Level RO Tier 1 Group 1 K/A# 008 AA2.20 Imp. RO 3.4 Imp. SRO 3.6

1. The following conditions are observed about 3 minutes after an automatic safety injection:
   - Core exit T/Cs 540°F
   - Pressurizer level 58% and increasing
   - RCS pressure 1100 psig and decreasing
   - Containment pressure 0 psig

   Based on these indications, it is likely that a…

a. small break LOCA has occurred outside the containment.
b. a pressurizer PORV is stuck open.
c. steam generator tube rupture has occurred.
d. steam line break has occurred outside containment.

ANSWER: B

Explanation: **All choices are plausible since containment pressure has not changed. A pressurizer steam space LOCA is the only accident listed that results in pressurizer level increasing while RCS pressure decreases.**

Technical References: **This is a diagnostic question using integrated plant knowledge.**
E-0, Reactor Trip or Safety Injection, diagnostic steps provide an incomplete reference.

Objective: **P8197L-012**

KA Statement: **Ability to determine and interpret the following as they apply to the Pressurizer Vapor Space Accident: The effect of an open PORV on code safety, based on observation of plant parameters**

Cog. Level:	**HIGH**	**10CFR55.41:**	**YES**	**10CFR55.43:**		**New Question:**	**NO**
Bank:	**Part-B**	**Ques. ID:**	**P8197L-012 (003)**	**Modified:**	**YES**	**Last NRC Exam:**	**----**

Level RO Tier 1 Group 1 K/A# 009 EA2.14 Imp. RO 3.8 Imp. SRO 4.4

2. You are responding to a small break LOCA in accordance with ES-1.1, “Post-LOCA Cooldown and Depressurization” when the Shift Manager provides the following update: “RCS conditions have met ORANGE path conditions on the Integrity Critical Safety Function Status Tree.”

   What actions would be taken in response to an ORANGE path condition being met?

a. Restart any SI pump that was previously stopped.
b. The RCS cooldown should be suspended.
c. RCS pressure should be raised to maximize subcooling.
d. One RCP should be stopped if both RCPs are running.

ANSWER: B

Explanation:
a. Plausible because this is an EOP action which is taken for some internal transitions but is incorrect for a PTS event because extra flow could lower temperature or raise pressure.
b. Correct.
c. Plausible because this is a strategy for some FRPs but is incorrect for a PTS event.
d. Plausible because this is an action for some EOPs but is incorrect for a PTS event which looks to start an RCP if none are running.

Technical References: ES-1.1 Step 5
FR-P.1 Step 2

Objective: P8197L-012

KA Statement: Ability to determine and interpret the following as they apply to a small break LOCA: Actions to be taken if PTS limits are violated

Cog. Level:	HIGH	10CFR55.41:		10CFR55.43:	YES	New Question:	YES
Bank:		Ques. ID:		Modified:		Last NRC Exam:	

Level RO Tier 1 Group 1 K/A# 011 EK3.15 Imp. RO 4.3 Imp. SRO 4.4

3. Why is 33% RWST level a criterion for shifting ECCS into the recirculation mode?

RWST level below 33%…

a. does NOT provide adequate NPSH for 2 trains of ECCS pumps at runout conditions.
b. may allow vortexing in the RWST with 2 trains of ECCS pumps at runout conditions.
c. ensures enough level in containment sump B to provide adequate NPSH for the ECCS pumps.
d. ensures adequate boron has been added to maintain the reactor subcritical.

ANSWER: C

Explanation:
a Plausible because NPSH is tied to level.
b Plausible because vortexing is more likely as water level drops in RWST.
c Correct per T.S. bases.
d Plausible because the RWST does add boron but subcriticality is assured by adding the full deliverable volume of 200,000 gallons.

Technical References: **T.S. 3.5.4, RWST Bases**

Objective: **P8197L-012**

KA Statement: **Knowledge of the reasons for the following responses as they apply to the Large Break LOCA: Criteria for shifting to recirculation mode**

Cog. Level:	**LOW**	**10CFR55.41:**	**YES**	**10CFR55.43:**		**New Question:**	**YES**
Bank:		**Ques. ID:**		**Modified:**		**Last NRC Exam:**	

Level RO Tier 1 Group 1 K/A# 015/17 AK2.08 Imp. RO 2.6 Imp. SRO 2.6

4. If component cooling water flow is lost to an RCP, what parameters will change?

   Temperatures will rise on the…

a. RCP motor radial and thrust bearings and the pump radial bearing.
b. RCP motor stator and the motor radial and thrust bearings.
c. RCP motor stator and the pump radial bearing.
d. RCP motor radial and thrust bearings.

ANSWER: D

Explanation: **All choices are plausible combinations of parameters that must be cooled by something.**
a Incorrect because pump is cooled by seal injection flow.
b Incorrect because motor stator is air cooled.
c Incorrect because motor stator is air cooled and pump is cooled by seal injection flow..
d. Correct per B3 description of CC cooling. Also accurate based on simulator response.

Technical References: **B3, Reactor Coolant Pumps**
Objective: **P8170L-002**
KA Statement: **Knowledge of the interrelations between the Reactor Coolant Pump Malfunctions and the following: CCWS**

Cog. Level:	**LOW**	**10CFR55.41:**	**YES**	**10CFR55.43:**		**New Question:**	**YES**
Bank:		**Ques. ID:**		**Modified:**		**Last NRC Exam:**	

Level RO Tier 1 Group 1 K/A# 022 AK1.02 Imp. RO 2.7 Imp. SRO 3.1

5. The position of CV-31158, Charging Line Flow Control, is changed to vary RCP seal injection flow. IF CV-31158 is closed slightly, THEN…

	Charging Pump Header Pressure	RCP Seal Water Injection Flow	Charging Flow to Regen HX
a.	Increases	Increases	Decreases
b.	Increases	Decreases	Increases
c.	Decreases	Increases	Decreases
d.	Decreases	Decreases	Increases

ANSWER: A

Explanation: **All distracters represent possible combinations of flow and pressure with one flow changing directly with pressure and the other flow changing inversely with pressure.**

A is correct because PI uses positive-displacement charging pumps with a throttle valve in the charging line to the regen HX with RCP seal injection line connected to charging before the throttle valve.

Technical References: **B12A, Chemical and Volume Control System**

Objective: **P8172L-001A**

KA Statement: **Knowledge of the operational implications of the following concepts as they apply to Loss of Reactor Coolant Pump Makeup: Relationship of charging flow to pressure differential between charging and RCS**

Cog. Level: **HIGH** **10CFR55.41:** **YES** **10CFR55.43:** **New Question:** **YES**

Bank: **Ques. ID:** **Modified:** **Last NRC Exam:**

Level RO Tier 1 Group 1 K/A# 025 AK1.01 Imp. RO 3.9 Imp. SRO 4.3

6. **References available:**
   - **FIG C1-31, "Boiling Curve"**
   - **FIG C1-32, "Boiling Curve"**
   - **FIG C1-33, "Time to Boiling After Pool Flood"**

   Given the following:
   - It is presently 0900 on 09/19/03.
   - Unit 2 is in Mode 6.
   - RCS temperature is 140°F.
   - The unit was shutdown following a 300-day continuous power run.
   - The timeline for recent Unit 2 operations includes:
     - 09/14/03, 1000 Reactor shutdown.
     - 09/14/03, 1100 Cooldown initiated for REFUELING outage
     - 09/14/03, 1900 Entered MODE 5
     - 09/16/03, 0800 Reactor vessel head removed
     - 09/16/03, 1330 Normal level established in refueling cavity

   If RHR cooling is lost, how much time (in minutes) is available before boiling will occur?

a. 12.5
b. 14
c. 180
d. 440

ANSWER: D

Explanation: **a &b Incorrect but are valid times if wrong Figure is used (See Figures C1-31 and C1-32).**
c Incorrect but valid for 5 days if scale is misunderstood.
d. Correct based on Figure C1-33 at 119 hours after shutdown.

Technical References: **Figure C1-33**

Objective: **P8180L-003**

KA Statement: **Knowledge of the operational implications of the following concepts as they apply to Loss of Residual Heat Removal System: Loss of RHRS during all modes of operation**

Cog. Level:	**HIGH**	**10CFR55.41:**	**YES**	**10CFR55.43:**		**New Question:**	**NO**
Bank:	**INPO**	**Ques. ID:**	**#20291 Byron**	**Modified:**	**YES**	**Last NRC Exam:**	**2001**

Level RO Tier 1 Group 1 K/A# 027 AK3.03 Imp. RO 3.7 Imp. SRO 4.1

7. If the pressurizer spray valves are not available for the RCS depressurization in E-3 for a steam generator tube rupture, why are the pressurizer PORVs the next preferred method of RCS depressurization ahead of using auxiliary spray?

a. Some of the excess RCS inventory would be removed.
b. RCS depressurization would be more controllable.
c. RCS boron concentration would not be diluted by pressurizer outsurge.
d. Pressurizer spray nozzle failure would be precluded.

ANSWER: D

Explanation:
a. This is a true statement but actually a negative aspect of using the PORVs..
b. Plausible because the PORVs are preferred over the aux spray because they are faster which is similar but not the same as more controllable.
c. This is a true statement under some conditions but not significant for a SGTR because the pressurizer out surges during the RCS cooldown which precedes depressurization.
d. Correct based on E-3 Step 17 Basis

Technical References: **E-3 Basis (See step 17)**
Objective: **P8170L-005**
KA Statement: **Knowledge of the reasons for the following responses as they apply to the Pressurizer Pressure Control Malfunctions: Actions contained in EOP for PZR PCS malfunction**

Cog. Level:	**LOW**	**10CFR55.41:**	**YES**	**10CFR55.43:**		**New Question:**	**NO**
Bank:	**INPO**	**Ques. ID:**	**#20568 Point Beach**	**Modified:**	**YES**	**Last NRC Exam:**	**2002**

Level RO Tier 1 Group 1 K/A# 029 EK2.06 Imp. RO 2.9 Imp. SRO 3.1

8. Assume Unit 2 is operating in Mode 1 and the reactor trip breakers have failed such that NO automatic signal will cause them to open.

   What initiating event would be considered an ATWS AND cause AMSAC/DSS to automatically actuate?

a. With reactor power at 8%, the main turbine inadvertently trips during turbine roll-up.
b. With reactor power at 28%, 21 SG level drops to 10% in the narrow range.
c. With reactor power at 8%, the RO inadvertently unblocks and energizes the Source Range NIs.
d. With reactor power at 28%, 22 RCP shaft seizes causing an overload trip of its supply breaker.

ANSWER: D

Explanation:
- **a** **Plausible reactor trip but incorrect because this reactor trip is blocked when power is below 10%.**
- **b** **Plausible because SG level is below reactor trip setpoint but incorrect because WR level is NOT below AMSAC/DSS setpoint.**
- **c** **Plausible because this will cause a valid automatic reactor trip but is incorrect because AMSAC/DSS will not automatically actuate.**
- **d** **Correct.**

Technical References: **B8, Reactor Protection System**
Objective: **P8184L-004**
KA Statement: **Knowledge of the interrelations between the ATWS and the following: Breakers, relays, and disconnects**

Cog. Level:	**HIGH**	**10CFR55.41:**	**YES**	**10CFR55.43:**		**New Question:**	**YES**
Bank:		**Ques. ID:**		**Modified:**		**Last NRC Exam:**	

Level	RO	Tier	1	Group	1	K/A#	038 EA1.27	Imp. RO	3.9	Imp. SRO	3.9

9. **Refer to Exhibit 1: Steam Dump Photos**
Reference available: 1E-3, Steam Generator Tube Rupture, Pages 7 and 8.

The LEAD has performed Step 7 of E-3 and the steam dump controls are positioned as shown in Exhibit 1. The MSIV for the unaffected SG is open. RCS Tavg is 538°F.

You have been asked to verify the setup. What would you report?

a. Setup correct. Maximum rate cooldown is in progress.
b. Disagree with setup. Steam Dump Mode switch should be in "STM PRESS."
c. Disagree with setup. Lo-Lo Tavg Interlock switches should be in "BYPASS INTLK."
d. Disagree with setup. Controller 1HC484 should be in AUTO with setpoint at 40%."

ANSWER: B

Explanation:

a **Plausible because a steam dump valve is open. Incorrect because the valve is NOT fully open and the mode selector switch in NOT in STM PRESS.**
b **Correct. Must be in steam pressure mode to have controller in the control loop.**
c **Plausible because Tavg is below Lo-Lo Tavg setpoint but incorrect because switch position is momentary and already performed since a steam dump valve is open.**
d **Plausible because controller is in MAN but will be placed in AUTO to control temperature <u>after</u> cooldown is complete.**

Technical References: **E-3**
Objective: **P8197L-013**
KA Statement: **Ability to operate and/or monitor the following as they apply to a SGTR: Steam dump valve status lights and indicators**

Cog. Level:	**HIGH**	**10CFR55.41:**	**YES**	**10CFR55.43:**		**New Question:**	**YES**
Bank:		**Ques. ID:**		**Modified:**		**Last NRC Exam:**	

Level RO Tier 1 Group 1 K/A# 040 2.4.31 Imp. RO 3.3 Imp. SRO 3.4

10. If a pipe elbow blows out on the steam supply to the air ejectors near the inlet to the air ejector, which alarm would be unexpected for this steam line failure?

a. 47008-0209, CONDENSER HI PRESS
b. 47022-0204, TURBINE BUILDING STM EXCLUSION ACTUATED
c. 47022-0305, 122 FIRE PUMP (DIESEL) RUNNING
d. 47022-0611, FIRE DETECTION PANEL FP121 FIRE ALARM

ANSWER: C

Explanation:
a This alarm would be expected if the air ejector stopped working.
b This alarm is expected for a high energy line break in the turbine building.
c This alarm is NOT expected since the steam leak should NOT actuate any deluge or sprinkler system.
d This alarm is expected for a high energy line break.

Technical References: Simulator response
Alarm response C47008 and C47022
Objective: P8197L-012
KA Statement: Emergency Procedures/Plan: Knowledge of annunciators alarms and indications, and use of the response instructions. (Steam Line Rupture)

Cog. Level:	HIGH	**10CFR55.41:**	YES	**10CFR55.43:**		**New Question:**	YES
Bank:		**Ques. ID:**		**Modified:**		**Last NRC Exam:**	

Level RO Tier 1 Group 1 K/A# 054 AK3.01 Imp. RO 4.1 Imp. SRO 4.4

11. If the air supply is isolated to a main feedwater regulating valve with the Unit at 100% power. What automatic action will occur and why is the automatic action necessary?

	Auto Action	Basis for Auto Action
a.	Reactor trip on low SG level	To provide protection against a loss of heat sink
b.	Reactor trip on low SG level	To prevent DNBR from dropping below 1.30
c.	Turbine trip and FW isolation on SG high level	To limit containment pressurization during a steam break
d.	Turbine trip and FW isolation on SG high level	To prevent carryover into the steam lines and main turbine

ANSWER: A

Explanation:
a. Correct as noted in T.S. Bases B 3.3.1 Function 13.
b. Plausible but incorrect because DNBR is maintain >1.3.
c. Plausible if affect of loss of air is not known, basis is correct for the auto action.
d. Plausible if affect of loss of air is not known, basis is correct for the auto action.

Technical References: **T.S. Bases B 3.3.1 Function 13**
T.S. Bases B 3.3.2 Function 5

Objective: **P8184L-004**

KA Statement: **Knowledge of the reasons for the following responses as they apply to the Loss of Main Feedwater (MFW): Reactor and/or turbine trip, manual and automatic**

Cog. Level: **HIGH** **10CFR55.41:** **YES** **10CFR55.43:** **New Question:** **NO**
Bank: **INPO** **Ques. ID:** **#5055 Turkey Point** **Modified:** **YES** **Last NRC Exam:** **1998**

Level RO Tier 1 Group 1 K/A# 055 2.2.25 Imp. RO 2.5 Imp. SRO 3.7

12. The coping study that was done to support the analysis for a loss of all AC power event at Prairie Island took credit for the condensate storage tanks (CSTs). The minimum volume of water in the CSTs ensures the affected unit can be…

a. placed in MODE 5 within 20 hours.
b. maintained in HOT STANDBY for at least 36 hours.
c. maintained in HOT SHUTDOWN for at least 36 hours.
d. placed in MODE 4 within 20 hours.

ANSWER: D

Explanation:
- **a** **Plausible because it matches the timeline for CST volume but not correct because cooling using the CST can not ensure Tavg can be reduced below 200°F.**
- **b** **Plausible because the CST basis discusses maintaining MODE 3 but incorrect because the CST does not have enough water for 36 hours.**
- **c** **Plausible because the CST can provide the water needed to cool down to MODE 4 but incorrect because the CST does not have enough water for 36 hours.**
- **d** **Correct.**

Technical References: **T.S. LCO 3.7.6 Bases**
Design Basis Document for Station Blackout

Objective: **P8186L-008**

KA Statement: **Equipment Control: Knowledge of bases in technical specification for limiting conditions for operation and safety limits. (Station Blackout)**

Cog. Level:	**HIGH**	**10CFR55.41:**		**10CFR55.43:**	**YES**	**New Question:**	**YES**
Bank:		**Ques. ID:**		**Modified:**		**Last NRC Exam:**	

This Question was deleted from the exam based on the NRC's review of post exam comments from the licensee.

Level	RO	Tier	1	Group	1	K/A#	056 AA1.37	Imp. RO	3.4	Imp. SRO	3.5

13. **Refer to Exhibit 3: 121 Air Compressor Control Switch**

What would be the indications on this control switch if Bus 15 locked out?

a. There would be no change since this air compressor is ultimately powered by Bus 16.
b. The red light would be off with the green and white lights on.
c. The red and white lights would be off with the green light on.
d. All lights would be off.

ANSWER: D

Explanation:	**All distracters are plausible combinations of light configurations. D is the correct answer because these lights are powered from AC supply to the air compressor.**						
Technical References:	**Simulator response**						
Objective:	**P8178L-005**						
KA Statement:	**Ability to operate and/or monitor the following as they apply to the Loss of Offsite Power: Instrument air**						
Cog. Level:	**LOW**	**10CFR55.41:**	**YES**	**10CFR55.43:**		**New Question:**	**YES**
Bank:		**Ques. ID:**		**Modified:**		**Last NRC Exam:**	

Level RO Tier 1 Group 1 K/A# 057 AA2.12 Imp. RO 3.5 Imp. SRO 3.7

14. Given the following Unit 1 plant conditions:
    - The unit was at 50% for turbine valve testing
    - A load increase is in progress per 1C1.4 “Power Operation”
    - Power is currently at 72%
    - A lockout has occurred on 480V Bus 122
    - No operator actions have been taken

    What is the status of pressurizer heater groups?

a. All groups are energized.
b. All groups are de-energized.
c. Groups B, C, D, and E are energized AND group A heaters are de-energized.
d. Groups A, C, D, and E are energized AND group B heaters are de-energized.

ANSWER: A

Explanation: **All choices are plausible combinations of heater configurations. The heater control group can be powered from either of two sources one of which is Bus 122. At the power level specified, the A control group is always powered from Bus 121 so choice A is correct. Choices B and C are incorrect because the A group of heaters will not de-energize. Choice D is incorrect because Group B is normally aligned to the non-safeguards (Bus 180) supply.**

Technical References:

Objective: **P8186L-015**

KA Statement: **Ability to determine and interpret the following as they apply to the Loss of Vital AC Instrument Bus: PZR level controller, instrumentation, and heater indications**

Cog. Level:	**HIGH**	**10CFR55.41:**		**10CFR55.43:**	**YES**	**New Question:**	**NO**
Bank:	**INPO**	**Ques. ID:**	**#2698 PI**	**Modified:**	**NO**	**Last NRC Exam:**	**1997**

Level RO **Tier** 1 **Group** 1 **K/A#** 058 2.1.32 **Imp. RO** 3.4 **Imp. SRO** 3.8

15. A NOTE in 2C20.9 AOP1, "Loss of Unit 2 Train 'A' DC" states that the Main Generator Output Breakers will NOT open automatically following the turbine trip. What prevents this normally automatic action **AND** is a compensatory manual action required?

a. No breaker control power but no compensatory action is required due to "breaker failure" logic.
b. No breaker control power so the breakers must be opened locally.
c. Generator lockout relay does not actuate so the breakers must be opened manually.
d. Generator lockout relay does not actuate but no compensatory action is required due to "breaker failure" logic.

ANSWER: C

Explanation: **The generator lockout relay is powered from Train A DC power and is energize to trip. This device causes the generator to trip on a turbine trip. The breaker failure scheme does not actuate because there is no trip signal. The breakers can still be operated from the control room.**

Technical References: **2C20.9 AOP1, "Loss of Unit 2 Train 'A' DC"**

Objective: **P8186L-005**

KA Statement: **Conduct of Operations: Ability to explain and apply all system limits and precautions. (Loss of DC Power)**

Cog. Level:	**LOW**	**10CFR55.41:**	**YES**	**10CFR55.43:**	**YES**	**New Question:**	**NO**
Bank:	**INITIAL1**	**Ques. ID:**	**P8186L-005 (015)**	**Modified:**	**YES**	**Last NRC Exam:**	**----**

Level RO **Tier** 1 **Group** 1 **K/A#** 065 AA1.05 **Imp. RO** 3.3 **Imp. SRO** 3.3

16. You are assigned to a Unit which is operating at 100% power.
IF a rupture occurs in the Instrument Air system, you should monitor plant conditions and initiate a manual reactor trip if plant conditions approach any automatic reactor trip setpoint.

Which plant parameter is going to reach its automatic reactor trip setpoint FIRST for this event?

a. Pressurizer level
b. Steam generator level
c. Pressurizer pressure
d. RCS loop ΔT ($OT\Delta T$)

ANSWER: B

Explanation:
- **a** **Plausible because letdown isolates and level will rise but this is a slow transient.**
- **b** **Correct because FRVs will fail closed.**
- **c** **Plausible because pressurizer spray valves fail closed and the RCS will heatup as feedwater is lost but PORVs have air accumulators and will keep the RCS pressure below trip setpoint.**
- **d** **Plausible because the RCS will heatup as feedwater is lost but pressure rise will raise setpoint. Also, temperature rise will not be excessive until the SG U-tubes start to uncover after the SG level trip.**

Technical References: **C34 AOP1 Attachment A**

Objective: **P8178L-005**

KA Statement: **Ability to operate and/or monitor the following as they apply to the Loss of Instrument Air: RPS**

Cog. Level: **HIGH** **10CFR55.41:** **YES** **10CFR55.43:** **New Question:** **YES**

Bank: **Ques. ID:** **Modified:** **Last NRC Exam:**

Level RO Tier 1 Group 1 K/A# E05 EK1.3 Imp. RO 3.9 Imp. SRO 4.1

17. A loss of all feed water has occurred. You are implementing FR-H.1, "Response to Loss of Secondary Heat Sink." While depressurizing SGs to establish condensate feed, you receive alarm C47010-0101, "Condensate Storage Tank Lo-Lo Level."

    What impact, if any, does this have on your (the crew's) actions?

a. We must align an alternate water supply to the AFW pumps using C28.1 AOP2, "Loss of Condensate Supply to Aux Feed Pump Suction."
b. This alarm means we can't use the condensate pumps and must go on to the next mitigating strategy in the EOPs.
c. This has no immediate impact because we are trying to establish flow using the condensate pumps.
d. This has no impact because it is an expected alarm. The condensate makeup valve fails open dumping the CST to the main condenser.

ANSWER: C

Explanation:
- **a** **Plausible because it is what the caution says in FR-H.1 but not correct because AFW is not available anyway since we are attempting to use a low pressure FW supply.**
- **b** **Plausible because the CST is the source of makeup to the condenser but not correct because the condenser can supply water for secondary cooling for some period of time.**
- **c** **Correct.**
- **d** **Plausible because the condensate makeup valve does have a fail open mode but not correct because loss of air is not expected for an FR-H.1 event.**

Technical References:

Objective: **P8197L-014**

KA Statement: **Knowledge of the operational implications of the following concepts as they apply to the Loss of Secondary Heat Sink: Annunciators and conditions indicating signals, and remedial actions associated with the Loss of Secondary Heat Sink**

Cog. Level:	**HIGH**	**10CFR55.41:**	**YES**	**10CFR55.43:**		**New Question:**	**YES**
Bank:		**Ques. ID:**		**Modified:**		**Last NRC Exam:**	

Level RO Tier 1 Group 1 K/A# E11 EK2.2 Imp. RO 3.9 Imp. SRO 4.3

18. Identify the strategy that is NOT used in ECA-1.1, "Loss of Emergency Coolant Recirculation" to cope with a loss of emergency coolant recirculation capability during a loss of coolant accident.

a. Starting a reactor coolant pump to establish forced circulation in the RCS.
b. Starting all available CRDM fans to maximize cooling to the reactor vessel head.
c. Depressurizing intact steam generators by dumping steam.
d. Reducing ECCS injection flow from the RWST to match RCS coolant loss.

ANSWER: B

Explanation:
a This is performed in step 12.
b This is a plausible action because it provides for heat removal but the strategy is employed in ES-0.3A/B, "Natural Circulation Cooldown…" EOPs.
c This is performed in step 4.
d This is performed in step 13 RNO.

Technical References: ECA-1.1, Loss of Emergency Coolant Recirculation
Objective: P8180L-003
KA Statement: Knowledge of the interrelations between the Loss of Emergency Coolant Recirculation 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

Cog. Level:	LOW	10CFR55.41:	YES	10CFR55.43:		New Question:	YES
Bank:		Ques. ID:		Modified:		Last NRC Exam:	

Level RO Tier 1 Group 2 K/A# 001 AA2.02 Imp. RO 4.2 Imp. SRO 4.2

19. If Unit 1 is operating at 75% power, what event will cause a continuous control rod withdrawal in automatic?

a. MV-32086, Emergency Boration to Charging Pump Suction valve partially (<5%) open.
b. Electrical fault which causes an RCS Loop B cold leg RTD in the bypass loop to fail high.
c. A continuous turbine load runback.
d. Detector failure resulting in N44, Power Range NI, failing high

ANSWER: A

Explanation:
a Correct. Although the BA transfer pumps are in SLOW speed, the BA system pressure will still cause boric acid flow to the VCT but at a value less than 12 gpm..
b This causes control rod insertion. Plausible distracter because it is associated with the rod control system.
c This causes control rod insertion. Plausible distracter because it is associated with the rod control system.
d This causes control rod insertion. Plausible distracter because it is associated with the rod control system.

Technical References: B5, Rod Control System
B7, Reactor Control System
Objective: P8172L-001A
KA Statement: Ability to determine and interpret the following as they apply to the Continuous Rod Withdrawal: Position of emergency boration valve

Cog. Level:	LOW	10CFR55.41:		10CFR55.43:	YES	New Question:	YES
Bank:		Ques. ID:		Modified:		Last NRC Exam:	

Level RO Tier 1 Group 2 K/A# 033 AK1.01 Imp. RO 2.7 Imp. SRO 3.0

20. Unit 2 is performing a shutdown. Power is 3% when alarm 47013-0602, “N36 Intermediate Range Loss of Comp Voltage,” comes in.

How does this affect the Nuclear Instrumentation?

a. N36 reading would immediately drop about 1 decade. During the subsequent shutdown, SR NIs will energize automatically when N35 drops below P-6 setpoint.
b. N36 reading would immediately rise about 1 decade. During the subsequent shutdown, SR NIs will NOT energize automatically because N36 reading will remain above the P-6 setpoint.
c. N36 reading would NOT immediately change. During the subsequent shutdown, SR NIs will energize automatically when N35 drops below P-6 setpoint.
d. N36 reading would NOT immediately change. During the subsequent shutdown, SR NIs will NOT energize automatically because N36 reading will remain above the P-6 setpoint.

ANSWER: D

Explanation:
- **a** **Choice added to balance option B. Plausible if candidate does not understand compensating voltage. Incorrect because N36 will read higher in the range where this is an issue.**
- **b** **Plausible choice based on fact that N36 will read higher than normal without compensating voltage but incorrect because gamma effect is NOT equivalent to a decade in the power range.**
- **c** **Plausible because N36 reading will not change but incorrect because N36 will read higher than normal at the low end of the intermediate range.**
- **d** **Correct**

Technical References: B9A, Nuclear Instrument System
Objective: P9140L-702
KA Statement: Knowledge of the operational implications of the following concepts as they apply to Loss of Intermediate Range Nuclear Instrumentation: Effects of voltage changes on performance

Cog. Level:	HIGH	**10CFR55.41:**	YES	**10CFR55.43:**		**New Question:**	YES
Bank:		**Ques. ID:**		**Modified:**		**Last NRC Exam:**	

Level RO **Tier** 1 **Group** 2 **K/A#** 068 AK3.18 **Imp. RO** 4.2 **Imp. SRO** 4.5

21. F5 Appendix B, "Control Room Evacuation Fire", Attachment F, "Unit 1 Lead Plant Equipment and Reactor Operator Actions," Step AC directs you to open knife switches (located inside breaker cubicles) for several breakers including 11 SI pump, 11 RHR pump and 11 CS pump.

    How does opening these knife switches affect the operation of the associated breakers?

    The open knife switches…

a. only block the automatic closure of the associated breaker on an SI signal.
b. block all closing and opening of the associated breaker except local mechanical.
c. prevent remote operation of the associated breaker but do NOT block automatic trips.
d. block auto-trips of the associated breaker BUT allow operation from the Hot Shutdown Panel.

ANSWER: B

Explanation:
a Plausible because this is true but a very incomplete answer to the question.
b Correct
c Plausible because this can be accomplished removing a downstream fuse.
d Plausible because trips can be defeated by removing a downstream fuse.

Technical References: **Drawing NE-40006 (48), et. al.**

Objective:

KA Statement: **Knowledge of the reasons for the following responses as they apply to the control room evacuation: Actions contained in EOP for control room evacuation emergency task**

Cog. Level: **LOW** **10CFR55.41:** **10CFR55.43:** **YES** **New Question:** **YES**
Bank: **Ques. ID:** **Modified:** **Last NRC Exam:**

Level RO Tier 1 Group 2 K/A# 076 AK3.06 Imp. RO 3.2 Imp. SRO 3.8

22. If a valid R-9 alarm occurs due to excessive Reactor Coolant System activity, Tavg is reduced to below 500°F in order to...

a. increase the safety margin for fuel clad integrity during any design basis accident.
b. ensure RCS saturation pressure is below the setpoint of the SG safety valves.
c. reduce the atmospheric dispersion of fission products during a loss of coolant accident.
d. lower peak containment pressure and containment leakage if a loss of coolant accident occurs.

ANSWER: B

Explanation:
a Sounds plausible since lower temperature usually improves safety margins but fuel clad is not the basis for this action.
b Correct per basis for T.S. LCO 3.4.17.
c Sounds plausible since atmospheric dispersion varies with temperature.
d Sounds plausible since containment pressure response will depend on the initial energy level in the RCS.

Technical References: Alarm response C47047-1R-09
T.S. LCO 3.4.17 bases

Objective: P8182L-002
P8197L-012

KA Statement: Knowledge of the reasons for the following responses as they apply to the High Reactor Coolant Activity: Actions contained in EOP for high reactor coolant activity

Cog. Level:	LOW	10CFR55.41:	YES	10CFR55.43:		New Question:	NO
Bank:	INPO	Ques. ID:	#2505 Palisades	Modified:	YES	Last NRC Exam:	1997

Level RO Tier 1 Group 2 K/A# E02 EA1.2 Imp. RO 3.6 Imp. SRO 3.8

23. Unit 1 was operating at 100% power when a spurious SI occurred.
All systems respond as designed with the exception of the “B” reactor trip breaker, which did NOT open and remains closed. The crew has transitioned to 1ES-0.2, "SI TERMINATION.” The following conditions exist:
- RCS pressure is 2200 psig and slowly rising
- Containment pressure is 0.1 psig
- MSIVs are open and SG pressures are 990 psig

When step 1 is performed and both SI pushbuttons have been momentarily “pushed in”, what will be the status of SI?

a. Both trains of SI will be reset with automatic SI initiation blocked.
b. Both trains of SI will be reset but only the "A" train automatic SI initiation will be blocked.
c. Only the “A” train of SI will be reset with automatic SI initiation blocked.
d. Only the “A” train of SI will be reset but neither train’s automatic SI initiation will be blocked.

ANSWER: B

Explanation:
a Plausible because this is the normal response.
b Correct.
c Plausible if SI reset circuit behavior is not understood.
d Plausible if SI reset circuit behavior is not understood.

Technical References: **Westinghouse logics for SI actuation (X-HIAW-1-242)**

Objective: **P8197L-012**

KA Statement: **Ability to operate and/or monitor the following as they apply to the SI Termination: Operating behavior characteristics of the facility**

Cog. Level:	**HIGH**	**10CFR55.41:**	**YES**	**10CFR55.43:**		**New Question:**	**NO**
Bank:	**INPO**	**Ques. ID:**	**# 1221 North Anna**	**Modified:**	**YES**	**Last NRC Exam:**	**1996**

The NRC reviewed this question. Both answers B and C are correct based on Licensee post exam comments.

Level RO Tier 1 Group 2 K/A# E07 EK2.1 Imp. RO 3.2 Imp. SRO 3.5

24. **Reference available: F-0.2, "Core Cooling"**

A small break LOCA occurred about 4 hours ago and mitigating actions were performed as directed by the appropriate EOPs. The current plant conditions are:

- RCS core exit thermocouple average temperature at 290°F
- RCS pressure is 280 psig
- Pressurizer level is 45%
- RHR is aligned for shutdown cooling and 11 RHR pump is in service
- Overpressure Protection System is enabled
- Both RCPs are stopped
- RCS cooldown rate is about 10°F/hr.
- Procedure ES-1.1, "Post LOCA Cooldown and Depressurization" is still being used

Assuming the Core Cooling Critical Safety Function Status Tree (CSFST) is currently GREEN, what failure could result in a Yellow path condition on the Core Cooling CSFST?

a. Pressurizer spray valve fails OPEN due to a controller failure.
b. Fuse blows (opens) in DC power supply to CV-31226, LETDOWN LINE ISOLATION.
c. RCS wide range pressure instrument PT-420 fails HIGH.
d. Air supply line breaks to valve CV-31235, 11 RHR HX OUTLET FLOW CONTROL.

ANSWER: C

Explanation: **The status tree will change to Yellow from Green when subcooling is lost.**

a Plausible because spray valve opening usually lowers RCS pressure but incorrect because RCPs are not running.
b Plausible failure but letdown isolation would raise pressurizer level and RCS pressure.
c Correct because this failure would open pressurizer PORV in LTOP mode.
d Plausible because subcooling is affected by RHR cooling but incorrect because the valve fails OPEN on loss of air.

Technical References: **F-0.2, "Core Cooling"**
C47012-0609

Objective: **P8184L-004**

KA Statement: **Knowledge of the interrelations between the Saturated Core Cooling and the following: Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features**

Cog. Level:	**HIGH**	**10CFR55.41:**	**YES**	**10CFR55.43:**		**New Question:**	**YES**
Bank:		**Ques. ID:**		**Modified:**		**Last NRC Exam:**	

Level RO Tier 1 Group 2 K/A# E08 2.1.23 Imp. RO 3.9 Imp. SRO 4.0

25. Given the following conditions:
    - A main steam line break occurred inside containment
    - MSIVs are closed
    - The faulted SG is isolated
    - RED PATH conditions exist on the Integrity Status Tree
    - The actions of FR-P.1, "Response To Imminent Pressurized Thermal Shock Condition" are being performed
    - RCS temperature soak is required and has been initiated
    - NO RCPs are running

    Which evolution can be performed during the one hour “soak period”?

a. Place normal letdown in service.
b. Lower the non-faulted SG PORV controller pressure setpoint 25 psi.
c. Raise AFW flow to and establish SG blowdown from the non-faulted SG.
d. Raise RCS pressure to the middle of the pressure band allowed by Figure FRP1-1.

ANSWER: A

Explanation:
a Correct. There is no restriction since this should neither cool nor pressurize the RCS
b RCS cooldown is NOT allowed.
c This should NOT be performed because it increases heat removal and could cause an RCS cooldown.
d RCS pressure can NOT be raised.

Technical References: **FR-P.1 and background document.**
Objective: **P8197L-014**
KA Statement: **Conduct of Operations: Ability to perform specific system and integrated plant procedures during all modes of plant operation. (Pressurized Thermal Shock)**

Cog. Level:	**HIGH**	**10CFR55.41:**		**10CFR55.43:**		**New Question:**	**NO**
Bank:	**INPO**	**Ques. ID:**	**#19488 Kewaunee**	**Modified:**	**YES**	**Last NRC Exam:**	**2000**

Level RO Tier 1 Group 2 K/A# E13 2.1.23 Imp. RO 3.9 Imp. SRO 4.0

26. FR-H.2, “Response to Steam Generator Overpressure”, may be implemented when SG pressure is above _____ psig because pressure is above the _____ setpoint.

a. 1005, steam dump controller
b. 1050, SG PORV controller
c. 1077, lowest SG safety
d. 1131, highest SG safety

ANSWER: D

Explanation: **All choices are plausible because values specified are above the setpoints mentioned. D is the correct answer based critical safety function status tree and background information.**

Technical References: **Background for FR-H.2**

Objective: **P8197L-014**

KA Statement: **Conduct of Operations: Ability to perform specific system and integrated plant procedures during all modes of plant operation. (Steam Generator Overpressure)**

Cog. Level:	**LOW**	**10CFR55.41:**		**10CFR55.43:**		**New Question:**	**NO**
Bank:	**INITIAL1**	**Ques. ID:**	**P8197L-010 (008)**	**Modified:**	**NO**	**Last NRC Exam:**	**----**

Level RO Tier 1 Group 2 K/A# E14 EK2.1 Imp. RO 3.4 Imp. SRO 3.7

27. During a LOCA, at what containment pressure would we declare "adverse containment conditions" AND why is this a concern?

    Containment conditions FIRST become adverse when containment pressure is greater than…

a. 4 psig because instruments inside containment become less accurate due to high ambient temperature associated with higher pressures.
b. 4 psig because instruments inside containment become less accurate due to the external pressure on their casings.
c. 5 psig because instruments inside containment become less accurate due to high ambient temperature associated with higher pressures.
d. 5 psig because instruments inside containment become less accurate due to the external pressure on their casings.

ANSWER: C

Explanation:
- **a** **Plausible because 4 psig is a "memory-trigger"value but incorrect because it is the SI actuation setpoint instead of adverse containment.**
- **b** **Plausible because 4 psig is a "memory-trigger"value but incorrect because it is the SI actuation setpoint instead of adverse containment.**
- **c** **Correct.**
- **d** **Plausible because adverse value is correct but incorrect because instruments are temperature sensitive instead of pressure sensitive.**

Technical References: **Adverse containment is defined on information page of any EOP.**
WOG Executive Volume – Generic Issues: Instrumentation

Objective: **P8197L-010**

KA Statement: **Knowledge of the interrelations between the High Containment Pressure and the following: Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features**

Cog. Level:	**LOW**	**10CFR55.41:**	**YES**	**10CFR55.43:**		**New Question:**	**YES**
Bank:		**Ques. ID:**		**Modified:**		**Last NRC Exam:**	

Level RO **Tier** 2 **Group** 1 **K/A#** 003 K2.01 **Imp. RO** 3.1 **Imp. SRO** 3.1

28. Unit 1 is performing a reactor startup and power is currently stable at 10^{-8} amps while critical data is recorded. Annunciator 47005:0201, "Bus 11 4.16KV UNDERVOLTAGE," alarms and all other annunciators on that panel are clear. When you check Bus 11 voltage you see a reading of 3200 volts.

    What will be the status of the Unit 1 Reactor Coolant Pumps with no operator action?

a. 12 RCP will be running but 11 RCP will be stopped with its breaker open due to UV on Bus 11.
b. 11 RCP will be running but 12 RCP will be stopped with its breaker open due to UV on Bus 11.
c. 11 RCP and 12 RCP will be running.
d. 11 RCP and 12 RCP will be stopped.

ANSWER: A

Explanation:
- **a Correct.**
- **b Plausible if actual bus power supplies are not known.**
- **c Plausible because Buses 13 and 14 are also non-safeguards buses of the correct voltage.**
- **d Plausible because Bus 11 UV does trip the RCP breaker but incorrect because it only trips the 11 RCP breaker.**

Technical References: B3, "Reactor Coolant Pumps"
Logic drawing NF-40781-1
Objective: P8170L-002
KA Statement: Knowledge of bus power supplies to the following: RCPS

Cog. Level:	HIGH	**10CFR55.41:**	YES	**10CFR55.43:**		**New Question:**	YES
Bank:		**Ques. ID:**		**Modified:**		**Last NRC Exam:**	

Level RO Tier 2 Group 1 K/A# 004 K5.17 Imp. RO 2.6 Imp. SRO 3.1

29. If the water level drops in the Boron Concentration Measuring System shield tank, what type radiation hazard would exist in the vicinity of the tank?

a. Alpha
b. Beta
c. Gamma
d. Neutron

ANSWER: D

Explanation: **These are the 4 predominant types of radiation for a nuclear plant so all distracters are plausible. D is the correct answer because the system has an installed neutron source.**

Technical References: **B12A, Chemical and Volume Control, pages 12-13**

Objective:

KA Statement: **Knowledge of the operational implications of the following concepts as they apply to the CVCS: Types and effects of radiation, dosimetry, and shielding-time-distance**

Cog. Level:	**LOW**	**10CFR55.41:**	**YES**	**10CFR55.43:**		**New Question:**	**YES**
Bank:		**Ques. ID:**		**Modified:**		**Last NRC Exam:**	

Level RO Tier 2 Group 1 K/A# 005 K6.03 Imp. RO 2.5 Imp. SRO 2.6

30. On the current outage schedule, the RCS cooldown (from 340°F to <200°F) is supposed to occur in the next 3 hours. You have just finished placing RHR in service for Phase II cooldown but during this evolution you determined the 11 RHR HX had a tube leak. The 11 RHR HX is currently isolated. How will this impact the RCS cooldown on the outage schedule?

a. The cooldown will be completed on schedule because the RHR system has two 100% redundant trains.
b. The cooldown will be completed on schedule because the SGs will do most of the cooling until RCS temperature is below 212°F.
c. The RCS cooldown can not be completed until decay heat level drops below the capacity of the single RHR train.
d. The RCS cooldown will be completed but it will take about twice as long as scheduled.

ANSWER: D

Explanation:
a Plausible if student's misunderstand meaning of redundant trains.
b Plausible if student doesn't understand the limitation of SG cooling as steam pressure drops.
c A true statement but the decay heat level is never greater than the capacity of the RHR heat exchanger.
d Correct.

Technical References: B15 page 9
Objective: P8180L-003
KA Statement: Knowledge of the effect of a loss or malfunction of the following will have on the RHRS: RHR heat exchanger

Cog. Level:	HIGH	10CFR55.41:	YES	10CFR55.43:		New Question:	YES
Bank:		Ques. ID:		Modified:		Last NRC Exam:	

Level RO **Tier** 2 **Group** 1 **K/A#** 006 K5.06 **Imp. RO** 3.5 **Imp. SRO** 3.9

31. A small break LOCA is in progress on Unit 1 with the following conditions:
    - All ECCS Pumps are operating except 11 SI pump which failed to start
    - RCS pressure is 1700 psig and stable
    - Pressurizer level is 5% and stable
    - RCS average temperature is slowly lowering about 5°F/hour
    - 11 SI pump is now available for operation

    IF 11 SI pump is started, THEN the new equilibrium RCS pressure will be _____ than before and break flow will be _____ than before.

a. higher; higher
b. higher; the same
c. the same; the same
d. the same; higher

ANSWER: A

Explanation: **This is an appropriate RO question since it is related to expected plant response (part of STAR) for an action to be performed.**

- **a** **Correct based on injection flow exceeding break flow until pressurizer level and RCS pressure rise causing break flow to increase and injection flow to decrease until a new equilibrium is established.**
- **b** **Plausible if relationship in K/A is not understood.**
- **c** **Plausible if RCS pressure is believed to be under the control of the pressurizer.**
- **d** **Plausible if relationship in K/A is not understood.**

Technical References: **Reverse logic applied to the discussion of RCS pressure and break flow response to SI flow reduction sequence in the WOG ERG Executive Volume Generic Issue of SI Flow Reduction. This is also generic fundamental knowledge.**

Objective: **P8180L-005**

KA Statement: **Knowledge of the operational implications of the following concepts as they apply to the ECCS: Relationship between ECCS flow and RCS pressure**

Cog. Level:	**HIGH**	**10CFR55.41:**	**YES**	**10CFR55.43:**		**New Question:**	**NO**
Bank:	**INITIAL1**	**Ques. ID:**	**P8180L-004 (005)**	**Modified:**	**NO**	**Last NRC Exam:**	**-----**

Level RO Tier 2 Group 1 K/A# 007 A3.01 Imp. RO 2.7 Imp. SRO 2.9

32. The following conditions occurred in Unit 1:

Time:	1000 hrs	1100 hrs
PRT level	72%	78%
PRT temperature	96°F	96°F
Pressurizer level	45%	43%
Tavg	570°F	569°F
Containment temperature	102°F	108°F

What is the MOST LIKELY cause of the PRT level increase?

a. Expansion due to containment heatup
b. Pressurizer PORV leakage
c. Letdown relief valve (inside containment) leakage
d. Seal return relief valve (inside containment) leakage

ANSWER: D

Explanation: **All distracters are possible sources of level changes.**
- **a Incorrect because PRT temperature did not change enough AND expansion does NOT change level indication.**
- **b Incorrect because PRT temperature did not change enough.**
- **c Incorrect because PRT temperature did not change enough.**
- **d Correct because seal return water temperature is close to initial PRT temperature.**

Technical References: **Flow diagram XH-1-7**
Objective: **P8170L-003**
KA Statement: **Ability to monitor automatic operation of the PRTS, including: Components which discharge to the PRT**

Cog. Level:	**HIGH**	**10CFR55.41:**	**YES**	**10CFR55.43:**		**New Question:**	**NO**
Bank:	**INPO**	**Ques. ID:**	**#16779 Point Beach**	**Modified:**	**NO**	**Last NRC Exam:**	**1998**

Level RO **Tier** 2 **Group** 1 **K/A#** 008 A1.04 **Imp. RO** 3.1 **Imp. SRO** 3.2

33. Both Units are operating in MODE 1 at 100% power.
The CC system in each unit is in its "normal" alignment.

Predict the change in surge tank levels if a single tube rupture occurs in the Unit 1 letdown heat exchanger.

	Unit 1 Surge Tank Level	Unit 2 Surge Tank Level
a.	Increases	Increases
b.	Increases	No Change
c.	Decreases	Decreases
d.	Decreases	No Change

ANSWER: A

Explanation: **There are two knowledge items needed to answer this question. Will the leak be into or out of the CC system? At the letdown HX, the leakage will be into the CC system. Are the CC systems normally cross-tied? Per C14, the 1½ inch crosstie line is always open.**

All distracters are plausible based on balanced pairs to the two questions posed above and due to the fact that some CVCS HXs will leak into and others out from the CC system.

Technical References: **C14 Section 5.8 discussion**
C14 AOP1

Objective: **P8172L-002**

KA Statement: **Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CCWS controls including: Surge tank level**

Cog. Level: **HIGH** **10CFR55.41:** **YES** **10CFR55.43:** **New Question:** **YES**
Bank: **Ques. ID:** **Modified:** **Last NRC Exam:**

Level	RO	Tier	2	Group	1	K/A#	010 A1.01	Imp. RO	2.8	Imp. SRO	2.9

34. **Reference Available: ES-0.3A, "Natural Circulation Cooldown with CRDM Fans"**

When preparing for a cooldown, the Unit is borated to establish adequate shutdown margin for cold shutdown. This concept is true for a "normal" cooldown AND a natural circulation (NC) cooldown guided by ES-0.3A, "Natural Circulation Cooldown with CRDM Fans."

IF 400 gallons of boric acid must be added to the RCS in either cooldown, compare the relationship between RCS and pressurizer boron concentrations in each cooldown case after the FIRST 200 gallons of boric acid has been added. You can assume that RCS and pressurizer boron concentrations were the same at the start of the boration in each case.

a. NC cooldown boration will have less difference between RCS and pressurizer boron concentrations AND RCS boron concentration > pressurizer boron concentration.
b. NC cooldown boration will have less difference between RCS and pressurizer boron concentrations AND RCS boron concentration < pressurizer boron concentration.
c. NC cooldown boration will have more difference between RCS and pressurizer boron concentrations AND RCS boron concentration > pressurizer boron concentration.
d. NC cooldown boration will have more difference between RCS and pressurizer boron concentrations AND RCS boron concentration < pressurizer boron concentration.

ANSWER: D

Explanation: **There are only 4 possible comparisons, so all distracters are plausible.**
In natural circulation cooldown the pressurizer sprays can't be used to keep PRZR boron concentration within 50 ppm of RCS boron concentration. This makes choices A & B incorrect. To prevent PRZR water from being a potential dilution source, NC cooldown directs aligning charging flow to the pressurizer via auxiliary spray. Therefore, the PRZR boron concentration will increase first and be higher than RCS boron concentration during the boration.

Technical References: **ES-0.3A, Natural Circulation Cooldown with CRDM Fans**

Objective: **P8170L-003**

KA Statement: **Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PZR PCS controls including: PZR and RCS boron concentrations**

Cog. Level:	HIGH	10CFR55.41:	YES	10CFR55.43:		New Question:	YES
Bank:		Ques. ID:		Modified:		Last NRC Exam:	

This Question was deleted from the exam based on the NRC's review of post exam comments from the licensee.

Level RO Tier 2 Group 1 K/A# 010 K1.06 Imp. RO 2.9 Imp. SRO 3.1

35. While establishing a bubble in the pressurizer per 1C1.2, "Unit 1 Startup Procedure," CV-31203, Letdown Pressure Control valve opens progressively in AUTO.

CV-31203 slowly opens…

a. because RCS temperature is slowly lowering.
b. due to thermal expansion of PRZR liquid.
c. because the PRZR spray valves are slowly closed while drawing a bubble.
d. due to the switchover of letdown to orifices from RHR-CVCS cross-connect.

ANSWER: B

Explanation:
- **a** **Plausible because RCS temperature changes will affect position of letdown pressure control valve but incorrect because temperature change is in wrong direction.**
- **b** **Correct**
- **c** **Plausible because closing sprays is usually accompanied by rising RCS pressure which would affect letdown pressure control valve. Wrong because sprays are closed before starting to draw bubble.**
- **d** **Plausible because this is an actual event which occurs upstream of the letdown pressure control valve but incorrect because this event is an effect of rising pressure not a cause of rising pressure in the letdown line.**

Technical References: **1C1.2, "Unit 1 Startup Procedure"**

Objective: **P8170L-005**

KA Statement: **Knowledge of the physical connections and/or cause-effect relationships between the PZR PCS and the following systems: CVCS**

Cog. Level:	**HIGH**	**10CFR55.41:**	**YES**	**10CFR55.43:**		**New Question:**	**NO**
Bank:	**INPO**	**Ques. ID:**	**# 10811 Kewaunee**	**Modified:**	**NO**	**Last NRC Exam:**	**1997**

Level RO Tier 2 Group 1 K/A# 012 K5.01 Imp. RO 3.3 Imp. SRO 3.8

36. Which of the following Reactor Protection System trips is listed in the Technical Specifications Bases as protecting against Departure from Nucleate Boiling (DNB) accidents?

a. Source Range High Flux
b. High Pressurizer Pressure
c. Overpower ΔT (OPΔT)
d. Power Range Negative Flux Rate

ANSWER: D

Explanation:
- **a** **Plausible because it is a valid reactor trip but incorrect because it protects against excessive power generation.**
- **b** **Plausible because it is a valid reactor trip but incorrect because it protects against overpressure.**
- **c** **Plausible because it is a valid reactor trip but incorrect because it protects the integrity of the fuel (i.e. no fuel pellet melting).**
- **d** **Correct it protects against localized flux peaks following two or more dropped rods.**

Technical References: **T.S. LCO 3.3.1 Bases**

Objective: **P8184L-004**

KA Statement: **Knowledge of the operational implications of the following concepts as they apply to the RPS: DNB**

Cog. Level:	**LOW**	**10CFR55.41:**	**YES**	**10CFR55.43:**		**New Question:**	**NO**
Bank:	**INPO**	**Ques. ID:**	**# 19191 Braidwood**	**Modified:**	**NO**	**Last NRC Exam:**	**2000**

Level RO Tier 2 Group 1 K/A# 013 K6.01 Imp. RO 2.7 Imp. SRO 3.1

37. Unit 1 is operating at 100% Reactor power when 12 Steam Generator RED channel level transmitter (1LT-461) loses power. NO operator actions have yet been taken.

Of the remaining channels, _____ is the MINIMUM number of channels that have to trip to cause a Feedwater Isolation Actuation, and _____ is the MINIMUM number of channels that have to trip to cause a Auxiliary Feedwater Actuation.

	FEEDWATER ISOLATION	AFW ACTUATION
a.	1	1
b.	1	2
c.	2	1
d.	2	2

ANSWER: A

Explanation: **Feedwater isolation occurs when 2 of 3 SG level transmitters for the same generator show high level. AFW auto start occurs when 2 of 3 SG level transmitters for the same generator show low level. On a loss of power, both the high and low level bistables are tripped so only 1 more input is needed in each circuit for actuation. This makes A the correct answer.**

Technical References: **1C51**
TS LCO 3.3.2 Table 3.3.2-1

Objective:

KA Statement: **Knowledge of the effect of a loss or malfunction of the following will have on the ESFAS: Sensors and detectors**

Cog. Level: **HIGH** **10CFR55.41:** **YES** **10CFR55.43:** **New Question:** **NO**
Bank: **INPO** **Ques. ID:** **#20170 Byron** **Modified:** **YES** **Last NRC Exam:** **2001**

Level RO Tier 2 Group 1 K/A# 022 A1.04 Imp. RO 3.2 Imp. SRO 3.3

38. During the month of August, the Unit 2 containment fan cooling units are being supplied from Containment Chilled Water. The Containment Chillers trip and the CFCUs switch to cooling water. The cooling water inlet temperature is 95°F.
a) What changes would you expect to see in the containment parameters?
b) Which parameter will be the most difficult to control if we wish to continue operating Unit 2?

	Affected Parameters	Most Difficult
a.	Increases in temperature and pressure	pressure
b.	Increases in temperature and pressure	temperature
c.	Increase in pressure and decrease in humidity	pressure
d.	Increase in temperature and decrease in humidity	temperature

ANSWER: B

Explanation: **Only 3 parameters are monitored in the control room: temperature, pressure and humidity. Only pressure and temperature have T.S. limits. All distracters are plausible because they are combinations of the 3 parameters.**
Based on plant experience, temperature, pressure and humidity will rise due to the reduced heat removal because of higher CL temperatures. B is the correct answer because there is no other method to lower temperature. Pressure can be controlled by 2 forms of controlled venting.

Technical References: **Plant operating experience: CAP 031042, CAP 030532**

Objective: **P8180L-009H**

KA Statement: **Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CCS controls including: Cooling water flow**

Cog. Level: **HIGH** **10CFR55.41:** **YES** **10CFR55.43:** **New Question:** **YES**

Bank: **Ques. ID:** **Modified:** **Last NRC Exam:**

Level RO Tier 2 Group 1 K/A# 026 A2.03 Imp. RO 4.1 Imp. SRO 4.4

39. Assume the associated Relay Logic Cabinet loses power due to a fault in 125v DC Panel 15, and that the loss of DC power affects ONLY the associated Relay Logic Cabinet.

    HOW would this failure affect the operation of the containment spray system if a large break LOCA occurred inside the Unit 1 containment at the same time? **WHAT** manual action(s) should you take, if any?

a. Containment Spray Train A equipment would NOT actuate. The spray pump could be manually started but the discharge valve would have to be locally opened.
b. Containment Spray Train B equipment would NOT actuate. The spray pump could be manually started but the discharge valve would have to be locally opened.
c. Both trains of containment spray would be actuated. Train A would have actuated when power was lost. No immediate manual actions are needed.
d. Both trains of containment spray would be actuated. Train B would have actuated when power was lost. No immediate manual actions are needed.

ANSWER: A

Explanation:
a Correct. ESF equipment needs power to master and slave relays to actuate.
b Plausible ESF equipment needs power to master and slave relays to actuate but DC Panel 15 supplies power to Train A.
c Plausible if meaning of fail-safe is misunderstood for this system.
d Plausible if meaning of fail-safe is misunderstood for this system.

Technical References: **B18C, Engineered Safeguards System**
Objective: **P8197L-012**
KA Statement: **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**

Cog. Level: **HIGH** **10CFR55.41:** **YES** **10CFR55.43:** **YES** **New Question:** **YES**
Bank: **Ques. ID:** **Modified:** **Last NRC Exam:**

Level RO Tier 2 Group 1 K/A# 026 K3.01 Imp. RO 3.9 Imp. SRO 4.1

40. IF one containment spray pump is inoperable, THEN what is the MINIMUM containment cooling required to mitigate a design basis steam line break inside containment?

The other train of Containment Spray…

a. OR BOTH trains of CFCUs.
b. AND ONE train of CFCUs.
c. AND three of the four CFCUs.
d. AND BOTH trains of CFCUs.

ANSWER: B

Explanation: **The DBA is analyzed with loss of one train of CS and CFCUs due to loss of a safeguards power train. This represents the "minimum" cooling allowed by the accident analysis. All distracters are plausible combinations of containment fan cooling units.**

Technical References: **T.S. 3.6.5 basis**

Objective: **P8180L-002**

KA Statement: **Knowledge of the effect that a loss or malfunction of the CSS will have on the following: CCS**

Cog. Level:	**LOW**	**10CFR55.41:**	**YES**	**10CFR55.43:**		**New Question:**	**NO**
Bank:	**INITIAL1**	**Ques. ID:**	**P8180L-002 OBJ9 (001)**	**Modified:**	**NO**	**Last NRC Exam:**	**----**

Level RO Tier 2 Group 1 K/A# 039 2.4.49 Imp. RO 4.0 Imp. SRO 4.0

41. What are the immediate actions of E-0 associated with the main turbine?

Verify Turbine Trip:

a. a. Both turbine stop valves – CLOSED
   a. Manually trip turbine.
   IF NOT, THEN manually close control valves.
   IF NOT, THEN manually close MSIVs and bypass valves.

b. a. Both turbine stop valves – CLOSED
   a. Manually trip turbine.
   IF NOT, THEN manually stop both EHC pumps.
   IF stop valves are NOT closed, THEN manually close MSIVs and bypass valves.

c. a. All turbine control valves – CLOSED
   a. Manually trip turbine.
   IF NOT, THEN manually close control valves.
   IF NOT, THEN manually close MSIVs and bypass valves.

d. a. All turbine control valves – CLOSED
   a. Manually trip turbine.
   IF NOT, THEN manually stop both EHC pumps.
   IF control valves are NOT closed, THEN manually close MSIVs and bypass valves.

ANSWER: A

Explanation: **All distracters contain parts of the immediate action steps. Operation of the EHC pumps is a plausible distracter since turbine valves fail close on loss of EHC pressure.**
a Correct.
b Incorrect due to EHC pump operation.
c Incorrect due to check of control valves vice stop valves.
d Incorrect due to check of control valves vice stop valves and EHC pump operation.

Technical References: **E-0, Reactor Trip or Safety Injection, step 2.**

Objective: **P8197L-012**

KA Statement: **Emergency Procedures/Plan: Ability to perform without reference to procedures those actions that require immediate operation of system components and controls. (Main and Reheat Steam)**

Cog. Level: **LOW** **10CFR55.41:** **YES** **10CFR55.43:** **YES** **New Question:** **YES**

Bank: **Ques. ID:** **Modified:** **Last NRC Exam:**

Level RO Tier 2 Group 1 K/A# 039 K1.06 Imp. RO 3.1 Imp. SRO 3.0

42. Unit 2 is operating at 6% reactor power in preparation for rolling the main turbine.

Starting the turbine roll-up will have what affect on the steam dump system?

a. The steam dumps will open if the roll-up arms the “loss of load” permissive.
b. The steam dumps will open due to the change in RCS Tavg.
c. The steam dumps will close if RCS Tavg drops below 545°F.
d. The steam dumps will close due to the change in steam header pressure.

ANSWER: D

Explanation:
- **a** **Plausible since steam dumps need an arming signal to open. Incorrect because steam dumps will be open in STM PRESS mode for this evolution.**
- **b** **Plausible because steam dumps do change position with Tavg changes. Incorrect because steam dumps will be in STM PRESS mode for this evolution.**
- **c** **Plausible because steam dumps will close on a low-low Tavg signal. Incorrect because low-low Tavg setpoint is 540°F.**
- **d** **Correct. Prior to turbine operation, reactor power is maintained at 6% using steam dumps in the steam pressure mode.**

Technical References: **Simulator response.**
2C1.2, Unit 2 Startup Procedure

Objective: **P8174L-002**

KA Statement: **Knowledge of the physical connections and/or cause-effect relationships between the MRSS and the following systems: Condenser steam dump**

Cog. Level: **HIGH** **10CFR55.41:** **YES** **10CFR55.43:** **New Question:** **YES**
Bank: **Ques. ID:** **Modified:** **Last NRC Exam:**

Level	RO	Tier	2	Group	1	K/A#	056 A2.04	Imp. RO	2.6	Imp. SRO	2.8

43. Given the following conditions on Unit 1:
    - Reactor power is 80% (460MWe)
    - 13 Condensate Pump is in standby
    - Annunciator 47009-0103, "12 CONDENSATE PUMP LOCKED OUT" alarms

    What is the plant response to this condition and what "general" action is appropriate?

a. 13 Condensate Pump AUTO STARTS. Power may be maintained at 80% (460MWe).
b. 11 Feedwater Pump TRIPS. Power must be reduced below 60% (330 MWe).
c. BOTH Feedwater Pumps TRIP. E-0, "Reactor Trip or Safety Injection," must be implemented.
d. CV-31087, Condensate Bypass to Feedwater Pump, AUTOMATICALLY OPENS. Power must be reduced below 50% (287MWe).

ANSWER: B

Explanation: **With two feedwater pumps running, at least two Condensate Pumps must be running. If one condensate pump trips, the 11 FW Pump will also trip. With one FW Pump operating, the turbine power must be reduced to less than 330 MWe (or 60%).**

- **a** **Plausible since the auto-start will occur but incorrect because a MFW will trip and power can not be maintained at 80% with only 1 FW Pump.**
- **b** **Correct.**
- **c** **Plausible since this will occur if FW Pump suction pressure falls below 220 psig for long enough to satisfy a time-delay relay.**
- **d** **Plausible since this will occur if FW Pump suction pressure falls below 220 psig.**

Technical References: **B28A, "Condensate and Feedwater"**
C1.4 AOP1, "Rapid Power Reduction"
Alarm Response C47009:0103, "Condensate Pump Locked Out"
Alarm Response C47010:0101, "11 Feedwater Pump Locked Out"

Objective: **P8174L-003**

KA Statement: **Ability to (a) predict the impacts of the following malfunctions or operations on the Condensate System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of condensate pumps**

Cog. Level:	HIGH	10CFR55.41:	YES	10CFR55.43:	YES	New Question:	YES
Bank:		Ques. ID:		Modified:		Last NRC Exam:	

Level RO Tier 2 Group 1 K/A# 059 A4.12 Imp. RO 3.4 Imp. SRO 3.5

44. Given the following:
    - Reactor power is 8%
    - Turbine is rolling at 1800 rpm but output breakers are OPEN.
    - 11 SG narrow range level is 70%
    - 12 SG narrow range level is 75%

    List the AUTOMATIC actions that will occur from the above conditions.

a. Turbine trip, Reactor trip and FRV & bypass valves close.
b. Turbine trip, Reactor trip and Feedwater pumps trip.
c. FRV & bypass valves close and Feedwater pumps trip.
d. Turbine trip, Feedwater pumps trip, AFW pumps start and FRV & bypass valves close.

ANSWER: D

Explanation:
a Plausible but only a partial list of actions AND reactor does not trip.
b Plausible but only a partial list of actions AND reactor does not trip.
c Plausible but only a partial list of actions.
d Correct.

Technical References: **Alarm Response C47011:0401 (and 0402), "11 STM GEN HI WTR LVL Turbine Trip"**

Objective:

KA Statement: **Ability to manually operate and/or monitor in the control room: Initiation of automatic feedwater isolation**

Cog. Level:	**HIGH**	**10CFR55.41:**	**YES**	**10CFR55.43:**		**New Question:**	**NO**
Bank:	**INPO**	**Ques. ID:**	**#4242 Harris**	**Modified:**	**NO**	**Last NRC Exam:**	**1997**

Level RO Tier 2 Group 1 K/A# 059 K3.04 Imp. RO 3.6 Imp. SRO 3.8

45. Given the following conditions on Unit 1:
    - 83% Reactor power.
    - Both feedwater pumps are operating.
    - Steam Generator Water Level Controls are in AUTOMATIC.

    Which ONE of the following failures will cause RCS Tavg to INITIALLY INCREASE?

a. 11 SG Red Channel Narrow Range Level (LI-461) fails HIGH.
b. The air supply line to Bypass FW valve, CV-31369, is inadvertently closed.
c. 12 FWP Discharge Valve, MV-32324, spuriously closes.
d. 12 SG Blue Pressure Channel (PI-478) fails LOW.

ANSWER: C

Explanation:
a **Plausible if SGWLC operation is not understood. Incorrect because circuit rejects failed input and FRV does not move.**
b **Plausible failure which would cause Tavg to increase if the bypass valve was open. However, at the specified power level the bypass valve is already closed.**
c **Correct**
d **Plausible if SGWLC operation is not understood. Incorrect because circuit rejects failed input and FRV does not move.**

Technical References:
Objective: **P8174L-003**
KA Statement: **Knowledge of the effect that a loss or malfunction of the MFW System will have on the following: RCS**

Cog. Level:	**HIGH**	**10CFR55.41:**	**YES**	**10CFR55.43:**		**New Question:**	**NO**
Bank:	**INPO**	**Ques. ID:**	**#20186 Byron**	**Modified:**	**YES**	**Last NRC Exam:**	**2001**

Level RO **Tier** 2 **Group** 1 **K/A#** 061 K2.02 **Imp. RO** 3.7 **Imp. SRO** 3.7

46. What are the power supplies for the motor-driven auxiliary feedwater pumps?

	12 AFW Pump	21 AFW Pump
a.	Bus 15	Bus 25
b.	Bus 15	Bus 26
c.	Bus 16	Bus 25
d.	Bus 16	Bus 26

ANSWER: C

Explanation: **These are the only plausible configurations for MDAFW pump power.**
Pump 12 is powered from Safeguards Bus 16 and pump 21 is powered from Safeguards Bus 25.

Technical References: **B28B, "Auxiliary Feedwater System"**

Objective: **P8180L-007**

KA Statement: **Knowledge of bus power supplies to the following: AFW electric driven pumps**

Cog. Level: **LOW** **10CFR55.41:** **YES** **10CFR55.43:** **New Question:** **YES**

Bank: **Ques. ID:** **Modified:** **Last NRC Exam:**

Level RO Tier 2 Group 1 K/A# 061 K4.02 Imp. RO 4.5 Imp. SRO 4.6

47. The following Unit 1 conditions exist:
- Unit 1 has tripped from 15% power due to loss of power to Buses 11 and 12.
- Prior to the trip, all equipment was operable.
- Prior to the trip, BOTH AFW pump were stopped with their control switches in AUTO.
- Prior to the trip, #12 MFW pump was in service.
- Prior to the trip, control power was lost to #12 MFW pump.
- Busses 11 and 12 are still de-energized.
- 11 SG NR level has remained above 20% during this event.
- 12 SG NR level has remained above 16% during this event.

With NO operator action since the trip, what is the status of the AFW pumps?

	11 AFW pump	12 AFW pump
a.	running	NOT running
b.	NOT running	NOT running
c.	running	running
d.	NOT running	running

ANSWER: A

Explanation: **The distracters represent all possible configurations for the Unit 1 AFW pumps.**

Due to the loss of power to both bus 11 and 12, both main FW pumps trip. However, due to the loss of control power, the trip of 12 main FW pump is not "sensed." So, although both AFW pumps should start on the trip of both main FW pumps, neither AFW pump actually starts. The TDAFW pump starts on UV on buses 11 and 12. This makes A the correct choice.

Technical References: **B28B, "Auxiliary Feedwater System"**

Objective: **P8180L-007**

KA Statement: **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**

Cog. Level:	**HIGH**	**10CFR55.41:**	**YES**	**10CFR55.43:**		**New Question:**	**NO**
Bank:	**INITIAL1**	**Ques. ID:**	**P8180L-007 OBJ3,7 (003)**	**Modified:**	**NO**	**Last NRC Exam:**	**1997**

The NRC reviewed this question and determined that answer C is correct vice answer A based on licensee post exam comments.

Level RO Tier 2 Group 1 K/A# 062 K3.02 Imp. RO 4.1 Imp. SRO 4.4

48. Unit 2 is operating at 100% with a "normal" electrical alignment and all T.S. equipment operable.

You observe the following:
- Annunciator 47524:0704, "Bus 26 Sequence – Channel Alert" alarms
- This is followed shortly by an alarm on 47524:0304, "Bus 26 4.16KV Degraded Voltage"
- All other annunciators on Panel 47524 remain clear
- 12CT Substation voltage reads 3850v
- Bus 26 voltage is at 3820v

If there is NO further degradation or improvement in Bus 26 voltage, Emergency Diesel Generator D6 will…

a. NOT start because Bus 26 voltage is still above the D6 auto-start setpoint for Bus 26 voltage.
b. NOT start because Bus 26 will LOCKOUT due to sustained degraded voltage.
c. start but its output breaker will remain open because Bus 26 will LOCKOUT.
d. start and its output breaker will close when the source from CT12 opens.

ANSWER: D

Explanation:
a Plausible if the UV setpoint is not known (3973v).
b Plausible because degrade voltage does lockout all but one supply breaker to Bus 26. Incorrect because the D6 breaker is NOT locked out.
c Plausible because a bus LOCKOUT does prevent breaker closure but incorrect because UV does not cause a bus lockout.
d Correct.

Technical References: **B20.7, Emergency Diesel Generator**
C47524:0304, "Bus 26 4.16KV Degraded Voltage"
Objective: **P8186L-004**
KA Statement: **Knowledge of the effect that a loss or malfunction of the A.C. Distribution System will have on the following: ED/G**

Cog. Level:	**HIGH**	**10CFR55.41:**	**YES**	**10CFR55.43:**		**New Question:**	**YES**
Bank:		**Ques. ID:**		**Modified:**		**Last NRC Exam:**	

Level RO Tier 2 Group 1 K/A# 063 A2.01 Imp. RO 2.5 Imp. SRO 3.2

49. How will a very low-resistance (“hard”) ground affect the Train A 125V DC Safeguards System?

a. A ground on the “+” distribution line will cause a short which will blow the fuse closest to the ground. At worst it could cause a complete loss of Train A DC power.
b. A ground on the “-” distribution line will cause a short which will blow the fuse closest to the ground. At worst it could cause a complete loss of Train A DC power.
c. The Train A DC system would be more susceptible to failure. If another ground should occur on the opposite polarity line, then a short would occur and blow a fuse in the system.
d. The Train A DC system would be more susceptible to failure. If another ground should occur on the same polarity line, then a short would occur and blow a fuse in the system.

ANSWER: C

Explanation: **This question is only written to the first part of the K/A statement because PI does not have DC ground isolation procedures for OPS. When a DC panel ground alarm occurs, the alarm response procedure has only 2 actions: (See 47024-1101)**

- **Locally verify alarm**
- **Notify electrical section**

a Incorrect because the system is designed as ungrounded. Plausible for a grounded DC system.
b Incorrect because the system is designed as ungrounded. Plausible for a grounded DC system.
c Correct.
d Incorrect but added to balance distracters.

Technical References: **Generic Fundamentals**
Objective: **P8186L-005**
KA Statement: **Ability to (a) predict the impacts of the following malfunctions or operations on the D.C. Electrical System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Grounds**

Cog. Level: **LOW** **10CFR55.41:** **YES** **10CFR55.43:** **YES** **New Question:** **YES**
Bank: **Ques. ID:** **Modified:** **Last NRC Exam:**

Level	RO	Tier	2	Group	1	K/A#	064 A3.03	Imp. RO	3.4	Imp. SRO	3.3

50. **Refer to Exhibit 2: Bus 15 Load Sequencer**

Based on the load sequencer panel lights, Bus 15…

a. is de-energized. D1 did not start.
b. is de-energized. D1 started and is ready to load.
c. is energized. D1 is supplying power and the sequencer has completed all steps.
d. is energized. D1 is supplying power but the sequencer has NOT run through its steps.

ANSWER: B

Explanation: **All distracters represent possible combinations of related actions.**
a Incorrect because D1 is up to speed and voltage.
b Correct because normal voltage is not present on phases A and C.
c Incorrect because normal voltage is not present on phases A and C.
d Incorrect because normal voltage is not present on phases A and C.

Technical References:

Objective: **P8186L-004**

KA Statement: **Ability to monitor automatic operation of the ED/G System, including: Indicating lights, meters, and recorders**

Cog. Level:	**HIGH**	**10CFR55.41:**	**YES**	**10CFR55.43:**		**New Question:**	**YES**
Bank:		**Ques. ID:**		**Modified:**		**Last NRC Exam:**	

Level RO **Tier** 2 **Group** 1 **K/A#** 073 A4.03 **Imp. RO** 3.1 **Imp. SRO** 3.2

51. You are performing the test of R-18 in preparation for a release of the 121 ADT Monitor Tank. When you place the OPERATIONAL SELECTOR switch in the "CHECK SOURCE" position, what should happen?

    First, alarm 47022:0209, "Rad Monitor Check Source Actuated," will come in, then…

a. R-18 reading will go to 0 then rise to the "check source" reading.
   No radiation monitor alarms are expected.
b. R-18 reading will go to 0 then rise to the "check source" reading.
   Alarm 47022:0208, Rad Monitor Downscale Failure will come in.
c. R-18 reading will rise from background by an amount equal to the "check source" reading.
   No radiation monitor alarms are expected.
d. R-18 reading will rise from background by an amount equal to the "check source" reading.
   Alarm 47022:0108, Hi Radiation Train A will come in.

ANSWER: C

Explanation:
- **a** **Plausible response if detector is taken off-line and a source substituted but that is not how the source check function works.**
- **b** **Plausible response if detector is taken off-line and a source substituted but that is not how the source check function works.**
- **c** **Correct.**
- **d** **Plausible since rad monitor reading will rise but normally R-18 is set too high for the alarm to come in on a source check. In addition, R-18 is a Train "B" rad monitor.**

Technical References: **B11, Radiation Monitoring System**
C21.1-5.1, 121 ADT Monitor Tank Release
Objective: **P8182L-002**
KA Statement: **Ability to manually operate and/or monitor in the control room: Check source for operability demonstration**

Cog. Level: **LOW** **10CFR55.41:** **YES** **10CFR55.43:** **New Question:** **YES**
Bank: **Ques. ID:** **Modified:** **Last NRC Exam:**

Level RO Tier 2 Group 1 K/A# 076 2.1.14 Imp. RO 2.5 Imp. SRO 3.3

52. What Cooling Water System evolution should be preceded by a PA announcement?

a. Removing a traveling screen from service.
b. Opening the emergency bypass gate in the intake canal.
c. Starting the diesel-driven cooling water pump for monthly surveillance.
d. Switching containment fan coolers to Cooling Water from Chilled Water.

ANSWER: C

Explanation: **All choices are plausible because since each choice is a realistic evolution which is performed using or within the Cooling Water System. Per SWI-O-0, Attachment 7, "Equipment Manipulation and Status Control," Step 3.1.5 states that the PA system should be used to announce the starting of major pumps and motors. This makes choice C correct. The other choices are incorrect through common plant practice and through the SWI because these evolutions do not meet the threshold of step 3.1.5.**

Technical References: **SWI-O-0**

Objective: **P8176L-003**

KA Statement: **Conduct of Operations: Knowledge of system status criteria which require the notification of plant personnel. (Service Water System)**

Cog. Level:	**LOW**	**10CFR55.41:**		**10CFR55.43:**	**YES**	**New Question:**	**YES**
Bank:		**Ques. ID:**		**Modified:**		**Last NRC Exam:**	

Level RO **Tier** 2 **Group** 1 **K/A#** 076 A4.04 **Imp. RO** 3.5 **Imp. SRO** 3.5

53. Following a Unit 1 safety injection actuation, which heat load is isolated from the Cooling Water System?

A. Standby Control Room Chiller Unit
B. Unit 2 Containment Fan Cooler Units (switch to Chilled Water)
C. Unit 1 Containment/Auxiliary Building Chillers
D. Non-Running Unit 2 Diesel Generators

ANSWER: C

Explanation:
a **Plausible because "standby" equipment does not need to be cooled.**
b **Plausible because FCUs can be supplied by either system.**
c **Correct**
d **Plausible because "non-running" equipment does not need to be cooled.**

Technical References:
Objective: **P8176L-003**
KA Statement: **Ability to manually operate and/or monitor in the control room: Emergency heat loads**

Cog. Level:	**LOW**	**10CFR55.41:**	**YES**	**10CFR55.43:**		**New Question:**	**NO**
Bank:	**INPO**	**Ques. ID:**	**#1261 North Anna**	**Modified:**	**YES**	**Last NRC Exam:**	**1996**

Level RO Tier 2 Group 1 K/A# 078 K1.05 Imp. RO 3.4 Imp. SRO 3.5

54. Assume the Unit 2 Main Steam Isolation Valves (MSIVs) are open. What will happen to the MSIVs if instrument air pressure is lost?

The MSIVs will…

a. close when air header pressure drops to about 75 psig.
b. remain open if their associated air tanks do NOT have check valve leakage.
c. drift off their open seat but will NOT fully close without a manual or automatic close signal.
d. fail as is (open) and will NOT close on either a manual or automatic close signal.

ANSWER: B

Explanation:
a Plausible since valve will close sometime after air tank pressure drops below 80 psig but incorrect since design has an installed check valve.
b Correct
c Plausible if students do know how air impacts MSIV.
d Plausible if students do know how air impacts MSIV.

Technical References: XH-112-1
C47011:0505, "11 or 12 STM GEN ISOLATION VALVE LO AIR PRESS"
Objective: P9140L-405
KA Statement: Knowledge of the physical connections and/or cause-effect relationships between the IAS and the following systems: MSIV air

Cog. Level:	LOW	10CFR55.41:	YES	10CFR55.43:		New Question:	YES
Bank:		Ques. ID:		Modified:		Last NRC Exam:	

Level RO Tier 2 Group 1 K/A# 103 K4.04 Imp. RO 2.5 Imp. SRO 3.2

55. The design of the containment equipment hatch...

a. is sized to allow reactor vessel head "O" ring passage.
b. will allow only 2 people to enter/exit at a time.
c. includes a pneumatic seal to minimize leakage.
d. uses an interlock to prevent both doors being open simultaneously.

ANSWER: A

Explanation:
a Correct.
b Plausible because it is true for personnel access hatch.
c Plausible because it true for personnel access hatch.
d Plausible because it is true personnel access hatch.

Technical References: B19, Containment Systems
Objective: P8180L-001
KA Statement: Knowledge of Containment System design feature(s) and/or interlock(s) which provide for the following: Personnel access hatch and emergency access hatch

Cog. Level:	LOW	10CFR55.41:	YES	10CFR55.43:		New Question:	NO
Bank:	INITIAL1	Ques. ID:	P8180L-001 (017)	Modified:	NO	Last NRC Exam:	2000

Level RO Tier 2 Group 2 K/A# 002 A3.03 Imp. RO 4.4 Imp. SRO 4.6

56. Given the following conditions on Unit 1:
- 60% power and stable
- PRZR Spray Valves closed in AUTO
- PRZR Pressure Control Selector Switch is selected to the "2-3 (White-Blue)" position
- PRZR Pressure Indications are:
  - PT-429 (Red) 2230# and rising
  - PT-430 (White) 2235# and rising
  - PT-431 (Blue) at 2185# and stable
  - PT-449 (Yellow) at 2235# and rising

Assuming NO operator action is taken and the trend is due to an instrument failure, what is the Pressurizer Pressure Control System response to these conditions?

a. PRZR spray valves will fully open and depressurize the RCS, causing a reactor trip.
b. PRZR pressure will oscillate between 2210 and 2250 psig by the cycling of the heaters.
c. PRZR spray valves will stabilize RCS pressure below 2310 psig.
d. PRZR pressure will oscillate between 2315 and 2335 psig by the cycling of PORV PCV-430.

ANSWER: D

Explanation: **Controlling channel failure, heaters on and sprays off. PCV-431C will not open, so other PORV cycles to limit pressure rise.**
Technical References: **B7, Reactor Control System**
Objective: **P8170L-003**
KA Statement: **Ability to monitor automatic operation of the RCS, including: Pressure, temperatures, and flows**

Cog. Level:	HIGH	10CFR55.41:	YES	10CFR55.43:		New Question:	NO
Bank:	INITIAL1	Ques. ID:	P8170L-006 (043)	Modified:	NO	Last NRC Exam:	----

Level RO Tier 2 Group 2 K/A# 011 K2.01 Imp. RO 3.1 Imp. SRO 3.2

57. What are the normal power supplies for the Unit 1 charging pumps?

	11 Charging Pump	12 Charging Pump	13 Charging Pump
a.	Bus 11	Bus 12	Bus 13
b.	Bus 11	Bus 12	Bus 11
c.	Bus 15	Bus 16	Bus 15
d.	Bus 16	Bus 15	Bus 16

ANSWER: D

Explanation:
a Plausible based on pump and bus numbering.
b Plausible based on student's remembering 2 pumps are powered by same bus.
c Plausible based on student's remembering 2 pumps are powered by same bus.
d Correct.

Technical References:
Objective: P8172L-001A
KA Statement: Knowledge of bus power supplies to the following: Charging pumps

Cog. Level:	LOW	10CFR55.41:	YES	10CFR55.43:		New Question:	NO
Bank:	INPO	Ques. ID:	#9279 Ginna	Modified:	NO	Last NRC Exam:	1998

Level RO Tier 2 Group 2 K/A# 014 K3.02 Imp. RO 2.5 Imp. SRO 2.8

58. If power fuse blows (opens) for the rod position indication to the shutdown bank control rod E3, what will change on ERCS?

ERCS will…

a. display the last valid rod position but change the color to cyan to indicate questionable data. There will be no ERCS generated alarms.
b. display "UNK" for rod position and generate alarm 47013:0507, "Computer Alarm Rod Deviation/Sequencing."
c. display 0 for rod position and generate alarm 47013:0507, "Computer Alarm Rod Deviation/Sequencing."
d. display 228 for rod position and generate alarm 47013:0507, "Computer Alarm Rod Deviation/Sequencing" if the associated bank is actually below 216 steps.

ANSWER: C

Explanation:
a Plausible because this is what happens on loss of data feed but in this case the system would feed a 0 position signal to ERCS.
b Plausible sounding based on loss of signal.
c Correct
d Plausible if candidate does not know which way RPI is calibrated i.e. what does 0v mean.

Technical References: **Computer displays: "RODS" and**
Objective: **P8184L-005**
KA Statement: **Knowledge of the effect that a loss or malfunction of the RPIS will have on the following: Plant computer**

Cog. Level:	**LOW**	**10CFR55.41:**	**YES**	**10CFR55.43:**		**New Question:**	**YES**
Bank:		**Ques. ID:**		**Modified:**		**Last NRC Exam:**	

Level RO Tier 2 Group 2 K/A# 017 A1.01 Imp. RO 3.7 Imp. SRO 3.9

59. IF ERCS is unavailable, core exit thermocouple temperatures can be monitored from…

a. any remote multiplexing unit using portable thermocouple bridge readers.
b. the hot shutdown panels in the auxiliary feed pump room.
c. panel EM-A3 in the Train A Event Monitor Room.
d. the ICCM panel behind the main control board.

ANSWER: D

Explanation:
a Plausible because the T/C signal does pass through these panels. Incorrect because the information is not available at all of the RMUs.
b Plausible because subcooling is monitored when the control room is evacuated but T/C information is NOT available on the HSDP.
c Plausible sounding but this panel does not exist.
d Correct

Technical References: 1C1.5, Operation Without Computer, Table 3
Objective: P8184L-001
KA Statement: Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ITM System controls including: Core exit temperature

Cog. Level:	LOW	10CFR55.41:	YES	10CFR55.43:		New Question:	YES
Bank:		Ques. ID:		Modified:		Last NRC Exam:	

Level RO Tier 2 Group 2 K/A# 028 A4.02 Imp. RO 3.7 Imp. SRO 3.9

60. Where are the containment pressure sensors located and how are they affected by rising atmospheric pressure?

	LOCATION	EFFECT OF RISING ATMOSPHERIC PRESSURE
a.	Inside Containment	containment pressure indication decreases
b.	Inside Containment	containment pressure indication increases
c.	Outside Containment	containment pressure indication decreases
d.	Outside Containment	containment pressure indication increases

ANSWER: C

Explanation: **The distracters are plausible in terms of location and affect (2 out of 2 twice).**
a Incorrect because instruments are outside containment.
b Incorrect because instruments are outside containment.
c Correct
d Incorrect because instrument response is incorrect.

Technical References: **Physical plant arrangement**
Generic knowledge of pressure transmitter operation

Objective: **P8180L-008**

KA Statement: **Ability to manually operate and/or monitor in the control room: Location and interpretation of containment pressure indications**

Cog. Level: **HIGH** **10CFR55.41:** **10CFR55.43:** **YES** **New Question:** **YES**
Bank: **Ques. ID:** **Modified:** **Last NRC Exam:**

Level RO Tier 2 Group 2 K/A# 041 K5.07 Imp. RO 3.1 Imp. SRO 3.6

61. With Unit 2 at 98% power near the end of a fuel cycle, what is the initial plant response to a Condenser Steam Dump valve failing open?

a. An increase in steam flow resulting in an increase in turbine load.
b. A decrease in Tavg resulting in Bank D rods stepping IN.
c. A decrease in reactor power and an increase in SG levels.
d. An increase in reactor power and a decrease in PRZR level.

ANSWER: D

Explanation: **With the steam dump valve open, steam flow increases and RCS Tavg drops. This results in an increase in reactor power and pressurizer level decreasing.**

a Plausible because steam flow will increase but turbine load will not increase. IMP IN control with cause load to be constant and IMP OUT control will cause load to decrease due to lower steam pressures.
b. Plausible because Tavg will decrease but rods will step OUT in response to Tavg decrease.
c Plausible because there should be some rise in SG level (due to swell) but reactor power will go up.
d Correct.

Technical References: **Simulator response**
Objective: **P8174L-002**
KA Statement: **Knowledge of the operational implications of the following concepts as they apply to the SDS: Reactivity feedback effects**

Cog. Level:	**HIGH**	**10CFR55.41:**	**YES**	**10CFR55.43:**		**New Question:**	**NO**
Bank:	**INPO**	**Ques. ID:**	**#19383 Kewaunee**	**Modified:**	**NO**	**Last NRC Exam:**	**2000**

Level RO Tier 2 Group 2 K/A# 055 2.1.32 Imp. RO 3.4 Imp. SRO 3.8

62. C26, “Air Removal System” has a requirement to open SV-33341, AIR EJECTOR LOOP SEAL DRAIN, if condenser air leakage flow is greater than 8.5 scfm. Why is this action necessary?

a. This will remove excess moisture carried over from the condenser due to the high flow.
b. To provide an additional air flow path to prevent supersonic velocity at the air ejector nozzle.
c. To prevent loop seal failure, at high flow, which would make the air removal system ineffective.
d. This changes the d/p in the discharge line which acts to rescale the air leakage flow meter.

ANSWER: C

Explanation:
a Plausible if air ejector operation is compared to SG operation.
b As air flow rises the velocity must rise and there is an association of supersonic velocity with air ejectors. This is a plausible distracter if that association is not understood.
c Correct
d Plausible because loop seal failure is caused by d/p change in the line but not correct because it has nothing to do with meter scaling.

Technical References: C26, Air Removal System, Limitation 4.3
Objective: P8174L-001
KA Statement: Conduct of Operations: Ability to explain and apply all system limits and precautions. (Condenser Air Removal System)

Cog. Level:	LOW	10CFR55.41:	YES	10CFR55.43:	YES	New Question:	YES
Bank:		Ques. ID:		Modified:		Last NRC Exam:	

Level RO Tier 2 Group 2 K/A# 068 A2.04 Imp. RO 3.3 Imp. SRO 3.3

63. During a liquid radwaste discharge, alarm C47022:0101, HI RADIATION TRAIN B PANEL ALARM, comes in due to a high reading on R-18 but the auto actions do not occur.

What initial operator actions are required?

a. Close CV-31256,"Waste Liquid Common Discharge Header Valve" and CV-31841, "Waste Liquid Common Discharge Header Keylock Release Valve."
b. Close CV-31256,"Waste Liquid Common Discharge Header Valve" and switch the affected tank to recirculation.
c. Close CV-31841, "Waste Liquid Common Discharge Header Keylock Release Valve" and switch the affected tank to recirculation.
d. Place the affected tank on recirculation and resample. Flush the discharge line and the radiation monitor.

ANSWER: A

Explanation:
a Correct per alarm response procedure.
b Plausible because it contains partially correct answer.
c Plausible because it contains partially correct answer.
d Plausible because it contains subsequent actions for the event.

Technical References: **C47048:R-18, Waste Liquid Disposal Liquid Effluent Monitor**

Objective: **P8182L-001A**

KA Statement: **Ability to (a) predict the impacts of the following malfunctions or operations on the Liquid Radwaste System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Failure of automatic isolation**

Cog. Level:	LOW	10CFR55.41:	YES	10CFR55.43:	YES	New Question:	NO
Bank:	INPO	Ques. ID:	#19535 Cook	Modified:	YES	Last NRC Exam:	2001

Level RO **Tier** 2 **Group** 2 **K/A#** 079 K4.01 **Imp. RO** 2.9 **Imp. SRO** 3.2

64. 121 Instrument Air Compressor is going to be isolated for maintenance.

In order to align Station Air to supply Instrument Air upstream of the air dryers, the operator must...

a. Open cross connect valves SA-12-19 and SA-12-18 and verify dryer bypass valve MV-32363 is in automatic.
b. Open manual cross connect valve CP-40-7 and verify one station air compressor is in MANUAL, the other in STANDBY.
c. Open MV-32318, Service Air Header Isolation Valve, and verify station air pressure is greater than instrument air pressure.
d. Open MV-32321, Header Cross Connect, and verify Instrument Air pressure is greater than 85 psig.

ANSWER: B

Explanation: **CP-40-7 connects upstream of the dryers, one SA compressor must be in manual to compensate for different loading characteristics. SA-12-18/19 connect downstream of dryers. MV-32318 supplies station air from instrument air. MV-32321 splits IA headers downstream of the dryers.**

Technical References: **C34**

Objective: **P9140L-405**

KA Statement: **Knowledge of SAS design feature(s) and/or interlock(s) which provide for the following: Cross-connect with IAS**

Cog. Level:	**LOW**	**10CFR55.41:**	**YES**	**10CFR55.43:**		**New Question:**	**NO**
Bank:	**INITIAL1**	**Ques. ID:**	**P8178L-005 (011)**	**Modified:**	**NO**	**Last NRC Exam:**	**2000**

Level RO Tier 2 Group 2 K/A# 086 K1.01 Imp. RO 3.0 Imp. SRO 3.4

65. If all Fire Pumps and the Screenwash Pump fail, the fire suppression water system can be cross-tied to _____ to maintain fire suppression capability.

a. Circulating Water System
b. Cooling Water System
c. Filtered Water System
d. Screenhouse Well Pump

ANSWER: B

Explanation:
a Plausible because CW is a high volume system.
b Correct.
c Plausible because the filtered water system is available and has no other safety function.
d Plausible because such a crosstie makes sense in terms of already present in the screenhouse.

Technical References: C31, Fire Protection & Detection Systems
F5 Appendix K section 4.3
Objective: P8178L-002
KA Statement: Knowledge of the physical connections and/or cause-effect relationships between the Fire Protection System and the following systems: High-pressure service water

Cog. Level: LOW **10CFR55.41:** YES **10CFR55.43:** **New Question:** YES
Bank: **Ques. ID:** **Modified:** **Last NRC Exam:**

Level	RO	Tier	3	Group	1	K/A#	GEN 2.1.18	Imp. RO	2.9	Imp. SRO	3.0

66. Which event is required to be recorded in the Unit 1 Reactor Log?

a. Receipt of a fuel oil shipment.
b. Placing the #11 Boric Acid Tank on recirc.
c. Addition of oil to the main turbine lube oil reservoir.
d. Operation of the Water Treatment/Reverse Osmosis system.

ANSWER: B

Explanation: **All distracters are plausible because each represents a mandatory log entry.**
a This is logged in the Turbine Building Log.
b Correct.
c This is logged in the Turbine Building Log.
d This is logged in the Turbine Building Log.

Technical References: **SWI-O-25, Periodic Data Acquisition and Log Keeping**

Objective:

KA Statement: **Conduct of Operations: Ability to make accurate, clear and concise logs, records, status boards, and reports.**

Cog. Level:	LOW	10CFR55.41:		10CFR55.43:		New Question:	NO
Bank:	INPO	Ques. ID:	#1153 Callaway	Modified:	YES	Last NRC Exam:	1997

The NRC reviewed this question and determined that both B and C are correct answers based on licensee post exam comments.

Level	RO	Tier	3	Group	1	K/A#	GEN 2.1.29	Imp. RO	3.4	Imp. SRO	3.3

67. During an independent verification (IV) a valve is found out of position. How should the verifier handle the component out of position situation?

a. Do NOT change valve position. Notify the shift supervisor of the discrepancy.
b. Do NOT change valve position. Notify the initial valve positioner of the discrepancy.
c. Correct the valve position. Have shift supervisor obtain new verifier for that valve only.
d. Correct the valve position. Have the initial valve positioner perform the IV for that valve only.

ANSWER: A

Explanation:
a Correct
b Plausible since the initial positioner made the error.
c Plausible in terms of time efficiency with management notification.
d Plausible in terms of time efficiency with personal accountability for initial positioner.

Technical References: **5AWI 3.10.1, Methods of Performing Verifications, Step 6.3.9.j**

Objective:

KA Statement: **Conduct of Operations: Knowledge of how to conduct and verify valve lineups.**

Cog. Level:	LOW	10CFR55.41:	YES	10CFR55.43:		New Question:	NO
Bank:	INPO	Ques. ID:	#19510 Cook	Modified:	YES	Last NRC Exam:	2001

Level RO Tier 3 Group 1 K/A# GEN 2.1.31 Imp. RO 4.2 Imp. SRO 3.9

68. An illuminated status light on the "SI ACTIVE" Panel with the Unit at FULL POWER means the associated component…

a. is in standby alignment.
b. is NOT in standby alignment.
c. is in its "normal" alignment.
d. is in its "S" signal alignment.

ANSWER: D

Explanation:
a Plausible if SI monitor panels are confused. Incorrect because SI NOT READY panel monitors standby condition.
b Plausible if SI monitor panels are confused. Incorrect because SI NOT READY panel monitors standby condition.
c Plausible since some lights will be lit with components in "normal" alignment but incorrect because panel monitors Post-SI alignment.
d Correct.

Technical References: B18B, Emergency Core Cooling System, page 10
Objective:
KA Statement: Conduct of Operations: Ability to locate control room switches, controls and indications and to determine that they are correctly reflecting the desired plant lineup.

Cog. Level:	LOW	10CFR55.41:		10CFR55.43:		New Question:	NO
Bank:	INPO	Ques. ID:	#20654 Point Beach	Modified:	Yes	Last NRC Exam:	2002

Level	RO	Tier	3	Group	1	K/A#	GEN 2.2.1	Imp. RO	3.7	Imp. SRO	3.6

69. **Reference available: Fig C1A-3, "Estimated Critical Boron Concentration Based On Simulate Code."**

We are performing a reactor startup on Unit 1 in accordance with C1.2, "Unit 1 Startup Procedure " and C1B, "Appendix – Reactor Startup." Rod withdrawal to obtain initial criticality is in progress. The current conditions are:

- Zero power rod insertion limit is control bank C @ 47 steps
- Control Bank D is at 195 steps
- Rods have NOT been moved for the last 80 seconds
- There is a stable SUR of +0.25 dpm

What actions are required?

a. Declare the reactor critical and continue with Appendix C1B.
b. Declare the reactor critical and borate to lower Control Bank D to <170 steps.
c. Fully insert control banks and borate RCS to Mode 3 Hot Shutdown boron concentration.
d. Insert rods to the Estimated Control Rod Position of FIG C1A-3 and dilute to achieve criticality.

ANSWER: C

Explanation:
a Plausible if out of limit condition is not recognized.
b Plausible if candidate does not understand startup process because Fig. C1A-3 does list 170 steps.
c Correct
d Plausible since SDM is not an issue and dilution to criticality is performed for post-refueling startups.

Technical References: **1C1.2, Unit 1 Startup Procedure**
C1B, Appendix – Reactor Startup

Objective:

KA Statement: **Equipment Control: Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity.**

Cog. Level:	HIGH	10CFR55.41:		10CFR55.43:		New Question:	NO
Bank:		Ques. ID:	#20981 Palisades	Modified:	YES	Last NRC Exam:	2001

Level RO Tier 3 Group 1 K/A# GEN 2.2.4 Imp. RO 2.8 Imp. SRO 3.0

70. If the diesel generators automatically start due to a safety injection signal, what diesel generator condition would cause a trip of D1 BUT the same condition would NOT cause a trip of D5?

a. Engine overspeed
b. Generator differential current
c. Ground fault
d. Crankcase high pressure

ANSWER: C

Explanation: **All distracters are valid trips associated with D1 and/or D5.**
a Incorrect because this will trip either DG.
b Incorrect because this will trip either DG.
c Correct, this is a unit difference.
d Incorrect because neither DG will trip with SI active.

Technical References: **C20.7, Diesel Generators**
B20.7, Diesel Generators
B38A, Unit 1 Diesel Generators
B38C, Unit 2 Diesel Generators

Objective:

KA Statement: **Equipment Control: (multi-unit) Ability to explain the variations in control board layouts, systems, instrumentation and procedural actions between units at a facility.**

Cog. Level: **LOW** **10CFR55.41:** **10CFR55.43:** **New Question:** **YES**
Bank: **Ques. ID:** **Modified:** **Last NRC Exam:**

Level RO Tier 3 Group 1 K/A# GEN 2.3.1 Imp. RO 2.6 Imp. SRO 3.0

71. 10CFR20 limits the radiation exposure (dose) to a qualified radiation worker to _____ per year. NMC limits the radiation dose to a qualified radiation worker to _____ per year without special authorization.

	10CFR20 limit	NMC limit
a.	3000 mrem	1500 mrem
b.	3000 mrem	2000 mrem
c.	5000 mrem	2000 mrem
d.	5000 mrem	3000 mrem

ANSWER: C

Explanation:
- **a** Plausible because 3 REM/qtr use to be a federal limit and NMC limit is a small fraction of 10CFR20 limit. Incorrect because federal limit is 5 REM and NMC limit is 2 REM.
- **b** Plausible because 3 REM/qtr use to be a federal limit and NMC limit is a small fraction of 10CFR20 limit. Incorrect because federal limit is 5 REM.
- **c** Correct.
- **d** Plausible because 5 REM is federal limit and NMC limit is a small fraction of 10CFR20 limit. Incorrect because NMC limit is 2 REM.

Technical References: 10CFR20
RPIP 1110

Objective:

KA Statement: Radiation Controls: Knowledge of 10 CFR 20 and related facility radiation control requirements.

Cog. Level: LOW **10CFR55.41:** YES **10CFR55.43:** YES **New Question:** YES
Bank: **Ques. ID:** **Modified:** **Last NRC Exam:**

Level	RO	Tier	3	Group	1	K/A#	GEN 2.3.10	Imp. RO	2.9	Imp. SRO	3.3

72. The unit is in Mode 1 at 75% power?

What is required if a containment entry must be made?

a. Containment area radiation monitor R2 must read less than 500 mrem/hr.
b. Containment airborne radiation on R11 must be less than 2,000 CPM.
c. Flux mapping can not be performed during the containment entry.
d. Reactor power must be reduced ≤ 50% rated thermal power.

ANSWER: C

Explanation:
a. Plausible based on concern for radiation exposure but not required.
b. Plausible based on concern for internal radiation exposure but not required.
c. Correct based on F2 section 9.3.3 A.
d. Plausible based on radiation level being a function of reactor power.

Technical References: **F2 section 9.0**

Objective:

KA Statement: **Radiation Controls: Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.**

Cog. Level:	**LOW**	**10CFR55.41:**		**10CFR55.43:**	**YES**	**New Question:**	**YES**
Bank:		**Ques. ID:**		**Modified:**		**Last NRC Exam:**	

Level RO Tier 3 Group 1 K/A# GEN 2.3.9 Imp. RO 2.5 Imp. SRO 3.4

73. To place the Unit 1 containment in-service purge system in service,

a. the unit must be in MODE 5 or 6.
b. the R11/12 sample selector must be on “CONTAIN.”
c. there must be no personnel in the containment.
d. the supply fan should be started before the isolation dampers are opened.

ANSWER: A

Explanation:
- **a** **Correct. The unit must be in MODE 5 or below.**
- **b** **Plausible that sample should be on containment but incorrect because R11/12 must sample the vent path instead.**
- **c** **Plausible because “standing clear” of equipment to be started is a practice but incorrect because there is no requirement to evacuate containment for this activity.**
- **d** **Plausible as a means of controlling outflow of gas through an unmonitored line but incorrect because of system limitations.**

Technical References: **1C19.2 section 5.3**
Objective:
KA Statement: **Radiation Controls: Knowledge of the process for performing a containment purge.**
Cog. Level: **LOW** **10CFR55.41:** **10CFR55.43:** **YES** **New Question:** **YES**
Bank: **Ques. ID:** **Modified:** **Last NRC Exam:**

Level RO Tier 3 Group 1 K/A# GEN 2.4.16 Imp. RO 3.0 Imp. SRO 4.0

74. A reactor trip has occurred. During the SS read-through of E-0 Step 3, an Orange Path condition on a Critical Safety Function (CSF) Status Tree occurs.

Transition to the Orange Path procedure should take place:

a. immediately after confirming the Orange Path condition.
b. when transitioning to another E-series procedure.
c. immediately after the SS completes reading step 4.
d. at the discretion of the SS.

ANSWER: B

Explanation: **Immediately is incorrect because CSFSTs are not monitored until directed by E-0 or after transition from E-0.**
a. Plausible because when CSFSTs are monitored this transition would occur immediately.
b. Correct. (see SWI-O-10)
c. Plausible because step 4 is the last immediate action step of E-0.
d. Plausible because the SS does have some discretion in EOP implementation.

Technical References: **SWI-O-10, "Operations Manual Usage" section 7.8.4-e.**

Objective:

KA Statement: **Emergency Procedures/Plan: Knowledge of EOP implementation hierarchy and coordination with other support procedures.**

Cog. Level:	**LOW**	**10CFR55.41:**	**YES**	**10CFR55.43:**	**YES**	**New Question:**	**YES**
Bank:		**Ques. ID:**		**Modified:**		**Last NRC Exam:**	

Level RO **Tier** 3 **Group** 1 **K/A#** GEN 2.4.4 **Imp. RO** 4.0 **Imp. SRO** 4.3

75. Unit 2 is at 85% power and has experienced an event with the following alarms and indications:
    - 47520-0106, 21 CC PUMP LOCKED OUT
    - 47520-0407, 22 CC PUMP DISCH HDR LO PRESS
    - 47520-0205, 21 CC SURGE TANK HI/LO LVL
    - 47520-0105, 21 CC SURGE TANK LO LO LEVEL
    - 47515-0506, 21 RCP BEARINGS/STATOR HI TEMP
    - 21 RCP radial bearing temperature is 205°F and rising

    What should be your first action as RO or LEAD?

a. Open MV-32374, REACTOR MAKEUP TO 21 CC SURGE TANK.
b. Trip 21 REACTOR COOLANT PUMP.
c. Manually start 22 CC PUMP.
d. Manually trip the reactor.

ANSWER: D

Explanation: **This is an AOP with immediate actions which should be performed from memory. In order to perform the actions from memory, the ROs must recognize the entry conditions for the AOP. All distracters are actions in the AOP but only D is an Immediate Manual Action.**

Technical References: **2C14 AOP1**

Objective:

KA Statement: **Emergency Procedures/Plan: Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.**

Cog. Level:	**HIGH**	**10CFR55.41:**	**YES**	**10CFR55.43:**	**YES**	**New Question:**	**NO**
Bank:	**INPO**	**Ques. ID:**	**#2672 PI**	**Modified:**	**NO**	**Last NRC Exam:**	**1997**