

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	1	
	Group#	1	
	K/A#	000007K103	
		Knowledge of the operational implications of the following concepts as they apply to the reactor trip: - Reasons for closing the main turbine governor valve and the main turbine stop valve after a reactor trip	
	Importance	3.7	4

Question # 1

Which if the following is the basis for verifying the Main Turbine Tripped after a reactor trip?

- A. Prevent consequences resulting from an excessive cooldown of the RCS.
- B. Prevent an unnecessary transition to FR-H.1 upon exit from E-0.
- C. Prevent missile hazards resulting from turbine overspeed condition.
- D. Prevent exceeding RCS – SG ΔP limit

Answer: A

Explanation/Justification:

A. Correct

B. Incorrect. Plausible because continuing to remove steam from the steam generators will deplete inventory. This can satisfy SG level entry conditions to FR-H.1

C. Incorrect. Plausible because turbine overspeed is a possible consequence if a generator trip occurs before a turbine trip.

D. Incorrect. Plausible because if all inventory is removed from a SG the pressure will rapid decrease. This condition can challenge the RCS-SG delta P limit.

Technical References: 2-E-0 BG

Proposed References to be provided: None

Learning Objective I2LP-ILO-EOPE00 1

Question Source: New

Question History: NA

Question Cognitive Level: Fundamental Knowledge

10 CRF Part 55 Content: 55.41 (b) 5

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	1	
	Group#	1	
	K/A#	000008A108	
		Ability to operate and/or monitor the following as they apply to the Pressurizer Vapor Space Accident: - PRT level pressure and temperature	
	Importance	3.8	3.8

Question # 2

The unit is at 100% power and PZR Pressure has lowered to 2025 psig in two minutes. No automatic trip setpoint has been met. Which of the following sets of conditions could confirm that a PORV is leaking significantly?

1. Acoustic Monitor Indication for flow through the PORV
 2. Tailpipe temperature at saturation temperature for PRT pressure
 3. Tailpipe temperature at saturation temperature for the PZR
 4. PRT level elevated
 5. PRT temperature slightly elevated
 6. PRT temperature equal to tailpipe temperature
- A. 1,3,6
- B. 3,4,6
- C. 2,4,5
- D. 1,2,4,5

Answer: C

Explanation/Justification:

Explanation:

For this event, items 2,4, and 5 will occur and the others will not occur. No more than 2 wrong answers can be eliminated by knowing that any one of the incorrect changes is incorrect. All choices appear twice.

Acoustic monitor indication is only available for the PZR safeties, but it is plausible that an operator makes this mistake especially since the panel in the back of the control room.

Tailpipe temperature being at saturation for the PZR is wrong but is plausible if misread or if the candidate misunderstands where temperature is measured.

PRT temperature equal to tailpipe temperature is wrong but plausible if the candidate does not know that this is liquid temperature.

Technical References: Syst Desc 1.4

Proposed References to be provided: None

Learning Objective I2LP-ILO-RCSPZR 4

Question Source: New

Question History: NA

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.41 (b) 5

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	1	
	Group#	1	
	K/A#	000011K101	
		Knowledge of the operational implications of the following concepts as they apply to the Large Break LOCA: - Natural circulation and cooling, including reflux boiling	
	Importance	4.1	4.4

Question # 3

Following a Large Break LOCA one of the heat removal methods used during a loss of containment sump recirculation condition is reflux cooling.

Which of the following describes the reflux cooling mechanism and what conditions are necessary to enhance this method of cooling?

- A. Steam produced in the core rises in the hot legs to the steam generators where it is condensed and returned to the vessel via the cold legs. Steam generator levels must be maintained to enhance reflux cooling.
- B. Steam produced in the core rises in the hot legs to the steam generators where it is condensed and returned to the vessel via the cold legs. RCS pressure must be maintained less than 1000 psig to ensure reflux cooling will occur.
- C. Steam produced in the core flows along the top of the hot leg piping to the steam generators where it is condensed and returns to the vessel via the bottom of the hot leg piping. Steam generator levels must be maintained to enhance reflux cooling.
- D. Steam produced in the in the core flows along the top of the hot leg piping to the steam generators where it is condensed and returns to the vessel via the bottom of the hot leg piping. RCS pressure must be maintained less than 1000 psig to ensure reflux cooling will occur.

Answer: C

Explanation/Justification:

A. Incorrect. Plausible because steam produced in the core rises to the SG and is condensed; however water flows back down the hot leg to the core. Also it is true that SG level must be maintained.

B. Incorrect. Plausible because steam produced in the core rises to the SG and is condensed; however water flows back down the hot leg to the core.

C. Correct.

D. Incorrect. Plausible because steam produced in the core rises to the SG and is condensed, and the water flows back to the core via the hot leg; however, there is no requirement to maintain pressure < 1000 psig.

Technical References: 2-ECA-1.1 BG

Proposed References to be provided: None

Learning Objective I2LP-ILO-NACIRC 1
I2LP-ILO-NACIRC 3

Question Source: Bank

Question History: NA

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.41 (b) 5

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	1	
	Group#	1	
	K/A#	000015A112	
		Ability to operate and/or monitor the following as they apply to the Reactor Coolant Pump Malfunctions: - Reactor coolant loop flow meters	
	Importance	2.8	3.1

Question # 4

Given:

- The unit is operating at 25% power during a plant shutdown for refueling.
- 23 RCP shaft sheers.
- Simultaneously the common tap for loop 23 RCS Flow indication has developed a leak.

Which of the following correctly describes the plant status, actual and indicated RCS flow for loop 23?

	Reactor Status	Indicated flow	Actual Flow
A.	Tripped	≈ 0%	≈ 0%
B.	Tripped	≈ 0%	≈ 20% reversed
C.	Not Tripped	≈ 120%	≈ 20% reversed
D.	Not Tripped	≈ 120%	≈ 0%

Answer: B

Explanation/Justification:

A. Incorrect. Plausible because the unit will trip with power above P-8 (18%) and low flow in one loop. Candidate must recall that the common tap is the high

pressure tap and that indicated flow will decrease because the measured delta P will decrease. Actual loop flow will reverse and indicate approx 20%.

B. Correct. The unit will trip due to low flow with power above P-8.

C. Incorrect. Plausible because the candidate must recall that the common tap is the high pressure tap and that indicated flow will decrease; the measured delta P will decrease. The RCP breaker will NOT trip due to sheered shaft. Actual loop flow will reverse and indicate approx 20%.

D. Incorrect. Plausible because the candidate must recall that the common tap is the high pressure tap and that indicated flow will decrease; the measured delta P will decrease. The RCP breaker will NOT trip due to sheered shaft. Actual loop flow will reverse and indicate approx 20%.

Technical References:

Proposed References to be provided: None

Learning Objective I2LP-ILO-RCS001 13
I2LP-ILO-RCS001 4

Question Source: New

Question History: NA

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.41 (b) 3

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	1	
	Group#	1	
	K/A#	000022K304	
		Knowledge of the reasons for the following responses as they apply to the Loss of Reactor Coolant Makeup: - Isolating letdown	
	Importance	3.2	3.4

Question # 5

The plant is 100% normal full power lineup when the running charging pump trips. The cause is a common pump suction issue. It will be 5 minutes before a charging pump can be started.

What will be done with normal letdown due to these conditions?

- A. The CVCS Beds will be bypassed to ensure temperature limits are not exceeded.
- B. No action should be necessary since the Non Regen Heat Exchanger will maintain letdown temperature for a short duration loss of charging.
- C. Letdown will be diverted to ensure that VCT level and temperature limits are not exceeded.
- D. Letdown will be isolated to prevent flashing downstream of the letdown orifices.

Answer: D

Explanation/Justification:

Explanation:

Per 2-AOP-CVCS-1 steps 4.7/4.8, letdown is isolated whenever there is no charging pump running at this point in the procedure. It is plausible that for a short duration loss of charging with expected restoration, the procedure could allow continued letdown flow.

- A. Plausible since bed overheating is a legitimate concern.
- B. Plausible since for 5 minutes is a short term loss of charging and CCW will be cooling letdown at the NRHX.
- C. Plausible since VCT parameters are a concern.
- D. Correct answer.

Technical References: 2-AOP-CVCS-1
Proposed References to be provided: None

Learning Objective I2LP-ILO-AOPCVC 2

Question Source: New

Question History: NA

Question Cognitive Level: Fundamental Knowledge

10 CRF Part 55 Content: 55.41 (b) 4

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	1	
	Group#	1	
	K/A#	000025K205	
		Knowledge of the interrelations between the Loss of Residual Heat Removal System and the following: - Reactor building sump	
	Importance	2.6	2.6

Question # 6

Given:

- Vacuum fill is in progress in accordance with 2-SOP-1.1.1, Vacuum Filling and Degassing the Reactor Coolant System.
- The RCS is at 62'3" elevation
- 21 RHR pump is in service
- 22 RHR pump is in standby.

The operating RHR pump tripped on overcurrent and the standby pump failed to start. Assuming no change in RHR pump status, how will the core be cooled 1 hour from now?

- Two charging pumps taking a suction on the VCT to the RCS via normal cold leg injection.
- One Recirc pump taking a suction on the Recirc Sump to RHR Heat exchanger and back to the RCS.
- One Recirc Pump taking a suction on the Recirc Sump to RHR Heat exchanger to SI Pump suction and back to RCS via hot leg injection.
- One SI pump taking a suction on the RWST to the RCS via normal cold leg injection.

Answer: D

Explanation/Justification:

A. Incorrect. Plausible because charging pumps can be aligned to makeup to the RCS in AOP-RHR-1, Loss of RHR; however, the charging pumps are NOT aligned to the VCT.

B. Incorrect. Plausible because this lineup would be correct if the condition lasted for greater approximately 15 hours (i.e., after the RWST was pumped through the RCS to the sump).

C. Incorrect. Plausible because this lineup would be correct if the condition lasted for greater than approximately 15 hours and an RCS cold leg was NOT intact.

D. Correct. With the RCS intact (Vacuum fill in progress), an SI pump is used to pump the contents of the RWST through the RCS & PRZR to the PRT. When the PRT rupture disk ruptures the RWST water will flow to the Recirculation Sump.

Technical References: 2-AOP-RHR-1

Proposed References to be provided: None

Learning Objective I2LP-ILO-AOPRHR 2

Question Source: New

Question History: NA

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.41 (b) 10

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	1	
	Group#	1	
	K/A#	000026K302	
		Knowledge of the reasons for the following responses as they apply to the Loss of Component Cooling Water: - The automatic actions (alignments) within the CCWS resulting from the actuation of the ESFAS	
	Importance	3.6	3.9

Question # 7

The plant is in a normal full power lineup. During I&C troubleshooting, a technician inadvertently causes a Train A Safety Injection actuation. What effect will this have on the Component Cooling Water System?

	CCW Pumps	Aux CCW Pumps	CCW from RHR Hx
A.	2 Pumps Running	1 Pump Running	Both Valves Open
B.	All Running	Both Pumps Running	Both Valves Open
C.	All Running	1 Pump Running	One Valve Open
D.	2 Pumps Running	Both Pumps Running	One Valve Open

Answer: C

Explanation/Justification:

A safety injection signal from either train will start all three component cooling water pumps.

A safety injection signal from one train will only start the train specific Aux CCW pump and open the train specific CCW outlet valve from the RHR heat exchanger. Because either train of safety injection will start all 3 CCW pumps and Aux CCW pumps and CCW from RHR Heat Exchanger Valve are started/opened from a safety injection signal, any combination of pumps and valves is plausible.

A. Incorrect.

B. Incorrect.

C. Correct.

D. Incorrect

Technical References: Plant Prints

Proposed References to be provided: None

Learning Objective I2LP-ILO-ESS001 5

Question Source: Modified

Question History: NA

Question Cognitive Level: Fundamental Knowledge

10 CRF Part 55 Content: 55.41 (b) 7

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	1	
	Group#	1	
	K/A#	0000572136	
		Conduct of Operations - Knowledge of procedures and limitations involved in core alterations.	
	Importance	3	4.1

Question # 8

Given the following plant conditions on Unit 2:

- The unit is in Mode 6 with refueling activities in progress.
- Containment purge is in service.
- 22 Static Inverter faults resulting in a loss of 22/22A instrument bus

Which of the following describes a consequences of the loss of Instrument Bus 22/22A?

- A. Suspend core alterations until 32 source range channel is re-energized from alternate source.
- B. Refueling operations can continue for 1 hour as long as primary water to the refueling cavity is isolated.
- C. Refueling operations may continue as long as R-41 is restored to OPERABLE status in 7 days.
- D. Suspend core alterations until Audio Count Rate/Scaler Time is re-energized.

Answer: A

Explanation/Justification:

A. Correct.

B. Incorrect. Plausible because refueling can continue for one hour under certain conditions; however loss of one SR NIS is not one of them.

C. Incorrect. Plausible because R-41 monitors containment particulate activity; however, R-41 is energized from 24/24A instrument buses. The 7 day completion time is plausible because grab samples could be used.

D. Incorrect. Plausible because Audio Count Rate/Scaler Timer is powered from an instrument bus; however it is powered from IB 24.

Technical References: 2-AOP-IB-1

Proposed References to be provided: None

Learning Objective I2LP-ILO-AOPIB1 5

Question Source: New

Question History: NA

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.41 (b) 6

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	1	
	Group#	2	
	K/A#	000038A215	
		Ability to determine and interpret the following as they apply to a SGTR: - Pressure at which to maintain RCS during S/G cooldown	
	Importance	4.2	4.4

Question # 9

The plant experienced a SGTR.

The following major actions of E-3 have been completed:

- Initial Cooldown
- Depressurization to restore inventory
- SI has been terminated
- Normal charging and letdown have been restored

Given the following plant conditions:

- Pressurizer Level is 68% and increasing
- Ruptured SG NR Level is 35% and decreasing
- No other event is in progress
- Shutdown margin is adequate

What action is required per E-3, Steam Generator Tube Rupture, based on these conditions?

- A. Increase RCS Makeup Flow
- B. Turn ON Pressurizer Heaters
- C. Depressurize the RCS using normal spray
- D. Increase cooldown rate using SG atmospherics

Answer: B

Explanation/Justification:

A. Incorrect. Plausible because increasing makeup would slowly raise RCS pressure stopping the backfill and this would be used if Pressurizer level was low.

B. Correct.

C. Incorrect. Plausible because this action is used if SG level is increasing and Pressurizer Level is decreasing.

D. Incorrect. Plausible because this action will cause a Decrease in RCS Pressure not an Increase.

Technical References: 2-ES-3.2
3-ES-3.2

Proposed References to be provided: None

Learning Objective I3LP-ILO-EOPE30 16

Question Source: Bank

Question History: Unit 3 NRC 2013

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.41 (b) 10

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	1	
	Group#	1	
	K/A#	000040K101	
		Knowledge of the operational implications of the following concepts as they apply to Steam Line Rupture: - Consequences of PTS	
	Importance	4.1	4.4

Question # 10

15 minutes ago, the plant experienced a main steamline break, from 100% power. Because of difficulties in closing the MSIVs, two SGs have blown dry.

Current Plant status is as follows:

- Step 6 of E-2, "Faulted SG Isolation", is in progress.
- RCS temperature is 285°F and decreasing.
- SI flow is still being supplied to the RCS,
- Total AFW flow is 800 gpm.
- All RCPs have been stopped due to loss of cooling water.
- RCS Pressure is 1000 psig and stable
- Attachment 1 of E-0 has been completed

Which of the following is of greatest immediate concern?

- A crack could propagate in the reactor vessel wall due to a pressurized thermal shock event.
- Injection of ECCS accumulator nitrogen into the RCS is imminent, natural circulation cooling will be limited.
- A significant reduction in the heat sink capacity is present due to two S/Gs being dry.
- The loss of thermal driving head in the dry SGs will reduce the amount of natural circulation flow, due to stagnant coolant loops.

Answer: A

Explanation/Justification:

A. Correct. Crack propagation is the possible result of a rapid cooldown combined with elevated pressure.

B. Incorrect. Plausible because at 1000 psig, accumulator injection is close and loss of natural circulation is possible; however, with pressure stable it is not the greatest immediate concern.

C. Incorrect. Plausible because loss of 2 steam generators for cooldown will increase the time to achieve cold shutdown, but only one SG is necessary to safely remove all decay heat.

D. Excessive cooldown in one or more loops will impede natural circulation; however, natural circ will be re-established if the RCS heats up.

Technical References: 2-FR-P.1 BG

Proposed References to be provided: None

Learning Objective I2LP-ILO-EOPFP1 3

Question Source: Bank

Question History: NA

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.41 (b) 10

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	1	
	Group#	1	
	K/A#	000058K301	
		Knowledge of the reasons for the following responses as they apply to the Loss of DC Power: - Use of dc control power by ED/Gs	
	Importance	3.4	3.7

Question # 11

An electrical short causes a loss of 23 DC Power Panel. Subsequently a loss of the Station Auxiliary Transformer occurs. Five minutes after these events, what would the configuration of the Emergency Diesel Generators be?

- A. All three EDGs would be running with the output breaker for 3A open.
- B. All three EDGs would be running with their output breakers closed.
- C. Only 21 and 23 EDGs would be running with their output breakers open.
- D. Only 22 and 23 EDGs would be running with their output breakers closed.

Answer: B

Explanation/Justification:

A. Incorrect. Plausible because all 3 EDGs will be running. 23 DC Power Panel supplies Normal DC control power to 22 EDG, but 22 EDG has emergency control power from Distribution Panel 22. Similarly, Power Panel 23 supplies normal control power to 480V bus 3A breakers, and they are backed up from Power Panel 21.

B. Correct. Control Power for the diesel generators and their output breakers have normal and backup DC control power supply via an Auto Bus Transfer switch.

C. Incorrect. Plausible because 22 EDG receives Normal control power from 23 DC Power Panel; backup power from 22 Distribution Panel will start the EDG. Similarly, the output breakers have a normal and auto backup control power supply.

D. Incorrect. Plausible because 21 EDG receives backup control power from 23 DC Power Panel; it will start on its normal control power supply. Similarly, the output breakers have a normal and auto backup control power supply.

Technical References: 2-AOP-DC-1
Proposed References to be provided: None

Learning Objective I2LP-ILO-EDS03 11

Question Source: Bank

Question History: NA

Question Cognitive Level: Analysis Synthesis Evaluation

10 CRF Part 55 Content: 55.41 (b) 7

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	1	
	Group#	1	
	K/A#	0000552417	
		Emergency Procedures/Plan - Knowledge of EOP terms and definitions.	
	Importance	3.9	4.3

Question # 12

Given the following conditions:

- A Station Blackout has occurred.
- The Team is performing ECA-0.0, Loss of All AC Power.
- RCS Subcooling is 0 degrees F.
- PZR Pressure 1800 psig
- A RED Path exists on the Heat Sink CSF Status Tree.
- 21 EDG has been started and is supplying its associated bus.
- The Team is preparing to transition to the appropriate recovery procedure.

Which ONE (1) of the following describes the recovery strategy?

- Transition to FR-H.1 upon exit from ECA-0.0. Perform ECA-0.1, Loss of All AC Power Recovery Without SI Required, when FR-H.1 is complete.
- Transition to FR-H.1 upon exit from ECA-0.0. Perform ECA-0.2, Loss of All AC Power Recovery with SI Required, when FR-H.1 is complete.
- Transition to ECA-0.1, Loss of All AC Power Recovery Without SI Required, and enter FR-H.1 when directed by ECA-0.1.
- Transition to ECA-0.2, Loss of All AC Power Recovery with SI Required, and enter FR-H.1 when directed by ECA-0.2.

Answer: D

Explanation/Justification:

A. Incorrect. Plausible because FR-H.1 is the correct procedure for a RED Path condition on Heat Sink; however, the procedure is not entered until after step 9 of ECA-0.1 or step 11 of ECA-0.2 is complete.

B. Incorrect. Plausible because FR-H.1 is the correct procedure for a RED Path condition on Heat Sink; however, the procedure is not entered until after step 9 of ECA-0.1 or step 11 of ECA-0.2 is complete.

C. Incorrect. Plausible because ECA-0.1 would be the correct procedure if no safety injection signal or condition existed. Candidate should recognize that 0 degrees subcooling requires a safety injection.

D. Correct.

Technical References:	2-ECA-0.0 2-ECA-0.0 BG 2-FR-H.1 2-FR-H.1 BG 3-ECA-0.0 3-FR-H.1
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Proposed References to be provided:	None
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Learning Objective	I2LP-ILO-EOPROU 10
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Question Source:	Bank
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Question History:	NA
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Question Cognitive Level:	Comprehension
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10 CRF Part 55 Content:	55.41 (b) 10
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Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	1	
	Group#	1	
	K/A#	000056A133	
		Ability to operate and/or monitor the following as they apply to the Loss of Offsite Power: - PORV block valve control switch	
	Importance	3.3	3.5

Question # 13

Unit 2 was operating at 100% when the following occurred:

- A loss of 480V Bus 6A occurred due to a fault.
- The bus could not be re-energized.
- Following completion of all actions of AOP-480V-1, an area wide blackout occurred.
- All equipment responded as designed for the blackout.
- Five minutes after the blackout, no additional operator actions have been taken at this point.

If it is desired to use a PZR PORV to control pressure, what actions will be required?

- Either PORV can be used. No operation of the PORV Block Valve switches will be necessary for this set of conditions.
- One PORV is available. No operation of the associated PORV Block Valve switch is necessary since the Block Valve switch was maintained in the OPEN position per AOP-480V-1.
- No PORV is available. Following reset of MCCs, the associated PORV Block Valve can be opened using the flight panel switch.
- One PORV will be available after its associated PORV Block Valve is opened. The associated PORV Block can be opened at this time using the flight panel switch.

Answer: D

Explanation/Justification:

IP-2 operates with block valves closed and the switches in automatic. The power supplies for these valves are 5A and 6A. A loss of 6A will cause one block to fail closed. On the loss of offsite power, the other valve will lose power, but only during the time before the emergency diesel re-energizes bus 5A.

A. Incorrect but plausible. It is plausible that a candidate might forget that action is normally needed to use a PORV. Also a candidate could believe that AOP-480V-1 took action to get block valves open.

B. Incorrect but plausible. It is very plausible that AOP-480V-1 would open the block valve that has power. In fact, there is a good chance that a team would elect to take this action. Saying the switch is maintained in the open position makes this choice incorrect. This remains plausible since other switches (e.g. PZR BU Heaters) have a locked in open/on position.

C. Incorrect but plausible. Plausible because a candidate may not know which MCCs power the block valves or they may not know that these do not strip.

D. Correct answer.

Technical References:	Syst Desc 1.4
Proposed References to be provided:	None

Learning Objective	I2LP-ILO-RCSPZR 2
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Question Source:	New
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Question History:	NA
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Question Cognitive Level:	Comprehension
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10 CRF Part 55 Content:	55.41 (b) 7
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Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	1	
	Group#	1	
	K/A#	0000542416	
		Emergency Procedures/Plan - Knowledge of EOP implementation hierarchy and coordination with other support procedures or guidelines such as, operating procedures, abnormal operating procedures, severe accident management guidelines.	
	Importance	3.5	4.4

Question # 14

Given:

- The reactor has tripped from 100% power
- Level is at 52% WR in all SGs and lowering slowly
- Pressurizer level is 14% - STABLE
- AC 480V Bus 6A Normal Supply Breaker 52/6A opened on a bus overcurrent
- ES-0.1, "Reactor Trip Response" has been entered
- 21 AFW pump is out of service for maintenance
- 22 AFW pump just tripped on overspeed

What action is or will be required?

- Actuate SI and Go To E-0, "Reactor Trip or Safety Injection.
- Remain in ES-0.1, "Reactor Trip Response" perform AOP-FW-1, "Loss of Main Feedwater", in parallel.
- Go to FR-H.1, "Response to Loss of Secondary Heat Sink".
- Remain in ES-0.1, "Reactor Trip Response" perform AOP-480V-1, "Loss of Normal Power to any 480V Bus", in parallel.

Answer: C

Explanation/Justification:

A. Incorrect. Plausible because Pressurizer level is significantly lower than expected, but it is not below the SI initiation criterion.

B. Incorrect. Plausible WR level is well above the feed and bleed setpoint and AOP-FW-1 will initiate actions to restore AFW flow; however, FR-H.1 conditions are met and it is a higher priority procedure.

C. Correct. 52% wide range SG level is approximately 0% narrow range level. The criteria to enter FR-H.1 are met.

D. Incorrect. Similar to B above AOP-480V-1 will potentially re-energize bus 6A which will provide power to 23 AFW pump.

Technical References:	2-FR-H.1
	2-FR-H.1 BG
	3-FR-H.1

Proposed References to be provided:	None
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Learning Objective	I2LP-ILO-EOPFH1 3
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Question Source:	Modified
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Question History:	NA
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Question Cognitive Level:	Comprehension
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10 CRF Part 55 Content:	55.41 (b) 10
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Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	1	
	Group#	1	
	K/A#	000065A207	
		Ability to determine and interpret the following as they apply to the Loss of Instrument Air: - Whether backup nitrogen supply is controlling valve position	
	Importance	2.8	3.2

Question # 15

Consider the following plant conditions:

- Loss of all AC power has occurred and is affecting the entire site.
- The Turbine Driven ABF pump is providing flow to the SGs.
- A rapid cooldown has been commenced.

What are the expected methods of control for the following:

- (1) 21-24 SG Turbine Driven ABFP flow control valves (FCV-405A, B, C&D) and
- (2) 21-24 Atmospheric Steam Dumps (PCV-1134 through 1137)

- (1) Manual remote (CCR) control using nitrogen.
 - (2) Manual local control using nitrogen
- (1) Manual local control using nitrogen
 - (2) Manual local control using nitrogen
- (1) Manual remote (CCR) control using nitrogen
 - (2) Manual remote (CCR) control using nitrogen.
- (1) Manual local control using nitrogen
 - (2) Manual remote (CCR) control using nitrogen.

Answer: C

Explanation/Justification:

A. Incorrect: In a complete loss of AC power instrument and station air would be lost. Critical components have either safety related air or nitrogen. For AFW, nitrogen automatically aligns to supply and the CCR retains control. For the Atmospheric Steam Dumps nitrogen is aligned locally and the valves are controlled from the control room.

B. Incorrect: Plausible: because methods both are potential (NOT Expected) ways to take control of the valves.

C. Correct:

D. Incorrect: Plausible because AFW valves can be controlled locally but it is not the Expected method. Atmospheric Steam dumps are expected to be controlled from the CCR.

Technical References:	2-AOP-AIR-1 2-ECA-0.0 Syst Desc 18 Syst Desc 21
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Proposed References to be provided:	None
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Learning Objective	I2LP-ILO-MFW001 15 I2LP-ILO-MFW001 9 I2LP-ILO-MSS001 15 I2LP-ILO-MSS001 8
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Question Source:	Bank
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Question History:	Unit 2 NRC 2008
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Question Cognitive Level:	Comprehension
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10 CRF Part 55 Content:	55.41 (b) 7
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Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	1	
	Group#	1	
	K/A#	00WE04K202 Knowledge of the interrelations between the LOCA Outside Containment 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	3.8	4

Question # 16

The team has responded to a LOCA outside Containment. They are implementing the procedure for loss of recirculation capability. The following plant conditions exist after the initiating event:

- RCS Pressure 525 psig and stable
- Core Exit Thermocouples 385°F and stable
- RCS Subcooling 96°F
- CNMT Pressure 1.0 psig
- RWST Level 20 feet
- RVLIS Level Not available
- 24 RCP Running
- 21 HHSIP Running
- 22 RHR Running
- 21 Charging Pump Running

Based on the above plant conditions, the team's first action should be to:

- A. Stop 22 RHR pump.
- B. Stop 21 HHSI pump.
- C. Stop 21 Charging pump.
- D. Stop 24 RCP.

Answer:

Explanation/Justification:

ECA-1.1 will stop all RHR pumps for this condition. The pumps in the other choices will be kept in service.

A. Correct

B. Incorrect but plausible since suction on the RWST is reduced. It's plausible that the HHSI would be secured since the RHR pump can be used for recirculation cooling. 525 psig is below the RHR piping rating of 600 psig.

C. Incorrect but plausible. The charging pump would be depleting RWST without providing as much cooling as the HHSI pump or RHR pump.

D. Incorrect but plausible since the RCP would be adding heat to the RCS.

Technical References: 2-ECA-1.1

Proposed References to be provided: None

Learning Objective I2LP-ILO-EOPC11 2

Question Source: Bank

Question History: NA

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.41 (b) 10

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	1	
	Group#	1	
	K/A#	00WE05K201	
		Knowledge of the interrelations between the Loss of Secondary Heat Sink and the following: - Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features	
	Importance	3.7	3.9

Question # 17

Following a small-break LOCA and SI actuation, core exit TC's read 625°F and increasing.

- ☐ RCS pressure is 1400 psia and rising.
- S/G pressures are stable at 900 psig.
- Containment pressure is stable at 3 psig.
- Tave is offscale LOW
- The control room operators are attempting to establish MFW flow in response to a loss of secondary heat sink.
- They are unable to lift the live lead on the feed water isolation relay signal.

Under the above conditions, which of the following is TRUE?

- Air control line for Main FRVs can locally bypass trip solenoids to open valves from the control room.
- The Main FRVs can be locally operated using the manual handwheel.
- Air control line for Low Flow FRVs can locally bypass trip solenoids to open valves from the control room.
- The Main Boiler Feed Pumps cannot be reset.

Answer: C

Explanation/Justification:

A. Incorrect. Plausible because this is true if the bypass control air line is NOT installed. If the line is installed, the bypass FRVs can be controlled from the control room.

B. Incorrect. The Main and Low Flow Bypass Valves fail closed on a loss of air. The manual handwheels cannot override this. Local control requires air to drive the valve open. The handwheel adjust in the close direction.

C. Correct. The control air bypass line connects the positioner output directly to the valve diaphragm bypassing the trip solenoids. The valves can then be controlled from the control room.

D. Incorrect. Plausible because the Feed Pump must be reset to restart; however, it can be reset.

Technical References: 2-FR-H.1

Proposed References to be provided: None

Learning Objective I2LP-ILO-EOPFH1 5

Question Source: Modified

Question History: Unit 2 NRC 2010

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.41 (b) 10

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	1	
	Group#	1	
	K/A#	00WE11A201	
		Ability to determine and interpret the following as they apply to the Loss of Emergency Coolant Recirculation: - Facility conditions and selection of appropriate procedures during abnormal and emergency operations	
	Importance	3.4	4.2

Question # 18

Which actions are directed by ECA-1.1, "LOSS OF EMERGENCY COOLANT RECIRCULATION"?

1. Provide guidance on aligning the Safety Injection Pump suction directly to the Containment Sump.
 2. Terminate Cold Leg Recirculation and restore Charging.
 3. Cooldown and depressurize the Reactor Coolant System to allow Residual Heat Removal to be put into service.
 4. Provide methods to make-up to the Refueling Water Storage Tank.
-
- A. 1, 2, and 3.
 - B. 4 ONLY.
 - C. 1, 3, and 4.
 - D. 3 and 4 ONLY.

Answer: D

Explanation/Justification:

Choice 1 is not done by ECA-1.1 but is plausible because this would be a way of cooling the core with a loss of RWST.

Choice 2 is not done by ECA-1.1 but is plausible because it would conserve RWST level.

Choice 3 is a correct action in ECA-1.1.

Choice 4 is a correct action in ECA-1.1.

Technical References:	2-ECA-1.1 3-ECA-1.1 3-ECA-1.1 Background
Proposed References to be provided:	None

Learning Objective	I3LP-ILO-EOPE10 22
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Question Source:	Bank
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Question History:	Unit 3 NRC 2010
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Question Cognitive Level:	Fundamental Knowledge
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10 CRF Part 55 Content:	55.41 (b) 10
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Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	1	
	Group#	2	
	K/A#	0000012132	
		Conduct of Operations - Ability to explain and apply all system limits and precautions.	
	Importance	3.8	4

Question # 19

During a recovery from an event that resulted in excess boron being added to the core, control bank D rods continuously withdrew after the In-Hold-Out switch was released until the step counter indicated 228 steps. Without informing the CRS, the ATC inserted control rods until the step counters indicated 223.

What impact will this condition have on the operation of the rod control system?

- A. Approaching Rod Insertion Limit and Rod Insertion Limit alarms will annunciate before (CBD actual position above RIL) the actual condition occurs.
- B. Bank overlap between D and C will occur after (CBD further inserted) the actual condition occurs.
- C. Control bank D rods will be too slow to add negative reactivity as they are out of the core
- D. Individual rod positions for control bank D will be inaccurate by 5 steps

Answer: B

Explanation/Justification:

For the setup of the question the rods physically stop withdrawing at 225 steps. The rods are at 225 when the step counters indicate 228. When the step counters are at 223 the actual rod position will be 220.

A. Incorrect. Plausible because candidate must understand the direction of the difference between actual and indicated rod position.

B. Correct.

C. Incorrect. Plausible because when the rods are near the top of the core the pcm per step added is smaller than it is when they are further inserted. Historically this was called "rod bite". For the question, the rods are further inserted than indicated.

D. Incorrect. Plausible because the step counters will be inaccurate by 3 steps not the IRPIs.

Technical References: 2-SOP-RC-ROD-001

Proposed References to be provided: None

Learning Objective I2LP-ILO-ICROD 8

Question Source: New

Question History: NA

Question Cognitive Level: Fundamental Knowledge

10 CRF Part 55 Content: 55.41 (b) 6

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	1	
	Group#	2	
	K/A#	000003K110	
		Knowledge of the operational implications of the following concepts as they apply to Dropped Control Rod: - Definitions of core quadrant power tilt	
	Importance	2.6	2.9

Question # 20

Given:

- The unit is in MODE 1 at 45% RTP during power ascension.
- A control rod dropped into the core.
- QPTR is determined to be 1.05.
- Due to grid instability, the System Operator has requested the maximum power possible and when the unit can resume full power operations.

In addition to realigning the dropped rod, which one of the following describes the conditions that must be met to raise reactor power to 100% RTP?

- QPTR must be lowered to at least 1.02 prior to raising reactor power above 50% RTP.
- Reactor power may be raised to 100% RTP after determining that F_N^H and $F_Q(Z)$ are within limits.
- Continue the power ascension but do not exceed 85% RTP until QPTR is lowered to at least 1.02.
- Commence a power reduction until 30% RTP, then the power reduction must be terminated until a safety analysis is performed.

Answer: C

Explanation/Justification:

This satisfies the KA because it is looking for the definition of a core quadrant power tilt (i.e., > 1.03 quadrant power tilt ratio).

A. Incorrect. Plausible because the applicability for QPTR is > 50% power; however, the Required Actions allow operation for an unlimited period of time, which is permissible by LCO 3.0.4. Once the MODE of Applicability is entered, the Required Actions must be performed within the associated Completion Times.

B. Incorrect. Plausible because calculating Hot Channel Factors is required for a Quadrant Power Tilt condition; however, power cannot exceed 85% with a tilt of 1.05.

C. Correct. A quadrant power tilt condition exists with QPTR > 1.02. The Required Actions allow operation for an unlimited period of time, which is permissible by LCO 3.0.4. Once the MODE of Applicability is entered, the Required Actions must be performed within the associated Completion Times.

D. Incorrect . Plausible because TS action is to reduce power 3% Rated Thermal Power for every 1% QPTR exceeds 1.00. This would result in a 15% power reduction from 100% not 45%.

Technical References:	Tech Specs
Proposed References to be provided:	None

Learning Objective	I2LP-ILO-ICNXC 11
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Question Source:	Bank
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Question History:	NA
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Question Cognitive Level:	Comprehension
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10 CRF Part 55 Content:	55.41 (b) 6
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Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	1	
	Group#	2	
	K/A#	000005K303	
		Knowledge of the reasons for the following responses as they apply to the Inoperable/Stuck Control Rod: - Tech-Spec limits for rod mismatch	
	Importance	3.6	4.1

Question # 21

Initial Conditions:

- A 20% load rejection from 100% has occurred and the crew is stabilizing the plant in accordance with the appropriate AOP.

Current Conditions:

- Control Bank "D" Group Counters are at 180 steps.
- H-2, a Control Bank "D" rod, indicates 223 steps on IRPI.
- All other Control Bank "D" rods indicate 180 steps on IRPI.
- I&C reports no blown fuse indicators for H-2.

Which ONE (1) of the following describes the current condition of rod H-2 and the most limiting time required to take appropriate actions in accordance with Tech Spec and what is the Tech Spec basis for the action

	Condition	Completion Time	Basis
A.	Untrippable	1 Hour	Shutdown Margin
B.	Untrippable	6 Hours	Peaking Factors
C.	Trippable	1 Hour	Axial Flux Difference
D.	Trippable	6 Hours	DNBR

Answer: A

Explanation/Justification:

A. Correct. The rod should have "ratcheted" into the core with a blown moveable gripper fuse and be at some level lower than the rest of the bank. The rod is untrippable.

B. Incorrect. Plausible because the rod is untrippable but the completion time and basis are incorrect. The completion time of 6 hours is the value to be in Mode 3 for this condition if SDM is not verified.

C. Incorrect. Plausible because the completion time to realign a misaligned rod is correct; however the rod is untrippable and thus inoperable by TS. The basis is also incorrect but plausible because misaligned rods can have an impact on AFD.

D. Incorrect. Plausible because the completion time of 6 hours is the value to be in Mode 3 for an untrippable rod if SDM is not verified.

Technical References:	2-AOP-ROD-1 3-AOP-ROD-1 Tech Specs
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Proposed References to be provided:	None
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Learning Objective	I2LP-ILO-ICROD 14
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Question Source:	New
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Question History:	NA
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Question Cognitive Level:	Comprehension
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10 CRF Part 55 Content:	55.41 (b) 5
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Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	1	
	Group#	2	
	K/A#	000033A201	
		Ability to determine and interpret the following as they apply to the Loss of Intermediate Range Nuclear Instrumentation: - Equivalency between source-range, intermediate-range, and power-range channel readings	
	Importance	3	3.5

Question # 22

Unit 2 is conducting a reactor startup following a refueling outage. The following conditions exist:

- Source Range Instrument N 31 indicates 2.1×10^4 cps.
- Source Range Instrument N 32 indicates 2.0×10^4 cps.
- Intermediate Range Instrument N 35 indicates 1.8×10^{-11} amps.
- Intermediate Range Instrument N 36 indicates 1.0×10^{-10} amps.
- Rods are in manual with no rod motion.
- Source Range and Intermediate Range Nuclear Instruments are slowly rising.

Which ONE of the following best explains the indications?

- A. N 35 compensating voltage is set too high
- B. N 35 compensating voltage is set too low
- C. N 36 compensating voltage is set too high
- D. N 36 compensating voltage is set too low

Answer: A

Explanation/Justification:

A. Correct.

B Incorrect N 35 reads too low;

C Incorrect Overlap is proper for N 36;

D Incorrect Overlap is proper for N 36.

Technical References: GRAPH-NI-1

Proposed References to be provided: None

Learning Objective I2LP-ILO-ICEXC 8

Question Source: Bank

Question History: DC Cook NRC 2004

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.41 (b) 6

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	1	
	Group#	2	
	K/A#	000036K101	
		Knowledge of the operational implications of the following concepts as they apply to Fuel Handling Incidents: - Radiation exposure hazards	
	Importance	3.5	4.1

Question # 23

Given the following conditions:

- The plant is in Refueling mode
- Refueling is in progress
- The Refueling SRO reports damage to an irradiated fuel assembly on the Refueling Crane mast
- R-41 and R-42, Containment Radiation monitors, are in alarm
- VC Purge is in progress

Which ONE (1) of the following will be the status of the VC equipment and personnel in the VC immediately following implementation of the applicable AOP?

- VC Purge Supply Valves are closed and Exhaust Valves remain open to maintain negative pressure in VC. All personnel are evacuated from the VC.
- VC Purge Supply and Exhaust Valves are closed. All personnel are evacuated from the VC.
- VC Purge Supply Valves are closed and Exhaust Valves remain open to maintain negative pressure in VC. Non-essential personnel are evacuated from the VC.
- VC Purge Supply and Exhaust Valves are closed. Non-essential personnel are evacuated from the VC.

Answer: B

Explanation/Justification:

This is a modified bank question (bank id 24035). The question was modified to be more plausible since the original had choices where pressure relief valves remain open.

The correct answer per 2-AOP-FH-1 is B. Having the exhaust valves remain open to keep negative pressure in the VC is plausible since this is what is done in the FSB. This is more plausible than in the past because the VC hatch is removed during fuel movement (a contingency is in place to close VC). In the past the VC had modified integrity during fuel movement. It is also plausible that essential personnel would remain in the VC. Therefore, there is one correct answer and the other three choices are all plausible.

Technical References: 2-AOP-FH-1

Proposed References to be provided: None

Learning Objective I2LP-ILO-FHD001 11

Question Source: Modified

Question History: NA

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.41 (b) 11

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	1	
	Group#	2	
	K/A#	000060K202	
		Knowledge of the interrelations between the Accidental Gaseous Radwaste Release and the following: - Auxiliary building ventilation system	
	Importance	2.7	3.1

Question # 24

Given the following conditions:

- The plant is at 100% power
- 23 Large Gas Decay Tank is aligned for in-service and re-use
- 24 Large Gas Decay Tank is in standby
- 22 Large Gas Decay Tank is isolated with a pressure of 90 psig and a content of 5000 Curies
- All remaining Gas Decay Tanks are inerted with nitrogen
- 22 Large Gas Decay Tank relief valve (1622) failed open

Which one of the following describes the plant response to this event?

- Warn radiation level alarm on R-44, Plant Vent Air Monitor;
Closes RCV-014 and Secures PAB Supply Fan, diverts PAB Exhaust through charcoal beds.
- High radiation level alarm on R-44, Plant Vent Air Monitor ;
Secures VC Purge/Pressure Relief if in progress, diverts PAB Exhaust through charcoal beds
- Warn radiation level alarm on R-50, Waste Gas Decay Tank Monitor,
Closes RCV-014 and Secures PAB Supply Fan, diverts PAB Exhaust through charcoal beds
- High radiation level alarm on R-50, Waste Gas Decay Tank Monitor,
Secures PAB Supply Fan, secures VC Purge/Pressure Relief if in progress.

Answer: B

Explanation/Justification:

A. Incorrect. Plausible because the closing RCV-014 would be correct if it was opened and at the Alarm level and securing the supply fan would limit spread of potential contamination; however PAB Supply fan is not secured and RCV-014 would not be opened at this time.

B. Correct.

C. Incorrect. Plausible because securing the supply fan would limit spread of potential contamination. Diverting PAB exhaust through the charcoal beds is correct for an R-44 Alarm level condition. There are no automatic actions associated with R-50.

D. Incorrect. Plausible because securing the supply fan would limit spread of potential contamination. Securing VC Purge/Pressure Relief is correct for an R-44 Alarm level condition. There are no automatic actions associated with R-50.

Technical References: 2-SOP-12.3.3

Proposed References to be provided: None

Learning Objective I2LP-ILO-GWR01 5
I2LP-ILO-RMS001 3

Question Source: Bank

Question History: NA

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.41 (b) 7

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	1	
	Group#	2	
	K/A#	000069A202	
		Ability to determine and interpret the following as they apply to the Loss of Containment Integrity: - Verification of automatic and manual means of restoring integrity	
	Importance	3.9	4.4

Question # 25

Given the following conditions:

- The plant is operating at 100% power.
- Work performed on SI-AOV-1813 requires a Post Maintenance Retest.
- SI-878A, 21 Spray Pump Discharge Test Isolation, must be opened for the retest. It is a locked closed, non-automatic containment isolation valve

Which ONE (1) of the following is required to open SI-878A to perform the retest?

- CRS or SM approval only, since the valve is part of a line open to containment during normal operations
- An approved Temporary Change is required for the off-normal valve position.
- A Dedicated Operator must be stationed at the valve to close it in the event of an emergency
- It must be inside of a tagged boundary to be opened above Mode 5.

Answer: C

Explanation/Justification:

A. Incorrect. Plausible because the CRS or SM must approve the action; however it is not the only action required.

B. Incorrect. Plausible because a Temporary Change could address the condition; however it is not required as long as actions are covered by another procedure or retest step text.

C. Correct.

D. Incorrect. Plausible because a tagged boundary would provide some form of protection; however it would not necessarily protect penetration open to containment.

Technical References:	Tech Specs
Proposed References to be provided:	None

Learning Objective	I2LP-ILO-VCCIS 11
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Question Source:	Bank
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Question History:	NA
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Question Cognitive Level:	Comprehension
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10 CRF Part 55 Content:	55.41 (b) 7
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Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	1	
	Group#	2	
	K/A#	000074A112	
		Ability to operate and/or monitor the following as they apply to an Inadequate Core Cooling: - RCS temperature and pressure indicators	
	Importance	4.1	4.4

Question # 26

Given the following plant conditions:

- A loss of coolant accident has taken place.
- The operators are transitioning to 2-ES-1.2, Post LOCA Cooldown and Depressurization, from 2-E-1, Loss of Reactor or Secondary Coolant.

The following plant conditions exist:

- All Reactor Coolant Pumps are OFF.
- All Core Exit thermocouples are reading approximately 720°F and increasing.
- RCS subcooling is 0°F
- RVLIS NC Range indicates 35%.
- All SG pressures are approximately 1125 psig
- Containment pressure peaked at 3.5 psig
- Total AFW flow is approximately 100 GPM
- SG WR levels are 22%, 24%, 24%, and 31%, respectively

Which ONE of the following procedures will the crew implement to respond to these conditions?

- 2-FR-H.1, Response to Loss of Secondary Heat Sink
- 2-FR-H.2, Response to Steam Generator Overpressure
- 2-FR-C.1, Response to Inadequate Core Cooling
- 2-FR-C.2, Response To Degraded Core Cooling

Answer: C

Explanation/Justification:

- A. Incorrect. Plausible because the Heat Sink safety function is severely challenged (Red), but Core Cooling is a higher priority.
- B. Incorrect. Plausible because SG pressure is above required value for entry to 2-FR-H.2, but Core Cooling is a higher priority
- C. Correct. Red condition for 2-FR-C.1 exists due to $<30^{\circ}\text{F}$ subcooling, 0 RCPs, Core Exit T/Cs $>700^{\circ}\text{F}$, and RVLIS $<41\%$
- D. Incorrect. Plausible because core exit thermocouple temperatures are not 1200° which is the most common entry condition for FR-C.1.

Technical References: 2-F-0.2
2-F-0.3

Proposed References to be provided: None

Learning Objective I2LP-ILO-EOPROU 10
I2LP-ILO-EOPROU 11

Question Source: Bank

Question History: NA

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.41 (b) 10

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	1	
	Group#	2	
	K/A#	00WE03K202	
		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	3.7	4

Question # 27

A LOCA has occurred, and the control room operators are now preparing to conduct a post LOCA cooldown and depressurization. The plant is currently stable with the following conditions:

- RCS pressure....1200 Psig
- RCS Tavg.....450°F
- PZR level.....visible in the indicating range
- Total SI flow...580 gpm

It is decided that the plant will be cooled down at 100°F/hr by dumping steam to the condenser.

The cooldown will cause

- SI flow to Decrease and RCS pressure to Decrease.
- SI flow to Increase but have no effect on RCS pressure.
- SI flow to Decrease and Pressurizer Level to Decrease.
- SI flow to Increase and RCS pressure to Decrease.

Answer: D

Explanation/Justification:

A. Incorrect. Plausible because RCS Pressure will decrease; however, SI flow will increase

B. Incorrect. Plausible because SI flow will increase; however RCS pressure will decrease.

C. Incorrect. Plausible because Pressurizer level will decrease; however SI flow will increase.

D. Correct. SI flow will increase due to the reduction in pressure of the RCS.

Technical References: 2-E-1 BG

Proposed References to be provided: None

Learning Objective I2LP-ILO-SIS01 4

Question Source: Bank

Question History: NA

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.41 (b) 5

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	1	
	K/A#	003000K103	
		Knowledge of the physical connections and/or cause-effect relationships between the RCPS and the following systems: - RCP seal system	
	Importance	3.3	3.6

Question # 28

The following plant conditions exist:

Reactor Power:	100%
21 RCP Seal Return Flow:	0.2 gpm and stable
21 RCP Upper Radial Bearing Temperature:	145°F and stable
21 RCP Vibration:	12 mils and increasing @ 2 mil/hr
21 RCP #1 Seal Inlet Temperature:	165 F and increasing
21 RCP Stator Winding Temperature:	175°F and stable

The following annunciators are in alarm:

- 21 RCP HIGH VIBRATION
- RCP NO. 1 SEAL RETURN HIGH/LOW FLOW (COMMON)

The CRS has announced entry into AOP-RCP-1.

What actions should be taken based upon 21 RCP indications?

- A. Trip the reactor, Trip 21 RCP, Initiate E-0, Close 21 RCP Seal Return Valve when pump has stopped rotating.
- B. Initiate Attachment 1, Initiate POP 3.1 (Plant Shutdown From Full Power Operation to Zero Power Condition), Trip 21 RCP within 8 hours.
- C. Notify I&C to change High Vibration alarm setpoint, Initiate Attachment 1, Initiate POP 3.1 (Plant Shutdown From Full Power Operation to Zero Power Condition).
- D. Trip the reactor, Trip 21 RCP, Go to E-0.

Answer: A

Explanation/Justification:

A. Correct.

B. Incorrect. Plausible because depending on the severity of the conditions, a plant shutdown may be initiated as opposed to a reactor trip.

C. Incorrect. Plausible because the action is correct if the rate of increase is less than 1 mil/hr.

D. Incorrect. Plausible because this action is correct (GO TO E-0) if the reason for the trip is a failure of #2 or 3 seal combined with high vibrations.

Technical References: 2-AOP-RCP-1

Proposed References to be provided: None

Learning Objective I2LP-ILO-RCSRCP 15

Question Source: Bank

Question History: NA

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.41 (b) 7

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	1	
	K/A#	004000K631	
		Knowledge of the effect of a loss or malfunction on the following CVCS components: - Seal injection system and limits on flow range	
	Importance	3.1	3.5

Question # 29

Given:

Pressurizer pressure 1620 psig
 Volume Control Tank pressure 20 psig
 21 RCP # 1 Seal leakage 1 gpm
 22 RCP # 1 Seal leakage 0.5 gpm
 23 RCP # 1 Seal leakage 1.8 gpm
 24 RCP # 1 Seal leakage 3.8 gpm
 The operating charging pump tripped
 CCW pumps remain in service.
 All other seal parameters are normal.

Which of the following states the condition of the RCP seal leakage and why it is a concern?

- A. 22 RCP #1 seal leakage is low.
The lower pump radial bearing does not have enough cooling flow.
- B. 24 RCP #1 seal leakage is high.
#1 seal is not properly seated
- C. 22 RCP #1 seal leakage is low.
#2 seal damage is likely due to backpressure from #1 seal
- D. 24 RCP #1 seal leakage is high
#2 seal does not have adequate flow for lubrication

Answer: A

Explanation/Justification:

A. Correct.

B. Incorrect. Plausible because leakage is higher than normally observed at Unit 2 and slightly higher than design, but it is not greater than limits.

C. Incorrect. Plausible because low seal return flow can be an indication that #2 seal has failed; however, with all other seal parameters normal (no standpipe level alarms) this is not correct.

D. Incorrect. Plausible because leakage is higher than normally observed at Unit 2 and slightly higher than design, but it is not greater than limits.

Technical References: 2-SOP-1.3

Proposed References to be provided: None

Learning Objective I2LP-ILO-RCSRCP 7

Question Source: Bank

Question History: Prarie Island NRC 2003

Question Cognitive Level: Fundamental Knowledge

10 CRF Part 55 Content: 55.41 (b) 5

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	1	
	K/A#	005000K112	
		Knowledge of the physical connections and/or cause-effect relationships between the RHRS and the following systems: - Safeguard pumps	
	Importance	3.1	3.4

Question # 30

A large break LOCA has occurred 10 hours ago, and your crew has just returned from days off to relieve the watch. A plant cooldown is in progress. As you begin your walkdown of the CCR, what would you expect the safety injection system lineup to be at this point in time?

- A. Recirculation pump in service - through the RHR heat exchangers - to the cold leg injection valves.
- B. Recirculation pump in service - through the RHR heat exchangers - to the hot leg injection valves.
- C. Recirculation pump in service - through the RHR heat exchangers - to the safety injection pumps - to the cold leg injection valves.
- D. Recirculation pump in service - through the RHR heat exchangers - to the safety injection pumps - to both the hot and cold leg injection valves.

Answer: D

Explanation/Justification:

A Incorrect. Plausible because this lineup is correct if transfer to hot leg Recirc has not been completed yet.

B. Incorrect. Plausible because Recirc pumps through heat exchangers is correct; however, the flowpath to hot leg Recirc is through the SI pumps.

C. Incorrect. Plausible because the flowpath from Recirc pumps through SI pumps is correct; however the cold leg injection valves are not correct.

D. Correct.

Technical References: 2-E-1
Proposed References to be provided: None

Learning Objective I2LP-ILO-EOPS13 4
I3LP-ILO-EOPE10 22

Question Source: Bank

Question History: NA

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.41 (b) 7

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	1	
	K/A#	006000A107	
		Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ECCS controls including: - Pressure, high and low	
	Importance	3.3	3.6

Question # 31

When implementing ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, you are instructed to depressurize the Steam Generators (SG) to 710 psig. What is the basis for stopping the SG depressurization at 710 psig?

This pressure corresponds to the Reactor Coolant System pressure

- A. at the point where the Safety Injection Accumulators are required to be isolated.
- B. below which the high head injection flow paths must be isolated.
- C. at the point where low head injection sources begin to inject.
- D. below which the Safety Injection Accumulators will begin to inject.

Answer: D

Explanation/Justification:

A. Incorrect. Plausible because 710 is above the pressure at which the accumulator would start to inject and typically the accumulators are isolated at this pressure. In ECA-1.1 the accumulators are slowly injected to "buy time" to restore a low head injection path.

B. Incorrect. Plausible because the cooldown in ECA-1.1 is rapid which may result in a PTS concern. Isolating high pressure injection would minimize the potential for repressurization.

C. Incorrect. Plausible because it is true that low pressure injection would begin at a pressure slightly below this pressure; however, low pressure injection is not the concern; the concern is low pressure recirculation.

D. Correct. The goal of the SG depressurization is to set the plant up for slow controlled accumulator injection to “buy time” until recirculation flow path can be established.

Technical References: 2-ECA-1.1 BG

Proposed References to be provided: None

Learning Objective I2LP-ILO-EOPC11 1

Question Source: Bank

Question History: NA

Question Cognitive Level: Fundamental Knowledge

10 CRF Part 55 Content: 55.41 (b) 10

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	1	
	K/A#	007000A301	
		Ability to monitor automatic operation of the PRTS, including: - Components which discharge to the PRT	
	Importance	2.7	2.9

Question # 32

The Unit is operating at 100% power with all control systems in Automatic. A RCS leak has developed, and the following conditions have been noted from the initial time of the event, and after 1 hour:

	<u>Initially</u>	<u>1 Hour Later</u>
PRT level	70%	75%
PRT Pressure	5 psig	6 psig
Pressurizer Tailpipe Temperature	150°F	150°F
Acoustic Monitors	NOT Alarming	NOT Alarming

Given the above information, which one of the events below best explains the noted change in plant conditions?

- A. Leakage by a Pressurizer PORV or Safety Valve has increased.
- B. PCV-135, Letdown Backpressure Control Valve, is controlling letdown backpressure too HIGH.
- C. RCP leak-off flow through the standpipe has increase on at least one RCP.
- D. A Containment Spray Pump has been tested and the associated relief valve has lifted.

Answer: B

Explanation/Justification:

A. Incorrect. Plausible because PORVs and Safeties discharge to the PRT; however, the tailpipe temperatures have not increased.

B. Correct. PCV-135 discharges to the PRT.

C. Incorrect. Plausible because RCP seal return relief valve goes to the PRT; however, seal leakoff goes to the RCDT.

D. Incorrect. Plausible because a large portion of the containment spray system exists inside containment; however there is no relief valve for the system.

Technical References: 9321-2738

Proposed References to be provided: None

Learning Objective I2LP-ILO-RCSPZR 6

Question Source: Bank

Question History: NA

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.41 (b) 7

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	1	
	K/A#	007000K502	
		Knowledge of the operational implications of the following concepts as they apply to the PRTS: - Method of forming a steam bubble in the PZR	
	Importance	3.1	3.4

Question # 33

Unit 2 is in Mode 5 performing steps to draw a bubble in the Pressurizer. The following steps have been completed:

- Pressurizer is filled to an actual level of 50%
- All Pressurizer heaters are energized
- Pressure is at atmospheric pressure

Per procedure, the PORVs will be closed after pressure reaches 25 psi in the PRT.

Which of the following correctly describes the reason for keeping the PORVs open until this pressure is reached?

- Required as part ensuring LTOPs is operable when initially pressurizing the RCS.
- Provides a flowpath for venting non-condensable gases out of the Pressurizer.
- Verification that the PORV tailpipe temperature device will respond to changes in temperature.
- Maintains flow from the RCS into the Pressurizer to ensure boron concentrations are equalized.

Answer: B

Explanation/Justification:

Original question Salem 1999 (INPO QID 15151)

Unit 1 is in Mode 5 performing steps to draw a bubble in the Pressurizer. The following steps have been completed:

- The Pressurizer is filled as indicated on the cold calibrated level channel
- All Pressurizer heaters have been energized
- Pressure is controlled at approximately 65 psig

The next major action is to manually open PR1 & PR2 for 10-15 minutes when the Pressurizer reaches approximately 300 degrees F.

Which of the following correctly describes the reason for opening PR1 & PR2?

Answer:

Provides a flowpath for venting non-condensable gases out of the Pressurizer

Dist 1:

Required as part of the operability check for PR1 & PR2.

Dist 2:

Verification that the PORV tailpipe temperature device will respond to changes in temperature.

Dist 3:

Establishes flow from the RCS into the Pressurizer to ensure boron concentrations are equalized.

Explanation:

Per SOP-3.3 Section 4.10, the Pressurizer is vented to the Vent Header by keeping the PORVs open until pressure reaches 25# in the PRT.

A. Incorrect but plausible. Slight change from original question because the valves are not cycled as they apparently are at Salem. It is plausible because it is important that LTOPs be operable in this condition.

B. Correct answer.

C. Incorrect but plausible because this would in fact provide an opportunity to operationally check tailpipe temperature response.

D. Incorrect but plausible because having spray valves open does this. Also, opening a PORV under operating conditions can lead to flow from RCS to PZR.

Technical References: 2-SOP-3.3
Proposed References to be provided: None

Learning Objective I2LP-ILO-RCSPZR 11

Question Source: Bank

Question History: Salem 1999

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.41 (b) 10

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	1	
	K/A#	008000K301	
		Knowledge of the effect that a loss or malfunction of the CCWS will have on the following: - Loads cooled by CCWS	
	Importance	3.4	3.5

Question # 34

The Unit is operating at full power, with normal system alignment. CCW Surge Tank level and activity levels are rising due to CCW in leakage.

Select from the list below the failed component which may be the source of CCW in leakage.

- A. SGBD Sample Heat Exchangers
- B. Non-regenerative Heat Exchangers
- C. Spent Fuel Pit heat Exchanger
- D. Seal Return Heat Exchanger

Answer: B

Explanation/Justification:

B is the correct answer. All components are cooled by CCW. Only the Non-regen heat exchanger letdown liquid pressure is higher than CCW.

Technical References: 2-AOP-CCW-1
3-AOP-CCW-1

Proposed References to be provided: None

Learning Objective I2LP-ILO-CCW001 14

Question Source: Bank

Question History:	NA
Question Cognitive Level:	Comprehension
10 CRF Part 55 Content:	55.41 (b) 5
Comments	

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	1	
	K/A#	010000K601	
		Knowledge of the effect of a loss or malfunction of the following will have on the PZR PCS: - Pressure detection systems	
	Importance	2.7	3.1

Question # 35

Given the following:

- Pressurizer Pressure Control is selected to the normal alignment (DFT CH III IV position).
- Actual pressurizer pressure is 2240 psig and rising.
- The modulating heaters are energized.
- PC 455K, PRZR Spray Control Master Controller, fails to a **constant milliamp output** equivalent to 2215 psig.

Which ONE of the following describes the response of the pressure control system if the operator takes NO further action?

- A. Pressure will rise until the PRZR PORVs 455C and 456 open to control pressure.
- B. Pressure will rise until the spray valves open to control pressure.
- C. Pressure will rise until the high pressure Reactor Trip setpoint is reached and the Reactor will trip.
- D. Pressure will cycle on the modulating heaters at a higher setpoint.

Answer: A

Explanation/Justification:

The master pressure controller output controls the spray valves and heaters. The original design had the master pressure controller also control PORV 455C. (This has been changed and PORV 455C does not come off of the master pressure controller.)

Controller output will cause pressurizer heaters to be energized which will cause pressure to increase. Since the heaters, and spray valves are controlled by the output of the master pressure controller, they will not change from their existing position (heaters energized and spray valves closed)

A. Correct. Pressure will increase, PORV block valves will open and PORVs will open when pressure increases greater than 2335 psig.

B. Incorrect. Plausible because the PORVs are not controlled by the master pressure controller, and they will operate as expected for a pressure increase. The spray valves are controlled by the output of the master pressure controller.

C. Incorrect. Plausible because the spray valves are controlled by the master pressure controller but the PORVs are not. If both spray valves and PORVs were controlled by the master pressure controller this would be true.

D. Incorrect. Plausible because the PORVs are not controlled by the master pressure but the heaters are.

I3SG-LOR-AOP013

Technical References: 2-AOP-INST-1

Proposed References to be provided: None

Learning Objective I2LP-ILO-AOPINT 8

Question Source: Bank

Question History: NA

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.41 (b) 5

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	1	
	K/A#	0130002130	
		Conduct of Operations - Ability to locate and operate components, including local controls.	
	Importance	4.4	4

Question # 36

An inadvertent Safety Injection Actuation (SIA) and automatic Reactor Trip has occurred. It was noted during the performance of E-0, Reactor Trip or Safety Injection, that Instrument Air to Containment Isolation Valve, PCV-1228 failed to automatically close as required, and had to be manually closed. SI has subsequently been placed in DEFEAT and has been RESET in E-0. However, Containment Isolation (CIA) Phase A could NOT be reset when attempted.

Which of the following could be a cause for the failure of CIA, Phase A to reset?

- A. Instrument Air to Containment Isolation Valve, PCV-1228 failed to AUTOMATICALLY close.
- B. Control switch for the Weld Channel & Penetration Pressurization System valves (WCPPS) is OPEN.
- C. Equipment Hatch Solenoid control switch is in INCIDENT.
- D. Isolation Valve Seal Water Valve, 1410 control switch is in CLOSE.

Answer: D

Explanation/Justification:

A. Incorrect. Plausible because the switch position of 1228 is an input to Phase A reset circuit; however, the valve position is not.

B. Incorrect. Plausible because most phase A valves are closed when a signal is generated; however, WCPPS valves are opened and the switch must be in OPEN.

C. Incorrect. Plausible because the Equipment Hatch Solenoids are inputs to the Phase A reset circuit; however INCIDENT is the correct position.

D. Correct. 1410 is Opened by a Phase A signal and the switch must be in OPEN to reset Phase A.

Technical References: 2-E-0

Proposed References to be provided: None

Learning Objective I2LP-ILO-ESS001 5

Question Source: Bank

Question History: NA

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.41 (b) 7

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	1	
	K/A#	012000K304	
		Knowledge of the effect that a loss or malfunction of the RPS will have on the following: - ESFAS	
	Importance	3.8	4.1

Question # 37

The unit was at 15% power during power ascension. 21 RCP tripped. Attempts to trip the reactor from the control room were unsuccessful. The NPO tripped the reactor by opening the rod drive MG set output breakers.

Which of the following is a consequence of these conditions?

- A. Feedwater isolation signal cannot be reset without using the key defeat switches.
- B. MOV BFD-5 through 5-3 and 90 through 90-3 will not close on a feedwater isolation signal.
- C. Low flow bypass feed regulating valves will not close on low temperature
- D. Motor driven AFW pumps will not automatically start if off-site power is lost.

Answer: C

Explanation/Justification:

A. Incorrect. Plausible because the key defeat switches are used for Safety Injections and Phase A isolation, but they are not used in feedwater isolation. If it is necessary to override feedwater isolation, it is done by lifting a lead as in AOP-SSD-1.

B. Incorrect. Plausible because there are two categories of feedwater isolation. One signal (low Tavg with Reactor Trip) only closes main feed regulating and low flow bypass valves. The second signal (High SG level or Safety Injection) closes MFRV, LFBV, Main Boiler Feed Pump discharge valve, motor operated isolation valves and trips the MBFP. Reactor trip breaker position will not impact the MOV closure during a FWIS.

C. Correct. At 15% power the MFRVs would be closed and the LFBVs would be in service. With both reactor trip breakers closed the signal to close the LFBV (and MFRV if they were open) will not occur.

D. Incorrect. Plausible because the MDAFW pumps start on a Blackout – Unit trip signal. The reactor trip breaker position is NOT used for Unit Trip input.

Technical References: Logic Unit 3 Sheet 13

Proposed References to be provided: None

Learning Objective I2LP-ILO-ESS001 5

Question Source: New

Question History: NA

Question Cognitive Level: Fundamental Knowledge

10 CRF Part 55 Content: 55.41 (b) 5

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	1	
	K/A#	013000K201	
		Knowledge of bus power supplies to the following: -	
		ESFAS/safeguards equipment control	
	Importance	3.6	3.8

Question # 38

Given the following conditions:

- The plant is in Hot Shutdown.
- 21 and 23 AFW pumps are in service feeding all four SGs.
- One of the 125 VDC control power fuses to the 23 AFW breaker blows.

Which one of the following describes the effect on the operation of 23 AFW Pump?

- 23 AFW Pump trips
No indication or control is available from the Control Room
- 23 AFW Pump remains in service
No indication or control is available from the Control Room
All automatic trips are lost. The only way to trip the pump is manually at the breaker
- 23 AFW Pump remains in service
No indication is available in the Control Room
All pump trips are available including taking the Control Room switch to trip
- 23 AFW Pump remains in service
No indication or control is available from the Control Room
Overcurrent and manual trips at the breaker remain available

Answer: D

Explanation/Justification:

This question is a significantly modified version of IPEC Bank 8719

Original Question:

Given the following conditions:

- The plant is in Hot Shutdown.
- 21 and 23 Auxiliary Boiler Feed Pumps (ABFPs) are in service feeding all four SGs.
- The 125 VDC control power fuses to the 23 ABFP breaker become open (are blown).

Which one of the following describes the effect on the operation of 23 ABFP?

- A. Breaker indication in CCR is lost
CCR breaker control is lost
Pump remains running
- B. Breaker indication in CCR is lost
CCR breaker control is lost
Pump will trip
- C. Breaker indication is available
CCR breaker control is lost
Pump will trip
- D. Breaker indication in CCR is available
CCR breaker control is lost
Pump will remain running

Explanation:

The K/A states, "knowledge of bus power supplies to...safeguards equipment control". This question is testing knowledge of bus power supply's effect on safeguards equipment control. This seemed to be an interpretation of this K/A that led to higher quality question as opposed to recognizing which power supply goes to a particular component.

There are two fuses in a fuse block at the breaker; either blowing causes a complete loss of control power. On a loss of control power, 480V breakers stay in their current position. Overcurrent protection remains available via the breaker amptector device. Manually tripping the breaker via mechanical device on breaker is always available. All remote, electrical trips are lost. Control Room indication is lost when control power is lost.

A. Incorrect but plausible because a candidate could think that the breakers will open on loss of power like reactor trip breakers do. Also, there are low flow alarms associated with 21/23 AFW Pumps and U3 AFW Pumps actually trip on low flow. All of these make it plausible that a candidate would think the pump would trip. The second part of the distracter is correct.

B. Incorrect but plausible because this would be a true statement for some station 6.9KV breakers.

C. Incorrect but plausible because a candidate might think that the two fuses have separate functions. One fuse going to indication while the other fuse goes to control. All of the choices have no indication would actually support this misconception.

D. Correct answer

Technical References:	Syst Desc 27.1
Proposed References to be provided:	None

Learning Objective	I2LP-ILO-EDS03 7
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Question Source:	Modified
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Question History:	NA
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Question Cognitive Level:	Fundamental Knowledge
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10 CRF Part 55 Content:	55.41 (b) 7
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Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	1	
	K/A#	0220002422	
		Emergency Procedures/Plan - Knowledge of the bases for prioritizing safety functions during abnormal/emergency operations.	
	Importance	3.6	4.4

Question # 39

During a LOCA, emergency coolant recirculation capability was lost, and ECA-1.1, Loss of Emergency Coolant Recirculation, is currently in progress. A RED path is identified on the CONTAINMENT status tree, and transition to FR-Z.1, Response to High Containment Pressure, is performed.

What procedure should be used to operate the containment spray pumps, and why?

- A. FR-Z.1 because it takes precedence over ECA-1.1.
- B. FR-Z.1, because it provides for GREATER containment spray.
- C. ECA-1.1; it provides for REDUCED containment spray.
- D. ECA-1.1; an ECA should be completed prior to transferring to a FR Procedure.

Answer: C

Explanation/Justification:

A. . Incorrect. Plausible because in general FR procedures have a higher priority than any other procedure.

B. . Incorrect. Plausible because FR-Z.1 does provide greater spray flow than ECA-1.1; however, this is not the strategy of ECA-1.1.

C Correct. One of the goals of ECA-1.1 is to maintain core cooling from the RWST. Reducing spray flow will aid in this goal.

D Incorrect. Plausible because the procedure referenced is correct; however the reason is not correct

Technical References: 2-ECA-1.1
2-ECA-1.1 BG
2-FR-Z.1
2-FR-Z.1 BG

Proposed References to be provided: None

Learning Objective I2LP-ILO-EOPC12 6

Question Source: New

Question History: Unit 2 NRC 2008

Question Cognitive Level: Fundamental Knowledge

10 CRF Part 55 Content: 55.41 (b) 10

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	1	
	K/A#	022000A301	
		Ability to monitor automatic operation of the CCS, including: -	
		Initiation of safeguards mode of operation	
	Importance	4.1	4.3

Question # 40

The following conditions exist at Unit 2:

- Plant heatup was in progress at the end of an outage
- RCS temperature was 450°F
- Three Containment Fan Cooler Units (FCUs) were in service
- The other two FCUs were off in AUTO
- All other systems were in expected alignment for these conditions
- No personnel were in containment
- A loss of RCS coolant occurred which caused an automatic safety injection
- SI was reset

Assuming no other operator actions, what is the configuration of Containment Cooling at this time?

- Three FCUs are in service, valves 1104 and 1105 are SHUT.
- Three FCUs are in service, valves 1104 and 1105 are OPEN.
- Five FCUs are in service, valves 1104 and 1105 are SHUT.
- Five FCUs are in service, valves 1104 and 1105 are OPEN.

Answer: D

Explanation/Justification:

SI will autostart the two initially non-running FCUs and open valves 1104/1105. Resetting SI will not cause these devices to go back to their pre-SI state.

A. Incorrect but plausible. Having the plant in Mode 3 and two FCUs secured is not a lineup that candidates may be used to. It's plausible a candidate could believe previously non-running FCUs would turn off on SI reset. Also it is plausible that 1104/1105 go back shut without action because this is the case at U3.

B. Incorrect but plausible. It's plausible a candidate would believe that the FCUs that were previously off would turn off since 5 FCUs are almost always in service or tagged out.

C. Incorrect but plausible. It's plausible that a candidate would believe that without other operator actions 1104/1105 would shut because this is the case at U3.

D. Correct answer.

Technical References:	Logic Unit 2 Sheet 8
Proposed References to be provided:	None

Learning Objective	I2LP-ILO-AOIRH1 8
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Question Source:	New
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Question History:	NA
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Question Cognitive Level:	Fundamental Knowledge
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10 CRF Part 55 Content:	55.41 (b) 8
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Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	1	
	K/A#	026000A203	
		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: - Failure of ESF	
	Importance	4.1	4.4

Question # 41

The following events happened at Unit 2:

- A LBLOCA occurred
- The automatic spray setpoint was exceeded but spray failed to actuate
- SI was reset by procedure
- The BOP has just initiated a manual spray

Which of the following describes the effect of initiating manual spray?

- An SI signal will be generated. Safeguards equipment that was realigned following SI reset will return to SI configuration.
- An SI signal will be generated. Safeguards equipment that was realigned following SI reset will not be affected by initiating manual spray.
- An SI signal will NOT be generated. Both Containment Spray Pumps will start, but since SI was reset, the discharge MOVs will have to be opened.
- An SI signal will NOT be generated. Both Containment Spray Pumps will start and the discharge MOVs will open.

Answer: D

Explanation/Justification:

Manual spray does not cause an SI, but automatic spray does. The signal will start both spray pumps and open both discharge MOVs.

A. Incorrect but plausible because if an SI signal were generated some equipment would restart.

B. Incorrect but plausible because the second part of the answer is correct.

C. Incorrect but plausible because a candidate could believe that SI is the signal that opens the valves and they went shut on reset.

D. Correct answer.

Technical References: Logic Unit 2 Sheet 8

Proposed References to be provided: None

Learning Objective I2LP-ILO-ESS001 5

Question Source: New

Question History: NA

Question Cognitive Level: Fundamental Knowledge

10 CRF Part 55 Content: 55.41 (b) 8

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	1	
	K/A#	039000A106	
		Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the MRSS controls including: - Main steam pressure	
	Importance	3	3.1

Question # 42

Given the following conditions:

- Reactor power is 11%, with a plant startup in progress
- HP steam dumps are modulated open in Auto Pressure Control mode
- T-avg – 550°F
- RCS pressure - 2235 psig
- Main Steam Header pressure transmitter PT-404 fails at its current pressure value.

Which one of the following is the steam dump response as startup continues?

- Steam dumps modulate further open based on the steam pressure input as power is increased, and close when T-avg decreases to less than the Low T-avg setpoint.
- Steam dumps modulate based on the T-ref/T-avg error signal generated as power rises.
- Steam dumps will modulate closed as power is increased, and will only reopen when the Steam Dump Mode Selector Switch is placed in Temperature Control Mode.
- Steam dumps remain open until the Steam Dump Mode Selector Switch is placed in Temperature Control Mode.

Answer: D

Explanation/Justification:

A. Incorrect. Plausible because steam dump do modulate based on steam pressure input; however, PT-404 is the steam pressure input and it is failed as is.

B. Incorrect. Plausible because in temperature mode steam dumps do modulate based on T-ref/Tavg error signal. In steam pressure mode, the dumps modulate based on controller setpoint and steam pressure (PT-404) input.

C. Incorrect. Plausible because with no failure, the steam dumps will modulate closed as power is increased. With PT-404 failed as is, the dumps will not modulate.

D. Correct. The pressure input from PT-404 unchanged will be compared to the setpoint also unchanged and the valves will remain at their current position.

Technical References: 2-AOP-INST-1

Proposed References to be provided: None

Learning Objective I2LP-ILO-SDSHP 7

Question Source: New

Question History: NA

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.41 (b) 7

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	1	
	K/A#	059000K304	
		Knowledge of the effect that a loss or malfunction of the MFW System will have on the following: - RCS	
	Importance	3.6	3.8

Question # 43

Given:

- The plant is operating at 15% power.
- 21 MBFP is in service in Automatic
- 22 MBFP is in standby.
- Preparations are in progress to transfer from Low Flow Bypass Valves (LFBV) to Main Feed Reg Valves (MFRV).
- PT-408A Main Boiler Feed Pump (MBFP) Discharge pressure failed low.

Which of the following describes the effect on the plant and what actions are necessary?

	MBFP Speed	SG Level	RCS Temp	RCS Pressure	Action
A.	Increase	Increase	Decrease	Decrease	Take Manual Control 21 MBFP to control level
B.	Decrease	Decrease	Increase	Increase	Place 22 MBFP in Automatic
C.	Increase	Increase	Increase	Increase	Trip Reactor then Trip 21 MBFP
D.	Decrease	Decrease	Decrease	Decrease	Increase speed of 22 MBFP to control level

Answer: A

Explanation/Justification:

A. Correct. Discharge pressure failing low will cause MBFP speed to increase. Since LFBVs are in service, SG level will increase. The increase in level will cause a decrease in pressure. Taking man control of the MBFP

B. Incorrect. Plausible because if the MBFP slowed down this response would be correct. Placing 22 MBFP in auto might seem to correct the problem but it would not because it would slow down also.

C. Incorrect. Plausible because the MBFP speed would increase and SG level would increase; however, the RCS Temp and Pressure would not increase.

D. Incorrect. Plausible because RCS Temp and Pressure would decrease for a failure of 408A; however, MBFP speed and SG level will not decrease.

Technical References: 2-AOP-INST-1

Proposed References to be provided: None

Learning Objective I2LP-ILO-AOPINT 32

Question Source: New

Question History: NA

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.41 (b) 5

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	1	
	K/A#	059000A401	
		Ability to manually operate and/or monitor in the control room: - MFW turbine trip indication	
	Importance	3.1	3.1

Question # 44

The following conditions exist at Unit 2:

Reactor power is 3% during startup

21 MBFP is in service

Bypass FRVs have just been placed in service

Aux FRVs are all now shut

SG NR Levels are all 48% and stable

22 MBFP Turbine is indicating a green light and red flag on the flight panel

What actions (if any) are required prior to securing 21 and 23 AFW Pumps per SOP-AFW-001?

- A. No actions are required prior to securing pumps.
- B. 22 MBFPT steam supply valves must be shut prior to securing pumps.
- C. 22 MBFPT must be green flagged prior to securing pumps.
- D. 22 MBFPT trip switch must be placed in pull-to-lock prior to securing pumps.

Answer: C

Explanation/Justification:

The red flag/green light configuration of 22 MBFPT switch shows a disagreement. This would be the indication if the turbine had tripped by a signal other than the switch. A switch/light disagreement is one of the start signals to 21 and 23 AFW pumps. Green flagging is a common Unit 2 term meaning to rotate the switch in the trip direction to make the switch indicator flag green.

A. Incorrect but plausible if candidate misunderstand either the indications or requirements for securing the pumps.

B. Incorrect but plausible if candidate does not understand the operation of the MBFPT.

C. Correct answer

D. Incorrect but plausible if candidate does not understand the operation of the MBFPT switch.

Technical References: 2-SOP-21.3

Proposed References to be provided: None

Learning Objective I2LP-ILO-MFW001 9

Question Source: New

Question History: NA

Question Cognitive Level: Fundamental Knowledge

10 CRF Part 55 Content: 55.41 (b) 7

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	1	
	K/A#	061000K402	
		Knowledge of AFW System design feature(s) and/or interlock(s) which provide for the following: - AFW automatic start upon loss of MFW pump, S/G level, blackout, or safety injection	
	Importance	4.5	4.6

Question # 45

The following plant conditions exist:

- A reactor trip has occurred coincident with a loss of off-site power
- 22 EDG failed to auto start
- 22 AFW Pump was tagged out for maintenance
- NPO has been dispatched to investigate the failure of 22 EDG
- 21 and 22 SG WR levels are 54% and lowering slowly
- 23 and 24 SG NR levels are 12% and rising slowly

The FSS and the NPO are ready to start 22 EDG. When the EDG is started and the bus is energized, the motor driven AFW pump will:

- Not automatically start because the pump 86 relay must be reset.
- Automatically start without any time delay because SG levels are less than 10% in 2/4 SGs.
- Not automatically start because the pump was placed in trip pull out.
- Automatically starts after a time delay when blackout loads are sequenced on.

Answer: D

Explanation/Justification:

A. Incorrect. Plausible because an 86 lockout feature exists for CCW and other pumps to prevent start on low pressure; however, there is no 86 for AFW.

B. Incorrect. Plausible because candidate must remember that sequence timer starts when the bus is re-energized not from the time of the incident.

C. Incorrect. Plausible because some pumps are procedurally placed in trip pull out to prevent an automatic start. AFW is only placed in trip pull out during loss of all AC power.

D. Correct.

Technical References:	2-E-0 2-E-0 BG
Proposed References to be provided:	None

Learning Objective	I2LP-ILO-MFW001 9
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Question Source:	Bank
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Question History:	NA
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Question Cognitive Level:	Comprehension
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10 CRF Part 55 Content:	55.41 (b) 7
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Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	1	
	K/A#	062000A204	
		Ability to (a) predict the impacts of the following malfunctions or operations on the A.C. Distribution System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Effect on plant of de-energizing a bus	
	Importance	3.4	3.1

Question # 46

The unit is being restarted following a weekend outage.

The watch team has just reset the Main Generator 86P and 86 BU relays in preparation for synchronizing the Main Generator.

6.9KV bus 5 faults.

Which one of the following will be the resultant 480V electrical alignment and what procedure should be entered?

- A. Bus 2A is energized from 22 EDG. Bus 5A is de-energized, 21 EDG is running. The crew should enter 2-AOP-480V-1, Loss of Normal Power to Any 480V Bus.
- B. Bus 2A is de-energized, 22 EDG is running. Bus 5A is energized from 21 EDG. The crew should enter 2-AOP-480V-1, Loss of Normal Power to Any 480V Bus.
- C. Bus 2A and 5A are energized from 21 and 22 EDG respectively. The crew should enter 2-AOP-138kV-1, Loss of Power to 6.9KV Bus 5 And/Or 6.
- D. Bus 2A and 5A are de-energized. All EDGs running. The crew should enter 2-AOP-138kV-1, Loss of Power to 6.9KV Bus 5 And/Or 6.

Answer: D

Explanation/Justification:

A. Incorrect. Plausible because bus 2A is supplied from 22 EDG and would lose power under the above conditions; however, the EDG breaker would not close due to reset of 86P and BU. It is correct that bus 5A would be de-energized. AOP-480V-1 would be correct; if only 5A was de-energized.

B. Incorrect. Plausible because bus 5A is supplied from 21 EDG and would lose power under the above conditions; however, the EDG breaker would not close due to reset of 86P and BU. It is correct that bus 2A would be de-energized. It is correct that bus 5A would be de-energized. AOP-480V-1 would be correct; if only 2A was de-energized.

C. Incorrect. Plausible because this would be true if 86P and BU had not been reset. AOP-138KV-1 is correct for these conditions.

D. Correct. While the EDGs will start, the conditions to close the EDG breakers will not be satisfied. The requirement for a "unit trip" is from 86P and BU. AOP-138KV-1 is correct for these conditions.

Technical References:	Syst Desc 27.1
Proposed References to be provided:	None

Learning Objective	I2LP-ILO-EDSEDG 2 I2LP-ILO-EDS08 3
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Question Source:	Bank
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Question History:	NA
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Question Cognitive Level:	Comprehension
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10 CRF Part 55 Content:	55.41 (b) 6
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Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	1	
	K/A#	063000K201	
		Knowledge of bus power supplies to the following: - Major DC loads	
	Importance	2.9	3.1

Question # 47

The crew is performing actions in 2-AOP-SSD-1 due to a fire in the 480V switchgear room. All 480V buses are de-energized and power is being supplied by the App R/SBO diesel generator. The procedure directs actions to purge the generator with CO2 if available.

What is the reason for purging the generator?

- A. Allows breaking vacuum on the turbine/generator to secure Emergency Oil Pump to conserve station battery.
- B. Allow securing Emergency Seal Oil Pump to conserve station battery power.
- C. More rapidly slow down the turbine/generator to secure Emergency Oil Pump to conserve station battery.
- D. Remove hydrogen to allow access to generator disconnect links to allow back feeding the 6.9 KV buses via Main Transformers.

Answer: B

Explanation/Justification:

- A. Incorrect. Plausible because breaking vacuum will help to reduce DC loads.
- B. Correct. Securing major DC loads extends time batteries can supply DC power to Instrument buses and other equipment.
- C. Incorrect. Plausible because slowing down the turbine/generator will allow securing the Emergency Oil Pump; however these actions are not designed to slow the generator faster.

D. Incorrect. Plausible because power to 6.9 KV buses could be supplied by back feeding via the Main Transformers and Unit Aux.

Technical References: 2-AOP-SSD-1

Proposed References to be provided: None

Learning Objective I2LP-ILO-ASSD 11

Question Source: New

Question History: NA

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.41 (b) 10

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	1	
	K/A#	062000A407	
		Ability to manually operate and/or monitor in the control room: - Synchronizing and paralleling of different ac supplies	
	Importance	3.1	3.1

Question # 48

Given:

- Reactor Power is approximately 12%
- The Main Turbine Generator is rotating at approximately 1800 rpm
- 86P and BU have been reset
- The generator voltage is approximately 22 KV.

When the Sync Pot Control Selector switch is placed in Bkr 7 position the synchroscope pointer begins to move very slowly in the counter-clockwise direction.

All other conditions to synchronize the generator are met.

Which ONE of the following actions is required prior to closing breaker 7 to parallel the Generator to the grid?

- Governor Control, to the RAISE position.
- Governor Control, to the LOWER position.
- AC Regulator, to the RAISE position.
- AC Regulator, to the LOWER position.

Answer: A

Explanation/Justification:

A. Correct. The scope moving in the counter-clockwise direction indicates that the generator is slower than the grid frequency so the governor speed must be placed to raise.

B. Incorrect. Plausible because the governor control is the correct switch; however it would be adjusted to the RAISE not LOWER position

C. Incorrect. Plausible because AC Regulator (voltage control) would have been adjusted just prior to adjusting the governor to establish synchronizing conditions.

D. Incorrect. Plausible because AC Regulator (voltage control) would have been adjusted just prior to adjusting the governor to establish synchronizing conditions.

Technical References: 2-SOP-26.4

Proposed References to be provided: None

Learning Objective I2LP-ILO-POP007 4

Question Source: Modified

Question History: Sequoyah NRC 2010

Question Cognitive Level: Fundamental Knowledge

10 CRF Part 55 Content: 55.41 (b) 7

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	1	
	K/A#	064000K411	
		Knowledge of ED/G System design feature(s) and/or interlock(s) which provide for the following: - Automatic load sequencer: safeguards	
	Importance	3.5	4

Question # 49

Given:

- The plant was operating at 100% power
- A large steam break accident occurred on the west header.
- All systems functioned as designed.

After approximately 15 minutes a drop in offsite system voltage causes 480V Bus 5A voltage to drop to 418V causing the "SUSTAINED UV SAFEGUARD BUS TRIP" alarm to annunciate. System voltage is subsequently restored to normal one minute later.

Which of the following describes the effect on Bus 5A?

- Load breakers on 5A for non-safeguards equipment open, but the bus stays energized. Safeguards loads will remain energized.
- Load breakers on 5A for safeguards and non-safeguards equipment open, but the bus stays energized. Safeguards equipment must be manually restarted.
- The normal supply breaker to Bus 5A opens, load breakers for safeguards and non-safeguards equipment open, and power to the bus is restored by 21 EDG. Safeguards loads will be sequenced on the bus.
- The normal supply breaker to Bus 5A opens, load breakers for non-safeguards equipment open, and power to the bus is restored by 21 EDG. Safeguards loads will remain energized

Answer: C

Explanation/Justification:

A. Incorrect. Plausible because removing non-essential loads may assist in raising bus voltage, however, sustained undervoltage for greater than 9 seconds will result in opening the bus supply breaker.

B. Incorrect. Plausible because this is true if this condition occurred after SI was reset.

C. Correct. After 9 seconds < 420 V with an SI signal, the bus normal feed breaker will open. With 21 EDG already running the output breaker will close re-energizing the bus. All loads will sequence on according to their timers.

D. Incorrect. Plausible because the normal feed breaker will open after approximately 9 seconds; however all loads will strip and sequence back on when the EDG breaker closes.

Technical References: 2-ARP-FCF

Proposed References to be provided: None

Learning Objective I2LP-ILO-EDS01 3
I2LP-ILO-EDS01 9

Question Source: New

Question History: NA

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.41 (b) 7

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	1	
	K/A#	073000K101	
		Knowledge of the physical connections and/or cause-effect relationships between the PRM System and the following systems: - Those systems served by PRMs	
	Importance	3.6	3.9

Question # 50

Given:

- Unit 2 is at 60% power.
- The 22 SG has developed a 60 gpd tube leak.
- Operators are preparing to shutdown the Unit due to fuel failure resulting in RCS activity increasing at a steady rate.

Based on these plant conditions, which ONE of the following identifies how R-45 (Condenser Air Ejector) and R-61B (Main Steam N-16) will respond as RCS activity increases?

- R-45 indication will increase;
R-61B indication will increase.
- R-45 indication will increase;
R-61B indication will not change.
- R-45 indication will not change;
R-61B indication will increase.
- R-45 indication will not change;
R-61B indication will not change.

Answer: B

Explanation/Justification:

A. Incorrect. First part is correct as R-45 is sensitive changes in Ar-41 activity and thus will increase as RCS activity increases. Second part is incorrect but plausible because the applicant who is not aware that N-16 monitor is NOT sensitive to changes in RCS activity may conclude that this distractor makes logic sense because activity is increasing.

B. Correct. First part is correct as discussed in Distractor A. Second part is also correct as mentioned above, the N-16 monitors are not sensitive to changes in RCS activity.

C. Incorrect. Plausible as discussed above, since the applicant may reverse which monitor is sensitive to RCS activity change and which is not.

D. Incorrect. First part is incorrect as described in Distractor A, R-45 monitor is sensitive to RCS activity changes and thus will show an increasing trend. Second part is correct as discussed in Distractor B (monitor is not sensitive to changes in RCS activity).

Technical References:

Proposed References to be provided: None

Learning Objective I2LP-ILO-AOPSG1 10
I2LP-ILO-AOPSG1 9

Question Source: Bank

Question History: NA

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.41 (b) 5

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	1	
	K/A#	073000K502	
		Knowledge of the operational implications of the following concepts as they apply to the PRM System: - Radiation intensity changes with source distance	
	Importance	2.5	3.1

Question # 51

The plant is in a refueling outage and is returning the Reactor Lower Internals (core barrel) from the stand to the vessel. If cavity level is lower than required and the core barrel is lifted higher than needed, which of the following radiation monitors is likely to alarm first to warn control room operators of this condition?

- A. R-42 Containment Gas
- B. R-25 Containment High Range
- C. R-27 Plant Vent
- D. R-41 Containment Particulate

Answer: B

Explanation/Justification:

Explanation/Plausibility:

This event actually happened in 2006, but the radiation monitor alarming was a very minor part of the event. Some of the candidates were non licensed operators when this event occurred, but answering the question would still require knowledge of the process radiation monitoring system. When the event occurred, R-25 alarmed due to the core barrel being exposed in close proximity to the detector. This is the connection to the KA. Answering the question will also

require knowledge of radiation monitor locations and some sense that the major radiological effect of this event is radiation level vs. airborne.

A. Incorrect but plausible. A candidate may surmise that a particulate monitor is unlikely to be the first to alarm (thus eliminating C and D). However, the candidate probably knows that R-7 setpoint is much lower than R-25 and thus would alarm first despite having greater distance and shielding from the source.

B. Correct answer. The detector is located at the edge of the cavity and alarmed immediately during the actual event.

C. Incorrect but plausible. It is plausible that a candidate would believe that airborne activity would be the first response.

D. Incorrect but plausible. It is plausible that a candidate would believe that airborne activity would be the first response.

Technical References: Syst Desc 12

Proposed References to be provided: None

Learning Objective I2LP-ILO-RMS001 3

Question Source: New

Question History: None

Question Cognitive Level: Fundamental Knowledge

10 CRF Part 55 Content: 55.41 (b) 11

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	1	
	K/A#	076000A201 Ability to (a) predict the impacts of the following malfunctions or operations on the SWS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Loss of SWS	
	Importance	3.5	3.7

Question # 52

The following plant conditions exist:

- Reactor power is 15%
- Main Generator load is 112 MWe
- Service Water is in three header operation
- 11 RWP is tagged out for maintenance
- 12 RWP just tripped
- The conventional Service Water header is affected

Based upon the plant conditions the operators should:

- A. Trip the reactor, trip the turbine, go to E-0, (Reactor Trip or Safety Injection)
- B. Trip the turbine, go to AOP-TURB-1, (Main Turbine Trip Without a Reactor Trip)
- C. Initiate SOP 24.1, (Service Water System Operation) to swap to two header operation
- D. Initiate POP 3.1, (Plant Shutdown From 45% Power); reduce Turbine load if increasing turbine/generator temperatures observed.

Answer: B

Explanation/Justification:

- A. Incorrect. Plausible because this would be correct if power was > P-8 (19%).
- B. Correct.
- C. Incorrect. Plausible because this would be correct if the turbine was not on the line.
- D. Incorrect. Plausible because this is the correct procedure to perform a normal plant shutdown.

Technical References: 2-AOP-SW-1

Proposed References to be provided: None

Learning Objective I2LP-ILO-AOPSW1 3

Question Source: Bank

Question History: NA

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.41 (b) 5

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	1	
	K/A#	078000K402	
		Knowledge of IAS design feature(s) and/or interlock(s) which provide for the following: - Cross-over to other air systems	
	Importance	3.2	3.5

Question # 53

Normal plant alignment of the air systems exist. 11 Centac has tripped, Station air pressure is 110 psig and declining. Which of the following best describes the sequence of start of alternate air supplies as pressure continues to decline? (No operator action)

- A. 12 Centac, 21 Station air compressor, 21 and 22 Instrument air compressors, Station Air back up to WCCPPS, N2 backup to WCCPPS
- B. 21 Station air compressor, 21 and 22 Instrument air compressors, Station Air back up to WCCPPS, N2 backup to WCCPPS
- C. 21 and 22 Instrument air compressors, 21 Station air compressor, station air back up to WCCPPS, Nitrogen backup to WCCPPS
- D. 21 Station air compressor, 21 and 22 Instrument air compressors, Nitrogen back up to WCCPPS, Station air backup to WCCPPS

Answer: B

Explanation/Justification:

A. Incorrect. Plausible because station air and instrument air compressor starts are in the correct sequence, but 12 Centac would not auto start.

B. Correct. Station Air Compressor starts at 112 psig, and Instrument air compressor starts at 90 psig.

C. Incorrect. Plausible because Nitrogen backup and Station Air to WCCPPS are correct, but Instrument air compressor and station air compressor are swapped.

D. Incorrect. Plausible because station air instrument air compressor starts are correct, but eh nitrogen backup and station air to WCCPPS is swapped.

Technical References: Syst Desc 29.2
 Syst Desc 29.3

Proposed References to be provided: None

Learning Objective I2LP-ILO-SA01 7

Question Source: Bank

Question History: NA

Question Cognitive Level: Fundamental Knowledge

10 CRF Part 55 Content: 55.41 (b) 7

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	1	
	K/A#	103000A403	
		Ability to manually operate and/or monitor in the control room: - ESF slave relays	
	Importance	2.7	2.7

Question # 54

Given:

- 22 Instrument bus has tripped due to a fault.
- The crew is performing actions in 2-AOP-IB-1.
- The procedure directs placing the TOPAZ inverter in service.

What is the reason for placing the TOPAZ inverter in service?

- Provide power to operate the Containment Spray Master relay
- Provide power to operate the Containment Spray Logic relays.
- Provide power to Bistable Status Panel on Panel SOF
- Provide power to Intermediate Range NI Rx Trip and Rod Stop slave relays

Answer: B

Explanation/Justification:

A. Incorrect. Plausible because the TOPAZ inverter is used to supply containment spray slave relays (energize to actuate).

B. Correct. Containment Spray logic is energize to actuate. The TOPAZ inverter provides power to allow the slave relays to be energized in the event of a Containment Spray Signal with a loss of IB 22.

C. Incorrect. Plausible because 22 Instrument bus provides power to the Bistable Status Panel; however it is not re-energized from the TOPAZ inverter.

D. Incorrect. Plausible because IB-22 provides power to N-36; however, when removing an IR channel blocking strips are place on relays that are expected to be energized.

Technical References: 2-AOP-IB-1

Proposed References to be provided: None

Learning Objective I2LP-ILO-AOPIB1 3

Question Source: New

Question History: NA

Question Cognitive Level: Fundamental Knowledge

10 CRF Part 55 Content: 55.41 (b) 7

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	1	
	K/A#	103000A101	
		Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the Containment System controls including: - Containment pressure, temperature, and humidity	
	Importance	3.7	4.1

Question # 55

Unit 2 is operating at 100% power. A small instrument air leak inside Containment causes a slow rise in Containment pressure. Containment pressure is currently 1.6 psig. In order to ensure that adequate margin to Containment Technical Specification pressure limits is maintained, which ONE of the following indicates the appropriate action to reduce Containment pressure ?

- A. Maximize SW cooling to the Containment Fan Cooler Units.
- B. The Containment should be vented using the Containment Purge System.
- C. The Containment should be vented using the Containment Pressure Relief system.
- D. All Containment Fan Cooler Units should be started or verified running.

Answer: C

Explanation/Justification:

A. Incorrect Increasing cooling (lowering temperature) may cause a slight pressure reduction but with continued in leakage pressure a release will have to be performed;

B. Incorrect The Containment Purge system requires multiple reviews and sampling prior to use and is used only for shutdown conditions;

C. Correct

D. Incorrect Increasing cooling (lowering temperature) may cause a slight pressure reduction but with continued in leakage pressure a release will have to be performed.

Technical References: 2-SOP-5.4.1
Tech Specs

Proposed References to be provided: None

Learning Objective I2LP-ILO-VCVCB 6
I2LP-ILO-VCVCB 8

Question Source: Bank

Question History: DC Cook NRC 2004

Question Cognitive Level: Fundamental Knowledge

10 CRF Part 55 Content: 55.41 (b) 5

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	2	
	K/A#	001000K203	
		Knowledge of bus power supplies to the following: - One-line diagram of power supplies to logic circuits	
	Importance	2.7	3.1

Question # 56

Given:

- The unit is at 100% power
- 22 EDG is OOS for a breaker PM
- A fault occurred in the Buchanan switchyard resulting in a loss of 138KV power.

What is the immediate impact on the plant?

- The reactor will trip due to loss of both Rod Drive MG Sets when bus 138kV power is lost.
- Since 21 Rod Drive MG set was required to be secured due to 22 EDG being OOS; the reactor trips when bus 138kV power is lost.
- The reactor will remain at approximately 100% power with only 21 Rod Drive MG set energized.
- The reactor will remain at approximately 100% power with both Rod Drive MG Sets energized.

Answer: C

Explanation/Justification:

Duplicated from question no 25961

A. Incorrect. Plausible because candidate may believe the rod drive MG sets are powered from 5A and 6A which both lose power when offsite power is lost.

Note: Buses 2A and 3A do not lose power and 21 Rod Drive MG Set will continue to operate (powered from 2A)

B. Incorrect. Plausible because a precaution in a 480V SOP states "If and EDG is sole power supply for a 480V bus and 2 rod drive MG sets are in operation then MG set supplied by EDG should be shutdown." Candidate may believe 21 RDMG set is already shutdown.

C. Correct.

D. Incorrect. Plausible because candidate may believe the MG set flywheel will maintain voltage until EDG re-energizes the bus. The MG set supply breaker will trip on undervoltage.

Technical References: 2-AOP-480V-1

Proposed References to be provided: None

Learning Objective I2LP-ILO-ICROD 4

Question Source: Bank

Question History: IP3 2013

Question Cognitive Level: Fundamental Knowledge

10 CRF Part 55 Content: 55.41 (b) 5

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	1	
	Group#	1	
	K/A#	002000K607	
		Knowledge of the effect of a loss or malfunction on the following RCS components: - Pumps	
	Importance	2.5	2.8

Question # 57

Given:

- The Unit is operating at 5% power during a plant startup.
- The System Operator notifies the control room that grid frequency is unstable

What is the effect on the plant if grid frequency decreases to 57 Hz?

- Frequency less than 57.5 Hz for greater than 0.3 seconds will cause a direct trip of the reactor.
- Frequency less than 57.5 Hz for greater than 30.5 seconds will cause a direct trip of the reactor.
- Frequency less than 57.5 Hz on any 2 inside 6.9KV busses will cause all RCP breakers to open. The reactor will NOT automatically trip on loss of flow.
- Frequency less than 57.5 Hz on any 2 inside 6.9KV busses will cause all RCP breakers to open. The reactor will automatically trip on loss of flow.

Answer: C

Explanation/Justification:

9321-LL-31133 Sh 7

A. Incorrect. Plausible because Under Voltage not Underfrequency (75% of nominal value) for 0.3 seconds will trip the reactor. If the Voltage remains below setpoint for 30.5 seconds, the associated RCP will trip.

B. Incorrect. Plausible because Under Voltage not Under frequency (75% of nominal value) for 30.5 seconds will trip the associated RCP . If power is greater than 35% the reactor will trip on any single pump trip. If power is greater than 10% the reactor will trip if 2 of 4 6.9 kV buses exceed the setpoint and time.

C. Correct.

D. Incorrect since the reactor does not trip at this power.

Technical References:	Syst Desc 28
Proposed References to be provided:	None

Learning Objective	I2LP-ILO-ICRXP 8 I3LP-ILO-RCSRCP 3 I3LP-ILO-RCSRCP 4
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Question Source:	Bank
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Question History:	Unit 3 NRC 2010
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Question Cognitive Level:	Fundamental Knowledge
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10 CRF Part 55 Content:	55.41 (b) 7
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Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	2	
	K/A#	014000K501	
		Knowledge of the operational implications of the following concepts as they apply to the RPIS: - Reasons for differences between RPIS and step counter	
	Importance	2.7	3

Question # 58

During at-power operation, a control bank D rod drops into the core. AOP-ROD-1 requires that the affected group step counter reading be recorded. This reading must be recorded

- A. To verify the operability of the dropped rod after it has been recovered
- B. To verify that the P/A converter is indicating properly
- C. So the bank overlap unit can be reset to its proper value
- D. So the operator knows where the dropped rod should be positioned during recovery

Answer: D

Explanation/Justification:

Explanation:

Prior to recovering the dropped rod, the group step counter is set to zero. This number must be recorded so the operator knows where to align the rod. The other rods are not going to move during recovery, so this group counter position will match the unaffected rods after recovery.

- A. Incorrect but plausible because having this set properly does affect operability, but it is not the reason for recording the value.
- B. Incorrect but plausible because if rod motion in auto or manual affects the P/A converter. In this case the rod will be moved in bank select.

C. Incorrect but plausible because if rod motion in auto or manual affects the bank overlap unit. In this case the rod will be moved in bank select.
D. Correct answer.

Technical References: 2-AOP-ROD-1
3-AOP-ROD-1

Proposed References to be provided: None

Learning Objective I2LP-ILO-AOPROD 8

Question Source: Bank

Question History: Not on NRC Exam

Question Cognitive Level: Fundamental Knowledge

10 CRF Part 55 Content: 55.41 (b) 6

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	2	
	K/A#	015000K403	
		Knowledge of NIS design feature(s) and/or interlock(s) which provide for the following: - Reading of source range/intermediate range/power range outside control room	
	Importance	3.9	4

Question # 59

2-AOP-SSD-1, Control Room Inaccessibility Safe Shutdown Control, was implemented due to a fire in the Control Room.

The control room was evacuated due to a fire in the control room.

Which of the following describes where reactor power can be determined outside the control room.

- A. Charging Pump Emergency Control Panel.
- B. Safe Shutdown Panel.
- C. Upper Electrical Tunnel.
- D. Cable Spreading Room.

Answer: B

Explanation/Justification:

A. Incorrect. Plausible because source range indication may be desired at the charging station where boration is controlled.

B. Correct.

C. Incorrect. Plausible because the cables from the source range NIs penetrate the VC wall in the upper electrical tunnel.

D. Incorrect. Plausible because the reactor is tripped from the cable spreading room and local indication may be desired.

Technical References: 2-AOP-SSD-1

Proposed References to be provided: None

Learning Objective I2LP-ILO-ASSD 16

Question Source: New

Question History: NA

Question Cognitive Level: Fundamental Knowledge

10 CRF Part 55 Content: 55.41 (b) 6

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	2	
	K/A#	017000A202	
		Ability to (a) predict the impacts of the following malfunctions or operations on the ITM System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Core damage	
	Importance	3.6	4.1

Question # 60

The plant experienced a LOCA with core damage.

Which of the following is true regarding the individual Core Exit Thermocouple indications?

- A. Accurate due to being located near the fuel assembly exit flow. The CRS must use indicated CET values for decision making.
- B. Inaccurate due to high gamma fields as upper head voiding occurs. The CRS must use Adverse Containment values for decision making.
- C. Accurate due to being calibrated at zero/low flow conditions. The CRS must use quadrant average calculated values for decision making
- D. Inaccurate due to flow stagnation in the upper head area. The CRS must use program calculated CET values for decision making

Answer: A

Explanation/Justification:

A. Correct: Thermocouples located on the core top plate.

B. Incorrect. Plausible because most instruments are affected by high gamma fields; however, thermocouples are not affected by high gamma fields. There are no adverse values for CET.

C. Incorrect. Thermocouples are calibrated for temperature response and their accuracy is not dependent on flow conditions.

D. Incorrect. Plausible because loop RTDs need flow to give a "representative" sample indication.

Technical References: Syst Desc 14

Proposed References to be provided: None

Learning Objective I2LP-ILO-ICNXC 4

Question Source: New

Question History: NA

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.41 (b) 5

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	2	
	K/A#	016000K309	
		Knowledge of the effect that a loss or malfunction of the NNIS will have on the following: - ESFAS	
	Importance	3.5	3.7

Question # 61

Steam Generator 21 "C" Pressure channel has failed low.

- No actions have been taken.

Which one of the following additional failures will result in a Steamline Delta P Safety Injection?

- Steam Generator 21 "A" Pressure channel failing high
- Steam Generator 22 "A" Pressure channel failing high
- Steam Generator 23 "B" Pressure channel failing low
- Steam Generator 24 "C" Pressure channel failing low

Answer: B

Explanation/Justification:

Steamline Delta P SI provides protection of a steam break accident upstream of MSIVs when they are closed. The signal is generated when one SG pressure is 155 psid lower than two of the remaining three SGs. The SG pressure channels are compared in a specific arrangement to generate this SI signal. The initial failure results in 21 SG "appearing" more than 155 psi less than 24 SG. Any SG pressure transmitter failure (high or low) will generate a Delta P SI input signal. It takes the proper arrangement of transmitters to actually result in a Safety Injection.

A Incorrect. This failure will make 22 SG “appear” > 155 psi lower than 21.

B. Correct. This failure will make 21 SG “appear” > 155 psi lower than 22 and since it already “appears that 21 SG is > 155 psi lower than 24 the SI signal will occur.

C. Incorrect. This failure will make 23 SG “appear” > 155 psi lower than 24

D. Incorrect. This failure will make 24 SG “appear” equal to 21 (in the failed condition)

Technical References:	Logic Unit 2 Sheet 12
Proposed References to be provided:	None

Learning Objective	I2LP-ILO-ESS001 4
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Question Source:	Bank
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Question History:	NA
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Question Cognitive Level:	Fundamental Knowledge
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10 CRF Part 55 Content:	55.41 (b) 7
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Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	2	
	K/A#	029000A102	
		Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the Containment Purge System controls including: - Radiation levels	
	Importance	3.4	3.4

Question # 62

The plant is in MODE 5 and in Day 4 of a Refueling Outage. Radiation monitor R-41, Vapor Containment Particulate Activity Monitor, has just gone into ALARM. From the list below, select the actions that would occur from R-41 reaching the ALARM setpoint.

1. Containment pressure relief valves would receive a CLOSE signal.
 2. Pressure Relief Fan would receive a TRIP signal.
 3. PAB Exhaust Fan would receive a signal to divert through the Charcoal Filters.
 4. CB Purge Fan would be sent a TRIP signal.
 5. A containment Evacuation ALARM signal would be initiated.
 6. Containment purge supply valves would receive a CLOSE signal.
 7. RCV-014 would receive a CLOSE signal.
 8. Containment purge exhaust valves would receive a CLOSE signal.
- A. 1, 2, 3, 4, 6
- B. 2, 3, 5, 7, 8
- C. 1, 2, 4, 5, 6, 8
- D. 2, 3, 4, 6, 7, 8

Answer: C

Explanation/Justification:

Items 3 and 7 are plausible because they are correct for Radiation Monitor R-44 but not for R-41.

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

Technical References: 2-SOP-12.3.3
Proposed References to be provided: None

Learning Objective

Question Source: Bank
Question History: NA
Question Cognitive Level: Fundamental Knowledge
10 CRF Part 55 Content: 55.41 (b) 11

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	2	
	K/A#	045000A304	
		Ability to monitor automatic operation of the MT/G System, including: - T/G trip	
	Importance	3.4	3.6

Question # 63

The unit is operating at 100% power

You observe the white lights extinguished for

- 20 AST Auto Stop Solenoid
- 20 ASB Auto Stop Solenoid

What are consequences of the above condition?

The turbine will not trip on:

- A. Low Vacuum or Manual pushbutton (flight panel)
- B. High SG level or Thrust Bearing Wear
- C. Reactor Trip or AMSAC
- D. Low Bearing Oil Pressure or Safety Injection

Answer: C

Explanation/Justification:

A. Incorrect. Plausible because Manual pushbutton will NOT function, but Low Vacuum will.

B. Incorrect. Plausible because High SG Level will NOT function, but Thrust Bearing Wear will.

C. Correct. Both are Solenoid Trips that require the solenoid valves to energize to open to cause a turbine trip.

D. Incorrect. Plausible because Safety Injection will NOT function, but Low Bearing Oil Pressure will.

Technical References: Syst Desc 28

Proposed References to be provided: None

Learning Objective I2LP-ILO-ICRXP 4
I2LP-ILO-ICRXP 9

Question Source: New

Question History: NA

Question Cognitive Level: Fundamental Knowledge

10 CRF Part 55 Content: 55.41 (b) 7

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	2	
	K/A#	072000A402	
		Ability to manually operate and/or monitor in the control room: - Major components	
	Importance	2.5	2.5

Question # 64

Which one of the following describes the MINIMUM requirement for automatic swap of CCR ventilation to the INCIDENT OUTSIDE AIR FILTERED FOR SI/HI RAD mode?

- A. Alarm on R-1 CCR Area Radiation Monitor AND either R-38-1 or R-38-2 CCR Intake Radiation Monitors
- B. Alarm on R-1, CCR Area Radiation Monitor.
- C. Alarm on either R-38-1 or R-38-2, CCR Intake Radiation Monitors.
- D. Alarm on BOTH R-38-1 and R-38-2 CCR Intake Radiation Monitors

Answer: C

Explanation/Justification:

- A. Incorrect. Plausible because R-38-1 or R-38-2 will cause the ventilation system to shift to incident mode; however R-1 will not and it is not required to swap modes.
- B. Incorrect. Plausible because it does monitor CCR Area Radiation and only one signal is necessary to swap to incident mode.
- C. Correct. Either R-38-1 or R-38-2 in alarm will cause CCR ventilation to swap to incident mode.
- D. Incorrect. Plausible because either R-38-1 or R-38-2 in alarm will cause CCR ventilation to swap to incident mode, but both are not required.

Technical References:	2-SOP-12.3.3 Syst Desc 11
Proposed References to be provided:	None
Learning Objective	I2LP-ILO-RMS001 3 I2LP-ILO-RMS001 5
Question Source:	Bank
Question History:	NA
Question Cognitive Level:	Fundamental Knowledge
10 CRF Part 55 Content:	55.41 (b) 11
Comments	

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	2	
	Group#	2	
	K/A#	086000K103	
		Knowledge of the physical connections and/or cause-effect relationships between the Fire Protection System and the following systems: - AFW System	
	Importance	4.3	4.4

Question # 65

The following conditions exist at Unit 2:

- A plant trip occurred four hours ago due to a seismic event
- The only supply of AC power is the Appendix R Diesel Generator
- RCS Temperature is 300⁰F
- Verplanck fire trucks are on site to maintain fire hose pressure if needed
- The CST tank lost inventory due to a crack at the bottom of the tank
- City Water backup to AFW is not available

In accordance with 2-SOP-ESP-001, Local Equipment Operation and Contingency Actions, which of the following would be a method of using fire water to feed steam generators?

- Connect a fire hose to connection at suction to 21 AFW pump.
- Connect a fire hose to connection at suction to 22 AFW pump.
- Connect a fire hose to connection on line from CST to AFW.
- Connect a fire hose to the SG chemical feed line.

Answer: D

Explanation/Justification:

Explanation/plausibility:

The correct answer is D in accordance with 2-SOP-ESP-001 sections 4.8 or 4.9 depending on how fire water pressure is being maintained. Regardless of how pressure is being maintained, fire hose pressure will be around 100 psi and SG pressure at 3000F will be 52 psi.

2-SOP-ESP-001 also allows for connecting fire water to the city water supply of AFW, but this is precluded by the stem and not a choice. Another method not in 2-SOP-ESP-001 but in B5B procedures is to fill the CST from the top of the tank, but this is precluded by the stem and not a choice as well.

A. Is incorrect because there is no connection at this point in the system. It's plausible because 21 AFW Pump is the APP-R pump.

B. Is incorrect because there is no connection at this point in the system. It's plausible because 22 AFW pump is the most important pump for cooling.

C. Is incorrect because there is no connection at this point in the system. It's plausible because it would be useful to have a connection point here but it is not the case.

D. Correct answer.

Technical References: 2-SOP-ESP-001

Proposed References to be provided: None

Learning Objective I2LP-ILO-MFW001 15
I0LP-ILO-AOPSEC 7

Question Source: New

Question History: None

Question Cognitive Level: Fundamental Knowledge

10 CRF Part 55 Content: 55.41 (b) 8

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	3	
	Group# K/A#	1940012123 Conduct of Operations - Ability to perform specific system and integrated plant procedures during all modes of plant operation.	
	Importance	4.3	4.4

Question # 66

The plant is in MODE 5. The RCS is operating with a water solid Pressurizer.

Which one of the following indications and actions confirms the pressurizer is water solid?

- A. RCS pressure increasing with a decrease in letdown flow.
- B. RCS pressure decreasing with a decrease in letdown flow.
- C. RCS pressure stable with an increase in letdown flow.
- D. RCS pressure stable with a decrease in letdown flow.

Answer: A

Explanation/Justification:

- A. Correct
- B. Incorrect. Plausible because pressure would decrease with decreasing with increasing letdown flow.
- C. Incorrect. Plausible because this indication may be present when collapsing or just drawing a pressurizer bubble, but this indication would be present with a bubble in the pressurizer.

D. Incorrect. Plausible because this indication may be present during collapsing of the pressurizer bubble, but this indication would be present with a bubble in the pressurizer.

Technical References: 2-POP-3.3
3-POP-4.1

Proposed References to be provided: None

Learning Objective I3LP-ILO-POP003 6
I2LP-ILO-POP002 5

Question Source: Bank

Question History: NA

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.41 (b) 5

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	3	
	Group#		
	K/A#	1940012140	
		Conduct of Operations - Knowledge of refueling administrative requirements.	
	Importance	2.8	3.9

Question # 67

When fuel is being transported between the VC and SFP, which ONE of the following describes the requirement for oversight of fuel handling operations?

- A. Either a Reactor Engineer OR a fully qualified SRO may supervise Fuel Handling Activities in the VC OR SFP area.
- B. A fully qualified SRO must be present for all fuel handling activities in BOTH the VC AND in the SFP area.
- C. A fully qualified SRO must be present for all fuel handling activities in the VC ONLY.
- D. A Reactor Engineer must be present for all fuel handling activities in the VC. An active must be present for fuel handling activities in the SFP.

Answer: C

Explanation/Justification:

Duplicated from question no 23917 with some slight wording changes based on validation comments.

A. Incorrect. Plausible because a fully qualified SRO, however, the Reactor Engineer (Core Physics Monitor) is required to station in the control room not VC.

B. Incorrect. Plausible because the statement is true except for the requirement for the SRO to be present in the SFP.

C. Correct.

D. Incorrect. Plausible because a Reactor Engineer (Core Physics Monitor) is required to station in the control room not VC.

Technical References: Tech Specs

Proposed References to be provided: None

Learning Objective I2LP-ILO-FHD001 19

Question Source: Bank

Question History: NA

Question Cognitive Level: Fundamental Knowledge

10 CRF Part 55 Content: 55.41 (b) 10

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	3	
	Group#		
	K/A#	1940012145	
		Conduct of Operations - Ability to identify and interpret diverse indications to validate the response of another indication.	
	Importance	4.3	4.3

Question # 68

A rapid load reduction has just been completed. You observe the following:

- pressurizer sprays partially open
- modulating heaters full off
- backup heaters on

Which of the following would cause these indications?

- A. Controlling pressurizer pressure channel failed high
- B. Pressurizer level surge from the downpower
- C. Controlling pressurizer level channel failed low
- D. Pressurizer program level decrease from the downpower

Answer: B

Explanation/Justification:

A. Incorrect. Plausible because spray valves would be open (fully) and modulating heaters would be off; however the backup heaters would be off also.

B. Correct. The surge would cause pressure to increase, when actual pressurizer level exceeds program level by 5% the backup heaters would be energized.

C. Incorrect. Plausible because the control system would cause charging to increase which would cause actual pressurizer level to increase. Actual level increase may cause pressure to increase resulting in heaters off and sprays open. The backup heaters would be off.

D. Incorrect. Plausible because Pressurizer Program Level will decrease after the load reduction due to lowering Tav_g; however, the indications are not consistent with this phase of the event.

Technical References:

Proposed References to be provided: None

Learning Objective	I2LP-ILO-RCSPZR 4 I3LP-ILO-RCSPZR 3
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Question Source:	Bank
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Question History:	NA
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Question Cognitive Level:	Fundamental Knowledge
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10 CRF Part 55 Content:	55.41 (b) 5
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Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	3	
	Group#		
	K/A#	1940012206	
		Equipment Control - Knowledge of the process for making changes to procedures.	
	Importance	3	3.6

Question # 69

In accordance with IP-SMM-AD-102, "IPEC Implementing Procedure Preparation, Review and Approval", which of the following would prevent changing a procedure using a temporary procedure change?

- A. Editorial change to correct attachment numbers.
- B. Changes are necessary due to a temporary plant condition.
- C. A change to less restrictive acceptance criteria.
- D. The procedure will be exited prior to completion.

Answer: C

Explanation/Justification:

There are 3 types of Temporary Procedure Changes, Advance, Conditional and Editorial. In addition, knowledge of "intent change" is necessary to answer this question.

A. Incorrect. Plausible because the change will become permanent and not just remain "temporary".

B. Incorrect. Plausible because an Advance Change TPC addresses conditions that will be made permanent. This specific condition is addressed by a Conditional TPC and is allowed.

C. Correct. This condition is specifically identified as an Intent Change not allowed by the administrative procedure.

D. Incorrect. Plausible because the necessity for a TPC may be questioned if the procedure will be exited before the actions of the TPC are completed.

Technical References: IP-SMM-AD-102

Proposed References to be provided: None

Learning Objective I0WKB-ILO-ADM00 2.2.6

Question Source: Bank

Question History: NA

Question Cognitive Level: Fundamental Knowledge

10 CRF Part 55 Content: 55.41 (b) 10

Comments

Exam Outline Cross Reference: Level RO SRO
Tier# 3
Group#
K/A# 1940012212
Equipment Control - Knowledge
of surveillance procedures.
Importance 3.7 4.1

Question # 70

April

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21

A weekly surveillance test was completed at 1300 on Tuesday April 3rd.

In accordance with Technical Specifications, what is the LATEST this test can be scheduled to be completed this week, without exceeding an LCO?

- A. 1900 on Tuesday April 10th
- B. 1300 on Wednesday April 11th
- C. 0700 on Thursday April 12th
- D. 1300 on Tuesday April 17th

Answer: C

Explanation/Justification:

Technical References:	Tech Specs
Proposed References to be provided:	None
Learning Objective	I0LP-ILO-ITS001 1 (3967)
Question Source:	Bank
Question History:	Cooper Unit 1 NRC 2002
Question Cognitive Level:	Comprehension
10 CRF Part 55 Content:	55.41 (b) 10
Comments	

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	3	
	Group#		
	K/A#	1940012305	
		Radiological Controls - Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.	
	Importance	2.9	2.9

Question # 71

The plant is in Mode 6 with fuel reconstitution activities underway in the Fuel Storage Building. Area Radiation Monitor R-5 "Fuel Storage Building ARM" comes into alarm. Which of the following describes automatic actions, if any, as a result of this alarm?

- A. FSB Exhaust Fan Starts, Charcoal Filter Inlet and Outlet Dampers Open.
- B. FSB Exhaust Fan Stops, Charcoal Filter Inlet and Outlet Dampers Open.
- C. FSB Exhaust Fan Starts, Charcoal Filter Inlet and Outlet Dampers Isolate.
- D. Area Radiation Monitor R-5 "Fuel Storage Building ARM" has only alarm function, there are no automatic actions.

Answer: D

Explanation/Justification:

Explanation:

R-5 only has alarm function at IP-2. Other answers are plausible since IP-3 has functions on R-5 alarm involving the exhaust fan and charcoal filter dampers. It is plausible a candidate could think these auto functions are in place.

Technical References: 2-SOP-12.3.3

Proposed References to be provided: None

Learning Objective

I2LP-ILO-RMS001 6

Question Source:	Bank
Question History:	Not NRC Exam
Question Cognitive Level:	Fundamental Knowledge
10 CRF Part 55 Content:	55.41 (b) 11
Comments	

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#		
	Group#		
	K/A#	1940012312	
		Radiological Controls - Knowledge of radiological safety principles pertaining to licensed operator duties, such as containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.	
	Importance	3.2	3.7

Question # 72

You are about to sign on to an RWP to operate a valve in the Reactor Coolant Filter Cell and notice there is no requirement to wear a respirator. You recall from your tour this morning that the cell is posted as a High Airborne Activity Area. You ask the HP tech about this and are told it is consistent with ALARA to NOT wear a respirator.

Why would NOT wearing a respirator in a High Airborne Activity Area be consistent with ALARA?

- A. The respirator is only effective on particulates so there will be NO difference in TEDE.
- B. The respirator will limit your vision and may be a safety hazard in "tight" spaces.
- C. Wearing a respirator may increase your stay time and actually increase TEDE.
- D. The Airborne Activity is short lived and the respirator will have NO impact on ALARA

Answer: C

Explanation/Justification:

Explanation/plausibility:

This question was previously used on Oyster Creek Unit 1 ILO exam. The only modification is that the job location was changed to the RCS Filter Cell. The question meets the KA since it tests the principle of TEDE/ALARA vs. absolute minimizing internal exposure. The distracters are plausible if the candidate knowledge radioactivity and radiological controls is weak.

Technical References:

Proposed References to be provided: None

Learning Objective I0WKB-ILO-ADM00 1

Question Source: Bank

Question History: Oyster Creek Unit 1 2005

Question Cognitive Level: Fundamental Knowledge

10 CRF Part 55 Content: 55.41 (b) 12

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	3	
	Group# K/A#	1940012413 Emergency Procedures/Plan - Knowledge of crew roles and responsibilities during EOP flowchart use.	
	Importance	4	4.6

Question # 73

The following plant conditions exist:

- A Large Break Loss of Coolant Accident occurred.
- Bus 5A faulted when safeguards loads began loading on.
- 22 Containment Spray Pump tripped after running for 10 minutes.
- Procedure in effect E-1, "Loss of Reactor or Secondary Coolant".
- Containment pressure is 25 psig and increasing.
- Containment Radiation level indicates 2 R/hr.

The Team transitions to FR-Z.1, "Response to High Containment Pressure" and upon completion of all steps in FR-Z.1, containment pressure is still 25 psig and stable.

At this point, you are required to:

- Exit FR-Z.1 and return to E-1, "Loss of Reactor or Secondary Coolant" at the step in effect.
- Remain in FR-Z.1 until the condition is no longer a RED priority.
- Exit FR-Z.1 and enter FR-Z.3, "Response to High Containment Radiation Level".
- Remain in FR-Z.1 until the condition is no longer an ORANGE priority.

Answer: A

Explanation/Justification:

Duplicated from question no 25104 to correct for Unit 2
Duplicated from question no 15898

Significantly modified bank question

- A. Correct answer. When actions of FR-Z.1 are complete it is exited.
- B. Incorrect. Plausible because in most FRPs you remain in the procedure until the condition is clear. The condition is not Red, but this is easily confused since the procedure is "1" of this series.
- C. Incorrect because the entry condition for FR-Z.3 is 3 R/hr. Plausible because this is an elevated dose rate.
- D. See B and this is the correct condition level.

Technical References:	2-FR-Z.1 2-FR-Z.1 BG 3-FR-Z.1 OAP-012
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Proposed References to be provided:	None
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Learning Objective	I3LP-ILO-EOPFRZ 11
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Question Source:	Modified
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Question History:	Indian Point 3 2010
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Question Cognitive Level:	Fundamental Knowledge
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10 CRF Part 55 Content:	55.41 (b) 10
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Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	3	
	Group#		
	K/A#	1940012430	
		Emergency Procedures/Plan - Knowledge of which events related to system operations/status that must be reported to internal organizations or external agencies, such as State, the NRC, or the transmission system operator.	
	Importance	2.7	4.1

Question # 74

A valid, unplanned Reactor Protection System signal has caused an automatic reactor trip from 100% power.

Which one of the following represents the most restrictive NRC Notification requirement for this event?

- A. Emergency 1 Hour NRC Hotline Notification
- B. Non-Emergency 2 Hour NRC Hotline Notification
- C. Non-Emergency 4 Hour NRC Hotline Notification
- D. Non-Emergency 8 Hour NRC Hotline Notification

Answer: C

Explanation/Justification:

Duplicated from question no 8158 to eliminate non-plausible distracter.

Correct answer is C. All other choices are plausible since a candidate relies on memory and none of the other choices are far off from the correct answer.

Technical References: IP-SMM-LI-108

Proposed References to be provided: None

Learning Objective

I0WKB-ILO-ADM00 2.1.18

Question Source:

Bank

Question History:

Not NRC

Question Cognitive Level:

Fundamental Knowledge

10 CRF Part 55 Content:

55.41 (b) 10

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#	3	
	Group#		
	K/A#	1940012225	
		Equipment Control - Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.	
	Importance	3.2	4.2

Question # 75

What is the basis for requiring a minimum of 360,000 gallons of water in the Condensate Storage Tank?

Ensures adequate volume to:

- A. maintain Hot Zero Power for 24 hours and then cooldown to MODE 4 <350°F.
- B. maintain MODE 4 for 24 hours with at minimum of 2 SGs greater than 9% NR level.
- C. Cooldown from Trip concurrent with loss of off-site power to MODE 4 <350°F on RHR.
- D. remove decay heat while in MODE 3 for 24 hours following a reactor trip from 102% RTP.

Answer: D

Explanation/Justification:

To satisfy accident analysis assumptions, the CST must contain sufficient cooling water to remove decay heat while in MODE 3 for 24 hours following a reactor trip from 102% RTP.

A. Incorrect. Plausible because the 24 hour time is correct; however, the action and plant conditions are not correct

B. Incorrect. Plausible because the 24 hour time is correct; however, the action and plant conditions are not correct

C. Incorrect. Plausible because the cooldown with LOOP will be performed using the Atmospheric steam dumps. The CST inventory will be consumed.

D. Correct.

Technical References:	Tech Specs
Proposed References to be provided:	None

Learning Objective	I2LP-ILO-CND01 3 I3LP-ILO-CND001 9
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Question Source:	Modified
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Question History:	Unit 3 NRC 2013
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Question Cognitive Level:	Fundamental Knowledge
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10 CRF Part 55 Content:	55.43 (b) 2
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Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#		1
	Group#		1
	K/A#	0000072145	
		Conduct of Operations - Ability to identify and interpret diverse indications to validate the response of another indication.	
	Importance	4.3	4.3

Question # 76

The plant experienced a reactor trip from 100% power. The crew completed the immediate operator actions of E-0, Reactor Trip or Safety Injection and transitioned to ES-0.1, Reactor Trip Response.

- An excessive cooldown resulted in pressurizer level decrease to approximately 12%. Pressurizer Level is now slowly rising.
- Step 4 of ES-0.1 checks the status of letdown. Both red and green indicating lights for LCV-459 are extinguished.
- While attempting to replace the green light bulb, the bulb broke and became lodged in the socket.

Which of the following indications can be used to confirm LCV-459 is closed and what actions are directed by ES-0.1? Assume all other equipment operated as designed.

	Indications		Actions
A.	Letdown flow PCV-135 LP Letdown Relief Temp	0 gpm Closed 102°F	Place letdown in service per 2-SOP-3.1 when level is greater than 18%.
B.	LP Letdown Pressure VCT Level Charging Temp	0 psig Slowly lowering Rising slowly	Place letdown in service per 2-SOP-3.1 when level is greater than 18%.
C.	Letdown flow PCV-135 LP Letdown Relief Temp	0 gpm Closed 102°F	Manually actuate SI and go to E-0 step 1.
D.	LP Letdown Pressure VCT Level	0 psig slowly lowering	Manually actuate SI and go to E-0 step 1.

	Charging Temp	Rising slowly	
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Answer: A

Explanation/Justification:

If all equipment operated as designed, only LCV-459 would have closed. Indications that letdown flow has stopped confirm that LCV-459 is closed.

Procedurally, ES-0.1 assumes no accident is in progress; therefore, SOP should be used to restore letdown. Also ES-0.1 has a lower threshold for SI Actuation 9% vice 14% for most other EOPs.

A. Correct

B. Incorrect. Plausible because indications for LP Letdown Pressure and VCT level are correct. Charging temp is incorrect. Also the procedure SOP-3.1 is correct.

C. Incorrect. Plausible because all indications are correct. Manually actuating SI is plausible because most EOP foldout page SI Actuation Criterion is 14%.

D. Incorrect. Plausible because indications for LP Letdown Pressure and VCT level are correct. Charging temp is incorrect. Manually actuating SI is plausible because most EOP foldout page SI Actuation Criterion is 14%.

Technical References: 2-ES-0.1

Proposed References to be provided: None

Learning Objective I2LP-ILO-CVCS 5
I2LP-ILO-CVCS 8

Question Source: New

Question History: NA

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.43 (b) 5

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#		1
	Group#		1
	K/A#	0000562225 Equipment Control - Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.	
	Importance	3.2	4.2

Question # 77

The Technical Specifications require that the 6.9 kV bus tie breaker control switches in the CCR be placed in TPO if the 138 kV source is lost and the 13.8 kV source is being used to feed 6.9 kV Buses 5 and 6. What is the basis for this requirement?

- A. Automatic transfer of 6.9 kV Buses 1 - 4 to offsite power following a reactor trip could overload the Appendix "R" Diesel if it were carrying the 6.9 kV GT Buses
- B. The 13.8 kV source may not be in sync with the 138kV supply to 6.9 kV Buses 1 – 4
- C. Automatic transfer of 6.9 kV Buses 1 - 4 to offsite power following a reactor trip could overload the 13.8/6.9 kV transformer
- D. Automatic transfer of 6.9 kV Buses 1 - 4 to offsite power following a reactor trip could overload the Gas Turbine if it were carrying the 6.9 kV GT Buses

Answer: C

Explanation/Justification:

A. Incorrect. Plausible because the Appendix R diesel is a possible source of power to the 6.9kV buses; however, it is not considered part of the 13.8kV offsite circuit.

B. Incorrect. Plausible because it is possible for the 138 kV and 13.8 kV sources to be out of synchronization. A sync-check relay would prevent the tie breakers from closing if this was the concern.

C. Correct.

D. Incorrect. Plausible because a Gas Turbine-Generator is a possible source of power to the 6.9kV buses; however, it is not considered part of the 13.8kV offsite circuit.

Technical References:	Tech Specs
Proposed References to be provided:	None

Learning Objective	I2LP-ILO-EDS01 14
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Question Source:	Bank
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Question History:	NA
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Question Cognitive Level:	Comprehension
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10 CRF Part 55 Content:	55.43 (b) 2
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Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#		1
	Group#		1
	K/A#	0000092418	
		Emergency Procedures/Plan -	
		Knowledge of the specific bases	
		for EOPs.	
	Importance	3.3	4

Question # 78

During the performance of SI flow reduction, following a small break LOCA, the Emergency Operating procedures remind the operators to allow RCS pressure to stabilize before attempting to stop an additional SI pump.

What is the bases for allowing RCS pressure to stabilize during this period?

- A. RCS pressure decreasing after the first SI pump is stopped is an indication that SI flow is less than break flow.
- B. RCS cooldown rate will change as SI pumps are secured and may require adjustments to remain within limits.
- C. The SI flow reduction criteria for stopping additional SI pumps have been calculated for steady-state conditions.
- D. Stopping additional SI pumps before the break has uncovered could lead to unacceptably high peak clad temperatures.

Answer: C

Explanation/Justification:

A. Incorrect. Plausible because this is a true statement, but it is not the only reason pressure could be decreasing. The procedure is looking to achieve a new steady state condition before continuing.

B. Incorrect. Plausible because cooldown rate may change slightly; however the change is small.

C. Correct.

D. Incorrect. Plausible because uncovering the break can be beneficial during earlier phases of the event; it is not desirable during this phase.

Technical References: 2-ES-1.2
3-ES-1.2

Proposed References to be provided: None

Learning Objective I2LP-ILO-EOPS12 1
I3LP-ILO-EOPE10 22

Question Source: Bank

Question History: NA

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.43 (b) 5

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#		1
	Group#		1
	K/A#	000055A203 Ability to determine and interpret the following as they apply to a Station Blackout: - Actions necessary to restore power	
	Importance	3.9	4.7

Question # 79

Unit 2 is in Mode 3.

A loss of the Station Auxiliary Transformer has just occurred.

All 3 EDGs failed to start.

Con Ed DO stated that 13.8 KV power is available.

Which one of the following is an alignment of 13.8KV to energize the 6.9KV Buses 5 and 6 in AOP-138KV-1?

- A. From Unit 3 GT35 through Unit 3 GT bus, GTBT and OSP, GT25 and GT26
- B. 13W92 through Breakers GT1, GT2, OSP, GT25 and GT26
- C. 13W93 through L&P Bus 3, L&P bus 2, and breakers GT1, GT2, OSP, GT25 and GT26
- D. 13W94 through Unit 3 GT bus, and breaker GTBT and OSP, GT25 and GT26

Answer: B

Explanation/Justification:

Duplicated from question no 18810

A, C, and D are physically possible; however they are not specifically listed in AOP-138KV-1.

A. Incorrect

B. Correct

C. Incorrect.

D. Incorrect.

Technical References: 2-AOP-138KV-1

Proposed References to be provided: None

Learning Objective I2LP-ILO-EDS01 6

Question Source: Modified

Question History: NA

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.43 (b) 5

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#		1
	Group#		1
	K/A#	000062A202	
		Ability to determine and interpret the following as they apply to the Loss of Nuclear Service Water: - The cause of possible SWS loss	
	Importance	2.9	3.6

Question # 80

Given the following:

- The plant is at 100% power
- An inadvertent Safety Injection occurs during testing
- The crew is performing E-0 Reactor Trip or Safety Injection
- During recovery the BOP notes the following:
 - A rise in Containment temperature
 - Diesel Generator Service Water Flow Low alarm annunciates
- The Conventional NPO reports the High and High-High Water Temperature Alarms are lit on the EDG Control Panels

What actions are required for the above indications?

- A. Proper Essential Service Water flow will be re-established when IA is restored or unnecessary SW loads isolated in E-0.
- B. Service Water Pumps supplying the essential header will be started in E-0, Reactor Trip or Safety Injection.
- C. Fail air to FCV-1176 and FCV-1176A to establish adequate SW flow per 2-SOP-27.3.X, X EDG Manual Operation.
- D. Service Water supply valves from the Non-essential header to supply the EDGs only will be opened using 2-SOP-24.1, Service Water System Operation.

Answer: B

Explanation/Justification:

KA Justification:

Per discussion with Dave Silk, knowledge of the cause of the failure is necessary to select the correct action.

A. Incorrect. Loss of instrument air will cause many valves to fail open. In the service water system TCVs for containment fan coolers and FCVs for the EDGs will all fully open on an SI signal. This will not result in inadequate flow to components.

B. Correct. If the SW Pump Mode Selector Switch is misaligned the pumps supplying the Non-Essential header will start instead of the pumps supplying the Essential Header. Whether using ARP or E-0, service water pumps will be started in the header with no operating pumps. This will restore SW flow to essential components.

C. Incorrect. FCV-1176 and 1176A are SW outlet valves for the EDG Jacket Water Coolers. If these valves are closed, it would cause EDG temperatures to increase; however, this does not explain the rise in containment temperature.

D. Incorrect. A leak could cause inadequate flow; however, for the conditions given securing the EDGs is appropriate.

Technical References: 2-E-0
2-E-0 BG

Proposed References to be provided: None

Learning Objective I2LP-ILO-EOPE00 1

Question Source: Modified

Question History: NA

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.43 (b) 5

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#		1
	Group#		1
	K/A#	00WE05A201 Ability to determine and interpret the following as they apply to the Loss of Secondary Heat Sink: - Facility conditions and selection of appropriate procedures during abnormal and emergency operations	
	Importance	3.4	4.4

Question # 81

The plant tripped from 100% due to a small break LOCA. During the performance of E-0, the operating Team experienced a total loss of main feedwater and auxiliary feedwater and transitioned to the appropriate functional restoration procedure. The following plant conditions exist:

- RCS Pressure 800 psig
- SG Pressures 950 psig
- SG NR levels Off scale low
- SG WR levels 30-35% in all SGs
- Steam Driven AFW Pump Out of Service for PMs.
- Motor Driven AFW pumps Tripped on Over current

Which of the following describe the proper procedure flowpath?

- A. Transition to E-1," Loss of Reactor or Secondary Coolant."
- B. Attempt to restore flow to the SGs by using AFW, main feed, or condensate systems.
- C. Immediately establish bleed and feed of the RCS.
- D. Transition back to E-0," Reactor Trip or SI" procedure and step in effect.

Answer: D

Explanation/Justification:

The proper procedure flowpath for this event is E-0 -> FR-H.1 (heat sink not required at step 1) -> E-0 -> E-1.

A. Incorrect. Plausible because E-1 addresses LOCA conditions and will eventually be entered.

B. Incorrect. Plausible because restoring feed flow to the SGs is the first major action category in FR-H.1; however the procedure is exited at step 1 because heat sink is not required.

C. Incorrect. Plausible because bleed and feed criteria is the second major action category in FR-H.1; however the procedure is exited at step 1 because heat sink is not required.

D. Correct. The first step in FR-H.1 evaluates the need for a secondary heat sink. Heat sink is not necessary for the stated plant conditions.

Technical References: 2-FR-H.1
3-FR-H.1

Proposed References to be provided: None

Learning Objective I2LP-ILO-EOPFH1 1
I2LP-ILO-EOPFH1 5

Question Source: Bank

Question History: NA

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.43 (b) 5

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#		1
	Group#		2
	K/A#	0000372237	
		Equipment Control - Ability to determine operability and/or availability of safety related equipment.	
	Importance	3.6	4.6

Question # 82

Given the following:

- The plant was operating at 100% power.
- N-16 Radiation Monitor for 22 SG alarms
- NPO reports N-16 indicates 150 GPD leak
- Chemistry confirms the leakrate at approximately 150 GPD
- The operating crew entered 2-AOP-SG-1, Steam Generator Tube Leak
- During the performance of 2-AOP-RSD-1, Rapid Shutdown, the plant was tripped at 250 MWe.
- Bus 3A normal supply breaker tripped on overcurrent when the main generator tripped.

Which of the following describes steam generator level control in AOP-SG-1 for the above conditions?

- 22 AFW pump is used to supply 21 and 22 SG as necessary.
23 AFW pump supplies feedwater to 23 and 24 SGs as necessary.
An NPO is dispatched to close MS-41.
If MS-41 cannot be closed, PCV-1139 is tripped.
- 21 AFW Pump supplies feedwater to 21 and 22 SG as necessary
23 AFW pump supplies feedwater to 23 and 24 SG as necessary.
22 AFW pump will be used if necessary after MS-41, Steam Supply to 22 AFW pump is closed.
- PCV-1139, Main Steam Supply to 22 AFW, is tripped.
After MS-41, Steam supply to 22 AFW pump is closed, 22 AFW pump is used to supply 21 SG.
Feed flow to 22 SG is isolated due to leak.
23 AFW pump supplies feedwater to 23 and 24 SGs as necessary.

- D. 21 AFW pump supplies feedwater to 21 SG.
Feed flow to 22 SG is isolated due to leak.
23 AFW supplies feedwater to 23 and 24 SG as necessary.
22 AFW pump will be used if necessary after MS-41, Steam Supply to 22 AFW pump is closed.

Answer: A

Explanation/Justification:

SRO Only Justification:

This question is SRO Only because it required knowledge of specific differences between the emergency procedure for SGTR and the abnormal operating procedure for SGTL. In particular, the SGTR procedure will isolate steam to the turbine driven AFW pump until the steam supply from a ruptured SG is isolated as long as one motor driven AFW pump is operating. During a SGTL the turbine driven AFW pump is left running if only one motor driven AFW pump is running and the NPO is dispatched to close the steam supply valve.

- A. Correct. 22 AFW pump must be used because bus 3A supplies 21 AFW pump. Feed flow to 22 SG will be isolated ONLY if level is greater than 10% and reinitiate if level decreases to less than 10%.
- B. Incorrect. Plausible because 21 AFW pump supplies 21 and 22 SG if power is available. Feed flow to 22 SG will be isolated ONLY if level is greater than 10% and reinitiate if level decreases to less than 10%.
- C. Incorrect. Plausible because 22 AFW pump must be used to feed 21 and 22 because bus 3A supplies 21 AFW pump. Feed flow to 22 SG will be isolated ONLY if level is greater than 10% and reinitiate if level decreases to less than 10%.
- D. Incorrect. 21 SG supplies feedwater to 21 SG. Feed flow to 22 SG is isolated due to leak. 23 SG supplies feedwater to 23 and 24 SG as necessary. 22 AFW pump will be used if necessary after MS-41, Steam Supply to 22 AFW pump is closed.

Technical References:	2-AOP-SG-1
Proposed References to be provided:	None

Learning Objective	I2LP-ILO-AOPSG1 2 I2LP-ILO-AOPSG1 3
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Question Source:	New
Question History:	NA
Question Cognitive Level:	Comprehension
10 CRF Part 55 Content:	55.43 (b) 5
Comments	

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#		1
	Group#		2
	K/A#	0000682106	
		Conduct of Operations - Ability to manage the control room crew during plant transients.	
	Importance	3.8	4.8

Question # 83

A fire in the 15 ft. control building forced the Team to evacuate the control room and implement AOP-SSD-1, Control Room Inaccessibility Safe Shutdown Control.

Which of the following correctly describes the responsibilities of the team members after the control room has been evacuated?

- A. CRS and one RO report to the Nuclear Side.
Second RO and Conventional NPO report to the Aux Boiler Feed Pump Building
Unit 3 Polisher and Unit 1 NPO conduct electrical lineups
STA report to TSC to monitor PICS
SM provides field oversight
Unit 3 SM assumes Emergency Director role.
- B. CRS and one RO report to the Aux Boiler Feed Pump Building.
Second RO and Conventional NPO report to Nuclear Side.
Unit 3 Polisher and Unit 1 NPO conduct electrical lineups
STA report to TSC to monitor PICS
SM assumes Emergency Director role.
Unit 3 SM provides field oversight
- C. CRS and one RO report to the Nuclear Side.
Second RO report to the Aux Boiler Feed Pump Building
Conventional NPO and Unit 1 NPO conduct electrical lineups
STA assumes Emergency Director role.
SM provides field oversight
Unit 3 SM report to TSC to monitor PICS
- D. CRS and one RO report to the Nuclear Side.
Second RO and Unit 1 NPO report to the Aux Boiler Feed Pump Building
Unit 3 Polisher and Conventional NPO conduct electrical lineups

STA provides field oversight
SM report to TSC to monitor PICS
Unit 3 SM assumes Emergency Director role.

Answer: A

Explanation/Justification:

The following NOTE appears in 2-AOP-SSD-1 prior to step 4.19.

NOTE

The expectations for the use of personnel are as follows:

The CRS, one RO and the Nuclear NPO will be present on the Nuclear Side with one copy of this procedure.

The second RO and the Conventional NPO will be present in the Auxiliary Feed Pump Building. Each person will have one copy of this procedure.

The Unit 3 Polisher Watch and Unit 1 NPO will be conducting electrical operations, etc with the last copy of this procedure (labelled FSS Copy Packet). STA will report to TSC or Unit 3 CCR to monitor PICS.

SM provides field oversight.

Unit 3 SM assumes the ED role.

A. Correct

B. Incorrect

C. Incorrect

D. Incorrect.

Technical References: 2-AOP-SSD-1

Proposed References to be provided: None

Learning Objective I2LP-ILO-ASSD 12

Question Source: New

Question History: NA

Question Cognitive Level: Fundamental Knowledge

10 CRF Part 55 Content: 55.43 (b) 5

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#		1
	Group#		2
	K/A#	00WE02A202	
		Ability to determine and interpret the following as they apply to the SI Termination: - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments	
	Importance	3.5	4

Question # 84

Given:

- The team is performing the actions of ES-1.1, "SI Termination"
- At step 4 of ES-1.1, The team secured all SI and RHR Pumps
- At step 5 of ES-1.1, the team secured all but one charging pump
- RCS Pressure and Pressurizer Level begin to lower after the charging pumps are secured

Which one of the following describes the required operator actions in accordance with ES-1.1?

- Monitor RCS Pressure and Pressurizer Level, if pressure and level continue to lower, restart SI pumps and return to procedure previously in effect.
- Manually re-initiate SI and Transition to E-0, "Reactor Trip or Safety Injection" step 1.
- Adjust charging flow and if Pressurizer Level cannot be maintained, then restart SI pumps as required and transition to E-1, "Loss of Reactor or Secondary Coolant".
- Restart one charging pump and if Pressurizer Level cannot be maintained transition to E-1, "Loss of Reactor or Secondary Coolant."

Answer: C

Explanation/Justification:

- A. Incorrect. Plausible because candidate may believe that returning to the procedure previously in effect will resume mitigation strategies for that event.
- B. Incorrect. Plausible because candidate may believe that a new event has occurred and that restarting in E-0 is appropriate.
- C. Correct. These are the actions of step 6 in ES-1.1
- D. Incorrect. Plausible because the transition to E-1 is correct; however, the SI pumps must be started first.

Technical References:	2-E-1
	2-ES-1.1
	3-E-1
	3-ES-1.1

Proposed References to be provided:	None
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Learning Objective	I2LP-ILO-EOPE10 21
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Question Source:	Bank
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Question History:	IPEC Unit 3 NRC 2013
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Question Cognitive Level:	Comprehension
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10 CRF Part 55 Content:	55.43 (b) 5
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Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#		1
	Group#		2
	K/A#	00WE10A201 Ability to determine and interpret the following as they apply to the Natural Circulation with Steam Void in Vessel with/without RVLIS: - Facility conditions and selection of appropriate procedures during abnormal and emergency operations	
	Importance	3.2	3.9

Question # 85

Given the following plant conditions:

- A reactor trip occurred.
- The crew was performing ES-0.1, "Reactor Trip Response," when a loss of off-site power occurred.
- A transition is made to ES-0.2, "Natural Circulation Cooldown," to cool down the plant.

Which ONE of the following identifies

- (1) a reason the crew would transition to ES-0.3, " Natural Circulation Cooldown with Steam Void In Vessel (with RVLIS)."

AND

- (2) why RVLIS is maintained greater than 69% during performance of ES-0.3?
- A. (1) Unexpected large increase in Pressurizer Level is observed.
(2) To prevent loss of natural circulation due to steam voiding in the SG tubes.
- B. (1) Unexpected large increase in Pressurizer Level is observed.
(2) To ensure pressurizer level is adequate to accommodate void collapse.
- C. (1) Plant conditions require a cooldown rate faster than allowed by ES-0.2.
(2) To prevent loss of natural circulation due to steam voiding in the SG tubes.

- D. (1) Plant conditions require a cooldown rate faster than allowed by ES-0.2.
(2) To ensure pressurizer level is adequate to accommodate void collapse.

Answer: C

Explanation/Justification:

A. Incorrect. Plausible because an unexpected large increase in pressurizer level is an indication of a void in the reactor head. Also the reason for maintaining level is correct.

B. Incorrect. Plausible because an unexpected large increase in pressurizer level is an indication of a void in the reactor head. Pressurizer level adequate to accommodate void collapse is a reason for maintaining pressurizer level when starting an RCP.

C. Correct.

D. Incorrect. Plausible because conditions requiring a faster cooldown rate is correct. Pressurizer level adequate for void collapse is not correct, but it is a reason for maintaining pressurizer level when starting an RCP.

Technical References: 2-ES-0.2
2-ES-0.2 BG
2-ES-0.3

Proposed References to be provided: None

Learning Objective I2LP-ILO-EOPS03 1
I2LP-ILO-EOPS03 2

Question Source: Bank

Question History: Catawba NRC 2010

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.41 (b) 5

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#		2
	Group#		1
	K/A#	005000A201 Ability to (a) predict the impacts of the following malfunctions or operations on the RHRS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Failure modes for pressure, flow, pump motor amps, motor temperature, and tank level instrumentation	
	Importance	2.7	2.9

Question # 86

Given the following:

- A cooldown and depressurization are in progress for refueling.
- RCS temperature is 300 degrees F and slowly decreasing.
- RCS pressure is 360 psig and stable.
- 23 and 24 RCPs are running.
- RHR is in service.

The crew observes the following indications:

- RCS pressure rapidly lowering
- RHR flow oscillating
- VCT level increasing

Which of the following is a possible cause for the above indications and what procedural actions should be taken?

- PT-135 Failed High
Trip RCPs per AOP-RCP-1, Reactor Coolant Pump Malfunction
Enter AOP-CVCS-1, CVCS Malfunctions
- PT-135 Failed High
Trip RCPs if pressure < 325 psig
Enter AOP-RHR-1, Loss of RHR

- C. PT-402 Failed High
Trip RCPs per AOP-RCP-1, Reactor Coolant Pump Malfunction
Enter AOP-CVCS-1, CVCS Malfunctions
- D. PT-402 Failed High
Trip RCPs if pressure < 325 psig
Enter AOP-RHR-1, Loss of RHR

Answer: B

Explanation/Justification:

A. Incorrect. PT-135 failing high will cause PCV 135 to Open. This will cause letdown flow will be greater than charging flow. RCS pressure will decrease rapidly. RCP trip criteria in AOP-RCP-1 may not be reached. AOP-CVCS-1 does address the failure of PCV-135, but it does not address the cavitation of the RHR Pumps.

B. Correct. PT-135 failing high will cause PCV 135 to Open. This will cause letdown flow will be greater than charging flow. RCS pressure will decrease rapidly.

C. Incorrect. PT-402 is interlocked with RHR suction valve 730; however failing high will not cause 730 to close, it will prevent it from opening.

D. Incorrect. PT-402 is interlocked with RHR suction valve 730; however failing high will not cause 730 to close, it will prevent it from opening.

Technical References: 2-AOP-RHR-1

Proposed References to be provided: None

Learning Objective I2LP-ILO-AOPRHR 2

Question Source: New

Question History: NA

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.43 (b) 5

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#		2
	Group#		1
	K/A#	008000A202	
		Ability to (a) predict the impacts of the following malfunctions or operations on the CCWS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - High/low surge tank level	
	Importance	3.2	3.5

Question # 87

Given the following:

- Unit is operating at 100% reactor power, steady state conditions.
- All controlling systems are operating normally in automatic.
- "Supervisory Panel" SGF 1-2, Component Cooling Surge Tank Level is in alarm
- Operators are performing steps in AOP-CCW-1 "Loss of Component Cooling Water" due to a slowly lowering level in the CC surge tank.
- Makeup is in progress and operators dispatched to locate the leak.

When the following sequence of annunciators/indications is received:

- "Supervisory Panel" SGF 1-1 "Component Cooling Pump Discharge Low Pressure".
- "Supervisory Panel" SGF 3-3 "Thermal Barrier CCW Header Low Flow"
- CCW surge tank is 7% and lowering rapidly

The NEXT procedure to be entered by the operators is ____ (1) ____ because ____ (2) ____.

- (1) SOP-4.1.1 Component Cooling Filling and draining and 2SOP-4.1.2 Component Cooling System Operations ; (2) Normal make-up to the surge tanks is insufficient and backup cooling and makeup are required.
- (1) ARP-SGF 3-3. (2) RCP seal failures are imminent due to the loss of thermal barrier cooling which will require a plant shutdown.

- C. (1) ARP-SGF 1-1. (2) Any standby pumps will need to be started if they do not auto start to restore header pressure.
- D. (1) E-0 Reactor Trip or Safety Injection; (2) The reactor must be manually tripped and all RCPs stopped.

Answer: D

Explanation/Justification:

A. Incorrect: Although these procedures do support system makeup and backup cooling to vital loads these would not address the imminent threat to plant equipment.

Plausible: Some mitigation guidance is contained in these procedures

B. Incorrect: Seal failure is not imminent. Charging is providing cooling to seals.

Plausible: ARP could be implemented and does contain guidance to trip reactor and RCP(s) if seal temperature limits are reached.

C. Incorrect: loss of header pressure is a result of the leak so the actions of AOP-CCW should take priority (i.e. trip running CCW pps, trip reactor, trip RCP's)

Plausible: given low header pressure a pump start is a logical response.

D. Correct: Per step 4.12 if surge tank level is approaching off-scale low then per 4.13-4.16 ...trip CCW pumps, reactor and RCPs.

Technical References: 2-AOP-CCW-1

Proposed References to be provided: None

Learning Objective I2LP-ILO-AOPCCW A
I2LP-ILO-AOPCCW C
I2LP-ILO-CCW001 11

Question Source: Bank

Question History: IPEC Unit 2 NRC 2008

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.43 (b) 5

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#		2
	Group#		1
	K/A#	0620002236	
		Equipment Control - Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations.	
	Importance	3.1	4.2

Question # 88

Given the following:

- Unit 2 is at 100% power.
- 118 VAC Vital Bus Inverter 22 failed 8 hours ago.
- 118 VAC Vital Bus 22 is being powered from its associated constant voltage source transformer.
- Maintenance on 21 EDG is scheduled for this shift

Which ONE of the following identifies the minimum Technical Specification LCOs that contain required actions for these plant conditions, including the required compensatory measures in accordance with the Technical Specification Bases?

- TS 3.8.7, Inverters - Operating, LCO is required to be entered;
TS 3.8.9, Distribution Systems - Operating, LCO is NOT required to be entered;
Concurrent planned EDG maintenance is NOT allowed.
- TS 3.8.9, Distribution Systems - Operating, LCO is required to be entered;
TS 3.8.7, Inverters - Operating, LCO is NOT required to be entered;
Concurrent planned EDG maintenance can be performed.
- BOTH TS 3.8.9, Distribution Systems - Operating AND TS 3.8.7, Inverters Operating LCOs are required to be entered;
Concurrent planned EDG maintenance can be performed.
- BOTH TS 3.8.9, Distribution Systems - Operating AND TS 3.8.7, Inverters Operating LCOs are required to be entered;
Concurrent planned EDG maintenance is NOT allowed.

Answer: A

Explanation/Justification:

A. Correct. The inverter is required to be declared inoperable; however, the bus is still energized and operable. The basis is correct; limiting maintenance activities with an inverter unavailable reduces the likely hood of an inadvertent ESF actuation (due to momentary power interruption) in the event of a LOOP during the time the inverter is inoperable.

B. Incorrect. Plausible because LCO entry is reversed and relationship between EDGs and Instrument Buses is not obvious.

C. Incorrect. Plausible because the LCO for inverters is required, but the LCO for Distribution Systems is not. The relationship between EDGs and Instrument Buses is not obvious.

D. Incorrect. Plausible because the LCO for inverters is required, but the LCO for Distribution Systems is not. The relationship between EDGs and Instrument Buses is not obvious.

Technical References:	Tech Specs
Proposed References to be provided:	None

Learning Objective	I2LP-ILO-EDS04 6
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Question Source:	Bank
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Question History:	NA
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Question Cognitive Level:	Comprehension
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10 CRF Part 55 Content:	55.43 (b) 2
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Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#		2
	Group#		1
	K/A#	0760002408	
		Emergency Procedures/Plan -	
		Knowledge of how abnormal	
		operating procedures are used in	
		conjunction with EOPs.	
	Importance	3.8	4.5

Question # 89

Given:

- A seismic event has occurred.
- A small break LOCA has occurred inside the VC.
- Damage to the intake structure has resulted in a catastrophic failure of the Service Water System.
- VC pressure is 9 psig and rising.
- The crew is performing actions in E-1, Loss of Reactor or Secondary Coolant.
- Off-Site Power is available

Which of the following describes the actions for containment cooling?

- Perform FR-Z.1, Response to High Containment Pressure, in parallel with E-1 to re-establish containment cooling using Containment Spray System.
- Perform 2-AOP-SW-1, Service Water Malfunction, in parallel with E-1 to establish Service Water from the Wash Water system to the Fan Cooler Units.
- Perform 2-SOP-22.1, Wash Water System and Traveling Water Screen actions in parallel with E-1 to augment Service Water with Wash Water.
- Perform 2-SOP-ESP-1, Local Equipment Operation and Contingency Actions in parallel with E-1 to supply Service Water from the Fire Water System.

Answer: B

Explanation/Justification:

A. Incorrect. Plausible because FR-Z.1 will address challenges that result from inadequate containment cooling; however, rule of usage does not allow performing a functional restoration procedure in parallel with an EOP.

B. Correct. Rules of usage does allow performing AOPs in parallel with EOP if they do not interfere with the actions in the EOP and if their actions are necessary.

C. Incorrect. Plausible because SOP-22.1 is the procedure for normal lineup and operation of the Wash Water System. SOP-22.1 does not contain directions for augmenting the Service Water system with Wash Water.

D. Incorrect. Plausible because SOP-ESP-1 contains directions for various contingency actions and plant system lineups. Fire water can be aligned for a variety of uses if it is necessary; however, it can not be aligned to augment service water.

Technical References: 2-AOP-SW-1

Proposed References to be provided: None

Learning Objective I2LP-ILO-AOPSW1 2

Question Source: New

Question History: NA

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.43 (b) 5

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#		2
	Group#		1
	K/A#	103000A203	
		Ability to (a) predict the impacts of the following malfunctions or operations on the Containment System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Phase A and B isolation	
	Importance	3.5	3.8

Question # 90

The following conditions exist at Unit 2:

- A large break loss of coolant event occurred
- Containment pressure peaked at 26 psig
- No HHSI pumps are available
- All 6.9KV and 480V busses were continuously powered from offsite power
- The team has just exited E-0 and FR-C.1 entry criteria are met
- All procedural actions have completed for the above conditions

Which of the following describes the expected status of RCPs upon entry into FR-C.1 and how they could be operated as per FR-C.1 assuming no other equipment changes?

- No RCPs will be running. FR-C.1 will not allow for running RCPs with the stated conditions.
- All RCPs will be running. FR-C.1 will secure 24 RCP to ensure it is available for pressure control in subsequent procedures.
- No RCPs will be running. Based on CET trends, FR-C.1 may direct starting of RCPs.
- All RCPs will be running. RCPs will be left in service until FR-C.1 entry conditions are no longer met.

Answer: C

Explanation/Justification:

Explanation/justification:

The foldout page criteria for tripping RCPs on a LOCA is not met because there are no SI Pumps running. This makes choices with all RCPs running plausible. A containment pressure of 26 psig would have caused a Phase B isolation of all CCW to RCPs. Operators are expected to trip RCPs for this condition, so none would be running when FR-C.1 is entered. However, if needed, FR-C.1 will start RCPs for cooling. In this case CCW will be re-established.

This is an SRO level question because it requires assessing plant conditions and then selecting a procedure section to mitigate the event.

A. Incorrect but plausible since a candidate may not know if CCW is re-established in FR-C.1.

B. Incorrect but plausible a candidate may believe that RCPs are left running since foldout conditions are not satisfied. If RCPs were actually running, the second part of this distracter would be the correct response.

C. Correct answer.

D. Incorrect but plausible. The first part is plausible as in B. The second part is plausible since a candidate knows that RCPs are to be used FR-C.1 until to provide cooling.

Technical References: 2-E-0
2-FR-C.1

Proposed References to be provided: None

Learning Objective I2LP-ILO-EOPFC1 5

Question Source: New

Question History: None

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.41 (b) 5

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#		2
	Group#		2
	K/A#	034000A201 Ability to (a) predict the impacts of the following malfunctions or operations on the Fuel Handling System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Dropped fuel element	
	Importance	3.6	4.4

Question # 91

During core offload, the first fuel assembly was being removed from the core. The gripper was not properly engaged in the top nozzle so when the assembly was raised approximately halfway out of core it dropped back in.

- The gripper is in the latched position with no assembly attached.
- No permanent or temporary radiation monitor readings changed.
- Fuel damage cannot be determined since the assembly is surrounded on all four sides.
- There is no increase in gas bubbles coming from core.

Which of the following describes the required actions (if any) per AOP-FH-1, Fuel Damage or Loss of SFP/Refueling Cavity Level, and what actions are needed to retrieve the fuel assembly?

- Containment shall be evacuated.
The gripper can be unlatched in its current position to allow for retrieval of the fuel assembly.
- Containment evacuation is not required.
The gripper can be unlatched in its current position to allow for retrieval of the fuel assembly.
- Containment shall be evacuated.
The gripper must be placed down on assembly or unlatch fixture to allow unlatching prior to retrieval of the fuel assembly.

- D. Containment evacuation is not required.
The gripper must be placed down on assembly or unlatch fixture to allow unlatching prior to retrieval of the fuel assembly.

Answer: D

Explanation/Justification:

Plausibility/explanation:

AOP-FH-1 section for fuel damage in the VC only specifies evacuation if radiation monitors alarm. However, it is very plausible that a candidate could think that we would be required to evacuate the VC on a dropped assembly.

This makes A and C incorrect.

The gripper will only unlatch if it is sitting on something that pushes a mechanical interlocking device up. It is plausible that candidate does not know this. Also, there is an electrical interlock prevent gripper unlatching if there is weight detected on the hoist. This could make a candidate believe that unlatching is possible since there is no weight.

This makes A and B incorrect.

Technical References:	2-AOP-FH-1
Proposed References to be provided:	None

Learning Objective	I2LP-ILO-FHD001 11
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Question Source:	New
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Question History:	NA
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Question Cognitive Level:	Comprehension
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10 CRF Part 55 Content:	55.41 (b) 7
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Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#		2
	Group#		2
	K/A#	0720002418	
		Emergency Procedures/Plan - Knowledge of the specific bases for EOPs.	
	Importance	3.3	4

Question # 92

Given:

- The plant experienced a SBLOCA.
- Containment pressure spiked at 8 psig
- Containment pressure is currently 2 psig.
- R-25 and R-26 both spiked at 3×10^5 R/hr
- R-25 and R-26 currently indicate 4×10^3 R/hr

Which of the following describes the process parameter values (Normal vs Adverse Containment Values) used in the EOPs?

- Use Normal Values; both process parameters are currently below the value for Adverse Containment. Post accident instrument deviations are relatively insignificant below 228°F (saturation temp for 5 psig) and 10^5 R/hr.
- Use Normal Values: only containment pressure exceeded the setpoint and it is currently below the value for Adverse Containment. Post accident instrument deviations are relatively insignificant below 228°F (saturation temp for 5 psig)
- Use Adverse Values; containment radiation exceeded and remains above the setpoint. Post accident instrument deviations due to radiation are dependent on current existing radiation level.
- Use Adverse Values; both process parameters exceeded the setpoints and are currently below the value for Adverse Containment. Post accident instrument deviations due to radiation are based on accumulated dose.

Answer: D

Explanation/Justification:

SRO Only Justification:

This question is SRO only because it requires WOG EOP Background Executive Volume knowledge of when adverse containment values are used and when their use can be terminated. In particular for containment pressure, adverse values are used as long as condition exists and return to normal values when the condition no longer exists. If the Adverse containment values for high radiation are exceeded, the CRS never returns to normal values until an engineering evaluation is performed.

A. Incorrect. Plausible because if only containment pressure exceeds its setpoint and returns below, the CRS should return to using Normal Values.

B. Incorrect. Plausible because if only containment pressure exceeds its setpoint and returns below, the CRS should return to using Normal Values.

C. Incorrect. Plausible because Adverse Values should be used any time radiation exceeds it value; however, post accident deviations are the result of cumulated radiation dose to instruments.

D. Correct.

Technical References:	WOG-Executive
Proposed References to be provided:	None

Learning Objective	I2LP-ILO-EOPROU 23
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Question Source:	New
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Question History:	NA
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Question Cognitive Level:	Comprehension
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10 CRF Part 55 Content:	55.41 (b) 5
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Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#		2
	Group#		2
	K/A#	014000A204 Ability to (a) predict the impacts of the following malfunctions or operations on the RPIS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Misaligned rod	
	Importance	3.4	3.9

Question # 93

Given the following:

- The reactor was at 60% power when a control rod dropped without causing a reactor trip
- The cause of the problem was corrected
- The rod is now at 6 steps, being slowly withdrawn to the bank height in accordance with 2-AOP-ROD-1, DROPPED OR MISALIGNED ROD, ROD POSITION INDICATOR FAILURE

Which one of the following describes the correct operator action if a different rod in the same quadrant drops during retrieval of the first dropped rod?

- Complete the actions for retrieving the first rod and then re-enter 2-AOP-ROD-1 at Step 1
- Initiate a manual reactor trip and enter E-0
- Stop withdrawing the first dropped rod and re-calculate the QPTR
- In accordance with 2-AOP-ROD-1 commence an orderly shutdown in using POP 3.1.

Answer: B

Explanation/Justification:

A. Incorrect. Plausible because if the rod was greater than 20 steps, this would be correct; however, the rod being recovered is still considered dropped at less than 6 steps.

B. Correct. The rod being retrieved is still considered dropped (less than 20 is dropped); thus two dropped rods require a reactor trip.

C. Incorrect. Plausible because QPTR is a significant concern during a dropped rod event.

D. Incorrect. Plausible because the AOP does direct the performance of applicable POPs as directed by the OM.

Technical References:	2-AOP-ROD-1 3-AOP-ROD-1
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Proposed References to be provided:	None
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Learning Objective	I2LP-ILO-AOPROD 14
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Question Source:	Bank
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Question History:	NA
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Question Cognitive Level:	Fundamental Knowledge
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10 CRF Part 55 Content:	55.43 (b) 5
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Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#		3
	Group# K/A#	1940012125 Conduct of Operations - Ability to interpret reference materials such as graphs, curves, tables etc.	
	Importance	3.9	4.2

Question # 94

Given:

- The unit was shutdown 6 days ago for maintenance on 21 main transformer
- The reactor vessel head is being removed to replace a leaking O ring.
- RCS level is approximately 68' elevation
- 21 RHR pump is in service
- 22 RHR pump is in standby
- RCS temperature is 108° and stable.

21 RHR pump tripped on overcurrent.

Which of the following describes the required actions per AOP-RHR-1 and Graph ACS-2C?

- Equipment Hatch must be installed within 25 minutes
- Closure plug must be installed within 25 minutes
- Equipment Hatch must be installed within 30 minutes
- Closure Plug must be installed within 30 minutes.

Answer: B

Explanation/Justification:

A. Incorrect. Plausible because the time is correct and installing the Equipment Hatch would “seal the equipment hatch”; however this cannot be done in 25 minutes.

B. Correct. The closure plug will seal the equipment hatch and time to reach 200°F is approximately 25.2 minutes.

C. Incorrect. Plausible because the procedure states the hatch must be sealed within 30 minutes or time to boil which ever is shorter.

D. Incorrect. Plausible because the procedure states the hatch must be sealed within 30 minutes or time to boil which ever is shorter.

Technical References: 2-AOP-RHR-1

Proposed References to be provided: None

Learning Objective I2LP-ILO-AOPRHR 3

Question Source: New

Question History: NA

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.41 (b) 5

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#		3
	Group#		
	K/A#	1940012136	
		Conduct of Operations - Knowledge of procedures and limitations involved in core alterations.	
	Importance	3	4.1

Question # 95

Unit 2 is in Mode 6 with core alterations are in progress.

As per 2-SOP-17.30, Manipulator Crane Operations, which ONE of the following, by title, must approve bypass of a Fuel Handling interlock not specified in accordance with procedures for routine fuel handling activities?

- A. Shift Manager
- B. Refueling SRO
- C. Fuel Handling Supervisor
- D. Shift Outage Manager

Answer: B

Explanation/Justification:

Question originates from McGuire 2008 NRC Exam SRO Question

Unit 1 is in Mode 6, core alterations are in progress.

Which ONE of the following, by title, must approve bypass of a Fuel Handling interlock not specified in accordance with procedures for routine fuel handling activities?

- A. Shift Manager
- B. Fuel Handling SRO

C. Refueling Supervisor

D. Reactor Engineer

Proposed Answer: B

Explanation:

A. Incorrect. Shift Manager responsible for unit, but FH SRO is responsible for all refueling activities

B. Correct.

C. Incorrect. Administrative oversight required, but not approval for FH bypass

D. Incorrect. Shift Outage Managers will be involved in the critical path decisions, but are not part of approval for FH bypass; they are only approval authority during physics testing

Technical References: 2-SOP-17.30

Proposed References to be provided: None

Learning Objective I2LP-ILO-FHD001 20

Question Source: Bank

Question History: McGuire 2008

Question Cognitive Level: Fundamental Knowledge

10 CRF Part 55 Content: 55.43 (b) 7

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#		3
	Group# K/A#	1940012217 Equipment Control - Knowledge of the process for managing maintenance activities during power operations, such as risk assessments, work prioritization, and coordination with the transmission system operator.	
	Importance	2.6	3.8

Question # 96

Given:

- Unit 2 is at 100% Power with no equipment out of service.
- Unit 3 is in a refueling outage
- 138kV feeder 33332 L&M is out of service
- The quarterly tests, 2-PT-Q013 Inservice Valve Tests are scheduled for today for 1176 and 1176A.

Can the each of the valve stroke tests be performed? Why or why not?

- No. Stroke testing 1176 and 1176A will cause the EDGs to be inoperable and unavailable. On Line Risk Assessment will prevent performance of this test.
- Yes. Stroke testing 1176 and 1176A will cause the EDGs to be inoperable and unavailable. On Line Risk Assessment will allow performance of this test.
- No. Stroke testing 1176 and 1176A will NOT cause the EDGs to be inoperable or unavailable. On Line Risk Assessment will prevent performance of this test.
- Yes. Stroke testing 1176 and 1176A will NOT cause the EDGs to be inoperable or unavailable. On Line Risk Assessment will allow performance of this test.

Answer: D

Explanation/Justification:

A. Incorrect. Plausible because the existing plant conditions remove TS required 13.8kV power to both Unit 2 and 3. It may appear that any testing related to the EDGs would not be allowed; however EN-WM-104 definition of AVAILABLE would allow the test. Stroke testing of 1176 and 1176A will not cause EDGs to be inoperable.

B. Incorrect. Plausible because the existing plant conditions remove 138kV power between Unit 2 and 3. It may appear that any testing related to the EDGs would not be allowed; however EN-WM-104 definition of AVAILABLE would allow the test. Stroke testing of 1176 and 1176A will not cause EDGs to be inoperable.

C. Incorrect. Plausible because the existing plant conditions remove 138kV power between Unit 2 and 3. It may appear that any testing related to the EDGs would not be allowed; however EN-WM-104 definition of AVAILABLE would allow the test. Stroke testing of 1176 and 1176A will not cause EDGs to be inoperable.

D. Correct. Testing 1176 and 1176A do not cause the EDGs to be inoperable. Therefore there is minimal increase in risk related to the test.

Technical References: EN-WM-104
Proposed References to be provided: None

Learning Objective I0LP-ILO-ADM01 2.2.17

Question Source: New

Question History: NA

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.43 (b) 2

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#		3
	Group# K/A#	1940012218 Equipment Control - Knowledge of the process for managing maintenance activities during shutdown operations, such as risk assessments, work prioritization, etc.	
	Importance	2.6	3.9

Question # 97

Which of the following is correct per IP-SMM-OU-104, Shutdown Risk Assessment, for controlling maintenance activities during outages?

- A. A form is filled out SHIFTLY to determine available risk significant equipment whenever the plant is in Mode 2 and below.
- B. A form is filled out SHIFTLY to determine available risk significant equipment whenever the plant is BELOW Mode 3.
- C. A form is filled out DAILY to determine available risk significant equipment whenever the plant is Mode 2 and below.
- D. A form is filled out DAILY to determine available risk significant equipment whenever the plant is BELOW Mode 3.

Answer: B

Explanation/Justification:

Explanation:

As per IP-SMM-OU-104, the SM/designee is responsible for completing the Shiftly Outage Risk Assessment whenever the plant is in Modes 4,5,6 and defueled.

SRO question justification:

The KA is clearly met and the “Clarification Guidance for SRO-only Questions Figure 2” lists “knowledge of when to implement attachments and appendices...” as a criteria for an SRO question.

Technical References: IP-SMM-OU-104

Proposed References to be provided: None

Learning Objective I0LP-ILO-ADM01 3

Question Source: New

Question History: NA

Question Cognitive Level: Fundamental Knowledge

10 CRF Part 55 Content: 55.43 (b) 5

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#		3
	Group#		
	K/A#	1940012304	
		Radiological Controls - Knowledge of radiation exposure limits under normal and emergency conditions.	
	Importance	3.2	3.7

Question # 98

Current Conditions:

- A Site Area Emergency has been declared due to a LOCA outside Containment.
- The LOCA is into the PAB building and a pathway to the environment exists.
- Limited makeup to the RWST is available.
- An operator has volunteered to go to the PAB building to locally isolate the leak.
- The EOF has been fully staffed and operational for an hour.
- This action will result in a significant reduction in offsite dose, protecting a large population.

What is the maximum emergency exposure this operator may receive while performing this action?

- A. 10 Rem TEDE with SM approval
- B. 25 Rem TEDE with SM approval
- C. 10 Rem TEDE with ED approval
- D. 25 Rem TEDE with ED approval

Answer: D

Explanation/Justification:

Modified from question no 18694 with changes to be similar to a Seabrook NRC exam question

EP-Form 6 is the reference

A. Incorrect but plausible since this is the emergency limit for protecting valuable property. It is plausible that the SM could authorize this exposure since he is ED qualified.

B. Incorrect but plausible. The dose is correct and is plausible that the SM could authorize this exposure since he is ED qualified.

C. Incorrect but plausible since this is the emergency limit for protecting valuable property.

D. Correct answer per IPEC E-Plan Form 6

Technical References: IP-EP-115

Proposed References to be provided: None

Learning Objective IOLP-ILO-ERT005 14

Question Source: Bank

Question History: Seabrook 2009

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.43 (b) 4

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#		3
	Group#		
	K/A#	1940012432	
		Emergency Procedures/Plan -	
		Knowledge of operator response	
		to loss of all annunciators.	
	Importance	3.6	4

Question # 99

The following conditions exist at Unit 2:

A Station Auxiliary Transformer fault occurred.
 Bus 6A is de-energized and the cause is being investigated.
 A trip occurred because 21 RDMG set was secured prior to the event.
 DC circuit trips have caused a loss of all supervisory panel annunciators.
 All instrument busses are energized.
 All other equipment operated as designed.

Which of the following describes the proper emergency plan classification for this event?

- A. NUE due to the loss of offsite AC power sources.
- B. ALERT due to the loss of offsite AC power sources and 6A not being energized.
- C. NUE due to the loss of annunciators.
- D. ALERT due to the loss of annunciators with a significant transient in progress.

Answer: D

Explanation/Justification:

Explanation/justification:

The question tests SRO level knowledge of selecting the appropriate procedure section of the Emergency Plan for the event based on given conditions. While it

is not expected that a candidate have the EAL chart memorized, recognizing this classification from memory is reasonable. Statements are in the stem saying that alternate monitoring is available to prevent SAE from being a valid answer. This has the added benefit of making the NUE for annunciators and electrical EAL answers more plausible.

A. Incorrect but plausible because without the loss of annunciators, this would be the correct call.

B. Incorrect but plausible because this is the correct call if the plant was limited to one available power supply.

C. Incorrect but plausible since a candidate may not interpret a trip as a significant transient in progress. The plant would be considered stable for these conditions. However, for the purposes of this EAL call, a trip is considered a significant transient.

D. Correct answer.

Technical References: IP-EP-120

Proposed References to be provided: None

Learning Objective IOLP-ILO-ERT002 8

Question Source: New

Question History: None

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.41 (b) 5

Comments

Exam Outline Cross Reference:	Level	RO	SRO
	Tier#		3
	Group#		
	K/A#	1940012446	
		Emergency Procedures/Plan -	
		Ability to verify that the alarms	
		are consistent with the plant	
		conditions.	
	Importance	4.2	4.2

Question # 100

The following conditions exist at Unit 2:

- A loss of coolant accident occurred.
- All equipment was available and operated as designed.
- Transfer to cold leg recirculation was completed 90 minutes after the initiating event.
- The team is at the last step of ES-1.4 and completed transfer to hot leg recirculation within the appropriate time period.
- 21 Recirculation Pump, 21 and 23 HHSI Pumps are in service.
- The ATC just pointed out that the "LOW HEAD INJECTION LOW FLOW 320 GPM" alarm is up.

What actions should the CRS take at this time?

- The CRS should transition back to E-1, Loss of Reactor or Secondary Coolant.
- The CRS should transition back to ES-1.3, Transfer to Cold Leg Recirculation.
- The CRS should direct throttling open HCV-638 and/or 640 to increase low head flow.
- The CRS should transition to ECA-1.3, Loss of Emergency Coolant Recirculation Caused by Sump Blockage.

Answer: A

Explanation/Justification:

Alarm is up because ES-1.4 will close Valves 746 and 747 which isolates low head flow. This will stop low head flow. All flow will be via the HHSI pumps. When transfer to cold leg recirculation was completed, ES-1.3 would have directed the crew back to E-1. When transfer to hot leg recirculation is complete, ES-1.4 directs the crew back to procedure and step in effect. The procedure would be E-1.

A. Correct answer

B. Incorrect because transition is to E-1. Plausible because a candidate may not know that E-1 is re-entered after transfer to cold leg recirculation. In fact, B would be the correct answer for IP-3.

C. Incorrect because the alarm is expected. Plausible because a candidate may not know that this alarm is expected and the actions are reasonable.

D. Incorrect because alarm is expected. Plausible because a candidate may not know that this alarm is expected and the actions are reasonable.

Technical References: 2-ES-1.4

Proposed References to be provided: None

Learning Objective I2LP-ILO-EOPS14 1

Question Source: New

Question History: NA

Question Cognitive Level: Comprehension

10 CRF Part 55 Content: 55.43 (b) 5

Comments