

## QUESTION 76

### 007EG2.1.7

Examination Outline Cross-Reference:	Level	SRO
	Tier #	1
	Group #	1
	K/A #	007EG2.1.7
	Importance Rating	3.7

007EG2.1.7 – Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation during a reactor trip.

Proposed Question:

The main control room operators are currently implementing FRP-S.1 “Response to Nuclear Power Generation/ATWS,” Step 17, “Check ALL S/G’s – Faulted.”

The OATC reports that ‘A’ and ‘B’ S/G pressures are decreasing in an uncontrolled manner and ‘C’ S/G pressure is stable.

In order to isolate the ‘A’ and ‘B’ S/G’s, you shall:

- a. complete FRP-S.1, then transition to EOP-E-2, “Faulted Steam Generator Isolation.”
- b. exit FRP-S.1 at Step 17 and enter EOP-E-2, “Faulted Steam Generator Isolation.”
- c. enter EOP-E-2 “Faulted Steam Generator Isolation” and perform it concurrently with FRP-S.1.
- d. complete FRP-S.1, then return to EOP-E-0, “Reactor Trip or Safety Injection,” then transition to EOP-E-2, “Faulted Steam Generator Isolation.”

Proposed Answer:

- c. enter EOP-E-2 "Faulted Steam Generator Isolation" and perform it concurrently with FRP-S.1.

Explanation:

This question requires the applicant to assess plant conditions during an ATWS event and determine the proper procedural transition required to mitigate the effects of faulted steam generators.

- a. **INCORRECT** – FRP-S.1 states that if ALL S/G's are NOT faulted then S/G isolation should be performed IAW EOP-E-2 concurrently with implementation of FRP-S.1. Plausible since FRP-S.1 does have steps to isolate faulted S/G's, but they are only used if ALL S/G's are faulted.
- b. **INCORRECT** – FRP-S.1 states that if all S/G's are NOT faulted then S/G isolation should be performed IAW EOP-E-2 concurrently with implementation of FRP-S.1. Plausible since EOP-E-2 is entered from other procedures during accident mitigation, however FRP-S.1 is not one of them.
- c. **CORRECT** – FRP-S.1 states that if all S/G's are NOT faulted then S/G isolation should be performed IAW EOP-E-2 concurrently with implementation of FRP-S.1.
- d. **INCORRECT** – FRP-S.1 states that if all S/G's are NOT faulted then S/G isolation should be performed IAW EOP-E-2 concurrently with implementation of FRP-S.1. Plausible if the applicant determines that FRP-S.1 takes precedence over EOP-E-2. Additionally, upon completion of FRP-S.1, the procedure directs the operators to return to the procedure and step in effect, which could have been EOP-E-0, which in turn would direct the implementation of EOP-E-2.

Technical Reference(s): FRP-S.1, Revision 20 "Response to Nuclear Power Generation/ATWS"  
EOP-E-2, Revision 1 "Faulted Steam Generator Isolation"

Proposed references to be provided to applicants during examination: none

Question Source: new

Question History: none

Question Cognitive Level: Comprehension or Analysis

10 CFR Part 55 Content: 55.43 (5)

K/A match: The K/A is matched since the applicant is required to assess plant conditions after an unsuccessful reactor trip and determine which procedures to implement to mitigate the effects of two faulted S/Gs.

**QUESTION 77**  
**009EG2.2.22**

K/A number and description:

0009EG2.2.22

0009            Generic Emergency Plant Evolution – Small Break LOCA

G2.2            Equipment Control

G2.2.22        Knowledge of limiting conditions for operations and safety limits.

**Question:**

A Small Break LOCA has occurred inside containment. The crew is implementing EOP-E-0, REACTOR TRIP OR SAFETY INJECTION.

- RCS pressure is 1415 psig
- Highest core exit TCs are 565 F
- RCS hot leg temperatures are 555 F
- Only one charging pump is in service injecting into the RCS at 75 gpm

The reactor coolant pumps (RCPs) \_\_\_\_\_ (1) \_\_\_\_\_ required to be tripped for the conditions listed above.

LCO 3.4.5, RCS Loops – Mode 3 \_\_\_\_\_ (2) \_\_\_\_\_ require an RCP to be running to be considered an OPERABLE RCP.

- A.     (1) are  
       (2) does
- B.     (1) are NOT  
       (2) does
- C.     (1) are  
       (2) does NOT
- D.     (1) are NOT

(2) does NOT

**Distractor Analysis:**

A. Incorrect. The first part is correct. The SCM calculated using CETs is approximately 25 F and meets foldout page RCP trip criteria. The second part is incorrect; LCO 3.4.5 for Mode 3 Bases states that an RCP is OPERABLE if it is capable of being powered and is able to provide forced flow if required. Therefore an RCP is not required to be running in order to be considered OPERABLE. Plausible because LCO 3.4.5 action applicability is affected whether an RCP is or is not in service.

B. Incorrect. The first part is incorrect; plausible for applicant to evaluate values given and incorrectly use RCS hot leg temp to determine SCM (approximately 35 F) which would not meet foldout page trip criteria. The second part is incorrect; LCO 3.4.5 for Mode 3 Bases states that an RCP is OPERABLE if it is capable of being powered and is able to provide forced flow if required. Therefore an RCP is not required to be running in order to be considered OPERABLE. Plausible because LCO 3.4.5 action applicability is affected whether an RCP is or is not in service.

C. CORRECT. The first part is correct. The SCM calculated using CETs is approximately 25 F and meets foldout page RCP trip criteria. The second part is correct; LCO 3.4.5 for Mode 3 Bases states that an RCP is OPERABLE if it is capable of being powered and is able to provide forced flow if required. Therefore an RCP is not required to be running in order to be considered OPERABLE.

D. Incorrect. The first part is incorrect; plausible for applicant to evaluate values given and incorrectly use RCS hot leg temp to determine SCM (approximately 35 F) which would not meet foldout page trip criteria. The second part is correct; LCO 3.4.5 for Mode 3 Bases states that an RCP is OPERABLE if it is capable of being powered and is able to provide forced flow if required. Therefore an RCP is not required to be running in order to be considered OPERABLE.

**Reference(s)**

- Emergency Operating, EOP-E-0 and Basis Document, EOP-E-0-BD
- Technical Specification 3.4.5, Amendment 190 and Bases

**K/A Match discussion:**

The K/A is matched because the question involves a SBLOCA and knowledge of the LCO associated with RCS Loops (RCPs) in Mode 3. Related to safety limits because meeting the required number of RCS loops in operation ensures that the Safety Limit criteria will be met for all of the postulated accidents.

**Cognitive Level:** Memory or Fundamental Knowledge \_\_\_\_\_  
Comprehension or Analysis \_\_\_\_\_X

**Question Source:** Bank: \_\_\_\_\_  
Modified Bank: \_\_\_\_\_ (Note changes or attach parent)  
New: \_\_\_\_\_X

**SRO Only Basis:** Assessment of plant conditions during E-0 and diagnosing need to complete action on the foldout page.

**QUESTION 78**  
**026AA2.03**

**SRO Question 78**  
**026AA2.03**

**Loss of Component Cooling Water (CCW)**

**Ability to determine and interpret the following as they apply to the Loss of Component Water: The valve lineups necessary to restart the CCWS while bypassing the portion of the system causing the abnormal condition.**

**RO 2.6/SRO 2.9**

**CFR 43.5**

Initial Conditions:

- The plant is shutdown with an RCS temperature of 225°F
- RCP A is in operation
- RHR train B is in service

The following sequence occurs:

- Annunciator APP-001-C1, "RCP THERM BAR COOL WTR HI FLOW", alarms
- Annunciator APP-001-D1, "RCP THERM BAR COOL WTR LO FLOW", alarms
- Annunciator APP-001-C1 clears

Based on the provided sequence, Operators will   (1)   .

Entry into Technical Specification LCO 3.7.6, "Component Cooling Water (CCW) System" -   (2)   required.

Note: FCV-626, "THERM BAR FLOW CONT"

- | (1)                        | (2)    |
|----------------------------|--------|
| A. attempt to OPEN FCV-626 | is     |
| B. attempt to OPEN FCV-626 | is NOT |
| C. maintain FCV-626 CLOSED | is     |
| D. maintain FCV-626 CLOSED | is NOT |

### **Distractor Analysis**

- A. Incorrect. Plausible if applicant misapplies incorrect answers to question, see “B” and “C” distractor analyses.
- B. Incorrect. Answer is plausible due to being partially correct. APP-001-D1 contains actions to attempt reopening of FCV-626, should the result of closure be determined to be due to the valve failing closed. Question stem requires applicant to determine that the valve has closed based on a valid abnormal plant condition. (Ref APP-001, Page 32)
- C. Incorrect. Answer is plausible due to being partially correct. Although the mode of applicability is met (Mode 4 conditions are given) for LCO 3.7.6, SR 3.7.6.1 is modified by a note that states entry into this LCO is not required when individual components are isolated. This statement is further clarified by the T.S. Bases. (Ref T.S. LCO 3.7.6, Pages 3.7-16 and 17; T.S. Bases, Page B 3.7-39)
- D. Correct. Given information provides applicant success path.

### **References**

- Technical Specifications, Amendment No. 176, Page 1.1-6
- APP-001, Revision 57, Pages 24, 25, 33, & 34
- Technical Specifications, Amendment No. 176, Pages 3.7-16 & 17
- T.S. Bases, Revision 14, Page B 3.7-39

### **KA Match**

Applicant is given a situation where evaluation of plant conditions and technical specification entry criteria are required to arrive at correct conclusion.

### **Cognitive Level**

High

### **Source of Question**

Modified, NRC Exam Bank

### **SRO Only Basis**

Applicant must apply knowledge of SR 3.7.6.1 note to correctly answer question. This information meets the SRO license level for testable knowledge.

## QUESTION 79

### 057AA2.15

(SRO) APE057 AA2.15

Loss of Vital AC Electrical Instrument Bus

Ability to determine and interpret the following as they apply to Loss of Vital AC Instrument Bus:  
That a loss of AC has occurred. 3.8 /4.1 (43.5, 45.13)

- The plant is at 100% power, steady state.
- At 10:00, multiple annunciators are received, but no valid reactor trip signals are present.
- The Balance of Plant Operator reports that 'C' Feedwater Regulating Valve has reverted to Manual.
- Many bistable lights on the third row of Bistable Status Panel 'A' are LIT that were not lit before.

Based on these indications, Instrument Bus (1) is deenergized.

At 10:15 the Outside AO reports that 'A' Inverter's output voltage is 112VAC, 2 volts lower than the limit specified in OST-020, Weekly Surveillances. **{It would be more plausible to use the value from the OAO's log sheet, but I don't have access to that.}**

If neither off-normal condition is corrected, the unit must be in Mode 3 **no later than** (2).

#### [REFERENCE PROVIDED]

	(1)	(2)
A.	3	16:15
B.	8	16:15
C.	3	18:00
D.	8	18:00

#### **Distractor Analysis**

**Note:** HBR instrument busses are in pairs: IB1 feeds IB6 directly, IB2 feeds IB7, IB3 feeds IB8, and IB4 feeds IB9. IBs 1-4 can be fed from their normal supplies OR from MCC-8, a non-safety bus. IBs 6-9 can only be fed from their parent IB.

- A. **Incorrect.** The first part is incorrect but plausible because IB 3 supplies IB 8, so loss of 3 will cause loss of 8, which will cause 'C' FRV to revert to Manual (FRV behavior is one of the key parameters operators use to determine which IB was lost, and typically it's the "main" bus

that's lost, not the sub-bus). The second part is incorrect but plausible because the applicant might use the Note in ITS 3.8.7 Required Action A.1 to cascade to ITS 3.8.9 and say that two IB subsystems are out of service. 3.8.9 Condition G says, "Two trains with inoperable distribution subsystems *that result in a loss of safety function.*" [emphasis added] The question does not give any information about a loss of safety function, but the applicant may still choose that Condition. 16:15 is 6 hours (the LCO 3.0.3 time limit) from discovery of the inoperable power supply.

- B. **Incorrect.** The first part is correct: loss of IB 8 by itself will cause 'C' FRV to revert to Manual. Loss of IB 3 would cause Bistable Panel 'A' to deenergize, so because it is given that it is NOT dark, the applicant can rule out loss of IB 3. The second part is incorrect as discussed above.
- C. **Incorrect.** First part is incorrect as discussed in A. The second part is correct: the problem with IB8 puts in LCO 3.8.9, with 2 hours to correct, then 6 more hours to be in Mode 3. The problem with Inverter 'A' puts you in 3.8.7, but it allows 24 hours to correct, then 6 to Mode 3.
- D. **Correct.** First part is correct as discussed in B. Second part is correct as discussed in C.

**References Provided to Applicant:**

ITS 3.8.7, page 3.8-28

ITS 3.8.9, pages 3.8-32 through 3.8-34

**References:**

AOP-024, Loss of Instrument Bus, Revision 38

AOP-024-BD, Basis Document, Loss of Instrument Bus, Revision 38

ITS 3.8.7, AC Instrument Bus Sources – Operating

B 3.8.7, AC Instrument Bus Sources – Operating (Basis Document)

ITS 3.8.9, Distribution Systems – Operating

B 3.8.9, Distribution Systems – Operating (Basis Document)

ST-016, 480/120 VAC Electrical System, Revision 2

**KA Match:**

The KA is matched because the applicant has to analyze given indications and determine which of two instrument busses has lost power, either a main bus (which would also deenergize its subordinate bus), or just the subordinate bus.

**Cognitive Level: High**

Higher cognitive level as the applicant has to determine from given conditions that just IB8 is deenergized, and not the more-commonly seen IB3 AND 8. Applicant then has to differentiate between two Tech Spec Required Actions that can apply to a similar scenario.

**Source of Question: New**

**SRO Only Basis:**

See attached excerpt of "Clarification Guidance for SRO-only Question", Revision 1, for justification of why this is SRO only level knowledge.

**QUESTION 80**  
**062AA2.01**

<u>Examination Outline Cross-Reference:</u>	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #		AA 2.01
	Importance Rating		3.5

Proposed Question:

Unit 2 plant conditions on Saturday at 2200.

- Power is at 100%
- A rupture of the service water system has occurred on the inlet flange of service water booster pump A.
- AOP-022 Loss of Service Water has been performed.
- The rupture has been isolated by closing valves SW-28 SW BOOSTER PUMP "A" SUCTION, SW-32 SW BOOSTER PUMP "A" DISCHARGE, and SW-307 PI-1601A AND IVSW MAKE-UP SUPPLY ROOT VALVE.

The service water system has     (1)     train(s) operable.

In accordance with AD-OP-ALL-0101 Event Response and Notifications, the Shift Manager is required to make     (2)     notification to the Site Duty Manager.

Which one of the following completes the statements above?

A	(1) only one (2) Next Business Day
B	(1) both (2) Next Business Day
C	(1) only one (2) Immediate
D	(1) both (2) Immediate

Proposed Answer:    **C**

K/A Match Analysis

062 Loss of Nuclear Service Water, AA2.01

Ability to determine and interpret the following as they apply to the Loss of Nuclear Service Water: Location of a leak in the SWS.

Requires the ability to determine and interpret the operational implications of a leak in the SWS based on the leak location.

SRO only: Operability determinations are an SRO function.

Answer Choice Analysis

- A. INCORRECT. The first part is correct. TS 3.7.7 Basis defines an operable SWS train to include an operable SW booster pump. The second part is plausible because in accordance with AD-OP-ALL-0101, an AOP entry or a flooding event require “Next Business Day” notifications.
- B. INCORRECT. The first part is plausible because the both SW booster pumps can be aligned to either SW header so a misconception could be that one SW booster pump is sufficient for both SW headers to be operable. The second part is incorrect.
- C. CORRECT. The first part is correct. The second part is correct because in accordance with AD-OP-ALL-0101 “Immediate” notification is required for any unplanned Tech Spec entry with a required action time of 72 hours or less.
- D. INCORRECT. The first part is incorrect, the second part is correct.

Technical Reference(s):

Tech Spec 3.7.7 amendment 176

Tech Spec 3.7.7 Basis rev 15 amendment 187

AD-OP-ALL-0101, EVENT RESPONSE AND NOTIFICATIONS, Rev. 2

Proposed references to be provided to applicants during examination:      None

Learning Objective:

<u>Question Source:</u>	New	
<u>Question History:</u>	new	
<u>Question Cognitive Level:</u>	Memory or Fundamental Knowledge	–
	Comprehension or Analysis	<u>X</u>

<u>10 CFR Part 55 Content:</u>	55.41	<u>X</u>
	55.43	<u>X</u>

Comments:

Supporting References

**QUESTION 81**  
**WE12EG2.1.23**

Examination Outline Cross-Reference:	Level	SRO
	Tier #	1
	Group #	1
	K/A #	we12EG2.1.23
	Importance Rating	4.4

we12EG2.1.23 – Ability to perform specific system and integrated plant procedures during an uncontrolled depressurization of all steam generators

Proposed Question:

- The plant is operating in Mode 1 at 100% power.
- All 3 S/G's are faulted inside containment.
- Safety injection has been initiated and termination criteria are now satisfied.
- Operators are currently performing EPP-16, "Uncontrolled Depressurization of all Steam Generators," Step 33, "Check if SI Should Be Terminated As Follows:"

Based on these conditions:

- Control room operators are required to \_\_\_\_\_ (1) \_\_\_\_\_.
- EPP-7, "SI Termination," \_\_\_\_\_ (2) \_\_\_\_\_ required to be used to terminate SI.

	(1)	(2)
a.	maintain AFW flow to each S/G less than 80 gpm	is
b.	maintain AFW flow to each S/G less than 80 gpm	is NOT
c.	maintain AFW flow to each S/G between 80 and 90 gpm	is
d.	maintain AFW flow to each S/G between 80 and 90 gpm	is NOT

Proposed Answer:

- d. maintain AFW flow to each S/G between 80 and 90 gpm is NOT

Explanation:

This question requires the applicant to evaluate plant conditions and, based on the evaluation, determine the correct actions to take with respect to control of feed flow to faulted S/G's as well as which procedure shall be used to terminate SI.

- a. **INCORRECT** – The guidance in EPP-16 is to maintain AFW flow to each S/G between 80 and 90 gpm (not less than 80 gpm). In this case, EPP-16 contains it's own procedural steps to terminate SI when the termination criteria are met, so EPP-7 would not be used to terminate SI. Plausible if the applicant determines that controlling AFW flow to the S/G's at less than 80 gpm will further help minimize cooldown. Also, EPP-7 could be entered from FRP-H.1, making the second part of the distractor plausible.
- b. **INCORRECT** – The guidance in EPP-16 is to maintain AFW flow to each S/G between 80 and 90 gpm (not less than 80 gpm). In this case, EPP-16 contains it's own procedural steps to terminate SI when the termination criteria are met, so EPP-7 would not be used to terminate SI. Plausible if the applicant determines that controlling AFW flow to the S/G's at less than 80 gpm will further help minimize cooldown.
- c. **INCORRECT** – The guidance in EPP-16 is to maintain AFW flow to each S/G between 80 and 90 gpm. In this case, EPP-16 contains it's own procedural steps to terminate SI when the termination criteria are met, so EPP-7 would not be used to terminate SI. Plausible since EPP-7 could be entered from FRP-H.1, making the second part of the distractor plausible.
- d. **CORRECT** – The guidance in EPP-16 is to maintain AFW flow to each S/G between 80 and 90 gpm. In this case, EPP-16 contains it's own procedural steps to terminate SI when the termination criteria are met.

Technical Reference(s): EOP-E-0, Revision 5, "Reactor Trip or Safety Injection"  
EOP-E-2, Revision 1, "Faulted Steam Generator Isolation"  
EPP-16, Revision 23, "Uncontrolled Depressurization of All Steam Generators"  
EPP-7, Revision 35, "SI Termination"

Proposed references to be provided to applicants during examination:

Question Source: HBR master exam bank p. 797 (attached for reference)

Question History: unknown

Question Cognitive Level: Comprehension or Analysis

10 CFR Part 55 Content: 55.43 (5)

K/A match: The K/A is matched since the applicant is required to demonstrate ability to determine, from stated plant conditions, the correct method to feed S/G's when they are all faulted, as well as ability to determine requirements for SI termination.

## QUESTION 82

### 037AA2.10

K/A number and description:

037AA2.10

037            Generic Abnormal Plant Evolution – SG Tube Leak  
AA2            Ability to determine and interpret the following as they apply to the Steam  
                  Generator Tube Leak:  
AA2.10        Tech-Spec limits for RCS leakage

#### **Question:**

Unit 2 is initially at 100% power steady state. The following 0800 RCS Leak Rate surveillance results are provided:

- Leakage to the PRT is 6.9 gpm
- Leakage to the RCDT is 3.0 gpm
- Primary to Secondary Leakage is:
  - S/G A = 0.04 gpm
  - S/G B = 0.05 gpm
  - S/G C = 0.04 gpm

The Unit remains at 100% and at 1100, which time leakage to the RCDT increases to 3.5 gpm and all other Operational Leakage values remain the same. Tech Spec 3.4.13 would require Mode 3 no later than       (2)       today.

[REFERENCE PROVIDED]

- E.     1400
- F.     1700
- G.     1800
- H.     2100

#### **Distractor Analysis:**

A. Incorrect. The first part is correct; identified Leakage limit of 10 gpm exceeded. The second part is incorrect. Plausible because the TS 3.4.13 Action to Mode 3 is either 6 or 10 hours



**SRO Only Basis:** Application of TS 3.4.13 Required Actions (Section 3), "below the line".

**QUESTION 83**  
**059AA2.03**

**SRO Question 83**  
**059AA2.03**

**Accidental Liquid Radioactive-Waste Release**

**Ability to determine and interpret the following as they apply to the Accidental Liquid Radwaste Release: Failure modes, their symptoms, and the causes of misleading indications on a radioactive-liquid monitor.**

**RO 3.1/SRO 3.6**  
**CFR 43.5**

Initial Conditions:

- Following a Steam Generator tube leak, the "A" Steam Generator is being drained through the Steam Generator Blowdown (SGBD) system in accordance with OP-406, "STEAM GENERATOR BLOWDOWN/WET LAYUP SYSTEM"

Current Conditions:

- A Field Operator reports receipt of annunciator APP-035-4, "DRAIN TANK HIGH LEVEL", in alarm
- Annunciator APP-036-D8, "PROCESS MONITOR HI RAD" has **NOT** alarmed
- The Steam Generator Blowdown path has automatically isolated

Note: FCV-1930A, "SG "A" BLOWDOWN FLOW CONTROL VALVE"  
FCV-4204A, "SG "A" BLOWDOWN FLOW RATE CONTROL"

Based on the current conditions, closure of \_\_\_\_(1)\_\_\_\_ was responsible for isolating the blowdown flow path.

Once the isolation issue is corrected, re-establishing Steam Generator Blowdown without heat recovery will require blowdown flowrate estimation at least once per \_\_\_\_(2)\_\_\_\_ hours.

- |              | (1) | (2) |
|--------------|-----|-----|
| A. FCV-1930A |     | 4   |
| B. FCV-1930A |     | 24  |
| C. FCV-4204A |     | 4   |

**Distractor Analysis**

- A. Incorrect. Plausible if applicant misapplies incorrect answers to question, see “B” and “C” distractor analyses.
- B. Incorrect. Answer is plausible due to being partially correct. FCV-4204A isolates on the same signals that isolate FCV-1930A including receipt of APP-035-4, “DRAIN TANK HIGH LEVEL” (Ref ST-020, Pages 9 & 12; APP-035, Page 4)
- C. Incorrect. Answer is plausible due to being partially correct. Per OP-406, ODCM 2.6 requirements must be invoked when heat recovery is bypassed, due to system location of the S/G flow rate measuring device. Per the ODCM, this effluent pathway must be sampled every 24 hours. 4 hours is plausible as this is the appropriate sampling time if the R-18 flow rate measuring device is INOPERABLE. (Ref OP-406, Page 10; ODCM, Pages 2-25 & 26)
- D. Correct. Given information provides applicant success path.

**References**

- ST-020, Revision 3, Pages 9 & 12
- APP-035, Revision 7, Page 4
- OP-406, Revision 76, Page 10
- ODCM, Revision 32, Pages 2-25 & 26

**KA Match**

Applicant is given a situation where evaluation of plant annunciators and ODCM entry criteria are required to arrive at correct conclusion.

**Cognitive Level**

High

**Source of Question**

Modified, NRC Exam Bank

**SRO Only Basis**

Applicant must apply ODCM knowledge of the steam generator blowdown effluent pathway to correctly answer question. This information meets the SRO license level for testable knowledge.

## QUESTION 84

### 067AG2.1.20

(SRO) APE067 2.1.20

Plant fire on site

Ability to interpret and execute procedure steps. 4.6/4.6 (41.10, 43.5, 45.12)

- The unit was at 100% power.
- A fire on the Startup Transformer (SUT) caused a reactor trip and entry into the EOPs.
- The Control Room has completed the first 10 steps of AOP-041, RESPONSE TO FIRE EVENT, and has turned the procedure over to you as the Fire Brigade Incident Commander at Step 11.
- A Security Event is NOT in progress.

Per AOP-041, Offsite Fire Department assistance should be requested (1).

Attachment 1, REQUEST FOR OFFSITE FIRE DEPARTMENT OR FOREST FIRE ASSISTANCE, would be implemented by (2).

- |   |  |
|---|--|
| (1)   | (2)                                      |
| A. <b>any</b> time there is a fire on the SUT   | you, the Fire Brigade Incident Commander |
| B. <b>only</b> if firefighting efforts have not extinguished the fire within 10 minutes | you, the Fire Brigade Incident Commander |
| C. <b>any</b> time there is a fire on the SUT   | the Security Supervisor                  |
| D. <b>only</b> if firefighting efforts have not extinguished the fire within 10 minutes | the Security Supervisor                  |

**C is the correct answer.**

#### Distractor Discussion

- (1) The correct choice is “any time there is a fire on the SUT,” from AOP-041 Step 18 (a Continuous Action step), 2nd bullet. “only if ..... with 10 minutes” is plausible because the 3rd bullet of Step 18 says that, and it’s common knowledge that if a fire isn’t out in 10 minutes you call for offsite help.
- (2) The correct choice is “the Security Supervisor”, per AOP-041 Step 19 RNO. The procedure never requires the FBIC to be the one to request offsite assistance because he/she has control of the AOP while the Control Room is in EOPs, so it delegates that responsibility.

**References:**

AOP-041, Response to Fire Event, Rev. 7

AOP-041 Basis Document, Rev. 7

**KA Match:**

The KA is matched because the applicant must recall and correctly execute steps from a fire AOP.

**Cognitive Level: Low**

**Source of Question: New**

**SRO Only Basis:**

See attached excerpt of “Clarification Guidance for SRO-only Questions”, Revision 1, for justification of why this is SRO-only level knowledge.

**QUESTION 85**  
**WE15EG2.4.45**

<u>Examination Outline Cross-Reference:</u>	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #		G 2.4.45
	Importance Rating		4.3

Proposed Question:

Plant conditions are as follows:

- A Large Break LOCA has occurred in conjunction with a loss of offsite power
- EDG B Diesel has failed to start
- EOP E-1 LOSS OF REACTOR OR SECONDARY COOLANT is in progress
- Containment sump level is 424 inches and increasing
- refer to attached diagram of APP-002 for annunciators that are in alarm

The next procedure direction that the control room team will follow is to \_\_\_\_\_ on the containment status tree.

Which one of the following completes the sentence above?

A	continue in E-1 due to only YELLOW conditions
B	GO TO FRP-J1 due to an ORANGE condition
C	GO TO FRP-J1 due a RED condition
D	GO TO FRP-J2 due to an ORANGE condition

Proposed Answer:    **D**

K/A Match Analysis

WE E15 Containment Flooding, G 2.4.45

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

Requires the ability to interpret each alarm window on APP-002, determine the significance, and prioritize response.

SRO only: Meets 10CFR55.43 (b) (5) due to assessment of facility conditions and selection of appropriate procedures during emergency situations. Knowledge of containment design basis accident analysis, which assumes the loss of one ESF bus resulting in one train of containment spray and one train of containment cooling failing to function, and the resulting maximum

containment pressure in the worst case scenario to be less than 42 psig, is required to make the correct procedure selection.

Answer Choice Analysis

- E. INCORRECT. Plausible because if CV pressure assumed to be greater than 10 psi with one spray pump operating with its discharge valve open, if CV level were less than 375 inches, this would be correct. There is no CV level alarm at Robinson, so the applicant will have to know that 375 inches is the transition to orange. 354 inches is expected when implementing EPP-9 TRANSFER TO COLD LEG RECIRCULATION when the RWST is depleted.
- F. INCORRECT. Plausible because ORANGE is correct however, the path to FRP J1 on orange is caused by CV pressure greater than 10 psi with no spray flow.
- G. INCORRECT. Plausible because with a loss of power to the E-2 bus only one train of CS and one train of Containment cooling will be available. The applicant may incorrectly determine that this is less than required to maintain containment less than 42 psi.
- H. CORRECT. With CV sump level greater than 375 inches and the alarm indications given, a flooding event from HVH-3 service water into containment exists.

Technical Reference(s):

CSFST rev 4  
APP-002 Engineering Safeguards, rev 66  
APP-002 alarm C8 HVH-3 WTR OULET LO FLOW, rev 66  
FRP-J.2 RESPONSE TO CONTAINMENT FLOODING rev 3

Proposed references to be provided to applicants during examination:

APP-02 panel display with highlighted windows in alarm.

Learning Objective:

Question Source: New

Question History: new

Question Cognitive Level: Memory or Fundamental Knowledge      \_  
Comprehension or Analysis      X

10 CFR Part 55 Content: 55.41 X

55.43 X

Comments:

**QUESTION 86**  
**004A2.17**

Examination Outline Cross-Reference:	Level	SRO
	Tier #	2
	Group #	1
	K/A #	004A2.17
	Importance Rating	3.7

004A2.17 – Ability to (a) predict the impacts of low PZR pressure on the CVCS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of low PZR pressure

Proposed Question:

A plant cooldown is in progress in preparation for a refueling outage.

The following conditions exist:

- Main Control Room operators are currently depressurizing the RCS
- RCS temperature is 220°F
- RCS pressure is 375 psig
- VCT pressure is 25 psig
- All RCPs are running with their respective #1 seal leakoff valves open
- Seal injection of 8 gpm is being supplied to each RCP
- APP-001-E2 “RCP #1 SEAL LEAKOFF LO FLOW” is in alarm
- ‘B’ RCP seal leakoff flow indicates 0.7 gpm and slowly decreasing

Based on these conditions you shall \_\_\_\_\_ (1) \_\_\_\_\_ in accordance with \_\_\_\_\_ (2) \_\_\_\_\_.

- |    | (1)  | (2)  |
|----|--|--|
| a. | close seal leakoff valve CVC-303B for the ‘B’ RCP to increase #1 seal D/P      | AOP-018 “Reactor Coolant Pump Abnormal Conditions” |
| b. | close seal leakoff valve CVC-303B for the ‘B’ RCP to increase #1 seal D/P      | Annunciator Panel Procedure “APP-001-E2”           |
| c. | Open primary seal bypass isolation valve CVC-307 to increase seal leakoff flow | AOP-018 “Reactor Coolant Pump Abnormal Conditions” |
| d. | Open primary seal bypass isolation valve CVC-307 to increase seal leakoff flow | Annunciator Panel Procedure “APP-001-E2”           |



10 CFR Part 55 Content: 55.43 (5)

K/A match: The K/A is matched since the applicant is required to evaluate plant conditions during a plant cooldown and determine that the effect of low RCS pressure on CVCS has caused RCP seal flow to lower and then determine the correct procedural action to take to mitigate the plant conditions given.

**QUESTION 87**  
**006A2.08**

K/A number and description:

006A2.08

006            Emergency Core Cooling  
A2            Ability to (a) predict the impacts of the following malfunctions or operations on the ECCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:  
A2.08        Effect of electric power loss on valve position

**Question:**

Given the following:

- The Unit has experienced a Large Break LOCA
- RHR Pump A is tagged out and unavailable due to previously planned maintenance
- The ECCS is being aligned per EPP-9

At step 18, while attempting to open RHR PUMP B suction valves (CV SUMP TO RHR Valves, SI-860B and SI-861B), the breaker to SI-860B immediately tripped.

All attempts to open SI-860B were unsuccessful; the SRO will     (1)    .

The maximum RWST level any running CV and/or SI pump taking suction from the RWST is/are allowed to operate is     (2)     percent.

EPP-9, Transfer to Cold Leg Recirculation  
EPP-15, Loss of Emergency Coolant Recirculation

(1)	(2)
A. remain in EPP-9	6
B. remain in EPP-9	9
C. immediately transition to EPP-15	6
D. immediately transition to EPP-15	9

**Distractor Analysis:**

- A. Incorrect. The first part is incorrect; per EPP-9 step 19 RNO, if one train of valves can NOT be opened, then go to EPP-15. Plausible because EPP-9 utilizes contingency actions for other component problems such as Attachment 1 for SI-856A&B rather than just contained within an RNO. The Basis document for EPP-9 discusses the timeline for fuel to start heating up again (6 minutes) because at this point all RHR, SI and CV Spray pumps are stopped in preparation to establish the “piggyback” mode. The second part is incorrect; any remaining pumps taking suction from the RWST are stopped when RWST is < 9%.
- B. Incorrect The first part is incorrect; per EPP-9 step 19 RNO, if one train of valves can NOT be opened, then go to EPP-15. Plausible because EPP-9 utilizes contingency actions for other component problems such as Attachment 1 for SI-856A&B rather than just contained within an RNO. The Basis document for EPP-9 discusses the timeline for fuel to start heating up again (6 minutes) because at this point all RHR, SI and CV Spray pumps are stopped in preparation to establish the “piggyback” mode. The second part is correct; any remaining pumps taking suction from the RWST are stopped when RWST is <9%.
- C. Incorrect. The first part is correct; per EPP-9 step 19 RNO, if one train of valves can NOT be opened, then go to EPP-15. The second part is incorrect; any remaining pumps taking suction from the RWST are stopped when RWST is <9%.
- D. Correct. The first part is correct; per EPP-9 step 19 RNO, if one train of valves can NOT be opened, then go to EPP-15. The second part is correct; any remaining pumps taking suction from the RWST are stopped when RWST is <9%.

**Reference(s)**

EPP-9, Transfer to Cold Leg Recirculation, rev 35  
EPP-9-BD, Transfer to Cold Leg Recirculation Basis Document, rev 35

**K/A Match discussion:**

The K/A is matched because the question involves knowledge of loss of power impact to an MOV and procedures necessary to correct, control, or mitigate the consequences of that malfunction.

**Cognitive Level:** Memory or Fundamental Knowledge \_\_\_\_\_  
Comprehension or Analysis \_\_\_\_\_X\_\_\_\_\_

**Question Source:** Bank: \_\_\_\_\_  
Modified Bank: \_\_\_\_\_ (Note changes or attach parent)  
New: \_\_\_\_\_X\_\_\_\_\_

**SRO Only Basis:** Knowledge of Emergency procedure usage and associated transitions required due to equipment failure.

**QUESTION 88**  
**022A2.04**

**SRO Question 88**  
**022A2.04**

**Containment Cooling System (CCS)**

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

**RO 2.9/SRO 3.2**

**CFR 41.5/43.5**

The following sequence of events occurs with the reactor at 100% RTP and all HVH Containment Cooling Units in service:

- 0835 Annunciator APP-002-C8, "HVH-3 WTR OUTLET LO FLOW", alarms
- 0836 Field Operator dispatched to investigate in accordance with APP-002
- 0841 Following review of RTGB indications, the Reactor Operator reports no valves out of position or indications of running SW Booster Pump malfunction
- 0847 Field Operator reports DOWNSCALES on both of the following indications:

FI-1698C, "HVH-3 OUTLET FLOW" and  
PI-1646C, "HVH-3 OUTLET PRESSURE"

- 0853 Following consultation with Shift Manager and in accordance with APP-002, the Reactor Operator is directed to secure and isolate HVH-3
- 0855 Reactor Operator reports HVH-3 secured and line isolated

HVH-3 \_\_\_\_\_(1)\_\_\_\_\_ exceeded the allowable run time with no cooling water to its fan motor.

Based on the given conditions, entry into Technical Specification 3.7.7, "Service Water System (SWS)" REQUIRED ACTIONS \_\_\_\_\_(2)\_\_\_\_\_ required.

- | (1)        | (2)    |
|------------|--------|
| A. has     | is     |
| B. has     | is NOT |
| C. has NOT | is     |
| D. has NOT | is NOT |

### **Distractor Analysis**

- A. Incorrect. Answer is plausible due to being partially correct. As stated in the APP-002-C8 caution, a fifteen minute maximum run time is permitted for HVH fan motors provided there is a lack of cooling.(Ref APP-002, Page 39)
- B. Correct. Given information provides applicant success path.
- C. Incorrect. Plausible if applicant misapplies incorrect answers to question, see “A” and “D” distractor analyses.
- D. Incorrect. Answer is plausible due to being partially correct. Isolation of individual components does not render the Service Water System INOPERABLE as stated directly in the T.S. Bases and as a note in SR 3.7.7.1. (Ref T.S., Page 3.7-19 and T.S. Bases, Page B 3.7-45)

### **References**

- Technical Specifications, Amendment No. 176, Pages 3.6-15 & 3.7-19
- T.S. Bases, Revision 0, Pages B 3.7-45 & B 3.6-37
- APP-002, Revision 67, Page 39

### **KA Match**

Applicant is provided a situation where evaluation of given information concerning a SW malfunction requires isolation of an HVH fan unit. The applicant must determine whether run time limits have been exceeded and the appropriate T.S. entry for this condition.

### **Cognitive Level**

High

### **Source of Question**

New

### **SRO Only Basis**

Applicant must apply knowledge of Technical Specification SR and Bases requirements concerning T.S. entry criteria to correctly answer question. This information meets the SRO license level for testable knowledge.

## QUESTION 89

### 059G2.1.30

(SRO) 059 2.1.30

Main Feedwater System

Ability to locate and operate components, including local controls.

4.4/4.0 (41.7, 45.7)

Given the following:

- The plant is at 100% power.
- 'A' Feedwater Regulating Valve FCV-478 began operating erratically, so 12 hours ago it was placed in Local-Handwheel Control in accordance with OP-403, Feedwater System.

If you need the operator stationed at the FRV to LOWER feedwater flow, you will direct him/her to turn the handwheel in the (1) direction.

With FCV-478 still in local-handwheel control, the Work Control Center SRO reports that the breaker for V2-6A, Feedwater Header Section Valve, has tripped and that one attempt to reset it was unsuccessful. IAW Technical Specification 3.7.3 (provided), you have (2) hours to take action, or be in Mode 3 in 6 hours.

#### REFERENCE PROVIDED

	(1)	(2)
A.	clockwise	8
B.	counterclockwise	72
C.	clockwise	72
D.	counterclockwise	8

#### Distractor Analysis

FRVs are reverse-acting, so turning the handwheel counterclockwise allows the valve to close with spring pressure (air is isolated in this configuration). Clockwise is plausible because most valves are turned clockwise to close.

ITS 3.7.3, MFIVs, MFRVs, and Bypass Valves, concerns the ability of these valves to perform their design basis function of isolating feedwater to S/Gs for a steam line break or feedwater line break event.

- With 'A' FRV in Local-Manual, Condition B is in effect, which allows 72 hours before the valve must be closed or isolated.

- If a Feedwater Header Section Valve (which Tech Specs calls an MFIV), is inoperable with no other failure, then Condition ‘A’ applies, and again you have 72 hours to close or isolate it.
- With BOTH the ‘A’ FRV AND the ‘A’ MFIV inoperable, Condition D applies (“Two valves in the same flow path inoperable”) and you must isolate the flow path within 8 hours.

Plausibility of 72 hours stems from that being the number if EITHER discussed valve is inoperable, and the Note which says, “Separate Condition entry is allowed for each valve.” An applicant might 1) miss the Condition D statement entirely and think they’re in both Conditions A & B, or 2) might forget that the FRV is inoperable (it’s still doing its feed function) and only enter Condition A.

**Reference Provided:**

ITS 3.7.3, pages 3.7-8 and 3.7-9.

**References:**

ITS 3.7.3, MFIVs, MFRVs, and Bypass Valves

ITS 3.7.3 Basis

OP-403, Feedwater System, Rev. 4

ST-027, Feedwater System, Rev. 4

**KA Match:**

The KA is matched because the applicant must demonstrate knowledge of how to operate a local control for the Main Feedwater System. SRO knowledge required to answer the Tech Spec part of the question.

**Cognitive Level: Low**

**Source of Question:** Direction of operation of a FRV in Local-Manual control is commonly tested. RNP Master Bank question 5665 contributed that concept. The Tech Spec applicability concept is new.

**SRO Only Basis:**

See attached excerpt of “Clarification Guidance for SRO-only Question”, Revision 1, for justification of why this is SRO only level knowledge.

**QUESTION 90**  
**103G2.2.25**

<u>Examination Outline Cross-Reference:</u>	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #		G 2.2.25
	Importance Rating		4.2

Proposed Question:

Maintaining containment pressure at greater than or equal to the LCO lower pressure limit ensures that (1)

Maximum containment air temperature from a LOCA that exceeds the containment structural design temperature (2) acceptable for the design basis analysis for a LOCA.

Which of the following completes the statements above?

A	(1) ECCS systems will have sufficient net positive suction head during the recirculation phase of a design basis accident. (2) is
B	(1) ECCS systems will have sufficient net positive suction head during the recirculation phase of a design basis accident. (2) is NOT
C	(1) the containment will not exceed the design negative differential pressure limit following an inadvertent actuation of the Containment Spray System. (2) is
D	(1) the containment will not exceed the design negative differential pressure limit following an inadvertent actuation of the Containment Spray System. (2) is NOT

Proposed Answer:    **C**

K/A Match Analysis

103 Containment System, G 2.2.25

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

Requires knowledge of the TS Basis reasons for containment pressure and containment air temperature limits.

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

Answer Choice Analysis

- A. (1) INCORRECT. Plausible because at a low initial containment pressure for a DBA, the RHR pumps could have NPSH issues when aligned to the hot reactor building sump during recirculation.  
(2) CORRECT. TS Basis states that the structural design temperature for containment is 263 degrees, the max air temperature resulting from a LOCA is 264 and a steam break is 274, however because the time was short enough at these temperatures, the max equipment surface temperature remained below the design temperature.
- B. (1) INCORRECT.  
(2) INCORRECT. This is plausible because without knowledge of the TS Basis statement above exceeding the design temperature would seem wrong.
- C. (1) CORRECT. According to TS Basis, the low limit for containment pressure is based upon an inadvertent actuation of CSS.  
(2) CORRECT.
- D. (1) CORRECT.  
(2) INCORRECT.

Technical Reference(s):

HBRSEP Unit No. 2 Tech Spec 3.6.4 Basis, rev. 34  
" 3.6.5 Basis, rev. 0

Proposed references to be provided to applicants during examination: None

Learning Objective:

Question Source: New

Question History: New

Question Cognitive Level: Memory or Fundamental Knowledge —  
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X  
55.43 X

Comments:

Supporting References

## QUESTION 91

### 001A2.19

Examination Outline Cross-Reference:	Level	SRO
	Tier #	2
	Group #	2
	K/A #	001A2.19
	Importance Rating	4.0

001A2.19 – Ability to (a) predict the impacts of axial flux distribution on the CRDS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of axial flux distribution

Proposed Question:

You are the oncoming Control Room Supervisor.

Due to a malfunction of the CAOC software program, the last shift's operators had to manually monitor AFD IAW Section 8.4 of FMP-009 "Power Distribution Control".

As you review the AFD values recorded on Attachment 10.5 of FMP-009 you discover the following:

- Reactor power for the past 3.5 hours was 70%
- AFD values for all 4 excore channels have been outside of the target band (but within the acceptable operating region) for the past 3.5 hours with no compensatory actions taken
- AFD has not been outside the target band at any other time in the previous 24 hours

Based on the conditions above, the required action per the Technical Specifications is to reduce thermal power to       (1)      .

AFD values for all excore channels were restored to within the target band at the 3.5 hour mark referenced above. In this condition, thermal power cannot be increased above the applicable Tech Spec limit for a minimum of       (2)      .

	(1)	(2)
a.	< 50% RTP	210 minutes
b.	< 50% RTP	151 minutes
c.	< 15% RTP	210 minutes
d.	< 15% RTP	151 minutes

Proposed Answer:

- b. < 50% RTP 151 minutes

Explanation:

This question requires the applicant to assess plant conditions for AFD values outside their target band and determine the correct required actions per the applicable T/S LCO. Additionally, the applicant must determine when power ascension to a RTP level above 50% would be permitted based on the cumulative penalty time.

- a. **INCORRECT** – LCO 3.2.3 Condition C states that with 2 operable excore channels outside the AFD target band AND reactor power between 50% and 90% RTP AND with cumulative penalty deviation time greater than 1 hour during the previous 24 hours that thermal power must be reduced to < 50% within 30 minutes. Since the question stem states that two operable excore channels have been outside their AFD target band for 3.5 hours while at 70% power, this meets the criteria for entering condition C. Required action C.2 states that cumulative penalty deviation time must be less than 1 hour prior to increasing thermal power to greater than 50%, therefore thermal power cannot be raised above 50% for 151 minutes (3.5 hours x 60 = 210 minutes – 59 minutes = 151 minutes). Plausible if the applicant determines that cumulative penalty deviation must be 0 prior to raising thermal power above 50%.
- b. **CORRECT** – LCO 3.2.3 Condition C states that with 2 operable excore channels outside the AFD target band AND reactor power between 50% and 90% RTP AND with cumulative penalty deviation time greater than 1 hour during the previous 24 hours that thermal power must be reduced to < 50% within 30 minutes. Since the question stem states that two operable excore channels have been outside their AFD target band for 3.5 hours while at 70% power, this meets the criteria for entering condition C. Required action C.2 states that cumulative penalty deviation time must be less than 1 hour prior to increasing thermal power to greater than 50%, therefore thermal power cannot be raised above 50% for 151 minutes (3.5 hours x 60 = 210 minutes – 59 minutes = 151 minutes).
- c. **INCORRECT** – LCO 3.2.3 Condition D states that if the required action and associated completion time of Condition C are not met then thermal power must be reduced to less than 15% within 9 hours. The applicant may conclude that since Condition C has been applicable for the last 2.5 hours (3.5 hours – 1 hour deviation time) that the required actions and completion times have already been missed for Condition C. The required actions and completion times are referenced from time of discovery, thus making the required actions of Condition C applicable. Required action C.2 states that cumulative penalty deviation time must be less than 1 hour prior to increasing thermal power to greater than 50%, therefore thermal power cannot be raised above 50% for 151 minutes (3.5 hours x 60 = 210 minutes – 59 minutes = 151 minutes). Plausible if the applicant determines that cumulative penalty deviation must be 0 prior to raising thermal power above 50%.
- d. **INCORRECT** – LCO 3.2.3 Condition D states that if the required action and associated completion time of Condition C are not met then thermal power must be reduced to less than 15% within 9 hours. The applicant may conclude that since Condition C has been applicable for the last 2.5 hours (3.5 hours – 1 hour deviation time) that the required actions and completion times have already been missed for Condition C. The required actions and completion times are referenced from time of discovery, thus making the required actions of Condition C applicable. Required action C.2 states that cumulative penalty deviation time

must be less than 1 hour prior to increasing thermal power to greater than 50%, therefore thermal power cannot be raised above 50% for 151 minutes (3.5 hours x 60 = 210 minutes – 59 minutes = 151 minutes).

Technical Reference(s): FMP-009, Revision 17 “Power Distribution Control”  
Tech Spec LCO 3.2.3, Amendment 176

Proposed references to be provided to applicants during examination: none (< 24 hour LCO action statements should be known from memory at the SRO level)

Question Source: new

Question History: none

Question Cognitive Level: Comprehension or Analysis

10 CFR Part 55 Content: 55.43 (1)

K/A match: ***Note: Per NUREG-1021 Rev. 9 Supp. 1, pg. 6 of 33 of ES-401, this question only tests the higher cognitive level (b) portion of the K/A, as it was difficult to devise a scenario where AFD would have an effect on control rods (it’s typically the other way around).***

The K/A is matched since the applicant is required to demonstrate the ability to use procedures (Tech Specs) to mitigate the effects of AFD being outside the target band on two operable excor channels.

## QUESTION 92

### 011G2.2.44

K/A number and description:

011G2.2.44

011 Pressurizer Level Control System  
G2.2 Equipment Control  
G2.2.44 Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions.

#### Question:

Given the following plant conditions:

- Plant is stable in Mode 3.
- PZR level transmitter LT-459 fails LOW.
- No operator actions are taken.
- At 1700 PZR level is 85.1% and rising at a rate of 0.5%/min.
- PZR pressure is being maintained constant.

At the current rate of level rise (1) is the EARLIEST time at which the ITS 3.4.9, Pressurizer, will NOT be met.

The bases for the limit in this Mode is to ensure that the (2).

- A. (1) 1712
- (2) RCS does NOT go solid when criticality is achieved and preserves a steam space for pressure control
- B. (1) 1714
- (2) RCS does NOT go solid when criticality is achieved and preserves a steam space for pressure control
- C. (1) 1712
- (2) PZR level remains within the calibrated level range and provide protection against water relief through the PZR PORVs

- D. (1) 1714
- (2) PZR level remains within the calibrated level range and provide protection against water relief through the PZR PORVs

**Distractor Analysis:**

- A. Incorrect. The first part is incorrect; the time given is based on the Pressurizer Water Level - High reactor trip setpoint of 91%. At 1712 the level will be 91.1% ( $85.1 + (0.5 * 12)$ ); plausible since the applicant may use the pressurizer level reactor trip setpoint instead of the Tech Spec limit. The second part is correct per the ITS 3.4.9 bases.
- B. Correct. At 1714 the level will be 92.1% ( $85.1 + (0.5 * 14)$ ); above the Tech Spec limit of 92%.
- C. Incorrect. The first part is incorrect; the time given is based on the Pressurizer Water Level - High reactor trip setpoint of 91%. At 1712 the level will be 91.1% ( $85.1 + (0.5 * 12)$ ); plausible since the applicant may use the pressurizer level reactor trip setpoint instead of the Tech Spec limit.

The second part is incorrect; plausible because the Pressurizer Water Level-High reactor trip provides protection against water relief through the pressurizer safety valves (vs. the PORVs); also, the PZR level indication is calibrated throughout the full range of indication.

- D. Incorrect. The first part is correct. The second part is incorrect; plausible because the Pressurizer Water Level-High reactor trip provides protection against water relief through the pressurizer safety valves (vs. the PORVs); also, the PZR level indication is calibrated throughout the full range of indication.

**Reference(s)**

- Pressurizer System Description, SD-059
- Tech Spec 3.3.1, 3.4.9
- Tech Spec 3.3.1, 3.4.9 - Basis

**K/A Match discussion:**



**QUESTION 93**  
**015G2.4.11**

**SRO Question 93**  
**015G2.4.11**

**Nuclear Instrumentation**

**Knowledge of abnormal condition procedures.**

**RO 4.0/SRO 4.2**

**CFR 41.10/43.5**

Initial Conditions:

- The plant is in Mode 2
- A reactor startup is in progress in accordance with GP-003, "NORMAL PLANT STARTUP FROM HOT SHUTDOWN TO CRITICAL"
- A small dilution is in progress for inventory control
- Source Range to Intermediate Range channel overlaps have **NOT** been observed

Current Conditions:

- Source Range Channel N-31 has failed downscale

In accordance with GP-003, the CRS will \_\_\_\_\_ .

- A. Direct a Reactor Trip due to current power level
- B. Direct a Reactor Trip due to current rod positions
- C. Permit continued plant operation. Boron concentration change allowed to continue.
- D. Permit continued plant operation. Boron concentration change **NOT** allowed to continue.

### **Distractor Analysis**

- A. Incorrect. Answer is plausible due to being a true statement in accordance with GP-003 and Technical Specifications. The conditions presented in the question stem however, make this incorrect. **Two** INOPERABLE source range channels in MODE 2 are required to make this the correct answer. (Ref GP-003, Page 12, Technical Specifications, Page 3.3-13)
- B. Incorrect. Answer is plausible due to being a true statement in accordance with GP-003 and Technical Specifications. The conditions presented in the question stem however, make this incorrect. **Two** INOPERABLE source range channels in **MODE 3** are required to make this the correct answer. (Ref GP-003, Page 12, Technical Specifications, Page 3.3-13)
- C. Correct. Given information provides applicant success path.
- D. Incorrect. Answer is plausible due to being partially correct. Per GP-003 and Condition I of T.S. 3.3.1, limited boron concentration changes are permitted with one INOPERABLE source range channel. (Ref GP-003, Page 12, Technical Specifications, Page 3.3-4, & T.S. Bases, Page B 3.3-40)

### **References**

- GP-003, Revision 101, Page 12
- Technical Specifications, Amendment No.210, Page 3.3-13
- Technical Specifications, Amendment No. 190, Page 3.3-4
- T.S. Bases, Revision 16, Page B 3.3-40

### **KA Match**

Applicant is given a situation where evaluation of given information concerning a failed nuclear instrument and its impact on continued plant operation is necessary.

### **Cognitive Level**

High

### **Source of Question**

New

**SRO Only Basis**

Applicant must apply knowledge of T.S. requirements concerning source range instrument OPERABILITY to correctly answer question. This information meets the SRO license level for testable knowledge.

## QUESTION 94

### G2.1.34

(SRO) 2.1.34

Knowledge of primary and secondary plant chemistry limits.

2.7/3.5 (41.10, 43.5, 45.12)

Given the following plant conditions:

- The plant is operating at 100% RTP.
- R-15, Condenser Air Ejector Gas Monitor, and R-19B, S/G 'B' Liquid Sample Monitor, were observed to be increasing.
- E&C personnel evaluated the leakage and identified a primary to secondary leak in 'B' S/G of 120 gpd.

Based on this information, a (1) event has occurred.

The plant must be placed in Mode 3 within (2).

- |    | (1)    | (2)     |
|----|--------|---------|
| A. | PSAL-2 | 4 hours |
| B. | PSAL-2 | 6 hours |
| C. | PSAL-3 | 3 hours |
| D. | PSAL-3 | 6 hours |

#### Distractor Analysis

A. Incorrect. (1) is incorrect: 75 gpd to 100 gpd is the range of leakage for PSAL-2. (2) is incorrect. Plausible because 4 hours is the ITS 3.4.13 Condition A completion time, but that Condition does not apply to S/G tube leakage.

B. Incorrect. (1) is incorrect as discussed in A. 6 hours is the ITS 3.4.13, RCS Operational Leakage, Completion Time to be in Mode 3 and would be correct for PSAL-2.

C. CORRECT. >100gpd is the entry level for PSAL-3. It requires the plant to be in Mode 3 in 3 hours.

D.. Incorrect. (1) is correct. (2) is incorrect: 6 hours is the TS-required time, but AOP-035 says to be in Mode 3 in 3 hours.

**References:**

AOP-035, S/G Tube Leak, Rev. 27

OMM-001-13, Plant Chemistry, Rev. 16

ITS 3.4.13, RCS Operational Leakage

**KA Match:**

The KA is matched because the applicant has to demonstrate knowledge of threshold values for a primary plant chemistry limits. SRO match because the question requires an evaluation of >1 hour shutdown criteria.

**Cognitive Level: Low**

**Source of Question:** RNP bank question 2843 provided the “determine which PSAL” piece. RNP bank question 2857 provided the “be in Mode 3” piece.

**SRO Only Basis:**

See attached excerpt of “Clarification Guidance for SRO-only Question”, Revision 1, for justification of why this is SRO only level knowledge.

**QUESTION 95**  
**G2.1.41**

<u>Examination Outline Cross-Reference:</u>	Level	RO	SRO
	Tier #		3
	Group #		
	K/A #		G 2.1.41
	Importance Rating		3.7

Proposed Question:

To facilitate inserting a bowed fuel assembly, placing fuel assemblies in a location other than their final core location \_\_\_\_ (1) \_\_\_\_ the fuel assembly has less reactivity than the one intended for that location.

To facilitate seating in the core, a difficult to insert fuel assembly \_\_ (2) \_\_ all other assemblies involved are in their final core location.

Which of the following completes the statement above?

A	(1) is allowed if (2) is allowed to be rotated as long as
B	(1) is allowed if (2) is NOT allowed to be rotated, even if
C	(1) is NOT allowed, even if (2) is allowed to be rotated as long as
D	(1) is NOT allowed, even if (2) is NOT allowed to be rotated, even if

Proposed Answer:    **A**

K/A Match Analysis

G 2.1.41

Knowledge of the refueling process.

Requires knowledge of the fuel handling procedures used for core loading.

SRO Only: requires knowledge of fuel handling facilities and procedures. [10 CFR 55.43(b)(7)]

Answer Choice Analysis

- I. (1) CORRECT. In accordance with FMP-019, using fuel assemblies in a location other than the final core location for a “temporary box” is allowed after a reactivity evaluation to facilitate the insertion of a difficult assembly.  
 (2) CORRECT. In accordance with FMP-019, a fuel assembly that is difficult to insert may be rotated 180 degrees temporarily to facilitate seating in the core.
- J. (1) CORRECT.  
 (2) INCORRECT. Plausible because without knowledge of the fuel handling procedures,



## QUESTION 96

### G2.2.38

Examination Outline Cross-Reference:	Level	SRO
	Tier #	3
	Group #	
	K/A #	G2.2.38
	Importance Rating	4.5

G2.2.38 – Knowledge of conditions and limitations in the facility license.

Proposed Question:

The plant is at 100% power with the 'B' SI pump tagged out for maintenance.

The following events occur:

- On Monday at 0800 the 'A' SI pump is declared inoperable.
- On Tuesday at 1200 the 'C' SI pump is declared inoperable.
- On Tuesday at 1230 the 'A' SI pump is declared OPERABLE.

Which one of the following states the latest time the 'C' SI pump must be made OPERABLE to avoid entering a subsequent LCO shutdown state? (**Reference Provided**)

- a. Thursday at 0800
- b. Friday at 0800
- c. Friday at 1200
- d. Friday at 1230

Proposed Answer:

b. Friday at 0800

Explanation:

This question requires the applicant to assess plant conditions and determine the applicable Tech Spec required actions. In this case, when the 'A' SI pump is declared inoperable, LCO 3.5.2, Condition A is entered which requires restoring the pump to operable status within 72 hours. When subsequently the 'C' SI pump becomes inoperable and then the 'A' SI pump is restored to operable status, the applicant must determine that the 'C' pump must be restored to operable status by the more restrictive of Friday at 0800 or Friday at 1200; thus Friday at 0800 (per the guidance contained on T/S Section 1.3, pg. 1.3-2).

- a. **INCORRECT** – Since the 'C' SI pump became inoperable while the 'A' SI pump was inoperable and then was restored, then the completion time for restoration of the 'C' pump is 72 hours from time of discovery of 'A' pump inoperable plus a 24 hour extension. Plausible if the applicant determines that the 'C' pump must be restored within 72 hours as referenced from the inoperability time of the 'A' pump.
- b. **CORRECT** – Since the 'C' SI pump became inoperable while the 'A' SI pump was inoperable and then was restored, then the completion time for restoration of the 'C' pump is 72 hours from time of discovery of 'A' pump inoperable plus a 24 hour extension.
- c. **INCORRECT** – Since the 'C' SI pump became inoperable while the 'A' SI pump was inoperable and then was restored, then the completion time for restoration of the 'C' pump is 72 hours from time of discovery of 'A' pump inoperable plus a 24 hour extension. Plausible if the applicant does not remember that the subsequent inoperability clause in Section 1.3 requires restoration in the most limiting of two different times (this distractor is the stated completion time as measured from the inoperability of the 'C' pump – which is not the most limiting of the two choices).
- d. **INCORRECT** – Since the 'C' SI pump became inoperable while the 'A' SI pump was inoperable and then was restored, then the completion time for restoration of the 'C' pump is 72 hours from time of discovery of 'A' pump inoperable plus a 24 hour extension. Plausible is the applicant determines that the 72 hour clock begins upon restoration of the 'A' pump.

Technical Reference(s): ST-002, Revision 3, "Safety Injection System"  
Tech Spec Section 1.3, Amendment 176  
Tech Spec LCO 3.5.2, Amendment 176  
Tech Spec Bases LCO 3.5.2, Revision 0

Proposed references to be provided to applicants during examination: LCO 3.5.2, pg. 3.5-4 and 3.5-5

Question Source: new

Question History: none

Question Cognitive Level: Comprehension or Analysis

10 CFR Part 55 Content: 55.43 (1)

K/A match: The K/A is matched since the applicant is required to demonstrate knowledge of the limitations in the plant Technical Specifications which form part of the plant's licensing basis.

## QUESTION 97

### G2.2.5

**Question number: SRO xx**

K/A number and description:

G2.2.5

G2.2 Generic Knowledges and Abilities – Equipment Control

G2.2.5 Knowledge of the process for making design or operating changes to the facility

**Question:**

Given the following:

- The B Battery Room exhaust fan, HVE-8B, had a bearing failure that resulted in shaft damage.
- The fan was removed from service and tagged out by Operations.
- Maintenance is scheduled to complete repairs within 5 days based on the delivery date of identical replacement parts.
- A temporary fan was placed in service as an interim compensatory measure for the degraded condition.
- A temporary procedure change was implemented for the use of the temporary fan.

REG-NGGC-0010, 10 CFR 50.59 and Selected Regulatory Reviews, \_\_\_\_\_ (1) \_\_\_\_\_ state that 10CFR 50.59 should be applied to the temporary fan installation.

If a 10 CFR 50.59 screening is required, the primary source to review is the \_\_\_\_\_ (2) \_\_\_\_\_ document.

(2)

(2)

E. does

Updated FSAR

F. does

Improved Technical Specification Basis

G. does NOT

Updated FSAR

H. does NOT

Improved Technical Specification Basis

**Distractor Analysis:**

Proposed Answer: A

- A. CORRECT. The first part is correct, the use of 10 CFR 50.59 should be applied to temporary changes proposed as compensatory actions to address degraded or nonconforming conditions as referenced in REG-NGCGC -0010 (basis from NEI-96-07). The second part is correct; the primary source of information for performing a 10 CFR 50.59 Screen or Evaluation is the FSAR.
- B. Incorrect. The first part is correct; the use of 10 CFR 50.59 should be applied to temporary changes proposed as compensatory actions to address degraded or nonconforming conditions as referenced in REG-NGCGC -0010 (basis from NEI-96-07). The second part is incorrect; plausible because of the ITS description of safety related equipment requirements and basis; however, the UFSAR is specified as the primary document principally because of the extensive scope of plant design which also includes non-safety related functions supporting SSCs.
- C. Incorrect. The first part is incorrect; plausible because the maintenance activity to repair the fan does not require a 50.59 screening since it is covered under the separate regulation of 10 FCR 50.65(a)(4) and is scheduled to be completed within 90 days. The second part is correct.
- D. Incorrect. The first part is incorrect; plausible because the maintenance activity to repair the fan does not require a 50.59 screening since it is covered under the separate regulation of 10 FCR 50.65(a)(4) and is scheduled to be completed within 90 days. The second part is incorrect; plausible because of the ITS description of safety related equipment requirements and basis; however, the UFSAR is specified as the primary document principally because of the extensive scope of plant design which also includes non-safety related functions supporting SSCs.

**Reference(s)**

- REG-NGGC-0010, 10 CFR 50.59 and Selected Regulatory Reviews, Rev 15
- ST-036, HVAC, rev 3.

**K/A Match discussion:**

The K/A is matched because the question involves of the process for making design or operating changes to the facility

<b><u>Cognitive Level:</u></b>	Memory or Fundamental Knowledge	<u>  X  </u>
	Comprehension or Analysis	<u>      </u>

**Question Source:**

Bank:

\_\_\_\_\_

Modified Bank:

\_\_\_\_\_

(Note changes or attach parent)

New:

\_\_\_\_\_X\_\_\_\_\_

**SRO Only Basis:** The question involves the knowledge of the process for making design or operating changes to the facility

## QUESTION 98

### G2.3.6

#### Radiation Control

Ability to approve release permits.

RO 2.0/SRO 3.8

CFR 41.13/43.4

Initial Conditions:

- R-18, "LIQUID RADWASTE EFFLUENT DISCH LINE RAD MONITOR", is currently out of service.
- You are the Unit CRS when the on-shift E&C Technician arrives with a Liquid Waste Release Permit for a batch release of Waste Condensate Tank "A", which is ready for Operations release approval.

The E&C Tech informs you that two E&C Techs independently analyzed a single sample from WCT "A". The E&C Tech \_\_\_\_ (1) \_\_\_\_ properly ensured that ODCM 2.6.1 sampling requirements for a liquid release with the R-18 INOPERABLE are met.

In addition, you are informed that this release will result in exceeding the 10CFR50 quarterly dose limit of 50%.

E&C approval authority for liquid releases when the 50% quarterly 10CFR50 dose limit is exceeded is the \_\_\_\_ (2) \_\_\_\_ .

- |    | (1)     | (2)                |
|----|---------|--------------------|
| A. | has     | E&C Supervisor     |
| B. | has     | E&C Superintendent |
| C. | has NOT | E&C Supervisor     |
| D. | has NOT | E&C Superintendent |

### **Distractor Analysis**

- A. Incorrect. Answer is plausible due to being partially correct. In accordance with EMP-023 and ODCM 2.6.1, the R-18 INOPERABLE sampling requirement mandates analysis of two independent samples. As stated, the question stem provides for two analyses of a single sample. (Ref EMP-023, Pages 51 & 13; ODCM, Page 2-25)
- B. Incorrect. Plausible if applicant misapplies incorrect answers to question, see “A” and “D” distractor analyses.
- C. Correct. Given information provides applicant success path.
- D. Incorrect. Answer is plausible due to being partially correct. Per EMP-023, the E&C Superintendent may provide tank release approval without meeting analysis requirements when under extreme circumstances of plant operation. This condition is not present in the question stem. (Ref EMP-023, Pages 50 & 61)

### **References**

- EMP-023, Revision 57, Pages 13, 50, 51, and 61
- ODCM, Revision 32, Page 2-25

### **KA Match**

Applicant is given a situation where evaluation of given information concerning a liquid release permit is necessary.

### **Cognitive Level**

Low

### **Source of Question**

New

### **SRO Only Basis**

Applicant must apply knowledge of ODCM requirements concerning liquid radwaste releases when the R-18 monitor is out of service to correctly answer question. This information meets the SRO license level for testable knowledge.

## QUESTION 99

### G2.4.26

(SRO) 2.4.26

Knowledge of facility protection requirements, including fire brigade and portable fire fighting equipment usage. 3.1/3.6 (41.10, 43.5, 45.12)

Given the following:

- The unit is at 100% power.
- A fire has been reported in the Charging Pump Room.
- You are the Fire Brigade Incident Commander.

You performed an initial size up and advised the Control Room of the situation found. An appropriate place for you to set up your Command Post would be (1).

The Control Room advises you that Mechanical Maintenance technicians were in the Charging Pump Room when the fire started, and one individual remains trapped in the RCS Filter Room.

Three Fire Brigade members in full turnout gear and SCBAs arrive at the Command Post. You are procedurally allowed to direct two of them to retrieve the fire victim (2).

- A. (1) the Inside Auxiliary Operator office  
(2) immediately, with no need to have a backup team
- B. (1) the Old Fire Equipment Building  
(2) ONLY when a fourth member in full turnout gear and SCBA arrives
- C. (1) the Inside Auxiliary Operator office  
(2) ONLY when a fourth member in full turnout gear and SCBA arrives
- D. (1) the Old Fire Equipment Building  
(2) immediately, with no need to have a backup team

## **Distractor Analysis**

Command Post aspect: OMM-003, Fire Protection Pre-Plans, Attachment 10.1, Incident Commander Incident Management Guidelines, states that the Command Post should have a buffer zone away from any fire or respiratory hazard, but SHALL NOT be in the same building as the fire, and references a CAPR from NCR 129905. FBIC Responsibility 3.1.1 says the same.

The Inside AO office is in the Auxiliary Building, as is the Charging Pump Room, where the fire is. Plausible because it is separated from the fire area by two fire doors (so it has a buffer zone), and has an egress route away from the Aux Bldg. It's the perfect place for this fire because it has a phone, radio, and PA, and the Fire Brigade would be right outside the fire door for direct communication.

The Old Fire Equipment Building would be a suitable location. It has radios and possibly a PA, has "adequate space to work with pre-plans, accountability board," etc., and isn't far from the fire scene.

Victim rescue aspect: the "2-in/2-out" rule is heavily stressed at RNP. 1) never send someone into a fire area alone (2-in), and 2) they can't go in unless there are two fully-dressed FB members outside the IDLH atmosphere (2-out). FP-001, Fire Emergency, has an 8-page attachment explaining it (Att. 10.5).

OMM-003 Attachment 10.1 says to "Direct fire attack observing the 2-in/2-out rule." Next it says, "Ensure a primary search is completed."

OMM-003 3.3.7, under "All Fire Brigade Members" Responsibilities (3.3.7) discusses the rule. It adds this important caveat: "With the exception of rescue situations involving the retrieval of a known victim, verify a Back-up Team of at least two FB members is established..."

FP-001 says the same thing. Choosing the correct answer relies on remembering this exception. Plausibility of the other choice is based on how the rule is normally applied, which is most of the time.

### **References:**

FP-001, Fire Emergency, Rev. 63

OMM-003, Fire Protection Pre-Plans/Unit No. 2, Rev. 62

### **KA Match:**

The KA is matched because the applicant must demonstrate knowledge of facility protection requirements, including fire brigade operations and tangentially, portable fire fighting equipment usage.

**Cognitive Level: Low**

**Source of Question: New**

**SRO Only Basis:**

Fire Brigade Incident Commander is an SRO-only position at Robinson; you have to be an SRO to be a FBIC. Knowledge of where to set up a command post is only needed by, and procedurally directed to, SROs. Knowledge of the 2-in/2-out rule is required of *all* FB members, but the FBIC will make the decision to deviate from the rule. FP-001 has a Caution which states, "The FBIC has the ultimate responsibility and authority over the need for a Back-up Team or if this need can be relaxed. This responsibility cannot be delegated."

**QUESTION 100**  
**G2.4.40**

<u>Examination Outline Cross-Reference:</u>	Level	RO	SRO
	Tier #		3
	Group #		
	K/A #		G 2.4.40
	Importance Rating		4.5

Proposed Question:

The Emergency Response Organization (ERO) accountability process must be completed within a MAXIMUM of (1) from the time a Site Area Emergency is declared.

The Site Emergency Coordinator (SEC) task of making Offsite Protective Action Recommendations (PARs) (2) be delegated to the Radiological Control Manager.

In accordance with PLP-007, Robinson Emergency Plan, which one of following completes the statements above?

A	(1) 30 minutes (2) can NOT
B	(1) 30 minutes (2) can
C	(1) 15 minutes (2) can NOT
D	(1) 15 minutes (2) can

Proposed Answer:    **A**

K/A Match Analysis

G 2.4.40

Knowledge of SRO responsibilities in emergency plan implementation.

Requires knowledge of the SRO responsibilities as Site Emergency Coordinator during emergency plan implementation.

SRO only: Meets 10CFR55.43(b)(1) due to knowledge of the administration of the site emergency plan is required.

