

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

1

ID: 1015780

Points: 1.00

Given:

- Unit 1 is at 28% reactor power.
- Rod bank select switch is in manual.
- The 1B RCP trips due to an overcurrent condition.

With NO operator action, a reactor trip will ____ (1) ____ AND ΔT in loops 1A, 1C, and 1D will ____ (2) ____ over the next two minutes.

- | | ____ (1) ____ | ____ (2) ____ |
|----|---------------|---------------|
| A. | NOT occur | rise |
| B. | NOT occur | lower |
| C. | occur | lower |
| D. | occur | rise |

Answer: A

Answer Explanation

Bank Question (2014 NRC exam question 01)

RO level

Tier 2

High Cog

002K6.02

002 Reactor Coolant System

Knowledge of the effect or a loss or malfunction on the following RCS components: RCP.

RO 3.6 SRO 3.8

Meets K/A, examinee must determine what the status of the reactor is after the RCP trips and how that impacts the RCS (Tave).

10CFR55.41(b)(3) Mechanical components and design features of the reactor primary system.

Answer: A. A reactor trip will not occur with reactor power less than 30%. Without rod motion or operator action, ΔT for the unaffected loops will rise because only 3 SG's will be supplying the steam that 4 SG's were. The reactor coolant coming into the core from the SG will be colder since the unaffected SGs will be taking more steam out to meet the steam demand. This was run in the simulator and a reactor trip will not occur when the RCP trips and ΔT will rise.

A is correct. See explanation.

B is incorrect. See explanation.

C is incorrect. A reactor trip will not occur below 30% power.

D is incorrect. A reactor trip will not occur below 30% power.

Objective: S.RC1-06.

Technical References: EF-1, ESF Setpoints, BwAR 1-BP-3.7.

(Bank Farley 2001)

EXAMINATION ANSWER KEY

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2

ID: 1020039

Points: 1.00

Given:

- Unit 1 was at 100% power.
- A fire occurs in the Main Control Room.
- Unit 1 reactor is tripped.
- The crew evacuates the control room.
- The selector switch for the 1A SG Pressure Indicator at the Fire Hazards Panel (FHP), is in the FIRE position.
- The selector switch for the 1B SG Pressure Indicator at the FHP, is in the NORMAL position.

With the above conditions, the Remote Shutdown Panel (RSDP) and FHP provide ACTUAL steam generator pressure indication for which of the following SGs?

	<u>RSDP</u>	<u>FHP</u>
A.	All SGs	1A ONLY
B.	All SGs	1B ONLY
C.	1B, 1C, and 1D ONLY	1A ONLY
D.	1A, 1C, and 1D ONLY	1B ONLY

Answer: C

Answer Explanation

New Question (2014 NRC exam question 02)

RO level

Tier 2

Low Cog

016K4.01

016 Non-Nuclear Instrumentation System (NNIS)

Knowledge of NNIS design feature(s) and/or interlock(s) which provide for the following: Reading of NNIS channel values outside control room

RO 2.8 SRO 2.9

Meets K/A, examinee must have knowledge of NNIS interlocks which provide readings of NNIS channels outside the control room.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: C. The FHP only has indication of SG Pressure when the switch is taken to the Fire Position. When the switch is taken to the Fire Position at the FHP indication is lost at the RSDP and the MCR.

A is incorrect. Is a valid distracter if the examinee does not know that taking the switch at the FHP removes indication from the RSDP.

B is incorrect. Is a valid distracter if the examinee does not know that taking the switch at the FHP removes indication from the RSDP and if the switch at the FHP needs to be in normal position to have indication.

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C is correct. See explanation.

D is incorrect. Is a valid distracter if the examinee thinks the switch at the FHP needs to be in the normal position to have indication.

Objective: S.RS1-06

Technical References: Big Note PN-3 RSDP, 11-RS-XL-01 page 10

EXAMINATION ANSWER KEY

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3

ID: 1022205

Points: 1.00

Given:

- Unit 2 is at 100% power, then:
- An RCS LOCA occurs and SI is initiated.
- A Loss of offsite power occurs.
- The crew is currently in 2BwEP ES-1.2, Post LOCA Cooldown and Depressurization, with the following indications:
 - RCS pressure is 1250 PSIG and stable.
 - RCS cold leg temperatures are 500°F and stable.
 - RCS hot leg temperatures are 515°F and stable.
 - Core exit thermocouples (CETCs) are 585°F and stable.
 - S/G pressures are 700 PSIG and stable.

Given the conditions above, per 2BwEP ES-1.2, Attachment B, natural circulation is...

- A. occurring.
- B. NOT occurring because CETCs are NOT dropping.
- C. NOT occurring because hot leg temperature is greater than saturation temperature for SG pressure.
- D. NOT occurring because the reactor has inadequate subcooling.

Answer: D

Answer Explanation

Bank Question (2014 NRC exam question 03)

RO level

Tier 2

High Cog

017A3.01

In-Core Temperature Monitor System (ITM)

Ability to monitor automatic operation of the ITM system including: Indications of normal, natural, and interrupted circulation of RCS

RO 3.6 SRO 3.8

Meets K/A, examinee must be able to determine if subcooling is acceptable and what the indications would be on the subcooling monitors.

10CFR55.41(b)(2) General design features of the core, including core structure, fuel elements, control rods, core instrumentation, and coolant flow.

Answer: D. The Unit currently has inadequate subcooling. Tsat for RCS pressure is 1250 PSIG = 570°F. Per 2BwEP ES-1.2 RCS subcooling looks at RCS pressure and compares it to CETC (average of ten highest core exit TCs). Since CETC are at 585°F, no subcooling exists since Tsat for RCS pressure is 570°F.

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A is incorrect. Plausible if the examinee looks at RCS hot leg or cold leg temperatures, since they are both less than 570°F. No subcooling.

B is incorrect. Plausible if the examinee thinks that CETC need to be lowering for natural circulation to be occurring. CETC can be stable if natural circulation exists.

C is incorrect. Plausible if the examinee thinks SG pressures are compared to hot legs instead of Cold leg temp. Cold leg temp. is compared to SG pressure for natural circulation.

D is correct. See explanation.

Objective: S.CX1-05

Technical References: 2BwEP ES-1.2 page 43 and 45.

(Calloway 2004)

EXAMINATION ANSWER KEY

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4

ID: 1024886

Points: 1.00

Given:

- Unit 1 is in MODE 3.
- 1VP02CA, 1A Containment Charcoal Filter Fan, is running.
- 1VP02CB, 1B Containment Charcoal Filter Fan, is stopped (switch in NAT).

Subsequently:

- A fire occurs in the 1A containment charcoal absorber.
- The following annunciator is LIT:

(0-33-C3) CNMT CHAR FLTR UNIT TEMP HIGH

Given the conditions above, fire protection deluge to the containment charcoal filter unit has...

- A. to be manually actuated, this will cause 1VP02CA to auto trip.
- B. automatically actuated causing 1VP02CA to auto trip AND 1VP02CB to automatically start.
- C. automatically actuated causing 1VP02CA to auto trip AND 1VP02CB will NOT automatically start.
- D. to be manually actuated, 1VP02CA will NOT auto trip.

Answer: A

Answer Explanation

New Question (2014 NRC exam question 04)

Tier 2

Low Cog

027A4.04

Containment Iodine Removal System (CIRS)

Ability to manually operate and/or monitor in the control room: Filter temperature

RO 2.8 SRO 2.9

Meets K/A, examinee must be able to monitor the impacts of a fire on the CIRS (containment charcoal filter) and mitigate the consequences of those malfunctions. This is RO level since only systems level knowledge is required to be able determine the automatic/manual actions required for the containment charcoal filter.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: A. If a fire occurs in the containment charcoal filter, fire protection has to be manually actuated which will cause the 1VP02CA to auto trip. There is no auto start for either the 1VP02CB or 1VP02CA.

A is correct. See explanation.

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B is incorrect. Fire protection does not automatically actuate for containment charcoal filters. This is a plausible distracter since fire protection does have automatic actuations for different components in the plant.

C is incorrect. Fire protection does not automatically actuate for containment charcoal filters.

D is incorrect. 1VP02CA will auto trip when fire protection is actuated.

Objective: S.VP1-08-B

Technical References: BwOP VP-11, BwAR 0-32-C3, and Big note VP-1.

EXAMINATION ANSWER KEY

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5

ID: 1026843

Points: 1.00

Given:

- Unit 1 is in MODE 6 performing a core offload.
- A fuel assembly that had an initial enrichment of 3.8 wt % U-235 and has been in the core for one cycle with a total burnup of 25,289 MWD/MTU, has been moved to REGION 2 of the spent fuel pool storage racks.

In response to the conditions above, what actions per Tech Specs, if any, are required to be taken?

Reference Provided

- A. No action is required.
- B. Enter LCO 3.7.16, Spent Fuel Assembly Storage, and immediately initiate action to move the non-complying fuel assembly into a location which restores compliance.
- C. Enter LCO 3.7.16, Spent Fuel Assembly Storage, and immediately suspend movement of irradiated fuel assemblies in the spent fuel pool.
- D. Enter LCO 3.7.16, Spent Fuel Assembly Storage, and immediately initiate action to verify spent fuel pool boron concentration.

Answer: B

Answer Explanation

New Question (2014 NRC exam question 05)

Tier 2

High Cog

REFERENCE PROVIDED

FIGURE 3.7.16-1 of LCO 3.7.16.

FIGURE ONLY

034A2.03

Fuel Handling Equipment System (FHES)

Ability to (a) predict the impacts of the following malfunctions or operations on the Fuel Handling System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Mispositioned fuel element

RO 3.3 SRO 4.0

Meets K/A, examinee must be able to predict that an LCO has been entered and know what actions are required to be taken for a mispositioned fuel element.

This is RO level since an immediate action is required to be taken and LCO entry conditions are required to be known.

10CFR55.43(b)(2) Facility operating limitations in the technical specifications and their bases.

Answer: B. Utilizing Figure 3.7.16-1 it shows that the assembly has an unacceptable burnup domain and is not allowed to be stored in region 2. Therefore LCO 3.7.16 is required to be entered. The immediate action that is required to be taken is that action has to be taken to move the fuel assembly to a location that restores compliance.

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A is incorrect. This distracter is plausible if you look at the graph and determines that you are in the acceptable region.

B is correct. See explanation.

C is incorrect. This distracter is plausible since in other fuel move LCO's this is an immediate action that needs to be taken.

D is correct. This distracter is plausible since in other fuel move LCO's this is an immediate action that needs to be taken.

Objective: S.FC1-07-B

Technical References: LCO 3.7.16.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

6

ID: 1028376

Points: 1.00

Given:

- Unit 1 is in MODE 5 preparing for a plant heatup.
- RCS pressure is 325 psig.
- The 1D RCP has just been started (ONLY RCP running).
- The following RCS cold leg temperatures are noted:
 - Loop 1A = 74°F.
 - Loop 1B = 75°F.
 - Loop 1C = 73°F.
 - Loop 1D = 65°F.

Under these conditions, the Unit NSO will...

- A. trip the 1D RCP AND depressurize the RCS to < 200 psig within 30 minutes.
- B. trip the 1D RCP AND start another RCP.
- C. maintain 1D RCP running AND raise RCS pressure to > 350 psig.
- D. maintain 1D RCP running AND depressurize the RCS to < 200 psig within 30 minutes.

Answer: A

Answer Explanation

Bank Question (2014 NRC exam question 06)

Tier 2

High Cog

035G2.1.23

Steam Generator System

2.1.23 Ability to perform specific system and integrated plant procedures during all modes of plant operation.

RO 4.3 SRO 4.4

Meets K/A, examinee must be able to use integrated plant procedures during a plant heatup to ensure precautions are met associated with the SG.

10CFR55.41(b)(10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

Answer: A. Trip the 1D RCP and depressurize the RCS to < 200 psig within 30 minutes is CORRECT per the precaution in the procedures and TLCO 3.7.a. When either the Reactor or Secondary coolant temperature in the steam generator is below 70°F, the Reactor and Secondary coolant pressure shall be <200 psig in 30 minutes. In order to lower RCS pressure to <200 psig, the 1D RCP must be secured first. Per BwOP RC-1 the RCP is required to be tripped immediately if the #1 Seal Lekoff flow differential pressure lowers to less than 200 psid. The other answers state otherwise.

A is correct. See explanation.

B is incorrect. This is plausible if it is assumed that the RCP in the affected loop needs to be secured.

C is incorrect. This is plausible if it is assumed that pressure only needs to be raised.

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D is incorrect. This is plausible if it they only address the TLCO 3.7.a and forget that when pressure goes <200 psig (differential pressure lowers to less than 200 psid) that the RCP needs to be secured.

Objective: S.SG1-10-B.

Technical References: 1BwGP 100-1 Precaution D.2.d, TRM 3.7.a, BwOP RC-1 Limitation E.3.b

LORT Bank

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

7

ID: 1029835

Points: 1.00

Given:

- Unit 1 is at 28% power.
- Steam Dump Mode Select switch is in the TAVE position.
- The main turbine has JUST tripped.

With NO operator action, the steam dumps will subsequently maintain RCS temperature at...

- A. 550 °F.
- B. 557 °F.
- C. 560 °F.
- D. 561 °F.

Answer: C

Answer Explanation

Bank Question (2014 NRC exam question 07)

RO level

Tier 2

High Cog

045K3.01

045 Main Turbine Generator (MT/G) System

K3.01 Knowledge of the effect that a loss or malfunction of the MT/G system will have on the following:

Remainder of the plant.

RO 2.9 SRO 3.2

Meets K/A, examinee must have knowledge of the effect of a turbine trip will have on the RCS.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: C. 560 °F. is CORRECT, when the turbine trips, the steam dumps are armed on C-7(Loss of Load) and the with 1B Rx Trip breaker closed (less than 30% power reactor does not trip), the load reject controller will maintain Tave at 560 °F (557 °F plus a 3°F dead band). Since power is less than 30% (P-8) no reactor trip occurs.

A is incorrect. This is plausible if it is assumed that temperature will lower until P-12 (Low-Low Tave) is actuated at 550 °F.

B is incorrect. This is plausible if it is assumed the reactor trips, the 1B Rx Trip breaker would open and the steam dumps would maintain Tave at 557 °F.

C is correct. See explanation.

D is incorrect. This is plausible if it is assumed that the steam dumps don't operate and the SG PORV's are maintaining temperature at 561 °F.

Objective: S.MS1-19

Technical References: Big note MS-4, Steam Dumps LP I1-DU-XL-01 page 23.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

8

ID: 1030418

Points: 1.00

Given:

Radwaste reports the following in the waste gas system (GW):

- Online gas decay tank oxygen concentration is 5%.
- Online gas decay tank hydrogen concentration is 5%.

In response to this event, the crew will direct the radwaste operator to...

- A. monitor indications and report if concentration levels continue to rise, no action is yet required.
- B. IMMEDIATELY secure the Waste Gas Analyzer AND align nitrogen to the waste gas compressor.
- C. IMMEDIATELY suspend all additions of waste gases to the GW system AND secure the Waste Gas Analyzer.
- D. IMMEDIATELY suspend all additions of waste gases to the GW system AND reduce the concentration of OXYGEN to $\leq 4\%$.

Answer: D

Answer Explanation

New Question (2014 NRC exam question 08)

RO level

Tier 2

Low Cog

071K5.04

071 Waste Gas Disposal System (WGDS)

K5.04 Knowledge of the operational implication of the following concepts as they apply to the Waste Gas Disposal System: Relationship of hydrogen/oxygen concentrations to flammability.

RO 2.5 SRO 3.1

Meets K/A, examinee must know the hydrogen/oxygen concentrations of flammability and the operational implications if the limits are exceeded.

10CFR55.43(b)(1) Conditions and limitations in the facility license.

Answer: D. With the concentration of oxygen in the waste gas holdup system $>4\%$ by volume and the hydrogen concentration $>4\%$ by volume, IMMEDIATELY suspend all additions of waste gases to the system and reduce the concentration of oxygen to $\leq 4\%$ by volume.

A is incorrect. This is a valid distracter if examinee thinks no limits were exceeded.

B is incorrect. This is a valid distracter if the examinee thinks there is a concern for explosion and equipment that is in contact with the explosive mixture needs to be secured.

C is incorrect. This is a valid distracter if the examinee thinks there is a concern for explosion and equipment that is in contact with the explosive mixture needs to be secured, the first part is correct in that all additions of waste gases need to be secured.

D is correct. See explanation.

EXAMINATION ANSWER KEY

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Objective: S.GW1-10-A

Technical References: TRM Appendix L page 6, 0BwOA PRI-9.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

9

ID: 1033133

Points: 1.00

Given:

- Unit 1 is in MODE 6.
- Containment atmosphere purge is in progress with 1VQ04C, Cnmt Mini Flow Purge Supply, and 1VQ05C, Cnmt Mini Flow Purge Exhaust Fans, running.
- The 1AR012J, Containment Fuel Handling Incident Monitor, alarms RED on the RM-11.

In response to this event, what AUTOMATIC actions will occur?

- A. ONLY 'A' Train mini flow purge valves close AND ONLY 1VQ04C trips.
- B. ONLY 'B' Train mini flow purge valves close AND ONLY 1VQ05C trips.
- C. ONLY 'B' Train mini flow purge valves close AND BOTH 1VQ04C and 1VQ05C trip.
- D. BOTH 'A' and 'B' Train mini flow purge valves close AND BOTH 1VQ04C and 1VQ05C trip.

Answer: C

Answer Explanation

New Question (2014 NRC exam question 09)

RO level

Tier 2

Low Cog

072A1.01

072 Area Radiation Monitoring (ARM) System

A1.01 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ARM system controls including: Radiation levels

RO 3.4 SRO 3.6

Meets K/A, examinee must be able to predict changes in equipment lineup associated with high radiation levels of the ARM System.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: C. When the HIGH alarm comes in. The 1AR012 on the RM-11 will turn RED for that monitor. When the 1AR012J exceeds the HIGH alarm, only the B Train mini flow purge valves go closed (1VQ003, 1VQ004B, and 1VQ005B will go closed, 1VQ001B and 1VQ002B will also get a closed signal, but the valves are abandoned in place). 1VQ04C, Cnmt Mini Flow Purge Supply, and 1VQ05C, Cnmt Mini Flow Purge Exhaust Fans, will trip when the B train mini flow purge valves go closed. 1VQ004B going closed trips the 1VQ04C, Cnmt Mini Flow Purge Supply Fan, and when 1VQ005B goes closed the 1VQ05C, Cnmt Mini Flow Purge Exhaust Fans, will trip.

A is incorrect. This is plausible if the examinee thinks the 1AR012J closes the A Train mini flow purge valves. The A Train mini flow purge valves go closed when the 1AR011J alarms (turns red).

B is incorrect. This is correct for the B Train mini flow purge valves going closed, but the second portion stating only the 1VQ05C, Cnmt Mini Flow Purge Exhaust Fans, trips is incorrect.

C is correct. See explanation.

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D is incorrect. This is plausible if the examinee thinks the 1AR012J closes both the A and B Train mini flow purge valves.

Objective: S.AR1-04-A-1

Technical References: BwAR 4-1AR012J and BwAR 4-1AR011J and Big Note VP-2.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

10

ID: 1034811

Points: 1.00

Given:

- Unit 1 is at 100% power.
- 1A D/G is fully loaded per 1BwOSR 3.8.1.2-1, 1A D/G Operability Surveillance.
- Breaker 1413 is closed (C/S in after-close).
- Breaker 1412 is closed (C/S in after-close).
- The 1A SX pump is running.

Subsequently:

- A SAT 142-1 sudden pressure condition occurs.

Given the conditions above, with NO operator action, the...

- A. 1A SX pump tripped then restarted AND the 1B SX pump auto started.
- B. 1A SX pump tripped then restarted AND the 1B SX pump did NOT start.
- C. 1A SX pump continued to run AND the 1B SX pump auto started.
- D. 1A SX pump tripped and did NOT restart AND the 1B SX pump auto started.

Answer: C

Answer Explanation

New Question (2014 NRC exam question 10)

RO level

Tier 2

High Cog

075K2.03

075 Circulating Water System

K2.03 Knowledge of bus power supplies to the following: Emergency/essential SWS pumps

RO 2.6 SRO 2.7

Meets K/A, examinee must be able to determine whether the SX is running based on the loss of power supplies.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: C. Since the diesel generator is powering Bus 141, the 1A D/G will keep powering the bus and the 1A SX pump will keep running even though SAT 142-2 is tripped. Since SAT 142-1 is lost SAT 142-2 will be lost also, this will cause a loss of bus 142. The 1B D/G will then start and energize bus 142 and the 1B SX pump will start on the sequencer.

A is incorrect. This is a plausible distracter if the examinee does not realize that the 1A D/G kept bus 141 energized, the second portion is correct since the 1B SX pump will have auto started when the 1B D/G starts on the sequencer (see Big note DG-2).

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B is incorrect. This is a plausible distracter if the examinee does not realize the 1A D/G would keep the bus energized and the 1A SX pump running, the second part is plausible since the examinee might think bus 142 is locked out since a SAT 142-1 sudden pressure has occurred. This is not correct though, there is no fault on bus 142 and the 1B D/G will start and energize the bus.

C is correct. See explanation.

D is incorrect. This is plausible if the examinee does thinks that with the 1A D/G powering the bus, that the 1A D/G will get secured once the loss of the SAT 142-1 occurs and not restart to power the 1A SX pump. The second portion is correct since the 1B SX pump will have auto started when the 1B D/G starts.

Objective: S.SX1-15

Technical References: 20E-1-4001A, Big Note AC-7 and DG-2.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

11

ID: 1036495

Points: 1.00

Given:

- Unit 1 is at 100% power.
- An inadvertent phase A isolation signal occurs.

Given the conditions above, which of the following describes the effect, if any, on RCP seal leakoff operation?

- A. ONLY #1 seal leakoff flow rises.
- B. ONLY #2 seal leakoff flow rises.
- C. BOTH #1 and #2 seal leakoff flow rise.
- D. No change in seal leakoff flows will occur.

Answer: B

Answer Explanation

Bank Question (2014 NRC exam question 11)

Tier 2

High Cog

003 Reactor Coolant Pump System (RCPS)

K1.08 Knowledge of the physical connections and/or cause-effect relationships between the RCPS and the following systems: Containment isolation

RO 2.7 SRO 3.0

Meets K/A, examinee must know which valves close on a phase A, and how they affect the seal leakoff flowpath.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: B. When a phase A isolation signal occurs the RCP seal return lines get isolated (1CV8112 and 1CV8100) get isolated. Isolating the No. 1 seal return line causes pressure in the line to rise to the relief valve setpoint (150 psig) and the increased pressure will cause No.2 seal leakoff to rise.

A is incorrect. This is plausible if the examinee does not realize that the No. 1 seal return line goes back to the VCT. The #1 seal leakoff flow gets isolated and pressure rises until the relief valve setpoint (150 psig), this means that flow will not rise, it will actually lower.

B is correct. See explanation.

C is incorrect. See explanation.

D is incorrect. This is plausible if the examinee does not realize that the RCP seal return line gets isolated on a phase A.

Objective: S.RC2-08-C

Technical References: I1-RC-XL-02 page 21 and big note CV-1.

Bank (Daiblo Canyon 2009)

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

12

ID: 1038832

Points: 1.00

Given:

- Unit 1 is at 60% power.
- VCT level is 50%.

Subsequently:

- VCT level transmitter, 1LT-112, fails to 98%.

With NO operator action over the next 30 minutes, ACTUAL VCT level will ...

- A. remain near 50% during this time period.
- B. lower to 0%. Automatic CV pump suction swapover to the RWST will NOT occur.
- C. lower to 5%. Automatic CV pump suction swapover to the RWST will occur.
- D. lower to 37%. Automatic VCT makeup will maintain VCT level between 37-55%.

Answer: B

Answer Explanation

Bank Question (2014 NRC exam question 12)

RO level

Tier 2

High Cog

004 Chemical and Volume Control System

K6 Knowledge of the effect of a loss or malfunction on the following CVCS components: Purpose of VCT divert valve.

RO 2.8 SRO 3.1

Meets K/A, examinee must understand how a failure of the VCT divert valve will impact the CV system.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: B. lower to 0%, automatic CV pump suction swap over to the RWST will NOT occur is correct with 1LT- 112 failing to 98% the 1CV112A will divert to the RHUT causing the VCT level to start to lower. Since the 1LT-112 controls RMCS, auto makeup will not occur at 37%, and the VCT level will continue to drop. When VCT reaches 5%, the auto swap over will not occur as it is a 2/2 coincidence of LT-112 and LT-185 being < 5% cannot be met and the VCT level will drop to 0%. The VCT total volume is 3000 gal, since level is 50% the total gallons of water is approximately 1500 gallons, with approximately 120 gpm going to the RCS from the VCT and letdown going to the RHUT (120gpmX30min=3600 gallons) water level will get to 0%.

A is incorrect. This is a plausible distracter if the examinee does not realize that the VCT divert valve, 1CV112A, will divert water to the RHUT.

B is correct. See explanation.

C is incorrect. This would occur if the RWST swapover was 1/2 vs. 2/2 coincidence.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

D is incorrect. Is plausible if examinee does not realize that 1LT-112 controls auto makeup. This is what would occur if 1LT-185 failed to 98%.

Objective: S.CV2-11

Technical References: I1-CV-XL-01 page 20 and CV-3 Big note.

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EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

13

ID: 1040322

Points: 1.00

Given:

- Unit 2 is in MODE 5.
- The 2A RH pump is in standby and aligned for shutdown cooling.
- The 2B RH train is in shutdown cooling.

Subsequently:

- Breaker 2422, SAT 242-2 Feed to 4KV Bus 242, tripped due to a phase A overcurrent condition.

Given the conditions above, to restore shutdown cooling, one minute later the...

- A. 2A RH pump can be manually started.
- B. 2B RH pump can be manually started.
- C. 2A RH pump did automatically start and the 2B RH pump did NOT automatically start.
- D. 2A AND 2B RH pumps have automatically started.

Answer: A

Answer Explanation

New Question (2014 NRC exam question 13)

RO level

Tier 2

High Cog

005K2.01

005 Residual Heat Removal System (RHRS)

K2.01 Knowledge of bus power supplies to the following: RHR pumps.

RO 3.0 SRO 3.2

Meets K/A, examinee must understand how the loss of a power supply affects the RH pumps.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: A. Since Bus 242 is locked out due to an phase A overcurrent, only bus 241 is available to start the 2A RH pump. Since there is no SI in progress so the RH pumps do not receive an automatic start signal.

A is correct. See explanation.

B is incorrect. Plausible if examinee realizes that the RH pumps will not automatically start and does not realize that bus 242 is locked out.

C is incorrect. Plausible if examinee realizes bus 242 is locked out and thinks that on a loss of power the RH pumps will sequence on, in this case only the 2A RH pump. The RH pumps get an automatic start signal when a SI signal is present.

D is incorrect. Plausible if the examinee does not realize bus 242 is locked out and thinks that on a loss of power the RH pumps will sequence on.

Objective: S.RH1-11

Technical References: 20E-2-4001A and Big note DG-2.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

14

ID: 1041557

Points: 1.00

Given:

- Unit 1 RCS Cooldown is in progress.
- PZR level is 52% and stable.
- 1CV121, CV Pump Discharge Flow Control Valve, is in MANUAL.
- 1A RH train is aligned for shutdown cooling and RH letdown with the following parameters:
 - 1A RH train flow is 3300 gpm and STABLE.
 - 1RH606, RH Hx Outlet Flow Control Valve, is 10% OPEN.
 - 1RH618, RH Hx Bypass Flow Control Valve, is 65% OPEN in AUTOMATIC.

Subsequently:

- A tube in the 1A RH Hx fails resulting in a 150 gpm leak.

Given the conditions above, with NO operator action, INITIALLY 1A RH pump Amps will be ...

- A. higher AND PZR level will lower.
- B. higher AND PZR level will rise.
- C. the same AND RCS pressure will lower.
- D. the same AND 1A RH train flow will remain the same.

Answer: A

Answer Explanation

New Question (2014 NRC exam question 14)

RO level

Tier 2

High Cog

005K6.03

005 Residual Heat Removal System (RHRS)

K6.03 Knowledge of the effect of a loss or malfunction on the following will have on the RHRS: RHR heat exchanger

RO 2.5 SRO 2.6

Meets K/A, examinee must be able to determine how a malfunction in the RH heat exchanger will impact the RH system.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: A. 1A RH pump Amps will rise since more flow is going through the RH pump. Since 1CV121, CV Pump Discharge Flow Control Valve, is in manual PZR level will start lowering since flow is going out the RH Hx.

A is correct. See explanation.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

B is incorrect. PZR level rising is plausible if the examinee thinks that CC pressure can overcome RH pressure. This is not correct since the RH pumps will raise pressure 165 psig at 3000 gpm from suction to discharge, which will ensure that RH pressure is always higher than CC pressure (135 psig).

C is incorrect. 1A RH pump Amps remaining the same is plausible distracter since the RH train flow is kept constant with the bypass valve around the heat exchanger, 1RH618. Since the leak is in the 1A RH Hx 150 gallons will be going out the Hx and 1RH618 is going to open more to maintain 3300 gpm.

Therefore total flow from the 1A RH pump will actually rise to 300 gpm.

D is incorrect. Plausible is the examinee thinks 1RH618 maintains flow at constant at 3300 gpm.

Objective: S.RH1-09-A

Technical References: I1-RH-XL-01 and Big note RH-1.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

15

ID: 1042507

Points: 1.00

Given:

- A Unit 1 plant heatup is in progress in accordance with 1BwGP 100-1, Plant Heatup.
- RCS Tcold is 120°F.
- RCS pressure is 350 psig.
- RCS heatup rate is 25°F per hour.
- PZR is solid.
- ALL RCS Loops are operable, but only 1D RCP is running.
- The RH system is aligned for shutdown cooling.
- 1B CV Pump is Operable and providing normal charging flow.

Which ONE of the following describes the operational requirements associated with these conditions?

- A. BOTH SI Pumps must NOT be capable of injecting into the RCS due to RCS low temperature overpressure concerns.
- B. BOTH CV Pumps must NOT be capable of injecting into the RCS due to RCS low temperature overpressure concerns.
- C. BOTH SI Pumps must be operable and capable of injecting into the RCS for emergency core cooling.
- D. ONLY ONE SI Pump must be operable and capable of injecting into the RCS for emergency core cooling.

Answer: A

Answer Explanation

Bank Question (2014 NRC exam question 15)

RO level

Tier 2

Low Cog

006K5.05

006 Emergency Core Cooling System (ECCS)

K5.05 Knowledge of the operational implications of the following concepts as they apply to ECCS: Effects of pressure on a solid system

RO 3.4 SRO 3.8

Meets K/A, examinee must be able to identify the operational implications if the ECCS system actuates and the system goes solid.

10CFR55.43(b)(1) Conditions and limitations in the facility license.

Answer: A Explanation: Concern in Mode 5 is that start of an SI Pump will overpressurize RCS at low temperatures. LCO 3.4.12, Low Temperature Overpressure Protection (LTOP) System. Both SI Pumps capable of injecting into the RCS.

A. correct. See explanation.

B. Incorrect. Only one CV pump is required to be incapable of injection per 3.4.12.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

- C. Incorrect. This would be true if the unit was in Mode 3, but unit is in Mode 5.
D. Incorrect. This is plausible since TRM 3.5.a allows requires one SI pump and flow path available if PZR level is $\leq 5\%$.

Objective: S.EC1-15-A.

Technical References: LCO 3.4.12.

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EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

16

ID: 1043570

Points: 1.00

Given:

- Unit 1 is at 100% power, normal alignment.
- A slow and steady rise in PRT level has been noted over several hours.
- Alarm 1-12-A7, PRT LEVEL HIGH/LOW has just come in.

With the above conditions, the PRT level will be lowered by ...

- A. verifying 1RE1003, RCDT Pumps Discharge Cnmt Isol Valve, auto opens on high PRT level then the 1A RCDT pump auto starts.
- B. verifying 1RE1003, RCDT Pumps Discharge Cnmt Isol Valve, auto opens on high PRT level then the 1B RCDT pump auto starts.
- C. manually opening 1RY8031, PRT Drain Isol Valve, and 1RE1003, RCDT Pumps Discharge Cnmt Isol Valve, then verify auto start of the 1A RCDT pump.
- D. manually opening 1RY8031, PRT Drain Isol Valve, and 1RE1003, RCDT Pumps Discharge Cnmt Isol Valve, then verify auto start of the 1B RCDT pump.

Answer: D

Answer Explanation

New Question (2014 NRC exam question 16)

RO level

Tier 2

Low Cog

007A1.01

007 Pressurizer Relief Tank/Quench Tank System (PRTS)

A1.01 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PRTS controls including: Maintaining quench tank water level within limits RO 2.9 SRO 3.1

Meets K/A, examinee must be able to monitor changes in parameters associated with the PRT water level.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: D. When 1RY8031, PRT Drain Valve, is manually opened the 1B RCDT pump will auto start.

A is incorrect. Plausible since at 60% Level in the RCDT 1A pump will auto start.

B is incorrect. Plausible since at 80% Level in the RCDT 1B pump will auto start.

C is incorrect. Plausible if the examinee thinks the RCDT 1A pump will start when 1RY8031 is opened.

D is correct. See explanation.

Objective: S.RY1-17

Technical References: I1-RY-XL-01 page 35 and RY-4, PRT & RCDT.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

17

ID: 1044330

Points: 1.00

Given:

- Unit 1 is in MODE 6.
- The crew is filling the PRT per BwOP RY-3, Filling and Venting the Pressurizer Relief Tank.
- 1RY8030, PW to PRT CNMT ISOL Valve, is open.
- PRT level is 40% and rising.

Subsequently:

- Instrument air (IA) is isolated to containment.

In response to the conditions above, PRT level will ...

- A. continue to RISE until the PRT ruptures.
- B. REMAIN at 40% until IA is restored to containment and then continue to rise.
- C. continue to RISE until the NSO places 1RY8030 control switch to close.
- D. continue to RISE until PRT level reaches 88%, then a RCDT Pump will cycle to maintain PRT level between 59%-88%.

Answer: B

Answer Explanation

New Question (2014 NRC exam question 17)

RO level

Tier 2

High Cog

007A4.01

007 Pressurizer Relief Tank/Quench Tank System (PRTS)

A4.01 Ability to manually operate and/or monitor in the control room: PRT spray supply valve

RO 2.7 SRO 2.7

Meets K/A, examinee must be able to monitor plant status from the control room on a loss of instrument air for the PRT spray supply valves.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: B. On a loss of instrument air to containment 1RY8030, PW to PRT CNMT ISOL Valve, will fail closed. This will stop PW water going to the PRT and level will be maintained at 40%. The 1RY8030 switch will still be in the open position and when IA is restored to containment the valve will re-open and then PRT level will continue to rise.

A is incorrect. Plausible if the examinee thinks 1RY8030 fails open on a loss of instrument air in containment. This is a plausible distractor since 1CV8146 and 1CV8147 fail open on a loss of IA in containment.

B is correct. See explanation.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

C is incorrect. This is plausible if the examinee thinks 1RY8030 is a motor operated valve, or outside containment, and thinks 1RY8030 can be closed.

D is incorrect. Is plausible if the examinee thinks 1RY8030 fails open and thinks that the PRT level is maintained with the RCDT pump. This is plausible since the RCDT is automatically maintained by the RCDT pumps cycling on at 60% (1A RCDT pump) and 80% (1B RCDT pump).

Objective: S.RY1-25-C

Technical References: M-60 Sheet 6, Big Note RY-4 PRT and RCDT, and 20E-1-4030RY17

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

18

ID: 1044332

Points: 1.00

Given:

- Unit 1 is at 100% power.
- All systems normally aligned.
- 1CV121, CV Pump Flow Control Valve, is taken to manual and charging flow is adjusted to 100 gpm.

With NO additional operator action, over the next 15 minutes, the Letdown HX outlet temperature will...

- A. LOWER and then RISE to the original value.
- B. RISE and then LOWER to the original value.
- C. remain constant.
- D. LOWER and then remain STABLE at the new lower temperature.

Answer: B

Answer Explanation

New Question (2014 NRC exam question 18)

RO level

Tier 2

High Cog

008A3.04

008 Component Cooling Water System (CCWS)

A3.04 Ability to monitor automatic operation of the CCWS, including: Requirements on and for the CCWS for different conditions of the power plant.

RO 2.9 SRO 3.2

Meets K/A, examinee must be able to determine the requirements for CCWS for different conditions and determine the automatic actions that will occur.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: B. When 1CV121 is taken to manual and charging is reduced from about 130 gpm to 100 gpm there is less water flowing through the regenerative heat exchanger, this means that the temperature of the water going from the regenerative heat exchanger to the letdown heat exchanger rises. This will cause the water leaving the letdown heat exchanger to rise initially until 1CC130 can throttle open and lower the temperature of the water leaving the letdown heat exchanger to its original value.

A is incorrect. Plausible if the examinee does not realize that charging flow has been reduced from normal and thinks that flow has actually risen, then 1CC130 would throttle to return the temperature to the original value. This would cause the RH letdown temperature to lower then rise to the original value.

B is correct. See explanation.

C is incorrect. Plausible if the examinee does not understand that charging is cooling the regenerative heat exchanger.

D is incorrect. Plausible if the examinee does not realize that charging flow has been reduced from normal and thinks that flow has actually risen.

Objective: S.CC1-10

Technical References: I1-CC-XL-01 page 19 and 20, Big Note CV-1.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

19

ID: 1044389

Points: 1.00

Given:

- Unit 1 is at 50% power.
- Master PZR Pressure Controller, 1PK455A, potentiometer fails to its MAXIMUM setting of 10.

With NO operator action, this will result in PZR pressure rising until...

- A. PZR Spray Valves open.
- B. PZR Safety Valves open.
- C. 1RY455A, PZR PORV, opens.
- D. 1RY456, PZR PORV, opens.

Answer: D

Answer Explanation

New Question (2014 NRC exam question 19)

RO level

Tier 2

High Cog

010K4.03

010 Pressurizer Pressure Control System (PZR PCS)

K4.03 Knowledge of PZR PCS design feature(s) and/or interlock(s) which provide for the following: Over pressure control
RO 3.8 SRO 4.1

Meets K/A, examinee must have knowledge of the interlocks which provide protection for over pressure control.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: D. 1PK455A Controller Scale = 1700 - 2500 psig = 800 psig control band

To figure out the pressure for a POT setting of 10.0: $1.0 \times (800 \text{ psig}) = 800 \text{ psig}$

$1700 \text{ psig} + 800 \text{ psig} = 2500 \text{ psig}$

Therefore, heaters energize to try and raise pressure to 2500 psig, which will cause 1RY456 to open.

1RY456 will open first at 2335 psig.

A is incorrect. Plausible if the examinee thinks that taking the pot setting ten will cause pressure demand to lower and cause spray valves to open.

B is incorrect. Plausible if the examinee thinks that 1PK-455A controller failing to 10.0 that the PZR PORV's will not operate and the PZR safety valves will be the first to open.

C is incorrect. Plausible if the examinee thinks the 1RY455A will opens first, 1RY456 actually opens first at 2335 psig and 1RY455A opens at 2345 psig.

D is correct. See explanation.

Objective: S.RY1-20

Technical References: I1-RY-XL-01 page 26 and Big note RY-2.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

20

ID: 1044390

Points: 1.00

Given:

- Unit 1 is at 100% power.

Subsequently:

- 1PT-506, Turbine Impulse Pressure, has failed to 0 psig instantly.
- A reactor trip occurs.
- Reactor Trip Breaker A (RTA) is closed.
- Reactor Trip Breaker B (RTB) is open.
- 1D Loop Tave Channel remains at 585°F.

If NO operator action is taken, the steam dumps will ...

- A. maintain Tave at 550°F.
- B. maintain Tave at 557°F.
- C. maintain Tave at 560°F.
- D. remain CLOSED due to no arming signal being present.

Answer: A

Answer Explanation

New Question (2014 NRC exam question 20)

RO level

Tier 2

High Cog

012 Reactor Protection System

K3.03 Knowledge of the effect that a loss or malfunction of the RPS will have on the following: SDS

RO 3.1 SRO 3.3

Meets K/A, examinee must have knowledge of the impact of a malfunction of the RPS will have on the steam dump system.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: A. The steam dumps will remain open until actual Tave reaches 550°F is correct. The arming signal is provided by 1PT-506 failing to 0 psig. The plant trip controller is used since the RTB is open. With the 1D Loop Tave Channel remaining at 585°F the steam dumps will remain open until P-12 is energized by the other loops causing steam dumps to close and cycle at 550°F.

A is correct. See explanation.

B is incorrect. This is a valid distracter since the plant trip controller is maintaining temperature, the plant trip controller will maintain temperature at 557°F, but since the loop 1D Tave is failed at 585°F this is not true.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

C is incorrect. This is a valid distracter if the examinee assumes that with the RTA breaker remaining closed the steam dumps would be on the load reject controller which would maintain temperature at 560°F. It is the RTB breaker that switches the steam dumps to the plant trip controller.

D is incorrect. Plausible since the Reactor Trip Breaker A (RTA) remained closed after the reactor trip. The Reactor Trip Breaker A provides an arming signal to the plant trip controller.

Objective: S.MS1-19.

Technical References: Big note MS-4, Steam Dump LP I1-DU-XL-01 page 9, 15, 21.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

21

ID: 1044394

Points: 1.00

Given:

- Unit 1 is in MODE 1.
- P-7 permissive light is LIT.

Which of the following conditions on Unit 1 will cause a Unit 1 automatic reactor trip?

- A. PZR High Level.
- B. RCP BUS Underfrequency.
- C. RC Loop Low Flow on two loops.
- D. PZR High Pressure.

Answer: D

Answer Explanation

New Question (2014 NRC exam question 21)

RO level

Tier 2

Low Cog

012 Reactor Protection System

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

RO 4.1 SRO 4.3

Meets K/A, examinee must be able to interpret the annunciators and prioritize the correct action to take based on those annunciators.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: D. Correct since P-7 blocks the other three alarms, PZR high pressure is not blockable. Since Braidwood Station uses a dark board concept, above 30% power not alarm lights are lit, when the P-7 light is lit, that means that power is below 10%.

A is incorrect. Plausible if the examinee does not know that this is blocked by P-7. Also plausible if the examinee does not understand that if the light is lit P-7 is blocked.

B is incorrect. Plausible if the examinee does not know that this is blocked by P-7.

C is incorrect. Plausible if the examinee does not know that this is blocked by P-7.

D is correct. See explanation.

Objective: S.RP2-04

Technical References: Big note EF-1 and BwAR 1-BP-3.5

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

22

ID: 1044406

Points: 1.00

Given:

- Unit 1 is at 100% power, all systems are normally aligned.
- DC Bus 112 DEENERGIZES.
- Unit 1 reactor is manually TRIPPED.
- While performing step 4 of 1BwEP-0, Reactor Trip or Safety Injection, the crew diagnoses a Main Steam line break outside of Unit 1 Containment.
- The crew manually actuates Main Steam Line Isolation at 1PM05J.

Based on the above conditions AND assuming ALL equipment functions as designed, which ONE of the following correctly describes the status of the MSIVs?

- A. The 1A and 1D MSIVs CLOSED as a result of the ACTIVE accumulator train ONLY.
The 1B and 1C MSIVs CLOSED as a result of the STANDBY accumulator train ONLY.
- B. The 1A and 1D MSIVs CLOSED as a result of activation of BOTH accumulator trains.
The 1B and 1C MSIVs remained OPEN.
- C. The 1A and 1D MSIVs remained OPEN.
The 1B and 1C MSIVs CLOSED as a result of activation of BOTH accumulator trains.
- D. The 1A and 1D MSIVs CLOSED as a result of the STANDBY accumulator train ONLY.
The 1B and 1C MSIVs CLOSED as a result of the ACTIVE accumulator train ONLY.

Answer: A

Answer Explanation

Bank Question (2014 NRC exam question 22)

RO level

Tier 2

High Cog

013K4.16

013 Engineered Safety Features Actuation System (ESFAS)

K4.16 Knowledge of ESFAS design feature(s) and/or interlock(s) which provide for the following:

Avoidance of PTS

RO 3.8 SRO 4.2

Meets K/A, examinee must understand the design features which provide for avoidance of PTS, how the main steam lines isolate.

10CFR55.41(b)(8) Components, capacity, and functions of emergency systems.

Answer: A. With loss of DC 112, all MSIVs lose 1 accumulator (each MSIV has 2 accumulators), therefore they will still all close. DC 112 supplies B & C MSIV active train air solenoids and A & D MSIV standby train air solenoids. DC 111 supplies A & D MSIV active train air solenoids and B & C MSIV standby train air solenoids. Therefore on a Loss of Bus DC 112 the B & C MSIV close on the active trains and the 1B & 1C MSIV close on the standby train.

A is correct. See explanation.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

B is incorrect. Plausible if the examinee does not understand that there are two accumulators powered from separate DC busses.

C is incorrect. See explanation.

D is incorrect. See explanation.

Objective: S.MS1-07-C

Technical References: I1-MS-XL-01, MS lesson plan page 35

LOD: NUMBER

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

23

ID: 1044407

Points: 1.00

Given:

- Unit 1 reactor trip has occurred.
- A secondary steam leak is occurring in containment, SI has NOT actuated.
- ALL containment cooling has been lost.
- Containment temperature has risen from 96°F to 160°F over the last 15 minutes.

If this trend continues, which ONE of the following describes the potential effect on containment instrumentation readings?

Indicated PZR level will be _____ 1 _____ actual level due to density _____ 2 _____.

- | | _____ 1 _____ | _____ 2 _____ |
|----|---------------|--|
| A. | higher than | lowering in the reference leg |
| B. | higher than | lowering in the variable leg |
| C. | the same as | remaining constant in the variable leg |
| D. | lower than | rising in the reference leg |

Answer: A

Answer Explanation

Bank Question (2014 NRC exam question 23)

RO level

Tier 2

High Cog

022K3.02

022 Containment Cooling System (CCS)

K3.02 Knowledge of the effect that a loss or malfunction of the CCS will have on the following:

Containment instrumentation readings

RO 3.0 SRO 3.3

Meets K/A, examinee must have knowledge of how a malfunction of the CCS will have no containment instrumentation reading.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: A. Reference leg density will lower due to exposure to the containment temperature rise, resulting in higher DP, since the variable leg density is unaffected.

A is correct. See explanation.

B is incorrect. The reference leg density will lower, not the variable leg due to containment temperature rising.

C is incorrect. The same as would be plausible if the examinee assumed that the reference leg was not exposed to ambient conditions, level indication would remain the same as actual level.

D is incorrect. Density will not rise due to the higher temperature.

Objective: S.RY1-18

Technical References: I1-RY-XL-01 page 20 and 21 and Big note RY-3.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

24

ID: 1044408

Points: 1.00

Given:

- Unit 2 reactor trip and SI have occurred.
- SI signal has been reset.
- 2SI8811A, Cnmt Sump 2A Isol Valve, is energized.
- 2SI8811B, Cnmt Sump 2B Isol Valve, is closed and de-energized (CANNOT be energized).

Subsequently:

- RWST Level LO-2 alarm comes in.

Given the above conditions, 2SI8811A 1 automatically opened and after RWST level reaches the LO-3 setpoint with CS aligned for recirculation, 2 CS pump(s) will be running.

- | | <u>1</u> | <u>2</u> |
|----|----------|-------------|
| A. | has NOT | ONLY the 2A |
| B. | has NOT | BOTH |
| C. | has | ONLY the 2A |
| D. | has | BOTH |

Answer: C

Answer Explanation

New Question (2014 NRC exam question 24)

RO level

Tier 2

High Cog

026A2.03

026 Containment Spray System (CSS)

A2.02 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 automatic recirculation transfer.

RO 4.1 SRO 4.4

Meets K/A, examinee must understand that if automatic recirculation transfer has not occurred and the required actions out of the procedure to take to restore recirculation. (Because there is a failure of the B train to auto re-align).

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

Answer: C. 2SI8811A will auto open with a LO-2 RWST level and a SI signal present. Both of these are currently present. Even though the SI signal has been reset, the 2SI8811A is designed so that it requires the SI signal to be reset using the SI Recirc Sump isolation valve reset pushbuttons on the 2PM06J to be depressed, which they have not. For the 2CS009B valve to open for the 2B CS pump to take a suction from the containment sump, the 2SI8811B is required to be open. Since the 2SI8811B is failed closed the 2CS009B cannot be open.

A is incorrect. Valid distracter if the examinee assumes with SI reset the 2SI8811A will not auto open with a LOW-2 RWST level, this is not correct since the SI recirc sump has to be reset for 2SI8811A to not auto open.

B is incorrect. Distracter is valid if the examinee does not understand that CS takes its own suction from the containment sump and does not get a suction from the RH pumps, the 1B CS pump requires the 2SI8811B valve to be open to get a suction from the containment sump (2CS009B and 2SI8811B are in series).

C is correct. See explanation.

D is incorrect. See explanation.

Objective: S.EC1-07-C

Technical References: 2BwGP 100-1A3, Big note ECCS-2, ECCS ring, and ECCS Lesson plan I1-EC-XL-01 page 21.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

25

ID: 1044409

Points: 1.00

Given:

- Unit 1 is at 16% power at the EOL.
- Preparations are in progress to synchronize the main generator to the grid.

Subsequently:

- 1PT-507, S/G Header Pressure, fails to 1050 psig.

In response to the 1PT-507 failure, over the next five minutes the steam dumps will throttle 1 and reactor power will 2 .

- | | <u> 1 </u> | <u> 2 </u> |
|----|--------------|-----------------|
| A. | closed | remain constant |
| B. | open | rise |
| C. | open | remain constant |
| D. | closed | lower |

Answer: D

Answer Explanation

Bank Question (2014 NRC exam question 25)

RO level

Tier 2

High Cog

039K5.08

039 Main and Reheat Steam System (MRSS)

K5.08 Knowledge of the operational implications of the following concepts as they apply to the MRSS:

Effect of steam removal on reactivity

RO 3.6 SRO 3.6

Meets K/A, examinee must understand the operational implications of more steam removal on reactivity.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: D. closed, lower is CORRECT the steam dumps are in the steam pressure mode at this point, this is because the reactor is at 16% power, the steam dumps will stay online in steam pressure mode until the turbine is synchronized to the grid. When 1PT- 507 fails to 1050 psig, the steam dumps will close in attempt to maintain main steam header pressure at 1092 psig. Since the reactor is >POAH, reactor power follows steam demand and will lower.

A is incorrect. This is a valid distracter if the examinee does not understand that the steam dumps are in steam pressure mode maintaining pressure at 1092 psig. Also if the examinee does not understand that reactor power follows steam demand.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

B is incorrect. This is a valid distracter if the examinee does not know where pressure is maintained in the steam pressure mode and thinks steam dumps will open more.

C is incorrect. See explanation.

D is correct. See explanation.

Objective: S.MS1-11

Technical References: I1-MS-XL-01 page 18 and big note MS-4.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

26

ID: 1044410

Points: 1.00

Of the following, what is the approximate power level when feed flow is transferred from FW Bypass Reg Valves (1FW510A/520A/530A and 540A) to the FW Reg Valves (1FW510/520/530 and 540) , per 1BwGP 100-3, Power Ascension?

- A. 5%.
- B. 10%.
- C. 20%.
- D. 30%.

Answer: C

Answer Explanation

Bank Question (2014 NRC exam question 26)

RO level

Tier 2

Low Cog

059A1.03

059 Main Feedwater (MFW) System

A1.03 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the MFW controls including: Power level restrictions for operation of MFW pumps and valves
RO 2.7 SRO 2.9

Meets K/A, examinee must have knowledge of reactor power limits associated with 1 feedwater pump operation and FW Bypass valve limitations.

10CFR55.41(b)(10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

Answer: C. This is the power limit 1BwGP 100-3 states as the approximate power level where feed flow is transferred from the FW Bypass valves to the Main FW Reg Valves. The lesson plan also states that the Main FW Bypass valves are designed for low power level control <20%.

A is incorrect. 5% is plausible since the unit 2 MFW system allows tempering flow only to the SG less than 5%.

B is incorrect. 10% is plausible since this is the max power level the startup feedwater pump can go to.

C is correct. See explanation.

D is incorrect. 30% is plausible since it corresponds to the max power level you can run with no Heater Drain pumps running.

Objective: S.CD1-10-C

Technical References: LP I1-FW-XL-01 page 3 and 1BwGP 100-3 step 41.

(Byron 2012 NRC exam)

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

27

ID: 1044411

Points: 1.00

Given:

- Unit 1 is at 50% power.
- All systems normally aligned and stable.

Subsequently:

- The 1A AF Pump inadvertently started.

Given the above indications, with NO operator action over the next 10 minutes SG level will...

- A. rise slightly then stabilize back at normal level with Feed Reg Valve's more CLOSED.
- B. slowly rise to the P-14 setpoint.
- C. lower slightly then stabilize back at normal level with Feed Reg Valve's more OPEN.
- D. rise and then stabilize at a slightly higher than normal level.

Answer: A

Answer Explanation

New Question (2014 NRC exam question 27)

RO level

Tier 2

High Cog

061 Auxiliary / Emergency Feedwater (AFW) System

K1.02 Knowledge of the physical connections and/or cause-effect relationships between the AFW and the following systems: MFW System

RO 3.4 SRO 3.7

Meets K/A, examinee must understand how MFW is connected to the AFW system and the cause-effect relationship of MFW on the AFW system.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: A. When the 1A AF Pump inadvertently starts the SG level will rise initially due to the added AF flow. Since the SG are level dominant though, the SG water level will return to normal level with the Feed Reg Valves more closed since the 1A AF pump is supplying added AF flow, the Feed Reg Valves can throttle closed to compensate for the added AF flow.

A is correct. See explanation.

B is incorrect. Plausible if the examinee does not understand the SG water level system is level dominant. AF flow ties in after the FW flow is sensed, therefore if the SG were not level dominate, the SG water level will rise since feedwater flow never sensed the added AF flow being added.

C is incorrect. This is plausible if the examinee thinks the SG will shrink and water level will lower.

D is incorrect. This is plausible if the examinee thinks that water level would only rise slightly with the added AF flow and that SG levels will remain slightly higher.

Objective: S.FW2-16

Technical References: LP I1-FW-XL-01 page 12 and Big note FW-2.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

28

ID: 1044413

Points: 1.00

Given:

- A reactor trip has occurred on Unit 1.
- Bus 141 has been deenergized due to a bus fault.
- A fire has occurred in the Unit 1 AEER.
- The 1B AF pump did NOT automatically start and CANNOT be started from the MCR.
- The 1B AF pump suction pressure transmitter has failed at 16 psia.

Under these conditions, the 1B AF pump can be locally started in the Aux Building on the...

- A. 364' level at column M-16.
- B. 383' level in the 1B AF pump room.
- C. 383' level in the Unit 1 RSDP room.
- D. 426' level in the ESF switchgear room.

Answer: A

Answer Explanation

Bank Question (2014 NRC exam question 28)

RO level

Tier 2

Low Cog

061 Auxiliary / Emergency Feedwater (AFW) System

2.1.30 Ability to locate and operate components, including local controls.

RO 4.4 SRO 4.1

Meets K/A, examinee must be able to locate and operate local controls and determine which will start the AF pump during a given plant condition.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: A. 364' level is correct since placing the 1B AF pump switch in the "START with BYPASS" position bypasses the low suction pressure trip. The LO-2 suction pump trip occurs at 16.5 psia.

A is correct. See explanation.

B is incorrect. The ability to locally start the pump from the pump room will not work since there is no means to bypass the low suction pressure trip from this location.

C is incorrect. The fire in the AEER implies that damage has occurred to the cabling from the MCR that prevents a remote start from either the remote shutdown panel or the MCR along with the failed suction pressure transmitter.

D is incorrect. Plausible since the 1A AF pump could be started from the 426' level in the ESF switchgear room.

Objective: S.AF1-15

Technical References: I1-AF-XL-01 page 8 and Big note AF-1

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

29

ID: 1044414

Points: 1.00

Given:

- Unit 1 is at 75% power ramping to 90% power.

Subsequently:

- A loss of instrument bus 114 occurs.
- Before any crew actions, Tref rose to 1.6°F above Tave.

Given the conditions above, control rods will...

- A. automatically withdraw until Tave returns to within 1°F of Tref.
- B. NOT automatically withdraw, but can be manually withdrawn to restore Tave within 1°F of Tref WITHOUT PR channel N-44 rod stop being bypassed.
- C. NOT automatically withdraw UNTIL the PR channel N-44 rod stop is bypassed, then rods will automatically withdraw to restore Tave within 1°F of Tref.
- D. NOT automatically withdraw AND can NOT be manually withdrawn even if PR channel N-44 rod stop is bypassed. Turbine load can be adjusted to restore Tave within 1°F of Tref.

Answer: D

Answer Explanation

New Question (2014 NRC exam question 29)

RO level

Tier 2

High Cog

062 AC Electrical Distribution System

A2.01 Ability to (a) predict the impacts of the following malfunctions or operations on the ac distribution system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Types of loads that, if de-energized, would degrade or hinder plant operation

RO 3.4 SRO 3.9

Meets K/A, examinee must understand how a loss of instrument bus 114 impacts the rod control system and based on the failure mitigate the consequences of those malfunctions.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: D. With a loss of instrument bus 114, rods will not withdraw in auto, in manual, or when PR N-44 rod stop is bypassed when greater than 20% power.

A is incorrect. Plausible since Tref is greater than 1.5°F above Tave, rods would normally move in auto if instrument bus 114 was energized.

B is incorrect. Plausible if the examinee believes that only automatic withdrawal is affected by the loss of bus 114.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

C is incorrect. Plausible since this would be the correct answer if instrument bus 113 was lost.
D is correct. See explanation.

Objective: T.OA02-13

Technical References: 1BwOA Elec-2 page 19

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

30

ID: 1044415

Points: 1.00

Under which of the following conditions is it permissible to close 1413 breaker when paralleling the 1A DG to bus 141?

	<u>Bus Running Voltage</u>	<u>Incoming DG Voltage</u>	<u>Synchroscope Rotation</u>
A.	116	118	slow in the SLOW direction
B.	116	118	slow in the FAST direction
C.	118	116	slow in the FAST direction
D.	118	116	slow in the SLOW direction

Answer: B

Answer Explanation

Bank Question (2014 NRC exam question 30)

RO level

Tier 2

Low Cog

062 AC Electrical Distribution System

A4.03 Ability to manually operate and/or monitor in the control room: Synchroscope, including an understanding of running and incoming voltages

RO 2.8 SRO 2.9

Meets K/A, examinee must be able to manually operate the synchroscope and understand running and incoming voltages to close a breaker.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: B. Incoming voltage (DG) is required to be 0-4 Volts higher than running voltage (bus). The generator speed is adjusted so that the synchroscope is rotating slowly in the fast direction.

A is incorrect. Slow in the slow direction is plausible since this is done when the SAT is being restored to a bus being powered by a DG.

B is correct. See explanation.

C is incorrect. Plausible if the examinee does not understand that the incoming voltage needs to slightly higher than the running voltage.

D is incorrect. See explanation.

Objective: S.AP1-11-C

Technical References: BwOP DG-11, Page 24

(Beaver Valley 2001)

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

31

ID: 1044416

Points: 1.00

Given:

- Unit 2 is operating at 90% power with all control systems in automatic.
- NO annunciators are currently in alarm.

Subsequently:

- The following annunciator just ALARMED:

BUS 243 CONT PWR FAILURE (2-21-B1)

- NO other annunciators are LIT.

What Control Board indications would you expect to see with the above annunciator LIT?

- A. Letdown will be isolated.
- B. PZR HTR B/U GRP B indicating lights extinguished.
- C. OC WS pump breaker position indicating lights extinguished.
- D. Control Board meter 2EI-AP055, BUS 243 VOLTAGE, indication reading 0 volts.

Answer: C

Answer Explanation

Bank Question (2014 NRC exam question 31)

RO level

Tier 2

High Cog

063A3.01

063 DC Electrical Distribution System

A3.01 Ability to monitor automatic operation of the DC electrical system, including: Meters, annunciators, dials, recorders, and indicating lights

RO 2.7 SRO 3.1

Meets K/A, examinee must assess Control Board Meters and annunciators to determine the status of the DC Electrical Distribution System.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: C. When the annunciator alarms, indicating a loss of DC control power to bus 243, all 4KV breakers directly fed from or by the Bus will have their indicating lights extinguished. The OC WS pump is fed directly from this bus, therefore will not have any indication lights since DC control power is lost.

A is incorrect. Letdown will be isolated is considered plausible because the letdown line AOVs are fed from all four of the Unit 2 DC buses. This is not the correct answer because the control power for these valves comes from a separate DC power feed from DC bus 213/211 (depending on the valve).

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

B is incorrect. PZR HTR B/U GRP B indicating lights extinguished is considered plausible because it is a 480 volt load with DC control power, however the B Group is powered from bus 212 and bus 244.

C is correct. See explanation.

D is incorrect. Bus 243 voltage indication reading 0 is plausible if the examinee believes the meter is DC powered. It is powered from the bus potential transformers which are AC.

Objective: T.OA01-02

Technical References: BwAR 2-21-B1 and I1-DC-XL-01 page 46.

(Bank Byron 2012)

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

32

ID: 1044418

Points: 1.00

Given:

- Unit 1 is at 100% power.
- The 1A DG #1 air compressor is out of service.
- The 1A DG #2 air compressor started to repressurize the air receiver.

Subsequently:

- ACB 1412, SAT 142-1 Feed to 4KV Bus 141, is inadvertently tripped.

In response to this event, the 1A DG #2 air compressor ...

- A. remained running until the air receiver reached 235 psig.
- B. stopped running and restarted as soon as Bus 141 was re-energized.
- C. stopped running and restarted when the 1A DG reached 280 RPM.
- D. stopped running and restarted 70 seconds later to allow the sequencer to start the vital loads.

Answer: B

Answer Explanation

New Question (2014 NRC exam question 32)

RO level

Tier 2

High Cog

064K2.01

064 Emergency Diesel Generators (ED/G)

K2.01 Knowledge of bus power supplies to the following: Air compressor

RO 2.7 SRO 3.1

Meets K/A, examinee must have knowledge of the bus power supply to the DG air compressor.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: B. When bus 141 loses power, the 1A DG #2 air compressor will stop, the air receiver pressure will drop to provide the starting air to the DG. When the DG gets to rated speed and is powering the bus, in approximately 10 seconds, the 1A DG #2 air compressor will start when power is restored to bus 141 since air pressure will have dropped to below the 210 psig setpoint.

A is incorrect. Is plausible if the examinee thinks the air compressor is powered from bus 142.

B is correct. See explanation.

C is incorrect. Is plausible since both of the fuel oil transfer pumps gets a start signal at 280 rpm.

D is incorrect. Is plausible since the ATWS Mitigation System (AMS) to start the AF Pump is bypassed for 70 seconds to allow the DG sequencer to complete before it can send a start signal to the AF Pump, examinee could assume that there is a similar delay for the DG air compressor.

Objective: S.DG1-02-E

Technical References: 20E-1-4030DG10

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

33

ID: 1044419

Points: 1.00

Given:

- Unit 1 is at 100% power.
- 1A and 1C Diesel Generator Fuel Oil Transfer Pumps are declared INOPERABLE.

Given the conditions above, which of the following action(s) is/are required per Technical Specifications?

- A. No TS entry is required.
- B. Enter LCO 3.0.3.
- C. Enter LCO 3.8.1, AC Sources - Operating, ONLY.
- D. Enter LCO 3.8.9, Distribution Systems - Operating, ONLY.

Answer: C

Answer Explanation

Bank Question (2014 NRC exam question 33)

RO level

Tier 2

Low Cog

064 Emergency Diesel Generators (ED/G)

2.2.38 Knowledge of conditions and limitations in the facility license.

RO 3.6 SRO 4.5

Meets K/A, examinee must have knowledge of the conditions and limitations in the facility license. This is RO level since the RO must be able to recognize that one of the two diesel generators are NOT capable of supplying the onsite loads.

10CFR55.43(b)(1) Conditions and limitations in the facility license.

Answer: A. SR 3.8.1.6 is not met on the 1A DG (1A and 1C DG Fuel Oil Transfer Pumps both support the 1A DG).

A is correct. See explanation.

B is incorrect. This is plausible if the examinee assumes that a fuel oil transfer pump is out for each DG, only one DG fuel oil transfer pump is required for each DG.

C is incorrect. This is not correct since no AC bus electrical power distribution subsystem is inoperable.

D is incorrect. This is plausible if the examinee assumes that a fuel oil transfer pump is out for each DG and that two DG fuel oil transfer pumps are required for each DG.

Objective: S.DG1-10-A

Technical References: LCO 3.8.1. and Big note DG-9

(ILT BANK used on Systems 2 exam)

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

34

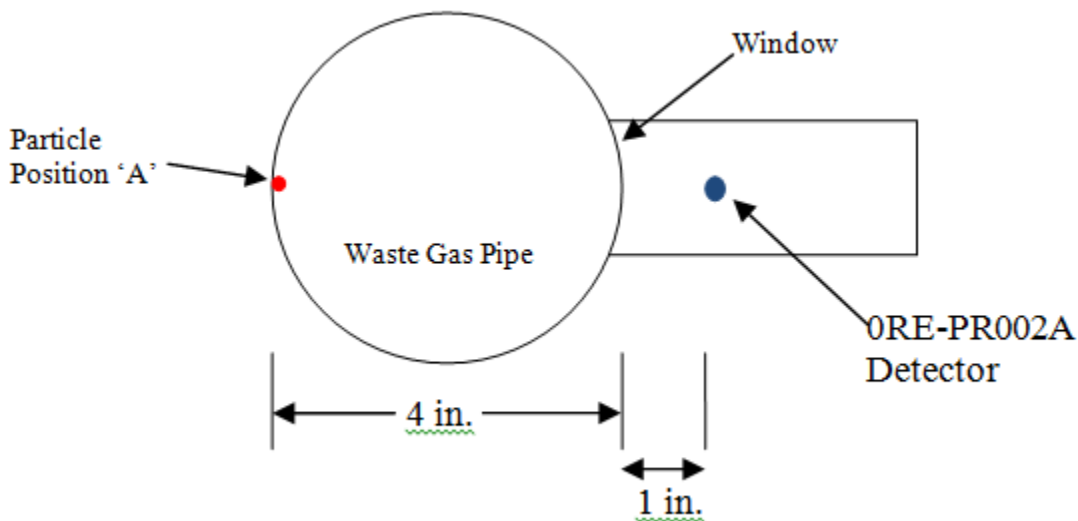
ID: 1044426

Points: 1.00

Given:

- 0RE-PR002A, Gas Decay Tank Effluent Gas Low Monitor (part of the 0PR02J), consists of a detector mounted on one side of the Waste Gas discharge pipe with a window through the pipe wall, with the pipe 4 inches in diameter (see below).
- The detector is a point detector located 1 inch from the ID of the pipe.
- The particle is considered a point source.

The 0RE-PR002A HIGH alarm setpoint is $6.06\text{E-}4 \mu\text{Ci/ml}$.



With the particle at position 'A' the 0RE-PR002A currently reads $2.20\text{E-}4 \mu\text{Ci/ml}$.

What is the FARTHEST distance the particle needs to be from the 0RE-PR002A detector to cause the HIGH alarm setpoint to be reached?

- A. 4 inches
- B. 3 inches
- C. 2 inches
- D. 1 inch

Answer: B

Answer Explanation

New Question (2014 NRC exam question 34)

RO level

Tier 2

High Cog

073 Process Radiation Monitoring (PRM) System

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

K5.02 Knowledge of the operational implications as they apply to concepts as they apply to the PRM system: Radiation intensity changes with source distance
RO 2.5 SRO 3.1

Meets K/A, examinee must have knowledge of the operational implications associated with intensity changes with source distance.

10CFR55.41(b)(11) Purpose and operation of radiation monitoring systems, including alarms and survey equipment.

Answer: B. $I_1 \times (D_1)^2 = I_2 \times (D_2)^2$ $2.20\text{E-}4 \times (5)^2 = 6.06\text{E-}4 \times (D_2)^2$ therefore D_2 is 3 inches

A is incorrect. Not correct since $I_1 \times (D_1)^2 = I_2 \times (D_2)^2$ $2.20\text{E-}4 \times (5)^2 = I_2 \times (4)^2$ therefore I_2 is $3.4\text{E-}4$, which is not greater than $6.06\text{E-}4$.

B is correct. See explanation.

C is incorrect. This is plausible if the examinee does not account for 1 inch that the point detector located from the ID of the pipe. $I_1 \times (D_1)^2 = I_2 \times (D_2)^2$ $2.20\text{E-}4 \times (4)^2 = I_2 \times (2)^2$ therefore I_2 is $8.8\text{E-}4$. Which would be the nearest the particle can travel by the ORE-PR002A detector to first cause the alarm and would be correct if the examinee assumes 4 inches to the detector instead of 5 inches.

D is incorrect. 1 inch is plausible if the examinee thinks that, $I_1 \times (D_1) = I_2 \times (D_2)$
 $2.20\text{E-}4 \times (5) = I_2 \times (1)$ therefore I_2 is $1.1\text{E-}3$

Objective: S.AR1-02 (also covered in Generic Radworker)

Technical References: Big Note Radiation Protection 5, I1-AR-XL-01 page 28, and BwAR 3-0PR02J

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

35

ID: 1044427

Points: 1.00

Given:

- Unit 1 is at 50% power.
- 1SX016A, 1A and 1C RCFC SX Inlet Valve, is closed.
- 1SX027A, 1A and 1C RCFC SX Outlet Valve, is closed.
- The 1B SX pump is running.
- The 1A SX aux lube oil pump is running.

Subsequently the following occur in order:

- 1) - The 1B SX pump trips.
- 2) - The NSO takes the 1SX01PA, SX Pump 1A, control switch to start and releases it to NAC.
- 3) - The NSO manually opens 1SX016A and then 1SX027A.
- 4) - A safety injection occurs.

Given the conditions above, the 1A SX pump FIRST started when the...

- A. 1SX01PA C/S was placed in start and released to NAC.
- B. 1SX016A was opened.
- C. 1SX027A was opened.
- D. SI occurred.

Answer: D

Answer Explanation

New Question (2014 NRC exam question 35)

RO level

Tier 2

High Cog

076K4.02

076 Service Water System (SWS)

K4.02 Knowledge of SWS design feature(s) and/or interlock(s) which provide for the following: Automatic start features associated with SWS pump controls

RO 2.9 SRO 3.2

Meets K/A, examinee must know the interlocks associated with the automatic start of an SX pump.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: D. On a SI signal the 1A SX pump will start regardless if 1SX016A and 1SX027A are open or not.

A is incorrect. Plausible if the examinee thinks the SX pumps automatically start on low discharge pressure, like CC pumps. There are no low discharge pressure auto starts on the SX pumps. The only auto start signals are SI and UV.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

B is incorrect. The starting interlock for the 1A SX pump is not met when the switch is momentarily taken to start. To manually start the 1A SX pump the 1SX16A and 1SX27A are required to be open.

C is incorrect. This is plausible if the examinee thinks that when 1SX016A and 1SX027A are open the 1A SX pump will then auto start.

D is correct. See explanation.

Objective: S.SX1-06

Technical References: 20E-1-4030SX01 and Big note SX-1

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

36

ID: 1044428

Points: 1.00

Given:

- Unit 1 at 100% power.
- 0C WS pump is OOS.

Subsequently:

- A fault occurs on bus 143.
- 0B WS pump trips.
- Unit 1 reactor is tripped.

Given the conditions above, which of the following SACs, if any, can be locally started using fire protection for cooling per BwOP SA-1, Startup and Operation of Station Air Compressor (SAC)?

- A. U-0 SAC
- B. U-1 SAC
- C. U-2 SAC
- D. None

Answer: B

Answer Explanation

New Question (2014 NRC exam question 36)

RO level

Tier 2

High Cog

078 Instrument Air System (IAS)

K1.04 Knowledge of the physical connections and/or cause-effect relationships between the IAS and the following systems: Cooling water to compressor

RO 2.6 SRO 2.9

Meets K/A, examinee must understand the impact a loss of cooling water on the air compressor.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: B. With no WS available (0A WS no power, powered from bus 143, 0C WS pump OOS) fire protection can only be aligned to the U-1 SAC and the U-0 SAC. Since the U-0 SAC is powered from bus 143 it cannot be started. That leaves only the U-1 SAC to be started with fire protection for cooling.

A is incorrect. The U-0 sac is powered from bus 143 therefore has no power to be started.

B is correct. See explanation.

C is incorrect. U-2 SAC is not able to be cooled by FP.

D is incorrect. This is plausible if the examinee does not realize that FP can be used to cool the U-1 SAC.

This is plausible since the U-2 SAC is unable to be cooled by fire protection.

Objective: S.SA1-05

Technical References: I1-SA-XL-01, page 31 and 52 and Big note SA/IA-2

EXAMINATION ANSWER KEY

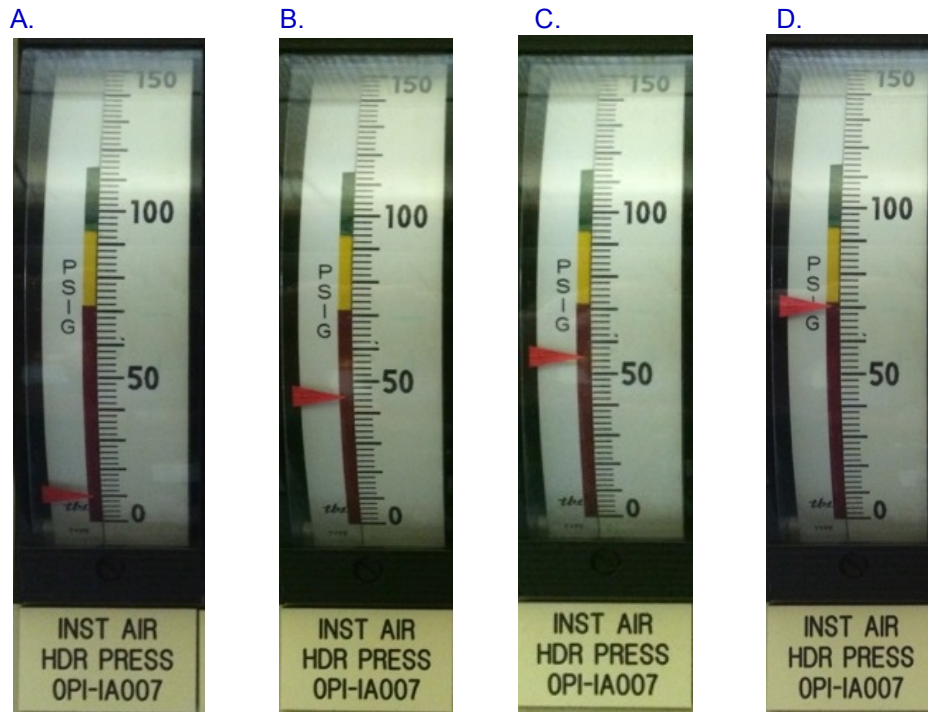
2014 RO NRC Exam (Class 13-1)

37

ID: 1044429

Points: 1.00

Per BwOP SA-1, Start Up and Operation of the Station Air Compressor, which of the following indicates the MAXIMUM pressure that requires using a nitrogen bottle to start a service air compressor?



Answer: B

Answer Explanation

New Question (2014 NRC exam question 37)

RO level

Tier 2

Low Cog

078 Instrument Air System (IAS)

A4.01 Ability to manually operate and/or monitor in the control room: Pressure gauges

RO 3.1 SRO 3.1

Meets K/A, examinee must be able to monitor IA Pressure from the control room and determine if local actions are required to restart the SAC.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: B. A nitrogen bottle is required if < 50 psig air pressure is present at the OPM01J (the gauge displayed is the gauge from the OPM01J).

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

A is incorrect. See explanation. Plausible if the examinee thinks it is any pressure less than 40#.

B is correct. See explanation.

C is incorrect. See explanation. Plausible since 60# is the required pressure that the reactor needs to be tripped at per 1BwOA SEC-4.

D is incorrect. See explanation. Plausible since it is just at the edge of the red band for the gauge.

Objective: S.SA1-11

Technical References: BwOP SA-1 page 14 and 20.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

38

ID: 1044430

Points: 1.00

Given:

- Unit 2 is in MODE 6.
- A core onload is in progress.
- 13 fuel assemblies have been installed.

Subsequently:

- An uncontrolled dilution occurs on Unit 2.
- Source range channels N31 and N32 are rising.
- The following annunciator is LIT:

SR SD FLUX HIGH (2-10-A1)

Given the conditions above, the Containment Evacuation Alarm is activated ____ (1) ____ and a ____ (2) ____ sounds in containment.

- | | ____ (1) ____ | ____ (2) ____ |
|----|---------------|---------------|
| A. | manually | bell |
| B. | manually | horn |
| C. | automatically | bell |
| D. | automatically | horn |

Answer: B

Answer Explanation

New Question (2014 NRC exam question 38)

RO level

Tier 2

Low Cog

103A2.04

103 Containment System

A2.04 Ability to (a) predict the impacts of the following malfunctions or operations on the containment system and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Containment evacuation (including recognition of the alarm)

RO 3.5 SRO 3.6

Meets K/A, examinee must predict the impacts of an inadvertent dilution on the containment system, including recognition of how to actuate the alarm and the actions per the procedure to correct the malfunction.

10CFR55.43(b)(6) Procedures and limitations involved in initial core loading, alterations in core configuration, control rod programming, and determination of various internal and external effects on core reactivity.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

Answer: B. The SR SD FLUX HIGH alarm comes in when the SR rise by a factor of 5. The action that is required for this is to manually actuate the Containment Evacuation Alarm using the Containment Evacuation Switch on 2PM06J. The sound in containment is a horn.

A is incorrect. The sound in containment is a horn not a bell.

B is correct. See explanation.

C is incorrect. The Containment Evacuation Alarm use to automatically actuate from the SR SD FLUX HIGH alarm, which is not true anymore.

D is incorrect. See explanation.

Objective: T.GP06-05

Technical References: BwAR 2-10-A1 and 20E-2-4030NR03

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

39

ID: 1044431

Points: 1.00

Given:

- Unit 1 is at 8% power.
- The crew is raising power per 1BwGP 100-3, Power Ascension 5% to 100%.

Subsequently at time:

- 1201: Bus 157 loses power.
- 1202: IR NI N35 fails high.
- 1203: A RCS LOCA occurs and RCS pressure drops to 50 psig.
- 1204: NSO takes the manual reactor trip switch to actuate.

Which of the following alarms would be flashing RED at 1205?

- A. RCP BUS UNDERVOLT RX TRIP (1-11-A5).
- B. IR HIGH FLUX RX TRIP (1-11-B2).
- C. PZR PRESS LOW SI/RX TRIP (1-11-C1).
- D. MANUAL RX TRIP (1-11-B1).

Answer: B

Answer Explanation

New Question (2014 NRC exam question 39)

Tier 1

High Cog

007EA2.05

007 Reactor Trip

EA2.05 Ability to determine or interpret the following as they apply to a reactor trip: Reactor trip first-out indication.

RO 3.4 SRO 3.9

Meets K/A, examinee must be able to assess plant conditions and determine what reactor trip first-out indication would be lit.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: B. When bus 157 loses power, the 1A RCP will trip, but since power is below P8 (30%) the reactor will not trip. When IR NI N35 fails high it will cause a reactor trip and the red-first out light will be IR HIGH FLUX RX TRIP, this is because the reactor is less than 10% power, therefore the IR High Flux Trip is not blocked, IR High Flux Trip is allowed to be blocked above 10% (P-10). A LOCA is plausible if the examinee thinks the red-first out light will only be lit if a SI occurs, because reactor power is below P7 (10%) LO-pressure SI is blocked. When the crew manually trips the reactor the reactor would have already had a red-first out from N35 failing high.

A is incorrect. When bus 157 loses power, the 1A RCP will trip, but since power is below P8 (30%) the reactor will not trip..

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

B is correct. See explanation.

C is incorrect. A LOCA is plausible if the examinee thinks the red-first out light will only be lit if a SI occurs, because reactor power is below P7 (10%) LO-pressure SI is blocked.

D is incorrect. When the crew manually trips the reactor the reactor would have already had a red-first out from N35 failing high.

Objective: S.NI2-04-A

Technical References: BwAR 1-11-B2, BwAR 1-11-A5, and big note EF-1.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

40

ID: 1044432

Points: 1.00

Given:

- A RCS LOCA has occurred.
- 1BwEP ES-1.2, Post LOCA Cooldown and Depressurization, is in progress at step 7, "Check Intact SG Levels".
- Containment pressure is 4 psig and lowering.
- CETCs are 600°F.
- RCS pressure is 1450 psig and lowering.
- PZR level is 100%.
- ALL S/G NR levels are 15% and stable.
- Total AF flowrate is 240 gpm.
- 1A CV pump is in standby.
- 1B CV pump is running.
- Both SI pumps are running.
- Both RH pumps are secured.

Based on the conditions above, the next action the crew will take is to ...

- A. secure one SI pump to lower PZR level.
- B. raise AF flow to ≥ 500 gpm.
- C. start the 1A CV pump.
- D. start both RH pumps.

Answer: C

Answer Explanation

New Question (2014 NRC exam question 40)

Tier 1

High Cog

008 Pressurizer (PZR) Vapor Space Accident (Relief Valve Stuck Open)

AA2.30 Ability to determine and interpret the following as they apply to the Pressurizer Vapor Space

Accident: Inadequate core cooling

RO 4.3 SRO 4.7

Meets K/A, examinee must be able to determine that subcooling is inadequate and the necessary ECCS pumps have to be manually started to restore RCS subcooling. This is RO level because RO's are expected to know when to implement the actions on the OAS.

10CFR55.41(b)(10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

Answer: C. Since subcooling is inadequate, (this can be looked up using the steam tables, at 600°F saturated pressure is approx. 1540 psia). Per the Operator action summary (OAS) page if RCS subcooling is inadequate it tells you to start and align ECCS pumps as necessary. Since the 1A CV pump is not running, you would start the pump.

A is incorrect. This is plausible since PZR level is 100%, but subcooling is inadequate.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

B is incorrect. This is plausible since SG water level is 15% and AF flow is less than 500 gpm. These flow and inventory conditions would not be adequate if containment was adverse, but since containment is less than 5 psig and not adverse, AF flowrate is okay as is.

C is correct. See explanation.

D is incorrect. This is plausible since the Operator action summary states that if RCS subcooling is inadequate it to start and align ECCS pumps as necessary. It is not correct since the RH pumps are already secured and they will not be restarted until RCS pressure drops to less than 325#. This is also plausible since you are not allowed to secure the RH pumps until RCS pressure is stable (they could have been secured earlier in the procedure when RCS pressure was stable), since RCS pressure is above shutoff head this would not help to restore subcooling.

Objective: T.EP02-01

Technical References: 1BwEP ES-1.2 on Operator Action Summary page

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

41

ID: 1044433

Points: 1.00

Given:

- A RCS LOCA is in progress.
- Only the 1A CV and 1A RH Pumps are running.
- 1A SI pump is out of service.
- 1B ECCS train failed to actuate.
- RCS pressure is 1290 psig.
- RCS temperature is 703°F.

Given the conditions above, in order to prevent fuel damage from inadequate core cooling, secondary heat sink is maintained ...

- A. to provide an alternate means of RCS pressure control.
- B. because reflux boiling provides the primary means of heat removal prior to voiding the hot legs.
- C. to ensure removal of RCS heat because the RCPs are expected to be running.
- D. because RCS pressure remains high and cooling from injection flow alone is inadequate.

Answer: D

Answer Explanation

Bank Question (2014 NRC exam question 41)

Tier 1

High Cog

009 Small Break LOCA

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

RO 3.0 SRO 3.3

Meets K/A, examinee must have the knowledge required that a secondary heat sink must be maintained during a SBLOCA.

10CFR55.41(b)(10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

Answer: D. Mass loss out the break is not sufficient to lower RCS pressure to a point where energy loss through the break along with injection flow is sufficient to address all decay heat removal requirements. The SG will aid in removing some of the excess decay heat.

A is incorrect. RCS pressure is being maintained by the mass/energy balance of break flow and injection flow.

B is incorrect. The primary means of heat removal is the break/SI flow. The SGs are just providing a secondary heat removal function. Per the background document reflux boiling is occurring with partially filled hot legs.

C is incorrect. SBLOCA analysis assumes that the RCPs are tripped.

D is correct. See explanation.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

Objective: T.EP02B-01

Technical References: WOG E-1 Loss of Reactor or Secondary Coolant (Background BwEP-1) page 7.

Bank DC Cook 2008

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

42

ID: 1044434

Points: 1.00

Given:

- An SI has actuated due to a RCS LOCA on Unit 1.
- ALL ECCS pumps automatically started.
- Cold leg recirculation has been established.
- SI signal has been reset.
- 1BwEP-1, Loss of Reactor or Secondary Coolant, is in progress at step 14, "Check if SI Accumulators Should be Isolated".

Given the conditions above, if a loss of offsite power occurs, the crew will...

- A. manually start the SI and then RH pumps after the sequencer starts the CV pumps.
- B. place the CV pumps in PULL OUT, then manually start the RH pumps followed by the CV and SI pumps after sequencer completion.
- C. verify the CV, RH, and SI pumps started on the sequencer.
- D. place the CV and SI pumps in PULL OUT, verify the RH pumps start on the sequencer and then manually start the CV and SI pumps.

Answer: B

Answer Explanation

New Question (2014 NRC exam question 42)

Tier 1

High Cog

011 Large Break LOCA

2.4.20 Knowledge of the operational implications of EOP warnings, cautions, and notes.

RO 3.8 SRO 4.3

Meets K/A, examinee must have knowledge of the operational implications of EOP warnings, cautions, and notes.

10CFR55.41(b)(10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

Answer: B. Per the Caution in 1BwEP-1 the CV pumps should be placed in PULL OUT, then after sequencer completion, ECCS pumps should be restarted in the following order: RH pumps, CV pumps, SI pumps. This is done to ensure the CV and SI pumps have a suction source of water, which is provided by RH when aligned for cold leg recirculation.

A is incorrect. Plausible if the examinee does not remember the caution and thinks that since SI has been reset the RH and SI pumps have to be manually started.

B is correct. See explanation.

C is incorrect. Plausible if the student thinks the sequencer will start all of the pumps and does not remember the caution.

D is incorrect. Plausible if the student remembers the caution, but does not realize that SI is reset and the SI and RH pumps won't auto start.

Objective: T.EP02-01

Technical References: 1BwEP-1 page 24.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

43

ID: 1044435

Points: 1.00

Given:

- Unit 1 is at 100% power.
- The 1A CV pump is out of service.
- 1SI8801B, Charging Pumps to Cold Leg Injection Isolation Valve, is closed and de-energized.
- All other equipment is normally aligned.

Given the conditions above, which of the following LCOs and/or TLCOs is Unit 1 in?

1. 3.5.2 ECCS – Operating
 2. 3.1.b Boration Flow Path – Operating
 3. 3.1.d Charging Pumps – Operating
- A. 1, 2, and 3.
- B. 1 ONLY.
- C. 1 and 3 ONLY.
- D. 1 and 2 ONLY.

Answer: C

Answer Explanation

New Question (2014 NRC exam question 43)

Tier 1

Low Cog

022 Loss of Reactor Coolant Makeup

2.2.22 Knowledge of limiting conditions for operations and safety limits.

RO 4.0 SRO 4.7

Meets K/A, examinee must knowledge of the limiting conditions for operations for Loss of Reactor Coolant Makeup. Loss of Reactor Coolant Makeup is described as a loss of 1 CV Pump and 1 hi head injection path.

10CFR55.43(b)(2) Facility operating limitations in the technical specifications and their bases.

Answer: C. Since one CV pump is out of service LCO/TLCO 3.5.2 and 3.1.d are entered. With 1SI8801B breaker open, the valve will not open, but since it is in parallel with 1SI8801A, there is still a flowpath from the RWST and a flowpath from the Boric Acid Storage Tank (BAST) 3.1.b does not apply.

A is incorrect. Plausible if the examinee thinks that with the 1SI8801B breaker open and the 1A CV pump OOS there is no flowpath from the RWST.

B is incorrect. Plausible if the examinee does not know that 3.1.d requires two CV pumps.

C is correct. See explanation.

D is incorrect. See explanation.

Objective: S.CV2-12-A

Technical References: 3.5.2, 3.1.b, and 3.1.d

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

44

ID: 1044436

Points: 1.00

Given:

- Unit 2 is at 100% power.
- 2A CC pump is running.
- 2B CC pump is in standby.
- Unit 0 CC pump is aligned to Unit 1.

Subsequently:

- The 2A CC pump impeller degrades.
- CC pump discharge pressure at 2PM06J drops to 90 psig.

Given the conditions above, which ONE of the following describes the response of 2TK-130, Letdwn HX Out Temp Control 2CC130A, demand?

- A. Lowers and stabilizes at a lower value.
- B. Rises and stabilizes at a higher value.
- C. Rises and returns to previous value.
- D. Lowers and returns to previous value.

Answer: B

Answer Explanation

Bank Question (2014 NRC exam question 44)

Tier 1

High Cog

026 Loss of Component Cooling Water (CCW)

AA1.06 Ability to operate and / or monitor the following as they apply to the Loss of Component Cooling Water: Control of flow rates to components cooled by the CCWS

RO 2.9 SRO 2.9

Meets K/A, examinee must monitor how flow rates will change to components cooled by CCWS if a malfunction occurred.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: B. As the 2A CC pump impeller degrades, discharge header pressure will drop causing reduced CCW flow to the letdown system components cooled by CC. Since discharge header pressure does not reach the setpoint to start the standby pump (85 psig for 4 seconds), the lower flow condition will remain. The 2TK-130 demand will then rise and then stabilize at a higher value to make up for the reduced flow.

A is incorrect. This is plausible if the examinee does not understand how the demand on the 2TK-130 works, they could assume that lower demand means lowering temperatures.

B is correct. See explanation.

C is incorrect. This is plausible if the examinee does not realize that with the degraded impeller the 2TK-130 will not return to original flow.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

D is incorrect. See explanation.

Objective: S.CC1-07

Technical References: 20E-2-4030CC01, 20E-2-4030CC11, and Big Note CC-1

Bank (South Texas Project 2005)

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

45

ID: 1044437

Points: 1.00

Given:

- Unit 1 is at 100% power.
- Rods are in manual.
- 1PK-455A, Master PZR Pressure Controller output, is failed "AS IS".
- 1PK-455A will NOT transfer to Manual control.
- A 100 MWe load rejection occurs.

Given the conditions above, which ONE of the following will INITIALLY occur?

- A. OPDT trip setpoints will rise.
- B. PZR level will lower.
- C. 1RY455B, PZR Spray Valve, will throttle open.
- D. 1CV121, CV Pump Flow Control Valve, will throttle closed.

Answer: D

Answer Explanation

New Question (2014 NRC exam question 45)

Tier 1

High Cog

027AK1.02

027 Pressurizer Pressure Control System (PZR PCS) Malfunction

AK1.02 Knowledge of the operational implications of the following concepts as they apply to Pressurizer Pressure Control Malfunctions: Expansion of liquids as temperature increases
RO 2.8 SRO 3.1

Meets K/A, examinee must understand how a pressurizer pressure control malfunction and expansion of liquids as temperature increases in the PZR affect the plant.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: D. Since a 100 MWe load reject occurs, Tave will go up and PZR level will rise. Since 1PK-455A, the master PZR Pressure controller, is failed as is it will sense that PZR level is rising and cause 1CV121 to throttle close to lower PZR level.

A is incorrect. Plausible if the student thinks pressure rising will cause the OPDT setpoint to rise. OPDT doesn't use pressure input to calculate the trip setpoint (OTDT does use pressure as an input), since Tave went up so the setpoints will actually lower.

B is incorrect. Plausible if the student does not understand that with a load reject Tave will initially go up and PZR level will rise.

C is incorrect. This is plausible since this is what would occur if the master PZR pressure controller was in auto and worked as designed.

D is correct. See explanation.

Objective: S.RY1-21-E

Technical References: I1-RY-XL-01 page 30-31 and Big note RY-2

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

46

ID: 1044438

Points: 1.00

During a SGTR, what is the bases for the automatic action initiated by 0PR16J, Blowdown After Filter Monitor?

To prevent...

- A. the spread of contamination to the main condenser.
- B. contamination from reaching the chemistry sample panel.
- C. contamination from reaching the waste water treatment system.
- D. the spread of contamination to the blowdown system.

Answer: A

Answer Explanation

Bank Question (2014 NRC exam question 46)

Tier 1

Low Cog

038 Steam Generator Tube Rupture (SGTR)

EK3.04 Knowledge of the reasons for the following responses as the apply to the SGTR: Automatic actions provided by each PRM

RO 3.9 SRO 4.1

Meets K/A, examinee must have knowledge of the automatic actions associated with 0PR16J, Blowdown After Filter Monitor, and the basis for the action during a SGTR.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: A. The 0PR16J, Blowdown After Filter Monitor, isolates of 0WX119A, CST Inlet Header Isolation from Blowdown Demin 0A Valve, and opens 0WX058A, Blowdown Monitor Tank 0A Inlet Valve, to prevent the spread of contamination to the main condenser. Normally blowdown is aligned back the the main condenser.

A is correct. See explanation.

B is incorrect. 1PS179A, Steam Generator Blowdown Sample Isolation Valve, gets its closed signal from the 1PR008J, not the 0PR16J, which prevents contamination from reaching chemistry's sample panel.

C is incorrect. The 0PR05J, Turb Building Fire and Oil Sump, gives a signal to 0OD030 to stop sending water to the waste water treatment system, not the 0PR16J.

D is incorrect. Blowdown is not stopped by 0PR16J, Blowdown After Filter Monitor, flow will still go through the blowdown system and go to the blowdown monitor tanks.

Objective: S.AR1-04-B-04

Technical References: I1-AR-XL-01 page 28 and Big note RW-4 SG Blowdown.

Bank (2006 Palisades)

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

47

ID: 1044439

Points: 1.00

Given:

- Unit 1 reactor is shutdown for a refueling outage.
- A RCS cooldown is in progress.
- RCS pressure is 1100 psig.
- RCS temperature is 450 °F.

Given the conditions above, the MSIVs will close and provide protection against a steamline break accident by a signal from ...

- A. low steamline pressure.
- B. high steamline negative rate.
- C. manual actuation ONLY.
- D. low pressurizer pressure.

Answer: B

Answer Explanation

Bank Question (2014 NRC exam question 47)

Tier 1

Low Cog

040 Steam Line Rupture

AK2.01 Knowledge of the interrelations between the Steam Line Rupture and the following: Valves
RO 2.6 SRO 2.5

Meets K/A, examinee must be able to understand how the MSIV's will respond to a steam line rupture.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: B. High steamline pressure rate is CORRECT. As part of a normal cooldown/depressurization, when PZR press is <1930 psig P-11 actuates and the operators block the low steam line pressure SI signal which enables the steamline rate SI.

A is incorrect. Low steamline pressure is wrong since this blocked below 1930 psig (P-11).

B is correct. See explanation.

C is incorrect. Manual only is wrong, because the steam line rate signal is still active.

D is incorrect. Low PZR pressure is wrong since this also blocked when P-11 lights.

Objective: S.MS1-07-D

Technical References: I1-MS-XL-01 page 10 and Big note MS-1

Bank (LORT BANK)

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

48

ID: 1044440

Points: 1.00

Given:

- Unit 1 is at 100% power.
- 2SX005, Unit 0 CC Heat Exchanger Inlet Valve, is de-energized and closed for valve operator replacement.

Subsequently:

- 1A SX pump trips on overcurrent.
- 1B SX pump can NOT be started.
- Unit 1 reactor is tripped.
- A feedwater isolation occurs.
- Both Unit 1 AF pumps have automatically started.

Given the conditions above and assuming SX can NOT be restored to Unit 1, 30 minutes later, which of the following is correct?

- A. BOTH Unit 1 AF pumps MUST be shutdown.
- B. BOTH Unit 1 AF pumps can continue to operate.
- C. 1B AF pump MUST be shutdown AND 1A AF pump can continue to operate.
- D. 1A AF pump MUST be shutdown AND 1B AF pump can continue to operate.

Answer: D

Answer Explanation

Bank Question (2014 NRC exam question 48)

Tier 1

High Cog

054 Loss of Main Feedwater (MFW)

AA1. Ability to operate and / or monitor the following as they apply to the Loss of Main Feedwater (MFW): AFW auxiliaries, including oil cooling water supply.

RO 3.5 SRO 3.7

Meets K/A, examinee must understand what provides cooling to the AF pumps to allow them to operate on a loss of main feedwater.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: D. Neither Unit 1 SX pumps available and the SX cross tie breaker closed, no SX flow is available to cool the 1A AF pump. The 1B AF pump can run without a SX pump running because it has its own shaft driven SX booster pump. Per IER L1-11-4 Braidwood response for a loss of all AC associated with the operation of the Diesel Driven AF pump (DDAF), worst case scenario the 1B AF pump can run for 1 hour (conservative estimate) before the potential exists for pump and engine overheating.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

A is incorrect. Plausible if the examinee does not understand that the 1B AF pump has its own shaft driven SX booster pump.

B is incorrect. Plausible if the examinee thinks both AF pumps have their own shaft driven booster pump or different cooling supply than SX.

C is incorrect. Plausible if the examinee thinks that the 1A AF pump is the one with the shaft driven booster pump.

D is correct. See explanation.

Objective: S.AF1-04

Technical References: I1-AF-XL-01 page 12.

Bank (ILT used on Systems 08 exam)

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

49

ID: 1044441

Points: 1.00

Given:

- Unit 1 is at 100% power.
- A loss of offsite power occurs.

One minute after the loss of offsite power occurs and with NO operator action, SX flow to the containment chillers ____ (1) ____ and the in-service containment chilled water pump is ____ (2) ____.

- | | ____ (1) ____ | ____ (2) ____ |
|----|---------------------|---------------|
| A. | remains in service, | tripped |
| B. | remains in service, | running |
| C. | is isolated, | tripped |
| D. | is isolated, | running |

Answer: D

Answer Explanation

Modified Question (2014 NRC exam question 49)

Tier 1

Low Cog

056 Loss of Offsite Power

AA1.12 Ability to operate and / or monitor the following as they apply to the Loss of Offsite Power:

Reactor building cooling unit

RO 3.2 SRO 3.3

Meets K/A, examinee must understand what happens to the containment chillers on a loss of offsite power.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: D. On a loss of offsite power bus 141 and 142 become de-energized until the DG restarts. The 1SX112/114 will become de-energized and fail closed and 1SX147 will fail open, even when power is restored to the bus the 1SX112/114 will remain closed and the 1SX147 will remain open until either an operator opens it or a SI occurs. Bus 143/144 auto swapped over and did not lose power during a LOOP, therefore the containment chilled water pumps will remain running.

A is incorrect. Plausible if the examinee assumes the valves only change positions on an SI for the SX flow. The containment chilled water pump is plausible if the examinee does not know what power supply is supplying the containment chilled water pump.

B is incorrect. See explanation.

C is incorrect. See explanation.

D is correct. See explanation.

Objective: S.VP1-13-B

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

Technical References: M-42-3, 20E-1-4030SX15, WO03. Big note WO-2.

LOD: NUMBER

(LORT BANK)

After an SI occurs, the SX flow to the Containment Chillers _____ and the in-service Containment Chilled Water Pump _____.

- A. remains in service, trips
- B. remains in service, remains running
- C. is isolated, trips
- D. is isolated, remains running

Answer: C

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

50

ID: 1044442

Points: 1.00

Given:

- Unit 1 is in MODE 3.
- PZR pressure is at 2235 psig.
- Instrument Bus 111 is deenergized.
- PZR PORV 1RY456 is isolated due to excessive seat leakage.

Subsequently:

- A RCS pressure transient is in progress.
- PZR pressure is 2360 psig.

Given the conditions above, PZR PORV 1RY455A is currently...

- A. closed, but can be manually opened.
- B. closed, and CANNOT be manually opened.
- C. open, and will close when PZR pressure reaches 2185 psig.
- D. open, and will close when PZR pressure reaches 2315 psig.

Answer: A

Answer Explanation

Bank Question (2014 NRC exam question 50)

Tier 1

Low Cog

057 Loss of Vital AC Electrical Instrument Bus

2.4.11 Knowledge of abnormal condition procedures.

RO 4.0 SRO 4.2

Meets K/A, examinee must be able to have knowledge of 1BwOA Elec-2 and how it impacts components powered by instrument bus 111.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: A. 1BwOA ELEC-2, Table A. 1RY455A open setpoint of 2345 psig is exceeded, but it will not open in AUTO as stated in the table, but can be manually opened.

A is correct. See explanation.

B is incorrect. Plausible if the examinee thinks that 1RY455A is not able to be opened manually with the loss of instrument bus 111.

C is incorrect. Plausible if the examinee thinks that 1RY455A is open and with the loss of instrument bus 111 that 1RY455A will not open until the PZR PORV 2185 psig interlock is met.

D is incorrect. Plausible if the examinee thinks that 1RY455A is open and will function as designed.

Objective: T.OA02-03

Technical References: 1BwOA ELEC-2 page 10

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

51

ID: 1044466

Points: 1.00

Given:

- Unit 1 is at 100% power.

The following annunciators alarm:

- 125V DC BATT 112 MAIN BRKR TRIP (1-22-E6).
- 125V DC DIST. PNL 112/114 VOLT LOW (1-22-E10).

Concerning the 125 VDC 112 bus, battery and battery charger, what do these alarms indicate and what are the immediate required actions, if any, associated with these alarms?

- A. BOTH the battery AND charger are isolated from the bus AND a reactor trip IS required.
- B. ONLY the battery is isolated from the bus AND a reactor trip IS required.
- C. ONLY the battery charger is isolated from the bus AND a reactor trip is NOT required.
- D. 480V AC feed is isolated from the battery charger AND a reactor trip is NOT required.

Answer: A

Answer Explanation

Bank Question (2014 NRC exam question 51)

Tier 1

High Cog

058 Loss of DC Power

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

RO 2.8 SRO 3.1

Meets K/A, examinee must analyze status of 125 VDC bus components based on monitored indication and know the actions required by the operator.

10CFR55.41(b)(4) Secondary coolant and auxiliary systems that affect the facility.

Answer: A. 125V DC BATT 112 MAIN BRKR is brkr AF-2 which isolates BOTH the battery and charger from the bus, thereby de-energizing the bus and requiring a reactor trip due to loss of feedwater.

A is correct. See explanation.

B is incorrect. Plausible if the examinee does not understand the the 125V DC BATT 112 MAIN BRKR is brkr AF-2 the examinee might think that only the battery is isolated from the bus, not the charger.

C is incorrect. Plausible if the examinee does not understand the the 125V DC BATT 112 MAIN BRKR is brkr AF-2 the examinee might think that only the battery charger is isolated from the bus, not the battery.

D is incorrect. Plausible if the examinee only thinks this alarm comes in when 480V AC feed is isolated to the charger.

Objective: T.OA01-09

Technical References: BwAR 1-22-E6, BwAR 1-22-E10 and Big note DC-1

Bank 2013 Cert Exam (most recent exam use, not used on 2014 Cert Exam)

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

52

ID: 1044467

Points: 1.00

Given:

- At 1155, the Unit 1 reactor tripped due to a 1A FRV failure from full power.
- The 1B CV pump was OOS for a bearing replacement.
- At 1200, SX system flooding was reported in the A SX pump room.
- The flooding has NOT affected the B SX pump room.
- FP could NOT be aligned to the 1A CV pump.

- At 1210, 1BwOA PRI-8, Essential Service Water Malfunction, Attachment A, step 4.b, "Place in PULL OUT ANY vital equipment – exceeding the limits of Table A", was in progress with the following temperatures for the running ESF pumps:
 - 1A CV pump: ALL bearing temps are 172°F and rising at 3°F/min,
 - 1A CV pump: Gear drive oil temperature is 154°F and rising at 1.5°F/min.

Given the conditions above, if ALL trends continue, what is the EARLIEST time the 1A CV pump is REQUIRED to be tripped per 1BwOA PRI-8?

Reference Provided

- A. 1211
- B. 1221
- C. 1224
- D. 1244

Answer: B

Answer Explanation

New Question (2014 NRC exam question 52)

Tier 1

High Cog

Reference provided **1BwOA PRI-8, Essential Service Water Malfunction Table A**

062 Loss of Nuclear Service Water

AA2.06 Ability to determine and interpret the following as they apply to the Loss of Nuclear Service Water: The length of time after the loss of SWS flow to a component before that component may be damaged

RO 2.8 SRO 3.1

Meets K/A, examinee must know on a Loss of Nuclear Service Water the length of time before a component must be placed in PULL OUT before damage can occur.

10CFR55.41(b)(10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

Answer: B. Table A provides limits for the 1A CV Pump of 205° for the bearings and 175° for the gear drive oil. Bearing temperatures for the 1A CV Pump are 172° and rising 3°F/min thus will exceed 205° in 11 minutes 1210+11=1221

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

A is incorrect. Bearing temperatures for the 1A CV Pump are 172° and rising 3°F/min and if the examinee reads that the bearing temperature limit is 175° the temperature would be exceeded in 1 minute. $1210 + 1 = 1211$

B is correct. See explanation.

C is incorrect. Gear Drive temperatures for the 1A CV Pump are 154° and rising 1.5°F/min thus will exceed 175° in 14 minutes. $1210 + 14 = 1224$

D is incorrect. If the examinee thinks the Gear Drive temperatures for the 1A CV Pump limit is 205° and rising 1.5°F/min thus will exceed 205° in 34 minutes. $1210 + 34 = 1244$

Objective: T.OA18-02

Technical References: 1BwOA PRI-8, Essential Service Water Malfunction. Page 15 and 29

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

53

ID: 1044469

Points: 1.00

Given:

- Unit 1 is at 100% power.
- A LOCA outside containment has occurred
- The crew has implemented 1BwCA-1.2, LOCA Outside Containment.
- ALL systems automatically actuated as designed.

Based upon pipe ratings and relief capabilities, the leak would MOST likely be located in the...

- A. RH system discharge piping.
- B. RH system suction piping.
- C. SI system discharge piping.
- D. CV system discharge piping.

Answer: B

Answer Explanation

Bank Question (2014 NRC exam question 53)

Tier 1

Low Cog

E04 LOCA Outside Containment

EK1. Knowledge of the operational implications of the following concepts as they apply to the (LOCA Outside Containment)

EK1.1 Components, capacity, and function of emergency systems.

RO 3.5 SRO 3.9

Meets K/A, examinee must have knowledge of how the most likely leak location will impact the ECCS system and how they are operated.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: B. From WOG background document for CA-1.2, the RH suction path is the dominant probability of LOCA outside containment from the simultaneous failure of two MOVs.

A is incorrect. LOCA outside containment is possible from this flowpath due to simultaneous failure of three check valves, but probability is 6×10^{-11} vs. 1×10^{-7} for RH suction path. This flowpath is least likely of the three possible paths. Question stem asks for most likely path.

B is correct. See explanation.

C is incorrect. Flowpath would be isolated and SI system piping is class I and is rated for RCS pressure.

D is incorrect. Normal charging flowpath would be isolated and CV system piping is class I and is rated for RCS pressure.

Objective: T.CA2-03

Technical References: WOG background document for 1BwCA-1.2 page 7, I1-CA-XL-02 page 17

Bank ILT (Last used 2011 Cert Exam)

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

54

ID: 1044470

Points: 1.00

What is the basis for establishing ONLY one train of ECCS flow per 1BwCA-1.1, Loss of Emergency Coolant Recirculation?

- A. Depressurize the RCS to minimize subcooling.
- B. Depressurize the RCS to reduce break flow in a LOCA condition.
- C. Delay the time until RWST depletion occurs.
- D. Maintain ECCS pumps available for future use.

Answer: C

Answer Explanation

New Question (2014 NRC exam question 54)

Tier 1

Low Cog

E11 Loss of Emergency Coolant Recirculation

EK3. Knowledge of the reasons for the following responses as they apply to the (Loss of Emergency Coolant Recirculation)

EK3.2 Normal, abnormal and emergency operating procedures associated with (Loss of Emergency Coolant Recirculation).

RO 3.5 SRO 4.0

Meets K/A, examinee must know the reasons for performing actions in 1BwCA-1.1.

10CFR55.41(b)(10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

Answer: C. Per the background, the basis for establishing ONLY one train of ECCS flow is to establish core cooling while at the same time conserving RWST inventory since ECCS cannot be aligned in the recirculation mode.

A is incorrect. Plausible since this is the one of the basis in 1BwCA-1.1, just not the reason for securing one train of ECCS.

B is incorrect. Plausible if the examinee thinks this is one way to conserve inventory.

C is correct. See explanation.

D is incorrect. Plausible if the examinee thinks that with no emergency coolant recirculation that one train of ECCS pumps must be available for when ECCS is restored.

Objective: T.CA2-03

Technical References: WOG background document for 1BwCA-1.1 page 46, I1-CA-XL-02 page 6.

LOD: NUMBER

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

55

ID: 1044471

Points: 1.00

Given:

- 1BwFR-H.1, Response to Loss of Heat Sink, is in progress about to perform step 7, "Reset the FW isolation (FWI) Signal".
- ALL RCPs are stopped.
- Containment pressure is 3 psig.
- 1A S/G WR level is 33%.
- 1B-1D S/G WR levels are 38%.
- CETCs are 575 °F and dropping.
- PZR pressure is 2275 psig.
- 1A D/G out of service.

Based on the above conditions, RCS bleed and feed must be established if ...

- A. SAT feed breaker 1412 trips open.
- B. 1A S/G WR level drops to 25%.
- C. Containment pressure rises to 5 psig.
- D. PZR pressure rises to 2335 psig due to natural circulation being established.

Answer: C

Answer Explanation

Bank Question (2014 NRC exam question 55)

RO level

Tier 1

Low Cog

E05 Loss of Secondary Heat Sink

EK2.1 Knowledge of the interrelations between the (Loss of Secondary Heat Sink) and the following: Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

RO 3.7 SRO 3.9

Meets K/A, examinee must have knowledge of the interrelationship between components/interlocks and the Loss of Secondary Heat Sink. This is a RO level question since this is on the operator action summary and the RO would be responsible for informing the SRO that the conditions have been met to initiate bleed and feed.

10CFR55.41(b)(10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

Answer: C. 1BwFR-H.1 OAS, with the 1A/1B/1D SG levels < 43% when cntmt becomes adverse (> 5 psig) the OAS establishing RCS bleed and feed (steps 14-17).

A is incorrect. The loss of bus 141 would only make the 1A CV pump unavailable, not the 1B CV pump.

B is incorrect. 1A SG WR level <25% with 3 psig in cntmt would be only 1 SG < 27% (not 3).

C is correct. See explanation.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

D is incorrect. PZR pressure > 2335 psig is not due to loss of heat sink so it's incorrect, this is specifically addressed in the NOTE above step 3 in 1BwFR-H.1.

Objective: T.FR03-02

Technical References: 1BwFR-H.1 on Operator Action Summary page

(LORT BANK)

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

56

ID: 1044472

Points: 1.00

Given:

- Unit 1 is at 25% power.
- Bus 156 and 157 voltage drops to 5200 VAC due to a generator voltage issue.

Given the conditions above, the Unit 1 reactor has ____ (1) ____.
The reason this did/didn't occur is ____ (2) ____.

- A. (1) NOT automatically tripped.
(2) bus 156 and 157 voltage dropped low enough to strip all load breakers, but the coincidence for the reactor trip was NOT met.
- B. (1) NOT automatically tripped.
(2) bus 156 and 157 voltage did NOT drop low enough to strip all load breakers.
- C. (1) automatically tripped.
(2) to protect the reactor from DNB.
- D. (1) automatically tripped.
(2) to protect the reactor from a loss of heat sink.

Answer: C

Answer Explanation

New Question (2014 NRC exam question 56)

Tier 1

Low Cog

077 Generator Voltage and Electric Grid Disturbances

AK3.01 Knowledge of the reasons for the following responses as they apply to Generator Voltage and Electric Grid Disturbances: Reactor and turbine trip criteria.

RO 3.9 SRO 4.2

Meets K/A, examinee must be know the reason why the reactor tripped on a 6.9KV bus undervoltage.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: C. The reactor is tripped since 2/4 RCP buses are below 5268 volts for 0.7 seconds (above P-7 (10% power)). The reason the reactor is tripped is since the RCP might not have enough flow and this protects the core from DNB.

A is incorrect. Plausible if the examinee thinks that bus 156 and 157 voltage dropped low enough to strip all load breakers, but the coincidence for the reactor trip was not met. The examinee could believe this trip does not come in until P-8 (30% power)

B is incorrect. Plausible if the examinee thinks that bus 156 and 157 voltage did NOT drop low enough to strip all load breakers.

C is correct. See explanation.

D is incorrect. Plausible if the examinee thinks that the RCPs are running and that the loss of the CD/CB pumps and HD pumps caused a loss of heat sink. Also the AF pumps auto start with 2/4 RCP buses below 5268 volts for 0.7 seconds.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

Objective: S.RC2-08-A

Technical References: BwAR 1-11-A5 and Big note EF-1

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

57

ID: 1044474

Points: 1.00

Given:

- Unit 1 is at 88% power in a normal alignment.

Subsequently the following occurs:

- Reactor power is rising.
- Tave greater than Tref.
- Pressurizer pressure rising.
- Pressurizer level rising.

Which of the following would initially cause the above symptoms to occur?

- A. Uncontrolled rod withdrawal.
- B. Impulse Channel 1PT-505 fails HIGH.
- C. Failed OPEN SG safety valve.
- D. Power range channel N-43 fails HIGH.

Answer: A

Answer Explanation

Bank Question (2014 NRC exam question 57)

Tier 1

High Cog

001 Continuous Rod Withdrawal

AK1.03 Knowledge of the operational implications of the following concepts as they apply to Continuous Rod Withdrawal: Relationship of reactivity and reactor power to rod movement
RO 4.5 SRO 4.7

Meets K/A, examinee must understand how a continuous rod withdrawal will impact reactivity and the RCS.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: A. Correct, a constant addition of positive reactivity will raise reactor power, Tave, PZR pressure, and PZR level will increase due to increasing Tave. This would cause Auct Tave High to come in which states the probable cause would be a Rod Control System Malfunction.

A is correct. See explanation.

B is incorrect. Plausible since Pimp failing high will cause rods to withdraw, raising Tave, PZR pressure and level. But since Tave is greater than Tref this would not be true. Tref would fail high above Tave if Pimp failed high.

C is incorrect. Although a rise in steam flow will raise reactor power, this would cause Tave to lower and PZR pressure and level to lower.

D is incorrect. This is plausible since PR N-43 failing high would cause Tave to be above Tref. But since PR failing high, the rods will insert causing lowering Tave, pressure and level.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

Objective: S.RD1-20

Technical References: BwAR 1-14-E2

Bank (2001 Braidwood NRC Exam)

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

58

ID: 1044475

Points: 1.00

Given:

- Unit 2 is at 70% power.
- All systems were normally aligned.
- A power ascension was in progress.
- Control rods began withdrawing in Auto as expected due to a temperature mismatch.
- Rod H-8 in group 2 of CB D did NOT move with the rest of the bank.
- The Rod Bank Select Switch was placed in Manual and the power ascension halted.
- The crew entered 2BwOA ROD-3, Dropped or Misaligned Rod.
- Rod H-8 is determined to be 8 steps below the rest of the bank.
- Repairs have been made to the rod control system and power level is acceptable for rod recovery.
- Two hours have elapsed since control rod H-8 was discovered misaligned.

In addition to manipulating the Rod Control In-Hold-Out switch, which ONE of the following describes the proper switch manipulations in the main control room to recover Rod H-8?

Place the Rod Bank Select Switch in ...

- A. CB-D AND disconnect the lift coils for ALL rods in the unaffected group of CB D.
- B. CB-D AND disconnect the lift coils for ALL rods in CB D EXCEPT H-8.
- C. Manual AND disconnect the lift coil for rod H-8 ONLY.
- D. CB-D, NO further switch alignment is necessary.

Answer: B

Answer Explanation

Bank Question (2014 NRC exam question 58)

Tier 1

Low Cog

005 Inoperable/Stuck Control Rod

AK2. Knowledge of the interrelations between the Inoperable / Stuck Control Rod and the following:

Breakers, relays, disconnects, and control room switches

RO 2.5 SRO 2.6

Meets K/A, examinee must determine the method of rod recovery and determine the switch manipulations required to realign inoperable/stuck control rod. This is RO level since the RO must understand how the rod control system works.

10CFR55.41(b)(10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

Answer: B. 2BwOA ROD-3 directs realigning rod to bank by disconnecting lift coils for all other rods in affected bank and placing rod bank select switch to affected bank. This accounts for all of the switches that have to be operated in the MCR before recovering the rod. This allows for only the dropped rod to be withdrawn, and the unaffected rods will not be withdrawn with the lift coils disconnected.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

A is incorrect. This would not realign the rods. This would still allow the unaffected rods in the unaffected group to be withdrawn.

B is correct. See explanation.

C is incorrect. Correct for realigning bank to rod, but 2BwOA ROD-3 directs rod to bank realignment. Re-aligning bank to rod would have a much bigger reactivity impact and would not recover Rod H-8.

D is incorrect. Would not realign rod, would cause all the rods to withdraw.

Objective: T.OA34-03

Technical References: 2BwOA Rod-3 page 17

Bank 2009 Cert Exam

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

59

ID: 1044477

Points: 1.00

Given:

- A Unit 1 reactor trip occurs.
- DRPI indication for 1 rod indicates 12 steps.
- ALL other rods "rod at bottom" lights are lit.
- Then a loss of offsite power occurs.
- 1BwEP ES-0.1, Reactor Trip Response, is in progress at step 2, "Check Shutdown Reactivity".
- RCS pressure is 2150 psig and rising.
- RCS cold leg temperature is 550 °F and rising.

Subsequently:

- Power has just been restored bus 143 and bus 144.

Given the conditions above, the crew is ...

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2	CHECK SHUTDOWN REACTIVITY STATUS: a. Verify all control rods fully inserted: <ul style="list-style-type: none">• Rod bottom lights - <u>ALL LIT</u> b. Check RCPs - <u>ANY RUNNING</u>	a. Perform the following: 1) <u>IF</u> two or more rods are <u>NOT</u> fully inserted, <u>THEN</u> emergency borate 1320 GAL (5500 GAL FROM RWST) for each rod <u>NOT</u> fully inserted per 1BwQA PRI-2, EMERGENCY BORATION. 2) * Within 1 HOUR calculate Shutdown Margin per 1BwQSR 3.1.1.1-1, SHUTDOWN MARGIN VERIFICATION DURING SHUTDOWN. b. Perform the following: 1) Request Chemistry obtain RCS hot leg boron samples every 15 MINUTES. 2) <u>WHEN</u> power is available to boric acid transfer pump, <u>THEN</u> initiate 6000 GAL emergency boration: a) Open ICV8104. b) Start boric acid transfer pump. c) Establish at least 60 GPM charging flow. 3) Refer to Tech Specs: <ul style="list-style-type: none">• 3.3.9• 3.4.5

- A. NOT required to emergency borate.
- B. required to emergency borate a MINIMUM of 1320 gallons from the boric acid storage tank.
- C. required to emergency borate a MINIMUM of 5500 gallons from the RWST.
- D. required to emergency borate a MINIMUM of 6000 gallons from the boric acid storage tank.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

Answer: D

Answer Explanation

New Question (2014 NRC exam question 59)

Tier 1

High Cog

Reference Provided 1BwEP ES-0.1 STEP 2

024 Emergency Boration

Ability to interpret and execute procedure steps.

RO 4.5 SRO 4.7

Meets K/A, examinee must be able to interpret and execute procedure steps associated with emergency boration. This is RO level since step is on the continuous actions summary and the RO would be responsible for borating the 6000 gal once power is restored to the boric acid transfer pump.

10CFR55.41(b)(10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

Answer: D. This is correct since all RCPs are secured and when power is available to the boric acid transfer pump, then initiate 6000 gal emergency boration. This step is on the continuous action summary.

A is incorrect. This is plausible if the examinee does not realize the RCPs are tripped.

B is incorrect. 1BwEP ES-0.1 step 2.a RNO states that "if two or more rods are not fully inserted, then emergency borate 1320 gal for each rod not fully inserted". Since only one rod is not fully inserted the boration of 1320 gallons is not required.

C is incorrect. 1BwEP ES-0.1 step 2.a RNO states that "if two or more rods are not fully inserted, then emergency borate 5500 gal from the RWST for each rod not fully inserted". Since only one rod is not fully inserted the boration of 5500 gal is not required. Plausible since the loss of power occurred.

D is correct. See explanation.

Objective: T.EP01-06-C

Technical References: 1BwEP ES-0.1, page 5

LOD: NUMBER

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

60

ID: 1044478

Points: 1.00

Given:

- Unit 2 reactor shutdown is in progress.
- Intermediate range channel N36 is undercompensated.

Which of the following describes the effect the N36 undercompensation will have on energizing the source range channels?

- A. Both source range channels will energize when N35 lowers below the P-6 setpoint if no operator action is taken.
- B. Both source range channels will energize at a higher power level than normal, because N36 will reach the P-6 setpoint early.
- C. The source range channels will NOT automatically energize, the operator will have to take the SR Trip RESET/BLOCK switches to BLOCK.
- D. The source range channels will NOT automatically energize, the operator will have to take the SR Trip RESET/BLOCK switches to RESET.

Answer: D

Answer Explanation

Bank Question (2014 NRC exam question 60)

Tier 1

High Cog

032 Loss of Source Range Nuclear Instrumentation

AA1.01 Ability to operate and / or monitor the following as they apply to the Loss of Source Range

Nuclear Instrumentation: Manual restoration of power

RO 3.1 SRO 3.4

Meets K/A, examinee must be able to monitor nuclear instruments and determine if manual restoration of the source range NI's is required.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: D. Since IR channel N36 is undercompensated channel N36 will not drop below 5.0E-11. If both N35 and N36 do not drop below 5.0E-11 the source range channels will NOT automatically energize, the operator will have to take the SR Trip RESET/BLOCK switches to RESET to manually energize the SR detectors.

A is incorrect. N36 will not lower below the P-6 setpoint; both channels are required to be below P-6 to energize the source ranges.

B is incorrect. Both channels are required to be below P-6 and in this case, N36 will not lower to less than P-6. This would be correct if channel N36 was overcompensated.

C is incorrect. The switches are taken to BLOCK to de-energize the source ranges, they would not do anything to energize the source range channels.

D is correct. See explanation.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

Objective: S.NI1-07-D

Technical References: I1-NI-XL-01 page 22, and Big note NI-3 and EF-1.

Bank (Diablo Canyon 2012 NRC exam)

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

61

ID: 1044480

Points: 1.00

Given:

- Unit 1 is in a refueling outage.
- NO expected evolutions associated with RH are planned
- While taking logs during core loading, the NSO notices the following trends AFTER the initial source nucleus (initial 8-13 assemblies) have been installed.

	<u>RCS Temp</u>	<u>RCS Boron</u>	<u>SR N31</u>	<u>SR N32</u>
1100	72°F	2370 ppm	13 cps	15 cps
1300	77°F	2350 ppm	20 cps	21cps
1500	81°F	2310 ppm	32 cps	28 cps

In response to this event, the NSO will inform the Licensed Fuel Handling Supervisor that core loading...

- A. must be suspended because of the change in source range counts.
- B. must be suspended because of the change in boron concentration.
- C. must be suspended because of the change in RCS temperature.
- D. may continue.

Answer: B

Answer Explanation

Bank Question (2014 NRC exam question 61)

Tier 1

High Cog

036 Fuel Handling Incidents

AK1.02 Knowledge of the operational implications of the following concepts as they apply to Fuel

Handling Incidents: SDM

RO 3.4 SRO 3.8

Meets K/A, examinee must have knowledge of the operational implications of reduced SDM as they apply to a Fuel Handling.

10CFR55.41(b)(6) Design, components, and functions of reactivity control mechanisms and instrumentation.

Answer: B. Boron changed by greater than 20 ppm, SDM has been reduced. An UNEXPECTED change in RCS boron concentration of greater than 20 ppm, as determined from 2 successive samples, or RCS temperature changes by +10°F from the baseline values. Since RCS boron concentration changed greater than 20 ppm, the core loading must be suspended.

A is incorrect. Count rate of ALL responding nuclear monitoring channels did not rise by a factor of 2.

B is correct. See explanation.

C is incorrect. Would affect SDM, but the temperature change was only 9°F RCS temperature did not rise by +10°F from the baseline value.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

D is incorrect. Plausible if the examinee thinks that since the SFP is still above the tech spec requirement that no action is required.

Objective: T.GP06-05

Technical References: 1BwGP 100-6 page 7

Bank (2009 Diablo Canyon)

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

62

ID: 1044481

Points: 1.00

Given:

- Unit 2 is offloading the core to the spent fuel pool (SFP).
- 0A and 0B Inaccessible VA Filter Plenums are aligned.
- 0A and 0B Fuel Handling Building Charcoal Booster Fans are NOT running.
- 0AR055J, Fuel Handling Building (FHB) Area Radiation Monitor, indicates in RED on the RM-11.
- 0AR056J, Fuel Handling Building (FHB) Area Radiation Monitor, indicates in YELLOW on the RM-11.

Given the conditions above, the crew will...

- A. ensure that ONLY 0VA04CA, 0A Fuel Handling Building Charcoal Booster Fan, auto started to allow for any radioactive material being released to be absorbed by the charcoal filters.
- B. place the fuel being moved by the SFP bridge crane in a safe condition since the SFP bridge crane upward motion has been inhibited to prevent lifting a spent fuel element out of the water.
- C. ensure the 0VA03CB and 0VA03CD, 0B and 0D Inaccessible Filter Plenum Charcoal Booster Fans, auto started to make aux building D/P more negative to minimize the spread of contamination.
- D. ensure that 0VA04CA and 0VA04CB, 0A and 0B Fuel Handling Building Charcoal Booster Fans, auto started to allow for any radioactive material being released to be absorbed by the charcoal filters.

Answer: A

Answer Explanation

New Question (2014 NRC exam question 62)

Tier 1

Low Cog

061 Area Radiation Monitoring (ARM) System Alarms

AK3.02 Knowledge of the reasons for the following responses as they apply to the Area Radiation Monitoring (ARM) System Alarms: Guidance contained in alarm response for ARM system
RO 3.4 SRO 3.6

Meets K/A, examinee must have knowledge of the reasons for the ARM alarm response.

10CFR55.41(b)(10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

Answer: A. 0VA04CA, 0A Fuel Handling Building Charcoal Booster Fan, will start since the 0AR055J, Fuel Handling Building (FHB) Area Radiation Monitor, has alarmed in RED (ALARM Setpoint) on the RM-11. This is to allow for any radioactive material being released to be absorbed through the charcoal filters. This is one of the purposes of Aux Building Ventilation.

A is correct. See explanation.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

B is incorrect. Plausible if the examinee thinks that the 0AR039J FHB rad monitor alarmed, which has the interlock to prevent the SFP bridge crane from upward motion.

C is incorrect. Plausible if the examinee thinks there are automatic actions of the 0AR055J is to start the inaccessible filter plenum charcoal booster fans.

D is incorrect. Plausible if the examinee thinks that the 0VA04CB, 0B Fuel Handling Building Charcoal Booster Fan, has also started since the 0AR056J, Fuel Handling Building (FHB) Area Radiation Monitor, alarms in YELLOW (ALERT SETPOINT), the auto actions to start the fan does not occur until the RED (ALARM) setpoint. Both fans will not start even if both ARs were in alarm, only one fan starts.

Objective: S.AR1-04-A-01

Technical References: BwAR 4-0AR055J and I1-VA-XL-01 page 2 and 26

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

63

ID: 1044483

Points: 1.00

Given:

- A RCS LOCA had occurred on Unit 1.
- 1BwFR-C.1 "Response to Inadequate Core Cooling" is in progress at step 9, "Depressurize All Intact SGs to 90 psig".
- Containment pressure is 7 psig.
- 1A AF pump is OOS.
- 1A-D SG narrow range water levels are 35%.
- ALL SGs are intact.
- The 1A-D SG PORVs have been opened to depressurize all SGs to 90 psig.
- AF flow is 500 gpm total (125 gpm to each SG).

Subsequently:

- Before RCS pressure drops to 90 psig, the NSO reports that the 1A-D SG narrow range water levels have dropped to 5% and are lowering.

Given the conditions above, the crew will...

- A. continue depressurizing ALL SGs AND maximize AF flow to ALL SGs.
- B. stop depressurizing ALL the SGs AND maximize AF flow to ALL SGs until narrow range water levels are greater than 10%.
- C. stop depressurizing ALL the SGs AND maximize AF flow to only ONE SG until narrow range water level is greater than 31%.
- D. stop depressurizing only ONE SG AND maximize AF flow to that ONE SG until that narrow range water level is greater than 31%.

Answer: A

Answer Explanation

New Question (2014 NRC exam question 63)

Tier 1

Low Cog

074 Inadequate Core Cooling

EK2.03 Knowledge of the interrelations between the following Inadequate Core Cooling: AFW pump
RO 4.0 SRO 4.0

Meets K/A, examinee must have knowledge of the impact of only one AF pump while depressurizing all SGs to 90 psig and how the procedure for inadequate core cooling allows partial uncover of SG tubes while depressurizing the SGs.

10CFR55.41(b)(10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

Answer: A. There is a note before step 9 that states "partial uncover of SG tubes is acceptable in the following step". So when the water level in all SGs drop to 5% the crew will continue depressurizing all SGs.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

A is correct. See explanation.

B is incorrect. Plausible if the examinee thinks containment is not adverse and that all SG water levels have to be maintained between 10-50% while depressurizing.

C is incorrect. Plausible if the examinee thinks that all SG water levels have to be maintained between 31-50% while depressurizing.

D is incorrect. Plausible if the examinee thinks that one SG has to maintain water level between 31-50% while depressurizing.

Objective: T.FR2-03

Technical References: 1BwFR-C.1 page 16

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

64

ID: 1044484

Points: 1.00

Given:

- Unit 1 has experienced a transient that has resulted in a reactor trip and safety injection.
- Containment pressure is 0.2 psig and stable.
- ALL MSIVs are closed.
- The crew is implementing 1BwEP ES-0.0, Rediagnosis.
- The NSO observes the following SG indications:

	NR Level	Pressure	MSL Radiation	AF Flow
1A SG	60% and ↑	1080 psig and ↑	0.5 mr/hr	0 gpm
1B SG	0%	1080 psig and stable	0.1 mr/hr	100 gpm
1C SG	5% and ↓	700 psig and ↓	0.09 mr/hr	200 gpm
1D SG	20% and stable	900 psig and stable	0.11 mr/hr	100 gpm

Given the conditions above, which one of the following describes the status of the SGs?

- A. 1A SG is ruptured and 1B SG is faulted.
- B. 1B SG and 1D SG are both faulted.
- C. 1C SG and 1D SG are both faulted.
- D. 1A SG is ruptured and 1C SG is faulted.

Answer: D

Answer Explanation

Bank Question (2014 NRC exam question 64)

Tier 1

High Cog

E01 Rediagnosis

EA1. Ability to operate and / or monitor the following as they apply to the (Reactor Trip or Safety Injection/Rediagnosis)

EA1.2 Operating behavior characteristics of the facility.

RO 3.3 SRO 3.6

Meets K/A, examinee must be able to monitor the characteristics of the facility to determine the failed components and determine the appropriate actions in 1BwEP ES-0.0, Rediagnosis.

10CFR55.41(b)(10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

Answer: D. 1A SG indicates it is ruptured because there is higher Rad Monitor indication than the other SG's and the SG level is rising even though there is no AF flow to the SG. 1C SG is faulted because its level is lowering even though there is AF flow to the SG and the SG pressure is the lowest of all SG's and continues to lower.

A is incorrect. 1A SG is ruptured as stated, but the 1B SG is not faulted because its pressure is at what's expected and stable.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

B is incorrect. Neither of these SGs are faulted. 1B SG is not faulted because its pressure is at what's expected and stable. The 1D SG is not faulted because its pressure is where it's expected and stable. C is incorrect. 1C SG is faulted as stated, but the 1D is not faulted because its pressure is where it's expected and stable.
D is correct. See explanation.

Objective: T.EP01-06-B

Technical References: 1BwEP ES-0.0 page 2 and 3.

Bank (South Texas Project 2010)

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

65

ID: 1044485

Points: 1.00

Given:

- A RCS LOCA occurred on Unit 2.
- Containment pressure is 1.9 psig and stable.
- The crew has just entered 2BwFR-Z.2, Respond to Containment Flooding.

What is the mitigating strategy of 2BwFR-Z.2?

- A. Divert RHR flow from the containment sump to the RWST to lower Containment Level.
- B. Re-align containment spray to the recirculation sump.
- C. Identify and isolate unexpected sources of water.
- D. Stop both containment spray pumps.

Answer: C

Answer Explanation

Bank Question (2014 NRC exam question 65)

Tier 1

Low Cog

E15 Containment Flooding

EA2. Ability to determine and interpret the following as they apply to the (Containment Flooding)

EA2.2 Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.

RO 2.9 SRO 3.3

Meets K/A, examinee must be able to adhere to the procedure and take actions to operate within the limitations of the facility.

10CFR55.41(b)(10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

Answer: C. Containment design basis flood level takes into account the entire water contents of the RCS, RWST, Spray add tanks, and SI accumulators. SX, CC, FP, PW, and WM may be major contributors to exceeding "flood" level and causing a loss of equipment required for long term cooling. Per 2BwFR-Z.2 the expected actions is to identify and isolate unexpected sources of water.

A is incorrect. Water is not pumped out of containment using the RHR pumps.

B is incorrect. Re-aligning CS to the recirc sump is not correct, plausible if the examinee thought this would stop inputting water into CNMT.

C is correct. See explanation.

D is incorrect. The CS pumps are not stopped due to high level.

Objective: T.FR05-04-B

Technical References: 2BwFR-Z.2 page 2.

Bank (DC Cook 2008)

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

66

ID: 1044487

Points: 1.00

With normal letdown unavailable, excess letdown is required to ...

- A. monitor RCS radiation levels.
- B. ensure an adequate water supply for RCP seal cooling.
- C. provide a means for lowering RCS activity.
- D. maintain a constant PZR level.

Answer: D

Answer Explanation

Bank Question (2014 NRC exam question 66)

Tier 3

Low Cog

2.1.27 Knowledge of system purpose and/or function.

RO 3.9 SRO 4.0

Meets K/A, examinee must have knowledge of the purpose of the excess letdown system.

10CFR55.41(b)(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Answer: D. The purpose of excess letdown is to help keep pressurizer level stable on a loss of normal charging and letdown.

A is incorrect. This is plausible since it would be done by normal letdown. Excess letdown does not provide a flowpath through the rad skids.

B is incorrect. This is would be done by CVCS makeup so excess letdown is not required to maintain an adequate water supply for RCP seal cooling. This is plausible since excess letdown does provide water back to the VCT.

C is incorrect. This is plausible since it would be done by normal letdown. Excess letdown bypasses the CV demins.

D is correct. See explanation.

Objective: S.CV1-04-I

Technical References: I1-CV-XL-01 page 35

LORT Bank

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

67

ID: 1044489

Points: 1.00

Which of the following individuals is REQUIRED to request permission from the Unit NSO prior to entering the "Zone of Control" area (designated by contrasting carpet), per OP-AA-103-101, Control Room Access?

- A. Shift Manager
- B. NRC Resident Inspector
- C. Equipment Operator
- D. Shift Technical Advisor

Answer: C

Answer Explanation

Bank Question (2014 NRC exam question 67)

Tier 3

Low Cog

2.1.13 Knowledge of facility requirements for controlling vital/controlled access.
RO 2.5 SRO 3.2

Meets K/A, examinee must have knowledge of the requirements for controlling access in the MCR.

10CFR55.41(b)(10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

Answer: C. OP-AA-103-101 states that "In order to enter the zone of control, permission must be granted by the Reactor Operator (Control Room Operator). The Shift Manager, Unit Supervisor (Control Room Supervisor), STA, and Regulatory Personnel are not required to obtain permission.

A is incorrect. See explanation.

B is incorrect. See explanation.

C is correct. See explanation.

D is incorrect. See explanation.

Objective: T.AM31-03

Technical References: OP-AA-103-101 page 2.

(Bank Braidwood 2009 NRC exam)

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

68

ID: 1044491

Points: 1.00

In accordance with BwOP PRA-1, PRA Required Actions to Maintain Equipment Availability, whenever PRA equipment is being kept “available” by utilizing operator actions, which of the following are REQUIRED?

1. Unit NSO logs the operators assigned to restore the system or component.
 2. Operators briefed on the specific steps required for restoration.
 3. Have equipment status tags (EST’s) hung on components required to be kept “available”.
 4. The restoration steps clearly identified in the controlling document.
 5. Operators available to perform the actions promptly.
- A. 2, 4, and 5 only.
- B. 1, 2, 3, and 5 only.
- C. 1, 2, 4, and 5 only.
- D. 2, 3, and 4 only.

Answer: C

Answer Explanation

New Question (2014 NRC exam question 68)

Tier 3

Low Cog

2.2.18 Knowledge of the process for managing maintenance activities during shutdown operations, such as risk assessments, work prioritization, etc.

RO 2.6 SRO 3.9

Meets K/A, examinee must have knowledge of the process for managing maintenance activities during shutdown operations and the actions required to minimize risk.

10CFR55.41(b)(10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

Answer: C. BwOP PRA-1, PRA Required Actions to Maintain Equipment Availability, whenever PRA equipment is being kept “available” by utilizing operator actions, the following are required:

- ? The operator(s) designated the responsibility for performing actions to restore a system or component will be logged by name in the unit log.
- ? The operator(s) responsible of this restoration will be briefed on the specific steps for restoration in the controlling approved document. This will occur prior to performing the evolution or surveillance.
- ? The controlling document will have the restoration steps clearly identified to restore the system or component, these actions will be performed promptly without delay.
- ? The operator will understand that in the event his/her actions are required to restore the system or component, these actions will be performed promptly and without delay.

A is incorrect. The NSO is required to log the operator assigned to restore the equipment or component.

B is incorrect. Option 3 (hang EST’s) is not correct, since this is not required to be done per BwOP PRA-1..

C is correct. See explanation.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

D is incorrect. Option 3 (hang EST's) is not correct, since this is not required to be done per BwOP PRA-1..

Objective: 3E.AM-133

Technical References: BwOP PRA-1 page 5

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

69

ID: 1044492

Points: 1.00

Given:

- Unit 1 is at 400°F during a plant heatup.
- 1C and 1D RCPs are in OPERATION.
- 1A and 1B RCPs are OOS for maintenance.
- The Control Rod Drive MG sets are running.
- Both Reactor Trip Breakers are closed for rod control cabinet testing.
- The RCS is being diluted to ECC boron concentration.

Subsequently:

- A seal leakoff problem develops with the 1C RCP and the 1C RCP is tripped.

With the above conditions, which one of the following actions must be taken per Tech Specs?

- A. Initiate action to place 1 train of RH in service immediately.
- B. Initiate action to restore one RCP immediately.
- C. Verify Shutdown Margin is within limits of the COLR within one hour.
- D. Open the Reactor Trip Breakers within one hour.

Answer: D

Answer Explanation

Bank Question (2014 NRC exam question 69)

Tier 3

High Cog

2.2.40 Ability to apply Technical Specifications for a system.

RO 3.4 SRO 4.7

Meets K/A, examinee must be able to apply Tech Specs for a system during a RCP malfunction.

10CFR55.43(b)(2) Facility operating limitations in the technical specifications and their bases.

Answer: D. Per T.S. 3.4.5, RCS Loops Mode 3, two operable RCS loops shall be in operation when Rod Control system is capable of rod withdrawal. Tripping the 1C RCP would drop the number of operational loops to one. LCO 3.4.5 Condition A requires placing rod control in a condition incapable of rod withdrawal. Opening the reactor trip breakers would satisfy the condition.

A is incorrect. See explanation above. Placing RH loop in operation would be correct if unit was in Mode 4 with no loops in operation.

B is incorrect. Initiate action to restore one loop is required action for LCO 3.4.5 cond. B (no loops in operation).

C is incorrect. Verify SDM is one hour action for TS 3.1.4, 3.1.5 and 3.1.6.

D is correct. See explanation.

Objective: S.RC2-11-B

Technical References: TS LCO 3.4.5

Bank (Braidwood NRC 2009)

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

70

ID: 1044517

Points: 1.00

Per BwAP 340-1, Use of Procedures for Operating Department, what symbol is used in the margin of a procedure step to indicate Acceptance Criteria (data or step that is required to be acceptable for the successful completion of the surveillance procedure)?

- A. * (star symbol)
- B. ¢ (cent symbol)
- C. @ (at symbol)
- D. ♦ (diamond symbol)

Answer: B

Answer Explanation

Modified Question (2014 NRC exam question 70)

Tier 3

Low Cog

2.2.12 Knowledge of surveillance procedures.
RO 3.7 SRO 4.1

Meets K/A, examinee must have knowledge of the symbols used in surveillance procedures.

10CFR55.41(b)(10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

Answer: B. ¢ means acceptance criteria for surv. successful completion.

A is incorrect. * means a commitment.

B is correct. See explanation.

C is incorrect. @ means admin acceptance criteria (not required for successful surv. completion but does require corrective action).

D is incorrect. ♦ (diamond symbol) is used to designate a continuous action summary step.

Objective: T.AM04-23

Technical References: BwAP 340-1 page 4

Original question on 2013 Cert exam.

2013 Cert Exam has the following modified version of the question.

Per BwAP 340-1, USE OF PROCEDURES FOR OPERATING DEPARTMENT, what symbol is used in the margin of a procedure step to indicate administrative acceptance criteria (not required for successful surveillance completion but does require corrective action)?

- A. ¢ (cent symbol)
- B. @ (at symbol)
- C. I (vertical line)
- D. * (star symbol)

Answer: B

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

71

ID: 1044519

Points: 1.00

Given:

- A system valve alignment must be performed in an area where the radiation level is 150 mrem/hour.
- The individuals current annual Total Effective Dose Equivalent (TEDE) is 900 mrem.

Of the following times, what is the LONGEST amount of time that an individual can work in this area without exceeding their Administrative Dose Control Level (ADCL)?

- A. 30 minutes.
- B. 4 hours.
- C. 6 hours.
- D. 8 hours.

Answer: C

Answer Explanation

Bank Question (2014 NRC exam question 71)

Tier 3

High Cog

2.3.7 Ability to comply with radiation work permit requirements during normal or abnormal conditions.
RO 3.5 SRO 3.6

Meets K/A, examinee must be able to comply with radiation work permits and understand how to minimize exposure.

10CFR55.41(b)(12) Radiological safety principles and procedures.

Answer: C. $6 \text{ hours} \times 150 \text{ mrem/hour} = 900 \text{ mrem} + 900 \text{ mrem} = 1800 \text{ mrem}$. This is under the Administrative Dose Control Level of 2000 mrem.

A is incorrect. Plausible if the examinee thinks the Administrative Dose Control Level is 1000 mrem.

B is incorrect. Plausible if the examinee thinks the Administrative Dose Control Level is 1500 mrem.

C is correct. See explanation.

D is incorrect. Plausible if the examinee thinks the Administrative Dose Control Level is 5000 mrem, which is the federal limit.

Objective: T.AM-46-02

Technical References: RP-AA-203 page 3

Bank (SONGS 2011)

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

72

ID: 1044520

Points: 1.00

Given:

- A SGTR has occurred in the 1B SG.
- The crew is currently performing actions per 1BwEP-3, SGTR.
- 1B SG pressure is 1100 psig.
- The 1B SG PORV is closed.

In response to this event the 1B SG PORV controller will be ...

- A. verified in AUTO to ensure the ruptured SG and RCS pressures can be equalized.
- B. verified in AUTO so the ruptured S/G PORV is available to prevent challenging the S/G safeties.
- C. placed in manual to ensure the PORV is available for the upcoming RCS cooldown.
- D. placed in manual to prevent radioactive release to atmosphere.

Answer: B

Answer Explanation

New Question (2014 NRC exam question 72)

Tier 3

Low Cog

2.3.14 Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.

RO 3.4 SRO 3.8

Meets K/A, examinee must have knowledge of the consequences of the SG safeties lifting and not reseal radiation would be releasing. SG safeties not designed for water release and could fail open.

10CFR55.43(b)(4) Radiation hazards that may arise during normal and abnormal situations, including maintenance activities and various contamination conditions.

Answer: B. The PORV on the ruptured steam generator should remain available to limit steam generator pressure unless it fails open. This will minimize any challenges to the code safety valve.

A is incorrect. RCS and ruptured SG pressures are equalized by cooling down and depressurizing the RCS.

B is correct. See explanation.

C is incorrect. The ruptured SG PORV is not used for the RCS cooldown.

D is incorrect. The SG PORV controller in manual by itself will not minimize radioactive release, more concerned about the SG safeties opening.

Objective: T.EP04-08

Technical References: BwEP-3 background document (BD-EP-3) EOP step 3 on page 12. 1BwEP-3 step 3a, on page 4.

LOD: NUMBER

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

73

ID: 1044521

Points: 1.00

Per BwAP 340-1, USE OF PROCEDURES FOR OPERATING DEPARTMENT, which of the following correctly describes when an emergency procedure step on the Continuous Action Summary page, is applicable?

- A. Only PRIOR to performing the step in the main body of the procedure, AND it MAY apply after a transition is made to another procedure.
- B. Only after proceeding PAST the step in the main body of the procedure, BUT it will NOT apply after a transition is made to another procedure.
- C. Only after proceeding PAST the step in the main body of the procedure, AND it MAY apply after a transition is made to another procedure.
- D. ANY time during the procedure performance, BUT it will NOT apply after a transition is made to another procedure.

Answer: C

Answer Explanation

Bank Question (2014 NRC exam question 73)
Tier 3
Low Cog

2.4.17 Knowledge of EOP terms and definitions.
RO 3.9 SRO 4.3

Meets K/A, examinee must have knowledge of EOP terms and understand how to apply them.

10CFR55.41(b)(10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

The question meets the K/A, requires examinee ability to interpret and execute procedure steps. Examinee must know rules of usage for continuous action steps in order to properly execute them.

Answer explanation: BwAP 340-1 states that a step on the CAS page becomes applicable AFTER proceeding past that step in the main body. A CAS step then remains applicable until it is superseded by alternate guidance or stated to be inapplicable. It generally remains applicable throughout its associated procedure unless otherwise stated, and may apply after transition to another procedure if the actions are not inappropriate for the other procedure.

Choice A is incorrect, see explanation above also it is plausible because the OAS (vs. CAS) page list procedure steps that are applicable prior to performing it in the procedure main body.

Choice B is incorrect, see explanation above

Choice C is correct, see explanation above.

Choice D is incorrect, see explanation above.

Objective: T.AM04-28

Technical References: BwAP 340-1 page 10.
2009 Braidwood NRC Exam

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

74

ID: 1044522

Points: 1.00

Given:

- A Site Area Emergency is declared at 1411.

Given the condition above, which of the following identifies the LATEST time at which the State/Local notifications of the Site Area Emergency classification can be initiated and still meet the notification requirement per EP-AA-114, Notifications?

- A. 1420
- B. 1425
- C. 1440
- D. 1510

Answer: B

Answer Explanation

New Question (2014 NRC exam question 74)

Tier 3

High Cog

2.4.29 Knowledge of the emergency plan.
RO 3.1 SRO 4.4

Meets K/A, examinee must have knowledge of the emergency plan and when state notification is required.

10CFR55.41(b)(10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

Answer: B. Candidate must know that the Nuclear Accident Reporting System (NARS) is a telecommunication network and form used to transmit information to appropriate state and local agencies. This notification must be initiated within 15 minutes of the declaration of an emergency.

A is incorrect. Plausible if the examinee thinks the time is 10 minutes, which corresponds to when Everbridge must be activated (ERO Duty Team Notification).

B is correct. See explanation.

C is incorrect. Plausible if the examinee thinks the time is 30 minutes.

D is incorrect. Plausible if the examinee thinks the time is 60 minutes, which corresponds to when the NRC must be notified (ENS).

Objective: T.ZP1-35

Technical References: EP-AA-114, Notifications page 2.

EXAMINATION ANSWER KEY

2014 RO NRC Exam (Class 13-1)

75

ID: 1044523

Points: 1.00

Given:

- The U-1 Unit Supervisor is currently behind the control boards attending a brief.
- Subsequently a transient occurs on U-1 requiring an immediate operator action step from an approved procedure to stabilize the plant.

In accordance with OP-AA-101-111, ROLES AND RESPONSIBILITIES OF ON-SHIFT PERSONNEL, the Reactor Operator will perform the action...

- A. only after an SRO is at the Unit desk and agrees with verbalization of the action.
- B. promptly from memory without waiting for the US to confirm the action.
- C. promptly after first receiving a peer check.
- D. only after the procedure is in hand and the RO has read the step.

Answer: B

Answer Explanation

Bank Question (2014 NRC exam question 75)

Tier 3

Low Cog

2.4.13 Knowledge of crew roles and responsibilities during EOP usage.
RO 4.0 SRO 4.6

Meets K/A, examinee must have knowledge of the responsibilities of the NSO during EOP usage.

10CFR55.41(b)(10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

Answer: B. The question meets the K/A, requires examinee ability to manage crew actions during plant transients.

Section 4.7.2 part 1 of OP-AA-101-111 states it is the RO's responsibility to perform immediate operator actions of an abnormal procedure from memory. It is also preceded by a note that says the immediate actions to stabilize the plant during transients take priority over verbalization of the action to the US.

Choice A is incorrect, see explanation above.

Choice B is correct, see explanation above.

Choice C is incorrect, see explanation above.

Choice D is incorrect, see explanation above.

Objective: T.AM04-15

Technical References: OP-AA-101-111 page 7.

Bank (2011 Braidwood NRC Exam)

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

76

ID: 1044524

Points: 1.00

Given:

- Unit 1 is at 50% power.
- Annunciator RCP SEAL LEAKOFF FLOW HIGH (1-7-B3) is in alarm.
- 1A RCP #1 seal leakoff flowrate is 6.1 gpm.
- 1A RCP #1 seal DP is > 400 psid.
- 1A RCP #2 seal leakoff is 0.5 gpm
- 1A RCP #2 SEAL LEAKOFF FLOW HIGH alarm is NOT printed.
- ALL RCP seal injection flows are 10-12 gpm.
- There are no RCP instrumentation failures.

Given the conditions above, per 1BWOA RCP-1, Reactor Coolant Pump Seal Failure, the Unit 1 US will direct the crew to take which of the following actions?

- A. Continue to operate without a power restriction, monitor RCP seal operating conditions, and contact System Engineering.
- B. Reduce power to less than 50% in one hour, shutdown to MODE 3 in 2 hours and trip the 1A RCP.
- C. Initiate a unit shutdown per 1BwGP 100-4, Power Descension, and trip the 1A RCP within 8 hours.
- D. Immediately trip the reactor, trip the 1A RCP, enter 1BwEP-0, Reactor Trip or Safety Injection.

Answer: C

Answer Explanation

Bank Question (2014 NRC exam question 76)

SRO level

Tier 2

High Cog

003 Reactor Coolant Pump System (RCPS)

2.4.50 Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.

RO 4.2 SRO 4.0

Meets K/A, examinee must identify that the alarm response will direct you to 1BWOA RCP-1 and based upon that direct the crew to take the appropriate operator actions.

10CFR55.41(b)(10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

SRO level because examinee must have knowledge of diagnostic steps and decision points in the 1BWOA RCP-1 that involve transitions to event specific actions in the procedure.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

Answer: C. RCP SEAL LEAKOFF FLOW HIGH will send you into 1BwOA RCP-1. With 1A RCP #1 Seal leakoff flow < 8 gpm, the sum of the #1 & #2 seal leakoff flows is < 8 gpm, so they will maintain at least 9 gpm seal injection flow to the 1A RCP, and initiate a unit shutdown per 1BwGP 100-4, Power Descension, and trip the 1A RCP within 8 hours.

A is incorrect. Plausible if leakage was <6 gpm.

B is incorrect. Plausible if one of the as this is done in 1BwOA SEC-8 to reduce power to 50%.

C is correct. See explanation.

D is incorrect. Plausible if the 1A RCP #1 Seal leakoff flow > 8 gpm, 1BwOA RCP-1 directs actions to trip the reactor, trip RCP, and close 1CV8141A. All of the distracters are partially correct if 1A RCP #1 Seal leakoff flow was less than 8 gpm.

Objective: T.OA27-05

Technical References: 1BwOA RCP-1 page 13 and BwAR 1-7-B3

Bank (LORT Bank)

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

77

ID: 1044525

Points: 1.00

Given:

- Unit 2 reactor power is 56%.
- Containment pressure is 3 psig and rising.
- Both manual reactor trip switches have been taken to actuate.

Subsequently:

- The following immediate action steps have been performed:
 - Verify Reactor Trip.
 - Verify Turbine Trip.
- Unit 2 reactor power is 56%.

In response to this event, place the mitigation actions that are required to be performed NEXT in the sequence from the HIGHEST priority to the LOWEST priority.

1. Initiate emergency boration.
2. Verify power to 4KV ESF Busses
3. Start AF pumps
4. Manually actuate SI

- A. 3, 1
- B. 1, 3
- C. 2, 4
- D. 3, 4

Answer: A

Answer Explanation

New Question (2014 NRC exam question 77)

SRO level

Tier 2

High Cog

004 Chemical and Volume Control System (CVCS)

2.4.1 Knowledge of EOP entry conditions and immediate action steps.

RO 4.6 SRO 4.8

Meets K/A, examinee must analyze the plant conditions and determine what actions, specifically starting the AF pump and commencing emergency boration using CVCS, are required to be completed once the immediate action steps are complete in the EOP. This additionally meets the K/A since the SRO has to know the immediate actions of 2BwEP-0 to understand that the crew will be in 2BwFR-S.1 and then understand what actions are required to be taken.

10CFR55.41(b)(10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

SRO level because examinee must analyze plant conditions and determine which EOP was entered and understand what actions are required to be completed once the immediate actions are completed. This requires the SRO to have detailed knowledge of the procedure content since steps 3 and 4 of 1BwFR-S.1 are not immediate actions.

Answer: A. Initially the crew is required to enter 2BwEP-0. It is the immediate action of the RO to inform the SRO that the reactor has not tripped. The SRO then will tell the crew to perform immediate actions of an ATWS (2BwFR-S.1). 2BwFR-S.1 is entered since the reactor power is above 5%. Since the first two immediate actions (Verify reactor trip and verify turbine trip) are complete, the next priority for the crew is to start the AF pump and open 2CV8104, emergency boration valve, and start the boric acid pump to start emergency borating the core.

A is correct. See explanation.

B is incorrect. Plausible since these are both correct actions to take, just not in the right priority/order.

C is incorrect. This would be correct if the examinee thinks they are still in 2BwEP-0 and do not understand the crew is in 2BwFR-S.1.

D is incorrect. This is plausible since AF pumps are required to be started and SI should have actuated since containment pressure is at 4 psig. In 2BwFR-S.1 SI actuation is undesirable since it will cause a FWI signal, which could challenge SG inventory.

Objective: T.FR01-02

Technical References: 2BwFR-S.1 pages 2-4 and 2BwEP-0 page 3.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

78

ID: 1044526

Points: 1.00

Given:

- An inadvertent SI occurs from 100% power on Unit 1.
- The crew has just entered 1BwEP ES-1.1, SI Termination.

Subsequently:

- DC control power fuse to 1CV8160, Letdown Line Containment Isolation Valve, blows.

In response to this event, the main concern for an inadvertent SI is alleviated when ____ (1) ____, and the Unit 1 US will direct the crew to perform ____ (2) ____.

- A. (1) 1A and 1B SI pumps are secured
(2) BwOP CV-15, Excess Letdown Operations
- B. (1) 1A and 1B SI pumps are secured
(2) 1BwOA ESP-2, Reestablishing CV Letdown During Abnormal Conditions
- C. (1) 1SI8801A and 1SI8801B, CV Pump to Cold Legs Injection Isolation Valves, are closed
(2) 1BwOA ESP-2, Reestablishing CV Letdown During Abnormal Conditions
- D. (1) 1SI8801A and 1SI8801B, CV Pump to Cold Legs Injection Isolation Valves, are closed
(2) BwOP CV-15, Excess Letdown Operations

Answer: D

Answer Explanation

New Question (2014 NRC exam question 78)

SRO level

Tier 2

High Cog

006 Emergency Core Cooling System (ECCS)

A2.13 Ability to (a) predict the impacts of the following malfunctions or operations on the ECCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Inadvertent SIS actuation

RO 3.9 SRO 4.2

Meets K/A, examinee must predict what actions are necessary to alleviate the problem of an inadvertent SI, and be able to understand what procedure is required to mitigate the consequences of phase A not resetting.

10CFR55.41(b)(10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

SRO level because examinee must have knowledge of diagnostics steps and decision points in 1BwEP ES-1.1 that require transition to event specific sub-procedures which the SRO requires specific procedure content knowledge to restore the plant.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

Answer: D. The main concern for an inadvertent SI is that the PZR is filled with water approaching a RCS solid condition and the PZR PORVs are lifting, with pressure being well above 1500 psig securing the SI pumps will not alleviate the situation, isolating 1SI8801A and 1SI8801B will stop high head safety injection flow from further filling the PZR. Per 1BwEP ES-1.1 step 13, check if letdown can be established, it has you restore letdown per 1BwOA ESP-2, since 1CV8160 is failed closed normal letdown cannot be established the RNO for step 13 of 1BwEP ES-1.1 has you establish excess letdown utilizing BwOP CV-15.

A is incorrect. See explanation.

B is incorrect. See explanation.

C is incorrect. See explanation.

D is correct. See explanation.

Objective: T.EP02-09

Technical References: 1BwEP ES-1.1 page 5 and 10

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

79

ID: 1044527

Points: 1.00

Given:

- Unit 1 is at 100% power.
- PZR Backup Heater Group D is OOS.

Subsequently:

- The following annunciators are now LIT:

PZR HTR TRIP (1-12-A5)

PZR PRESS CONT DEV LOW HTRS ON (1-12-C1)

- PZR Variable Heaters Group C Breaker is tripped.
- Pressurizer pressure is 2200 psig and slowly rising.

Given the conditions above, with NO operator action, pressurizer pressure will be maintained by PZR heaters ____ (1) ____

The bases of the Tech Spec LCO required to be entered is to ____ (2) ____

- A. (1) cycling on and off.
(2) maintain RCS subcooling following a loss of offsite power for an extended period of time.
- B. (1) cycling on and off.
(2) ensure DNB design criteria will be met in the event of an unplanned loss of forced coolant flow.
- C. (1) remaining energized.
(2) maintain RCS subcooling following a loss of offsite power for an extended period of time.
- D. (1) remaining energized.
(2) ensure DNB design criteria will be met in the event of an unplanned loss of forced coolant flow.

Answer: B

Answer Explanation

Bank Question (2014 NRC exam question 79)

SRO level

Tier 2

Low Cog

010 Pressurizer Pressure Control System (PZR PCS)

A2.01 Ability to (a) predict the impacts of the following malfunctions or operations on the PZR PCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Heater failures

RO 3.3 SRO 3.6

Meets K/A, examinee must predict the impact of the failure of the PZR heaters and based on those predictions be able to enter the right LCO.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

10CFR55.43(b)(2) Facility operating limitations in the technical specifications and their bases.

SRO level because examinee must know the bases behind the PZR pressure LCO.

Answer: B. The PZR backup heaters will cycle and maintain pressure between 2232-2237 psig, the lesson plan and big note state that PZR backup heaters cycle full on at 2220 psig and full off at 2225 psig, but since 1PK-455A will try and maintain pressure at 2235 psig the backup heaters will eventually end up cycling on and off between 2232-2237 psig. This was verified in the simulator. Since PZR pressure went down to 2200 psig LCO 3.4.1 will be entered for DNB, LCO 3.4.1 states that Pressurizer pressure should be maintained within the limit specified in the COLR (2209 psig). The bases for LCO 3.4.1 states that this is to ensure DNB design criteria will be met in the event of an unplanned loss of forced coolant flow.

A is incorrect. Plausible since this is the bases for LCO 3.4.9 for two PZR heaters to be operable, PZR Backup heaters Group A and B are still available and meet the 2 groups and 150 KW requirement.

B is correct. See explanation.

C is incorrect. Plausible since during normal operations at 100% power the PZR variable heaters stay energized to maintain the PZR saturated and pressure stable. Also if backup heater were energized manually the heaters would stay energized and PZR pressure would rise and the PZR spray valves would open to lower pressure and maintain pressure at 2235 psig.

D is incorrect. See explanation.

Objective: S.RY1-26-D

Technical References: I1-RY-XL-01 page 8 and 26, Big note RY-2, LCO 3.4.1 page 1, and LCO 3.4.1 bases page 3, COLR page 15.

Bank (2011 Watts Bar)

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

80

ID: 1044528

Points: 1.00

Given:

- 1BwFR-C.1, Response to Inadequate Core Cooling, is in progress at step 16, "Check if RCPs should be started".
- After the 1B RCP was started, a Phase B actuation occurred.
- Actions are in progress to restore CC flow to containment, however CC flow CANNOT currently be restored to containment.
- CETCs are 1288 °F and slowly rising.
- RCS pressure is 500 psig and slowly dropping.
- ALL S/G NR levels are 45% and slowly dropping.
- ALL S/Gs are being depressurized to atmospheric pressure.
- The 1A, 1C and 1D RCPs are available for a start, if needed.

Given the conditions above, the US will direct the crew to...

- A. maintain the 1B RCP running, and restore CC flow to containment prior to continuing with 1BwFR-C.1.
- B. continue with 1BwFR-C.1, maintain the 1B RCP running, and start additional RCPs as required.
- C. continue with 1BwFR-C.1, maintain the 1B RCP running, and do NOT start additional RCPs.
- D. stop the 1B RCP, and restore CC flow to containment prior to continuing with 1BwFR-C.1.

Answer: B

Answer Explanation

Bank Question (2014 NRC exam question 80)

SRO level

Tier 2

High Cog

103 Containment System

A2 Ability to (a) predict the impacts of the following malfunctions or operations on the containment system and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations

A2.03 Phase A and B isolation

RO 3.5 SRO 3.8

Meets K/A, examinee must predict the impacts of a phase A and B isolation on starting RCPs during an emergency procedure.

10CFR55.41(b)(10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

SRO level because examinee be able to evaluate plant conditions and assess plant conditions and then utilize the procedure to mitigate the event.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

Answer: B. In 1BwFR-C.1, Response to Inadequate Core Cooling, the concept is that a damaged RCP takes lower priority to a damaged core. As long as SG water levels are above 31% and CETC are greater than 1200 °F additional RCPs will be started to provide cooling to the core. There is a note before step 16 stating that "Normal conditions are desired but NOT required for starting RCPs".

A is incorrect. Plausible if the examinee assumes only one RCP can be run to failure.

B is correct. See explanation.

C is incorrect. Plausible if the examinee assumes only one RCP can be run to failure.

D is incorrect. Plausible if the examinee thinks that the RCP needs to be secured since a phase B occurred.

Objective: T.FR02-01

Technical References: 1BwFR-C.1 page 27 and 1BwFR-C.1 Bases step 31.

LOD: NUMBER

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

81

ID: 1044529

Points: 1.00

Given:

- Unit 1 reactor tripped from full power 30 minutes ago.
- 1BwFR-S.2, Response to Loss of Core Shutdown, has just been entered.
- IR channel N-35 and N-36 both indicate 2.0×10^{-9} amps and stable.
- Post accident neutron monitors indicate 6.0×10^4 cps and stable.
- SR channel N-31 and N-32 are both de-energized.

Given the conditions above and IAW 1BwFR-S.2, the Unit 1 US will direct the crew to...

- A. perform 1BwOA Pri-2, Emergency Boration, then verify SR detectors are energized when current is less than 5.0×10^{-11} amps.
- B. energize the SR detectors manually.
- C. perform 1BwOA Inst-1, Nuclear Instrumentation Malfunction, AND suspend operations involving positive reactivity additions.
- D. perform 1BwOA Pri-12, Uncontrolled Dilution, AND dispatch operators to verify dilution paths isolated.

Answer: A

Answer Explanation

New Question (2014 NRC exam question 81)

SRO level

Tier 2

High Cog

015 Nuclear Instrumentation System

2.4.8 Knowledge of how abnormal operating procedures are used in conjunction with EOPs.

RO 3.8 SRO 4.5

Meets K/A, examinee must have knowledge of how abnormal operating procedures are utilized in conjunction with 1BwFR-S.2 in relation to the nuclear instrumentation system.

10CFR55.41(b)(10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

SRO level because examinee must have knowledge of diagnostics steps and decision points in 1BwFR-S.2 that require transition to event specific sub-procedures which the SRO requires specific procedure content knowledge to restore the plant.

Answer: A. 1BwFR-S.2 is entered if IR SUR is stable and SR NI's are not energized. 1BwFR-S.2 has the crew monitor IR Nis and post accident neutron monitors and if they indicate stable, it has the crew emergency borate until power is less than 5.0×10^{-11} amps then verify SR detectors are energized.

A is correct. See explanation.

B is incorrect. Plausible if the examinee thinks SR NIs should be energized or if they think the procedure just requires the plant to be less than P-10 (10%).

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

C is incorrect. Plausible if the examinee thinks one of the SR NIs have failed, there are actions in tech specs for suspending operations involving positive reactivity for the spent fuel pool, not actions per 1BwFR-S.2.

D is incorrect. Plausible if the examinee assumes that power is not lowering since there might be a dilution occurring, 1BwFR-S.1, ATWS, has you check dilution paths. 1BwFR-S.2 does not have you do this.

Objective: T.FR01-02

Technical References: 1BwFR-S.2 on page 3 and Big note NI-2.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

82

ID: 1044530

Points: 1.00

Given:

- Unit 1 is at 100% power.
- Fuel movement is occurring in the Fuel Handling Building.
- A seismic event occurs causing a major crack in the spent fuel pool.
- The crew is performing step 11, "Fill the Spent Fuel Pool", of 1BwOA Refuel-2, Refueling Cavity or Spent Fuel Pool Level Loss.
- ALL methods of providing borated water to the spent fuel pool have failed.

Given the conditions above, the US will direct the crew to FIRST fill the spent fuel pool with ____ (1) ____.

While filling the spent fuel pool with an unborated water source, if the spent fuel pool boron concentration is maintained within Tech Spec limits (300 ppm), a MAXIMUM Keff of ____ (2) ____ will occur in the spent fuel pool?

- A. (1) Fire Protection
(2) 0.95
- B. (1) Primary Water
(2) 0.95
- C. (1) Primary Water
(2) 0.99
- D. (1) Fire Protection
(2) 0.99

Answer: B

Answer Explanation

Bank Question (2014 NRC exam question 82)
SRO level
Tier 2
Low Cog

033 Spent Fuel Pool Cooling System (SFPCS)

A2.01 Ability to (a) predict the impacts of the following malfunctions or operations on the Spent Fuel Pool Cooling System ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Inadequate SDM
RO 3.0 SRO 3.5

Meets K/A, examinee must be evaluate Tech Spec action for inadequate boron concentration and understanding of the basis for Tech Spec required boron concentration, then take appropriate action to fill the spent fuel pool.

10CFR55.43(b)(2) Facility operating limitations in the technical specifications and their bases.

SRO level because examinee know the Tech Spec bases of why SFP boron concentration is required to be ≥ 300 ppm. The SRO also has to determine what source of water will be utilized to fill the spent fuel pool.

Answer: B. TS 3.7.15 requires 300 ppm boron and the basis is to maintain Keff less than or equal to 0.95. 1BwOA Refuel-2, Refueling Cavity or Spent Fuel Pool Level Loss, requires that the spent fuel pool be filled by PW or demin water, if demin water fails the procedure calls out to utilize fire protection.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

A is incorrect. Plausible since the second part of the answer is correct. Fire protection is incorrect since PW or demin water should be utilized first.

B is correct. See explanation.

C is incorrect. Plausible since 0.99 Keff is the reactivity requirement when in MODES 3 through 5.

D is incorrect. See explanation.

Objective: S.FC1-07-D

Technical References: 1BwOA Refuel-2 page 14 and LCO 3.7.15 and 3.7.15 bases page 2 and 3.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

83

ID: 1044531

Points: 1.00

Given:

- Unit 1 is in MODE 5.
- 1A and 1B RH trains are in shutdown cooling.
- PZR level is 60%.
- 1D RCP is running.
- 1A CV pump is running.
- RCS temperature is 190°F and stable.

The crew notes the following conditions:

- IA Header pressure is 40 psig and dropping.
- RCS pressure is 350 psig and slowly rising.
- RCS temperature is 180°F and dropping.
- RH pump amps and flow are stable.

The Unit 1 US just announced the crew is entering 1BWOA SEC-4, Loss of Instrument Air. The NEXT action the US will direct the crew to perform is to...

- A. STOP the 1D RCP AND then secure the 1A CV pump.
- B. STOP the 1A CV pump AND then secure the 1B RH pump.
- C. STOP one RH pump AND then locally throttle CC to RH heat exchanger.
- D. REDUCE demand on 1RH606 and 607, Heat Exchanger 1A and 1B Flow Control Valves.

Answer: C

Answer Explanation

Modified Question (2014 NRC exam question 83)

SRO level

Tier 2

High Cog

079 Station Air

2.4.47 Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material.

RO 4.2 SRO 4.2

Meets K/A, examinee must diagnose and recognize that the RH is cooling down the RCS and actions are required to stop the RH cooldown utilizing the appropriate procedure.

10CFR55.43(b)(5) Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

SRO level because examinee is required to know specific procedure content knowledge.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

Answer: C. Per 1BWOA SEC-4 since RCS pressure is less than 400 psig and the PZR is not solid, the main concern is RCS temperatures are dropping. RCS temperature dropping is alleviated by securing an RH pump and throttling CC flow to the RH Heat exchanger.

A is incorrect. This is a valid distracter since RCP would be secured at step 2a if RCS pressure was less than 200 PSIG.

B is incorrect. This is a valid distracter if RCS pressure greater than 400# and the RCS is solid and if there was erratic flow or amp indications on the RH pump.

C is correct. See explanation.

D is incorrect. Plausible to stop the cooldown, but on a loss of instrument air the valves fail open.

Objective: T.OA39-03.

Technical References: 1BWOA SEC-4 page 3 and 4.

LOD: NUMBER

Original Question (Used on 2014 CERT EXAM):

Given:

- Unit 1 is in MODE 5, with the pressurizer solid.
- 1A RH train is in standby.
- 1B RH train is in shutdown cooling.
- 1D RCP is running.
- 1A CV pump is running.

The following annunciators just alarmed:

- 0-37-C3 IA RCVR 1 PRESS LOW
- 0-37-D2 SAC 1 RCVR PRESS LOW
- 0-37-E2 SAC 1 AUTO START

The crew notes the following conditions:

- RCS pressure is 450 PSIG.
- RCS temperature is 130°F.
- 1B RH pump has erratic flow indication.

The Unit 1 US just announced the crew is entering 1BWOA SEC-4, Loss of Instrument Air. The NEXT action the US will direct the crew to perform is to...

- A. STOP the 1D RCP, and then secure the 1B RH pump and transition to 1BWOA PRI-10, Loss of RHR Cooling, while performing 1BWOA SEC-4.
- B. STOP the 1A CV pump, and then secure the 1B RH pump and transition to 1BWOA PRI-10, Loss of RHR Cooling, while performing 1BWOA SEC-4.
- C. STOP only the 1B RH pump and transition to 1BWOA PRI-10, Loss of RHR Cooling, while performing 1BWOA SEC-4.
- D. REDUCE demand on 1CV131, Letdown Line Pressure Control Valve, and continue performing 1BWOA SEC-4.

Answer: B

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

84

ID: 1044532

Points: 1.00

Given:

- Unit 1 is at 100% power.

Subsequently:

- 1A RCP ammeter indicates the following:



- NSO reports that a reactor trip RED first out light is lit.
- NSO reports that the reactor power is still 100%.
- NSO manually trips the reactor from the 1PM05J.
- NSO reports all rod bottom lights are lit.

Given the conditions above, the 1A RCP shaft ____ (1) ____.
A(n) ____ (2) ____ will be declared for this event.

Reference provided

- A. (1) sheared
(2) site area emergency
- B. (1) sheared
(2) alert
- C. (1) seized
(2) site area emergency
- D. (1) seized
(2) alert

Answer: D

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

Answer Explanation

New Question (2014 NRC exam question 84)

SRO level

Tier 1

High Cog

Reference provided

EP-AA-1001 Matrix

015/017 Reactor Coolant Pump (RCP) Malfunctions

AA2.01 Ability to determine and interpret the following as they apply to the Reactor Coolant Pump

Malfunctions (Loss of RC Flow): Cause of RCP failure

RO 3.0 SRO 3.5

Meets K/A, examinee must determine the cause of the RCP failure based on plant conditions.

10CFR55.41(b)(10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

SRO level because examinee evaluate plant conditions to determine what the correct EAL is, this is a SRO job function.

Answer: D. Since the shaft is seized, amps will higher for the operating pump. The plant would automatically trip since 2/3 detectors on 1/4 loops will <90% flow since the 1A RCP is seized. The EAL that is declared is an MA2 (Alert) since the automatic reactor trip was not successful and a manual trip was successful.

A is incorrect. Plausible because amps are abnormal, but amps would be lower than normal operating amps if the pump shaft sheared.

B is incorrect. Plausible if the examinee believes that a SAE is to be declared. MS1 for a SAE would be declared if the manual reactor trip was also not successful from the main control board.

C is incorrect. See explanation.

D is correct. See explanation.

Objective: S.RC2-09-E

Technical References: EP-AA-1001 on page BW 3-13 and I1-RC-XL-02 page 20 and 21, also the Simulator.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

85

ID: 1044534

Points: 1.00

Given:

- Unit 2 is in MODE 6.
- RCS temperature is 100°F.
- The reactor vessel head is removed.
- Reactor vessel water level is at 424.5 ft (24.5 ft above the reactor vessel flange).
- 2A RH train is in shutdown cooling.
- 2B RH train is in OOS.

Subsequently:

- 2A RH pump amps are fluctuating between 0 to 50 amps.
- 2A RH pump flow is fluctuating between 0 to 500 gpm.
- The following annunciator is LIT:

RH PUMP 2A DSCH FLOW LOW (2-6-C1)

Given the conditions above, ____ (1) ____.

The bases for having ONLY one train of RH OPERABLE per Tech Spec 3.9.5, Residual Heat Removal (RHR) and Coolant Circulation - High Water Level, is that ____ (2) ____.

- A. (1) a loss of instrument air occurred.
(2) on a loss of the RH system, with water level \geq 23 ft above the reactor vessel flange, this volume of water provides backup decay heat removal.
- B. (1) a loss of instrument air occurred.
(2) RH is only utilized to provide adequate mixing of boron.
- C. (1) the 2RH8701A, RC Loop 2A to RH Pump 2A Suction Isolation Valve, is failing closed.
(2) on a loss of the RH system, with water level \geq 23 ft above the reactor vessel flange, this volume of water provides backup decay heat removal.
- D. (1) the 2RH8701A, RC Loop 2A to RH Pump 2A Suction Isolation Valve, is failing closed.
(2) RH is only utilized to provide adequate mixing of boron.

Answer: C

Answer Explanation

New Question (2014 NRC exam question 85)

SRO level

Tier 1

Low Cog

025 Loss of Residual Heat Removal System (RHRS)

AA2.01 Ability to determine and interpret the following as they apply to the Loss of Residual Heat Removal System: Proper amperage of running LPI/decay heat removal/RHR pump(s)

RO 2.7 SRO 2.9

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

Meets K/A, examinee must be able to evaluate plant conditions and determine what caused RH pump amperage to be erratic on a loss of RH system and then understand the basis as to why only one RH train is required to be operable for the current conditions.

10CFR55.43(b)(2) Facility operating limitations in the technical specifications and their bases.

SRO level because examinee must understand the bases of why only one RH train is required per Tech Spec 3.9.5.

Answer: C. With 2RH8701A failing closed the RH pump will have erratic amps and flow will be lowering. The bases for LCO 3.9.5 states that on a loss of the RH system decay heat removal from the core occurs by natural convection to the heat sink provided by the water above the core.

A is incorrect. This is plausible since RH control valves are operated by air, but on a loss of instrument air the RH control valves will fail open and RH low flow alarm would not be in.

B is incorrect. Plausible since the RH system is utilized to mix boron and since Unit 2 is still in MODE 6 there is still fuel in the core and decay heat.

C is correct. See explanation.

D is incorrect. See explanation.

Objective: S.RH1-12-D

Technical References: LCO 3.9.5 and LCO 3.9.5 bases page 2 and Big note RH-1.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

86

ID: 1044535

Points: 1.00

Given:

- An ATWS is in progress on Unit 1.
- 1BwFR-S.1, Response to Nuclear Power Generation/ATWS, is in progress at step 10, "Check for Reactivity Insertion from Uncontrolled RCS Cooldown".
- 1A S/G is faulted inside containment.
- RCS temperature is 565 °F and slowly dropping.
- 1B-1D S/G pressures are 1070 psig and slowly dropping.
- The Containment Status Tree is RED.
- ALL other status tree results are YELLOW or GREEN.

Subsequently:

- The reactor was JUST tripped with the PR NIs at 0% and BOTH IR SURs at -0.4 dpm.

Given the conditions above, the US will ...

- A. perform 1BwFR-S.1 and 1BwFR-Z.1, Response to High Containment Pressure, concurrently.
- B. continue with steps 11-16 of 1BwFR-S.1, then transition to 1BwFR-Z.1, Response to High Containment Pressure.
- C. complete up to step 12, Identify Faulted SG(s), of 1BwFR-S.1, then transition to 1BwFR-Z.1, Response to High Containment Pressure.
- D. go to step 16 of 1BwFR-S.1, then transition to 1BwFR-Z.1, Response to High Containment Pressure.

Answer: D

Answer Explanation

Bank Question (2014 NRC exam question 86)

SRO level

Tier 1

High Cog

029 Anticipated Transient Without Scram (ATWS)

2.1.7 Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.

RO 4.4 SRO 4.7

Meets K/A, examinee must evaluate plant performance and make operational judgments based on operating characteristics and determine the appropriate procedure flowpath.

10CFR55.41(b)(10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

SRO level because examinee determine the appropriate procedure flowpath and transitions while performing the 1BwFR-S.1.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

Answer: D. 1BwFR-S.1, step 7, Check if Reactor is Subcritical (Continuous Action) PR < 5% and IR SUR is negative the US will transition to step 16 and then transition to 1BwFR-Z.1 since it is red path.

A is incorrect. Plausible if the examinee since it is an red path, not allowed though per BwAP 340-1.

B is incorrect. Plausible if the examinee does not understand that after step 7 with the PR < 5% the required actions of the procedure are complete.

C is incorrect. Plausible since there is faulted SG occurring in the stem, not correct though since step 7 has you transition out to step 16 once the reactor is tripped and PR is <5%.

D is correct. See explanation.

Objective: T.FR01-07

Technical References: 1BwFR-S.1 page 7 and CAS page (last page) and BwAP 340-1 page 12 and 14.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

87

ID: 1044536

Points: 1.00

Given:

- Unit 1 is performing a plant startup from a refuel outage.
- An event occurs requiring a safety injection.
- The crew is currently performing 1BwCA-2.1, Uncontrolled Depressurization of All Steam Generators.
- Plant conditions have stabilized and the crew is preparing to continue the plant cooldown to cold shutdown conditions.

Prior to initiating the plant cooldown, per 1BwCA-2.1, the crew will contact the TSC to ...

- A. obtain appropriate cooldown method.
- B. obtain minimum PZR water level for heater operation.
- C. verify adequate shutdown margin.
- D. obtain dose projection of the steam release.

Answer: C

Answer Explanation

New Question (2014 NRC exam question 87)

SRO level

Tier 1

Low Cog

WE12 Uncontrolled Depressurization of all Steam Generators

2.4.9 Knowledge of low power/shutdown implications in accident (e.g., loss of coolant accident or loss of residual heat removal) mitigation strategies.

RO 3.8 SRO 4.2

Meets K/A, examinee must have knowledge of the mitigation strategies of an uncontrolled depressurization of all steam generators, which is a loss of coolant accident, in MODE 3.

10CFR55.43(b)(5) Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

SRO level because examinee assess plant conditions and have detailed knowledge of the procedure to understand what the status of the plant is, and also to know what actions require coordination with teams outside the main control room.

Answer: C. Step in 1BwCA-2.1 to consult the TSC to verify SDM. This is done since with an uncontrolled depressurization of all SGs, there would be concern for SDM since the core is cooled so rapidly.

A is incorrect. Plausible, this is done in 1BwEP-3. The only cooling ability at this point would be RH, since four SGs have already cooled the plant down.

B is incorrect. Plausible, this is done in 1BwEP ES-1.2, Post LOCA Cooldown and Depressurization, since the RCS is intact in 1BwCA-2.1 this is not as big of a concern as SDM.

C is correct. See explanation.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

D is incorrect. Plausible, this is done in 1BwEP-1 for a LOCA. Since this is 4 faulted SGs with no SGTR, this is not a concern in 1BwCA-2.1.

Objective: T.CA3-05

Technical References: 1BwCA-2.1 page 39.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

88

ID: 1044537

Points: 1.00

Given:

- Unit 1 reactor was at full power.
- 1A SX pump is OOS.
- A reactor trip occurred and 1BwEP-0, Reactor Trip or SI, was entered.
- A Loss of All AC Power occurred two minutes later.
- BOTH D/Gs did NOT automatically start.
- 1BwCA-0.0, Loss of All AC Power, was entered.
- The 1A D/G was manually started at step 5, "Try to Restore Power to Any/Both Unit 1 4KV ESF Buses", of 1BwCA-0.0.
- The 1A D/G output breaker automatically closed reenergizing bus 141.
- The 1B D/G could NOT be started.

Given the conditions above, the Unit 1 US will direct the crew to...

- A. immediately transition to 1BwEP-0, then crosstie Unit 2 SX to Unit 1 SX per 1BwOA PRI-8, Essential Service Water Malfunction.
- B. remain in 1BwCA-0.0, then re-energize bus 141 loads from the 1A DG.
- C. immediately transition to 1BwEP-0, then crosstie bus 142 from bus 242 per 1BwOA ELEC-3, Loss of 4KV ESF Bus.
- D. remain in 1BwCA-0.0, then depress the emergency stop pushbutton on the 1A and 1B D/Gs.

Answer: D

Answer Explanation

Bank Question (2014 NRC exam question 88)

SRO level

Tier 1

High Cog

055 Loss of Offsite and Onsite Power (Station Blackout)

2.4.6 Knowledge of EOP mitigation strategies.

RO 3.7 SRO 4.7

Meets K/A, examinee must have knowledge of the EOP mitigation strategies for a Loss of Offsite Power.

10CFR55.41(b)(10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

SRO level because examinee must assess plant conditions and determine the appropriate actions necessary to mitigate the event.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

Answer: D. Remaining in 1BwCA-0.0 in this case is correct since NEITHER ESF bus is supported. Even though Bus 141 is re-energized, there is no SX cooling for the 1A DG since the 1A SX pump is OOS. Therefore, the 1A DG would not remain running. The ESF bus that cannot be energized (Bus 142), the affected DG emergency stop pushbutton is depressed (1A DG). The ESF bus that cannot be LOADED to SUPPORT continued DG operation (1A SX pump is OOS), the affected DG (1A DG) emergency stop pushbutton is depressed. Therefore, any answer that refers to a transition to 1BwEP-0 is incorrect.

A is incorrect. Plausible since the 1A DG is powering bus 141. The crew would also transition back to 1BwEP-0 if the 1A SX pump was running. This would be correct if the crew was not already in 1BwCA-0.0.

B is incorrect. Plausible since the 1A DG is powering bus 141. This would be the action taken if bus 241 was powering bus 141, not the 1A DG.

C is incorrect. Plausible since the 1A DG is powering bus 141. The crew would also transition back to 1BwEP-0 if the 1A SX pump was running.

D is correct. See explanation.

Objective: T.CA1-10

Technical References: 1BwCA-0.0 page 6

LOD: NUMBER

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

89

ID: 1044539

Points: 1.00

Given:

- Unit 1 is at 50% power.

Subsequently:

- 1IA066, IA Inside CNMT Isol Valve, fails and slowly closes.
- The crew enters 1BWOA SEC-4, Loss of Instrument Air.
- 1CV121, CV Pump Flow Control Valve, was taken to manual and throttled to reduce charging flow to 40 gpm.
- PZR pressure is 2275 psig and slowly rising.
- PZR level is 45% and slowly rising.
- VCT level is 50% and lowering.

Given the above conditions, per 1BWOA SEC-4, the US will direct the crew to ...

- A. swap CV pump suction to the suction of the RWST.
- B. immediately trip the CV pump AND trip the reactor if RCP temperatures approach RCP trip criteria.
- C. monitor PZR pressure AND trip the reactor if PZR pressure can only be controlled by the PZR PORVs.
- D. trip the reactor immediately when PZR level reaches 80% AND trip the CV pumps.

Answer: C

Answer Explanation

New Question (2014 NRC exam question 89)

SRO level

Tier 1

High Cog

065 Loss of Instrument Air

AA2.06 Ability to determine and interpret the following as they apply to the Loss of Instrument Air: When to trip reactor if instrument air pressure is decreasing.

RO 2.2 SRO 2.7

Meets K/A, examinee must interpret what procedures and what pressure is required to trip the Unit 1 reactor.

10CFR55.43(b)(5) Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

SRO level because examinee must assess plant conditions and then have detailed procedure knowledge of 1BWOA SEC-4.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

Answer: C. Since PZR pressure is 2275 psig and rising and with no instrument air available, PZR sprays will not be able to lower pressure. This means that PZR pressure will be maintained by the PZR PORVs. Per 1BwOA Sec-4 if you are unable to maintain PZR pressure less than 2235# using PZR heaters or sprays it has the crew trip the reactor.

A is incorrect. This would be correct if VCT level could not be maintained. Since IA is still available outside containment this is not an issue. Auto VCT makeup would still occur.

B is incorrect. This is plausible since PZR level is rising, but this is not correct since the CV pump is not tripped until PZR level reaches 80%.

C is correct. See explanation.

D is incorrect. This plausible since the CV pump would be stopped when PZR level reaches 80%, and the reactor would not be tripped until RCP lower radial bearing or seal outlet exceeded their max temperatures.

Objective: T.OA39-05

Technical References: 1BwOA Sec-4 page 13.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

90

ID: 1044541

Points: 1.00

Given:

- Unit 1 is at 8% power.
- 1LT-459, PZR level channel, is failed and its bistable is tripped per 1BWOA Inst-2, Operation with a Failed Instrument Channel.

Subsequently:

- 1LT-460, PZR level channel, fails high.

In response to this event, the Unit 1 US will direct the crew to ____ (1) ____

When operable PZR level channels are required, the Tech Spec bases ____ (2) ____

- A. (1) perform immediate actions per 1BwEP-0, Reactor Trip or Safety Injection.
(2) provide protection against water relief through the pressurizer safety valves.
- B. (1) check PZR level per 1BWOA Inst-2.
(2) provide protection against water relief through the pressurizer safety valves.
- C. (1) perform immediate actions per 1BwEP-0, Reactor Trip or Safety Injection.
(2) ensure PZR heaters remain covered with water.
- D. (1) check PZR level per 1BWOA Inst-2.
(2) ensure PZR heaters remain covered with water.

Answer: B

Answer Explanation

New Question (2014 NRC exam question 90)

SRO level

Tier 1

Low Cog

028 Pressurizer (PZR) Level Control Malfunction

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

RO 3.2 SRO 4.2

Meets K/A, examinee must have knowledge of the bases in Technical Specifications for the PZR level instrumentation.

10CFR55.43(b)(2) Facility operating limitations in the technical specifications and their bases.

SRO level because examinee must have knowledge of the bases for the PZR level control system.

Answer: B. Reactor is below P-7 (10%) so the reactor will not trip on high PZR level. 1BWOA Inst-2 will be entered for the failed instrument. The bases for Tech Spec 3.3.1 is to provide protection against water relief through the pressurizer safety valves.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

A is incorrect. Plausible since the reactor will trip on a 2 of 3 coincidence for high PZR level, but this is not correct since the reactor high PZR level trip is blocked below P-7 (10%).

B is correct. See explanation.

C is incorrect. Plausible since the PZR level system will secure the heaters if PZR level gets low, this is not the bases for Tech Spec 3.3.1 though.

D is incorrect. See explanation.

Objective: S.RY1-26-D

Technical References: 3.3.1 page 17 and 3.3.1 Bases page 22, and Big Note EF-1 ESF Setpoints

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

91

ID: 1044542

Points: 1.00

Given:

- Unit 1 is shutdown due to high reactor coolant activity.
- A loss of all AC Power condition has occurred on Unit 1.
- The crew is currently performing step 12.g, "Isolate RCP Seals", of 1BwCA-0.0, Loss of All AC Power.
- PZR level is 10%.
- RCS pressure is 2000 psig.
- CETCs are 580 °F.
- Only ESF bus 142 has been re-energized.
- 1CV8112, RCP Seal Water Return Containment Isolation Valve, is stuck open.
- SI equipment has NOT automatically actuated.

Given the conditions above:

(1) The EO will be dispatched to close ____ (1) ____ to reduce the potential for radioactive release in the Aux. Building.

(2) The next procedure the Unit Supervisor will transition to is ____ (2) ____.

- A. (1) 1CV8384A and 1CV8384B, RCP Seal Injection Filter Isolation Valves,
(2) 1BwCA-0.1, Loss of All AC Power Recovery Without SI Required
- B. (1) 1CV8384A and 1CV8384B, RCP Seal Injection Filter Isolation Valves,
(2) 1BwCA-0.2 Loss of All AC Power Recovery With SI Required
- C. (1) 1CV8100, RCP Seal Water Return Containment Isolation Valve,
(2) 1BwCA-0.1, Loss of All AC Power Recovery Without SI Required
- D. (1) 1CV8100, RCP Seal Water Return Containment Isolation Valve,
(2) 1BwCA-0.2 Loss of All AC Power Recovery With SI Required

Answer: D

Answer Explanation

New Question (2014 NRC exam question 91)

SRO level

Tier 1

Low Cog

076 High Reactor Coolant Activity

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

RO 4.2 SRO 4.1

Meets K/A, examinee must have knowledge of local auxiliary operator tasks during an emergency and the resultant operational impacts on the plant.

10CFR55.43(b)(5) Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

SRO level because examinee assess the plant conditions and select the appropriate procedure, it is the SROs responsibility to decide which procedure to transition to.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

Answer: D. From the background document, "isolating the seal return line prevents seal leakage from filling the VCT (via seal return relief valve outside containment) and subsequent transfer to other auxiliary building holdup tanks (via VCT relief valve) with the potential for radioactive release within the auxiliary building." Isolating 1CV8100 or 1CV8112 isolates the seal return line, but since bus 141 is de-energized and 1CV8112 is stuck open, 1CV8100 is required to be locally isolated. The unit supervisor will implement 1BwCA-0.2 since PZR level is less than 14% (it's 10%), the recovery procedure is 1BwCA-0.2 per step 13.b RNO.

A is incorrect. Plausible if the examinee believes that isolating the 1CV8384A and 1CV8384B will limit the release of radioactivity into the aux building, isolating the 1CV8384A and 1CV8384B just establishes conditions to restart a CV pump. 1BwCA-0.1 is plausible since no SI equipment is running, but is incorrect due to PZR level being below 14%.

B is incorrect. See explanation.

C is incorrect. See explanation.

D is correct. See explanation.

Objective: T.CA1-05

Technical References: 1BwCA-0.0 page 16 and 18, and background document for 1BwCA-0.0 page 86.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

92

ID: 1044543

Points: 1.00

Given:

- Unit 1 experienced a reactor trip.
- The STA reports a YELLOW path status tree on Containment Radiation still exists.
- The US enters 1BwFR-Z.3, Response to High Containment Radiation Level.
- The TSC has been contacted to evaluate performance of the procedure steps in 1BwFR-Z.3.
- While waiting for the TSC recommendations, the US is briefing the crew on 1BwFR-Z.3 steps as a contingency.

With the above conditions, the US will brief the crew on...

- A. BwOP VQ-6, Mini-Purge System Operation AND Manual Containment Spray actuation.
- B. BwOP VQ-6, Mini-Purge System Operation AND BwOP VQ-7, Containment Post LOCA Purge Exhaust Fan Operation.
- C. BwOP VQ-7, Containment Post LOCA Purge Exhaust Fan Operation AND BwOP VP-11, Containment Charcoal Filter System Start-Up.
- D. BwOP VP-11, Containment Charcoal Filter System Start-Up AND Manual Containment Spray actuation.

Answer: C

Answer Explanation

New Question (2014 NRC exam question 92)

SRO level

Tier 1

Low Cog

W/E16 High Containment Radiation

EA2. Ability to determine and interpret the following as they apply to the (High Containment Radiation)
EA2.1 Facility conditions and selection of appropriate procedures during abnormal and emergency operations.

RO 2.9 SRO 3.3

Meets K/A, examinee must determine from plant conditions (high containment radiation) the appropriate procedures to implement during an emergency.

10CFR55.43(b)(5) Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

SRO level because it requires assessment of conditions and selection of appropriate procedure.

Answer: C. Per 1BwFR-Z.3, the crew is required to determine if CNMT Atmosphere Filtration System should be placed in service by starting CNMT Charcoal Filter fans per BwOP VP-11. 1BwFR-Z.3 also has you evaluate use of the CNMT Post LOCA Purge System, which would be started by BwOP VQ-7.

A is incorrect. Plausible since containment spray is utilized to help scrub iodine from containment. But containment spray is never actuated unless containment pressure is >20 psig.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

B is incorrect. Plausible since BwOP VQ-6 would purge CNMT, but is not correct since 1BwFR-Z.3 does not direct this. Mini-purge also does not have all of the filters that the Post-LOCA Purge.

C is correct. See explanation.

D is incorrect. See explanation.

Objective: T.FR05-04-C

Technical References: 1BwFR-Z.3 page 2

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

93

ID: 1044544

Points: 1.00

Given:

- A SGTR has occurred in the 1C S/G.
- 1BwEP-3, Steam Generator Tube Rupture, step 17, "Depressurize RCS Using PZR PORV to Minimize Break Flow and Refill PZR", is in progress with PZR PORV 1RY455A open.
- 1C S/G NR level is 100%.
- ALL RCPs were tripped due to an inadvertent Phase B actuation just after the reactor tripped.
- The STA completed a Status Tree pass and then reported that an ORANGE path condition on the INTEGRITY status tree exists due to the RCS loop 1C cold leg temperature at 238 °F.

Given the conditions above, a transition to 1BwFR-P.1, Response to Imminent PTS Condition, must occur IMMEDIATELY after...

- A. the terminate high head ECCS flow step (step 21) in 1BwEP-3 is completed.
- B. the control RCS pressure & charging flow step (step 29) in 1BwEP-3 is completed.
- C. the STA reported the ORANGE path condition.
- D. ALL steps (through step 40) in 1BwEP-3 are completed.

Answer: B

Answer Explanation

Bank Question (2014 NRC exam question 93)

SRO level

Tier 1

High Cog

W/E08 Pressurized Thermal Shock

EA2. Ability to determine and interpret the following as they apply to the (Pressurized Thermal Shock)
EA2.1 Facility conditions and selection of appropriate procedures during abnormal and emergency operations.

RO 3.4 SRO 4.2

Meets K/A, examinee must determine from plant conditions (Pressurized Thermal Shock) when the transition to the appropriate procedures will occur during 1BwEP-3.

10CFR55.43(b)(5) Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

SRO level because examinee must have knowledge of the diagnostic steps and decision points in the EOPs that involve transitions to emergency contingency procedures.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

Answer: B. Since the RCPs are secured when the rapid cooldown of the RCS occurs it gives a Caution in 1BwEP-3 that states that PTS concern may occur, but that operators should remain in 1BwEP-3 until step 29 is complete (RCS and S/G pressure are equalized). The bases also say If the RCS is being cooled down on natural circulation during a steam generator tube rupture event, reverse flow through the ruptured loop during the cooldown or when the pressurizer PORV is opened to depressurize the RCS is possible and could cause the SI flow path in the ruptured loop to change. This change in the SI flow path could result in an indicated cold leg temperature (due to the location of the cold leg RTD) that drops to the point that the symptoms for FR-P.1 would occur. This false indication would only be seen in the ruptured loop since it is essentially stagnant while the other loops are circulating by natural circulation. This caution is for the STA and the RO would never be assigned to monitor this. This is a SRO job to monitor this caution.

A is incorrect. Plausible if the examinee assumes that when high head ECCS flow is terminated you are allowed to transition to 1BwFR-P.1.

B is correct. See explanation.

C is incorrect. Plausible if the examinee does not understand that 1BwEP-3 actions cause this condition and transition is not required until step 29 is complete (RCS and S/G pressure are equalized).

D is incorrect. Plausible if the examinee assumes that 1BwEP-3 takes priority over 1BwFR-P.1, which is only true until step 29 is complete.

Objective: T.EP04-08

Technical References: 1BwEP-3 step 6 Caution 1 (page 9) and 1BwEP-3 background document page 20.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

94

ID: 1044545

Points: 1.00

Which of the following evolutions requires a Licensed Supervisor with an active SRO License to be present at the refuel cavity with NO other concurrent responsibilities?

- A. Unlatching the control rod drive shafts.
- B. Removing the reactor vessel upper internals.
- C. Withdrawing the MIDS thimble tubes.
- D. Lifting the reactor vessel head.

Answer: A

Answer Explanation

New Question (2014 NRC exam question 94)

SRO level

Tier 3

Low Cog

2.1.36 Knowledge of procedures and limitations involved in core alterations.
RO 3.0 SRO 4.1

Meets K/A, examinee must have knowledge of procedures and limitations involved in core alterations.

10CFR55.43(b)(6) Procedures and limitations involved in initial core loading, alterations in core configuration, control rod programming, and determination of various internal and external effects on core reactivity.

SRO level because the SRO is the one responsible for having an understanding of what procedure requirements and limitations are required with core alterations, and also when a core alteration is occurring.

Answer: A. Per OU-AP-200 the Licensed Supervisor with an active SRO License must be present at the refuel cavity with no other concurrent responsibilities whenever a core alteration is in progress. Per 1BwGP 100-6 it states that unlatching the control rod drift shaft is considered to be a core alteration.

A is correct. See explanation.

B is incorrect. 1BwGP 100-6 specifically states movement of the upper internals is NOT considered to be a core alteration.

C is incorrect. Withdrawing the MIDS thimble tubes is not a core alteration, is plausible since it is performed in 1BwGP 100-6.

D is incorrect. 1BwGP 100-6 specifically states that lifting of the reactor vessel head does not constitute a core alteration.

Objective: T.GP06-05

Technical References: 1BwGP 100-6, Refueling Outage, page 17 and 20, and OU-AP-200, Administrative Controls during Fuel Handling Activities For Byron and Braidwood, page 6.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

95

ID: 1044546

Points: 1.00

Given:

- A Unit 1 reactor startup is in progress per 1BwGP 100-2, Plant Startup.
- Criticality is achieved with Control Bank C at 30 steps.
- The National Weather Service states a Tornado Watch is in effect for Will County (Braidwood Station).

Given the conditions above, the Unit 1 US will...

- A. transition to 1BwGP 100-2A1, Attachment A Contingency for Suspended Reactor Startup, then direct the crew to emergency borate AND manually insert control banks A-C.
- B. transition to 1BwGP 100-2A1, Attachment A Contingency for Suspended Reactor Startup, then direct the crew to immediately open the reactor trip breakers.
- C. transition to 1BwGP 100-2A3, Attachment C Contingency for Severe Weather During Reactor Startup, then direct the crew to insert control banks A-C.
- D. continue with 1BwGP 100-2 AND resume the startup.

Answer: A

Answer Explanation

New Question (2014 NRC exam question 95)

SRO level

Tier 3

High Cog

2.1.43 Ability to use procedures to determine the effects on reactivity of plant changes, such as reactor coolant system temperature, secondary plant, fuel depletion, etc.
RO 4.1 SRO 4.3

Meets K/A, examinee must be able to determine the effects of the reactor going critical below the low-low insertion limit and the actions the crew is required to take with the plant.

10CFR55.43(b)(5) Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

SRO level because examinee must assess plant conditions and then select the procedure or section of a procedure to mitigate the reactivity event, it is SRO knowledge since the SRO is required to know the knowledge of the content of the procedure versus knowledge of the procedure's overall mitigative strategy.

Answer: A. The US is required to enter 1BwGP 100-2A1, Attachment A Contingency for Suspended Reactor Startup, then direct the crew to emergency borate AND insert control banks A-C since criticality was achieved with the control banks below the low-low insertion setpoint of control bank C at 47 steps.

A is correct. See explanation.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

B is incorrect. Plausible since enter the crew is required to enter 1BwGP 100-2A1, Attachment A Contingency for Suspended Reactor Startup. It is incorrect since in Attachment A it does not say to immediately open the reactor trip breakers.

C is incorrect. Plausible since a Tornado Watch is in effect, a Tornado WARNING is required to go into 1BwGP 100-2A3. Even if the crew went into 1BwGP 100-2A3, a Tornado Warning is required before the crew inserts control banks A-C.

D is incorrect. Plausible if the examinee realized a Tornado Warning is not in effect and does not understand that the reactor went critical below the low-low insertion setpoint.

Objective: T.GP02-01

Technical References: 1BwGP 100-2 page 26, 1BwGP 100-2A1 page 1.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

96

ID: 1044547

Points: 1.00

Per CC-AA-103, Configuration Change Control for Permanent Physical Plant Changes, before the Configuration Change can be implemented, Operations is responsible for ...

- A. identifying AND ensuring their specific department procedures are updated for the Configuration Change.
- B. performing an independent detailed design verification of Augmented Quality Configuration Changes.
- C. determining the need for an Operational Briefing BEFORE the Work Orders that implement the configuration change are submitted to Operations.
- D. approving the Configuration Change at the Plant Operations Review Committee (PORC).

Answer: A

Answer Explanation

New Question (2014 NRC exam question 96)

SRO level

Tier 3

Low Cog

2.2.5 Knowledge of the process for making design or operating changes to the facility.
RO 2.2 SRO 3.2

Meets K/A, examinee must have knowledge of the process for making design changes to the facility.

10CFR55.43(b)(3) Facility licensee procedures required to obtain authority for design and operating changes in the facility.

SRO level because examinee must have knowledge of procedures required to obtain authority for design and operating changes in the facility.

Answer: A. CC-AA-103, Configuration Change Control for Permanent Physical Plant Changes, section 3.9 Operations is responsible for identifying AND ensuring specific operating procedures are updated for the Configuration Change.

A is correct. See explanation.

B is incorrect. This is the Design Reviewer's responsibility per CC-AA-103 section 3.7.

C is incorrect. This is the Design Engineering Manager's responsibility per CC-AA-103 section 3.6.3.

D is incorrect. The Plant Manager is responsible for approving Configuration Change at the Plant Operations Review Committee (PORC). (CC-AA-103 section 3.11)

Objective: 7E.AM-003-A

Technical References: CC-AA-103 page 7.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

97

ID: 1044548

Points: 1.00

Given:

- Unit 1 & 2 Wide Range Gas Monitors - 1/2PR030J are inoperable.
- Aux Building Supply Fan - 0VA01CA is running.
- Aux Building Exhaust Fan - 0VA02CA is running.
- ALL other Aux Building Supply and Exhaust Fans are stopped.
- Unit 1 Lab Exhaust Fan - 0VL02CA is running.
- Service Building and Solid Radwaste Fan - 0VW03CA is running.
- Aux Building Filtered Vent Fan - 0VF01CA is running.
- Unit 1 Vent Stack Effluent Flow - 0F-VA019 is 2.36×10^5 CFM.
- Unit 2 Vent Stack Effluent Flow - 0F-VA020 is inoperable.
- Unit 1 Vent Stack Effluent High Range Gas (1PD428) is 4.5×10^{-3} microCi/cc (highest reading channel).
- Unit 2 Vent Stack Effluent Low Range Gas (2PB128) is 9.5×10^{-4} microCi/cc (highest reading channel).

The station total release rate is...

Reference Provided

- A. 1.07×10^3 microCi/sec.
- B. 1.27×10^5 microCi/sec.
- C. 5.06×10^5 microCi/sec.
- D. 1.84×10^8 microCi/sec.

Answer: C

Answer Explanation

Bank Question (2014 NRC exam question 97)

SRO level

Tier 3

High Cog

Supplied Reference:

EP-AA-121-F-01 page 4 and 5.

2.3.5 Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.

RO 2.9 SRO 2.9

Meets K/A, examinee must be able to use radiation monitoring systems, such as fixed radiation monitors to be able to determine release rates.

10CFR55.43(b)(4) Radiation hazards that may arise during normal and abnormal situations, including maintenance activities and various contamination conditions.

SRO level because examinee determining release rates for EAL classification is an SRO function.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

Answer: C.

Unit 1 release rate:

$4.5 \text{ E-3 (given)} \times 2.36 \text{ E5 cfm (sum of estimated fans flow)} \times 472 \text{ (conversion factor)} = 501264$

Unit 2 release rate:

$9.5 \text{ E-4 (given)} \times (8630+1000) \text{ cfm (sum of estimated fans flow)} \times 472 \text{ (conversion factor)} = 4318$

Total release rate:

$501264 + 4318 = 505582 \text{ or } 5.06 \times 10^5 \text{ microCi/sec.}$

A is incorrect. This is result if 472 cc/sec/CFM multiplier is not used.

B is incorrect. This is the result if the Unit 1 and Unit 2 highest reading channel are swapped.

Unit 1 release rate:

$9.5 \text{ E-4 (wrong unit given)} \times 2.36 \text{ E5 cfm (sum of estimated fans flow)} \times 472 \text{ (conversion factor)} = 105822$

Unit 2 release rate:

$4.5 \text{ E-3 (wrong unit given)} \times (8630+1000) \text{ cfm (sum of estimated fans flow)} \times 472 \text{ (conversion factor)} = 20454$

Total release rate:

$105822 + 20454 = 126276 \text{ or } 1.27 \times 10^5 \text{ microCi/sec.}$

C is correct. See explanation.

D is incorrect. This is the result if the Unit 2 Aux building fans are added into the Unit 2 calculation.

Unit 1 release rate:

$4.5 \text{ E-3 (given)} \times 2.36 \text{ E5 cfm (sum of estimated fans flow)} \times 472 \text{ (conversion factor)} = 501264$

Unit 2 release rate:

$9.5 \text{ E-4 (given)} \times (8630+1000+205000+205000) \text{ cfm (sum of estimated fans flow)} \times 472 \text{ (conversion factor)} =$

Total release rate:

$501264+183848318 = 184349582 \text{ or } 1.84 \times 10^8 \text{ microCi/sec.}$

Objective: 7F.ZP-015-A

Technical References: **EP-AA-121-F-01 page 4 and 5.**

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

98

ID: 1044549

Points: 1.00

Given:

- A SGTR is in progress in the 1B S/G.
- ALL MSIVs are open.
- 1BwEP-3, Steam Generator Tube Rupture, is in progress at step 3.d., "Close Ruptured SG(s) MSIV and MSIV Bypass Valve".
- Steam dumps are open to maintain RCS temperature.

Subsequently:

- The 1B MSIV fails to close.
- The crew manually actuates Main Steamline Isolation AND ALL MSIVs remain open.

Given the conditions above, Unit 1 US will direct the crew to...

- A. CONTINUE dumping steam with the steam dumps AND transition to 1BwCA-3.1, SGTR with Loss of Reactor Coolant - Subcooled Recovery Desired.
- B. CLOSE the steam dumps AND transition to 1BwCA-3.1, SGTR with Loss of Reactor Coolant - Subcooled Recovery Desired.
- C. CLOSE the steam dumps AND transition to 1BwCA-2.1, Uncontrolled Depressurization of All Steam Generators.
- D. CONTINUE dumping steam with the steam dumps AND transition to 1BwCA-3.2, SGTR with Loss of Reactor Coolant - Saturated Recovery Desired.

Answer: B

Answer Explanation

New Question (2014 NRC exam question 98)

SRO level

Tier 3

High Cog

2.3.11 Ability to control radiation releases.

RO 3.8 SRO 4.3

Meets K/A, examinee must understand what needs to be isolated to control radiation releases.

10CFR55.43(b)(5) Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

SRO level because examinee assess plant conditions and then select a procedure to mitigate the event.

Answer: B. In 1BwEP-3 if the MSIVs fail to go closed, the steam dumps are isolated to minimize the release of radioactivity from the SG, 1BwCA-3.1 is entered after the steam dumps are closed since the ruptured SG cannot be isolated from at least one intact SG. Additional valves are also isolated, the Main FW pump turbine HP stop valves, MS RHTR S/U purge control valves, MS RHTR Shutoff Valves, Gland steam isolation and bypass valves, SJA isolation valves.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

A is incorrect. Plausible since the step has the crew dump steam from any intact SG(s) that are isolated from all ruptured SG(s), since no intact SG are isolated from the ruptured SG this is incorrect.

B is correct. See explanation.

C is incorrect. Plausible since none of the MSIVs went closed and the examinee could think there is an uncontrolled depressurization of all SGs.

D is incorrect. Plausible since the cooldown is necessary to and this is a strategy in 1BwCA-3.2, but is incorrect since 1BwCA-3.2 is only entered from 1BwCA-3.1.

Objective: T.EP04-06

Technical References: 1BwEP-3 page 6.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

99

ID: 1044550

Points: 1.00

Given:

- A SGTR has occurred on Unit 1.
- The ruptured S/G has been isolated.
- The RCS has been cooled down and depressurized.
- ECCS flow has been terminated.
- ALL RCPs are stopped.
- RVLIS head level is 100%.
- RCS pressure is 1050 psig.
- CETCs are 500 °F.
- PZR level is 61%.

Given the conditions above, when RCP support conditions are established, the US will direct the crew to...

- A. start one RCP because natural circulation will NOT allow cooldown of the ruptured SG.
- B. start one RCP because pressurized thermal shock concerns will lower.
- C. NOT start an RCP because the rate of S/G tube leakage will rise.
- D. NOT start an RCP because pressurized thermal shock concerns will rise.

Answer: B

Answer Explanation

Bank Question (2014 NRC exam question 99)

SRO level

Tier 3

High Cog

2.4.18 Knowledge of the specific bases for EOPs.

RO 3.3 SRO 4.0

Meets K/A, examinee must knowledge of the bases for starting an RCP during 1BwEP-3.

10CFR55.41(b)(10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

SRO level because examinee must assess the plant conditions and have knowledge of the diagnostic steps and decision points in the EOPs. The SRO would be deciding if the RCP was going to be started. The SRO also has to have specific knowledge of the content of the procedure versus just the procedure's overall mitigative strategy.

Answer: B. From the background document, it is desirable to start an RCP "to provide normal pressurizer spray and to ensure homogeneous fluid temperatures and boron concentrations. In addition to minimizing pressurized thermal shock and boron dilution concerns, this also aids in cooling the ruptured SG."

A is incorrect. From the given information, natural circulation conditions are currently present.

B is correct. See explanation.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

C is incorrect. Not starting an RCP is incorrect, plausible if the examinee thinks starting an RCP will result in more SG tube leakage.
D is incorrect. See explanation.

Objective: T.EP04-09

Technical References: BwEP-3 page 46 and BwEP-3 background document (BD-EP-3) EOP step 37 on page 88.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

100

ID: 1044551

Points: 1.00

Given:

- A RCS LOCA has occurred on Unit 2.
- Debris has blocked the Containment Recirculation Sump screens, and the crew has implemented 2BwCA-1.3, Sump Blockage Control Room Guideline, from 2BwEP ES-1.3, Transfer to Cold Leg Recirculation.
- ALL RCPs are tripped.
- The crew is performing step 41, "Check Core Exit TCs", of 2BwCA-1.3 when the following conditions are noted:
 - CETCs are 1230°F and slowly rising.
 - ALL S/G pressures are 80 psig.
 - RVLIS Plenum is 0%.
 - RCS pressure is 10 psig.
 - RWST level is 14%.

Given the conditions above, the NEXT procedure the Unit 1 US will direct the crew to implement is...

- A. 2BwCA-1.1, Loss of Emergency Coolant Recirculation.
- B. 2BwEP ES-1.3, Transfer to Cold Leg Recirculation.
- C. 2BwFR-C.1, Response to Inadequate Core Cooling.
- D. SACRG-1, Severe Accident Control Room Guideline Initial Response.

Answer: D

Answer Explanation

Bank Question (2014 NRC exam question 100)

SRO level

Tier 3

High Cog

2.4.16 Knowledge of EOP implementation hierarchy and coordination with other support procedures or guidelines such as, operating procedures, abnormal operating procedures, and severe accident management guidelines.

RO 3.5 SRO 4.4

Meets K/A, examinee must have knowledge of EOP implementation hierarchy and use with the Severe Accident Control Room Guideline (SACRG).

10CFR55.43(b)(5) Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

SRO level because examinee must assess plant conditions and then select the appropriate procedure to mitigate the event.

Answer: D. Since CETC's are greater than 1200°F and rising, the operator is directed to GO TO SACRG-1 at this point in the procedure because all other methods have been attempted to lower CETC temperature.

EXAMINATION ANSWER KEY

2014 SRO NRC Exam (Class 13-1)

A is incorrect. Plausible since a loss of emergency coolant recirculation has occurred since the recirculation sump screens are blocked.

B is incorrect. Plausible since the crew was in 2BwEP ES-1.3, Transfer to Cold Leg Recirculation when the debris clogged the sump screens.

C is incorrect. Plausible since there is a red path for core cooling since CETC are greater than 1200°F.

There is a NOTE in the beginning of 2BwCA-1.3 that states that Braidwood Status Trees should be monitored for information only. BwFRs should NOT be implemented.

D is correct. See explanation.

Objective: T.CA2A-03

Technical References: 2BwCA-1.3 step 41.a RNO page 35.