the following completes the statements below?

The 2B EDG tripped when Lube Oil Temperature **FIRST** exceeded ___(1)___.

The **SECOND** performance of SR 4.8.1.1.1.a must be completed within a **MAXIMUM** of ___(2)___ hours after the 2B EDG is declared inoperable.

	(1)	**(2)**
A.	190	8
B.	190	9
C.	205	8
D.	205	9

Answer: D

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. For Part 1, the local "LUBE OIL HI TEMP" comes in at 190 °F. Consequently, the candidate could incorrectly determine that the EDG tripped when the local "LUBE OIL HI TEMP" actuates. For Part 2, the candidate could incorrectly conclude that Surveillance Requirement 4.8.1.1.1.a needs to be performed every 24 hours after it was initially performed (25 hours from entering the LCO).

B. Incorrect but plausible. For Part 1, the local "LUBE OIL HI TEMP" comes in at 190 °F. Consequently, the candidate could incorrectly determine that the EDG tripped when the local "LUBE OIL HI TEMP" actuates. Part 2 is correct.

C. Incorrect but plausible. Part 1 is correct. For Part 2, the candidate could incorrectly conclude that Surveillance Requirement 4.8.1.1.1.a needs to be performed every 24 hours after it was initially performed (25 hours from entering the LCO).

D. **Correct.** For Part 1 and IAW 2B DG Alarm Response Manual, the 2B EDG tripped when Lube Oil Temperature FIRST exceeded 205 °F. For Part 2 and IAW Technical specifications, the crew has 1 hour to perform SR 4.8.1.1.1.a for the first time then an additional 8 hours to perform SR 4.8.1.1.1.a for the second time (9 hours from entering the LCO).

Question Number: 8

Tier: 1 Group 2

K/A: 068 Control Room Evacuation – G2.4.50

Ability to verify system alarm setpoints and operate controls identified in the alarm response manual

Importance Rating: 4.2

10 CFR Part 55: 41.10 / 43.5 / 45.3

10 CFR 55.43.b 2

K/A Match: K/A is matched because the candidate must know at what lube oil temperature the 2B EDG trips when receiving local alarms "LUBE OIL HI TEMP" and "ENGINE GENERATOR TRIPPED" in the EDG Control Room are received and how this applies to Tech Specs.

SRO Justification: The question meets the SRO requirements as described in NUREG 1021 ES-401 Attachment 2. The question is SRO Only because it requires the candidate to apply required actions (TS Section 3) and SRs (TS Section 4) in accordance with rules of application requirements (TS Section 1).

Technical References: S2.OP-AR-DG-0002 Alarms Manual

Proposed references to be provided: None

Learning Objective: NOS05TECHSPEC-12 (TECHNICAL SPECIFICATIONS)

14. Describe the general component and parameter categories that are addressed by Technical Specification Sections 3/4.1 through 3/4.12.

Cognitive Level:

Higher	X
Lower	

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

9 **Points: 1.00**

REFERENCE PROVIDED

Given:

- A plant heat up is in progress
- TAVG is 470 °F
- 2R31 (Letdown Line-Failed Fuel) is in alarm
- RCS Sampling has confirmed LCO 3.4.9 (Specific Activity) is **NOT** met

At time 12:00

- Periodic sampling of the RCS verifies the RCS Specific Activity is lowering but it is still above the LCO limit

In accordance with Technical Specifications, which ONE of the following completes the statement below?

The LCO 3.4.9 specific activity limit for DOSE EQUIVALENT I-131 is less or equal to a **MINIMUM** of ___(1)___ µCi / gram.

At **12:00** and in accordance with Technical Specifications, the crew ___(2)___ permitted to raise TAVG ≥ 500 °F while RCS activity is still above the LCO 3.4.9 limit.

	(1)	**(2)**
A.	1.0	is **NOT**
B.	1.0	is
C.	100	is **NOT**
D.	100	is

Answer: B

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. Part 1 is correct. For Part 2, the candidate could fail to recognize or misunderstand the LCO 3.0.4.c exemption for LCO 3.4.9 and incorrectly conclude that the crew is NOT permitted to raise TAVG ≥ 500 °F while RCS activity is still above the LCO 3.4.9 limit.

B. **Correct.** For Part 1 and IAW LCO 3.4.9, the LCO 3.4.9 specific activity limit for DOSE EQUIVALENT I-131 is less or equal to a MAXIMUM of 1.0 µCi / gram. For Part 2, LCO 3.0.4.c gives an allowance for LCO 3.4.9 to allow going up in MODE or other specified condition when LCO 3.4.9 is NOT met.

C. Incorrect but plausible. For Part 1, 100 EµCi / gram is another limit specified in LCO 3.4.9. For Part 2, the candidate could fail to recognize or misunderstand the LCO 3.0.4.c exemption for LCO 3.4.9 and incorrectly conclude that the crew is NOT permitted to raise TAVG ≥ 500 °F while RCS activity is still above the LCO 3.4.9 limit.

D. Incorrect but plausible. For Part 1, 100 EµCi / gram is another limit specified in LCO 3.4.9. Part 2 is correct.

Question Number: 9

Tier: 1 Group 2

K/A: 076: High Reactor Coolant Activity – AA2.03

Ability to determine and interpret the following as they apply to the High Reactor Coolant Activity: RCS radioactivity level meter

Importance Rating: 3.0

10 CFR Part 55: 43.5 / 45.13

10 CFR 55.43.b 2

K/A Match: K/A is matched because the candidate must analyze LCO 3.4.9 (Specific Activity) with 2R31 (Letdown Line-Failed Fuel) in alarm.

SRO Justification: The question meets the SRO requirements as described in NUREG 1021 ES-401 Attachment 2. The question is SRO Only because it requires application of generic LCO requirements (LCO 3.0.1 through 3.0.7 and SR 4.0.1 through 4.0.4).

Technical References: LCO 3.4.9
LCO 3.0.3

Proposed references to be provided: REDACTED LCO 3.4.9

Learning Objective: NOS05TECHSPEC-12 (Technical Specifications)

12 Describe the general requirements associated with Specifications 3.0.1 through 3.0.6 relating to implementation of the Technical Specifications

Cognitive Level:

Higher X
Lower ____

Question Source

New ____
Modified Bank ____
Bank X

Question History: ILOT 16-01 AUDIT SRO Q8

Comments:

10 **Points: 1.00**

Given:

- The crew is performing 2-EOP-TRIP-4 (NATURAL CIRCULATION COOLDOWN)
- Wide Range Loop 22 T_{HOT} has failed low

At time 12:00

- OHA B-11 "2B VTL INSTR BUS INVRT FAIL" actuates
- **ALL** Channel II indications are lost
- The crew enters S2.OP-AB.115-0002 (LOSS OF 2B 115V VITAL INSTRUMENT BUS)

At time 12:30

- The crew has just completed the RCS Stabilization Steps of 2-EOP-TRIP-4 and is now preparing to Cooldown and Depressurize the RCS
- ALL Channel II indications are still lost

In accordance with 2-EOP-TRIP-4, which ONE of the following completes the statement below?

The crew will transition to ___(1)___ if the required RCS Cooldown Rate is greater than a **MINIMUM** of ___(2)___ °F / Hour.

NOTE:

- 2-EOP-TRIP-**5** (NATURAL CIRCULATION RAPID COOLDOWN **WITHOUT RVLIS**)
- 2-EOP-TRIP-**6** (NATURAL CIRCULATION RAPID COOLDOWN **WITH RVLIS**)

	(1)	**(2)**
A.	2-EOP-TRIP-**5**	25
B.	2-EOP-TRIP-**5**	50
C.	2-EOP-TRIP-**6**	25
D.	2-EOP-TRIP-**6**	50

Answer: C

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. For Part 1, the candidate could correctly that Train A of RVLIS is inoperable when 2B Vital Instrument Bus de-energized. The candidate could then incorrectly conclude that indications Train B of RVLIS becomes invalid with Wide Range Loop 22 THOT has failed low. The candidate would then incorrectly conclude that both trains of RVLIS are inoperable and performance of 2-EOP-TRIP-5 (NATURAL CIRCULATION RAPID COOLDOWN WITHOUT RVLIS) is warranted. Part 2 is correct.

B. Incorrect but plausible. For Part 1, the candidate could correctly that Train A of RVLIS is inoperable when 2B Vital Instrument Bus de-energized. The candidate could then incorrectly conclude that indications Train B of RVLIS becomes invalid with Wide Range Loop 22 THOT has failed low. The candidate would then incorrectly conclude that both trains of RVLIS are inoperable and performance of 2-EOP-TRIP-5 (NATURAL CIRCULATION RAPID COOLDOWN WITHOUT RVLIS) is warranted. For Part 2, other EOPs and SOPs have maximum cooldown rates of 50 °F. Consequently, the candidate could incorrectly conclude transition to 2-EOP-TRIP-5 or 2-EOP-TRIP-6 is warranted when the required RCS Cooldown Rate is greater than a MINIMUM of 50 °F / Hour.

C. **Correct.** IAW 2-EOP-TRIP-4, if RVLIS is available then the crew will transition to 2-EOP-TRIP-6 (NATURAL CIRCULATION RAPID COOLDOWN WITH RVLIS) if the required RCS Cooldown Rate is greater than a MINIMUM of 25 °F / Hour. Loop 22 THOT provides input to Train A of RVLIS. 2B Vital Instrument Bus provides the power for RVLIS Train A Microprocessor Panel. Consequently, ONLY Train A of RVLIS is inoperable at 12:30. Train B of RVLIS not affected.

D. Incorrect but plausible. Part 1 is correct. For Part 2, other EOPs and SOPs have maximum cooldown rates of 50 °F. Consequently, the candidate could incorrectly conclude transition to 2-EOP-TRIP-5 or 2-EOP-TRIP-6 is warranted when the required RCS Cooldown Rate is greater than a MINIMUM of 50 °F / Hour.

Question Number: 10

Tier: 1 Group 2

K/A: WE10 Natural Circulation with Steam Void in Vessel with/without RVLIS – G2.4.46

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

Importance Rating: 4.2

10 CFR Part 55: 41.10 / 43.5 / 45.3 / 45.12

10 CFR 55.43.b 5

K/A Match: K/A is matched because the candidate must determine the status of RVLIS with Wide Range Loop 22 failed and a subsequent OHA B-11 "2B VTL INSTR BUS INVRT FAIL" alarm actuation. The candidate must then apply the status of RVLIS to select a procedure to mitigate the event (2-EOP-TRIP-5 (NATURAL CIRCULATION RAPID COOLDOWN WITHOUT RVLIS) or 2-EOP-TRIP-6 (NATURAL CIRCULATION RAPID COOLDOWN WITH RVLIS)).

SRO Justification: The question meets the SRO requirements as described in NUREG 1021 ES-401 Attachment 2. **The question is SRO Only because it requires the candidate to perform an assessment of plant conditions (normal, abnormal, or emergency) and then selection of a procedure or section of a procedure to mitigate or recover, or with which to proceed.**

Specifically, the candidate must assess Wide Range Loop 22 failed and a subsequent OHA B-11 "2B VTL INSTR BUS INVRT FAIL" alarm to determine a procedure when an increased RCS cooldown rate is required with the Unit in Natural Circulation.

Technical References: 2-EOP-TRIP-4 (NATURAL CIRCULATION COOLDOWN)

S2.OP-AB.115-0002 (LOSS OF 2B 115V VITAL INSTRUMENT BUS)

Proposed references to be provided: None

Learning Objective: NOS05TRP004-06 (EOP-TRIP 4,5,6; NATURAL CIRCULATION COOLDOWN)

1. Describe the mitigation strategy for any NATURAL CIRCULATION COOLDOWN

Cognitive Level:

Higher	X
Lower	

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

11 **Points: 1.00**

REFERENCES PROVIDED

Given:

- Unit 2 has entered MODE 3 for a planned refueling outage on **October 15** at 0700

On **October 17** at 0700

- Containment is OPEN
- TAVG is 150 °F
- PZR Level is 10%
- **BOTH** RHR Pumps have tripped
- The crew has just entered S2.OP-AB.RHR-0001 (Loss Of RHR)

Which ONE of the following completes the statements below?

If the RHR Pumps remain tripped, _____ is the **EARLIEST** time that the criteria for declaring an Alert per EAL# CA4.1 will be met.

A. 0710

B. 0715

C. 0810

D. 0815

Answer: C

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. 0710 would be the time if the candidate correctly calculated the heatup to 200 °F with a 5 °F / minute heatup rate and incorrectly used a 0 minute duration to meet EAL# CA4.1 criteria (by misinterpreting CA4.1 EAL Table).

B. Incorrect but plausible. 0715 would be the time if the candidate incorrectly calculated the heatup to 200 °F with a 3.4 °F / minute heatup rate and incorrectly used a 0 minute duration to meet EAL# CA4.1 criteria (by misinterpreting CA4.1 EAL Table).

C. **Correct.** Using the provided references, the operator should determine a heat up of 5 °F per minute (2 days after shutdown per before offload curve). Unit 2 will be will be in MODE 4 (>200 °F) in 10 minutes ((200 - 150) / 5). The RCS is intact. IAW EAL#CA4.1, to meet the criteria of CA4.1 with the RCS intact, RCS must be > 200 °F for 60 minutes. This will occur at 0810.

D. Incorrect but plausible. If the candidate used the wrong heatup curve (after offload curve), then the heatup rate would be 3.4 °F / hr. Therefore, it would then take 15 minutes ((200-150) / 3.4) for the RCS to reach 200 °F. If the candidate then correctly applied 60 minute criteria for meeting CA4.1, this would equate to 0815.

Question Number: 11

Tier: 2 Group 1

K/A: 005 Residual Heat Removal System – G2.4.41

Knowledge of the emergency action level thresholds and classifications

Importance Rating: 4.6

10 CFR Part 55: 41.10 / 43.5 / 45.11

10 CFR 55.43.b 6

K/A Match: K/A is matched because the candidate must know when Alert Classification Criteria is met for CA4.1 following a loss of RHR with the plant initially in MODE 5.

SRO Justification: The question meets the SRO requirements as described in NUREG 1021 ES-401 Attachment 2. The question is SRO Only because it requires the candidate to evaluate core conditions and emergency classifications based on core conditions.

Technical References: S2.OP-AB.RHR-0001 (Loss Of RHR)
EP-SA-111-27

Proposed references to be provided: Graph of S2.OP-AB.RHR-0001 Attachment 5 (HEATUP RATE FOR LOSS OF RHR COOLING - Heat Up Rate Before and After Core Reload At 10% PZR Level)

EA-SA-111-127 EAL# CA4.1

Learning Objective: EMERGENCY COORDINATOR AND DIRECT SUPPORT PERSONNEL DUTIES

3. Given plant conditions for an emergency, CLASSIFY the event in accordance with the ECG

Cognitive Level:

Higher X
Lower _____

Question Source

New X
Modified Bank _____
Bank _____

Question History:

Comments:

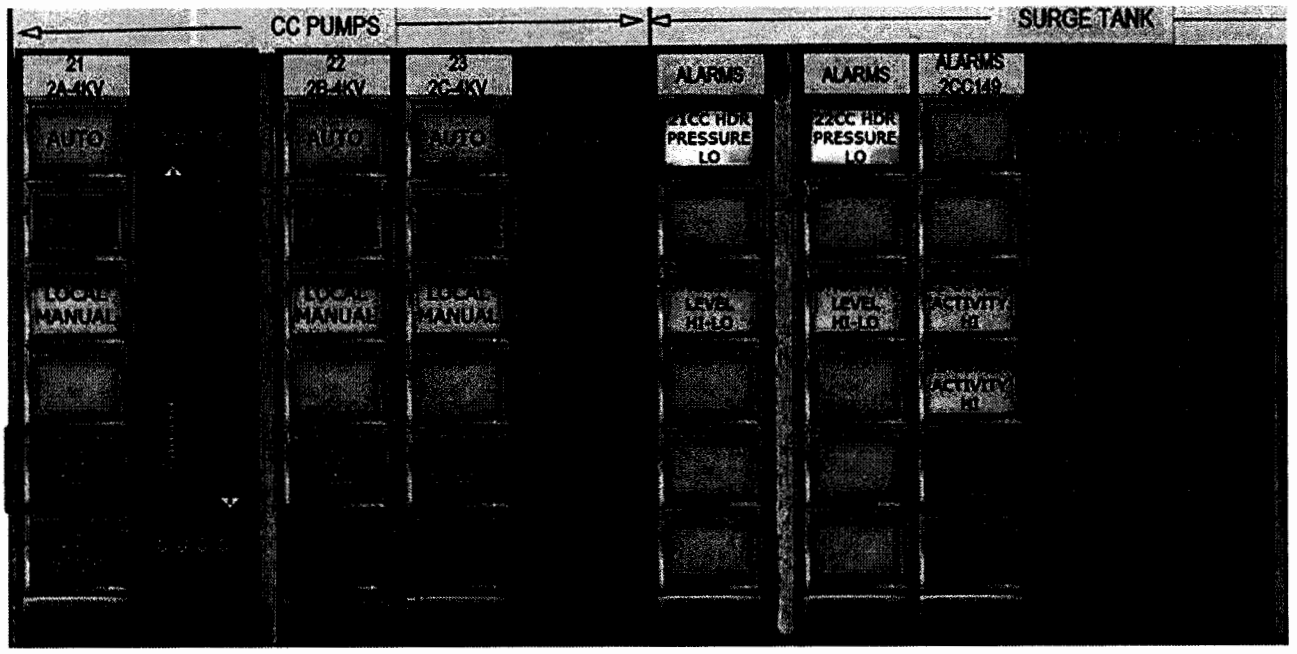
12 **Points: 1.00**

Given

- Unit 2 is in MODE 5 with RCS at Water Elevation 103.5 feet
- **ALL** CCW Pumps are in service

At time 17:00

- The NCO observes the following indications:



= Lights are Illuminated

Which ONE of the following completes the statement below?

The crew will perform _____.

A. S2.OP-AB.RHR-0001 (LOSS OF RHR) **ONLY**

B. S2.OP-AB.RHR-0002 (LOSS OF RHR AT REDUCED INVENTORY) **ONLY**

C. S2.OP-AB.CC-0001 (COMPONENT COOLING ABNORMALITY) and S2.OP-AB.RHR-0002 (LOSS OF RHR AT REDUCED INVENTORY) **CONCURRENTLY**

D. S2.OP-AB.CC-0001 (COMPONENT COOLING ABNORMALITY) and S2.OP-AB.RHR-0001(LOSS OF RHR) **CONCURRENTLY**

Answer: D

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. The candidate could incorrectly conclude that only performance of the Loss of RHR is required, since core boiling core boiling is a major concern and RCS is at Water Elevation 103.5 feet.

B. Incorrect but plausible. The candidate could incorrectly conclude that only performance of the Loss of RHR at reduced inventory is require, since the PZR is empty and core boiling is a major concern.

C. Incorrect but plausible. This distractor would have been correct if RCS was at Water Elevation of 101 feet or less.

D. **Correct.** Based on indications on the CCW Bezel, 22 and 23 CCW Pumps have tripped which is causing CC Header Low Pressure alarms. IAW the Abnormal procedures network, the crew is required to perform S2.OP-AB.CC-0001 (COMPONENT COOLING ABNORMALITY) and S2.OP-AB.RHR-0001(LOSS OF RHR) CONCURRENTLY.

Question Number: 12

Tier: 2 Group 1

K/A: 008 Component Cooling Water System – A2.01

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

Importance Rating: 3.3

10 CFR Part 55: 41.5 / 43.5 / 45.3 / 45.13

10 CFR 55.43.b 5

K/A Match: K/A is matched because the candidate must analyze the CCW Bezel and determine that 2 CCW Pumps have tripped. After analyzing plant conditions then the candidate must determine what procedure(s) are required to be performed.

SRO Justification: The question meets the SRO requirements as described in NUREG 1021 ES-401 Attachment 2. **The question is SRO Only because it requires the candidate to perform an assessment of plant conditions (normal, abnormal, or emergency) and then selection of a procedure or section of a procedure to mitigate or recover, or with which to proceed.**

Specifically, the candidate must analyze the CCW Bezel and determine that the 22 and 23 CCW Pumps have tripped trip which is causing CC Header Low Pressure alarms. After analyzing plant conditions then the candidate must determine what procedure(s) are required to be performed.

Technical References: S2.OP-AB.CC-0001 (COMPONENT COOLING ABNORMALITY)
S2.OP-AB.RHR-0001 (LOSS OF RHR)
S2.OP-AB.RHR-0002 (LOSS OF RHR AT REDUCED INVENTORY)

Proposed references to be provided: None

Learning Objective:

Cognitive Level:

Higher	X
Lower	

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

13 **Points: 1.00**

Given

- The crew is performing 2-EOP-LOCA-3 (TRANSFER TO COLD LEG RECIRCULATION)
- Containment Pressure is 23 psig
- RCS Pressure is 50 psig

At time 19:10

- **ALL** ECCS Pumps are aligned to the Containment Sump

At time 19:15

- Erratic flow and pressure on **21** SI Pump, **21** Charging Pump and **21** RHR Pump is observed

At time 19:20

- Erratic flow and pressure on **22** SI Pump, **22** Charging Pump and **22** RHR Pump is observed

Which ONE of the following completes the statements below?

At **19:10**, the discharge of the ___(1)___ Pumps provides the D/P to drive Containment Spray.

At **19:20** and in accordance with 2-EOP-LOCA-3, the crew will IMMEDIATELY transition to ___(2)___.

	(1)	**(2)**
A.	RHR	2-EOP-APPX-7 (CONTAINMENT SUMP BLOCKAGE GUIDELINE)
B.	RHR	2-EOP-LOCA-5 (LOSS OF EMERGENCY RECIRCULATION)
C.	SI	2-EOP-APPX-7 (CONTAINMENT SUMP BLOCKAGE GUIDELINE)
D.	SI	2-EOP-LOCA-5 (LOSS OF EMERGENCY RECIRCULATION)

Answer: A

Answer Explanation

DISTRACTOR ANALYSIS:

A. **Correct.** For Part 1, at 19:10 the Containment Spray Pumps are taking suction from the outlet of the RHR HXs. For Part 2 and IAW 2-EOP-LOCA-3 (TRANSFER TO COLD LEG RECIRCULATION) CAS, transition to 2-EOP-APPX-7 (CONTAINMENT SUMP BLOCKAGE GUIDELINE) is required "ANYTIME ECCS PUMPS ARE ALIGNED TO THE CONTAINMENT SUMP AND AT LEAST ONE TRAIN OF EMERGENCY COOLANT RECIRCULATION CAN NOT BE MAINTAINED DUE TO INDICATIONS OF CONTAINMENT SUMP BLOCKAGE. Cavitation of ECCS Pumps is an indication of sump blockage per 2-EOP-LOCA-3 Background Document. Consequently, the crew will IMMEDIATELY transition to 2-EOP-APPX-7.

B. Incorrect but plausible. Part 1 is correct. For Part 2, 2-EOP-LOCA-3 has a transition to 2-EOP-LOCA-5 when "EMERGENCY COOLANT RECIRCULATION CAN NOT BE ESTABLISHED OR MAINTAINED FOR REASONS NOT RELATED TO CONTAINMENT SUMP BLOCKAGE". Consequently, the candidate could incorrectly conclude that at 19:20, the crew will IMMEDIATELY transition to 2-EOP-LOCA-5.

C. Incorrect but plausible. The candidate could incorrectly conclude that SI pumps provide the D/P to drive Containment Spray. Part 2 is correct.

D. Incorrect but plausible. The candidate could incorrectly conclude that SI pumps provide the D/P to drive Containment Spray. For Part 2, 2-EOP-LOCA-3 has a transition to 2-EOP-LOCA-5 when "EMERGENCY COOLANT RECIRCULATION CAN NOT BE ESTABLISHED OR MAINTAINED FOR REASONS NOT RELATED TO CONTAINMENT SUMP BLOCKAGE". Consequently, the candidate could incorrectly conclude that at 19:20, the crew will IMMEDIATELY transition to 2-EOP-LOCA-5.

Question Number: 13

Tier: 2 Group 1

K/A: 026 Containment Spray System – A2.07

Ability to (a) predict the impacts of the following malfunctions or operations on the CSS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of containment spray pump suction when in recirculation mode, possibly caused by clogged sump screen, pump inlet high temperature exceeded cavitation, voiding), or sump level below cutoff (interlock) limit

Importance Rating: 3.9

10 CFR Part 55: 41.5 / 43.5 / 45.3 / 45.13

10 CFR 55.43.b 5

K/A Match: K/A is matched because the candidate select a procedure to mitigate a loss of Containment Spray Pump Suction (while in recirculation mode). *** RHR Pumps provide Containment Spray flow while in recirculation mode***

SRO Justification: The question meets the SRO requirements as described in NUREG 1021 ES-401 Attachment 2. **The question is SRO Only because it requires the candidate to perform an assessment of plant conditions (normal, abnormal, or emergency) and then selection of a procedure or section of a procedure to mitigate or recover, or with which to proceed.**

Specifically, the candidate must assess ECCS pump flow and pressure and determine what procedure to perform.

Technical References: 2-EOP-LOCA-3
Training Drawing CS-1

Proposed references to be provided: None

Learning Objective: NOS05LCA3U2-04 (EOP-LOCA-03, TRANSFER TO COLD LEG RECIRCULATION)

6. Given 2-EOP-LOCA-3 and a set of plant conditions:
   - A. Determine a discrete path through the EOP.
   - B. Determine an appropriate transition out of the EOP.

Cognitive Level:

Higher	X
Lower	

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

14 **Points: 1.00**

REFERENCE PROVIDED

Given:

- Unit 2 is at 100% Reactor Power

At time 09:00 on June 12

- The Vital Instrument Bus 2**A** Inverter is declared inoperable

At time 09:30 on June 12

- The 2**A** Vital Instrument Bus is now being powered from its alternate power source

At time 12:00 on June 12

- The Vital Instrument Bus 2**D** Inverter is declared inoperable

At time 12:30 on June 12

- The 2**D** Vital Instrument Bus is now being powered from its alternate power source

In accordance with Unit 2 Technical Specifications, which ONE of the following completes the statement below?

If **BOTH** Inverters remain inoperable, then _____ is the **LATEST** Time / Date that Unit 2 is required to be in HOT STANDBY.

A. 18:00 on June 12

B. 19:00 on June 12

C. 18:00 on June 13

D. 18:00 on June 15

Answer: B

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. 18:00 on June 12 is the time / date if the candidate correctly determines that LCO 3.0.3 is applicable but incorrectly determines that LCO 3.0.3 allows only 6 hours to be in HOT STANDBY.

B. **Correct.** Based on the question stem, at 0900 on June 12, the crew must perform LCO 3.8.2.1. (Required Action A). At 1200 on June 12 and with 2 inverters now inoperable, the crew must now perform LCO 3.0.3 (since there is no REQUIRED ACTION of LCO 3.8.2.1 for 2 inoperable inverters). LCO 3.0.3 requires the Unit to be placed in HOT STANDBY within a maximum of 7 hours (1200 on June 12 + 7 hours = 1900 on June 12).

C. Incorrect but plausible. 18:00 on June 13 is the time / date to restore the inverter to OPERABLE status IAW LCO 3.8.2 REQUIRED ACTION B.

D. Incorrect but plausible. 18:00 on June 15 is the time / date to place the Unit in HOT STANDBY IAW LCO 3.8.2 REQUIRED ACTION B (if 2D Inverter remains inoperable.

Question Number: 14

Tier: 2 Group 1

K/A: 062 AC Electrical Distribution – G2.2.42

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

Importance Rating: 4.6

10 CFR Part 55: 41.7 / 41.10 / 43.2 / 43.3 / 45.3

10 CFR 55.43.b 2

K/A Match: K /A is matched because the candidate must be able to apply LCO 3.8.2.1 (ONSITE POWER DISTRIBUTION SYSTEMS - AC. DISTRIBUTION – OPERATING) and LCO 3.0.3.

SRO Justification: The question meets the SRO requirements as described in NUREG 1021 ES-401 Attachment 2. The question is SRO Only because it requires the candidate to apply generic LCO requirements (LCO 3.0.1 through 3.0.7 and SR 4.0.1 through 4.0.4) to determine when the Unit is required to be in HOT STANDBY.

Technical References: LCO 3.8.2.1
LCO 3.0.3

Proposed references to be provided: LCO 3.8.2.1

Learning Objective: NOS05TECHSPEC-12 (Technical Specifications)

12 Describe the general requirements associated with Specifications 3.0.1 through 3.0.6 relating to implementation of the Technical Specifications

Cognitive Level:

Higher X
Lower _____

Question Source

New _____
Modified Bank _____
Bank X

Question History: LOR 2018 Bi-Annual Crew D Written Exam SRO Q33

Comments:

15 **Points: 1.00**

REFERENCE PROVIDED

Given:

- Unit 2 is at 100% Reactor Power

At time **12:00 on January 7th**

- Grounds have been detected in a few cells of the 2A 125 VDC Battery
- 3 connected battery cells have a Float Voltage of 0 Volts

In accordance with Unit 2 Technical Specifications, which ONE of the following completes the statement below?

If **ALL** 3 connected battery cells continue to have a Float Voltage of 0 Volts, then _____ is the **LATEST** Date / Time that Unit 2 is required to be in HOT STANDBY.

A. 2000 on January **8th**

B. 1800 on January **8th**

C. 2000 on January **7th**

D. 1800 on January **7th**

Answer: C

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. 2000 on January 8th is the time / date if the candidate incorrectly applies the 24 hours to restore the battery to OPERABLE status IAW LCO 3.8.2.3 REQUIRED ACTION C then applies the 8 hours to place the Unit in HOT SHUTDOWN per LCO 3.8.2.3 REQUIRED ACTION F (if ALL 3 connected battery cells continue to have a Float Voltage of 0 Volts).

B. Incorrect but plausible. 1800 on January 8th is the time / date if the candidate incorrectly applies the 24 hours to restore the battery to OPERABLE status IAW LCO 3.8.2.3 REQUIRED ACTION C then incorrectly applies 6 hours to place the Unit in HOT SHUTDOWN per LCO 3.8.2.3 REQUIRED ACTION F (if ALL 3 connected battery cells continue to have a Float Voltage of 0 Volts).

C. **Correct.** Based on the question stem, at 1200 the 2A 125 VDC battery does not meet the Category B and C limits for 3 connected cells. This puts the Unit in LCO 3.8.2.3 REQUIRED ACTIONS C, D and F. Condition D and F are the most limiting and the crew has 2 hours to restore the battery to OPERABLE status or be within HOT STANDBY within the next 6 hours. Consequently, If ALL 3 connected battery cells continue to have a Float Voltage of 0 Volts, then 2000 (2 + 6 = 8 hours maximum) on January 7th is the LATEST Date / Time that Unit 2 is required to be in HOT STANBY.

D. Incorrect but plausible. 1800 on January 7th is the time / date if the candidate incorrectly interprets LCO 3.8.2.3 REQUIRED ACTION F to only have 6 hours maximum to place the Unit in HOT STANDBY (if ALL 3 connected battery cells continue to have a Float Voltage of 0 Volts).

Question Number: 15

Tier: 2 Group 1

K/A: 063 DC Electrical Distribution System – A2.01

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

Importance Rating: 3.2

10 CFR Part 55: 41.5 / 43.5 / 45.3 / 45.13

10 CFR 55.43.b 2

K/A Match: K /A is matched because the candidate must be able Tech Specs (a procedure) to mitigate grounds in the DC Electrical Distribution System

SRO Justification: The question meets the SRO requirements as described in NUREG 1021 ES-401 Attachment 2. The question is SRO Only because it requires the candidate to apply required actions (TS Section 3) in accordance with rules of application requirements (TS Section 1).

Technical References: LCO 3.8.2.3

Proposed references to be provided: LCO 3.8.2.3

Learning Objective: NOS05TECHSPEC-12 (Technical Specifications)

14. Describe the general component and parameter categories that are addressed by Technical Specification Sections 3/4.1 through 3/4.12.

Cognitive Level:

Higher X
Lower _____

Question Source

New X
Modified Bank _____
Bank _____

Question History:

Comments:

16 **Points: 1.00**

Given:

- The crew is performing 1-EOP-LOCA-1 (LOSS OF REACTOR COOLANT) Step 24, "Containment Hydrogen Concentration Verification"
- Containment Hydrogen concentration is 0.7%

In accordance with 1-EOP-LOCA-1, which ONE of the following completes the statement below?

The crew will _____.

A. **START ONLY** ONE Hydrogen Recombiner by performing S1.OP-SO.CAN-0001 (HYDROGEN RECOMBINER OPERATION) **CONCURRENTLY** with 1-EOP-LOCA-1

B. **START BOTH** Hydrogen Recombiners by performing S1.OP-SO.CAN-0001 (HYDROGEN RECOMBINER OPERATION) **CONCURRENTLY** with 1-EOP-LOCA-1

C. **CONTINUE** in 1-EOP-LOCA-1 until Containment Hydrogen concentration reaches 4.0%

D. **CONSULT** TSC for additional recovery actions and **REMAIN** in 1-EOP-LOCA-1

Answer: A

Answer Explanation

DISTRACTOR ANALYSIS:

A. **Correct.** IAW 2-EOP-LOCA-1, the crew will start ONLY one Hydrogen Recombiner when Containment Hydrogen Concentration is greater than a 0.5%.

B. Incorrect but plausible. The candidate could recognize the need to start the Hydrogen Recombiners based on Containment concentration level, but incorrectly conclude that BOTH Hydrogen Recombiners need to be started.

C. Incorrect but plausible. The candidate could incorrectly conclude that 1-EOP-LOCA-1 will be performed until Hydrogen Concentration reaches 4.0%.

D. Incorrect but plausible. Consulting the TSC would have been proper if Containment Concentration was greater than 4.0%.

Question Number: 16

Tier: 2 Group 2

K/A: 028 Hydrogen Recombiner and Purge Control System – A2.03

Malfunctions or operations on the HRPS; and (b) based on those predictions, use procedures to correct, control or mitigate the consequences of those malfunctions or operations: The hydrogen air concentration in excess of limit flame propagation or detonation with resulting equipment damage in containment

Importance Rating: 4.0

10 CFR Part 55: 41.5 / 43.5 / 45.3 / 45.13

10 CFR 55.43.b 5

K/A Match: K /A is matched because the candidate must know at what containment hydrogen concentration level to operate the hydrogen Recombiners following a LBLOCA.

SRO Justification: The question meets the SRO requirements as described in NUREG 1021 ES-401 Attachment 2. **The question is SRO Only because it requires the candidate to perform an assessment of plant conditions (normal, abnormal, or emergency) and then selection of a procedure or section of a procedure to mitigate or recover, or with which to proceed.**

Specifically, the candidate must assess Containment Hydrogen level during performance of 1-EOP-LOCA-1 and determine what procedure to perform.

Technical References: 1-EOP-LOCA-1

Proposed references to be provided: None

Learning Objective: NOS05LOCA01-05 (EOP-LOCA-01, LOSS OF REACTOR COOLANT AND LOSS OF COOLANT ACCIDENT ANALYSIS)

1. Given EOP-LOCA-01 and a set of plant conditions:

   A. Determine a discrete path through the EOP.

   B. Determine an appropriate transition out of the EOP.

Cognitive Level:

Higher X
Lower _____

Question Source

New _____
Modified Bank X
Bank _____

Question History:

Comments:

17 **Points: 1.00**

Given:

- The crew is performing S2.OP-AB.COND-0001 (LOSS OF CONDENSER VACUUM) due to a malfunction of the Condenser Air Removal system
- With Condenser Backpressure degrading, Unit 2 Turbine Load is being lowered in an attempt maintain condenser backpressure within the Allowable Operating Region of S2.OP-AB.COND-0001 Attachment 4, Condenser Absolute Pressure Limits

At time 19:00

- Condenser Backpressure has just exceeded the limit of S2.OP-AB.COND-0001 Attachment 4
- Unit 2 is at 45% Reactor Power

At **19:00** and in accordance with S2.OP-AB.COND-0001, which ONE of the following completes the statement below?

The crew will **TRIP** the ___(1)___.

After the Reactor / Turbine is tripped, the crew will __(2)___.

A. **(1)** Reactor
(2) **NOT** perform S2.OP-AB.COND-0001 concurrently with 2-EOP-TRIP-1, Reactor Trip Or Safety Injection

B. **(1)** Reactor
(2) perform S2.OP-AB.COND-0001 concurrently with 2-EOP-TRIP-1, Reactor Trip Or Safety Injection

C. **(1)** Turbine
(2) **NOT** perform S2.OP-AB.COND-0001 concurrently with S2.OP-AB.TRB-0001, Turbine Trip Below P-9

D. **(1)** Turbine
(2) perform S2.OP-AB.COND-0001 concurrently with S2.OP-AB.TRB-0001, Turbine Trip Below P-9

Answer: D

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. For Part 1, if Reactor Power had been above P-9, tripping the Reactor would have been correct IAW S2.OP-AB.COND-0001 CAS. For Part 2, transitioning to EOP-TRIP-1 and not continuing with S2.OP-AB.COND-0001 is correct if the reactor had been required to be tripped.

B. Incorrect but plausible. For Part 1, if Reactor Power had been above P-9, tripping the Reactor would have been correct IAW S2.OP-AB.COND-0001 CAS. For Part 2, the candidate could have incorrectly conclude that performing EOP-TRIP-1 and S2.OP-AB.COND-0001 concurrently was required.

C. Incorrect but plausible. Par 1 is correct. For Part 2, the candidate could incorrectly conclude that performing S2.OP-AB.COND-0001 concurrently with S2.OP-AB.TRB-0001, Turbine Trip Below P-9 was not required.

D. **Correct.** For Part 1 and at 19:00, Reactor Power is 45% which is less than P-9. IAW S2.OP-AB.COND-0001 (LOSS OF CONDENSER VACUUM) CAS, the crew will trip the turbine when Condenser Backpressure exceeds the limit of S2.OP-AB.COND-0001 Attachment 4. For Part 2 and IAW S2.OP-AB.COND-0001 CAS, after the Turbine is tripped, the crew will perform S2.OP-AB.COND-0001 concurrently with S2.OP-AB.TRB-0001, Turbine Trip Below P-9

Question Number: 17

Tier: 2 Group 2

K/A: 055 Condenser Air Removal System – G2.4.11

Knowledge of abnormal condition procedures

Importance Rating: 4.2

10 CFR Part 55: 41.10 / 43.5 / 45.13)

10 CFR 55.43.b 5

K/A Match: K /A is matched because the candidate must have knowledge of performing S2.OP-AB.COND-0001 (LOSS OF CONDENSER VACUUM) with backpressure degrading due to a malfunction of the Condenser Air Removal system.

SRO Justification: The question meets the SRO requirements as described in NUREG 1021 ES-401 Attachment 2. The question is SRO Only because it requires the candidate to perform an assessment of plant conditions (normal, abnormal, or emergency) and then selection of a procedure or section of a procedure to mitigate or recover, or with which to proceed.

Technical References: S2.OP-AB.COND-0001

Proposed references to be provided: None

Learning Objective: NOS05ABCOND-05 (LOSS OF CONDENSER VACUUM)

4. Given a set of initial plant conditions:
   - A. Determine the appropriate abnormal procedure.
   - B. Describe the plant response to actions taken in the abnormal procedure
   - C. Describe the final plant condition that is established by the abnormal procedure

Cognitive Level:

Higher	X
Lower	

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

18 **Points: 1.00**

Given:

- Unit 1 is at 25% Power and stable
- The crew is performing S1.OP-AB.CA-0001 (Loss Of Control Air) due to a leak on the cross connect line between Station Air and the Unit 1 Control Air
- 1A Control Air Header Pressure is 79 psig
- 1B Control Air Header Pressure is 77 psig

In accordance with S1.OP-AB.CA-0001, which ONE of the following completes the statements below?

The crew's **NEXT** action will be to _____.

A. **CHECK** ANY Excess Flow Check Valve closed per S1.OP-AB.CA-0001 Attachment 5 (EXCESS FLOW CHECK VALVE TABLE)

B. **TRIP** the Reactor and perform 1-EOP-TRIP-1 (Reactor Trip Or Safety Injection) **CONCURRENTLY** with S1.OP-AB.CA-0001 Attachment 6 (ABNORMAL COOLING WATER LINEUPS)

C. **INITIATE** a plant shutdown per S1.OP-IO.ZZ-0004 (POWER OPERATION) while **CONCURRENTLY** performing S1.OP-AB.CA-0001 Attachment 12 (LOCAL CONTROL OF SG PRESSURE AND LEVEL)

D. **TRIP** the Reactor and perform 1-EOP-TRIP-1 (Reactor Trip Or Safety Injection) **CONCURRENTLY** with S1.OP-AB.CA-0001 Attachment 12 (LOCAL CONTROL OF SG PRESSURE AND LEVEL)

Answer: D

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. CHECKING ANY Excess Flow Check Valve closed per S1.OP-AB.CA-0001 Attachment 5 (EXCESS FLOW CHECK VALVE TABLE) is only required when at least one control air header is greater than 80 psig. (S1.OP-AB.CA-0001 Step 3.17)

B. Incorrect but plausible. Tripping of the Reactor is correct. However, the crew is not required to perform S1.OP-AB.CA-0001 Attachment 6 (ABNORMAL COOLING WATER LINEUPS) since cooling water to Station or Emergency Air Compressors was not lost.

C. Incorrect but plausible. The candidate could recognize the need take the plant offline because BOTH Control Air Headers indicate less than 80 psig. However, the candidate could incorrectly conclude that the plant will be shutdown per S1.OP-IO.ZZ-0004 (POWER OPERATION) while CONCURRENTLY performing S1.OP-AB.CA-0001 Attachment 12 (LOCAL CONTROL OF SG PRESSURE AND LEVEL).

D. **Correct.** IAW S1.OP-AB.CA-0001 (Loss Of Control Air) CAS, when BOTH Control Air Headers indicate less than 80 psig, the crew's NEXT action will be to TRIP the Reactor and perform 1-EOP-TRIP-1 (Reactor Trip Or Safety Injection) CONCURRENTLY with S1.OP-AB.CA-0001 Attachment 12 (LOCAL CONTROL OF SG PRESSURE AND LEVEL).

Question Number: 18

Tier: 2 Group 2

K/A: 079 Station Air System (SAS)-A2.01

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

Importance Rating: 3.2

10 CFR Part 55: 41.5 / 43.5 / 45.3 / 45.13

10 CFR 55.43.b 5

K/A Match: At Salem Generating Station, Station Air provides the air for the Control Air System (Instrument Air System). Consequently, a malfunction in Service Air affects Control Air. Therefore, the K/A is matched because the candidate must know when S2.OP-AB.CA-0001 Attachment 12, "Local Control Of SG Pressure and Level" is required to be performed which mitigates a malfunction between the connection between Service Air and Control Air.

SRO Justification: The question meets the SRO requirements as described in NUREG 1021 ES-401 Attachment 2. **The question is SRO Only because it requires the candidate to analyze plant parameters and determine what when to implement an attachment of a procedure**

Technical References: S2.OP-AB.CA-0001

Proposed references to be provided: None

Learning Objective: NOS05ABCA01-07 (LOSS OF CONTROL AIR)

2. Describe, in general terms, the actions taken in S2.OP-AB.CA-0001(Q) and the bases for the actions in accordance with the Technical Bases Document

Cognitive Level:

Higher	
Lower	X

Question Source

New	
Modified Bank	X
Bank	

Question History: Modified from ILOT 16-01 SRO Q18

Comments:

19 **Points: 1.00**

Given:

- Units 1 and 2 are at 100% Power
- John Doe is a licensed SRO who is also a qualified STA

In accordance with Technical Specifications, which ONE of the following completes the statements below?

John Doe ___(1)___ fill the **STA** minimum staffing requirement on **Unit 1** and **Unit 2** concurrently.

John Doe ___(2)___ fill the **STA** minimum staffing requirement on **Unit 2** while concurrently filling the **SRO** minimum staffing requirement on **Unit 2**.

	(1)	**(2)**
A.	may **NOT**	may
B.	may **NOT**	may **NOT**
C.	may	may
D.	may	may **NOT**

Answer: C

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. For Part 1, the candidate could incorrectly conclude that John Doe may not fill the STA minimum staffing requirement on Unit 1 and Unit 2 concurrently. Part 2 is correct.

B. Incorrect but plausible. For Part 1, the candidate could incorrectly conclude that John Doe may not fill the STA minimum staffing requirement on Unit 1 and Unit 2 concurrently. For Part 2, the candidate may incorrectly conclude that John Doe may not fill the STA minimum staffing requirement on Unit 2 while concurrently filling the SRO minimum staffing requirement on Unit 2.

C. **Correct.** For Part 1 and IAW TS Table 6.2-1, while fulfilling the STA minimum staffing requirement on Unit 2, John Doe may fill the STA minimum staffing requirement on Unit 1. For Part 2 and IAW TS Table 6.2-1, while fulfilling the STA minimum staffing requirement on Unit 2, John Doe may concurrently fill the SRO minimum staffing requirement on Unit 2.

D. Incorrect but plausible. Part 1 is correct. For Part 2, the candidate may incorrectly conclude that John Doe may not fill the STA minimum staffing requirement on Unit 2 while concurrently filling the SRO minimum staffing requirement on Unit 2.

Question Number: 19

Tier: 3 Group _____

K/A: G2.1.5

Ability to use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc.

Importance Rating: 3.2

10 CFR Part 55: 41.5 / 43.5 / 45.3 / 45.13

10 CFR 55.43.b 1

K/A Match: The K/A is matched because the candidate must know minimum staffing requirements IAW Technical Specifications.

SRO Justification: The question meets the SRO requirements as described in NUREG 1021 ES-401 Attachment 2. The question is SRO Only because it requires the candidate to know Conditions and Limitations in the Facility License.

Technical References: TS Table 6.2-1

Proposed references to be provided: None

Learning Objective: NOS05TECHSPEC-12 (TECHNICAL SPECIFICATIONS)

16. Describe the information that is contained in Technical Specification Section 6.0, Administrative Controls.

Cognitive Level:

Higher	
Lower	X

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

20 **Points: 1.00**

Given:

- Unit 2 is at 100% Power

At time 17:55

- An LCO 3.4.5 (RELIEF VALVES) REQUIRED ACTION has been entered due to a failure of the 2PR2 (PZR PORV) control circuitry.
- 2PR7 (PZR PORV BLOCK VALVE) will be closed to comply with LCO 3.4.5 (RELIEF VALVES) REQUIRED ACTION B

Which ONE of the following completes the statement below?

In accordance with LCO 3.4.5 and after 2PR7 has been closed, power will be ___(1)___ to 2PR7 and in accordance with OP-AA-108-101-1002 (COMPONENT CONFIGURATION CONTROL), configuration control will be **INITIALLY** maintained with a(n) ___(2)___.

	(1)	**(2)**
A.	maintained	Work Clearance Document (WCD)
B.	maintained	Abnormal Component Position Sheet (ACPS)
C.	removed	Work Clearance Document (WCD)
D.	removed	Abnormal Component Position Sheet (ACPS)

Answer: D

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. For Part 1, if 2PR7 was in operable due to excess seat leakage, the power would be maintained to 2PR7 (IAW LCO 3.4.5). For Part 2 and IAW OP-AA-108-101-1002, a WCD will be hung on the components as soon as practical after the TS is entered.

B. Incorrect but plausible. For Part 1, if 2PR7 was in operable due to excess seat leakage, the power would be maintained to 2PR7 (IAW LCO 3.4.5). Part 2 is correct.

C. Incorrect but plausible. Part 1 is correct. For Part 2 and IAW OP-AA-108-101-1002, a WCD will be hung on the components as soon as practical after the TS is entered.

D. **Correct.** For Part 1 and IAW LCO 3.4.5, after 2PR7 has been closed, power will be removed to 2PR7. For Part 2 and IAW OP-AA-108-101-1002 (COMPONENT CONFIGURATION CONTROL), an Abnormal Component Position Sheet (ACPS) will be used to position 2PR7 since removing power from 2PR7 is a 1 hour or less TS REQUIRED ACTION..

Question Number: 20

Tier: 3 Group _____

K/A: G2.2.14

Knowledge of the process for controlling equipment configuration or status

Importance Rating: 3.2

10 CFR Part 55: 41.5 / 43.5 / 45.3 / 45.13

10 CFR 55.43.b 2

K/A Match: The K/A is matched because the candidate must the requirements of OP-AA-108-101-1002 (COMPONENT CONFIGURATION CONTROL) to reposition 2PR7 (PZR PORV BLOCK VALVE) to comply with LCO 3.4.5 (RELIEF VALVES) REQUIRED ACTION A

SRO Justification: The question meets the SRO requirements as described in NUREG 1021 ES-401 Attachment 2. The question is SRO Only because it requires the candidate to know Conditions and Limitations in the Facility License.

Technical References: LCO 3.4.5

OP-AA-108-101-1002 (COMPONENT CONFIGURATION CONTROL)

Proposed references to be provided: None

Learning Objective: N/A

Cognitive Level:

Higher	
Lower	X

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

21 **Points: 1.00**

REFERENCE PROVIDED

Given:

- Unit 2 is at 100% Reactor Power and stable
- The crew is performing S2.OP-SO.CBV-0002 (Containment Pressure – Vacuum Relief System Operation) Section 5.3, "Performing a Containment Vacuum Relief"
- 2R12A (CNTMT NOBLE GAS) and 2R41D (PLANT VENT NOBLE GAS RELEASE RATE) have **BOTH** just failed

In accordance with Technical Specifications, which ONE of the following completes the statement below?

LCO 3.3.3.1 (RADIATION MONITORING INSTRUMENTATION) is _____.

A. **NOT** met and the crew must perform Action 24 **ONLY**

B. **NOT** met and the crew must perform Action 26 **ONLY**

C. **NOT** met and the crew must perform Actions 24 and 26

D. met because redundant radiation monitors are OPERABLE

Answer: C

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. The candidate could correctly conclude that 2R12A only meets the Table 3.3-6 requirements of 2.a.1.a (Containment- Gaseous Activity- Purge & Pressure Vacuum Relief Isolation) and 2.a.1.b (Containment- Gaseous Activity- RCS Leak Detection). However, the candidate could then incorrectly conclude that only one 2R41 channel is required to be an alternate monitor to meet Table 3.3-6 requirements of 2.a.1.a (Containment- Gaseous Activity- Purge & Pressure Vacuum Relief Isolation). This would cause the candidate to incorrectly conclude that the crew would only be required to perform Action 24.

B. Incorrect but plausible. The candidate could incorrectly conclude that with 2R12A and 2R41D failed that the Table 3.3-6 requirements of 2.a.1.a (Containment- Gaseous Activity- Purge & Pressure Vacuum Relief Isolation) is not met. This would cause the candidate to incorrectly conclude that the crew would only be required to perform Action 26.

C. **Correct.** When analyzing LCO 3.3.3.1 against the given plant conditions, the candidate will need to analyze Table 3.3-6. To properly analyze Table 3.3-6, the candidate must also know information contained in the Bases of LCO 3.3.3.1. 2 R12A is the credited monitor to meet the Table 3.3-6 requirements of 2.a.1.a (Containment- Gaseous Activity- Purge & Pressure Vacuum Relief Isolation) and 2.a.1.b (Containment- Gaseous Activity- RCS Leak Detection). Since S2.OP-SO.CBV-0002 (Containment Pressure – Vacuum Relief System Operation) Section 5.3, "Performing a Containment Vacuum Relief" is in progress, 2R41 (2R41A, B and D) can also be used to meet the requirements of Table 3.3-6 requirements of 2.a.1.a (Containment- Gaseous Activity- Purge & Pressure Vacuum Relief Isolation). Consequently, with 2R12A and 2R41D failed, LCO 3.3.3.1 (RADIATION MONITORING INSTRUMENTATION) is NOT met and the crew must perform Actions 24 and 26.

D. Incorrect but plausible. Since there are multiple 2R12s (2R12A, 2R12B, 2R12C) and multiple 2R41s (A-D), the candidate could incorrectly conclude that LCO 3.3.3.1 is met with ONLY a failure of 2R12A and 2R41D.

Question Number: 21

Tier: 3 Group _____

K/A: G2.2.42

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

Importance Rating: 4.6

10 CFR Part 55: 41.7 / 41.10 / 43.2 / 43.3 / 45.3

10 CFR 55.43.b 2

K/A Match: K/A is matched because the candidate must know the entry conditions for LCO 3.3.3.1 (RADIATION MONITORING INSTRUMENTATION)

SRO Justification: The question meets the SRO requirements as described in NUREG 1021 ES-401 Attachment 2. The question is SRO Only because it requires the candidate to have knowledge of TS bases that is required to analyze TS-required actions

Technical References: Technical Specifications

Proposed references to be provided: LCO 3.3.3.1

Learning Objective: NOS05CONTMT-15 (CONTAINMENT AND CONTAINMENT SUPPORT SYSTEMS)

9. Given a situation dealing with Containment and Containment Support Systems operability, examine the situation and apply the appropriate Technical Specification action

Cognitive Level:

Higher	X
Lower	

Question Source

New	
Modified Bank	X
Bank	

Question History: Modified from ILOT 16-01 NRC SRO Q14

Comments:

22 **Points: 1.00**

Given:

- A General Emergency exists at Unit 2
- The SM has turned over Emergency Coordinator duties to the EDO

In accordance with NC.EP-EP.ZZ-0304 (OPERATIONAL SUPPORT CENTER (OSC) RADIATION PROTECTION RESPONSE), which ONE of the following completes the statements below?

The Planned Emergency Exposure Limit (PEEL) for life saving is ___(1)___ REM.

The EDO ___(2)___ can approve the emergency exposure.

	(1)	**(2)**
A.	25	**ONLY**
B.	25	or SM
C.	75	**ONLY**
D.	75	or SM

Answer: C

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. For Part 1, 25 REM is Planned Emergency Exposure Limit (PEEL) for accident mitigation. Part 2 is correct.

B. Incorrect but plausible. For Part 1, 25 REM is Planned Emergency Exposure Limit (PEEL) for accident mitigation. For Part 2, since the SM served as the interim EDO, the candidate could incorrectly conclude that the SM and EDO can approve the emergency exposure.

C. **Correct.** For Part 1 and IAW NC.EP-EP.ZZ-0304 (OPERATIONAL SUPPORT CENTER (OSC) RADIATION PROTECTION RESPONSE), the Planned Emergency Exposure Limit (PEEL) for life saving is 75 REM. For Part 2 and IAW NC.EP-EP.ZZ-0304, Emergency Coordinator authorization that requires Emergency Exposure for LIFE SAVING TASKS should be done verbally.

D. Incorrect but plausible. Part 1 is correct. For Part 2, since the SM served as the interim EDO, the candidate could incorrectly conclude that the SM and EDO can approve the emergency exposure

Question Number: 22

Tier: 3 Group _____

K/A: G2.3.4

Knowledge of radiation exposure limits under normal or emergency conditions

Importance Rating: 3.7

10 CFR Part 55: 41.12 / 43.4 / 45.10

10 CFR 55.43.b 4

K/A Match: The K/A is matched because the candidate must know the Planned Emergency Exposure Limit (PEEL) for life saving IAW NC.EP-EP.ZZ-0304 (OPERATIONAL SUPPORT CENTER (OSC) RADIATION PROTECTION RESPONSE).

SRO Justification: The question meets the SRO requirements as described in NUREG 1021 ES-401 Attachment 2. The question is SRO Only because it requires the candidate to know the Radiation Hazards That May Arise during Normal and Abnormal Situations.

Technical References: NC.EP-EP.ZZ-0304 (OPERATIONAL SUPPORT CENTER (OSC) RADIATION PROTECTION RESPONSE)

Proposed references to be provided: None

Learning Objective: N/A

Cognitive Level:

Higher	
Lower	X

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

23 **Points: 1.00**

Given:

- An NEO has signed onto a RWP to perform an Independent Verification (IV) on a manual gate valve located inside a Locked High Radiation Area (LHRA)
- RP estimates that the operator would receive a dose of 15 mrem while performing the IV

Which ONE of the following completes the statements below?

In accordance with RP-AA-460 (CONTROLS FOR HIGH AND VERY HIGH RADIATION AREAS), an LHRA has a **MINIMUM** dose rate of ___(1)___ mrem / hr @ 30 cm.

In accordance with OP-AA-108-101-1002 (COMPONENT CONFIGURATION CONTROL) and based on the estimated dose of 15 mrem to perform the IV, the Shift Manager is ___(2)___ to waive the "Hands On" IV of the manual gate valve.

	(1)	**(2)**
A.	100	**NOT** permitted
B.	100	permitted
C.	1000	**NOT** permitted
D.	1000	permitted

Answer: D

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. For Part 1, 100 mrem / hr is the limit for posting the area as a High Radiation Area.

B. Incorrect but plausible. For Part 1, 100 mrem / hr is the limit for posting the area as a High Radiation Area.

C. Incorrect but plausible. Part 1 is correct. For Part 2, the candidate could incorrectly conclude that for an estimated dose of 15 mrem, the Shift Manager can not to waive the "Hands On" IV of the manual gate valve.

D. **Correct.** For Part 1 and in accordance with RP-AA-460 (CONTROLS FOR HIGH AND VERY HIGH RADIATION AREAS), an LHRA has a MINIMUM dose rate of 1000 mrem / hr @ 30 cm. For Part 2 and in accordance with OP-AA-108-101-1002 (COMPONENT CONFIGURATION CONTROL) and based on the estimated dose of 15 mrem to perform the IV, the Shift Manager is permitted to waive the "Hands On" IV of the manual gate valve.

Question Number: 23

Tier: 3 Group _____

K/A: G2.3.7

Ability to comply with radiation work permit requirements during normal or abnormal conditions

Importance Rating: 3.6

10 CFR Part 55: 41.12 / 45.10

10 CFR 55.43.b 4

K/A Match: The K/A is matched because the candidate must know the how complying with an RWP in a Locked High Radiation Area affects Independent Verification requirements for a manual gate valve.

SRO Justification: The question meets the SRO requirements as described in NUREG 1021 ES-401 Attachment 2. The question is SRO Only because it requires the candidate to know the Radiation Hazards That May Arise during Normal and Abnormal Situations.

Technical References: RP-AA-460 (CONTROLS FOR HIGH AND VERY HIGH RADIATION AREAS)

OP-AA-108-101-1002 (COMPONENT CONFIGURATION CONTROL)

Proposed references to be provided: None

Learning Objective: N/A

Cognitive Level:

Higher	
Lower	X

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

24 **Points: 1.00**

Given:

- Unit 2 is at 100% Reactor Power and stable

At time 02:00:00

- The crew enters S2.OP-AB.CR-0001 (Control Room Evacuation)

At time 02:01:00

- The Control Room has been evacuated and **ALL** of the Immediate Actions of S2.OP-AB.CR-0001 were successfully completed
- There is **NO** damage to the plant

In accordance with S2.OP-AB.CR-0001, which ONE of the following completes the statements below?

The SM will direct Safety Injection to be defeated by _____.

A. inserting a jumper to P-11 and, before leaving the control room, placing SEC Block switches in Block per S2.OP-AB.CR-0001 Attachment 5 (REACTOR OPERATOR)

B. opening vital instrument bus breakers to de-energize SSPS and the SEC cabinets per S2.OP-AB.CR-0001 Attachment 7 (#1 NEO)

C. inserting a jumper for P-11 and opening vital instrument bus breakers to de-energize SECs S2.OP-AB.CR-0001 Attachment 5 (REACTOR OPERATOR)

D. opening vital instrument bus breakers to de-energize SSPS and before leaving the control room, placing the SEC Block switches in Block per S2.OP-AB.CR-0001 Attachment 7 (#1 NEO)

Answer: B

Answer Explanation

DISTRACTOR ANALYSIS:

A. Incorrect but plausible. The RO would normally operate the SEC block switches from the control room and blocking the SECs would defeat Safety Injection.

B. **Correct.** The SM will direct Safety Injection to be defeated by opening vital instrument bus breakers to de-energize SSPS and the SEC cabinets per S2.OP-AB.CR-0001 Attachment 7 (#1 NEO).

C. Incorrect but plausible. This distractor is partially correct.

D. Incorrect but plausible. This distractor is partially correct.

Question Number: 24

Tier: 3 Group _____

K/A: G2.4.35

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

Importance Rating: 4.0

10 CFR Part 55: 41.10 / 43.5 / 45.13

10 CFR 55.43.b 5

K/A Match: The K/A is matched because the candidate must know if the crew will send a Nuclear Equipment Operator to defeat Safety injection during a Control Room Evacuation.

SRO Justification: The question meets the SRO requirements as described in NUREG 1021 ES-401 Attachment 2. The question is SRO Only because it requires the candidate **to perform an assessment of plant conditions (normal, abnormal, or emergency) and then selection of a procedure or section of a procedure to mitigate or recover, or with which to proceed.**

Technical References: S2.OP-AB.CR-0001 (Control Room Evacuation)

Proposed references to be provided: None

Learning Objective: NOS05ABCR01-05 (CONTROL ROOM EVACUATION)

3. Given a set of initial plant conditions:
   - A. Determine the appropriate abnormal procedure.
   - B. Describe the plant response to actions taken in the abnormal procedure.
   - C. Describe the final plant condition that is established by the abnormal procedure.

Cognitive Level:

Higher	
Lower	X

Question Source

New	X
Modified Bank	
Bank	

Question History:

Comments:

25 **Points: 1.00**

REFERENCE PROVIDED

Given:

At time 08:00

- The Shift Manager has declared a SITE AREA EMERGENCY per FB1.L and RB1.L, "Loss of the Fuel Clad Barrier and Loss of Reactor Coolant System Barrier"

At time 08:45

- Operational conditions have deteriorated
- The Shift Manager / Emergency Director has declared a GENERAL EMERGENCY per FB1.L, RB1.L and CB1.L, " Loss of the Fuel Clad Barrier, Loss of Reactor Coolant System Barrier and Loss Of Containment Barrier" (13 PTS)
- R44A/B (Containment High Range Area Monitors) are reading 1000 R/hr

At time 08:55

- The Shift Manager / Emergency Director has completed the Initial Contact Message Form (ICMF) and the form has been verified by the STA

At time 09:50

- A wind shift has occurred and the SM is evaluating the need for a possible Protective Action Recommendation (PAR) Upgrade

Which ONE of the following completes the statements below?

At **08:55**, the correct **INITIAL** PAR on the ICMF should be the ___(1)___ PAR.

Based on the wind shift at **09:50**, the SM will declare ___(2)___ PAR Upgrade.

	(1)	**(2)**
A.	Default	**NO**
B.	Default	an RPSA
C.	RPSA	an RPSA
D.	RPSA	**NO**

Answer: A

Answer Explanation

DISTRACTOR ANALYSIS:

A. **Correct.** For Part 1 and IAW EP-SA-111-F4 Attachment 4 (Appendix 1), the correct PAR is the Default PAR. For Part 2 and IAW EP-SA-111-F4 Attachment 4 (Appendix 1), NO PAR Upgrade is required.

B. Incorrect but plausible. PART 1 is correct. For PART 2, the operator could incorrectly apply IAW EP-SA-111-F4 Attachment 4 (Appendix 1), and determine that an RPSA PAR Upgrade is required.

C. Incorrect but plausible. For PART 1, the operator could incorrectly use the flow chart and incorrectly determine the RPSA PAR is required. For PART 2, the operator could incorrectly apply IAW EP-SA-111-F4 Attachment 4 (Appendix 1), and determine that an RPSA PAR Upgrade is required.

D. Incorrect but plausible. For PART 1, the operator could incorrectly use the flow chart and incorrectly determine the RPSA PAR is required. PART 2 is correct.

Question Number: 25

Tier: 3 Group _____

K/A: G2.4.38

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

Importance Rating: 4.4

10 CFR Part 55: 41.10 / 43.5 / 45.11

10 CFR 55.43.b 6

K/A Match: The K/A is matched because the candidate must know how to perform a PAR and PAR upgrade IAW the facility emergency plan.

SRO Justification: The question meets the SRO requirements as described in NUREG 1021 ES-401 Attachment 2. The question is SRO Only because it requires the candidate to perform an evaluation of core conditions and emergency classifications based on core conditions.

Technical References: EP-SA-111-F4

Proposed references to be provided: EP-SA-111-F4 **PAGE 7 & 8 ONLY**

Learning Objective: NEPECDTYSC-4 (Emergency Preparedness Training)

3. Given plant conditions for an emergency, CLASSIFY the event in accordance with the ECG
    - Explain the Purpose of the Event Classification Guide (ECG)
    - Describe the format and layout of the Emergency Action Level (EAL) sections
    - Describe management expectations for timeliness and accuracy (include Salem OE)
    - Interpret EAL flowcharts and EAL wall charts
    - Classify the event using EALs
    - Define a common site event

Cognitive Level:

Higher X
Lower _____

Question Source

New _____
Modified Bank _____
Bank X

Question History: ILOT 16-01 AUDIT SRO Q25

Comments: