

2010A NRC REACTOR OPERATOR EXAM

1 POINT

Question 1

Unit 1 initial conditions:

- Reactor in MODE 3
- RCS temperature = 500°F stable
- RCS pressure = 885 psig stable

Current conditions:

- RCS pressure decreasing
- Pressurizer level decreasing
- PZR relief valve tailpipe temperature = 300°F
- Quench tank level increasing
- Quench tank pressure = 10 psig increasing

Based on the above conditions, which ONE of the following describes the reason for the current conditions?

- A. 1B2 RCP Upper, Middle, and Lower seals have failed
- B. 1RC-159 and 1RC-160 (RXV Head vents) are leaking
- C. Low range RCS pressure has failed HIGH
- D. 1RC-66 (PORV) is leaking to the Quench Tank

Question 1

**T1/G1 - cpw**

008AK1.01, Pressurizer Vapor Space Accident

**Knowledge of the operational implications of the following concepts as they apply to a Pressurizer Vapor Space Accident:**

Thermodynamics and flow characteristics of open or leaking valves.

(3.2/3.7)

**K/A MATCH ANALYSIS**

**Requires knowledge of the throttling process and the operational implications of indications regarding PORV tailpipe temperatures**

**ANSWER CHOICE ANALYSIS**

**Answer: D**

- A. Incorrect, failure of all a RCPs seals would cause seal leakage to increase and thus QT level. A LOCA would also result which would cause RCS pressure to decrease. PZR level would decrease, however this would not cause the QT to pressurize or relief line temperature to increase.
- B. Incorrect, 1RC-159 and 1RC-160 (RXV Head vents) discharge to the RBCUs discharge. Plausible because the manual vents on the hot legs go to the QT.
- C. Incorrect, It is isolated above 600 psig. If Low range cooldown pressure were in service and LOW selected on the PORV this failure would cause the PORV to open.
- D. Correct, 1RC-66 (PORV) failing open would cause these indications.**

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Technical Reference(s): **PNS-PZR Page 34 - 35**

Proposed references to be provided to applicants during examination: **None**

Learning Objective: **PNS-PZR R19**

Question Source: **BANK**

Question History: Last NRC Exam: **2007 Q #31**

Question Cognitive Level: **Comprehension or Analysis**

**1 POINT**

**Question 2**

Unit 1 plant conditions:

- Reactor Trip
- SBLOCA has occurred
- Rule 2 (Loss of SCM) in progress
- 1A & 1B Steam Generator levels = 78" XSUR increasing

Based on the above conditions, which ONE of the following describes why SG levels are being increased AND the conditions required for RULE 2 to allow throttling EFDW flow?

- A. Ensure secondary inventory available for heat transfer if Steam Generator feed is lost / the primary side voids to the point of allowing boiler-condenser heat transfer
- B. Ensure secondary inventory available for heat transfer if Steam Generator feed is lost / cooldown rates approaching Tech Spec limits
- C. Ensure boiler-condenser heat transfer is established / the primary side voids to the point of allowing boiler-condenser heat transfer
- D. Ensure boiler-condenser heat transfer is established / cooldown rates approaching Tech Spec limits

Question 2

T1/G1 - cpw

009EK1.01 Small Break LOCA

**Knowledge of the operational implications of the following concepts as they apply to the small break LOCA:**

Natural circulation and cooling, including reflux boiling.

(4.2/4.7)

**K/A MATCH ANALYSIS**

**Requires knowledge of operational requirement to establish reflux (boiler condenser at ONS) boiling during SBLOCA**

**ANSWER CHOICE ANALYSIS**

**Answer: D**

- A. Incorrect: First part is plausible since that is a reason SG levels are increased as part of mitigation strategy when in the Turbine Building Flood tab of EOP. Second part is plausible since there is a concern over reaching the LOSCM setpoint **prior** to primary side voiding down enough to heat transfer. The second part would be correct if the question were about concerns with NOT throttling EFDW flow during approach to LOSCM stpt.
- B. Incorrect: First part is plausible since that is a reason SG levels are increased as part of mitigation strategy when in the Turbine Building Flood tab of EOP. Second part is correct.
- C. Incorrect: First part is correct. Second part is plausible since there is a concern over reaching the LOSCM setpoint **prior** to primary side voiding down enough to heat transfer. The second part would be correct if the question were about concerns with NOT throttling EFDW flow during approach to LOSCM stpt.
- D. CORRECT: Per EAP-LOSM page 22 & 23 - SG heat removal must be established by feeding SGs up to levels that will promote N/C and BCM heat removal. Flow may be throttled to control cooldown rate within Tech Spec limits, but SG levels must continue to increase until LOSCM setpoint is reached if SCM  $\leq 0$  °F.**

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Technical Reference(s): **EAP-LOSCM Attachment 1 Rule 2**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **EAP-LOSCM R6**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Knowledge and Fundamentals**

1 POINT

Question 3

Unit 1 plant conditions:

- Reactor trip from 100% power
- RCS pressure = 88 psig decreasing
- Reactor Building pressure = 27 psig increasing
- 1B LPI Pump failed to start

Based on the above conditions, which ONE of the following describes the guidance provided in EOP Enclosure 5.1 (ES Actuation) regarding the LPI pumps and system operation?

EOP Enclosure 5.1 (ES Actuation)....

- A. directs continued operation with only the 1A LPI pump and no re-alignment of LPI header flows
- B. directs continued operation with only the 1A LPI pump and manually re-aligns LPI flow down both the 1A and 1B LPI headers
- C. utilizes the 1A and the 1C LPI Pump and aligns flow down both headers with 1LP-9 and 10 closed
- D. utilizes only the 1C LPI Pump and aligns flow down both headers with 1LP-9 & 10 open

Question 3

**T1/G1 - cpw**

011EK2.02 Large Break LOCA

**Knowledge of the operational implications of the following concepts as they apply to the Large Break LOCA:**

Pumps

(2.6/2.7)

**K/A MATCH ANALYSIS**

**Requires knowledge of operational requirements provided in the EOP as they relate to operation of LPI pumps during a LBLOCA**

**ANSWER CHOICE ANALYSIS**

**Answer: A**

- A. CORRECT:** If ES channels 3&4 actuate and RCS pressure is < LPI shutoff head, LPIP's are checked running. If the A or the B LPI pump has failed then direction is given to close that trains injection valve (either LP-17 or 18). The operating pump is left running and aligned to its train only (although LPI will still inject through both nozzles via the crossover piping). With the addition of the LPI crossover mod, it is no longer necessary to align flow down both headers as the crossover piping in the RB ensures flow injected via both LPI nozzles.
- B. Incorrect: Plausible since this would be true without credit for the LPI crossover mod. Without an understanding of the crossover piping, the need to align flow down both headers is a plausible conclusion. Additionally, prior to the addition of the LPI crossover mod actions were required to put flow down both headers.
- C. Incorrect: Plausible since aligning the C pump to the B header would replace the flow lost down that header. Additionally plausible since direction to use the C pump is contained in Encl. 5.1 for other failures.
- D. Incorrect: Plausible direction to use the C pump down both LPI headers is contained in Encl. 5.1 and would be the correct actions if both the A and B LPIP's have failed.

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Technical Reference(s): **EP/1/A/1800/001 (EOP) Encl. 5.1 (ES Actuation), EAP-ESA**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **EAP-ESA R17**

Question Source: **New**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Knowledge and Fundamentals**

**1 POINT**

**Question 4**

Unit 1 plant conditions:

- Reactor power = 100%
- 1TA and 1TB lockout occurs

Based on the above conditions, which ONE of the following indicates the initial  $T_{hot}$  and  $T_{cold}$  values expected once stable natural circulation flow has been established?

$T_{hot}$  would be approximately \_\_\_\_\_°F and  $T_{cold}$  would be approximately \_\_\_\_\_°F.

- A. 562 / 532
- B. 582 / 532
- C. 585 / 555
- D. 605 / 555

Question 4

**T1/G1 - cpw**

015AA1.21 RCP Malfunctions

**Ability to operate and / or monitor the following as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow):**

Development of natural circulation flow

(4.4/4.5)

**K/A MATCH ANALYSIS**

Requires knowledge of  $T_{hot}$  and  $T_{cold}$  response expected during development of natural circ flow from a low power loss of RC flow. To monitor the development of NC flow requires the ability to predict expected temperature indications that would be indicative of NC flow.

**ANSWER CHOICE ANALYSIS**

**Answer: C**

- A. Incorrect: Plausible since these values would be correct under the misconception that  $T_c$  matched up to  $P_{sat}$  for 885 psig SG pressure. Since 885 is normal SG pressure during power ops it would be plausible to assume  $T_c$  moves to match that  $T_{sat}$  and then  $T_h$  increased to develop the 30 – 40 degree delta T.
- B. Incorrect: Plausible since these values would be correct for the same  $T_c$  assumptions as in A and then developed a 50 degree delta T. The 50 degree delta T is plausible since that is the normal delta T for 100% power operations.
- C. **CORRECT: During the transition from forced to natural circulation the cold leg temperatures should remain near the saturation temperature for the existing SG pressure and the hot leg temperatures and CETCs will increase until a stable  $\Delta T$  between the hot and cold legs is established, generally at 30-40°F. Since normal post trip temperature is approximately 555°F and  $T_h$  would increase to 585°F.**
- D. Incorrect: These values would be correct if you assume the correct value for  $T_c$  however used 50 degrees as the delta T. This is plausible since 50 degree delta T is the normal value for 100% power.

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Technical Reference(s): **TA-AM1**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **TA-AM1 R3**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Comprehension and Analysis**

**1 POINT**

**Question 5**

Unit 1 initial conditions:

- Reactor in MODE 5
- RCS pressure = 0 psig
- Normal LPI decay heat removal in service
- 1C LPI pump operating
- Unit Blackout occurs

Current conditions:

- MFB's re-energized from CT-5

Based on the above conditions, which ONE of the following describes actions required by AP/26 (Loss of Decay heat Removal)?

- A. Start previously running LPI pump AND initiate AP/11 (Recovery from Loss of Power)
- B. Start previously running LPI pump AND initiate the Blackout tab of the EOP
- C. Feed and steam SG's to maintain CETC < 246°F AND initiate AP/11 (Recovery from Loss of Power)
- D. Feed and steam SG's to maintain CETC < 246°F AND perform AP/26 Encl. 5.6 (Venting LPI Pumps and Suction Lines)

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Question 5

**T1/G1 - cpw**

025AG2.4.11, Loss of Residual Heat Removal System

**Knowledge of Abnormal Condition Procedures**

(4.0/4.2)

**K/A MATCH ANALYSIS**

**Requires knowledge of mitigation strategy for AP/26 (Loss of Decay Heat Removal)**

**ANSWER CHOICE ANALYSIS**

**Answer: A**

- A. CORRECT: AP/26 directs ensuring previously running LPI pump is operating. After pump is running AP directs initiating AP/11 which will recover from the loss of power to MFB's**
- B. Incorrect: The first part is correct. The second part is plausible since entering the EOP and performing the blackout tab would be the correct actions if the unit were above LPI DHR.
- C. Incorrect: First part is plausible since this would be a correct choice if RCS loops are full and would be utilized if LPIP's cannot be restarted. Since RCS pressure = 0 psig, the RCS loops cannot be full. Second part is correct.
- D. Incorrect: First part is plausible since this would be a correct choice if RCS loops are full and would be utilized if LPIP's cannot be restarted. Since RCS pressure = 0 psig, the RCS loops cannot be full. Second part is plausible since it is an enclosure performed in the AP and it is reasonable to think that after establishing SG cooling you would be making preps to restart LPI pumps and running this encl to ensure the pumps are water solid is plausible.

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Technical Reference(s): **AP/1/A/1700/026, EAP-APG Enclosure AP26**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **EAP-APG R9**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Comprehension and Analysis**

**1 POINT**

**Question 6**

Unit 1 plant conditions:

- Reactor trip occurred
- Total RCP seal injection flow = 0 gpm
- Component Cooling is unavailable

Based on the above conditions, which ONE of the following describes the immediate action(s) required by the EOP and the reason for the action(s)?

Initiate...

- A. AP/14 (Loss of Normal HPI Makeup and/or RCP Seal Injection) to restore RCP seal injection
- B. AP/16 (Abnormal Reactor Coolant Pump Operation) to secure all RCP's
- C. AP/20 (Loss of CC) to restore Component Cooling
- D. AP/25 (SSF EOP) to align an alternate source of seal injection

Question 6

**T1/G1 - cpw**

026AK3.03 Loss of Component Cooling Water

**Knowledge of the reasons for the following responses as they apply to the Loss of Component Cooling Water:**

Guidance actions contained in EOP for Loss of CCW.

(4.0/4.2)

**K/A MATCH ANALYSIS**

**Requires knowledge of reason EOP IMA's direct initiating AP/25 when RCP seal injection and CC have been lost**

**ANSWER CHOICE ANALYSIS**

**Answer: D**

- A. Incorrect: Plausible since the entry conditions for AP/14 are met and the EOP does direct entry into AP's in other conditions (Ex. AP/11, AP/25). The EOP does not direct actions to restore normal seal injection. Seal injection flow is re-established via the RCMUP since both CC and SI have been lost.
- B. Incorrect: Plausible since direction are given to trip RCP's however the directions are part if EOP Immediate Manual Actions. The EOP does not direct entry into AP/16 however the EOP does direct entry into AP's in other conditions (Ex. AP/11, AP/25).
- C. Incorrect: Plausible since the entry conditions for AP/20 are met and the EOP does direct entry into AP's in other conditions (Ex. AP/11, AP/25). Restoring CC is not directed by the EOP. IMA's will direct initiating AP/25 to restore seal injection.
- D. **CORRECT: If BOTH CC and HPI Seal injection are not available then RCP seal injection must be established from the SSF RCMUP via AP/25. These directions are part of EOP Immediate Manual Actions performed by the RO.**

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Technical Reference(s): **EAP-IMA**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **EAP-IMA R6**

Question Source: **New**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Knowledge and Fundamentals**

1 POINT

Question 7

Unit 1 initial conditions:

- Reactor power = 90%
- 1B Main Feedwater pump trips

Current conditions:

- Reactor power = 70% decreasing
- RCS pressure = 2165 psig slowly decreasing
- Pressurizer level = 228 inches slowly decreasing
- Pressurizer temperature = 640°F slowly decreasing
- All Pressurizer heater banks controlled from Unit 1 control room are in AUTO and are OFF

Based on the above conditions, which ONE of the following describes the status of the pressurizer and the pressurizer saturation circuit?

The pressurizer is \_\_\_\_\_ AND the pressurizer saturation circuit \_\_\_\_\_.

- A. subcooled / is responding as expected
- B. subcooled / has failed
- C. saturated / is responding as expected
- D. saturated / has failed

Question 7

**T1/G1 - cpw**

027AK2.03 Pressurizer Pressure Control System (PZR PCS) Malfunction  
**Knowledge of the interrelations between the Pressurizer Pressure Control Malfunctions and the following:**  
 Controllers and positioners  
 (2.6/2.8)

**K/A MATCH ANALYSIS**

Requires knowledge of how controllers for Pzr saturation circuit function and the ability to diagnose a malfunction of it.

**ANSWER CHOICE ANALYSIS****Answer: B**

- A. Incorrect: First part is correct. Second part is plausible since parameters given are reasonable for the post runback condition. Normal pressurizer spray valve RC-1 would open at 2205 psig and not closed until pressure reaches 2155 psig. The decreasing RCS pressure could be explained by the decreasing Pzr level as it returns to setpoint after FDWP trip.
- B. CORRECT: Saturation temp for 2165 psig is approximately 648 degrees. With the Pzr at 640 degrees it is clearly subcooled. Regarding the pressurizer level saturation circuitry, Psat must be 20 psig below actual RCS pressure before Bank 2 will energize and will not de-energize until Psat and RCS pressure (NR Med-selected RCS Pressure) are within 15 psig (5 psig dead band). With RCS pressure at 2165, pressurizer temp should be about 648°F (saturation for 2165). Saturation for actual pzr temp of 640°F is about 2045 psig therefore Bank 2 should be energized. 2205 psig.**
- C. Incorrect: First part is plausible since conditions in Pzr are consistent with the loss of FDWP runback. Decreasing RCS pressure is occurring concurrently with decreasing Pzr level which is a normal response if the Pzr is saturated. Second part is plausible since parameters given are reasonable for the post runback condition. Normal pressurizer spray valve RC-1 would open at 2205 psig and not closed until pressure reaches 2155 psig. The decreasing RCS pressure could be explained by the decreasing Pzr level as it returns to setpoint after FDWP trip.
- D. Incorrect: First part is plausible since conditions in Pzr are consistent with the loss of FDWP runback. Decreasing RCS pressure is occurring concurrently with decreasing Pzr level which is a normal response if the Pzr is saturated. Second part is correct.

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Technical Reference(s): **PNS-PZR**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **PNS-PZR R5, R7**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Comprehension and Analysis**

**1 POINT**

**Question 8**

Unit 2 initial conditions:

- Time = 1200:00
- Reactor power = 100%
- Both MFDW Pumps tripped

Current conditions:

- Time = 1201:45
- Reactor power = 30% decreasing
- Rule 1 (ATWS/Unanticipated Nuclear Power Production) in progress
- Loop A SCM = 0°F stable
- 2SA9/D2 (RC Pump Vibration High ) Actuated
- Rule 2 (Loss of SCM) initiated

Based on the above conditions, which ONE of the following describes the required actions regarding Reactor Coolant Pumps (RCP's) provided in Rule 2 and the reason for those actions?

- A. Leave RCP's operating to minimize core damage from an increase in DNBR that would occur if secured
- B. Leave RCP's operating to provide flow through the core for heat removal
- C. Secure RCP's to reduce heat input to the RCS
- D. Secure RCP's to prevent RCP damage

Question 8

**T1/G1 - cpw**

029EK3.12 Abnormal Transient Without Scram (ATWS)

**Knowledge of the reasons for the following responses as they apply to the ATWS:**

Actions contained in EOP for ATWS.

(4.4/4.7)

**K/A MATCH ANALYSIS**

**Requires knowledge of EOP directed actions for an ATWS as well as the reasons for those actions.**

**ANSWER CHOICE ANALYSIS**

**Answer: B**

- A. Incorrect: Leaving RCP's running is correct however the reason is due to the added heat transfer gained from forced circulation. Plausible since the second part could be correct if talking about a decrease in DNBR (instead of increase) since the loss flow that would result would cause DNBR to move towards unity.
- B. CORRECT: In accordance with RULE 2, Loss of SCM, if SCMs are lost during the UNPP event, RCPs should not be tripped; they should remain in operation until power is  $\leq 1\%$  to provide flow through the core for heat removal. Maintaining forced RCS flow is the preferred method to remove core heat (due to the increased heat transfer available).**
- C. Incorrect: Both parts are incorrect. Securing RCP's is plausible since this would be the correct actions if power  $< 1\%$ . The reason is also plausible since securing RCP's would in fact decrease the heat input to RCS.
- D. Incorrect: Both parts are incorrect. Securing RCP's is plausible since this would be the correct actions if power  $< 1\%$ . The reason is also plausible since pumping a 2 phase mixture would result in pump damage due to impeller cavitation and high vibration.

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Technical Reference(s): **EAP-UNPP**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **EAP-UNPP R11**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Comprehension and Analysis**

1 POINT

Question 9

Unit 1 plant conditions:

- SGTR tab in progress
- 1B SG isolated
- 1A loop Tcold = 440°F decreasing
- 1B S/G TUBE/SHELL DT = (-)72°F

Based on the above conditions, which ONE of the following describes the reason the SGTR tab directs minimizing core SCM during cooldown AND the initial method used to reduce the SCM?

To reduce the \_\_\_\_\_ AND reducing SCM would initially be attempted by \_\_\_\_\_.

- A. primary to secondary leak rate / de-energizing Pzr heaters and cycling Pzr spray
- B. primary to secondary leak rate / cycling the PORV
- C. compressive stresses in the 1B SG / de-energizing Pzr heaters and cycling Pzr spray
- D. compressive stresses in the 1B SG / cycling the PORV

Question 9

**T1/G1 - cpw**

038EK3.01 Steam Generator Tube Rupture (SGTR)

**Knowledge of the reasons for the following responses as they apply to the SGTR:**

Equalizing pressure on primary and secondary sides of ruptured S/G.

(4.1/4.3)

**K/A MATCH ANALYSIS**

Requires knowing the reason for equalizing pressure on primary and secondary sides of ruptured S/G and how that is done.

**ANSWER CHOICE ANALYSIS**

Answer: A

- A. **CORRECT:** The purpose of reducing SCM during a SGTR is to reduce RCS pressure as much as possible while still maintaining SCM and RCP NPSH. This minimizes the differential pressure between the RCS and the affected SG(s), thus minimizing the tube leak flow rate. The SGTR tab directs the operator to initially use pressurizer heaters and normal Pzr spray. If initial methods do not achieve desired results the PORV is cycled to reduce the SCM.
- B. Incorrect: First part is correct. Second part is plausible since using the PORV is a strategy used in the SGTR tab to reduce SCM however it is not used unless initial methods attempted are inadequate.
- C. Incorrect: First part is plausible since controlling compressive stresses across SG tubes is a prime concern during SGTR. 1B Tube/Shell delta T is violating the Compressive stress limit of -70°F. However, reducing SCM is not a strategy directed at correcting this issue. Feeding the isolated SG would be used to reduce the Compressive stresses. Second part is correct.
- D. Incorrect: First part is plausible since controlling compressive stresses across SG tubes is a prime concern during SGTR. 1B Tube/Shell delta T is violating the Compressive stress limit of -70°F. However, reducing SCM is not a strategy directed at correcting this issue. Feeding the isolated SG would be used to reduce the Compressive stresses. Second part is plausible since using the PORV is a strategy used in the SGTR tab to reduce SCM however it is not used unless initial methods attempted are inadequate.

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Technical Reference(s): **EAP-SGTR, EOP reference document**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **EAP-SGTR R9, R6**

Question Source: **New**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Comprehension and Analysis**

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1 POINT

Question 10

Unit 1 plant conditions:

- Both MFB's de-energized
- TDEFWP operating

Based on the above conditions, which ONE of the following describes the status of bearing oil cooling water supply to the TDEFWP?

TDEFWP bearing oil cooling is currently provided by \_\_\_\_\_ and it \_\_\_\_\_ provide adequate cooling water flow until AC power has been re-established.

- A. CCW / will
- B. HPSW / will
- C. CCW / will NOT
- D. HPSW / will NOT

Question 10

**T1/G1 - cpw**

054AA1.03 Loss of Main Feedwater (MFW)

**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.  
(3.5/3.7)

**K/A MATCH ANALYSIS**

**Loss of both MFB's will result in loss of both MFWP's. Question requires knowledge of how bearing cooling water supply to TDEFWP responds to loss of AC power.**

**ANSWER CHOICE ANALYSIS**

**Answer: B**

- A. Incorrect: First part is plausible since CCW is the normal cooling water supply to the TDEFWP bearing oil. It uses an AC pump which is not available due to loss of power. Second part is correct.
- B. CORRECT: CCW is the normal cooling water supply to the TDEFWP bearing oil. It uses an AC pump which is not available due to loss of power. HPSW is the alternate supply and can provide sufficient pressure and flow via the Elevated Water Storage Tank.**
- C. Incorrect: First part is plausible since CCW is the normal cooling water supply to the TDEFWP bearing oil however it uses an AC pump which is not available due to loss of power. Second part is plausible since the normal supply is via an AC pump whose suction is CCW and that pump is no longer available due to the loss of power.
- D. Incorrect: First part is correct. Second part is plausible since there is no AC available therefore there are no HPSW pumps operating. Additionally plausible since the normal supply is from an AC driven pump (although its suction is CCW water) which is now unavailable.

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Technical Reference(s): **CF-EF**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **CF-EF R26**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Knowledge and Fundamentals**

1 POINT

Question 11

Unit 1 initial conditions:

- Station Blackout occurred
- Neither KHU automatically started
- Manual Emergency Start of BOTH KHU's is required

Time = 1201

- Keowee Emergency Start Channel A control room switch placed in START

Time = 1202

- Keowee Emergency Start Channel B control room switch placed in START

Based on the above conditions, which ONE of the following describes the time at which BOTH KHU's have received an Emergency Start signal AND the Generator Output Voltage (KV) of the KHU's that would indicate proper operation?

- A. 1201 / 13.8
- B. 1202 / 13.8
- C. 1201 / 4.16
- D. 1202 / 4.16

## 2010A NRC REACTOR OPERATOR EXAM

Question 11

**T1/G1 - cpw**

055EA1.02 Loss of Offsite and Onsite Power (Station Blackout)

**Ability to operate and monitor the following as they apply to a Station Blackout:**

Manual ED/G start (Manual start of Hydro unit acceptable).

(4.3/4.4)

### **K/A MATCH ANALYSIS**

Requires the ability to determine how to perform a manual emergency start of both KHU's during a Station Blackout and expected indication when monitoring for proper operation.

### **ANSWER CHOICE ANALYSIS**

Answer: A

- A. **CORRECT:** There are 2 switches in the Unit 1 and 2 control room for emergency starting the KHU's. Both switches are associated with Unit 1's emergency start circuitry even though one of the switches is on the Unit 2 side of the control room. The 2 switches are a part of 2 redundant channels and either channel will emergency start both KHU's. Since the first switch was operated at 1201, that is the time both KHU's would have received an Emergency Start signal. Once operating, the normal output voltage for a KHU is 13.8 KV.
- B. Incorrect: First part is plausible since there are 2 switches and 2 KHU's therefore it would be reasonable to assume that there is a switch for each KHU (since the KHU's are redundant in themselves) and therefore chose 1202 as the time. Additional plausibility comes from the fact that when the EOP directs manually starting both KHU's it directs using both switches. Second part is correct.
- C. Incorrect: First part is correct. Second part is plausible since 4.16KV is the end voltage used by ONS.
- D. Incorrect: First part is plausible since there are 2 switches and 2 KHU's therefore it would be reasonable to assume that there is a switch for each KHU (since the KHU's are redundant in themselves) and therefore chose 1202 as the time. Additional plausibility comes from the fact that when the EOP directs manually starting both KHU's it directs using both switches. Second part is plausible since 4.16KV is the end voltage used by ONS.

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Technical Reference(s): **EOP Encl. 5.38 (Restoration of Power), EAP-BO Attach #1, EL-KHG**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **EAP-BO R6, R7, R13**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Knowledge and Fundamentals**

**1 POINT**

**Question 12**

Which ONE of the following would indicate that the 2DIC inverter has experienced a loss of AC output voltage AND how 2KVIC panelboard would then receive power?

- A. LOAD CONNECTED TO EMERGENCY light on the inverter will be illuminated AND panelboard 2KVIC will automatically be energized from panelboard 2KRA (regulated power).
- B. LOAD CONNECTED TO EMERGENCY light on the inverter will be illuminated AND panelboard 2KVIC will automatically be energized from Unit 3.
- C. INVERTER OUTPUT LOW light on the Inverter be illuminated AND the 2KVIC panelboard will be de-energized until manually aligned to panelboard 2KRA (regulated power).
- D. INVERTER OUTPUT LOW light on the Inverter be illuminated AND the 2KVIC panelboard will be de-energized until manually aligned to receive power from its alternate unit.

Question 12

**T1/G1 - cpw**

057AA2.15 Loss of Vital AC Electrical Instrument Bus

**Ability to determine and interpret the following as they apply to the Loss of Vital AC Instrument Bus:**

That a loss of ac has occurred.

(3.8/4.1)

**K/A MATCH ANALYSIS**

**Requires the ability to interpret indications to determine that a loss of the normal AC supply to KVID has occurred.** Per NRC, global loss of AC not required to match KA.

**ANSWER CHOICE ANALYSIS**

**Answer: C**

- A. Incorrect: Plausible since panelboards powered by essential inverters do have automatic backup. This would be correct if output of one of the essential inverters had been lost since their associated panelboards do have auto backup from ASCO switches and Static Transfer switches.
- B. Incorrect: Plausible since this indication is available for the Essential inverters. Additionally plausible since alternate units do back up the DC panelboards but not the AC panelboards.
- C. **CORRECT: If voltage on the inverter falls below 115 volts the associated output voltage low light will illuminate. If the output is lost procedures directs aligning KRA to KVIC in accordance with OP/1107/010 (Operation of the Batteries and Battery Chargers) since there is no automatic backup.**
- D. Incorrect: First part is correct and the second part is plausible since re-alignment is a manual function and alternate units do back up the DC panelboards but not the AC panelboards.

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Technical Reference(s): **1SA-13/B7, EL-VPC**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **EL-VPC R2/R5**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Comprehension and Analysis**

**1 POINT**

**Question 13**

Plant conditions:

- 1CA Battery Charger fails - output voltage = 0 VDC
- 1CA Battery voltage = 126 VDC
- 1DCB Bus voltage = 123 VDC
- Unit 2 DCA/DCB Bus voltage = 124 VDC
- Unit 3 DCA/DCB Bus voltage = 127 VDC

Based on the above conditions, which ONE of the following will automatically supply power to 1DIA panelboard?

- A. 1DCB Bus
- B. 1CA Battery
- C. Unit 2 DC Bus
- D. Unit 3 DC Bus

Question 13

**T1/G1 cpw**

058AK1.01, Loss of DC Power

**Knowledge of the operational implications of the following concepts as they apply to Loss of DC Power: Battery charger equipment and instrumentation (2.8/3.1)**

**K/A MATCH ANALYSIS**

**Requires knowledge of the operational implications of failed battery charger and the operational impact of the loss of a Vital DC Battery Charger and the response by the Vital DC system**

**ANSWER CHOICE ANALYSIS**

**Answer: B**

- A. Incorrect. For the Vital DC system, the 1DCB bus is not aligned to the 1DCA bus. Plausible because 1DCB Bus is aligned to backup the essential inverters.
- B. Correct. The voltage from 1CA battery is higher than the backup source (Unit 2 DC Bus). Unit 1CA battery will supply power.**
- C. Incorrect, plausible because this would be correct if the Unit 2 DC bus voltage was higher than the 1CA battery voltage.
- D. Incorrect. Unit 3's DC Bus is not connected to Unit 1. Plausible because unit 3 does backup Unit 1 in the SSF power scheme.

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Technical Reference(s): **Lesson Plan EL-DCD**

Proposed references to be provided to applicants during examination: **None**

Learning Objective: **EL-DCD R4**

Question Source: **Bank**

Question History: Last NRC Exam **2009 (modified) #14**

Question Cognitive Level: **Comprehension and Analysis**

**1 POINT**

**Question 14**

Unit 1 and 2 initial conditions:

- A and B LPSW pump operating

Current conditions:

- 1SA9/A9 (LPSW HEADER A PRESS LOW)
- A LPSW pump amps = 15 - 35 fluctuating
- B LPSW pump amps = 55 stable
- LPSW HDR PRESS = rapidly fluctuating between 60 & 75 psig

Based on current conditions, which ONE of the following describes the status of the LPSW pumps and what actions are directed by AP/24 (Loss of LPSW)?

- A. The A LPSW pump is cavitating / Place the Unit 1/2 STANDBY LPSW PUMP AUTO START CIRCUIT in DISABLE then stop LPSW Pump A and start LPSW Pump C
- B. The A LPSW pump has a sheared shaft / Place the Unit 1/2 STANDBY LPSW PUMP AUTO START CIRCUIT in DISABLE then stop LPSW Pump A and start LPSW Pump C
- C. The A LPSW pump is cavitating / Start LPSW Pump C then stop LPSW Pump A
- D. The A LPSW pump has a sheared shaft / Start LPSW Pump C then stop LPSW Pump A

Question 14

**T1/G1 - cpw**

0062AG2.1.20 Loss of Nuclear Service Water

**Ability to interpret and execute procedure steps.**

(4.6/4.6)

**K/A MATCH ANALYSIS**

Requires ability to compare LPSW system indications to AP/24 requirements and execute appropriate steps

**ANSWER CHOICE ANALYSIS**

**Answer: A**

- A. Correct: Indication given is consistent with pump cavitation on LPSW Pump A. LPSW Pump B amps are at the normal value for existing conditions. AP/24 procedural direction for cavitation is to disable the auto start feature then stop the affected pump.**
- B. Incorrect: Sheared shaft indication would be low amps vice fluctuating amps. Plausible as it is the correct pump. The actions given are procedurally correct if candidate decides the pump is not cavitating.
- C. Incorrect: Wrong pump is referenced as cavitating. Plausible if candidate misinterprets the data given. Procedure direction is consistent if wrong pump is selected.
- D. Incorrect: The wrong pump is selected. Sheared shaft indication would be low amps vice fluctuating amps. The actions given are procedurally correct if candidate decides the pump is not cavitating and are consistent with misinterpreting the pump affected.

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Technical Reference(s): **AP/24 (Loss of LPSW)**

Proposed references to be provided to applicants during examination: **None**

Learning Objective: **SSS-LPW Obj R15, EAP-APG (R9)**

Question Source: **BANK**

Question History: Last NRC Exam: **2007 Retest #53**

Question Cognitive Level: **Comprehension or Analysis**

**1 POINT**

**Question 15**

Unit 3 initial conditions:

- Time = 1200
- Reactor power = 45% stable
- Operating Main Feedwater Pump trips
- IA and AIA are lost to 3FDW-315

Current conditions:

- Time = 1300
- RCS Tave = 550°F stable

Based on the above conditions, which ONE of the following describes the expected SG level and the status of 3FDW-315?

**ASSUME NO OPERATOR ACTIONS HAVE OCCURRED**

- A. 25" S/U level / failed open
- B. 25" S/U level / controlling SG level at setpoint
- C. 30" XSUR / failed open
- D. 30" XSUR / controlling SG level at setpoint

Question 15

**T1/G1 - cpw**

065AA2.07 Loss of Instrument Air

**Ability to determine and interpret the following as they apply to the Loss of Instrument Air:**

Whether backup nitrogen supply is controlling valve position.

(2.8/3.2)

**K/A MATCH ANALYSIS**

**Requires interpreting plant conditions to determine how valve should be responding when being supplied by backup nitrogen supply to control valve position**

**ANSWER CHOICE ANALYSIS**

**Answer: D**

- A. Incorrect: Correct level is 30". 25" is Plausible since it would be the correct level if Main FDW were supplying the SG's. 3FDW-315 would still have auto control capability. Second part is plausible since there is a loss of air supply. Being unaware of N2 backup or not knowing N2 backup is good for at least 2 hours would lead to this choice. Additional plausibility comes from the fact that Rule 3 does provide guidance to feed through the startup valve if FDW-315 is failed open and when feeding through the startup valve, 25" is the normal level setpoint.
- B. Incorrect: Correct level is 30". 25" is Plausible since it would be the correct level if Main FDW were supplying the SG's. 3FDW-315 would still have auto control capability. Second part is correct.
- C. Incorrect: First part is correct. 3FDW-315 would still have auto control capability. Second part is plausible since there is a loss of air supply. Being unaware of N2 backup or not knowing N2 backup is good for at least 2 hours would lead to this choice. Additional plausibility comes from the fact that Rule 3 does provide guidance to feed through the startup valve if FDW-315 is failed open and when feeding through the startup valve AND when on EFDW, 30" XSUR is the normal level setpoint.
- D. **CORRECT: 3FDW-315 has backup N2 supply that insures adequate level control for at least 2 hours. Since elapsed time is only 1 hour the backup N2 supply would be regulating valve position as required. Since level being controlled by EFDW the correct level is 30" XSUR.**

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Technical Reference(s): **CF-EF**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **CF-EF R39**

Question Source: **New**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Comprehension and Analysis**

1 POINT

Question 16

Unit 1 plant conditions:

- Reactor power = 50% stable
- Units 2 and 3 in MODE 5
- Grid disturbance is in progress
- BOTH KHU's generating to the grid
- All but ONE of the Offsite Sources required by Tech Spec 3.8.1 (AC Sources-Operating) are lost

Based on the above conditions which ONE of the following describes ...

1) actions required by Tech Spec 3.8.1 ?

AND

2) a condition that would require manually separating BOTH KHU's from the electrical grid?

- A. Immediately enter Tech Spec LCO 3.0.3 / KHU High Generator Output Voltage
- B. Immediately enter Tech Spec LCO 3.0.3 / KHU Low Generator Output Voltage
- C. Energize BOTH Standby Busses within one hour / KHU High Generator Output Voltage
- D. Energize BOTH Standby Busses within one hour / KHU Low Generator Output Voltage

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Question 16

**T1/G1 - cpw**

077AG2.2.22 Generator Voltage and Electrical Grid Disturbances  
**Knowledge of limiting conditions for operations and safety limits.**  
(4.0/4.7)

**K/A MATCH ANALYSIS**

Requires knowledge of LCO entry conditions bases on degraded grid

**ANSWER CHOICE ANALYSIS**

Answer: D

- A. Incorrect: First part is plausible since entering LCO 3.0.3 is generally done when a loss of safety function has occurred and it would be a reasonable misconception that the KHU's would be inoperable due to generating to the grid during a grid disturbance which would constitute a loss of both emergency power supplies. Second part is plausible since a low switchyard voltage could result in high KHU output voltages so those conditions may exist given the IC's.
- B. Incorrect: First part is plausible since entering LCO 3.0.3 is generally done when a loss of safety function has occurred and it would be a reasonable misconception that the KHU's would be inoperable due to generating to the grid during a grid disturbance which would constitute a loss of both emergency power supplies. Second part is correct.
- C. Incorrect: First part is correct Second part is plausible since a low switchyard voltage could result in high KHU output voltages so those conditions may exist given the IC's.
- D. **CORRECT: With one or both required offsite sources inoperable TS 3.8.1 Condition J requires energizing both SBB's within 1 hour. Per AP/34 if a KHU is tied to the grid and its output voltage reaches 13.2KV the unit must be separated from the grid.**

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Technical Reference(s): **TS 3.8.1 AP/34 (Degraded Grid)**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **ADM-TSS R4 EAP-APG R8**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Knowledge and Fundamentals**

**1 POINT**

**Question 17**

Unit 1 initial conditions:

- Reactor power = 100%
- 1C HPI pump OOS

Current conditions:

- 1A and 1B Main FDW pumps tripped
- Condensate Booster Pumps unavailable
- All EFDW pumps unavailable
- 1A and 1B SG Outlet pressure = 860 psig slowly decreasing
- RCS pressure = 2317 psig increasing

Based on the above conditions, which ONE of the following describes the required operator action(s) in accordance with the EOP?

- A. Establish SSF ASW flow to the SG and establish SG levels at 240 inches.
- B. Establish SSF ASW flow to the SG and do NOT establish a level in the SGs.
- C. Establish HPI forced cooling and open 1HP-410.
- D. Establish HPI forced cooling and open 1HP-409.

Question 17

**T1/G1 - cpw**

BE04EA2.2 Inadequate Heat Transfer

**Ability to determine and interpret the following as they apply to the (Inadequate Heat Transfer):**

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

(3.6/4.4)

**K/A MATCH ANALYSIS**

Requires knowledge of appropriate mitigation strategy contained in plant procedures for inadequate heat transfer conditions. Demonstrating compliance with those procedures represents operation within the limitations in the facility's license and amendments.

**ANSWER CHOICE ANALYSIS**

**Answer: D**

- A. Incorrect. Will not be required with adequate HPI flow. Plausible because it would be correct if HPI is considered degraded. If there is only 1 HPIP operating then actions are taken to align SSF ASW to feed the SG's. 240" is level directed by Rule 7 when feeding from SSF-ASW
- B. Incorrect. Will not be required with adequate HPI flow. Plausible because aligning SSF-ASW would be correct if HPI is considered degraded (only 1 HPIP available). Not establishing a level is plausible since it is consistent with EOP guidance on feeding a dry SG with feedwater.
- C. Incorrect. HP-410 will not establish flow in the B header. Plausible because HP-410 is the cross over valve for the A HPI header and valve sequence is reversed.
- D. Correct. With the C HPIP inoperable, flow in the B HPI header will be inadequate which will require the operator to open HP-409.**

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Technical Reference(s): **EAP-LOHT Rule 4**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **EAP-LOHT R24, R28**

Question Source: **BANK EAP070102**

Question History: Last NRC Exam **Oconee RO 2006**

Question Cognitive Level: **Comprehension and Analysis**

**1 POINT**

**Question 18**

Unit 1 initial conditions:

- Reactor power = 100%
- 1A MSLB occurs

Current conditions:

- Reactor has tripped
- RCS Tave = 544°F slowly increasing
- 1A SG Pressure = 0 psig
- 1B SG Pressure = 990 psig slowly increasing
- Turbine bypass valves in Auto
- Reactor Building pressure = 0.2 psig stable

Based on the above conditions, which ONE of the following describes the status of the TDEFWP and how subsequent operation of the TDEFWP would be performed?

TDEFWP is...

- A. operating and can be secured with TDEFWP control switch before AFIS is reset
- B. operating and can be secured with TDEFWP control switch ONLY after AFIS is reset
- C. NOT operating and can be started with TDEFWP control switch before AFIS is reset
- D. NOT operating and can be started with TDEFWP control switch ONLY after AFIS is reset

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Question 18

**T1/G1 - cpw**

BE05EK2.1 Excessive Heat Transfer

**Knowledge of the interrelations between the (Excessive Heat Transfer) and the following:**

Components and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

(3.8/4.0)

**K/A MATCH ANALYSIS**

**Requires knowledge of the relationship between EHT and the manual and automatic operation of the TDEFWP.**

**ANSWER CHOICE ANALYSIS**

**Answer: C**

- A. Incorrect: Plausible since 1FDW-315 is closed in first step of Rule 5. This makes it plausible that AFIS would not secure the TDEFWP so that it would be available to feed the B SG if needed.
- B. Incorrect: Plausible since 1FDW-315 is closed in first step of Rule 5. This makes it plausible that AFIS would not secure the TDEFWP so that it would be available to feed the B SG if needed. Second part is plausible since many components require manual action other than just turning switch to re-position following a safety system actuation (ex: ES components).
- C. CORRECT: The TDEFWP control switch will override the AFIS interlock to close TO-145. TO-145 blocks the hydraulic oil supply to MS-95 therefore stopping steam supply to the TDEFWP. The TDEFWP switch overrides the AFIS signal and allows the operator to restart the TDEFWP as necessary to feed Steam Generators without resetting the AFIS signal.**
- D. Incorrect: TDEFWP would be off. Second part is plausible since many components require manual action other than just turning switch to re-position following a safety system actuation (ex: ES components).

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Technical Reference(s): **CF-EF**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **CF-EF R58**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Comprehension and Analysis**

**1 POINT**

**Question 19**

Unit 1 plant conditions:

- Reactor power = 70% stable
- Pressurizer level = 210" slowly decreasing
- 1HP-120 (RC VOLUME CONTROL) failed closed
- AP/14 (Loss of Normal HPI Makeup and/or RCP Seal Injection) initiated

Based on the above conditions, which ONE of the following describes the initial actions required to control Pressurizer level AND the minimum allowed Pressurizer level (inches) in accordance with AP/14?

Throttle...

- A. 1HP-26 / 200
- B. 1HP-26 / 80
- C. 1HP-122 (RC VOLUME CONTROL BYPASS) / 200
- D. 1HP-122 (RC VOLUME CONTROL BYPASS) / 80

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Question 19

T1/G2 - cpw

028AA1.07 Pressurizer (PZR) Level Control Malfunction

**Ability to operate and / or monitor the following as they apply to the Pressurizer Level Control Malfunctions:**

Charging pumps maintenance of PZR level (including manual backup).  
(3.3/3.3)

**K/A MATCH ANALYSIS**

Requires knowledge of how HPIP's and valves are utilized to maintain pressurizer level following a level control valve (HP-120) failure. Since pump operation is not directly impacted by a failure of the level control valve (HP-120), manual throttling of HP-26 is how PZR level is maintained.

**ANSWER CHOICE ANALYSIS**

Answer: A

- A. **CORRECT:** AP/14 directs throttling makeup through HP-26 to maintain PZR >200". If HP-26 fails, NEO locally open HP-122 (HP-120 bypass). EAP-APG Enclosure AP/14 page 5.
- B. Incorrect: First part is correct. Second part is plausible since 80" is the pressurizer level required to maintain pressurizer heater operability. Rule 6 allows throttling provided pressurizer level is increasing and with the 80" heater cutoff it could be a reasonable misconception that 80" is the low level limit.
- C. Incorrect: First part is incorrect. First part is plausible since 1HP-122 would be correct if 1HP-26 would not open. Second part is correct.
- D. Incorrect: Both parts are incorrect. First part is plausible since 1HP-122 would be correct if 1HP-26 would not open. Second part is plausible since 80" is the pressurizer level required to maintain pressurizer heater operability. Rule 6 allows throttling provided pressurizer level is increasing and with the 80" heater cutoff it could be a reasonable misconception that 80" is the low level limit.

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Technical Reference(s): **EAP-APG Enclosure AP/14**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **EAP-APG R9**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Knowledge and Fundamentals**

**1 POINT**

**Question 20**

Unit 1 initial conditions:

- Reactor in MODE 6

Current conditions:

- FTC Level approximately 6 inches below the 21.34 foot mark and slowly decreasing
- East fuel carriage is in the RB and empty
- West fuel carriage is in the SFP and empty
- Reactor Building Main Fuel Bridge in transit to the upender with a spent fuel assembly in the mast
- Section 4D (Fuel Transfer Canal Flooded) of AP/26 (Loss of Decay Heat Removal) initiated

Based on the conditions above, which ONE of the following describes the first actions required to be taken in accordance with Section 4D (Fuel Transfer Canal Flooded)?

- A. Close 1SF-1 and 1SF-2 (East/West Transfer Tube Isolations)
- B. Verify SF system aligned for refueling cooling mode and stop 2B SF cooling pump
- C. Place the fuel assembly into the East Upender and position the West Fuel Carriage to the RB
- D. Place the fuel assembly into the East Upender and position the East Fuel Carriage to the SFP

Question 20

**T1/G2 -**

036AK2.01 Fuel Handling Incidents

**Knowledge of the interrelations between the Fuel Handling Incidents and the following:**

Fuel handling equipment.

(2.9/3.5)

**K/A MATCH ANALYSIS**

Requires knowledge of the relationship between a fuel handling incident resulting in a decreasing fuel transfer canal water level and pieces of fuel handling equipment (Upenders and Fuel Carriage).

**ANSWER CHOICE ANALYSIS**

**Answer: D**

- A. Incorrect: Plausible because it will be performed later however both carriages must be placed in the SFP prior to closing SF-1/2.
- B. Incorrect: Plausible because it will be performed later in this section of AP/26.
- C. Incorrect: East upender is the correct location. Procedure directs placing the carriages in the SFP to allow FTT Isolation valves to be closed. Misconception about which way the carriage must go to close SF-1 & 2
- D. Correct: Procedure directs placing the fuel assembly in transit into a safe location and specifies the upender or original/intended location and positioning the carriages in the SFP in preparation for closing the FTT Isolation valves.**

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Technical Reference(s): **AP/26 Rev 20, TS 3.9.6**

Proposed references to be provided to applicants during examination: **None**

Learning Objective: **EAP-APG Obj R9, FH-FHS Obj R7**

Question Source: **BANK**

Question History: Last NRC Exam **ONS RO 2009 #62 (Re-ordered distracters)**

Question Cognitive Level: **Comprehension or Analysis**

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1 POINT

**Question 21**

Which ONE of the following describes conditions that indicate RIA-54 is unable to perform its function AND if batch releases are allowed while the RIA is inoperable?

- A. Counts do not increase when Source Check is performed / Batch releases are allowed.
- B. Counts do not increase when Source Check is performed / Batch releases are NOT allowed.
- C. Sample pump found OFF / Batch releases are allowed.
- D. Sample pump found OFF / Batch releases are NOT allowed.

Question 21

T1/G2 - cpw

059AK3.03 Accidental Liquid Radwaste Release

**Knowledge of the reasons for the following responses as they apply to the Accidental Liquid Radwaste Release:**

Declaration that a radioactive-liquid monitor is inoperable.

(3.0/3.7)

### **K/A MATCH ANALYSIS**

Per NRC OK to ask about functional vs operable. Also can ask what is prevented by declaring RIA inoperable (meaning an unmonitored release).

**Requires recognizing conditions that make RIA-54 unable to perform its function and actions required to prevent an unmonitored release when the RIA is non-functional.**

### **ANSWER CHOICE ANALYSIS**

**Answer: C**

- A. Incorrect. First part is plausible since it would be reasonable to assume that when RIA-54 is exposed to a source during its source check that indicated counts would increase however Limits and Precautions of PT/230/01 (RIA PT) clearly state that counts will NOT increase during a source check. Second part is correct.
- B. Incorrect. First part is plausible as discussed in A above Second part is plausible since it is reasonable to assume that if the RIA is unable to provide protection then any releases through that pathway must be suspended. However batch releases (via dip sample with bucket) are still allowed since each discrete release batch is sampled for activity prior to release.
- C. **CORRECT. If the sample pump is OFF then the RIA is not able to monitor water in the TBS. With RIA-54 inoperable, SLC 16.11.3 allows continuing releases if sampled prior to each discrete release.**
- D. Incorrect. First part is correct. Second part is plausible since it is reasonable to assume that if the RIA is unable to provide protection then any releases through that pathway must be suspended. However batch releases (via dip sample with bucket) are still allowed since each discrete release batch is sampled for activity prior to release.

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Technical Reference(s): **PT/230/01 (RIA PT) RAD-RIA SLC 16.11.3**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **RAD-RIA R5**

Question Source: **NEW**

Question History: **N/A**

Question Cognitive Level: **Knowledge and Fundamentals**

**1 POINT**

**Question 22**

Unit 2 plant conditions:

- 3 of the 5 fire detectors in the West penetration room will be simultaneously removed for repair and/or replacement

Based on the above conditions, which ONE of the following describes the compensatory actions required by SLC 16.9.6 (Fire Detection Instrumentation)?

Within 1 hour of removing the detectors....

- A. Perform Channel Functional Test on remaining fire detectors AND backup fire suppression equipment is NOT required.
- B. Establish an hourly fire watch AND backup fire suppression equipment is NOT required.
- C. Perform Channel Functional Test on remaining fire detectors AND backup fire suppression equipment must be staged in the area.
- D. Establish an hourly fire watch AND backup fire suppression equipment must be staged in the area.

Question 22

**T1/G2 -**

067AA1.03 Plant fire on site

**Ability to operate and / or monitor the following as they apply to the Plant Fire on Site:**

Bypassing of a fire zone detector.

(2.5/2.8)

**K/A MATCH ANALYSIS**

**Requires ability to take correct actions when bypassing (via removing) fire zone detectors**

**ANSWER CHOICE ANALYSIS**

**Answer: B**

- A. Incorrect: First part is plausible since it would be correct if a Fire Barrier were determined to be inoperable per SLC 16.9.5. This would require verifying operability of detectors which would be done by performing the functional test. Additional plausibility since this test is normally a 31 day surveillance performed on the detectors. Second part is correct
- B. CORRECT: Per SLC 16.9.6 an hourly fire watch established within 1 hour is required if more than 50% of detectors in one location are inoperable. There are no requirements for backup fire suppression in this case.**
- C. Incorrect: First part is plausible since it would be correct if a Fire Barrier were determined to be inoperable per SLC 16.9.5. This would require verifying operability of detectors which would be done by performing the functional test. Additional plausibility since this test is normally a 31 day surveillance performed on the detectors. Second part is plausible since this could be correct if there were fire suppression equipment in the area inoperable.
- D. Incorrect: Plausible since this could be correct if there were fire detection and suppression equipment in the area inoperable.

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Technical Reference(s): **SLC 16.9.5, 16.9.6**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **ADM-ITS R7**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Knowledge and Fundamentals**

**1 POINT**

**Question 23**

Unit 3 plant conditions:

- Loop A and Loop B SCM's = 0°F stable
- Core SCM = (-)5°F flashing with a red background

Based on the above conditions, which ONE of the following describes the status of the reactor core?

- A. saturated and covered
- B. saturated and partially uncovered
- C. superheated and covered
- D. superheated and partially uncovered

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Question 23

**T1/G2 - cpw**

074EG2.1.7 Inadequate Core Cooling

**Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.**

(4.4/4.7)

**K/A MATCH ANALYSIS**

**Requires instrument interpretation to make an operational judgment of core performance**

**ANSWER CHOICE ANALYSIS**

**Answer: D**

- A. Incorrect: Plausible since specific knowledge of the operation of the Subcooled Margin Monitors is required to determine that the core indicates superheated. Saturated is plausible since both loops indicate saturated. The core being fully covered is plausible since both loops still indicate saturated.
- B. Incorrect: Plausible since specific knowledge of the operation of the Subcooled Margin Monitors is required to determine that the core indicates superheated. Saturated is plausible since both loops indicate saturated. Second part is correct.
- C. Incorrect: First part is correct. Second part is plausible since both loops indicate saturated therefore in would be reasonable to deduce the core is still covered.
- D. CORRECT: Core SCM indicating flashing negative numbers with red background is an indication of superheated conditions in the core. If the core is superheated then it is at least partially uncovered.**

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Technical Reference(s): **EAP-ICC, IC-RCI**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **EAP-ICC R1, IC-RCI R42**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Knowledge and Fundamentals**

1 POINT

Question 24

Unit 2 initial conditions:

- Reactor power = 100%

Current conditions:

- 2SA2/B4 (RC AVERAGE TEMP HIGH/LOW) actuated
- Loop 'A' Controlling That fails high (620°F)

Based on the above conditions, which ONE of the following describes the initial ICS response AND required operator actions to mitigate the failure?

ICS will \_\_\_\_\_ Control Rods AND operator actions will include manually \_\_\_\_\_ feedwater.

- A. insert / increasing
- B. insert / decreasing
- C. withdraw / increasing
- D. withdraw / decreasing

Question 24

**T1/G2 - cpw**

BA02AK1.3 Loss of NNI-X

**Knowledge of the operational implications of the following concepts as they apply to the (Loss of NNI-X):**

Annunciators and conditions indicating signals, and remedial actions associated with the (Loss of NNI-X).

(3.8/3.8)

**K/A MATCH ANALYSIS**

Requires knowledge of operational implications of plant indications of failed NNI for RCS Thot (to determine control rod response) and the remedial actions required by operators to stabilize the plant.

**ANSWER CHOICE ANALYSIS**

**Answer: B**

- A. Incorrect: First part is correct. Second part is plausible since for the Thot failure, indicated Tave would increase. If the operator were to respond to indicated Tave instead of actual RCS temp then increasing FDW would be the direction needed to restore Tave to near setpoint.
- B. CORRECT: With Th failing high, indicated Tave increases and ICS causes control rods to drive (based on Tave error) in an attempt to restore (indicated) Tave to setpoint. Since actual Tave is decreasing, Feedwater should be decreased to stop the temperature (and pressure) decrease.**
- C. Incorrect: First part is plausible since actual Tave will be decreasing therefore if ICS responded to actual Tave (or the other loop Tave) it would withdraw rods. Second part is plausible since for the Thot failure, indicated Tave would increase. If the operator were to respond to indicated Tave instead of actual RCS temp then increasing FDW would be the direction needed to restore Tave to near setpoint.
- D. Incorrect: : First part is plausible since actual Tave will be decreasing therefore if ICS responded to actual Tave (or the other loop Tave) it would withdraw rods. Second part is correct.

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Technical Reference(s): **SAE-L074**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **SAE-L074 R6**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Comprehension and Analysis**

**1 POINT**

**Question 25**

Unit 1 initial conditions:

- Reactor power = 25% slowly increasing
- Turbine trip

Current conditions:

- Reactor power = 22% decreasing

Based on the above conditions, which ONE of the following describes the procedure(s) that will be utilized to direct plant activities AND the expected Steam Generator pressure (psig)?

- A. EOP UNPP tab / 885
- B. EOP UNPP tab / 1015
- C. Plant Operating Procedures / 885
- D. Plant Operating Procedures / 1015

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Question 25

**T1/G1 - cpw**

BA04AA2.1 Turbine Trip

**Ability to determine and interpret the following as they apply to the (Turbine Trip):**

Facility conditions and selection of appropriate procedures during abnormal and emergency operations.

(3.3/3.7)

**K/A MATCH ANALYSIS**

**Requires selecting the appropriate procedures following a turbine trip**

**ANSWER CHOICE ANALYSIS**

**Answer: C**

- A. Incorrect: The turbine trip should not have resulted in a reactor trip since power was < 30%. First part is plausible since this would be the correct answer if initial reactor power had been >30% and the reactor did not trip. Second part is correct and would still be plausible for UNPP since the Gen. breakers tripping open would make TLSF false and therefore remove the 50 psi bias thus TBV's would be controlling at setpoint.
- B. Incorrect: The turbine trip should not have resulted in a reactor trip since power was < 30%. First part is plausible since this would be the correct answer if initial reactor power had been >30% and the reactor did not trip. Second part is plausible with UNPP since there are conditions where AMSAC would actuate and still send the 125 psi bias to the TBV's which would result in them controlling at 1010 psig.
- C. **CORRECT: With Rx power < 30% a turbine trip does not result in a Rx trip. The plant would run back to 20% CTP via an ICS runback due to both Gen bkrs open. Once at 20% with turbine off line, either the Shutdown procedure or the Startup procedure would be implemented to direct the plant. With no Rx trip, the TBV's would control at setpoint (885) since the 50 psi bias to the setpoint would be removed by ICS when both Generator breakers open.**
- D. Incorrect: First part is correct. Second part is plausible since there are conditions where AMSAC would actuate and still send the 125 psi bias to the TBV's which would result in them controlling at 1010 psig.

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Technical Reference(s): **IC-RPS, EAP-SA, AP/1**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **IC-RPS R3, EAP-SA R1**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Comprehension and Analysis**

**1 POINT**

**Question 26**

Unit 1 plant conditions:

- Reactor power = 100%
- 2SA-18/A11 (TURBINE BSMT WATER EMERGENCY HIGH LEVEL) actuated
- NEO reports water level in Turbine Building basement increasing

Based on the above conditions, which ONE of the following describes the required actions directed by AP/10 (Turbine Building Flood)?

Manually trip the reactor and...

- A. align Station ASW pump for use
- B. start all Main Vacuum pumps
- C. secure all operating CCW pumps
- D. place all HPSW pump switches to "OFF"

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Question 26

**T1/G2 - cpw**

BA07AA2.2 Flooding

**Ability to determine and interpret the following as they apply to the (Flooding):**

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

(3.3/3.7)

**K/A MATCH ANALYSIS**

**Knowledge of mitigation strategy is required to ensure adherence to AP/10.**

**Adhering to AP/10 ensures operation within license limitations set by TS 5.4 requiring implementing procedures recommended by Reg Guide 1.33.**

**ANSWER CHOICE ANALYSIS**

**Answer: C**

- A. Incorrect: Plausible since this would be a correct answer if Unit 1 was on LPI DHR. In that case since Unit 1 is not available to provide alternate source of feedwater the Station ASW Pump is started to make Station ASW available to Units 2&3.
- B. Incorrect: Plausible since there is NOTE in AP/10 (for step 4.2) which explains that actions taken will result in a loss of condenser vacuum.
- C. CORRECT: AP/10 directs securing all CCWP's and closing discharge valves to isolate the intake canal from the leak.**
- D. Incorrect: Plausible since HPSW pumps are located in TBB and are susceptible to flooding. AP/10 does provide guidance on what to do if HPSW is lost. Additionally plausible since EWST is available to supply required HPSW in absence of operating HPSW pumps. This makes the HPSW supply unique and adds plausibility to securing the HPSW pumps.

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Technical Reference(s): **AP/1/A/1700/010**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **EAP-APG R8**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Knowledge and Fundamentals**

**1 POINT**

**Question 27**

Unit 1 plant conditions:

- Core SCM = 0°F
- LOCA Cooldown tab in progress
- CETC's = 395°F slowly decreasing
- 1LP-103 (POST LOCA BORON DILUTE) will NOT open

Based on the above conditions, which ONE of the following valves is required to be opened in accordance with the LOCA CD tab to establish post LOCA boron dilution flow?

- A. 1LP-3
- B. 1LP-19
- C. 1LP-104
- D. 1LP-105

Question 27

**T1/G2 - cpw**

BE03EG2.2.3 Inadequate Subcooling Margin

**Knowledge of the design, procedural, and operational differences between units.**  
(3.8/3.9)

**K/A MATCH ANALYSIS**

Requires knowledge of design, procedural, and operational differences between units following a SBLOCA when aligning Post Loca Boron Dilution flowpath. Due to differences in the routing of LPI piping, Unit 1 has a different alternate Post Loca Boron dilution flowpath than does units 2 and 3. Unit 1 has LP-105 in its flowpath where Units 2 & 3 would use LP-19.

**ANSWER CHOICE ANALYSIS**

**Answer: D**

- A. Incorrect: Plausible since 1LP-3 is in the normal DHR drop line however the tap for the alternate PLBD flowpath is between 1LP-2 & 1LP-3 therefore 1LP-3 is not required to be opened. Additional plausibility is added due to the fact that LP-3 is a valve required to be opened for Units 2 & 3.
- B. Incorrect: Plausible since LP-19 would be correct for Units 2 & 3 however Unit 1 has a unique alternate path that does not use 1LP-19.
- C. Incorrect: Plausible since 1LP-104 is a valve in the normal PLBD flowpath however it is in series with 1LP-103 therefore the failure of 1LP-103 to open renders 1LP-104 useless.
- D. **CORRECT:** For Unit 1, another drain line and motor operated valve, 1LP-105, is installed below LP-1 and LP-2 to provide a second flow path to the Reactor Building Emergency Sump. The addition of 1LP-105 was required in this flow path due to the arrangement of the Decay Heat Drop Line on Unit 1. On Unit 1 the Drop Line does not drop straight to the suction of the LPI pumps as it does on units 2 and 3, but instead, curves back upwards before reaching the pumps, in effect, forming a loop seal. This would prevent a gravity drain path from the hot leg to the LPI pumps suction header as it exists on Units 2 and 3 and requires using 1LP-105 for the alternate PLBD flowpath.

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Technical Reference(s): **PNS-LPI, EOP-LOCACD**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **PNS-LPI R27, R28**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Knowledge and Fundamentals**

1 POINT

Question 28

Unit 3 initial conditions:

- Time = 0300
- Reactor power = 100%
- Reactor trip
- CT-3 Lockout occurs

Current conditions:

- MFB re-energized
- 6900V power still unavailable
- HPI system leak downstream of 3HP-31 occurs
- 3A1 RCP SI flow = 3.9 gpm slowly decreasing
- 3A2 RCP SI flow = 3.7 gpm slowly decreasing
- 3B1 RCP SI flow = 3.5 gpm slowly decreasing
- 3B2 RCP SI flow = 3.4 gpm slowly decreasing
- Seal Inlet Header Flow = 40 gpm stable

Based on the above conditions, which ONE of the following describes the status of the following RCP support systems valve(s) two minutes later?

- A. 3HP-21 has closed (ONLY)
- B. 3HP-31 has opened (ONLY)
- C. ALL individual seal return valves have closed and 3HP-21 has closed
- D. ALL individual seal return valves have closed and 3HP-31 has opened

Question 28

T2/G1 - cpw

003K4.11 Reactor Coolant Pump

**Knowledge of RCPS design feature(s) and/or interlock(s) which provide for the following:**

Isolation valve interlocks

(3.0/3.0)

**K/A MATCH ANALYSIS**

**Requires knowledge of RCP Seal Injection flow isolation valve interlocks and the differences in these interlocks between units.**

**ANSWER CHOICE ANALYSIS**

**Answer: C**

- A. Incorrect: Plausible since 3HP-21 would be closed however the individual seal return valves would also be closed. The individual SR valves not being closed is plausible since total SI flow is still normal and on Unit 1 the individual SR valves close based on total SI flow and not individual SI flows.
- B. Incorrect. Plausible since seal injection flow to each RCP is low and 3HP-31 is the seal injection supply valve. 3HP-31 controls off of total seal injection flow so as long as total flow is at setpoint (40 gpm) 3HP-31 would not have attempted to increase SI flow. Additional plausibility from the fact that 2,3HP-31 will automatically close if SI flow is <4 gpm on each pump for > one minute.
- C. **CORRECT: There is a RCP Seal Return interlock that will automatically close Seal Return isolation valves (SRIVs) when SI flow is < 4 gpm so they will be closed. On Units 2&3 if seal injection flow to ALL RCPs < 4 gpm/RCP for > 1 min then, (2)(3)HP-21 automatically closes (U1 HP-31 must be manually closed).**
- D. Incorrect: The first part is correct. Second part is plausible since seal injection flow to each RCP is low and 3HP-31 is the seal injection supply valve. 3HP-31 controls off of total seal injection flow so as long as total flow is at setpoint (40 gpm) 3HP-31 would not have attempted to increase SI flow. Additional plausibility from the fact that 2,3HP-31 will automatically close if SI flow is <4 gpm on each pump for > one minute.

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Technical Reference(s): **OP/2,3/A/1104/002**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **PNS-HPI R22**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Knowledge and Fundamentals**

**1 POINT**

**Question 29**

Unit 1 plant conditions:

- Reactor power = 100%
- 1CC-8 (CC RETURN PENT (54) OUTSIDE BLOCK) fails closed
- 1LPSW-6 (UNIT 1 RCP COOLERS SUPPLY) fails closed

Based on the above conditions, which ONE of the failed valves will require ALL RCPs to be secured in accordance with AP/16 (Abnormal Reactor Coolant Pump Operation) and why?

- A. 1CC-8 / due to high RCP motor stator temperatures
- B. 1CC-8 / due to high RCP radial bearing temperatures
- C. 1LPSW-6 / due to high RCP motor stator temperatures
- D. 1LPSW-6 / due to high RCP radial bearing temperatures

Question 29

T2/G1 - okm

003K6.04 Reactor Coolant Pump

**Knowledge of the effect of a loss or malfunction on the following will have on the RCPs:**

Containment isolation valves affecting RCP operation.  
(2.8/3.1)

**K/A MATCH ANALYSIS**

**Both CC-8 and LPSW-15 are Containment isolation valves and with both failed closed the candidate must assess the effect of the failure on RCP operation**

**ANSWER CHOICE ANALYSIS**

**Answer: C**

- A. Incorrect: Plausible since CC is one of the cooling mediums that provides cooling to RCPs. Additionally plausible since there is a required immediate trip of RCP's if stator temps reach 295°F in AP/16 however CC does not cool the motor stators.
- B. Incorrect: Plausible since CC is one of the cooling mediums that provides cooling to RCPs. Additionally plausible if there is a misconception regarding cooling of the RCP bearings. Seal Injection water ~2.0 gpm is still available to cool the RCP bearings even though CC has been lost. AP/16 requires tripping RCP if radial brg temp reaches 225°F.
- C. CORRECT: LPSW via LPSW-6 supplies cooling water to the oil coolers and stator air coolers. If RCPs continued to run without oil and motor cooling they would all be damaged. AP/16 requires tripping RCP when motor stator temps reach 295°F.**
- D. Incorrect: First part is correct. Plausible since AP/16 requires tripping RCP if radial brg temp reaches 225°F. Additional plausibility if there is a misconception regarding cooling of the RCP bearings. Seal Injection water ~2.0 gpm is still available to cool the RCP bearings even though CC has been lost.

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Technical Reference(s): **PNS-CPM Pg 6 AP/16**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **PNS-CPM R1, 19**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Comprehension or Analysis**

**1 POINT**

**Question 30**

Unit 1 initial conditions:

- Reactor power = 100%
- 1A CC pump operating

Current conditions:

- 1CC-7 fails closed

Based on the above conditions, which ONE of the following describes the expected plant response?

- A. The reactor will automatically trip and NEITHER CC Pump will be operating
- B. The reactor will automatically trip and BOTH CC Pumps will be operating
- C. Letdown will be automatically isolated and NEITHER CC Pump will be operating
- D. Letdown will be automatically isolated and BOTH CC Pumps will be operating

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Question 30

**T2/G1 - cpw**

004K1.36 Chemical and Volume Control System

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

CCWS

(2.6/2.8)

**K/A MATCH ANALYSIS**

**Requires knowledge of cause-effect relationship of loss of CC flow on the HPI system**

**ANSWER CHOICE ANALYSIS**

**Answer: C**

- A. **INCORRECT:** Plausible since a loss of CC would ultimately result in a required reactor trip once CRD temps reach 180 degrees however it is a required manual trip and not an automatic trip. Second part is correct since both CC pumps trip when either CC-7 or CC-8 go closed.
- B. **Incorrect:** Plausible since a loss of CC would ultimately result in a required reactor trip once CRD temps reach 180 degrees however it is a required manual trip and not an automatic trip. Second part is plausible since there is an auto start of the standby CC pump on lo CC flow however if either CC-7 or 8 close, both CC pumps automatically trip.
- C. **CORRECT: CC is the cooling medium for the letdown coolers. If CC is lost, letdown temperature would rise very quickly. If the letdown temperature reaches 130°F a high temperature stat-alarm will sound and at 135°F the letdown isolation valve, HP-5, will close. This happens in ~ 1 minute with a total loss of CC flow. CC-7 closing would result in a total loss of CC flow to the letdown coolers.**
- D. **Incorrect:** First part is correct. Second part is plausible because if CC flow had decreased due to reasons other than CC-7 or CC-8 failing closed then both CC pumps would be operating since the S/B pump would start on low flow. If either CC-7 or 8 close, both CC pumps automatically trip.

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Technical Reference(s): **PNS-HPI, PNS-CC**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **PNS-HPI R22, PNS-CC R18,19**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Knowledge and Fundamentals**

1 POINT

Question 31

Unit 3 initial conditions:

- Reactor in MODE 4
- LPI DHR alignment for cooldown in progress

Current conditions:

- 3LP-1 (LPI RETURN BLOCK FROM RCS) will not open
- 3LP-12 (3A LPI COOLER OUTLET) failed closed

Based on the above conditions, which ONE of the following describes the effect of the failures on ECCS-LPI train availability?

The 3LP-1 failure \_\_\_\_\_ impact ECCS-LPI train availability and the failure of 3LP-12 \_\_\_\_\_ impact ECCS-LPI train availability.

- A. Does / Does
- B. Does / Does NOT
- C. Does NOT / Does
- D. Does NOT / Does NOT

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Question 31

**T2/G1 - cpw**

005K3.05 Residual Heat Removal System (RHRS)

**Knowledge of the effect that a loss or malfunction of the RHRS will have on the following: ECCS  
(3.7/3.8)**

**K/A MATCH ANALYSIS**

**Requires knowledge of the effect that malfunctions in the decay heat cooler/train will have on ECCS availability.**

**ANSWER CHOICE ANALYSIS**

**Answer: C**

- A. Incorrect: First part is plausible since 3LP-1 is a suction to the LPI pumps however it is the Decay Heat Removal suction. Since ECCS suction is from either the BWST or RBES, a failure of LP-1 has no impact on ECCS availability. Second part is correct.
- B. Incorrect: First part is plausible since 3LP-1 is a suction to the LPI pumps however it is the Decay Heat Removal suction. Since ECCS suction is from either the BWST or RBES, a failure of LP-1 has no impact on ECCS availability. Second part is plausible because unit 3 has LPI bypasses around the LPI cooler so it would be plausible to determine the ECCS train is still available since I would still be able to get flow down the header using the cooler bypass valve.
- C. **CORRECT: 3LP-1 is a suction valve to the LPI pumps however it is the Decay Heat Removal suction. Since ECCS suction is from either the BWST or RBES, a failure of LP-1 has no impact on ECCS availability. 3LP-12 is a cooler outlet valve. Since flow through the cooler is an integral part of the ECCS train (allows LPSW to cool RBES water), failure of the valve closed renders the LPI train unavailable (and inoperable).**
- D. Incorrect: First part is correct. Second part is plausible because unit 3 has LPI bypasses around the LPI cooler so it would be plausible to determine the ECCS train is still available since I would still be able to get flow down the header using the cooler bypass valve.

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Technical Reference(s): **LPI system drawing, PNS-LPI**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **PNS-LPI R5, R29, R30, R14**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Comprehension or Analysis**

**1 POINT**

**Question 32**

Which ONE of the following describes the highest RCS pressure (psig) at which the 1LP-1 (LPI RETURN BLOCK FROM RCS) pressure interlock will allow 1LP-1 to be opened and the reason 1LP-1 has a pressure interlock?

- A. 365 / prevent overpressurizing LPI suction piping
- B. 365 / ensure delta p across 1LP-1 will allow it to open
- C. 420 / prevent overpressurizing LPI suction piping
- D. 420 / ensure delta p across 1LP-1 will allow it to open

Question 32

T2/G1 – cpw

005K4.01 Residual Heat Removal System (RHRS)

**Knowledge of RHRS design feature(s) and/or interlock(s) which provide for the following:**

Overpressure mitigation system  
(3.0/3.2)

**K/A MATCH ANALYSIS**

Requires knowledge of how LPI overpressure protection is accomplished. This is done by an interlock that prevents placing LPI DHR piping in service prior to being below 400 psi,

**ANSWER CHOICE ANALYSIS**

Answer: A

- A. **CORRECT:** The 1 LP-1 interlock prevents system overpressurization by preventing 1LP-1 from being opened when WR RCS pressure (via the Amphenol connector) is >400 psig.
- B. Incorrect: First part is correct. Second part is plausible because waiting on a lower RCS pressure to open 1LP-1 would in fact lower the dp across LP-1 when it is opened and there are many different valves throughout the plant where we take specific actions to ensure dp is low enough across a valve before we try to open it (Ex. MSCV's, FDW valves, etc.).
- C. Incorrect: Plausible since the 1 LP-1 interlock prevents 1LP-1 from being opened when WR RCS pressure (via the Amphenol connector) is >400 psig. Second part is correct.
- D. Incorrect: First part is plausible since the 1 LP-1 interlock prevents 1LP-1 from being opened when WR RCS pressure (via the Amphenol connector) is >400 psig. Second part is plausible because waiting on a lower RCS pressure to open 1LP-1 would in fact lower the dp across LP-1 when it is opened and there are many different valves throughout the plant where we take specific actions to ensure dp is low enough across a valve before we try to open it (Ex. MSCV's, FDW valves, etc.).

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Technical Reference(s): **PNS-LPI pgs 52 & 53**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **PNS-LPI R16**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Memory or Fundamental Knowledge**

1 POINT

Question 33

Unit 1 initial conditions:

- Reactor power = 100%

Current conditions:

- RCS pressure = 1350 psig decreasing
- Reactor Building pressure = 4.8 psig increasing
- ES Channel 2 did NOT actuate

Based on the above conditions, which ONE of the following describes ALL safety injection pumps that have AUTOMATICALLY started?

- A. 1A HPI, 1B HPI, 1A LPI, 1B LPI
- B. 1A HPI, 1C HPI, 1A LPI, 1B LPI
- C. 1A HPI, 1B HPI, 1A LPI ONLY
- D. 1A HPI, 1A LPI ONLY

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Question 33

**T2/G1 - cpw**

006A3.05 Emergency Core Cooling

**Ability to monitor automatic operation of the ECCS, including:**

Safety Injection Pumps.

(4.2/4.3)

**K/A MATCH ANALYSIS**

Requires the ability to monitor automatic start of ECCS pumps based on ES channels that have actuated

**ANSWER CHOICE ANALYSIS**

Answer: A

- A. **CORRECT:** With RB pressure > 3 psig ES 1-6 should have actuated. Since LPI pumps are on ES 3&4, both A & B LPIP's would be operating and since both the A & B HPIP's are on are on ES-1, they would be operating.
- B. Incorrect: Plausible since the A HPI pump is on ES channel 1 but the C HPI pump is on channel 2. Additionally, all ES LPI pumps would be operating however 1C LPI pump is not an ES pump. Additional plausibility from the fact that other ES systems that have a "C" pump have that pump as one of the ES pumps (ex. HPI & LPSW)
- C. Incorrect: Plausible since the A and B HPIP's are actuated off of the ES channel 1 and this would be correct if ES pumps were also actuated off of ES 1&2 and the B LPIP was on the even numbered channel (like their actual arrangement on ES 5&6).
- D. Incorrect. Plausible if you assume both HPI and LPI are on ES 1&2 and the A pumps are on the odd channels and B pumps on the even channels.

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Technical Reference(s): **IC-ES**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **IC-ES R14, 18**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Comprehension and Analysis**

1 POINT

Question 34

Unit 1 plant conditions:

- OP/1/A/1103/002, (Filling and Venting RCS) Enclosure 4.14 (Establishing Pzr Steam Bubble And RCS Final Vent) in progress
- RCS pressure = 40 psig with a pure steam bubble
- 1GWD-13 (QUENCH TANK VENT OUTSIDE RB) is closed
- 1GWD-17 (PRESSURIZER VENT) is open

Based on the above conditions, which ONE of the following describes the response of QT level and pressure?

There would be a(n) \_\_\_\_\_ in QT pressure AND a(n) \_\_\_\_\_ in QT level.

- A. increase / increase
- B. increase / minimal change
- C. minimal change / increase
- D. minimal change / minimal change

Question 34

T2/G1 – okm/cpw

007K5.02 Pressurizer Relief Tank/Quench Tank System (PRTS)

**Knowledge of the operational implications of the following concepts as they apply to PRTS:**

Method of forming a steam bubble in the PZR  
(3.1/3.4)

**K/A MATCH ANALYSIS**

Requires knowledge of the QT operational parameters (pressure and level changes) that indicate PZR steam bubble formation is complete

**ANSWER CHOICE ANALYSIS**

**Answer: C**

- A. Incorrect: Plausible if you have the misconception that the PZR vent line is above the water level in the QT and therefore both QT pressure and level increase as some but not all of the steam would condense as it was vented to the QT.
- B. Incorrect: Plausible if you have the misconception that the PZR vent line is above the water level in the QT and therefore both QT pressure and level increase as some but not all of the steam would condense as it was vented to the QT.
- C. **CORRECT: Per OP/1103/002, PZR steam bubble formation is complete (ie, all the N2 gas is vented out of the PZR) when a change (rise) in QT pressure of less than 0.2 psig occurs and QT level increases by 2 inches. Since the PZR vent is underwater in the QT, when N2 is being vented it will rise to the surface and cause a corresponding increase in QT pressure therefore minimal pressure response is a sign that all of the N2 has been vented. Additionally, as water is vented it is condensed under the water level of the QT therefore minimal QT pressure change in conjunction with increasing QT level is indicative of all N2 being out of PZR.**
- D. Incorrect: Plausible if you do not understand conceptually how the N2 bubble is formed or if you do not understand that the pressurizer is being vented to the QT. Additionally plausible if you have the misconception that the QT was vented to the vent header.

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Technical Reference(s): **OP/1/A/1103/002, Encl. 4.11 pg 1; Encl. 4.14, pg 4 & 8**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **PNS-PZR R17**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Memory or Fundamental Knowledge**

1 POINT

**Question 35**

Which ONE of the following describes the normal power supply to the 1A CC pump AND the emergency backup source of power that will be supplying the Main Feeder Buses following a Loss of Offsite Power due to a Switchyard Isolation?

- A. 1XL / KHU via overhead path
- B. 1XL / KHU via underground path
- C. 1XS1 / KHU via overhead path
- D. 1XS1 / KHU via underground path

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Question 35

**T2/G1 - cpw**

008K2.02 Component Cooling Water

**Knowledge of bus power supplies to the following:**

CCW pump, including emergency backup.

(3.0/3.2)

**K/A MATCH ANALYSIS**

Requires knowledge of the 1A CC pump normal and emergency backup power supplies.

**ANSWER CHOICE ANALYSIS**

**Answer: A**

- A. CORRECT: 1XL is the normal power supply for the 1A CC pump. With no ES actuation and a switchyard isolation the KHU aligned to the overhead will energize the MFB via CT-1.**
- B. Incorrect: First part is correct. Second part is plausible since it would be correct if and ES actuation had occurred with the loss of offsite power.
- C. Incorrect: First part is plausible since 1XS1 is a load center that does supply major components including component cooling valve 1CC-7 however it does not supply power to the CC pumps. Second part is correct.
- D. Incorrect: First part is plausible since 1XS1 is a load center that does supply major components including component cooling valve 1CC-7 however it does not supply power to the CC pumps. Second part is plausible since it would be correct if and ES actuation had occurred with the loss of offsite power.

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Technical Reference(s): **PNS-CC EL-EPD**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **PNS-CC R17, EL-EPD R27,28**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Comprehension or Analysis**

**1 POINT**

**Question 36**

Unit 3 plant conditions:

- Reactor power = 100%
- Pressurizer pressure control malfunction has occurred
- RCS pressure = 2000 psig decreasing

Based on the above conditions, which ONE of the following describes the RCS pressure at which a LOW RCS PRESSURE reactor trip will occur AND the RCS pressure setpoint where Engineered Safeguards digital channels 1 and 2 will actuate?

The reactor will trip at \_\_\_\_\_ psig and ES digital channels 1 and 2 will actuate at \_\_\_\_\_ psig.

- A. 1810 / 1600
- B. 1810 / 900
- C. 1720 / 1600
- D. 1720 / 900

Question 36

**T2/G1 - cpw**

010K3.03 Pressurizer Pressure Control

**Knowledge of the effect that a loss or malfunction of the PZR PCS will have on the following:**

ESFAS

(4.0/4.2)

**K/A MATCH ANALYSIS**

Requires knowledge of if the effect that a malfunction of the PZR PCS will have on ESFAS actuation

**ANSWER CHOICE ANALYSIS**

Answer: A

Plausibility of all distracters enhanced by keeping the RPS setpoint options at a higher pressure than all of the ES setpoint options

- A. **CORRECT:** The setpoint for the RPS low pressure trip is 1810 psig and ES 1&2 actuate at 1600 psig.
- B. Incorrect: First part is correct. Second part is plausible since 900 psig is the setpoint for the LPI Inhibit bistable which allows bypassing LPI ES when satisfied.
- C. Incorrect: First part is plausible since 1720 psig is the RPS high pressure trip when the RPS channel is placed in shutdown bypass. Second part is correct.
- D. Incorrect: First part is plausible since 1720 psig is the RPS high pressure trip when the RPS channel is placed in shutdown bypass. Second part is plausible since 900 psig is the setpoint for the LPI Inhibit bistable which allows bypassing LPI ES when satisfied.

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Technical Reference(s): **IC-ES, IC-RPS**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **IC-ES R14, IC-RPS R3**

Question Source: **NEW**

Question History: Last NRC Exam     n/a    

Question Cognitive Level: **Knowledge and Fundamentals**

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1 POINT

Question 37

Unit 2 plant conditions:

- Reactor power = 100%
- 2B RPS Channel Low RCS Pressure Bistable failed in "tripped" state
- 2B RPS Channel in "Manual Bypass"

Current conditions:

- 2C RPS Channel inadvertently placed in "Shutdown Bypass"

Based on the above conditions, which ONE of the following describes the impact (if any) on reactor power and control room alarms?

With NO additional operator actions, reactor power will be \_\_\_\_\_ and the associated RPS Channel C statalarm for \_\_\_\_\_ bistable trip will be actuated.

- A. 0% / Low pressure
- B. 0% / High pressure
- C. 100% / Low pressure
- D. 100% / High pressure

Question 37

**T2/G1 – okm/cpw**

012A4.03 Reactor Protection System

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

Channel blocks and bypasses.

(3.6/3.6)

**K/A MATCH ANALYSIS**

**Requires the ability to monitor plant response and control room indications that occur when placing RPS Channels in Manual Bypass and Shutdown Bypass**

**ANSWER CHOICE ANALYSIS**

**Answer: D**

- A. Incorrect: Both parts are incorrect. First part is plausible since there would be a bistable tripped in both the B and C channels however with the B channel in Manual Bypass the failed bistable does not result in RPS logic seeing that channel as actuated. Since it takes 2 channels to actuate, the reactor will still be at power. Second part is plausible in that it would be essentially true if the question were asking which would be bypassed instead of actuated. It would be plausible to believe that the bistables in question were tripped instead of bypassed. If the bistable is bypassed then the statalarm is essentially bypassed.
- B. Incorrect: First part is incorrect but plausible as described in A above. Second part is correct
- C. Incorrect: First part is correct. Second part is plausible in that it would be essentially true if the question were asking which would be bypassed instead of actuated. It would be plausible to believe that the bistables in question were tripped instead of bypassed.
- D. **CORRECT: With the B channel in Manual Bypass the failed bistable does not result in RPS logic seeing that channel as actuated therefore there is only one RPS channel tripped. Since it takes 2 tripped RPS channels to generate a Reactor trip the Rx still be at power. When an RPS channel is placed in shutdown bypass, RPS automatically inserts a high RCS pressure trip set point of  $\leq 1720$  psig therefore the high RCS pressure bistable will have actuated.**

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Technical Reference(s): **IC-RPS pgs 8,18,19**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **IC-RPS R5, R6**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Comprehension or Analysis**

**1 POINT**

**Question 38**

Which ONE of the following would result in a trip of the 1D RPS Channel AND the 1D CRD Breaker?

- A. Reactor Building pressure bistables in the 1A and 1B RPS channels fail in the "tripped" state
- B. Reactor Building pressure bistable in the 1D RPS channel fails in the "tripped" state
- C. Loss of 1KVID
- D. Loss of 1DCB

Question 38

**T2/G1 - cpw**

012K2.01 Reactor Protection System

**Knowledge of bus power supplies to the following:**

RPS channels, components, and interconnections

(3.3/3.7)

**K/A MATCH ANALYSIS**

**Requires knowledge of the power supply to RPS Channels and related components (CRD breakers)**

**ANSWER CHOICE ANALYSIS**

**Answer: B**

- A. Incorrect: Plausible since failure of the 2 RB pressure bistables will cause all 4 CRD breakers to open however only the A and B RPS channels would be tripped.
- B. Incorrect: Plausible since this failure would result in the RPS channel tripping however the CRD breaker still requires 2 tripped RPS channels to open therefore it will remain closed
- C. **CORRECT: Loss of the vital power source to a particular RPS channel will result in that entire channel de-energizing, with all indicating lights off, and the channel tripped. Loss of the vital power source will also result in a trip of the individual CRD breaker associated with that RPS channel since the 120VAC to the breakers UV coil and shunt trip relay will be lost.**
- D. Incorrect: Plausible since DCB is the normal supply to DID. If DID is lost KVID would be de-energized resulting in D RPS channel and D CRD breaker trip. DCB is normal supply to DID however there is an auto backup from alternate unit via isolating diodes.

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Technical Reference(s): **IC-RPS**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **IC-RPS R18, 20**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Knowledge and Fundamentals**

1 POINT

**Question 39**

Unit 2 initial conditions:

- Reactor power = 100%

Current conditions:

- MSLB occurs
- RCS pressure = 1580 psig slowly increasing
- RB peak pressure = 2.8 psig

Based on the above conditions, which ONE of the following describes valves have received a signal to CLOSE?

- A. 2CC-7
- B. 2LWD-1
- C. 2LPSW-6
- D. 2LPSW-1062

Question 39

**T2/G1 – cpw**

013A3.02 Engineered Safety Features Actuation System (ESFAS)  
**Ability to monitor automatic operation of the ESFAS including:**  
Operation of actuated equipment.  
(4.1/4.2)

**K/A MATCH ANALYSIS**

**Requires knowledge of ES actuation setpoints, what components are operated from which ES digital channels.**

**ANSWER CHOICE ANALYSIS**

**Answer: B**

- A. Incorrect: Plausible since it would be correct if RB pressure had reached the ES 1-6 setpoint of 3 psig.
- B. CORRECT: 2LWD-1 is on ES channel 1. With RCS pressure below the ES channel 1 actuation setpoint for RCS pressure (1600 psig) ES 1 will have actuated and sent a close signal to 2LWD-1 for non essential containment isolation.**
- C. Incorrect: Plausible since 2LPSW-6 does receive a closed signal from ES actuation however it is not from either Channel 1 or 2. This answer would be correct if ES channel 5 had actuated which would occur at 3 psig RB pressure.
- D. Incorrect: Plausible since 2LPSW-1062 does receive a closed signal from ES actuation however it is not from either Channel 1 or 2. This answer would be correct if ES channel 6 had actuated which would occur at 3 psig RB pressure..

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Technical Reference(s): **IC-ES EOP Encl. 5.1**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **IC-ES R14**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Memory or Fundamental Knowledge**

1 POINT

Question 40

Unit 3 plant conditions:

- Reactor power = 100%
- 3KVIA AC Vital Power Panelboard supply breaker trips OPEN
- ES Analog Channel "C" WR RCS pressure signal fails LOW

Based on the above conditions, which ONE of the following describes which (if any) ES digital channels have actuated?

\_\_\_\_\_ have actuated.

- A. NO channels
- B. Channels 1 thru 4
- C. ONLY channels 2 AND 4
- D. ONLY channels 1 AND 3

Question 40

**T2/G1 – okm/cpw**

013K6.01 Engineered Safety Features Actuation System (ESFAS)

**Knowledge of the effect of a loss or malfunction on the following will have on the ESFAS:**

Sensors and detectors.

(2.7/3.1)

**K/A MATCH ANALYSIS**

**Requires knowledge of the effect of both a loss of power to a channels sensors/detectors as well as a malfunction of a sensor/detector will have on ESFAS actuation**

**ANSWER CHOICE ANALYSIS**

**Answer: C**

- A. Incorrect: Plausible since there is a loss of power to an analog channel. The digital channels fail in the untripped state when they lose power but the analog channels fail tripped when they lose power. Since KVIA is a supply to both the A analog and the Odd digitals, it would be plausible to determine the A analog channel does not trip therefore no digital channels would actuate.
- B. Incorrect: Plausible since there are 2 analog channels tripped on RCS pressure and therefore this would be correct if there were no loss of power to the Odd digital channels.
- C. **CORRECT:** The digital channels fail in the untripped state when they lose power but the analog channels fail tripped when they lose power. Since KVIA is a supply to both the A analog and the Odd digitals, there would be 2 Analog channels tripped on the RCS pressure parameter therefore a trip signal is sent to Digital channels 1-4. With the Odd Digital channels without power, only channels 2 and 4 would actuate.
- D. Incorrect: Plausible since it would be correct if KVIA supplied the Even digital channels instead of the Odd channels.

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Technical Reference(s): **IC-ES lesson pg 11, TS 3.3.5**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **IC-ES R2, R5, T1, ADM-ITS R7**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Comprehension or Analysis**

**1 POINT**

**Question 41**

Unit 1 plant conditions:

- Time = 03:00
- Reactor power = 100%
- 1B and 1C RBCUs operating in HIGH speed
- 1A RBCU is operable and OFF
- ES channels 1-6 actuate

Based on the above conditions, which ONE of the following describes RBCU status one minute later?

- A. 1B and 1C RBCUs operating in HIGH speed and 1A RBCU OFF
- B. 1B and C RBCUs operating in LOW speed and 1A RBCU OFF
- C. ALL RBCUs operating in LOW speed
- D. ALL RBCUs will be OFF

Question 41

T2/G1 - okm

022A3.01, Containment Cooling System (CCS)

**Ability to monitor automatic operation of the CCS, including:**

Initiation of safeguards mode of operation

(4.1/4.3)

**K/A MATCH ANALYSIS**

**Requires the ability to monitor RBCU operation during initiation of safeguards (ES) mode of operation**

**ANSWER CHOICE ANALYSIS**

**Answer: D**

- A. Incorrect: Plausible if the 3-minute time delay is mis-applied. Since this is the pre-Es position of the RBCU's this would be the correct answer if you understand that the 3 minute time delay is when the RBCU's got their signal to re-position to ES position but did not understand that they were all initially stopped at the point of ES actuation.
- B. Incorrect: Plausible if you were not aware of the 3 minute time delay and believed that the RBCU in OFF would not actuate on ES.
- C. Incorrect: When ES actuates a 3-minute time delay is in effect and once the time delay is finished then all 3 RBCUs will start at LOW speed. This choice is plausible if you are not aware of the 3 minute time delay or believe it is less than 1 minute.
- D. CORRECT: When ES actuates all operating RBCU's will stop and a 3-minute time delay is in effect. Once the time delay is finished then all 3 RBCUs will start at LOW speed. Since the 3 minute time delay has not yet timed out all RBCUs would be off.**

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Technical Reference(s): **PNS-RBC pg 5,6,16,17**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **PNS-RBC R1,R5**

Question Source: **Modified Bank – PNS150501- enclosed**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Comprehension or Analysis**

**1 POINT**

**Question 42**

Which ONE of the following describes the range of BWST levels where RBS pump suction would be aligned to both the RBES and the BWST simultaneously AND what action(s) would be required if 1LP-22 failed to close when isolating the BWST?

When performing Enclosure 5. 12 (ECCS Suction Swap to RBES) both suction sources are aligned when BWST level is between \_\_\_\_\_ (feet) AND \_\_\_\_\_.

- A. 15 – 9 / stop the 1B LPI pump AND 1B RBS pump
- B. 15 – 9 / Maximize total LPI flow < 3100 gpm
- C. 9 - 6 / stop the 1B LPI pump AND 1B RBS pump
- D. 9 - 6 / Maximize total LPI flow < 3100 gpm

Question 42

T2/G1 - cpw

026A1.03, Containment Spray System (CSS)

**Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CSS controls including:**

Containment sump level

(3.5/3.5)

### **K/A MATCH ANALYSIS**

**Requires ability to monitor changes in BWST level to ensure compliance with design limits on amount of BWST water moved to RBES to provide adequate volume of water in RBES. At ONS actions are taken based on BWST level instead of Containment sump level however analysis assume certain sump levels based on what BWST level is therefore monitoring BWST level and operating controls of RBS based on that level is synonymous with using Containment sump level.**

### **ANSWER CHOICE ANALYSIS**

**Answer: C**

- A. Incorrect: First part is plausible since there are actions being taken to swap the suction from BWST to RBES however the actions allowed in this range do not align suction to both sources. Second part is correct.
- B. Incorrect: First part is plausible since there are actions being taken to swap the suction from BWST to RBES however the actions allowed in this range do not align suction to both sources. Second part is plausible since these actions are correct if only 1 LPI pump is operating when isolating BWST.
- C. CORRECT: At 9' in BWST, LP-19 & 20 are both opened and suction for RBS & LPI pumps is aligned to both BWST and RBES simultaneously. When BWST level reaches 6' the BWST is isolated by closing LP-21 and LP-22. If 1LP-22 fails to close, the 1B LPI pump AND 1B RBS pump are secured until 1LP-28 is manually closed.**
- D. Incorrect: First part is correct. Second part is plausible since stopping the RBS pump would slow the rate of decrease of the BWST and is fact the correct answer if 1LP-20 fails to open at 9'. Second part is plausible since these actions are correct if only 1 LPI pump is operating when isolating BWST.

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Technical Reference(s): **EOP Enclosure 5.12 (ECCS Suction Swap to RBES) and EAP-LOSCM Attachment 3**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **EAP-LOSCM R34, 36**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Comprehension and Analysis**

1 POINT

Question 43

Unit 3 initial conditions:

- Reactor power = 35% slowly increasing

Current conditions:

- Reactor power = 30% decreasing
- PCB 58 and PCB-59 (Unit 3 Generator Output Bkrs) OPEN
- Turbine master in HAND
- OAC point O3X2060 (ICS TURBINE LOADING STATUS) = FALSE

Based on the above conditions, which ONE of the following describes the operation of the Turbine Bypass Valves (TBV's)?

\_\_\_\_\_ is being compared to Turbine Header Pressure setpoint to develop the controlling error signal AND TBV's are controlling at \_\_\_\_\_ psig?

- A. Turbine Header Pressure / 885
- B. Turbine Header Pressure / 935
- C. Steam Generator Outlet Pressure / 885
- D. Steam Generator Outlet Pressure / 935

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Question 43

**T2/G1 - cpw**

039G2.1.19, Main and Reheat Steam

**Ability to use plant computers to evaluate system or component status.**  
(3.9/3.8)

**K/A MATCH ANALYSIS**

**Requires utilizing OAC indication for Turbine Load Status Flag (TLSF) to determine the setpoint at which Main and Reheat Steam pressure is being controlled**

**ANSWER CHOICE ANALYSIS**

**Answer: C**

- A. Incorrect: First part is plausible since it would be correct if the Turbine Master were in Automatic. Second part is correct.
- B. Incorrect: First part is plausible since it would be correct if the Turbine Master were in Automatic. Second part is plausible since it would be correct if the Turbine Load Status Flag were True however both Gen output breakers being open forces the status of the flag to False.
- C. **CORRECT: With the Turbine master in HAND, TBV's compare Steam Generator Outlet Pressure to THP setpoint to develop the controlling error. With the TLSV being False and no trip confirmed signal from the Rx there is no bias applied to the TBV control therefore they would control at setpoint (which is 885).**
- D. Incorrect: First part is correct. Second part is plausible since it would be correct if the Turbine Load Status Flag were True however both Gen output breakers being open forces the status of the flag to False.

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Technical Reference(s): **STG-ICS Chapter 3**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **STG-ICS R10**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Knowledge and Fundamentals**

**1 POINT**

**Question 44**

Unit 1 initial conditions:

- Reactor power = 70% stable

Current conditions:

- 1HPE-6 (Heater 1A1 Bleed Inlet) closed

Based on the above conditions, which ONE of the following predicts the impact of the malfunction on Feedwater flow assuming no operator action AND the procedure which will be used to reopen 1HPE-6?

Feedwater flow will stabilize at a \_\_\_\_\_ value than the pre-transient level AND \_\_\_\_\_ will be used to reopen 1HPE-6.

- A. higher / OP/1/A/1106/23 (High and Low Pressure Extraction)
- B. higher / OP/1/A/1106/002 (Condensate and FDW system)
- C. lower / OP/1/A/1106/23 (High and Low Pressure Extraction)
- D. lower / OP/1/A/1106/002 (Condensate and FDW system)

Question 44

**T2/G1 - cpw**

059A2.06, Main Feedwater (MFW) System

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

Loss of steam flow to MFW system.

(2.7/2.9)

**K/A MATCH ANALYSIS**

**Requires ability to predict the impact on FDW system when steam flow is shut off to a high pressure feedwater heater and then requires knowledge of procedures use to mitigate the consequences of the operation**

**ANSWER CHOICE ANALYSIS**

**Answer: C**

- A. Incorrect: First part is plausible due to the initial ICS response. Initially, CTP will begin to increase which would generally indicate an increase in FDW flow is required however ICS will attempt to maintain CTP at setpoint and will therefore decrease the demand to the remaining portions of ICS which will then actually decrease FDW flow. Since the big picture of ICS is to maintain the primary and secondary heat balance it is plausible to deduce that ICS would increase feedwater to match the initial increase in CTP. Second part is correct.
- B. Incorrect: First part is plausible as described in A. Second part is plausible since OP/1/A/1106/002 (Condensate and FDW system) is the procedure used to control most FDW heater operations. Additionally, it is the procedure to which you are directed if you are not able to reopen the extraction valve.
- C. CORRECT: Initially, CTP will begin to increase however ICS will attempt to maintain CTP at setpoint and will therefore decrease the demand to the remaining portions of ICS. Additionally the FDW temperature correction ckt in the FDW subsection will modify FDW demand down since FDW temperature will be lower due to the loss of extraction steam. OP/1/A/1106/23, Enclosure 4.1 (Re-opening Extraction Valves) contains guidance for re-opening extraction valves at power.**
- D. Incorrect: First part is correct. Second part is plausible since OP/1/A/1106/002 (Condensate and FDW system) is the procedure used to control most FDW heater operations. Additionally, it is the procedure to which you are directed if you are not able to reopen the extraction valve.

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Technical Reference(s): **OP/1/A/1106/23, Enclosure 4.1., Re-opening Extraction Valves) AP/28 (ICS Instrument Failure) STG-ICS STG-FHS**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **STG-FHS R9, 23 STG-ICS R30, 14**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Comprehension and Analysis**

**1 POINT**

**Question 45**

Unit 1 initial conditions:

- Reactor power = 100%

Current conditions:

- Reactor trip
- 1FDW-33 (1A SU FDW Block) FAILS closed

Based on the above conditions, which ONE of the following describes the expected Steam Generator levels 20 minutes after the trip?

**ASSUME NO OPERATOR ACTIONS**

1A SG level = \_\_\_\_\_ AND 1B SG level = \_\_\_\_\_.

- A. 25" S/U / 25" S/U
- B. 12" S/U / 25" S/U
- C. 30" XSUR / 25" S/U
- D. 30" XSUR / 30" XSUR

Question 45

**T2/G1 - bank**

059K3.02, Main Feedwater (MFW) System

**Knowledge of the effect that a loss or malfunction of the MFW will have on the following:**

AFW system.

(3.6/3.7)

**K/A MATCH ANALYSIS**

**Requires knowledge of the effect that a malfunction of a FDW block valve will have on EFDW system**

**ANSWER CHOICE ANALYSIS**

**Answer: D**

- A. Incorrect: Plausible since 25" is the normal post trip SG level in both SG's when on Main FDW. Since the S/U control valve has not failed it is plausible to deduce the S/U valve could still control at 25". It is also plausible to believe that the main FDW control valve would control at 25" if the SU valve did not by believing the valve composite demand would be sent to the main control valve in lieu of the startup valve controlling. IF the A SG did not decrease and initiate dryout then the second part would be correct.
- B. Incorrect: Plausible since this would be correct if it took 21" in BOTH SG's to actuate EFDW on dryout protection.
- C. Incorrect: Plausible since the failure is on the 1A SG only. Failure to realize that BOTH MDEFWP's will start if EITHER SG reaches 21" for 30 seconds could lead to this choice.
- D. **CORRECT: With the SU block valve failed closed the SU control valve cannot supply FDW to the 1A SG. SG level will decrease until <21" for 30 seconds which will start BOTH MDEFWP's. With both MDEFWP's operating, FDW-315 and 316 will control at 30" XSUR**

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Technical Reference(s): **CF-EF, CF-FDW**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **CF-EF R20, R25, R37**

Question Source: **BANK (CF023704)**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Comprehension and Analysis**

1 POINT

Question 46

Unit 1 initial conditions:

- Reactor power = 100%
- Unit 1 TDEFWP unavailable

Current conditions:

- Both Main FDW pumps trip
- 1B MDEFWP fails to start

Based on the above conditions, which ONE of the following describes actions directed by the EOP to remove core decay heat?

Initiate...

- A. Rule 3 (Loss of Main or Emergency Feedwater) and cross connect with an alternate unit to supply the 1B Steam Generator
- B. Rule 3 (Loss of Main or Emergency Feedwater) to decrease SG pressure and feed with Condensate Booster pumps
- C. Rule 4 (Initiation of HPI Forced Cooling) if RCS pressure reaches 2300 psig
- D. EOP Encl. 5.9 (Extended EFDW Operation) and feed both SG's with 1A MDEFWP

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Question 46

**T2/G1 -**

061K6.02, Auxiliary / Emergency Feedwater (AFW) System

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

Pumps.

(2.6/2.7)

**K/A MATCH ANALYSIS**

**Requires knowledge of how AFW components are utilized based on loss of MFDWP's, TDEFWP, and one MDEFWP**

**ANSWER CHOICE ANALYSIS**

**Answer: D**

- A. Incorrect: Plausible since cross connecting with alternate unit is a mitigation strategy utilized by Rule 3 however it is applied if no EFDWPs are available on the subject unit.
- B. Incorrect: Plausible since CBP feed is a strategy utilized by Rule 3 and it would be correct if the 1A MDEFWP had also been lost.
- C. Incorrect: Plausible since HPI FC is utilized as a strategy in RULE 4 and would be correct if the 1A MDEFWP had also been lost since it is only applied if neither SG can be fed and RCS pressure reached 2300 psi.
- D. CORRECT: If only one MDEFWP is available Rule 3 will send you to Encl. 5.9 which will direct opening FDW-313 & 314 and feeding both SG's with one MDEFWP.**

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Technical Reference(s): **EOP Rule 3, EAP-LOHT Attachment 3**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **EAP-LOHT R26**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Knowledge and Fundamentals**

1 POINT

**Question 47**

Which ONE of the following describes actions required in that will extend the life of the Control Batteries following a loss of all AC power in accordance with EOP Enclosure 5.38 (Restoration of Power)?

Load Shed the \_\_\_\_ inverter.

- A. KI
- B. DIA
- C. KSF-1
- D. KOAC

Question 47

**T2/G1 - cpw**

062K3.03, AC Electrical Distribution System

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

DC system.

(3.7/3.9)

**K/A MATCH ANALYSIS**

**Requires knowledge of the effect of a loss of AC power will have on DC systems and actions required subsequent to the loss of AC that will impact DC system availability**

**ANSWER CHOICE ANALYSIS**

**Answer: A**

- A. CORRECT: If a blackout exists on all 3 units, Encl. 5.38 directs performing Encl. 5.32 which will open the DC input breaker to the KI inverter.**
- B. Incorrect: Plausible since DIA is an inverter powered from the control batteries load shedding the inverter would extend control battery life however DIA, DIB, DIC, and DID inverters remain energized from the batteries during a blackout.
- C. Incorrect: Plausible since the XSF-1 inverter is an inverter powered by DC however the inverter is at the SSF and remains energized during a blackout
- D. Incorrect: Plausible since the KOAC inverter is an inverter that is load shed when performing Enclosure 5.32 however it is powered from the Power Batteries and not the Control Batteries.

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Technical Reference(s): **EL-DCD**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **EL-DCD R1**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Knowledge and Fundamentals**

1 POINT

Question 48

Which ONE of the following describes the normal alignment of the Power Battery busses AND a condition in which SLC 16.8.3 (Power Battery Parameters) would require changing that alignment?

The Oconee units are normally \_\_\_\_\_ and this would be changed if \_\_\_\_\_.

- A. cross-tied / a single power battery becomes inoperable
- B. cross-tied / two or more power batteries become inoperable
- C. separated / a single power battery becomes inoperable
- D. separated / two or more power batteries become inoperable

Question 48

**T2/G1 - cpw**

063K4.02, D.C. Electrical Distribution

**Knowledge of DC electrical system design feature(s) and/ or interlock(s) which provide for the following:**

Breaker interlocks, permissives, bypasses and cross-ties.

(2.9/3.2)

**K/A MATCH ANALYSIS**

**Requires knowledge of the normal design status of DC power battery busses as well as the design feature which allows cross-tie between units.**

**ANSWER CHOICE ANALYSIS**

**Answer: C**

- A. Incorrect: First part is incorrect but plausible since the normal alignment of the Control Batteries is with the units cross-connected via the isolating diodes. Second part is correct.
- B. Incorrect: First part is incorrect but plausible since the normal alignment of the Control Batteries is with the units cross-connected via the isolating diodes. Second part is incorrect but plausible since SLC 16.8.3 Condition C is for having 2 or more batteries inoperable and does have immediate corrective actions however the corrective actions in that case do not include cross-tieing the busses.
- C. **CORRECT: Normal alignment of the power battery busses is with the units separated (EL-DCD page 35). SLC 16.8.3 Condition B is for a single power battery inoperable and requires initiating actions to cross-tie busses immediately.**
- D. Incorrect: First part is correct. Second part is plausible since SLC 16.8.3 Condition C is for having 2 or more batteries inoperable and does have immediate corrective actions however the corrective actions in that case do not include cross-tieing the busses.

---

Technical Reference(s): **EL-DCD SLC 16.8.3**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **EL DCD R7, ADM-TSS R4**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Knowledge and Fundamentals**

2010A NRC REACTOR OPERATOR EXAM

1 POINT

Question 49

Operators are preparing to synchronize KHU-2 to the grid in accordance with OP/0/A/1106/019, (Keowee Hydro At Oconee)

The operator notes the following indications:

- Grid Frequency = 59.9 cycles
- Keowee Frequency = 60.3 cycles
- Keowee 2 Line Volts = 13.7 kV
- Keowee 2 Output Volts = 15.2 kV

Based on the above conditions, which ONE of the following describes the control that will be used to adjust the synchroscope indication and the response when ACB-2 is closed?

The \_\_\_\_\_ will be used to adjust the synchroscope indication and \_\_\_\_\_.

- UNIT 2 AUTO VOLTAGE ADJUSTER / ACB-2 will immediately receive a trip signal as a direct result of the line voltage differential
- UNIT 2 SPEED CHANGER MOTOR / ACB-2 will NOT receive a trip signal as a direct result of the line voltage differential
- UNIT 2 AUTO VOLTAGE ADJUSTER / ACB-2 will NOT receive a trip signal as a direct result of the line voltage differential.
- UNIT 2 SPEED CHANGER MOTOR / ACB-2 will immediately receive a trip signal as a direct result of the line voltage differential

## 2010A NRC REACTOR OPERATOR EXAM

Question 49

**T2/G1 -**

064A1.03, Emergency Diesel Generators (ED/G)

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

Operating voltages, currents, and temperatures (use Hydro units if possible).

(3.1/3.4)

### **K/A MATCH ANALYSIS**

Per NRC OK not to address temperatures. **Requires monitoring parameters and predicting response when operating ED/G system controls. Additionally requires ability to manipulate controls of KHU to prevent exceeding design limits as unit is brought on-line.**

### **ANSWER CHOICE ANALYSIS**

**Answer: B**

**Out of tolerance circuit protection is only active for Emergency Starts. Speed Changer Motor (SCM), Auto Voltage Adjuster (AVA)**

A. Incorrect: First part is wrong but plausible if it is not known that the SCM not the AVA is used to adjust the synch scope. Second part is wrong but plausible if the OOT protection circuit is misapplied (only for Emerg Starts) in which case the breaker still would not trip as the voltage high but still within tolerance.

**B. CORRECT: Keowee frequency is higher than grid so synchroscope will be spinning clockwise (CW) which will require use of the MSC. Out of tolerance circuit protection will not trip ACB 2.**

C. Incorrect: Plausible in that the second part is correct. First part is wrong but plausible if it is not known that the SCM not the AVA is used to adjust the synch scope.

D. Incorrect. Plausible in that the first part is correct. Second part is wrong but plausible if the OOT protection circuit is misapplied (only for Emerg Starts) in which case the breaker still would not trip as the voltage high but still within tolerance.

Plausibility is based on memorizing the ACB auto trip feature and correctly calculating less than 10% normal voltage. Also, plausibility is hinged on the applicant knowing how the synch scope will respond to the frequency differential.

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Technical Reference(s): **EL-KHG, OP/0/A/1106/019 Rev 83**

Proposed references to be provided to applicants during examination: **None**

Learning Objective: **EL-KHG R11, R4, R20, R19, R7**

Question Source: **BANK EL041110**

Question History: Last NRC Exam **2009 ONS RO NRC Exam Q#49 (Slightly changed and re-ordered given conditions and rearranged answers)**

Question Cognitive Level: **Comprehension or Analysis**

**1 POINT**

**Question 50**

Unit 1 conditions:

Time = 1159:40

- Reactor power = 100% stable
- KHU-1 OOS
- ACB-4 closed
- KHU-2 gets Emergency Start signal from another unit

Time = 1200:00

- KHU-2 speed reaches 190 RPM

Time = 1200:30

- KHU-2 speed = 190 RPM

Based on the above conditions, which ONE of the following describes the status of KHU-2 and the procedural actions required by Unit 1 (if any) as a result of that status?

- A. Emergency locked out / Enter LCO 3.0.3 immediately
- B. Emergency locked out / Energize both Standby Buses within 1 hour
- C. Energizing CT-4 / No additional actions required
- D. Energizing CT-4 / Initiate AP/11 (Recovery From Loss Of Power)

Question 50

**T2/G1 - cpw**

064A2.02, Emergency Diesel Generators (ED/G)

**Ability to (a) predict the impacts of the following malfunctions or operations on the ED/G system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:**

Load, VARS, pressure on air compressor, speed droop, frequency, voltage, fuel oil level, temperatures.

(2.7/2.9)

**K/A MATCH ANALYSIS**

Per NRC OK to ask about lake level as malfunction and actions based on inoperability as response. (However could not make RO level question from that.)

**Predict the impact of overspeed on KHU and use TS required actions to mitigate the consequences of the inoperability.**

**ANSWER CHOICE ANALYSIS****Answer: B**

- A. Incorrect: First part is correct. Second part is plausible since it is common for TS to require immediate 3.0.3 entry when both trains (overhead and underground) of a safety function (emergency power to Ocone) have been lost.
- B. CORRECT: For KHU's, If an Emergency Start is present and the unit overspeeds ( $\geq 180$  RPM), then a 23 second timer starts. If the unit has not decreased to  $< 180$  RPM within this 23 seconds, then an Emergency Lockout is generated. Since KHU-1 is already OOS then both the overhead and underground KHU's are inoperable and TS 3.8.1 Condition J requires energizing both SBB's within 1 hour**
- C. Incorrect: First part is plausible since this would be correct if you did not have an emergency lockout. Second part is plausible since it would be correct if KHU-2 had operated properly.
- D. Incorrect: First part is plausible since this would be correct if you did not have an emergency lockout. Second part is plausible since AP/11 (Recovery from Loss of Power) is entered when 4160V buses lose power and it is subsequently regained. It would be correct if your unit were counting on the KHU's to energize your MFB since that would indicate that 4160V had lost power however in this case although the KHU's are inoperable, Unit 1 has not had a loss of power therefore 4160V buses were never deenergized.

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Technical Reference(s): **TS 3.8.1, EL-KHG**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **ADM-ITS R7, EL-KHG R21**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Comprehension and Analysis**

1 POINT

Question 51

Unit 1 initial conditions:

- Time = 1200
- Reactor power = 35%
- 1A steam generator tube leak = 2.1 gpd stable
- RCS activity = 0.25  $\mu\text{Ci/ml}$  DEI increasing

Current conditions:

- Time = 1400
- NO change in 1A SG tube leak rate
- RCS activity = 0.65  $\mu\text{Ci/ml}$  DEI and increasing

Based on the above conditions, which ONE of the following describes the response of the radiation monitors between 1200 and 1400?

- A. 1RIA-16 (Main Steam Line Monitor) and 1RIA-40 (CSAE Off-gas) increased.
- B. 1RIA-16 (Main Steam Line Monitor) increased while 1RIA-40 (CSAE Off-gas) remained constant.
- C. 1RIA-59 (N-16 monitor) and 1RIA-40 (CSAE Off-gas) increased.
- D. 1RIA-59 (N-16 monitor) increased while 1RIA-40 (CSAE Off-gas) remained constant.

## 2010A NRC REACTOR OPERATOR EXAM

Question 51

**T2/G1 - CPW**

073K5.01, Process Radiation Monitoring (PRM) System

**Knowledge of the operational implications as they apply to concepts as they apply to the PRM system:**

Radiation theory, including sources, types, units, and effects.

(2.5/3.0)

### **K/A MATCH ANALYSIS**

Knowledge of the operational implications of process RIA responses are required to determine expected RIA response to SGTR and failed fuel. Additionally, an understanding of N-16 production and decay is needed to understand RIA-59 & 60 responses (or lack of response) to failed fuel. RIA-40 is a process monitor.

### **ANSWER CHOICE ANALYSIS**

Answer: A

- A. **Correct: RIA-16 and 40 will respond to ALL activity, therefore an increase in RCS activity, which the stem provides with a degrading fuel failure, would cause all 3 to increase.**
- B. Incorrect. RIA-40 will be affected by the fuel failure as described in A. Plausible since RIA-40 is reading Air Ejector off gas flow and not directly monitoring the RCS.
- C. Incorrect. RIA-40 will be affected by the fuel failure, whereas RIA 59 (N-16 detectors) will not. Plausible since RIA-59 & 60 are Main Steam Line monitors and activity that leaks to the secondary side will pass by the RIA's on the way to the Main Turbine.
- D. Incorrect. RIA-40 will be affected by the fuel failure, whereas RIA 59 (N-16 detectors) will not. Plausible since RIA-40 is reading Air Ejector off gas flow and not directly monitoring the RCS.

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Technical Reference(s): **RAD RIA**

Proposed references to be provided to applicants during examination: NONE

Learning Objective: **RAD-RIA R2**

Question Source: **Bank RAD010207**

Question History: Last NRC Exam **ONS 2006**

Question Cognitive Level: **Comprehension and Analysis**

1 POINT

Question 52

Unit 1 initial conditions:

- Time = 1200
- Reactor power = 100%
- A and B LPSW Pumps operating
- C LPSW pump in AUTO
- Blackout Occurs

Current conditions:

- Time = 1230
- Both MFB's re-energized

Based on the above conditions, which ONE of the following describes the status of the C LPSW pump 5 seconds after the MFB's have re-energized AND the system that will require the use of OP/1/A/1104/010 (Low Pressure Service Water) to return it to service once LPSW pressure has been restored?

- A. operating / Reactor Building Aux Coolers
- B. operating / RBCU Waterhammer Prevention
- C. NOT operating / Reactor Building Aux Coolers
- D. NOT operating / RBCU Waterhammer Prevention

Question 52

**T2/G1 - CPW**

076A2.02, Service Water System (SWS)

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

Service water header pressure.

(2.7/3.1)

**K/A MATCH ANALYSIS**

**Requires predicting the impact of low LPSW header pressure due to loss of power on LPSW pump operation and ability to determine which system will require procedure use to mitigate the consequences of the malfunction.**

**ANSWER CHOICE ANALYSIS****Answer: C**

- A. Incorrect: First part is plausible since it is reasonable to assume that the pump in standby will auto start once power is available and LPSW pressure is low. With a 30 minute loss of power, LPSW pressure will be well below the 70 psig start setpoint and the misconception of the 10 second time delay operation would result in this choice. Second part is correct.
- B. Incorrect: First part is plausible since it is reasonable to assume that the pump in standby will auto start once power is available and LPSW pressure is low. With a 30 minute loss of power, LPSW pressure will be well below the 70 psig start setpoint and the misconception of the 10 second time delay operation would result in this choice. Second part is plausible since the LPSW RBCU Waterhammer Isolation valves (which are also addressed in AP/24) do isolate at the same low pressure setpoint of 18 psig as the RB Aux Coolers however the Waterhammer Isolation Circuitry will automatically reinstate itself as LPSW pressure returns to normal.
- C. CORRECT: Following a LOOP when power has been restored to the Main Feeder Busses if pressure remains  $\leq 70$  psig for 10 seconds the standby LPSW pump will start. If only 5 seconds have passed since MFB's re-energize the standby pump will not be operating. Low LPSW pressure will isolate the RB Auxiliary Coolers and the RBCU Waterhammer Prevention Circuitry. Once the RB Aux Cooler isolation valves close, they must be manually re-opened. AP/24 directs the operator to OP/1/A/1104/010 (Low Pressure Service Water) to restore the system once pressure is restored.**
- D. Incorrect: First part is correct. Second part is plausible since the LPSW RB waterhammer mod valves (which are also addressed in AP/24) do reopen automatically once LPSW pressure is restored.

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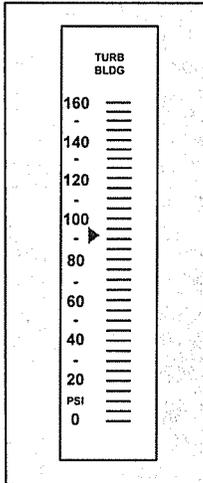
 Technical Reference(s): **SSS-LPW, AP/24**
Proposed references to be provided to applicants during examination: **NONE**Learning Objective: **SSS-LPW R13, R6**Question Source: **NEW**Question History: Last NRC Exam **N/A**Question Cognitive Level: **Comprehension and Analysis**

## 1 POINT

## Question 53

Initial plant conditions:

- Large IA leak occurs
- Service air header pressure = 87 psig decreasing
- Turbine Building air header pressure per gage below



Based on the above conditions, which ONE of the following describes the ONLY air compressors that will be operating?

- A. Diesel Air Compressors AND Primary IA Compressor
- B. Diesel Air Compressors AND AIA Compressors
- C. AIA Compressors AND Backup IA Compressors
- D. Primary IA Compressor AND Backup IA Compressors

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Question 53

**T2/G1 - cpw**

078A4.01, Instrument Air System (IAS)

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

Pressure gauges.

(3.1/3.1)

**K/A MATCH ANALYSIS**

**Requires demonstrating the ability to monitor an IA pressure gage in the control room and based on the indication determine IA compressor status.**

**ANSWER CHOICE ANALYSIS**

**Answer: D**

- A. Incorrect. Diesel Air Compressors will Auto start at 90 psig IA pressure. Gage indicates pressure is slightly > 90 psig. Plausible if you use Service Air pressure. Second part is correct.
- B. Incorrect. Diesel Air Compressors will Auto start at 90 psig IA pressure. Plausible if you use Service Air pressure. AIA compressors start at 88 psig IA pressure therefore would not be operating.
- C. Incorrect. AIA compressors start at 88 psig IA pressure therefore would not be operating. Second part is correct.
- D. CORRECT. Primary IA compressor would be operating loaded and the Backup IA compressors would start at 93 psig IA pressure**

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Technical Reference(s): **SSS-IA**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **SSS-IA R48**

Question Source: **Modified BANK SSS040802**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Comprehension and Analysis**

**1 POINT**

**Question 54**

Unit 2 conditions:

- Reactor power = 100%
- Letdown temperature = 112°F stable
- 2HP-5 failed closed

Based on the above conditions, which ONE of the following describes requirements for manually opening 2HP-5 locally in accordance with AP/32 (Loss of Letdown) AND the MINIMUM Pressurizer level (inches) at which a manual reactor trip would be required?

- A. Maintain constant communication with operator dispatched to open 2HP-5 / 400
- B. Maintain constant communication with operator dispatched to open 2HP-5 / 380
- C. Place the LETDOWN HI TEMP INTLK BYP switch to BYPASS / 400
- D. Place the LETDOWN HI TEMP INTLK BYP switch to BYPASS / 380

Question 54

**T2/G1 - CPW**

103G2.1.20, Containment System

**Ability to interpret and execute procedure steps.**

(4.6/4.6)

**K/A MATCH ANALYSIS**

Question requires knowledge of procedure steps regarding opening a containment isolation valve (HP-5) that has failed closed and the requirements to properly execute the steps.

**ANSWER CHOICE ANALYSIS**

Answer: B

- A. Incorrect: First part is correct. Second part is plausible since 400" is the maximum measurable pressurizer level (0"-400"). It is plausible to believe the required Rx trip would be at the point that pressurizer level goes off scale high however 375" is used to account for instrument errors.
- B. CORRECT: Since HP-5 is a containment isolation valve operated on ES actuation, constant communication is required to maintain Administrative control over the penetration as allowed by TS 3.6.3. AP/32 directs that at 375" Pzr level, trip the Rx.**
- C. Incorrect: First part is plausible since these directions are in HP-32 for opening HP-5 only it would be correct if HP-5 had closed due to High Letdown temperature and the valve was being opened under those directions. Second part is plausible since 400" is the maximum measurable pressurizer level (0"-400"). It is plausible to believe the required Rx trip would be at the point that pressurizer level goes off scale high however 375" is used to account for instrument errors.
- D. Incorrect: : First part is plausible since these directions are in HP-32 for opening HP-5 only it would be correct if HP-5 had closed due to High Letdown temperature and the valve was being opened under those directions. Second part is correct.

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Technical Reference(s): **AP/32 (Loss of Letdown)**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **EAP-APG R8**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Comprehension and Analysis**

1 POINT

Question 55

Unit 3 initial conditions:

- 3CC-8 has been manually opened due to loss of air to the valve

Current conditions:

- Instrument air has been restored to 3CC-8
- 3CC-8 remains manually open

Based on the above conditions, which ONE of the following describes whether 3CC-8 can be operated from the control room and 3CC-8's response to an ES 1-6 actuation?

3CC-8 \_\_\_\_\_ be operated from the control room and 3CC-8 \_\_\_\_\_ automatically close.

- A. can / will
- B. can / will NOT
- C. can NOT / will
- D. can NOT / will NOT

Question 55

**T2/G1 - CPW**

103G2.4.20, Containment System

**Knowledge of the operational implications of EOP warnings, cautions, and notes.**  
(3.8/4.3)

**K/A MATCH ANALYSIS**

**EOP tabs contain no warnings, cautions, or notes relevant to Containment Systems therefore used one from an AP. Question requires knowledge of operational implications of ES actuations on NOTE in AP/20 pg 3 regarding CC-8 being manually opened. CC-8 is a containment isolation valve.**

**ANSWER CHOICE ANALYSIS**

**Answer: D**

- A. Incorrect: Both parts are incorrect but plausible because a candidate could assume that with IA restored the valve would now work from the CR and from an ES signal.
- B. Incorrect: First part is incorrect but plausible because a candidate could assume that with IA restored the valve would now work from the CR however there is a mechanical lever that must be disengaged to allow the valve to operate from the control room. Second part is correct.
- C. Incorrect: First part is correct. Second part is incorrect but plausible because a candidate could assume that with IA restored the valve would now work from an ES signal. Additionally, this is basically correct for FDW 315 and 316. These valves are manually throttled against spring pressure therefore when these valves are manually throttled they cannot be opened from the control room but would be able to be closed from the control room.
- D. **CORRECT: Once CC-8 is manually opened there is a NOTE for step 4.3 of AP/20 that says if manually opened, CC-8 will not operate from the control room. This is true until a lever that was locally engaged to allow manual operation of the valve is disengaged. Until then CC-8 cannot respond to a signal from the CR to close.**

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Technical Reference(s): **PNS-CC, AP/20 (Loss of Component Cooling), CF-EF**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **PNS-CC R13, R14 EAP-APG R6, R8**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Knowledge and Fundamentals**

**1 POINT**

**Question 56**

Unit 1 initial conditions:

- 100% power
- 450 EFPD

Based on the above conditions, which ONE of the following events is the cause of the indications on the attached P/T display?

**SEE ATTACHMENT**

**ASSUME NO OPERATOR ACTIONS**

- A. SBLOCA with a Reactor Trip on variable low pressure
- B. LBLOCA with a Reactor Trip on low RCS pressure
- C. MSLB with a Reactor Trip on AFIS initiation
- D. Loss of MFDW with a Reactor Trip due to losing both MFDWPs

Question 56

**T2/G2 - CPW**

002A4.08, Reactor Coolant System (RCS)

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

Safety parameter display systems.

(3.4/3.7)

**K/A MATCH ANALYSIS**

Per NRC, question using OAC P/T display vs Westinghouse SPDS display info is OK.

**Requires ability to monitor OAC P/T display and interpret RCS pressure and temperature responses to determine the event in progress**

**ANSWER CHOICE ANALYSIS**

**Answer: C**

- A. Incorrect: the variable low pressure setpoint was never reached (diagonal line), Th & Tc stayed apart as they decreased (indicating a large overcooling event).
- B. Incorrect: Th & Tc decreased as pressure decreased. RB pressure is only 0.2 psi.
- C. Correct: "A" SG pressure is ~370 psi with indications of severe overcooling.**
- D. Incorrect: The display indicates overcooling. A loss of MFWDs would be indicated as under cooling (Temps increasing).

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Technical Reference(s): **SF-010 (PTID), EAP-EHT**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **SF-010 R9, EAP-EHT R14**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Comprehension and Analysis**

**1 POINT**

**Question 57**

Which ONE of the following describes the power supply for the Unit 1 Group B Pressurizer heaters?

- A. 1XH
- B. 1XI
- C. 1XJ
- D. 1XSF

Question 57

**T2/G2 - CPW**

011K2.02, Pressurizer Level Control System

**Knowledge of bus power supplies to the following:**

PZR heaters.

(3.1/3.2)

**K/A MATCH ANALYSIS**

Question requires knowledge of power supply to Group B Pressurizer heaters as well as the Operators ability to control Group B heaters

**ANSWER CHOICE ANALYSIS**

Answer: A

- A. **CORRECT:** The normal supply for Group B is 1XSF.
- B. Incorrect: Plausible since 1XH is the normal supply to group E pressurizer heaters.
- C. Incorrect: Plausible since 1XI is the normal supply to Group F pressurizer heaters.
- D. Incorrect: Plausible since 1XJ is the normal supply to Group D pressurizer heaters.

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Technical Reference(s): **PNS-PZR**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **PNS-PZR R7**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Knowledge and Fundamentals**

**1 POINT**

**Question 58**

Which ONE of the following describes who determines that a RB Continuous Release is allowed and after it is started what are the requirements for sampling the RB atmosphere in accordance with OP/1102/014 (RB Purge System)?

- A. CRSRO / Release may continue indefinitely after initial 24 hours without submitting daily sample requests.
- B. CRSRO / Release may continue indefinitely provided RP assigns a new GWR number and sample results are entered in the Unit Log every 24 hours.
- C. Shift RP / Release may continue indefinitely after initial 24 hours without submitting daily sample requests.
- D. Shift RP / Release may continue indefinitely provided RP assigns a new GWR number and sample results are entered in the Unit Log every 24 hours.

Question 58

**T2/G2 - cpw**

029A2.04, Containment Purge System (CPS)

**Ability to (a) predict the impacts of the following malfunctions or operations on the Containment Purge System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:**

Health physics sampling of containment atmosphere.

(2.5\*/3.2\*)

**K/A MATCH ANALYSIS**

Requires knowledge of HP sample requirements for a continuous RB purge and who can initiate a continuous release.

**ANSWER CHOICE ANALYSIS**

**Answer: C**

- A. Incorrect: first part is incorrect. Plausible because this is who normally makes decisions about the unit. Second part is correct.
- B. Incorrect: first part is incorrect. Plausible because this is who normally makes decisions about the unit. The second part is incorrect. Plausible because this is the normal required sampling frequency.
- C. Correct, RP determines when to put the RB on continuous release. Once on continuous release the RB is not required to be sampled.**
- D. Incorrect, first part is correct. The second part is incorrect. Plausible because this is the normal required sampling frequency.

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Technical Reference(s): **OP/1/A/1102/014 (RB Purge) Rev , PNS-RBP Rev 10**

Proposed references to be provided to applicants during examination: **None**

Learning Objective: **PNS-RBP Obj R4,5,8**

Question Source: **Bank**

Question History: **Last NRC Exam: ONS 2007 Re-test #61 (Re-ordered answers)**

Question Cognitive Level: **Memory or Fundamental Knowledge**

1 POINT

Question 59

Plant conditions:

- Spent Fuel Storage Cask has been dropped in Unit 1&2 SFP
- Spent Fuel damage is visible
- RIA-6 and RIA-41 HIGH alarm actuates
- Spent Fuel Pool level = -3.5 feet decreasing

Based on the above conditions, which ONE of the following describes which filters will be used to reduce off site releases and the status of the SF Pumps?

Unit \_\_\_\_\_ Reactor Building Purge filters and the Spent Fuel Cooling pumps will be \_\_\_\_\_.

- A. 1 / ON
- B. 1 / OFF
- C. 2 / ON
- D. 2 / OFF

Question 59

**T2/G2 - cpw**

033A3.02, Spent Fuel Pool Cooling System (SFPCS)

**Ability to monitor automatic operation of the Spent Fuel Pool Cooling System including:**

Spent fuel leak or rupture.

(2.9/3.1)

**K/A MATCH ANALYSIS**

**Knowledge of automatic operation of the SF Cooling pumps on a decreasing SF Pool level and SFPV as a result of a Spent Fuel Pool accident is required.**

**ANSWER CHOICE ANALYSIS**

**Answer: D**

- A. Incorrect: First part is Plausible since Unit 1 and Unit 2 share Spent Fuel Pools and there is only one set of filters needed for the Spent Fuel Filtered Exhaust system. Since there are no dedicated filters, Unit 2's filters Reactor Building Purge filters are used. Second part is plausible since 4' is the level at which SF Pumps loose suction and level is still > 4 feet.
- B. Incorrect: First part is Plausible since Unit 1 and Unit 2 share Spent Fuel Pools and there is only one set of filters needed for the Spent Fuel Filtered Exhaust system. Since there are no dedicated filters, Unit 2's filters Reactor Building Purge filters are used. Second part is correct
- C. Incorrect: First part is correct. Second part is plausible since 4' is the level at which SF Pumps loose suction and level is still > 4 feet.
- D. **CORRECT: Unit 1 and Unit 2 share Spent Fuel Pools and there is only one set of filters needed for the Spent Fuel Filtered Exhaust system. Since there are no dedicated filters, Unit 2's filters Reactor Building Purge filters are used. The Spent Fuel Cooling pumps have a low level trip at -2.5 feet. Since level is -3.5 feet the pumps would be off.**

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Technical Reference(s): **RAD-RIA, FH-SFC, FH-FES**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **RAD-RIA R2 FH-FES R2, and FH-SFC R3**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Knowledge and Fundamentals**

**1 POINT**

**Question 60**

Unit 2 initial conditions:

- Reactor power = 100%

Current conditions:

- Reactor trip
- Controlling 2A Steam Generator Outlet Pressure fails HIGH

Based on the above conditions, which ONE of the following describes the 2A AND 2B Turbine Bypass Valves (TBV's) response?

The 2A TBV's will fully open \_\_\_\_\_ AND the 2B TBV's will fully open \_\_\_\_\_.

- A. then return to throttled position / then return to throttled position
- B. then return to throttled position / and remain fully open
- C. and remain fully open / then return to throttled position
- D. and remain fully open / and remain fully open

Question 60

T2/G2 - cpw

041K6.03, Steam Dump System (SDS) and Turbine Bypass Control

**Knowledge of the effect of a loss or malfunction on the following will have on the SDS:**Controller and positioners, including ICS, S/G, CRDS.  
(2.7/2.9)**K/A MATCH ANALYSIS**

Requires knowledge of signal inputs to Turbine Bypass valve controls and the effect that a failed open controller will have on Turbine Bypass Control

**ANSWER CHOICE ANALYSIS****Answer: C**

- A. Incorrect: First part is plausible since it would be correct for normal post trip response without the instrument failure. Additionally plausible since the misconception that the TBV's continue to control from Turbine Header Pressure post trip would also lead to this choice however when the Turbine Bailey station trips to hand (which it does on a Rx trip) the controlling signal for the TBV's swaps from being Turbine Header Pressure to Steam Generator Outlet Pressure. Second part is correct.
- B. Incorrect: First part is plausible since it would be correct for normal post trip response without the instrument failure. Additionally plausible since the misconception that the TBV's continue to control from Turbine Header Pressure post trip would also lead to this choice however when the Turbine Bailey station trips to hand (which it does on a Rx trip) the controlling signal for the TBV's swaps from being Turbine Header Pressure to Steam Generator Outlet Pressure. Second part is plausible since it would be correct if you mistakenly applied the failed instrument to the B TBV's instead of the A TBV's OR if you are under the misconception that both sets of TBV's control from the same SG Outlet Pressure as is the case pre-trip when using Turbine header pressure as the controlling signal.
- C. CORRECT: When the reactor trips, both sets of TBV's would normally go full open in an attempt to relieve enough steam from the SG's to gain control of SG Outlet pressure. Shortly after the trip (generally less than a minute) both sets of TBV's will be back to the throttled position and in control of SG Outlet Pressure. With the controlling pressure for the A TBV failed high, the A TBV would remain full open since it will always believe that actual pressure is greater than setpoint.**
- D. Incorrect: First part is correct. Second part is plausible since it would be correct if you mistakenly applied the failed instrument to the B TBV's instead of the A TBV's OR if you are under the misconception that both sets of TBV's control from the same SG Outlet Pressure as is the case pre-trip when using Turbine header pressure as the controlling signal.

Technical Reference(s): **STG-ICS Chapter 3**Proposed references to be provided to applicants during examination: **NONE**Learning Objective: **STG-ICS R10**Question Source: **NEW**Question History: Last NRC Exam **N/A**Question Cognitive Level: **Comprehension and Analysis**

**1 POINT**

**Question 61**

Unit 3 initial conditions:

- Reactor power = 100%
- 3MS-112 & 3MS-173 (SSRH 3A/3B Controls) are in MANUAL
- 3MS-77, 78, 80, 81 (MS to SSRH's) are in AUTO

Current conditions:

- Main Turbine trips

Based on the above conditions, which ONE of the following describes the plant response?

- A. 3MS-112 & 3MS-173 valve demand will throttle back with load
- B. 3MS-112 & 3MS-173 valve demand will remain full open but the air will be ported off, causing the valves to close
- C. 3MS-77, 78, 80, and 81 will close when the air is dumped off of the valves
- D. 3MS-77, 78, 80, and 81 will close as SSRH inlet pressure decreases

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Question 61

**T2/G2 - cpw**

045K3.01, Main Turbine Generator (MT/G) System

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

Remainder of the plant.

(2.9/3.2)

**K/A MATCH ANALYSIS**

**Requires knowledge of the effect of a Turbine Trip on other components in the plant**

**ANSWER CHOICE ANALYSIS**

**Answer: D**

- A. **INCORRECT:** 3MS-112 & 173 will close in manual when the Main Turbine trips. Plausible because they will throttle back in a "runback condition".
- B. **Incorrect:**The signal from the Moore Controllers will direct the valves to close. Plausible because this and the air being bled off of the valves causes them to close.
- C. **Incorrect:** 3MS-77, 78, 80 and 81 are Motor Operated Valves. Plausible because they close in this situation
- D. **Correct:** Upon receipt of a Turbine Trip signal, and a decrease in SSRH inlet pressure, MS-77, 78, 80 and 81 will close regardless of the switch positions in the Control Room and on the Heater Panel unless power is not available.

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Technical Reference(s): **STG-MSR**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **STG-MSR R18**

Question Source: **Bank**

Question History: Last NRC Exam **2007 NRC exam Q #38**

Question Cognitive Level: **Comprehension and Analysis**

1 POINT

Question 62

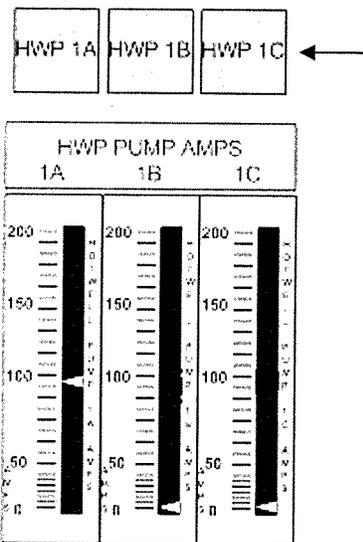
Unit 1 plant conditions:

- OP/1/A 1106/002A (Condensate And FDW System Startup And Shutdown) Encl. 4.2 (Condensate And FDW System Startup) in progress
- 1A Hotwell pump (HWP) operating
- CBP suction pressure = 45 psig stable
- The 3 square amber lights located above the HWP PUMP AMP gages are "ON"
- Procedure directs placing a standby Hotwell pump to "AUTO"

Based on the above conditions, which ONE of the following describes what the Hotwell pump amber lights indicate AND the 1B Hotwell pump response once it's control switch is placed in AUTO?

1A Hotwell pump is operating with \_\_\_\_\_ and the 1B Hotwell pump \_\_\_\_\_ automatically start when its control switch is placed in Auto.

- A. low suction pressure / will
- B. low discharge pressure / will
- C. low suction pressure / will NOT
- D. low discharge pressure / will NOT



Question 62

**T2/G2 - cpw**

056G2.2.44, Condensate System

**Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions.**

(4.2/4.4)

**K/A MATCH ANALYSIS**

**Question requires interpreting light indications for HWP discharge pressure as well as understanding how placing HWP switch to auto per procedure would affect plant conditions**

**ANSWER CHOICE ANALYSIS**

**Answer: B**

- A. Incorrect: The second part is correct as the 1B Hotwell Pump will start on low CBP suction pressure of < 55 psig when placed in Automatic, however the amber light indicates low HWP discharge pressure and not low suction pressure. Plausible since many pumps have low suction pressure indications and controls due to inadequate NPSH issues therefore having indication of low suction pressure (vs low disch pressure) is a more logical choice though incorrect in this application.
- B. CORRECT: The amber light does indicate low HWP discharge pressure and illuminates at <125 psig discharge pressure. The 1B Hotwell pump will start when its control switch is placed in Auto due to low CBP suction pressure < 55 psig. (CF-C Pages 21 & 22)**
- C. Incorrect: The amber light indicates low HWP discharge pressure and not low suction pressure. Plausible since many pumps have low suction pressure indications and controls due to inadequate NPSH issues therefore having indication of low suction pressure (vs low disch pressure) is a more logical choice though incorrect in this application. The HWP will start since CBP suction pressure is < 55 psig. Plausible since the light above the HWP starting switch is illuminated it would be reasonable to interpret it as a protective interlock to prevent the pump from starting similar to RCP starting interlock indications.
- D. Incorrect: The first part is correct however the HWP will start since CBP suction pressure is < 55 psig. Plausible since the light above the HWP starting switch is illuminated it would be reasonable to interpret it as a protective interlock to prevent the pump from starting similar to RCP starting interlock indications.

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Technical Reference(s): **CF-C, OP/1/A/1106/002A Encl. 4.2**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **CF-C R9, R28**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Comprehension and Analysis**

**1 POINT**

**Question 63**

Unit 3 plant conditions:

- Reactor power = 100%
- Fuel movement in progress in SFP
- 3RIA-6 (Spent Fuel Pool) in HIGH alarm

Based on the above conditions, which ONE of the following describes action(s) that will occur?

- A. 3RIA-6 audible alarm will automatically sound.
- B. the Spent Fuel Pool Ventilation system will be automatically isolated.
- C. the Spent Fuel Filtered Exhaust fans will be manually started from the Control Room.
- D. the Outside Air Booster Fans will be manually started from the Spent Fuel Pool entrance area.

Question 63

**T2/G2 - cpw**

072K1.03, Area Radiation Monitoring (ARM) System

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

Fuel building isolation.

(3.6/3.7)

**K/A MATCH ANALYSIS**

Per NRC, actions based on fuel damage and RIA-6 OK if distracter includes auto isolation of SFP ventilation systems

**Requires knowledge of any cause-effect relationship between ARM alarms and SFP isolation (none).**

**ANSWER CHOICE ANALYSIS**

**Answer: A**

- A. CORRECT: 3RIA-6 causes an audible alarm.**
- B. Incorrect: Plausible since it could be seen as desirable for the ventilation systems in the SFP (which exhausts to the Unit vent) to auto isolate on high radiation levels.
- C. Incorrect: Plausible since AP/9 does require starting one of the Spent Fuel filtered exhaust fans when there is fuel damage in the SFP however they are NOT started from the Control Room but in the entrance area to the SFP itself.
- D. Incorrect: Plausible since the Outside Air Booster Fans are manually started in accordance with AP/9 (Spent Fuel damage) when there is fuel damage in the SFP however the controls for the fans are located in the Control Room.

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Technical Reference(s): **AP/9, RAD-RIA**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **RAD-RIA R15, FH-FHS R31**

Question Source: **NEW**

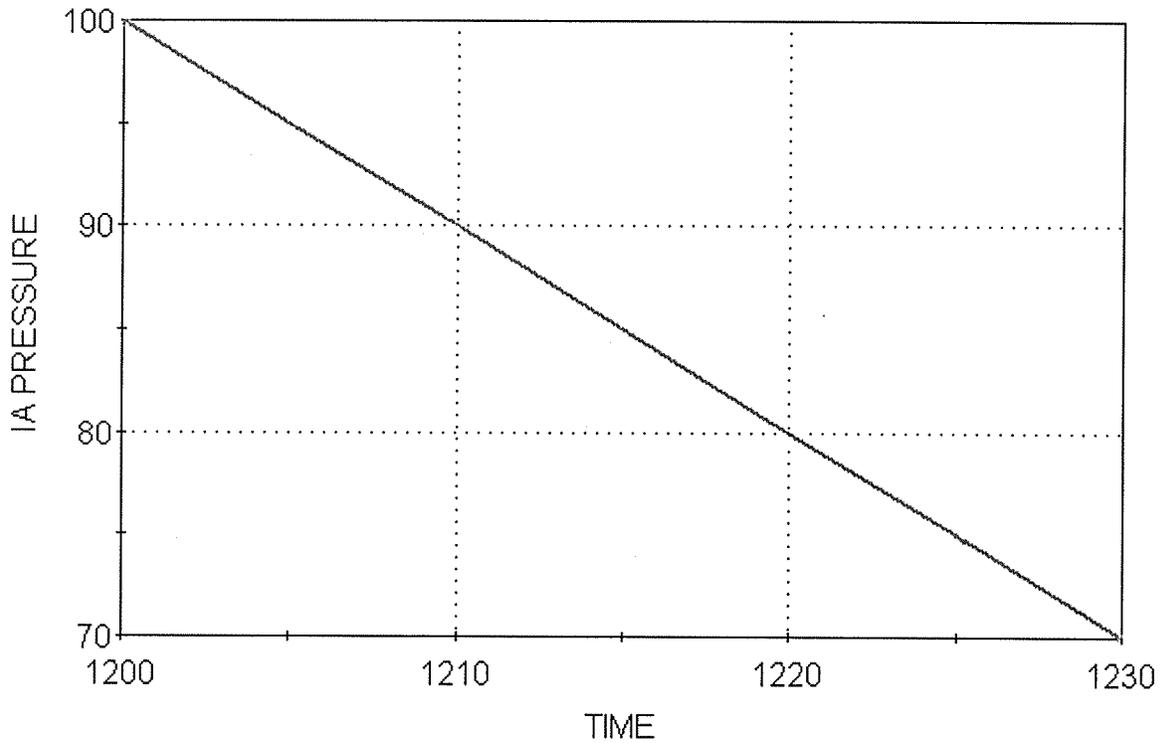
Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Knowledge and Fundamentals**

1 POINT

Question 64

## IA Pressure vs. Time



Based on the graph above, which ONE of the following describes the time at which SA-141 (SA to IA Controller) will automatically open?

- A. 1207
- B. 1210
- C. 1212
- D. 1215

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Question 64

**T2/G2 - cpw**

079K4.01, Station Air System (SAS)

**Knowledge of SAS design feature(s) and/or interlock(s) which provide for the following:**

Cross-connect with IAS.

(2.9/3.2)

**K/A MATCH ANALYSIS**

**Requires knowledge of automatic cross-connect between Service air and Instrument air systems.**

**ANSWER CHOICE ANALYSIS**

**Answer: D**

- A. Incorrect: Plausible since 93 psig is the pressure at which the Backup IA compressors will start.
- B. Incorrect: Plausible since 90 psig is the pressure at which the Diesel Air Compressors will start
- C. Incorrect: Plausible sine 88 psig is the pressure at which the AIA compressors will start
- D. CORRECT: SA to IA Controller (SA-141) valve senses the IA system pressure and opens at 85 psig to allow service air into the IA system.**

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Technical Reference(s): **SSS-IA, AP/2/A/1700/022 Loss of Instrument Air**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **SSS-IA R52, R27**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Comprehension and Analysis**

**1 POINT**

**Question 65**

Unit 3 plant conditions:

- Reactor power = 100%
- Fire in progress in area of 3TE switchgear
- 3TE has been de-energized

Based on the above conditions, which ONE of the following pieces of equipment is NOT available?

- A. 3A MDEFWP
- B. 3C HPIP
- C. 3B MDEFWP
- D. 3A LPSWP

Question 65

**T2/G2 - cpw**

086K5.03, Fire Protection System (FPS)

**Knowledge of the operational implication of the following concepts as they apply to the Fire Protection System:**

Effect of water spray on electrical components.

(3.1/3.4)

**K/A MATCH ANALYSIS**

Per NRC, put fire in a specific location which requires de-energizing a Load Center or 4160V bus and ask about equipment effected.

**Requires knowledge of operational implications of de-energizing 3TE to allow water spray to extinguish fire.**

**ANSWER CHOICE ANALYSIS**

**Answer: C**

A. Incorrect: 3A MDEFWP is powered from 3TD

B. Incorrect: 3C HPIP is powered from 3TD.

**C. CORRECT: 3B MDEFWP is powered from 3TE and would therefore NOT be available**

D. Incorrect: 3B LPSWP is powered from 3TC

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Technical Reference(s): **PNS-HPI, PNS-LPI, CF-EF, PNS-RBC, SSS-LPW**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **EL-EPD R27**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Knowledge and Fundamentals**

1 POINT

Question 66

Unit 2 plant conditions:

- Reactor in MODE 6
- RCS Boron = 2270 ppmb

Based on the above conditions, which ONE of the following describes whether RCS Boron concentration meets the requirements of OP/2/A/1502/007 (Operations Defueling/Refueling Responsibilities) for core alterations AND what is the minimum number of OPERABLE Source Range NI's required by the same procedure?

- A. meets / 2
- B. meets / 1
- C. does NOT meet / 2
- D. does NOT meet / 1

Question 66

**T3 - cpw**

2.1.36, Conduct of Operations

**Knowledge of procedures and limitations involved in core alterations.**

(3.0/4.1)

**K/A MATCH ANALYSIS**

Requires knowledge of procedure limits and precautions and/or Tech Spec requirements for fuel movement.

**ANSWER CHOICE ANALYSIS**

Answer: A

- A. **CORRECT:** First part is correct since 2250 - 2950 ppm boron is required per L&P of OP/2/A/1502/007 (Operations Defueling/Refueling Responsibilities). Second part is correct as both the procedure and TS require 2 Source Range NI's when moving a fuel assembly.
- B. Incorrect: First part is correct. Second part is plausible since conditions other than when moving fuel or adding positive reactivity, a single Source Range NI is all that is required.
- C. Incorrect: First part is plausible since 2950 is the upper end of band and it could easily be confused as the minimum boron allowed since it is above the TS required 2220 ppmb. Second part is correct.
- D. Incorrect: : First part is plausible since 2950 is the upper end of band and it could easily be confused as the minimum boron allowed since it is above the TS required 2220 ppmb. Second part is plausible since conditions other than when moving fuel or adding positive reactivity, a single Source Range NI is all that is required.

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Technical Reference(s): **FH-FHS, OP/2/A/1502/007, TECH SPECS**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **FH-FHS R5, R20**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Knowledge and Fundamentals**

1 POINT

Question 67

Unit 1 initial conditions:

- Reactor power = 100%
- LDST level = 75" stable
- Group 7 rod position = 94% withdrawn
- Makeup to LDST initiated from 1B BHUT
- Neutron error = 0 stable

Current conditions:

- 1HP-15 Bailey controller indicates 470 gallons added to LDST
- 1B Bleed Transfer Pump secured

Based on the above conditions, which ONE of the following would describe a diverse indication that 470 gallons of 1B BHUT had been added to the LDST?

LDST level is approximately \_\_\_\_\_ inches and neutron error will become \_\_\_\_\_.

- A. 90 / positive
- B. 90 / negative
- C. 95 / positive
- D. 95 / negative

Question 67

**T3 - cpw**

2.1.45, Conduct of Operations

**Ability to identify and interpret diverse indications to validate the response of another indication.**

(4.3/4.3)

**K/A MATCH ANALYSIS**

Requires analyzing various diverse indications to validate a SG tube leak exists.

**ANSWER CHOICE ANALYSIS**

**Answer: B**

- A. Incorrect. First part is correct. Second part is plausible since it would be correct if the addition was from A BHUT OR if the student made the common error of incorrectly determining the direction of rod motion required to offset the boron addition.
- B. CORRECT: LDST is 31.3 gal/inch. If 470 gallons of water had been added then level should have increased 15 inches which would put level at 90 inches. If B bleed had been added then Boron concentration would be decreasing which means neutron error would be building negative towards a rod push to offset the boron addition.**
- C. Incorrect: First part is plausible because this would be correct if you use 24 gal/inch for LDST volume however this is the Pressurizer value. Second part is plausible since it would be correct if the addition was from A BHUT OR if the student made the common error of incorrectly determining the direction of rod motion required to offset the boron addition.
- D. Incorrect: First part is plausible because this would be correct if you use 24 gal/inch for LDST volume however this is the Pressurizer value. Second part is correct.

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Technical Reference(s): **PNS-PZR, PNS-HPI, CP-016**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **PNS-PZR R1,2,3 CP-016 R5,**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Comprehension and Analysis**

**1 POINT**

**Question 68**

Which ONE following describes the RCS Pressure Safety Limit (psig) and what is credited with ensuring the limit is NOT exceeded?

- A. 2500 / RPS trip settings.
- B. 2500 / Pressurizer Spray Valve.
- C. 2750 / RPS trip settings.
- D. 2750 / Pressurizer Spray Valve.

Question 68

**T3- CPW**

2.2.25, Equipment Control

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

(3.2/4.2)

**K/A MATCH ANALYSIS**

Requires knowledge of the LCO for RCS Pressure safety limit and its bases.

**ANSWER CHOICE ANALYSIS**

Answer: D

- A. Incorrect: First part is plausible since 2500 psig is the RCS design pressure value. Second part is correct.
- B. Incorrect: First part is plausible since 2500 psig is the RCS design pressure value. Second part is plausible since the pressurizer spray valve is a method of limiting RCS pressure spikes however the bases of the Safety Analysis specifically says that no credit is take for operation of the spray valve.
- C. CORRECT: 2750 is the RCS Pressure Safety Limit. Safety Limit bases specifies that RPS trip setpoints are credited for ensuring safety limits are not exceeded.**
- D. Incorrect: First part is correct. Second part is plausible since the pressurizer spray valve is a method of limiting RCS pressure spikes however the bases of the Safety Analysis specifically says that no credit is take for operation of the spray valve.

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Technical Reference(s): **TS 2.1.2 (RCS Pressure Safety Limit) including bases**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **ADM-TSS R8**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Knowledge and Fundamentals**

**1 POINT**

**Question 69**

Unit 1 plant conditions:

- Reactor power = 100%
- 1A Core Flood Tank parameters:
  - Pressure = 572 psig stable
  - Level = 12.91 feet
  - Boron Concentration = 2010 ppmb
- 1B Core Flood Tank parameters:
  - Pressure = 590 psig stable
  - Level = 12.51 feet
  - Boron Concentration = 1895 ppmb

Based on the above condition, which ONE of the following describes the action(s) required (if any) in accordance with Tech Spec 3.5.1 (Core Flood Tanks)?

- A. NO actions required
- B. Enter LCO 3.0.3 immediately
- C. Restore 1A CFT to OPERABLE within 1 hour ONLY
- D. Restore 1B CFT to OPERABLE within 1 hour ONLY

Question 69

**T3 - CPW**

2.2.39, Equipment Control

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

(3.9/4.5)

**K/A MATCH ANALYSIS**

**Question requires recalling from memory the 1 hr or less requirements of TS 3.5.1 (Core Flood Tanks).**

**ANSWER CHOICE ANALYSIS**

**Answer: B**

- A. Incorrect: Plausible since even the parameters that are out of spec on the CFT's are reasonable close to the same parameter on the other CFT. This makes it difficult to identify an out of tolerance parameter just by looking at the deltas and therefore requires specific knowledge of the allowable values to be able to determine if either CFT is out of spec.
- B. CORRECT: TS 3.5.1 Condition D is for two CFT's inoperable and requires immediate entry into LCO 3.0.3. CFT pressure is required to be  $\geq 575$  psig. Since the A CFT pressure is 572, this SR is not met. CFT level is given in the spec as a value of cubic feet however the specific instrument surveillance performed in PT/600/01 identifies 12.56 to 13.44 feet as the acceptable level range. B CFT level does not meet that requirement. With two CFT's not meeting the SR's, Condition D is warranted which requires LCO 3.0.3.**
- C. Incorrect: Plausible since the A CFT is inoperable due to low CFT pressure. This would be a correct answer under the misconception that the B CFT level is acceptable.
- D. Incorrect: Plausible since the B CFT is inoperable due to low CFT level. This would be a correct answer under the misconception that the A CFT level is acceptable.

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Technical Reference(s): **Technical Specification 3.5.1 (Core Flood Tanks)**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **ADM-TSS R4**

Question Source: **New**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Knowledge and Fundamentals**

1 POINT

Question 70

Unit 1 plant conditions:

- Reactor power = 100%

Based on the above condition, which ONE of the following describes a condition that would require entry into a Tech Spec ACTIONS table?

- A. UST level = 5.6 feet
- B. BWST level = 47.3 feet
- C. 1D RPS channel in Manual bypass
- D. 230KV Dacus Black and White lines isolated

Question 70

**T3 - CPW**

2.2.42, Equipment Control

**Ability to recognize system parameters that are entry-level conditions for Technical Specifications.**

(3.9/4.6)

**K/A MATCH ANALYSIS**

Requires analyzing several conditions and parameters and determining if they result in TS entry conditions being met.

**ANSWER CHOICE ANALYSIS**

Answer: A

- A. **CORRECT:** TS 3.7.6 requires that both the UST and Hotwell be operable and that the UST contain > 30,000 gallons. . PT/600/01 (Periodic Instrument Surveillance) verifies this volume by requiring UST level be > 6 feet.
- B. Incorrect: Plausible since Tech Specs requires the BWST to be operable and contain 350,000 gallons of Borated water. PT/600/01 (Periodic Instrument Surveillance) verifies this volume by requiring >47 feet in BWST.
- C. Incorrect: Plausible since Tech Specs do require that RPS be operable, however there are 4 channels for each required function and only 3 channels are required therefore having one of the RPS channels in Manual Bypass does not result in required functions being inoperable as long as no other RPS inoperability's exist.
- D. Incorrect: Plausible since either Dacus black or white are part of what can be credited in TS 3,8,1 for one of the two offsite sources on separate towers however since there are still more than enough offsite sources available that meet the separate tower criteria, these being out of service would not require entry into the TS ACTION table for TS 3.8.1.

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Technical Reference(s): **TS 3.7.6, 3.5.4, 3.3.10, and 3.3.1 PT/600/01 (Periodic Instrument Surveillance)**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **ADM-TSS R8**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Knowledge and Fundamentals**

**1 POINT**

**Question 71**

Unit 1 plant conditions:

- Reactor in MODE 5
- Reactor Building Main Purge in operation

Based on the above conditions, which ONE of the following will cause the RB Purge fan to trip?

- A. Inadvertent actuation of ES Channel 5
- B. 1RIA-45 reaches ALERT setpoint
- C. Suction piping pressure = 5 inches of water vacuum
- D. 1PR-3 (RB PURGE CONTROL) closed

Question 71

**T3 - cpw**

2.3.11, Radiation Control

**Ability to control radiation releases.**

(3.8/4.3)

**K/A MATCH ANALYSIS**

**Question demonstrates ability to control radiation releases by demonstrating the ability to determine conditions that would result in terminating the release by tripping the main purge fan.**

**ANSWER CHOICE ANALYSIS**

**Answer: D**

- A. Incorrect: Plausible since there is ES actuations that will cause the purge fan to trip however it is ES Channels 1 &/or 2 therefore this would be a correct choice if asking about ES-1 or ES-2 actuation.
- B. Incorrect: Plausible since RIA-45 will trip the main purge fan however it takes a HIGH alarm to do so therefore this would be the correct choice if it were asking about a HIGH alarm instead of an ALERT alarm.
- C. Incorrect: Plausible since vacuum in the suction piping will trip the main purge fan however the setpoint is 9 inches water.
- D. CORRECT: The main purge fan will trip if PR-3 is closed while the fan is running,**

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Technical Reference(s): **PNS-RBP**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **PNS-RBP R4**

Question Source: **Modified Bank**

Question History: Last NRC Exam **2004 NRC Exam Q #56**

Question Cognitive Level: **Knowledge and Fundamentals**

1 POINT

Question 72

Unit 1 plant conditions:

- Reactor in MODE 6
- LPI DHR in progress using 1A LPI pump
- Fuel movement in progress
- NI-3 and 4 out of service
- RB Purge in progress

Based on the above conditions, which ONE of the following describes when Reactor Building evacuation is required?

- A. 1NI-2 fails low
- B. 1RIA-4 HIGH alarm
- C. 1RIA-45 HIGH alarm
- D. Loss of power to 1A LPI pump

Question 72

**T3 - cpw**

2.3.12, Radiation Control

**Knowledge of radiological safety principles pertaining to licensed operator duties, such as containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.**

(3.2/3.7)

**K/A MATCH ANALYSIS**

Requires knowledge of licensed operator duties required to reduce the possibility of excessive dose being received by individuals inside containment during a boron dilution event.

**ANSWER CHOICE ANALYSIS**

**Answer: D**

- A. Incorrect: Plausible since there is fuel movement in progress and there are required actions that must be performed if there is a failure of one of the two required operable SR NI's during core alterations. This failure would require immediate suspension of core alterations.
- B. CORRECT: RIA-4 HIGH alarm actuates with hi radiation area in the RB. The RB evacuation alarm will automatically sound when RIA-4 reaches its HIGH alarm point.**
- C. Incorrect: Plausible since 1RIA-45 monitors the RB and does have automatic actions as a result of high alarms. If the alarm is received, the RB Purge will trip off however a RB evacuation is not required.
- D. Incorrect: Plausible since a loss of the 1A LPI pump would constitute a loss of DHR and would require entry into AP/26. AP/26 does direct making a page however it is not under these conditions. Entering AP/26 due to a loss of inventory would require a plant page therefore the misconception that this path through the AP would also require the page is reasonable.

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Technical Reference(s): **AP/3 (Boron Dilution), AP/26 (Loss of DHR)**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **EAP-APG R8**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Knowledge and Fundamentals**

**1 POINT**

**Question 73**

For Operations personnel, which ONE of the following describes the required response to an Electronic Dosimeter dose alarm and when it is acceptable to deviate from that requirement?

- A. Exit the area immediately and contact RP / with RP permission
- B. Exit the area immediately and contact RP / with emergency dose limits in effect
- C. Move away from the area until alarm clears / with RP permission
- D. Move away from the area until alarm clears / with emergency dose limits in effect

Question 73

**T3 - cpw**

2.3.7, Radiation Control

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

(3.5/3.6)

**K/A MATCH ANALYSIS**

**Requires knowledge of how to respond to Dose and Dose Rate alarms determined by RWP's in both normal and abnormal conditions. Additionally requires knowledge of when it is acceptable under abnormal conditions to deviate from the RWP requirements**

**ANSWER CHOICE ANALYSIS**

**Answer: B**

- A. Incorrect: First part is correct. Second part is plausible since this would be the correct response to a making a temporary change to the RWP requirement but RP cannot authorize personnel to continue work with a continuous dose alarm. RAD-RPP page 59
- B. CORRECT: Per RAD-RPP page 59, if your dose alarm activates, exit the area and contact RP. Per OMP 1-18 when EDL's are implemented NEO's and others working under EDL's may continue to work through ED alarms.**
- C. Incorrect: First part is plausible since this is the correct response if a dose **rate** alarm occurs. Second part is plausible since this would be the correct response to a making a temporary change to the RWP requirement but RP cannot authorize personnel to continue work with a continuous dose alarm.
- D. Incorrect: First part is plausible since this is the correct response if a dose **rate** alarm occurs. Second part is correct

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Technical Reference(s): **RAD-RPP, OMP 1-18**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **EAP-TCA R6, RAD-RPP R9**

Question Source: **Modified Bank (RAD020902)**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Knowledge and Fundamentals**

**1 POINT**

**Question 74**

Unit 1 plant conditions:

- Blackout tab in progress
- EOP step gives direction to "Initiate AP/11 (Recovery From Loss of Power)"

Based on the above conditions, which ONE of the following describes the actions required to perform the EOP step?

- A. RO will perform AP/11 and SRO will wait until AP/11 has been completed to continue in the EOP.
- B. SRO will direct steps in AP/11 and then return to the EOP once AP/11 is complete.
- C. RO will take steps to begin AP/11 before SRO continues in EOP but once AP/11 is begun the SRO can re-direct the RO's activities.
- D. SRO can continue in EOP once AP/11 is being performed. SRO CANNOT re-direct the RO's activities until AP/11 is completed.

Question 74

T3 - cpw

2.4.16 Emergency Procedures / Plan

**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.**

(3.5/4.4)

**K/A MATCH ANALYSIS**

**Requires Knowledge of EOP/AP implementation hierarchy and process for coordinating AP with EOP based on criteria in step directing AP performance**

**ANSWER CHOICE ANALYSIS**

**Answer: C**

- A. Incorrect: Plausible since this would be correct if the step gave direction to "Perform AP/11". There are numerous steps in the EOP that are "Perform" steps and OMP-1-18 explains that the referenced procedure and/or steps must be performed prior to continuing in the current procedure in use. Additionally there are numerous cases of the EOP director waiting on completion of other procedures (Encl. 5.38).
- B. Incorrect: Plausible since this would be correct if the step were an If At Any Time (IAAT) step. EOP has numerous cases where the IAAT process is used. This requires going and performing the steps directed by the IAAT and then returning to the original step.
- C. **CORRECT: "Initiate" steps require actions to begin the referenced steps or procedure and then continuing with the current procedure in use.**
- D. INCORRECT: Plausible since this would result in both AP/11 and the EOP being performed however OMP 1-18 only requires the AP be initiated and then it allows the SRO to determine the best use of available manpower. Additionally plausible since this description would be correct if talking about the RO being in a Rule.

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Technical Reference(s): **OMP 1-18**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **ADM-OMP R10, R52**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Knowledge and Fundamentals**

**1 POINT**

**Question 75**

Unit 1 plant conditions:

- Reactor power = 100%
- 1SA3/B6 (FIRE ALARM) actuated
- Fire Alarm panel indication
  - point 0202071 (Unit 1 pipe trench room 348 north end) actuated

Based on the above conditions, which ONE of the following describes the initial action required by the Alarm Response Guide AND a method used in RP/1000/029 (Fire Brigade Response) to dispatch the fire brigade when it is required?

- A. Dispatch a Fire Brigade qualified operator to determine validity of the alarm / Plant Paging system
- B. Dispatch a Fire Brigade qualified operator to determine validity of the alarm / Have Security dispatch fire brigade
- C. Dispatch the Fire Brigade / Plant Paging system
- D. Dispatch the Fire Brigade / Have Security dispatch fire brigade

Question 75

**T3 -cpw**

2.4.26 Emergency Procedures / Plan

**Knowledge of facility protection requirements, including fire brigade and portable fire fighting equipment usage**

(3.1/3.6)

**K/A MATCH ANALYSIS**

Per NRC, ask about activating fire brigade from Control Room OK.

**Requires knowledge of actions directed by a Fire Alarm in the control room as well as knowledge of how Fire Brigade is dispatched.**

**ANSWER CHOICE ANALYSIS**

**Answer: A**

- A. CORRECT: Manual actions of ARG for Fire Alarm statalarm direct dispatching a fire brigade qualified operator to assess validity of the alarm. It does NOT direct dispatching the Fire Brigade until the alarm is determined to be valid. Attachment 2 is used to dispatch the fire brigade and the initial response is to use the plant page. This is significant since all fire brigade members do not have radios and pagers therefore the plant page is used to ensure all members are notified.**
- B. Incorrect: First part is correct. Second part is plausible since would be correct if asking about dispatching MERT to a medical emergency per RP/1000/016 (MERT activation...)
- C. Incorrect: First part is plausible since it would be reasonable to assume that dispatching the fire brigade would be directed if a Fire Alarm is received however the ARG does not direct dispatching Fire Brigade until the alarm is determined to be valid. Second part is correct.
- D. Incorrect: First part is plausible since it would be reasonable to assume that dispatching the fire brigade would be directed if a Fire Alarm is received however the ARG does not direct dispatching Fire Brigade until the alarm is determined to be valid. Second part is plausible since would be correct if asking about dispatching MERT to a medical emergency per RP/1000/016 (MERT activation...)

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Technical Reference(s): **RP/0/B/1000/029 (Fire brigade response) ARG for 1SA3/B6, IC-FDS, RP/1000/016 (MERT activation...)**

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: **IC-FDS R6**

Question Source: **NEW**

Question History: Last NRC Exam **N/A**

Question Cognitive Level: **Comprehension and Analysis**