

1. 001A3.06 1

Given the following sequence of events:

- An RCS pressure control malfunction reduces RCS pressure.
- A turbine runback initiates.
- Tavg is 4.0°F > Tref.
- Control Rods are inserting in automatic.

Which one of the following describes the initiating event for the runback and the current rod speed?

<u>Initiating Event</u>	<u>Current Rod Speed</u>
A. OP delta T runback	8 steps per minute
B. OP delta T runback	> 8 steps per minute
C. OT delta T runback	8 steps per minute
D. OT delta T runback	> 8 steps per minute

001A3.06 Control Rod Drive System

Ability to monitor automatic operation of the Control Rod Drive System including: (CFR: 41.5/43.5/45.3/45.13)

RCS Temperature and Pressure

K/A MATCH ANALYSIS:

The question meets the KA, because a change in RCS Pressure and temperature has caused the Control Rod Drive system to automatically respond. The examinee is asked to monitor how the CRDS is responding in terms of expected rod speed, and to determine the cause of the initiating signal.

ANSWER / DISTRACTOR ANALYSIS:

- A. Incorrect. First half is incorrect, OP delta T only has inputs from RCS Tave and rate of change of Tave, not RCS pressure.

Second half is incorrect, rod speed would be > 8 steps per minute with a 4.0°F temperature deviation (~ 40 steps per minute).

B. Incorrect. First half is incorrect, OP delta T only has inputs from RCS Tave and rate of change of Tave, not RCS pressure.

Second half is correct, rod speed would be > 8 steps per minute with a 4.0°F temperature deviation (~ 40 steps per minute).

C. Incorrect. First half is correct, OT delta T has an input from RCS pressure. RCS pressure lowering can reduce the OT delta T runback setback setpoint resulting in a turbine runback and rising RCS Tave causing inward rod motion.

Second half is incorrect, rod speed would be > 8 steps per minute with a 4.0°F temperature deviation (~ 40 steps per minute).

D. Correct. First half is correct, OT delta T has an input from RCS pressure. RCS pressure lowering can reduce the OT delta T runback setback setpoint resulting in a turbine runback and rising RCS Tave causing inward rod motion.

Second half is correct, rod speed would be > 8 steps per minute with a 4.0°F temperature deviation (~ 40 steps per minute).

REFERENCES:

PLS (Precautions, Limitations, and Setpoints) page # 24 for Control Rod Speeds

PLS (Precautions, Limitations, and Setpoints) pages # 11, 12, and 13 for OP and OT delta trip and runback setpoints.

Tech Specs 3.3.1, RTS Instrumentation, pages 3.3.1-20 through 3.3.1-22

VEGP learning objectives:

LO-LP-27101-07 Describe the operation of the Rod Control System when the bank selector switch is in Manual and Auto position. Include the following:

- a. Rod Speed
- b. Bank overlap and sequencing
- c. Input signals

LO-LP-16101-11 Describe how setpoints for OP and OT delta T vary with changes in Tav_g, pressurizer pressure, and delta flux.

Answer: D

2. 001AA1.02 1

Initial conditions:

- Unit 1 is maintaining 70% power.
- Control rods are in Automatic.
- Control bank "D" starts to step out continuously.
- The OATC places rods in Manual.

Current conditions:

- Rods continue to step out.

Per 18003-C, "Rod Control System Malfunction", the NEXT action the OATC will perform is to ...

- A. check Rod Motion - STOPPED.
- B. place the Rod Motion Switch in hold.
- C. open the reactor trip breakers and continue with 18003-C.
- D. trip the Reactor and go to 19000-C, "E-0, Reactor Trip or Safety Injection".

001AA1.02 Continuous Rod Withdrawal

**Ability to operate and / or monitor the following as they apply to the Continuous Rod Withdrawal:
(CFR 41.7 / 45.5 / 45.6)**

Rod in-out-hold switch

K/A MATCH ANALYSIS

The question presents a plausible scenario where uncontrolled outward rod motion is occurring. Given indications after rods are placed in manual, the operator must choose the NEXT action to take per 18003-C, Immediate Operator Actions.

ANSWER / DISTRACTOR ANALYSIS

- A. Incorrect. The next IOA is B1.b - Place the Rod Motion Switch in hold, NOT check Rod motion STOPPED which is step B2. It is plausible the candidate may the checking rod motion stopped is the IOA after placing rods in manual as stated in the stem.
- B. Correct. The next IOA is B1.b - Place the Rod Motion Switch in hold.
- C. Incorrect. The next IOA is B1.b - Place the Rod Motion Switch in hold, NOT trip the reactor and go to E-0 which is the RNO for step B2.a. It is plausible the candidate may think the IOA is tripping the reactor with the indications rods are still stepping out after placing rods in manual as stated in the stem.
- D. Incorrect. The next IOA is B1.b - Place the Rod Motion Switch in hold, NOT open the reactor trip breakers and go to step B6 (continue with 18003-C). It is plausible the candidate may think the IOA is tripping the reactor with the indications rods are still stepping out after placing rods in manual as stated in the stem.

REFERENCES

AOP-18003-C, "Rod Control System Malfunction" section B for "Uncontrolled Continuous Rod Motion".

VEGP learning objectives:

LO-LP-60303-12 State the immediate operator actions required for an uncontrolled continuous rod motions. Include RNO and substeps of the immediate action.

Answer: B

3. 001AA2.03 1

Initial conditions:

- Unit 1 Reactor power is 81% and stable.
- The PR Hi Flux Trip Setpoint is currently set at 90%.
- The OATC withdraws bank D rods 1 step and releases the Rod Motion Switch.
- Group 2 rods continue withdrawing without being noticed.

Current conditions:

- The following annunciators illuminate.

- ALB10-D06, ROD DEV.
- ALB09-E05, NIS HI FLUX HI SET POINT PWR RNG RX TRIP.
- Reactor power continues to rise.

The Tech Spec Bases for LCO 3.1.4, Rod Group Alignment Limits, that are being challenged in this condition is the preservation of ____ (1) ____,

and

the SS will directly enter procedure ____ (2) ____.

- A. (1) power distribution and reactivity limits
(2) 18003-C, "Rod Control System Malfunction"
- B. (1) power distribution and reactivity limits
(2) 19000-C, "E-0 Reactor Trip or Safety Injection"
- C. (1) Shut Down Margin limits
(2) 18003-C, "Rod Control System Malfunction"
- D. (1) Shut Down Margin limits
(2) 19000-C, "E-0 Reactor Trip or Safety Injection"

001AA2.03 Continuous Rod Withdrawal

Ability to determine and interpret the following as they apply to the Continuous Rod Withdrawal (CFR 43.5 / 45.13):

Proper actions to be taken if automatic safety functions have not taken place

K/A MATCH ANALYSIS

The question presents a plausible scenario where the OATC is shimming rods out while maintaining power at 80%. Uncontrolled outward rod motion occurs in Group 2 of Bank D, the ROD DEV and NIS HI FLUX HI SET POINT PWR RNG RX TRIP alarms are lit. The SRO must determine the correct procedure to enter and the Tech Spec Bases that is being challenged for the conditions presented.

SRO 10CFR55.43 (b)(2) due to knowledge of Tech Spec bases.

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. First part correct, power distribution and reactivity limits are the Tech Spec bases that is being challenged for uncontrolled outward rod motion.

a first higher taking any
Second part incorrect. While entry conditions for 18003-C are met, out for E-0 is also present and reactor trip entry condition is a higher priority. All EOP immediate actions must be completed prior to early or non-EOP action per 10020-C.

B. Correct. First part correct, power distribution and reactivity limits are the Tech Spec bases that is being challenged for uncontrolled outward rod motion.

Second part correct. While entry conditions for 18003-C are met, a first out for E-0 is also present and reactor trip entry condition is a higher priority. All EOP immediate actions must be completed prior to taking any early or non-EOP action per 10020-C.

C. Incorrect. First part incorrect. While Shutdown Margin is a concern in the event of a stuck or misaligned rod and is part of the bases for Tech Spec 3.1.4, power distribution and reactivity limits are the Tech Spec bases for this event.

Second part incorrect. While entry conditions for 18003-C are met, a first out for E-0 is also present and reactor trip entry condition is a higher priority. All EOP immediate actions must be completed prior to taking any early or non-EOP action per 10020-C.

D. Incorrect. First part incorrect. While Shutdown Margin is a concern in the event of a stuck or misaligned rod and is part of the bases for Tech Spec 3.1.4, power distribution and reactivity limits are the Tech Spec bases for this event.

Second part correct. While entry conditions for 18003-C are met, a first out for E-0 is also present and reactor trip entry condition is a higher priority. All EOP immediate actions must be completed prior to taking any early or non-EOP action per 10020-C.

REFERENCES

19000-C, E-0 Reactor Trip or Safety Injection.

18003-C, Rod Control System Malfunction.

17009-1, window E05 NIS Hi Flux High Setpoint Power Range Reactor Trip.

17010-1, window D06 for Rod Deviation.

10020-C, EOP and AOP Rules of Usage.

Tech Spec 3.1.4, Rod Group Alignment Limits

Tech Spec Bases 3.1.4, Rod Group Alignment Limits

VEGP learning objectives:

LO-LP-39205-01 Given section 3.1 of Tech Specs, be able to:

a. State the limiting conditions for operation (LCO), and

b. State any one hour or less required actions.

Figure 1: Screening for SRO-only linked to 10 CFR 55.43(b)(2) (Tech Specs)

Can question be answered *solely* by knowing ≤ 1 hour TS/TRM Action?

Yes RO question

No

Can question be answered *solely* by knowing the LCO/TRM information listed "above-the-line?"

Yes RO question

No

Can question be answered *solely* by knowing the TS Safety Limits?

Yes RO question

No

Does the question involve one or more of the following for TS, TRM, or ODCM?

Application of Required Actions (Section 3) and Surveillance Requirements (Section 4) in accordance with rules of application requirements (Section 1)

Application of generic LCO requirements (LCO 3.0.1 thru 3.0.7 and SR 4.0.1 thru

4.0.4)

Knowledge of TS bases that is required to analyze TS required actions and terminology

Yes SRO only

Answer: B

4. 003K2.02 1

Initial conditions:

- ACCW pump # 1 is running.
- ACCW pump # 2 is in standby.

Current sequence of events:

- Safety Injection occurs.
- 2 minutes later, RAT "1A" experiences a fault.
- DG1A energizes 1AA02.

- SI has NOT been reset.

Which one of the following correctly describes the status of the ACCW pumps?

	<u>ACCW Pump # 1</u>	<u>ACCW Pump # 2</u>
A.	OFF	OFF
B.	RUNNING	OFF
C.	OFF	RUNNING
D.	RUNNING	RUNNING

003K2.02 Reactor Coolant Pump System (RCPS)

Knowledge of bus power supplies to the following (CFR: 41.7):

CCW / ACCW Pumps

K/A MATCH ANALYSIS

The question presents a plausible scenario where an SI followed 2 minutes later by an LOSP of a safety related bus which is re-energized by it's respective EDG. Based on the sequence of events with the ACCW pump power supplies, the candidate must choose the correct status of the ACCW pumps.

ANSWER / DISTRACTOR ANALYSIS

- A. Correct. With an SI signal present and not reset, auto start of ACCW pumps is blocked. When the LOSP occurs on Train A, ACCW pump A (# 1) will load shed and not restart with an SI signal present. ACCW pump B (# 2) will not start due to the SI signal still present.
- B. Incorrect. With an SI signal present and not reset, auto start of ACCW pumps is blocked. When the LOSP occurs on Train A, ACCW pump A (# 1) will load shed and not restart with an SI signal present. ACCW pump B (# 2) will not start due to the SI signal still present.
- C. Incorrect. With an SI signal present and not reset, auto start of ACCW pumps is blocked. When the LOSP occurs on Train A, ACCW pump A (# 1) will load shed and not restart with an SI signal present. ACCW pump B (# 2) will not start due to the SI signal still present.
- D. Incorrect. With an SI signal present and not reset, auto start of ACCW pumps is blocked. When the LOSP occurs on Train A, ACCW pump A (# 1) will load shed and not restart with an SI signal present. ACCW pump B (# 2) will not start due to the SI signal still present.

REFERENCES

V-LO-TX-04101, Auxiliary Component Cooling Water System

2X3D-BD-L03B.cal, Auxiliary Component Cooling Water System

VEGP learning objectives:

LO-LP-60318-01 Describe how the ACCW pumps are affected by a simultaneous loss of offsite power and safety injection.

Answer: A
5. 004A2.21 1

Unit 1 is at 100% power:

- 120 gpm letdown is in service.
- Letdown Hx temperature element TE-0130 fails 5°F low.

Which one of the following correctly completes the statement below?

In response to the failure above, an inadvertent RCS ___(1)___ will occur,

and

per the annunciator response procedure, the OATC will manually ___(2)___ TV-0130 to control letdown temperature.

___(1)___

___(2)___

- | | |
|-------------|-------|
| A. boration | open |
| B. boration | close |
| C. dilution | open |
| D. dilution | close |

004A2.21 CVCS

Ability to (a) predict the impacts of the following malfunctions or operations on the CVCS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations(CFR: 41.5 / 43.5 / 45.3 / 45.7):

Excessive letdown flow, pressure, and temperatures on ion exchange resins (also causes)

K/A MATCH ANALYSIS

The question presents a plausible scenario where 1TI-130 fails 5°F low. Letdown temperature will rise. Higher temperature at demins would result in a possible boration of the RCS. Candidate must know the effect on CVCS demins and the corrective actions per the ARP.

ANSWER / DISTRACTOR ANALYSIS

A. Correct. Higher temperature at demins would result in a boration of the RCS, per

the ARP the OATC will verify TV-0130 opens to control letdown temperature.

- B. Incorrect. Higher temperature at demins would result in a boration of the RCS, per the ARP the OATC will verify TV-0130 opens to control letdown temperature. It is plausible the candidate may invert the direction the valve needs to respond to control letdown temperature.
- C. Incorrect. Higher temperature at demins would result in a boration of the RCS, per the ARP the OATC will verify TV-0130 opens to control letdown temperature. It is plausible the candidate may think the temperature of letdown lowers resulting in a dilution versus a boration.
- D. Incorrect. Higher temperature at demins would result in a boration of the RCS, per the ARP the OATC will verify TV-0130 opens to control letdown temperature. It is plausible the candidate may think the temperature of letdown lowers resulting in a dilution versus a boration. It is plausible the candidate may invert the direction the valve needs to respond to control letdown temperature.

REFERENCES

ARP 17007-1 , "Annunciator Response Procedures for ALB 07 on Panel 1A2 ON MCB"
Ver 29.0

Vogtle November 2005 SRO exam, question # 78.

V-LO-PP-53401-01 Instructor Guide page 32 of 43.

VEGP learning objectives:

V-LO-PP-09100-05, State how letdown temperature is controlled, relative to the following:

- b. Demineralizer performance.

V-LO-LP-53401-15 Describe the effect of temperature on saturated ion exchangers.

Answer: A

6. 004K3.06 1

Initial conditions:

- Unit 1 is at 90% power.
- CVCS letdown flow is 120 gpm.

- RCS boron concentration is 492 ppm.

Current conditions:

- A NEW CVCS cation bed demin is to be placed in service and is to be flushed to the Recycle Holdup Tank.
- 1HS-112A VCT HUT LETDOWN DIVERT is placed in the HUT position.
- The valve FAILS to reposition.
- The cation bed demin flush is initiated.

Based on the indications above, which one of the following will occur?

- A. RCS Tavg will rise.
- B. RCS pressure lowers.
- C. Letdown flow rises above 120 gpm.
- D. RCS lithium and cesium concentrations rise.

004K3.06 CVCS

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

**RCS temperature and pressure
(CFR 41.7 / 45.6)**

K/A MATCH ANALYSIS

The question presents a plausible scenario where a flush of a CVCS cation bed demin is to take place. The candidate has to determine from several possible choices the effect on the plant if the Letdown Divert valve to the RHUT 1LV-0112A is placed in divert and does not function properly when the flush is initiated.

ANSWER / DISTRACTOR ANALYSIS

- A. Correct. LV-112A failing to divert will cause a dilution of the RCS with an unsaturated CVCS cation demin placed in service. RCS Tavg will rise due to an increase in reactor power.
- B. Incorrect. RCS pressure would tend to rise on a power increase versus lower. RCS

pressure lowering is plausible if the candidate were to think the cation bed is borating the RCS while in service or inverts the effects.

- C. Incorrect. Letdown flow rising to greater than 120 gpm is incorrect. Per 13006-1/2, Letdown flow is lowered to 75 gpm prior to flushing the demin due to the flow capacity of the cation bed is only 75 gpm. This choice is plausible if the candidate thinks letdown flow would increase due to placing the cation bed in service.
- D. Incorrect. Lithium and cesium concentrations would actually lower with the CVCS cation bed placed in service.

REFERENCES

13006-1, "Chemical Volume Control System", section 4.3.5 for "Operating the Cation Bed Demineralizer"

13006-1, "Chemical Volume Control System", section 4.3.10 for "Cation Demineralizer Flush"

Callaway 2005 RO NRC Exam question # 5 used as a base.

VEGP learning objectives:

LO-LP-09100-06 State the purpose of each of the following letdown system components.

b. cation bed demineralizer

Answer: A

7. 005A1.03 1

Which one of the following correctly completes the following statements?

The RHR system is being placed in service for a plant startup, the OATC has started TWO CCW pumps and will verify CCW flow stabilizes at ___(1)___.

The limit for placing the CCW system in service to the RHR Pump Seal Coolers is ___(2)___ RHR system temperature.

- | | |
|---------------|-----------|
| ___(1)___ | ___(2)___ |
| A. ~ 5500 gpm | 150°F |
| B. ~ 5500 gpm | 225°F |

C. ~ 9000 gpm 150°F

D. ~ 9000 gpm 225°F

005A1.03 Residual Heat Removal System

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

**Closed cooling water flow rate and temperature
(CFR: 41.5 / 45.5)**

K/A MATCH ANALYSIS

The question presents a plausible scenario where RHR is being placed in service for a plant startup. The candidate must recognize the proper CCW flow rate for adequate cooling of the RHR system and the RCS / RHR temperature at which CCW cooling to the RHR pump seal coolers must be in service.

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. First half is incorrect and should be ~ 9000 gpm. 5500 gallons is plausible as this is the flow rate for single pump operations.

2nd half is correct temperature where CCW to RHR pump seals is required to be in service.

B. Incorrect. First half is incorrect and should be ~ 9000 gpm. 5500 gallons is plausible as this is the flow rate for single pump operations.

Second half is incorrect and should be 150°F. 225°F is plausible due to being the temperature where the 2nd RHR train should be placed in service.

C. Correct. First half is correct flow of ~ 9000 gpm.

2nd half is correct temperature where CCW to RHR pump seals is required to be in service.

D. Incorrect. First half is correct flow of ~ 9000 gpm.

Second half is incorrect and should be 150°F. 225°F is plausible due to being the temperature where the 2nd RHR train should be placed in

service.

REFERENCES

13011-1, "Residual Heat Removal System", Prerequisites or Initial Conditions 3.3

13011-1, "Residual Heat Removal System", step 4.3.2

13715A-1, "Component Cooling Water System Train A", step 4.1.2.7.

VEGP learning objectives

LO-PP-12101-02 State the sources for.

RHR pump motor cooler
Pump motor cooling
Pump seal cooling

LO-PP-101-01 From memory, state the following for the CCW system:

- a. Heat loads
- b. Where heat is rejected to
- c. System configuration for single pump operations

Answer: C

8. 006G2.2.4 1

Which one of the following correctly completes the following statement?

The High Head Safety Injection flow path for ___(1)___ physically flows through the Boron Injection Tank (BIT)

and

the main control boards (QMCBs) have a BIT flow indicator on ___(2)___ .

___(1)___

___(2)___

- | | |
|-----------|-------------|
| A. unit 1 | each unit |
| B. unit 1 | unit 1 only |
| C. unit 2 | each unit |
| D. unit 2 | unit 2 only |

006G2.2.4 ECCS

(multi-unit license) Ability to explain the variations in control board/control room layouts, systems, instrumentation, and procedural actions between units at a facility.

(CFR: 41.6 / 41.7 / 41.10 / 45.13)

K/A MATCH ANALYSIS

The question asks about the Unit difference between the HHSI system (ECCS) BIT flow paths. The candidate must determine the correct description of the flow paths and proper QMCB indication.

ANSWER / DISTRACTOR ANALYSIS

- A. Correct. First half is correct, Unit 1 flows through BIT, Unit 2 does not.
Second half is correct, both units have a BIT flow indicator on QMCB.
- B. Incorrect. First half is correct, Unit 1 flows through BIT, Unit 2 does not.
Second half is incorrect, both units have a BIT flow indicator on QMCB.
- C. Incorrect. First half is incorrect, Unit 1 flows through BIT, Unit 2 does not.
Second half is correct, both units have a BIT flow indicator on QMCB.
- D. Incorrect. First half is incorrect, Unit 1 flows through BIT, Unit 2 does not.
Second half is incorrect, both units have a BIT flow indicator on QMCB.

REFERENCES

V-LO-PP-61300, Unit Differences

022G2.2.04 Vogtle HL-15R RO Audit Exam question # 24

VEGP learning objectives:

LO-LP-61300-03, Given a design or operational difference, be able to describe why it exists and the impact on the plant and its operation.

Answer: A
9. 007A2.06 1

Initial conditions:

- Unit 1 is solid plant.
- PRZR bubble is being drawn per 12001-C, "Unit Heatup to Hot Shutdown".

Current conditions:

- The following alarm illuminates:

ALB12-E03, PRZR REL TANK HI TEMP

Which one of the following correctly completes the statement below?

During these conditions, this alarm will be ___(1)___,

and

per 13004-1, "Pressurizer Relief Tank Operation", the FASTEST way to cooldown the PRT is using ___(2)___.

A. (1) expected

(2) spray from RMWST and drain to the RCDT

B. (1) expected

(2) recirculation through the RCDT heat exchanger

C. (1) unexpected

(2) spray from RMWST and drain to the RCDT

D. (1) unexpected

(2) recirculation through the RCDT heat exchanger

007A2.06 PRT System

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

malfunctions or operations:

Bubble formation in PZR

K/A MATCH ANALYSIS

The question presents a plausible scenario where a PRZR bubble is being drawn in accordance with UOP-12001-C, "Unit Heatup to Hot Shutdown". The candidate should be able to predict if the PRZR REL TANK HI TEMP alarm is expected (NOT). The candidate must also choose per SOP-13004, "Pressurizer Relief Tank Operation" the fastest method to cool down the PRT.

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. First half is incorrect, this alarm should not come in from drawing a bubble in the PRZR.

Second half is correct, spray and drain method takes one hour.

B. Incorrect. First half is incorrect, this alarm should not come in from drawing a bubble in the PRZR.

Second half is incorrect, RCDT Hx (recirc) takes 8 hours.

C. Correct. First half is correct, this alarm is not expected.

Second half is correct, spray and drain method takes one hour.

D. Incorrect. First half is correct, this alarm is not expected.

Second half is incorrect, RCDT Hx (recirc) takes 8 hours.

REFERENCES

SOP-13004-1, "Pressurizer Relief Tank Operation" section 4.4.3 for "PRT Cooldown Using Spray and Drain (One Hour Cooldown)"

SOP-13004-1, "Pressurizer Relief Tank Operation" section 4.4.4 for "PRT Cooldown Using the RCDT Heat Exchanger (Eight Hour Cooldown)"

V-LO-TX-16001, Primary Systems pages 45 and 46.

VEGP learning objectives:

LO-PP-16301-01 List the sources of input into the PRT.

LO-PP-16301-09 Describe the methods of cooling the PRT.

Answer: C

10. 007EG2.4.2 1

Given the following:

- Unit 1 is at 8.5% power, plant startup in progress.
- A Reactor trip occurs.
- The crew is stabilizing the plant per 19001-C, "ES-0.1, Reactor Trip Response".

Which one of the following initiated the Reactor trip?

- A. Pressurizer Pressure - Low
- B. Pressurizer Pressure - High
- C. Pressurizer Water Level - High
- D. Safety Injection Pressurizer Pressure - Low

007EG2.4.2 Reactor trip/ stabilization/ recovery

Knowledge of system set points, interlock and automatic actions associated with EOP entry conditions (CFR: 41.7 / 45.7 / 45.8)

K/A MATCH ANALYSIS

The question presents a plausible scenario where the candidate must determine from plant conditions, which condition will trip the reactor with the crew performing the actions of 19001-C, "ES-0.1, Reactor Trip Response" to stabilize the plant.

ANSWER / DISTRACTOR ANALYSIS

- A. Incorrect. Pressurizer Pressure - Low Reactor Trip is only applicable with power above the P-7 setpoint (2/4 Power Range NI channels at 10% or 1/2 Turbine Impulse pressure channels at 10%).
- B. Correct. High Pressurizer Pressure Reactor trip is applicable at all times, even with

power below the P-7 setpoint. This is the only trip of those listed that could result in a reactor trip and have the crew stabilize in ES-0.1.

C. Incorrect. Pressurizer High Level Reactor Trip is only applicable with power above the P-7 setpoint (2/4 Power Range NI channels at 10% or 1/2 Turbine Impulse pressure channels at 10%).

D. Incorrect. While Pressurizer Pressure SI will cause a Reactor trip while below P-7, this did not cause the trip in this circumstance as the crew would be performing the actions of E-0 if an SI had occurred. This is a very plausible distractor as this is usually the answer to this question throughout the industry.

REFERENCES

17009-1 "Annunciator Response for ALB09 Panel 1C1 on MCB-Window A04

Functional Diagrams 1X6AA02-00228, 00229, and 00230

Tech Spec LCO 3.3.1, FU 8a, 8b, and 9 and Bases

Tech Spec LCO 3.3.2, FU 1d and Bases

G2.4.2, Vogtle 2011 RO NRC exam

VEGP learning objectives:

LO-PP-28103-02 List all permissives with applicable set points, coincidences and functions.

LO-PP-28103-02 List all reactor trip set points, coincidences, permissives and blocks.

Answer: B

11. 008A3.08 1

Initial conditions:

- CCW pumps # 1 and # 5 are running.
- All other CCW pumps are in standby.

Current conditions:

- Safety Injection occurs.

Which one of the following will be the correct status of the CCW pumps?

Train A

Train B

- | | |
|-------------------------|----------------------|
| A. only 2 pumps running | only 2 pumps running |
| B. only 2 pumps running | all 3 pumps running |
| C. all 3 pumps running | only 2 pumps running |
| D. all 3 pumps running | all 3 pumps running |

008A3.08 CCW / ACCW

Ability to monitor automatic operation of the CCW/ACCW including:

**Automatic actions associated with the CCW/ACCW that occur as a result of a safety injection signal.
(CFR: 41.7 / 45.5)**

K/A MATCH ANALYSIS

The question presents a plausible scenario where CCW pumps # 1 and # 5 (Train A) are running with CCW Train B in standby alignment. The candidate must realize from the given plant conditions which train and pumps are in service. This is a normal plant alignment with 2 pumps running on one train and the other train in standby. With an SI signal, the candidate must choose the correct pump status following the SI signal. The Train B pumps will be in proper alignment after load sequence.

ANSWER / DISTRACTOR ANALYSIS

- A. Incorrect. Train A CCW will end up with pumps # 1, # 3, and # 5 running after an SI signal is received.
CCW Train B will have 2 pumps running, this part is correct.
- B. Incorrect. Train A CCW will end up with pumps # 1, # 3, and # 5 running after an SI signal is received.
CCW Train B will have 2 pumps running, this part is incorrect too.
- C. Correct. Train A CCW will end up with pumps # 1, # 3, and # 5 running after an SI signal is received.

CCW Train B will have 2 pumps running, this part is correct.

D. Incorrect. Train A CCW will end up with pumps # 1, # 3, and # 5 running after an SI signal is received.

CCW Train B will have 2 pumps running, this part is incorrect.

REFERENCES

Vogtle Text Chapter 10, Component Cooling Water System

1X3D-BD-L01A, B, C, D, E, F elementaries for CCW pumps 1, 2, 3, 4, 5, 6

VEGP learning objectives:

LO-PP-10101-04 From memory, describe the expected system response and operator actions for each of the following:

- a. SI
- b. LOSP
- c. SI with LOSP
- d. Surge Tank Low Level
- e. Low header pressure
- f. Pump shaft shear/locked rotor
- g. Three pumps running

Answer: C

12. 008AG2.1.19 1

Initial conditions:

- Unit 1 is at 100% power, all systems normal.
- PRZR RELIEF DISCH HI TEMP illuminates.
- PRZR PRESS LO PORV BLOCK illuminates.
- All PRZR Relief temperatures are rising.

- PORV A has been placed in the closed position.
- PORV A indicates half red / hollow and half green / solid on the IPC computer point.

- PRZR pressure cycling between 2185 psig to 2200 psig.

Current conditions:

- PORV A Block Valve has been closed.

- PRZR pressure is 2208 psig and slowing rising.
- All PRZR Relief temperatures have stabilized and begun to lower.

Which one of the following correctly completes the following statement?

Per Tech Spec 3.4.11, "Pressurizer Power Operated Relief Valves (PORVs)", PORV A Block Valve will ___(1)___

and

assuming the PORV status does NOT change, the plant ___(2)___.

REFERENCE PROVIDED

- A. (1) remain energized
(2) can remain at power indefinitely
- B. (1) remain energized
(2) is required to be placed in Mode 4
- C. (1) have power removed
(2) can remain at power indefinitely
- D. (1) have power removed
(2) is required to be placed in Mode 4

008AG2.1.19 Pressurizer Vapor Space Accident (Relief Valve Stuck Open)

Ability to use plant computers to evaluate system and component status. (CFR 41.10 / 45.12)

K/A MATCH ANALYSIS

The question presents a plausible scenario where a pressurizer PORV sticks partially open and the candidate must use computer indication and other plant parameters to determine the problem. The candidate must determine required Tech Spec actions for the stuck PORV.

SRO 10CFR55.43 (b)(2)(Tech Specs)

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. First part is incorrect. Per Condition B, HV-8000A must be de-energized within one hour since the PORV is incapable of being cycled. It is plausible that it remain energized as that is the action for a PORV that is capable of being manually cycled (Condition A).

Second part is incorrect. Per Condition B, HV-8000A must be closed and de-energized within one hour since the PORV is incapable of being cycled. The plant will have to be placed in Mode 4 per actions of Conditions B and D is the PORV is not restored in the specified time.

B. Incorrect. First part is incorrect. Per Condition B, HV-8000A must be de-energized within one hour since the PORV is incapable of being cycled. It is plausible that it remain energized as that is the action for a PORV that is capable of being manually cycled (Condition A).

Second part is correct. Per Condition B, HV-8000A must be closed and de-energized within one hour since the PORV is incapable of being cycled. The plant will have to be placed in Mode 4 per actions of Conditions B and D is the PORV is not restored in the specified time.

C. Incorrect. First part is correct. Per Condition B, HV-8000A must be closed and de-energized within one hour since the PORV is incapable of being cycled.

Second part is incorrect. Per Condition B, HV-8000A must be closed and de-energized within one hour since the PORV is incapable of being cycled. The plant will have to be placed in Mode 4 per actions of Conditions B and D is the PORV is not restored in the specified time.

D. Correct. First part is correct. Per Condition B, HV-8000A must be closed and de-energized within one hour since the PORV is incapable of being cycled.

Second part is correct. Per Condition B, HV-8000A must be closed and de-energized within one hour since the PORV is incapable of being cycled. The plant will have to be placed in Mode 4 per actions of Conditions B and D is the PORV is not restored in the specified time.

REFERENCES

Technical Specification 3.4.11, Pressurizer Power Operated Relief Valves (PORVs), Conditions A, B, and D (Frozen Reference Version)

13505-1, "Integrated Plant Computer", Revision 19.1, page # 28.

REFERENCE TO BE PROVIDED TO THE CANDIDATES: Tech Spec 3.4 Reactor Coolant System (RCS), 3.4.11 Pressurizer Power Operated Relief Valves (PORVs)

VEGP learning objectives:

LO-LP-39208-03 Given a set of Tech Specs and the bases, determine for a specific set of plant conditions, equipment availability, and operational mode.

- a. Whether any Tech Spec LCOs of section 3.4 are exceeded.
- b. The required actions for all section 3.4 LCOs.

LO-LP-05210-03, Describe the color convention used for information and display symbols on the IPC.

Figure 1: Screening for SRO-only linked to 10 CFR 55.43(b)(2) (Tech Specs)

Can question be answered *solely* by knowing \leq 1 hour TS/TRM Action?

Yes RO question

No

Can question be answered *solely* by knowing the LCO/TRM information listed "above-the-line?"

Yes RO question

No

Can question be answered *solely* by knowing the TS Safety Limits?

Yes RO question

No

Does the question involve one or more of the following for TS, TRM, or ODCM?

Application of Required Actions (Section 3) and Surveillance Requirements (Section 4) in accordance with rules of application requirements (Section 1)

Application of generic LCO requirements (LCO 3.0.1 thru 3.0.7 and SR 4.0.1 thru 4.0.4)

Knowledge of TS bases that is required to analyze TS required actions and terminology

Yes SRO only

Answer: D

13. 008AK3.04 1

Initial conditions:

- Pressurizer Code Safety Temperature Indicator, TI-0466, is rising.
- PRT level, temperature, and pressure are rising.

Current conditions:

- Reactor trip and SI have occurred.
- RCS pressure is 1330 psig and lowering.
- No CCPs are running or available.
- SIP B is running, SIP A is tripped.
- The crew is performing 19010-C, "E-1, Loss of Reactor or Secondary Coolant" and are at the step for checking SI Termination Criteria.

Which one of the following is the required action to take at this time and the reason?

- A. Leave RCPs running, at least one CCP running is required.
- B. Leave RCPs running, RCP Trip Criteria do NOT apply at this time.
- C. Trip the RCPs, to prevent excessive depletion of RCS inventory.
- D. Trip the RCPs, to reduce concerns for pressurized thermal shock.

008AK3.04 Pressurizer Vapor Space Accident (Relief Valve Stuck Open)

Knowledge of the reasons for the following responses as they apply to the Pressurizer Vapor Space Accident (CFR 41.10 / 41.5 / 45.6 / 45.13):

RCP tripping requirements

K/A MATCH ANALYSIS

The question presents a plausible scenario where a LOCA to the PRT has occurred. The candidate must determine with given conditions if RCP Trip Criteria apply and the reason they do or do not apply.

ANSWER / DISTRACTOR ANALYSIS

- A. Incorrect. Per Foldout page of 19010-C, at least one CCP or SI pump should be running to allow RCPs to be tripped. This condition is met in the stem and the RCPs should be tripped.
- B. Incorrect. Per Foldout page of 19010-C, RCP Trip Criteria apply throughout the entire procedure. It is plausible since step # 4 of 19010-C is a check step for RCP Trip Criteria, the candidate may think the RCP Trip Criteria do not apply throughout the entire procedure.
- C. Correct. RCPs should be tripped as trip criteria are met and this is the basis for the Trip Criteria per the WOG Background Documents. The RCP Trip Criteria is a WOG Generic Issue.
- D. Incorrect. It is plausible the candidate may think that PTS could be a concern during an obvious small break LOCA event and stopping the RCPs could be a way to limit RCS pressure.

REFERENCES

Vogtle 2011 RO NRC Exam question # 15 (011EA1.03 002)
Westinghouse Owner Group (WOG), Generic Issues for RCP Trip Criteria
19010-C, E-1 Loss of Reactor Or Secondary Coolant Foldout Page and step 4.

VEGP learning objectives:

LO-LP-37111-06 State the RCP trip criteria. Tell why it is especially important in the case of a small break LOCA.

Answer: C

14. 010K5.02 1

Current conditions:

- RCS pressure is 2235 psig.
- PRT pressure is 40 psig.
- PRZR Safety Valve C is leaking by to the PRT.

Which one of the following correctly completes the following statement?

The approximate tailpipe temperature of the safety valve will be _____ °F

and

this is known as a constant _____ process.

	<u>Tailpipe Temp</u>	<u>Process</u>
A.	652	entropy
B.	652	enthalpy
C.	287	entropy
D.	287	enthalpy

010K5.02 Przr Pressure Control

Knowledge of the operational implications of the following concepts as they apply to PZR PCS (CFR 41.7 / 45.7):

Constant enthalpy expansion through a valve

K/A MATCH ANALYSIS

The question presents a plausible scenario where a PRZR Safety valve is leaking by to the PRT. The candidate must determine the tailpipe temperature and whether this is a constant enthalpy or entropy expansion of fluid through the valve.

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. 652°F is incorrect but plausible if the candidate forgets the lessons learned from TMI regarding throttling processes. This is saturation temperature in the PRZR for 2235 psig.

The process is isenthalpic (constant enthalpy) not isentropic (constant entropy) but plausible the candidate could confuse the process.

B. Incorrect. 652°F is incorrect but plausible if the candidate forgets the lessons learned from TMI regarding throttling processes. This is saturation

temperature in the PRZR for 2235 psig.

The process is isenthalpic (constant enthalpy) and this part is correct.

C. Incorrect. 287°F is the correct temperature.

The process is isenthalpic (constant enthalpy) not isentropic (constant entropy) but plausible the candidate could confuse the process.

D. Correct. 287°F is the correct temperature.

The process is isenthalpic (constant enthalpy) and this part is correct.

REFERENCES

Steam Tables and Mollier Diagram

V-LO-LP-34300-01, PWR Thermodynamics / Thermodynamic Processes pages 53, 54.

NOTE: Steam Tables are to be provided to the candidates for a REFERENCE.

VEGP learning objectives:

LO-LP-34200-08 Apply saturated and superheated steam tables in solving liquid-vapor problems.

Answer: D

15. 010K6.03 1

Initial conditions:

- Unit 1 is operating at 100% steady state power.
- All control systems in AUTOMATIC.

Current conditions:

- Pressurizer Master Pressure Controller (1PIC-455) output fails to 0%.

What effect will this have on PRZR Backup (B/U) heaters and spray valves over the next few minutes?

	<u>B/U Heaters</u>	<u>Spray Valves</u>
A.	energize	remain shut
B.	energize	open

- | | | |
|----|------------|-------------|
| C. | remain off | remain shut |
| D. | remain off | open |

010K6.03 Przr Pressure Control

Knowledge of the effect of a loss or malfunction on the following will have on PZR PCS (CFR 41.7 / 45.7):

PZR sprays and heaters

K/A MATCH ANALYSIS

The question presents a plausible scenario where PRZR Master Pressure Controller fails low. This failure effectively is a loss that affects the response of the PZR heaters and spray. The candidate has to recognize the correct system responses for the PRZR Pressure Control System.

ANSWER / DISTRACTOR ANALYSIS

- A. Correct. The first half is correct, with PRZR Master Controller output at 0%, the PRZR B/U heaters should energize and the PRZR Spray Valves should go fully closed.
- B. Incorrect. The first half is correct, with PRZR Master Controller output at 0%, the PRZR B/U heaters should energize and the PRZR Spray Valves should go fully closed.
- C. Incorrect. The first half is incorrect, this is an inverse response for failure of the PRZR Master Controller to 0% but is plausible the candidate could invert the system response. The spray valves should go fully closed with the conditions stated in the stem.
- D. Incorrect. The first half is incorrect, this is an inverse response for failure of the PRZR Master Controller to 0% but is plausible the candidate could invert the system response. The spray valves should go fully closed with the conditions stated in the stem.

REFERENCES

Salem 2005 RO NRC Exam question # 40
Seabrook 2004 RO NRC Exam question # 36
18000-C, Pressurizer Spray, Safety, or Relief Valve Malfunction, page # 3 and page # 5 Figure 1 for Pressurizer Pressure Controller Bank

VEGP learning objectives:

LO-PP-16301-02 Describe the purpose of the following pressurizer components or auxiliaries.

- a. Variable Heaters
- b. Backup Heaters
- c. Spray Valves

LO-PP-16303-01 Describe the response of the pressurizer pressure control system to variations in pressurizer pressure / level.

Answer: A
16. 011K2.01 1

Initial conditions:

- Unit 1 is at 4% power, all systems in normal alignment.

Current conditions:

- RAT "1B" switcher trips open.
- DG1B re-energizes 1BA03.
- The Reactor remains at 4% power.

Based on the above conditions, which one of the following is correct regarding the current charging pump status?

	<u>NCP</u>	<u>CCP "B"</u>
A.	running	running
B.	running	stopped
C.	stopped	running
D.	stopped	stopped

011K2.01 Przr Level control

Knowledge of bus power supplies to the following (CFR 41.7):

Charging Pumps

K/A MATCH ANALYSIS

The question presents a plausible low power scenario where an LOSP occurs. The candidate must know how the results of the LOSP on the charging pump status.

ANSWER / DISTRACTOR ANALYSIS

A. Correct. The NCP will remain running since 1NA05 is powered from RAT 1A. This bus will not lose power and affect the NCP status.

CCP "B" will start on the load sequence when DG1B re-energizes 1BA03. Both the NCP and CCP "B" will be running in this scenario.

B. Incorrect. The NCP will remain running since 1NA05 is powered from RAT 1A. This bus will not lose power and affect the NCP status.

CCP "B" will start on the LOSP load sequence. It is plausible the candidate may be confused with the plant electrical alignment at low power or invert the power supplies to the CCP. Both the NCP and CCP "B" will be running in this scenario.

C. Incorrect. The NCP will remain running since 1NA05 is powered from RAT 1A. It is plausible the candidate may not realize 1NA05 is unaffected and think RAT 1B is the power source to 1NA05.

CCP "B" will start on the load sequence when DG1B re-energizes 1BA03. Both the NCP and CCP "B" will be running in this scenario.

D. Incorrect. The NCP will remain running since 1NA05 is powered from RAT 1A. It is plausible the candidate may not realize 1NA05 is unaffected and think RAT 1B is the power source to 1NA05.

CCP "B" will start on the load sequence when DG1B re-energizes 1BA03. Both the NCP and CCP "B" will be running in this scenario.

REFERENCES

Vogtle 2007 RO NRC Exam question # 15

LO-PP-09200, "CVCS Charging" slides # 22 and # 23

Simplified Electrical Drawing from LO-PP-01101, Electrical Distribution slide # 20

Elementary diagram 1X3D-BD-C01B for CCP B.

VEGP learning objectives:

LO-PP-09200-02 State the power supply for the charging pumps.

Answer: A

17. 012G2.2.40 1

Given the following conditions:

- Unit 1 is at 100% power.
- Time is 1600 on 05-01-2012.

- The 12 hour Channel Check for RCS Loop Flow 1FI-425 was discovered missed.
- The last performance of the 12 hour Channel Check was 0015 on 05-01-2012.

Which one of the following completes the following statement?

To delay the declaring of the LCO being NOT met, the surveillance must be performed at the first reasonable opportunity NO later than _____ .

- A. 1700 on 05-01-2012
- B. 0015 on 05-02-2012
- C. 0400 on 05-02-2012
- D. 1600 on 05-02-2012

012G2.2.40 Reactor Protection System

**Ability to apply Tech Specs for a system.
(CFR 41.10 / 43.2 / 43.5 / 45.3)**

K/A MATCH ANALYSIS

The RCS Flow non-nuclear instrument is a Tech Spec Required transmitter with Tech Spec surveillances required at the specified frequency to maintain operability. The instrument provides input into the RCS. This question presents a situation where a

required surveillance was discovered "missed" for greater than the frequency and beyond the 1.25 times the frequency (grace period). Applying Tech Specs properly for this non-nuclear instrumentation at an SRO only knowledge level is required to answer this question.

SRO 10CFR55.43 (b)(2) due to application of required Tech Spec actions

ANSWER / DISTRACTOR ANALYSIS

- A. Incorrect. One hour from time of discovery. See time line below.
- B. Incorrect. 24 hours from time last performed. See time line below.
- C. Incorrect. 12 hours from time of discovery. See time line below.
- D. Correct. 24 hours from time of discovery (longest time allowed per SR 3.0.3).

0015 on 05-01-2012 - Last performed
1600 on 05-01-2012 - Discovered
1700 on 05-01-2012 - 1 hour from time of discovery.
0015 on 05-02-2012 - 24 hours from time last performed.
0400 on 05-02-2012 - 12 hours from discovery
1600 on 05-02-2012 - 24 hours after discovery (longest allowed per SR 3.0.3)

REFERENCES

Tech Spec 3.3.1 Reactor Trip System (RTS) Instrumentation.

SR 3.0.3

OSP-14000-1, Operations Shift and Daily Surveillance Logs.

VEGP learning objectives:

LO-LP-39202-04 State the allowable time intervals for extension of surveillances.
State the result of failure to perform surveillances within this period.

Figure 1: Screening for SRO-only linked to 10 CFR 55.43(b)(2) (Tech Specs)

Can question be answered *solely* by knowing \leq 1 hour TS/TRM Action?

Yes RO question

No

Can question be answered *solely* by knowing the LCO/TRM information listed “above-the-line?”

Yes RO question

No

Can question be answered *solely* by knowing the TS Safety Limits?

Yes RO question

No

Does the question involve one or more of the following for TS, TRM, or ODCM?

Application of Required Actions (Section 3) and Surveillance Requirements (Section 4) in accordance with rules of application requirements (Section 1)

Application of generic LCO requirements (LCO 3.0.1 thru 3.0.7 and SR 4.0.1 thru 4.0.4)

Knowledge of TS bases that is required to analyze TS required actions and terminology

Yes SRO only

Answer: D
18. 012K1.06 1

Which one of the following correctly states the MINIMUM coincidences for the Low Fluid Oil Pressure and Turbine Stop Valve Closure that will result in a Reactor Trip from Turbine Trip?

	<u>Low Fluid Oil Pressure < 580 psig</u>	<u>Turbine Stop Valve Closure < 96.7% open</u>
A.	2 of 3	3 of 4
B.	2 of 3	4 of 4
C.	2 of 4	3 of 4
D.	2 of 4	4 of 4

012K1.06 Reactor Protection

Knowledge of the physical connections and/or cause-effect relationships between RPS and the following systems (CFR 41.2 to 41.9 / 45.7 to 45.8):

Turbine – Generator

K/A MATCH ANALYSIS

The question asks about the cause-effect relationship between RPS and the TG by checking knowledge of the coincidence for the reactor trip from turbine trip on low fluid oil pressure and turbine stop valve closure.

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. First half is correct for low fluid oil pressure.
(2 of 3 < 580 psig is the correct setpoint)

Second half for turbine stop valve closure is wrong.
(4 of 4 < 96.7% is the correct setpoint, not 3 of 4)
Plausible the candidate may think 3 of 4 since a lot of the coincidences in the plant use 2 of 3, 2 of 4, etc.

B. Correct. First half is correct for low fluid oil pressure.
(2 of 3 < 580 psig is the correct setpoint)

Second half for turbine stop valve closure is correct.
(4 of 4 < 96.7% is the correct setpoint)

C. Incorrect. First half is wrong for low fluid oil pressure.
(2 of 3 < 580 psig is the correct setpoint, not 3 of 4)
Plausible the candidate could think 3 of 4 since there are 4 stop valves.

Second half for turbine stop valve closure is wrong.
(4 of 4 < 96.7% is the correct setpoint, not 3 of 4)
Plausible the candidate may think 3 of 4 since a lot of the coincidences in the plant use 2 of 3, 2 of 4, etc.

D. Incorrect. First half is wrong for low fluid oil pressure.
(2 of 3 < 580 psig is the correct setpoint, not 3 of 4)
Plausible the candidate could think 3 of 4 since there are 4 stop valves.

Second half for turbine stop valve closure is correct.
(4 of 4 < 96.7% is the correct setpoint)

REFERENCES

Technical Specification 3.3.1, Reactor Trip Instrumentation, FU 14a and 14b Nominal Trip Setpoints.

Technical Specification Bases for 3.3.1, Reactor Trip Instrumentation, FU 14a and 14b for coincidences.

VEGP learning objectives:

LO-LP-28103-03 List all reactor trip set points, coincidences, permissives, and blocks.

Answer: B

19. 012K4.09 1

A short circuit occurs in the CONTROL section of the Pressurizer Master Pressure Controller (PIC-455).

Based on the above conditions, the pressurizer PROTECTION circuit will _____,

- A. be affected, causing the associated channel to trip.
- B. NOT be affected, due to the use of isolation devices.
- C. NOT be affected, due to the use of auctioneering devices.
- D. be affected, preventing the associated channel from tripping.

012K4.09 Reactor Protection

Knowledge of RPS design feature(s) and/or interlock(s) which provide for the following (CFR 41.7):

Separation of control and protection circuits

K/A MATCH ANALYSIS

The question presents a plausible scenario where a short circuit occurs in the control section of the Pressurizer Master Controller circuit. The candidate must determine if the

protection circuit is affected and either the result or why not affected.

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. Isolation devices would prevent the protection circuit from being affected.

B. Correct. Isolation devices would prevent the protection circuit from being affected.

C. Incorrect. Isolation devices would prevent the protection circuit from being affected, not the use of auctioneering devices..

D. Incorrect. Isolation devices would prevent the protection circuit from being affected.

REFERENCES

Watts Bar 2004 RO NRC Exam question # 36

Watts Bar May 2009 RO NRC Exam question # 58

Vogtle 2010 RO Audit question # 21

V-LO-TX-28101, Reactor Protection System, page # 4

VEGP learning objectives:

LO-PP-28102-03 Describe how a signal is processed through RPS. Include the progression of the signal from the field detector to protection and control circuits.

LO active bank V-LO-PP-28101-03 originally from PI 2005 NRC

REPLACE WITH 016K5.01 #21 ON VOGTLE 2010 AUDIT.

Answer: B

20. 013A4.01 1

Initial Conditions:

- Unit 2 is at 6% power.

- Feedwater control has just been transferred from AFW to the Bypass Feed Regulation Valves.

- All AFW pumps have just been aligned to standby readiness.

Current conditions:

- Steam Generator # 3 level indications as follows:

Ch I	Ch II	Ch III	Ch IV
82.4%	81.4%	81.7%	84.2%

- Both MFPT TRIP annunciators illuminate.

- No AFW pumps are currently running.

Based on the current conditions, which one of the following correctly completes the following statement?

The AFW system status is ...

- A. expected, no AFW actuation setpoint has been exceeded.
- B. expected, the AFW actuation signal is blocked per procedure.
- C. NOT expected, BOTH MDAFW pumps should have started only.
- D. NOT expected, BOTH MDAFW pumps and the TDAFW pump should have started.

013A4.01 ESFAS

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

ESFAS-initiated equipment which fails to actuate.

K/A MATCH ANALYSIS

The question presents a plausible scenario where feedwater has been swapped to the BFRVs and the AFW system has been placed in standby readiness. The candidate has to determine that the MDAFW pumps should have started on a Trip of Both MFPT's due to a P-14 signal.

ANSWER / DISTRACTOR ANALYSIS

- A. Incorrect. 2 / 4 SG levels > 82% causes a full FWI and trips both MFPTs. Both MFPTs tripping results in an AFW actuation signal. Both MDAFW pumps will be running. The TDAFW pump does NOT get an actuation signal from trip of both MFPTs.

B. Incorrect. 2 / 4 SG levels > 82% causes a full FWI and trips both MFPTs. Both MFPTs tripping results in an AFW actuation signal. Both MDAFW pumps will be running. The TDAFW pump does NOT get an actuation signal from trip of both MFPTs. It is plausible the candidate may think the AFW actuation will be blocked at this point in plant operations, however, this is reinstated prior to swapping over to the BFRVs and shutting down AFW. Both MDAFW pumps will start.

C. Correct. Trip of both MFPTs on P-14 is an MDAFW actuation signal

D. Incorrect. Both MDAFW pumps will start on trip of both MFPTs, the TDAFW pump

will not start as trip of both MFPTs is NOT a TDAFW actuation signal.

REFERENCES

12004-C, Power Operation (Mode 1)

17013-2, Annunciator window E04

V-LO-PP-28103, Reactor Trip and ESFAS Signals, slide # 58 and 59 for P-14

V-LO-PP-20101, Auxiliary Feedwater System

1X6AA02-00237 Functional Diagram for FW Control and Isolation

1X6AA02-00231 Functional Diagram Steam Generator Trip Signals

VEGP learning objectives:

LO-PP-20101-04 List the AFW system automatic start signals and component actuations.

LO-PP-28103-02 List all permissives with applicable set points, coincidences, and functions.

LO-PP-28103-05 List all ESF actuation signals with applicable set points, coincidences, permissives, blocks, and discuss the systems response to each ESF actuation signal.

Answer: C

21. 015A2.05 1

An event is in progress resulting in void formation in the core.

At the onset of core void formation, SR NI response will initially ___(1)___ as void fraction rises

and

per 19263-C, "FR-I.3 Response to Voids in Reactor Vessel" the FIRST action the SS will direct will be to attempt to ___(2)___ .

A. (1) rises

(2) pressurize the RCS to collapse the voids

B. (1) rises

(2) start a Reactor Coolant Pump (RCP) to sweep the voids from the core

C. (1) lower

(2) pressurize the RCS to collapse the voids

D. (1) lower

(2) start a Reactor Coolant Pump (RCP) to sweep the voids from the core

015A2.05 Nuclear Instrumentation System

Ability to (a) predict the impacts of the following malfunctions or operations on the NIS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations (CFR 41.5, 43.5, 45.5):

Core void formation

K/A MATCH ANALYSIS

The question presents a plausible scenario where a reactor vessel void is occurring. The candidate must determine / predict the NIs response at the onset of voiding.

In addition, the candidate must determine per 19263-C, the first action the SRO will take to mitigate the event.

SRO 10CFR55.43 (b) (5) based on assessing plant conditions (normal, abnormal, or emergency) and then selecting a procedure or section of a procedure to mitigate, recover, or with which to proceed.

ANSWER / DISTRACTOR ANALYSIS

- A. Correct. First part correct. At the onset of core voiding, vessel void fraction will be low resulting in an increasing SR NI count rate.
Second part correct. The first action the SS will direct will be to pressurize the RCS in an attempt to collapse the core voids.
- B. Incorrect. First part correct. At the onset of core voiding, vessel void fraction will be low resulting in an increasing SR NI count rate.
Second part incorrect. Per 19263-C, the first action the SS will take will be to pressurize the RCS in an attempt to condense the core voids, if this is unsuccessful, the SS will then attempt to start an RCP.
- C. Incorrect. First part incorrect. At the onset of core voiding, vessel void fraction will be low resulting in an increasing SR NI count rate, not lowering.
Second part correct. The first action the SS will direct will be to pressurize the RCS in an attempt to condense the core voids.
- D. Incorrect. First part incorrect. At the onset of core voiding, vessel void fraction will be low resulting in an increasing SR NI count rate, not lowering.
Second part incorrect. Per 19263-C, the first action the SS will take will be to pressurize the RCS in an attempt to collapse the core voids, if this is unsuccessful, the SS will then attempt to start an RCP.

REFERENCES

19263-C, "FR-I.3 Response to Voids in Reactor Vessel", version 20.1.

WOG EOP Background document- Generic issue-RCS voiding Rev 2.0

V-LO-LP-37061 Response to Inadequate Core Cooling

VEGP learning objectives

V-LO-LP-36103 -02 State the SRNI response to the listed core void fractions:

- a. Low void fraction
- b. Moderate to high void fraction
- c. Very high void fraction

LO-LP-37012-10 State the operation implications of starting a Reactor Coolant Pump if a void exists in the vessel.

**Figure 2: Screening for SRO-only linked to 10 CFR 55.43(b)(5)
(Assessment and selection of procedures)**

Can the question be answered *solely* by knowing "systems knowledge", i.e., how the system

works, flowpath, logic, component location?

Yes RO question

No

Can the question be answered *solely* by knowing immediate operator actions?

Yes RO question

No

Can the question be answered *solely* by knowing entry conditions for AOPs or plant parameters that require direct entry to major EOPs?

Yes RO question

No

Can the question be answered *solely* by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure?

Yes RO question

No

Does the question require one or more of the following?

Assessing plant conditions (normal, abnormal, or emergency) and then selecting a procedure or section of a procedure to mitigate, recover, or with which to proceed

Knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps

Knowledge of diagnostic steps and decision points in the EOPs that involve transitions to event specific subprocedures or emergency contingency procedures

Knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures

Yes SRO-only

Answer: A

22. 015AK2.10 1

Initial conditions:

- Unit 1 is in Mode 3.
- All RCPs are in service.

Current conditions:

- RCP # 1 trips due to a faulty relay.

After the plant stabilizes,

(1) what will be the RCP Loop # 1 flow indication

and

(2) when starting RCP # 1 after repair, the OATC is required to close which RCP breaker handswitch first?

	__(1)__	__(2)__
A.	0%	1E
B.	0%	non-1E
C.	~15%	1E
D.	~15%	non-1E

015AK2.10 RCP malfunctions

Knowledge of the interrelations between the Reactor Coolant Pump Malfunctions (Loss of RC Flow) and the following (CFR 41.7 / 45.7):

RCP indicators and controls

K/A MATCH ANALYSIS

The question presents a plausible scenario where an RCP has tripped. The candidate must choose the correct expected flow indication and which RCP handswitch is required to be closed first when starting an RCP.

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. First column is incorrect, reverse flow indication with 3 RCPs running and 1 RCP stopped will be ~ 15% on the loop with the stopped RCP.

Second column is correct, per SOP-13003-1, "Reactor Coolant Pump Operation", the RCP 1E handswitch is required to be closed first when starting an RCP.

B. Incorrect. First column is incorrect, reverse flow indication with 3 RCPs running and 1 RCP stopped will be ~ 15% on the loop with the stopped RCP.

Second column is incorrect, per SOP-13003-1, "Reactor Coolant Pump Operation", the RCP 1E handswitch is required to be closed first when starting an RCP.

C. Correct. First column is correct, reverse flow indication with 3 RCPs running and 1 RCP stopped will be ~ 15% on the loop with the stopped RCP.

Second column is correct, per SOP-13003-1, "Reactor Coolant Pump Operation", the RCP 1E handswitch is required to be closed first when starting an RCP.

D. Incorrect. First column is correct, reverse flow indication with 3 RCPs running and 1 RCP stopped will be ~ 15% on the loop with the stopped RCP.

Second column is incorrect, per SOP-13003-1, "Reactor Coolant Pump Operation", the RCP 1E handswitch is required to be closed first when starting an RCP.

REFERENCES

Vogtle 2011 RO Audit question # 20

Vogtle 2007 RO NRC Exam question # 20

Farley 2010 RO NRC Exam question # 21

SOP-13003-1/2, "Reactor Coolant Pump Operation" version 45, steps 4.1.2.16 and step 4.3.1.4.

VEGP learning objectives:

LO-PP-16401-09 Describe the following for the RCP supply breakers.

- a. Breaker arrangement
- c. Protection features

Answer: C
23. 015G2.4.45 1

Initial conditions:

- Unit 1 is at 2.0×10^{-3} % power and stable.

Current conditions:

- The CONTROL POWER circuit breaker on the signal processor for SR / IR channel 1N31 / 1N35 trips.
- The green control power light on the front of the signal processor EXTINGUISHES.

Based on the current conditions, which one, if any, of the following is/are the annunciator window(s) that will be LIT?

	<u>NIS HI FLUX SOURCE RANGE REACTOR TRIP</u>	<u>NIS HI FLUX IR REACTOR TRIP</u>	
A.	LIT		NOT
LIT			
B.	NOT LIT		LIT
C.	LIT		LIT
D.	NOT LIT		NOT LIT

015G2.4.45 Nuclear Instrumentation

Ability to prioritize and interpret the significance of each annunciator or alarm. (CFR 41.10 / 43.5 / 45.3 / 45.12)

K/A MATCH ANALYSIS

The question presents a plausible scenario where a SR / IR Signal Processor is in the level trip bypass position when the control power to the drawer is lost. The candidate has to determine whether first out alarms for the NIS are expected.

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. Window A05 will not be expected since at 2×10^{-3} % power the SR Hi

Flux trip will be blocked per procedure.

- B. Correct. Window B05 will be expected since at $2 \times 10^{-3}\%$ power the IR Hi Flux trip is NOT blocked per procedure, an IR NIS reactor trip will occur.
- C. Incorrect. Window A05 will not be expected since at $2 \times 10^{-3}\%$ power the SR Hi Flux trip will be blocked per procedure.
- D. Incorrect. Window B05 will be expected since at $2 \times 10^{-3}\%$ power the IR Hi Flux trip is NOT blocked per procedure, an IR NIS reactor trip will occur.

REFERENCES

Vogtle Txt chapter 17201, Nuclear Instrumentation Gamma-Metrics Source Range & Intermediate Range, pages 42, 43, 45, 47, 49, 51, 78, and 79.

17009-1, windows A05 and B05

17010-1, window A02

VEGP learning objectives:

LO-PP-17201-02 Discuss the operation of the Source & Intermediate Range switches:

- a. Level Trip Bypass
- b. High Flux at Shutdown Block
- c. Test Mode

LO-PP-28103-01 List all control interlocks with applicable setpoints, coincidences, and functions.

LO-PP-28103-02 List all permissives with applicable setpoints, coincidences, and functions.

Answer: B

24. 016K1.09 1

Given the following plant conditions:

- Unit 1 is at 100%.
- Power is lost to the bistables for Containment Pressure Channel II (P-936).

Which one of the following indicates the MINIMUM number of ADDITIONAL channels required to INITIATE an actuation signal on Hi-1 and Hi-3 Containment Pressure?

Hi-1

Hi-3

A.	1	1
B.	1	2
C.	2	1
D.	2	2

016K1.09 Non-nuclear Instrumentation

Knowledge of the physical connections and/or cause-effect relationships between Non-nuclear Instrumentation and the following systems (CFR 41.2 to 41.9 / 45.7 to 45.8):

ESFAS

K/A MATCH ANALYSIS

The question tests the selected KA because the examinee must comprehend the cause / effect relationship between the change of state of some NNIS bistables (due to a loss of power) and the ESFAS.

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. First column is correct since the Hi-1 bistables are de-energize to actuate and one bistable would be tripped due to the loss of power Only 1 more bistable is required to meet the actuation coincidence.

Second column is incorrect since the Hi-3 bistables are energize to actuate and with the bistable de-energized the bistable would NOT be in the tripped condition. Therefore, 2 more bistables are required to meet the actuation coincidence.

B. Correct. First column is correct since the Hi-1 bistables are de-energize to actuate and one bistable would be tripped due to the loss of power Only 1 more bistable is required to meet the actuation coincidence.

Second column is correct since the Hi-3 bistables are energize to actuate and with the bistable de-energized the bistable would NOT be in the tripped condition. Therefore, 2 more bistables are required to meet the actuation coincidence.

C. Incorrect. First column is incorrect since the Hi-1 bistables are de-energize to

actuate and one bistable would be tripped due to the loss of power Only 1 more bistable is required to meet the actuation coincidence.

Second column is incorrect since the Hi-3 bistables are energize to actuate and with the bistable de-energized the bistable would NOT be in the tripped condition. Therefore, 2 more bistables are required to meet the actuation coincidence.

D. Incorrect. First column is incorrect since the Hi-1 bistables are de-energize to actuate and one bistable would be tripped due to the loss of power Only 1 more bistable is required to meet the actuation coincidence.

Second column is correct since the Hi-3 bistables are energize to actuate and with the bistable de-energized the bistable would NOT be in the tripped condition. Therefore, 2 more bistables are required to meet the actuation coincidence.

REFERENCES

Vogtle Simulator photo of SI, SLI, and Spray bistable MLBs.

V-LO-PP-15101, Containment Spray slides # 16, 19, and 40.

V-LO-PP-28103, Reactor Trip and ESFAS Signals, slide # 153

1X6AA-02-00232 Functional Diagram Safeguard Actuation System, Notes 4 and 15

VEGP learning objectives:

LO-LP-39207-020 Given a set of Technical Specification and the Bases, determine for a specific set of plant conditions, equipment availability, and operational mode.

a. Whether any Tech Spec LCOs of section 3.3 are exceeded.

b. The required actions for any section 3.3 LCOs.

LO-LP-28103-05 List all ESFAS actuation signals with all applicable set points, coincidences, permissives, blocks, and discuss the system response to each ESF actuation signal.

Answer: B

25. 022A4.01 1

Initial CNMT pressure:

Ch I	Ch II	Ch III	Ch IV
3.7 psig	3.4 psig	3.9 psig	3.5 psig

Current CNMT pressure:

Ch I	Ch II	Ch III	Ch IV
20.8 psig	21.2 psig	21.6 psig	22.2 psig

Which one of the following correctly identifies the QMCB MLB status for the Containment Coolers for the initial and current CNMT pressures?

	<u>Initial pressure</u>	<u>Current pressure</u>
A.	LIT	LIT
B.	LIT	OFF
C.	OFF	LIT
D.	OFF	OFF

022A4.01 Containment Cooling

Ability to manually operate and/or monitor in the control room (CFR 41.7 / 45.5 to 45.8):

Containment Cooling System fans

K/A MATCH ANALYSIS

The question presents a plausible scenario where the CNMT pressure is bordering on the SI actuation setpoint for high containment pressure. The candidate has to recognize the status of the coolers by QMCB indication. With a 2nd given containment pressure, the candidate has to again recognize the change in cooler status. The candidate must also be able to differentiate that the QMCB status lights represent the low speed cooler status versus the high speed.

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. First column is incorrect, the SI actuation setpoint of 3.8 psig has not been reached. The lights should be OFF with the fans either in high

speed or not running. Plausible the candidate may think SI has actuated based on containment pressures.

Second column is correct, the SI actuation setpoint has been reached. The lights should be LIT as the fans will be in low speed after an SI signal.

- B. Incorrect. First column is incorrect, the SI actuation setpoint of 3.8 psig has not been reached. The lights should be OFF with the fans either in high speed or not running. Plausible the candidate may think SI has actuated.

Second column is incorrect, the SI actuation setpoint on containment pressure has been reached. The light should be LIT. B choice as a whole is plausible if the candidate thinks the lights represent the cooler high speed status.

- C. Correct. First column is correct, the SI actuation setpoint of 3.8 psig has not been reached. The lights should be OFF with the fans either in high speed or not running.

Second column is correct, the SI actuation setpoint has been reached. The lights should be LIT as the fans will be in low speed after an SI signal.

- D. Incorrect. First column is correct, the SI actuation setpoint of 3.8 psig has not been reached. The lights should be OFF with the fans either in high speed or not running.

Second column is incorrect, the SI actuation setpoint on containment pressure has been reached. The light should be LIT. B choice as a whole is plausible if the candidate thinks the lights represent the cooler high speed status.

REFERENCES

Vogtle 2009 RO NRC Exam question # 22 used as a base for modification.

Vogtle simulator photo for Containment Coolers Lo Speed MLBs.

V-LO-PP-29101 Containment HVAC Systems, slides 21, 22, and 23.

V-LO-PP-28103, Reactor Trip and ESFAS Signals, slide # 126

1X6AA-02-00232 Functional Diagram Safeguard Actuation System
(**Note to chief:** This logic is already included on question # 20, the previous question)

VEGP learning objectives:

LO-PP-29101-02 State the ESF function of Containment Coolers and state the backup for this system.

LO-LP-29101-13 State why two speeds are provided for the Containment Coolers and when each speed is used.

LO-LP-29101-14 State all auto start signals for the Containment Cooling including set points and coincidences where applicable.

LO-LP-29101-21 State any auto actions that occur in the systems listed as a result of the following signals: SI, High Rad, and CVI.

a. Containment Cooling Coolers

Answer: C

26. 022AG2.2.42 1

Initial conditions:

- Unit 1 is at 100% power.
- CCP "1A" is running.
- The NCP is in standby.

Current conditions:

- CCP "1A" trips.

Which one of the following correctly completes the following statement regarding real LCOs that are required to be entered? (consider only real LCOs, not INFO).

TR LCO 13.1.5, Charging Pumps - Operating is ___(1)___ to be entered

and

Tech Spec LCO 3.5.2, ECCS - Operating is ___(2)___ to be entered.

___(1)___

___(2)___

A. required

required

B. required

NOT required

- C. NOT required required
- D. NOT required NOT required

022AG2.2.42 Loss of Rx Coolant makeup

**Ability to recognize system parameters that are entry-level conditions for Tech Specs.
(CFR: 41.7 / 41.10 / 43.2 / 43.3 / 45.3)**

K/A MATCH ANALYSIS

The question presents a plausible scenario where CCP "A" is running and the NCP is stopped. The CCP will trip requiring the candidate to know whether or not the TRM for charging pumps and the ECCS Tech Spec LCO entry conditions are met.

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. First half is incorrect, only two charging pumps are required to meet the LCO for the TRM.

Second half is correct, LCO entry is required for the ECCS Tech Spec.

B. Incorrect. First half is incorrect, only two charging pumps are required to meet the LCO for the TRM.

Second half is incorrect, LCO entry is required for the ECCS Tech Spec.

C. Correct. First half is correct, only two charging pumps are required to meet the LCO for the TRM.

Second half is correct, LCO entry is required for the ECCS Tech Spec.

D. Incorrect. First half is correct, only two charging pumps are required to meet the LCO for the TRM.

Second half is incorrect, LCO entry is required for the ECCS Tech Spec.

REFERENCES

Technical Specification 3.5.2 ECCS - Operating

TRM 13.1.5 Charging Pumps - Operating

VEGP learning objectives:

LO-PP-13101-14, State the Technical Specification LCO, bases, applicability, and one hour or less actions for the Emergency Core Cooling Systems.

LO-PP-39205-03, For any given section in section 13.1 of the TRM, be able to:

- a. State the Technical Requirement (TR) for operation.
- b. State any one hour or less required actions.

LO-PP-39205-04, Given the TRM, determine for a specific set of plant conditions, equipment availability, and operational mode:

- a. Whether any TR of section 13.1 has been exceeded.
- b. The required actions for all section 13.1 TRs.

Answer: C
27. 025AK2.03 1

Initial conditions:

- Unit 1 is in Mode 4.
- CCW pump # 6 is running in single pump operation.

Current conditions:

- CCW pump # 6 trips.

Which one of the following correctly describes components that have ALL lost CCW flow?

- A. 1A RHR Hx and 1A RHR pump seal cooler only
- B. 1B RHR Hx and 1B RHR pump seal cooler only
- C. 1A RHR Hx, 1A RHR pump seal cooler, and 1A RHR pump motor cooler
- D. 1B RHR Hx, 1B RHR pump seal cooler, and 1B RHR pump motor cooler

025AK2.03 Loss of RHR

Knowledge of the interrelations between the Loss of RHR and the following(CFR 41.7 / 45.7) :

Service water or closed cooling water pumps

K/A MATCH ANALYSIS

The question presents a plausible scenario where a CCW pump trips while in the single pump mode of operation. This is essentially a knowledge based loads question for CCW Train B. The candidate must know which train of CCW and respective RHR heat exchanger and seal cooler is affected.

ANSWER / DISTRACTOR ANALYSIS

- A. Incorrect. CCW pump # 6 is a train B pump, train A RHR is not affected.
- B. Correct. CCW pump # 6 is a train B pump, train B RHR Hx and pump seal cooler are affected.
- C. Incorrect. CCW pump # 6 is a train B pump, train A RHR is not affected.
- D. Incorrect. CCW pump # 6 is a train B pump, train B RHR Hx and pump seal cooler are affected. However, the choice is incorrect as the RHR pump motor cooler is cooled by the NSCW system.

REFERENCES

027AK2.03 from Farley 2007 RO NRC exam question # 26

V-LO-TX-10101, "Component Cooler Water", version 3.

1X4DB137 Component Cooling Water System Loads

VEGP learning objectives:

LO-PP-10101-01 From memory, state the following for the CCW System.

- a. Heat Loads

Answer: B
28. 026A1.06 1

Initial conditions:

- 14806B-1, TRAIN B CONTAINMENT SPRAY PUMP IST AND RESPONSE TIME TEST is being performed.
- HV-9001B, CNMT SPRAY PUMP B DISCH ISOLATION has been verified closed.

Current conditions:

- Containment Spray Pump "B" has been started.

Containment Spray Pump B motor will be cooled by ___(1)___

and

the pump temperature is currently ___(2)___.

___(1)___

___(2)___

- A. CCW stable with recirculation to the RWST
- B. CCW rising due to no miniflow protection
- C. NSCW stable with recirculation to the RWST
- D. NSCW rising due to no miniflow protection

026A1.06 Containment Spray system

Ability to predict and / or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CSS controls including (CFR 41.5 / 45.5):

Containment Spray Pump Cooling

K/A MATCH ANALYSIS

The question presents a plausible scenario where a Containment Spray Pump surveillance is being run (operating controls). The candidate must choose the correct cooling water supply to the CS Pump motor cooler and the status of the pump cooling with the discharge valve shut.

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. First half is incorrect, CCW is plausible (Component Cooling Water) since it cools RHR in the recirculation mode and the CS pumps can be placed on recirculation. NSCW cools the motor coolers.

Second half is correct, the Containment Spray Pump normally does not have mini-flow. During the surveillance, a recirculation line is manually valved in to the RWST

B. Incorrect. First half is incorrect, CCW is plausible (Component Cooling Water) since it cools RHR in the recirculation mode and the CS pumps can be placed on recirculation. NSCW cools the motor coolers.

Second half is incorrect, during surveillance testing, Containment Spray Pumps are aligned to the RWST for mini-flow protection.

C. Correct. First half is correct, NSCW cools the motor coolers.

Second half is correct, the Containment Spray Pump normally does not have mini-flow. During the surveillance, a recirculation line is manually valved in to the RWST

D. Incorrect. First half is correct, NSCW cools the motor coolers.

Second half is incorrect, during surveillance testing, Containment Spray Pumps are aligned to the RWST for mini-flow protection.

REFERENCES

14806B-1, TRAIN B CONTAINMENT SPRAY PUMP IST AND RESPONSE TIME TEST.

1X4DB131 Containment Spray System print.

1X4DB134 Nuclear Service Cooling Water System print.

Vogtle Text Chapter 15, Containment Spray System, pages 8 and 10.

V-LO-PP-15101, Containment Spray System, slide # 37.

VEGP learning objectives:

LO-PP-15101-07 Describe how the Containment Spray pumps are provided minimum flow protection during test.

Answer: C

29. 026AA1.03 1

Initial conditions:

- ACCW pump # 2 is in service.
- All other systems in normal alignment.

Current conditions:

- NSCW Train "B" is shutdown due to a leak on the discharge header.

Which one of the following correctly completes the following statement?

ACCW pump # 2 motor ___(1)___ cooling

and

the ACCW loads ___(2)___ cooling.

___(1)___

___(2)___

- A. has lost have lost
- B. has lost still have
- C. still has have lost
- D. still has still have

026AA1.03

Loss of CCW

Ability to operate and/or monitor the following as they apply to the loss of CCW (CFR 41.7 / 45.5 / 45.6):

SWS as a backup to the CCWS

K/A MATCH ANALYSIS

The question presents a plausible scenario where an ACCW pump is in service when the associated NSCW train is shutdown due to a system leak. The candidate must determine the effects of a loss of NSCW on the pump cooling water and the systems loads of ACCW. The pump cooling water is unaffected as the ACCW pumps provide their own cooling from pump discharge flow and the system loads will continue to be

cooled from the opposite train heat exchanger (series Hx) which are 100% capacity. This meets the KA since the candidate must determine if a loss of ACCW pump or load cooling has occurred and requires the system knowledge that the pumps are self cooled and the loads are cooled by the backup train of NSCW.

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. The first part is incorrect as the ACCW pumps are self cooled from the ACCW pump discharge header. NSCW cools many major pump motors and it is plausible the candidate may think cooling water has been lost.

The second part is incorrect as the ACCW loads are cooled by two series 100% capacity heat exchangers, one cooled from Train A NSCW and one cooled from Train B NSCW. Losing either train of NSCW will not cause a loss of cooling to the ACCW system loads as the other train heat exchanger will maintain cooling.

B. Incorrect. The first part is incorrect as the ACCW pumps are self cooled from the ACCW pump discharge header. NSCW cools many major pump motors and it is plausible the candidate may think cooling water has been lost.

The second part is correct as the ACCW loads are cooled by two series 100% capacity heat exchangers, one cooled from Train A NSCW and one cooled from Train B NSCW. Losing either train of NSCW will not cause a loss of cooling to the ACCW system loads as the other train heat exchanger will maintain cooling.

C. Incorrect. The first part is correct as the ACCW pumps are self cooled from the ACCW pump discharge header.

The second part is incorrect as the ACCW loads are cooled by two series 100% capacity heat exchangers, one cooled from Train A NSCW and one cooled from Train B NSCW. Losing either train of NSCW will not cause a loss of cooling to the ACCW system loads as the other train heat exchanger will maintain cooling.

D. Correct. The first part is correct as the ACCW pumps are self cooled from the ACCW pump discharge header.

The second part is correct as the ACCW loads are cooled by two series 100% capacity heat exchangers, one cooled from Train A NSCW and one cooled from Train B NSCW. Losing either train of NSCW will not cause a loss of cooling to the ACCW system loads as the other train heat exchanger will maintain cooling.

REFERENCES

LO-PP-04101-01-001 from LOIT Exam Bank.
LO-PP-04101-01-007 from LOIT Exam Bank.
V-LO-TX-04101 for Auxiliary Component Cooling Water (ACCW)
1X4DB138-1 Auxiliary Component Cooling Water System

VEGP learning objectives:

LO-PP-04101-01 From memory state the following for the ACCW system:

- a. Heat loads
- b. Heat loads cooled by either unit's ACCW cooling system.
- c. Where heat is rejected to
- d. The impact on ACCW due to a loss of one train of NSCW

Answer: D
30. 026K2.01 1

Given the following on Unit 1:

- The Reactor trips due to a LOCA.
- Containment pressure PEAKS at 20.4 psig and is lowering.

Which one of the following correctly completes the statement below?

Containment Spray pump B is ____ (1) ____

and

the breaker which will supply power to the pump is located on ____ (2) ____.

A. (1) running

(2) 480 volt bus 1BB16

B. (1) running

(2) 4160 volt bus 1BA03

C. (1) NOT running

(2) 480 volt bus 1BB16

D. (1) NOT running

(2) 4160 volt bus 1BA03

26K2.01 Containment Spray

Knowledge of the bus power supplies to the following (CFR 41.7):

Containment spray pumps

K/A MATCH ANALYSIS

The question presents a plausible scenario where a LOCA has occurred with given data regarding peak containment pressure. The candidate must determine from the given data the operational status of the 1B Containment Spray pump and the direct power supply to the pump.

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. The first part is incorrect, the pump will not auto start until Containment pressure has reach 21.5 psig. It is plausible the candidate may think containment pressure is lowering due to a spray pump actuation.

The second part is incorrect, the pump is directly powered from 1E 4160 bus 1BA03, it is plausible the candidate could confuse the power supply since the Containment Spray valves are powered from 480 volt buses and some other pumps / motors are powered from 480 volt switchgear.

B. Incorrect. The first part is incorrect, the pump will not auto start until Containment pressure has reach 21.5 psig. It is plausible the candidate may think containment pressure is lowering due to a spray pump actuation.

The second part is correct, the pump is directly powered from 1E 4160 bus 1BA03.

C. Incorrect. The first part is correct, the pump will not auto start until Containment pressure has reach 21.5 psig.

The second part is incorrect, the pump is directly powered from 1E 4160 bus 1BA03, it is plausible the candidate could confuse the power supply since the Containment Spray valves are powered from 480 volt buses and some other pumps / motors are powered from 480 volt switchgear.

D. Correct. The first part is correct, the pump will not auto start until Containment pressure has reach 21.5 psig.

The second part is correct, the pump is directly powered from 1E 4160 bus 1BA03.

REFERENCES

North Anna 2008 RO NRC exam question # 25.

V-LO-TX-15101, Containment Spray System.

1X3D-AA-D03B 4160 1E Switchgear 1BA03 one line drawing.

VEGP learning objectives:

LO-PP-15101-02 Describe what will actuate the Containment Spray System, including coincidence and set point.

LO-PP-15101-03 Describe the Containment Spray Systems normal standby alignment.

NOTE: Feedback to LOIT group after the exam is given in April. There is no specific objective in Containment Spray cluster # 15 or Electrical Distribution cluster # 1 for knowledge of Containment Spray pump power supplies. There are no questions in LOIT bank regarding Containment Spray pump power supplies.

Answer: D

31. 028A2.02 1

Following a LOCA, the Emergency Director has directed Post-LOCA Hydrogen Purge System to be placed in service to reduce CNMT H₂ concentration per 13130-1, "Post Accident Hydrogen Control."

- An SO is locally opening 1-1508-U4-012, "POST LOCA PURGE CTB ISO VALVE".

- Following the local manipulation, the UO will open 1-HV-2624A, "CTB POST LOCA PURGE EXH IRC ISO VLV" on the HVAC panel.

Which one of the following is:

(1) where the SO will perform the local manipulation, and

(2) the isolation signal the UO will have to reset to open the valve at the HVAC panel?

A. (1) doghouse cubicle on the Equipment Building roof

(2) CIA

B. (1) doghouse cubicle on the Equipment Building roof

(2) CVI

C. (1) Equipment Building ground level, adjacent to Containment

(2) CIA

D. (1) Equipment Building ground level, adjacent to Containment

(2) CVI

028A2.02 Hydrogen purge control

Ability to (a) predict the impacts of the following malfunctions or operations on the HRPS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations (CFR 41.5 / 43.5 / 45.3 / 45.13):

LOCA conditions and related concern over hydrogen

K/A MATCH ANALYSIS

The question presents a plausible scenario where the ED has directed placing the Post LOCA CNMT H2 Purge system in service. The candidate must determine the location of the manual POST LOCA PURGE CTB ISO VLV and the isolation signal the UO will have to reset to allow opening the valves (1-HV-2624A/B) on the HVAC panel per the listed procedure.

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. First part is correct, the valve is located in the doghouse on the Equipment Building roof.

Second part is incorrect, CVI must be reset to open the valves, not CIA.

B. Correct. First part is correct, the valve is located in the doghouse on the Equipment Building roof.

Second part is correct, CVI must be reset to open the valves.

C. Incorrect. First part is incorrect, the valve is located in the doghouse on the Equipment Building roof, not at ground level adjacent to containment.

Second part is incorrect, CVI must be reset to open the valves, not CIA.

D. Incorrect. First part is incorrect, the valve is located in the doghouse on the Equipment Building roof, not at ground level adjacent to containment.

Second part is correct, CVI must be reset to open the valves.

REFERENCES

SOP-13130-1, "Post Accident Hydrogen Control", section 4.4.3, version 19.

VEGP learning objectives:

LO-PP-29101-20 List the methods for monitoring and controlling hydrogen inside Containment.

Answer: B

32. 028A2.03 1

Procedure 13130-1, "Post Accident Hydrogen Control" sections are as follows:

- 4.4.2, "Diluting Containment Hydrogen Concentration Using The Service Air System"

- 4.4.3, "Post-LOCA Containment Hydrogen Purge System Operation"

After an RCS Large Break LOCA, Unit 1 Containment hydrogen concentration is 6.8%.

The___(1)___ concentration threshold for Hydrogen has been exceeded,

and

the Shift Supervisor will direct the UO to perform section___(2)___ of 13130-1.

___(1)___

___(2)___

A. explosive

4.4.2

B. explosive

4.4.3

C. flammable

4.4.2

D. flammable

4.4.3

028A2.03 Hydrogen Recombiner and Purge Control System

Ability to (a) predict the impacts of the following malfunctions or operations on the HRPS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations (CFR 41.5, / 43.5 / 45.3 / 45.13):

The hydrogen air concentration in excess of limit flame propagation or detonation with resulting equipment damage in containment

K/A MATCH ANALYSIS

The question presents a plausible scenario where the candidate is given a Hydrogen concentration in containment following a LOCA. Candidate must determine whether this is above or below the flammable / explosive limits and the procedure section of 13130-1/2, Post Accident Hydrogen Control he would select for use as the SS.

SRO 10CFR55.43 (b)(5)(Assessment and selection of procedures)

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. First half is incorrect, the H₂ concentration is in the flammable range.

Second half is correct, section 4.4.2 will be performed with H₂ concentration greater than 4.0%.

B. Incorrect. First half is incorrect, the H₂ concentration is in the flammable range.

Second half is incorrect, section 4.4.2 will be performed with H₂ concentration greater than 4.0%.

C. Correct. First half is correct, the H₂ concentration is in the flammable range.

Second half is correct, section 4.4.2 will be performed with H₂ concentration greater than 4.0%.

D. Incorrect. First half is correct, the H₂ concentration is in the flammable range.

Second half is incorrect, section 4.4.2 will be performed with H₂

concentration greater than 4.0%.

REFERENCES

13130-1, "Post Accident Hydrogen Control" Rev 19.

Vogtle November 2005 SRO Retake Exam, Question # 8.

V-LO-PP-29101, Containment HVAC System.

VEGP learning objectives:

LO-PP-29101-03, List the systems that are designed to control and mitigate hydrogen gas buildup in containment.

LO-LP-36107-02, State the hazardous concentration ranges of explosive and flammable mixtures of hydrogen in air.

Figure 2: Screening for SRO-only linked to 10 CFR 55.43(b)(2) (Assessment and selection of procedures)

Can question be answered *solely* by knowing "systems knowledge", i.e., how the system works, flowpath, logic, component location?

Yes RO question

No

Can question be answered *solely* by knowing immediate operator actions?"

Yes RO question

No

Can question be answered *solely* by knowing entry conditions for AOPs or plant parameters that required direct entry into major EOPs?

Yes RO question

No

Can the question be answered *solely* by knowing the purpose, overall sequence of events or overall mitigative strategy of a procedure?

Yes RO question

No

Does the question require one or more of the following?

Assessing plant conditions (normal, abnormal, or emergency) and then selecting a procedure or section of a procedure to mitigate, recover, or with which to proceed.

Knowledge of when to implement attachments and appendices, including how to coordinate, these items with procedure steps.

Knowledge of diagnostic steps and decision points in the EOPs that involve transitions to event specific sub-procedures or emergency contingency procedures.

Knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures.

Yes SRO only

Answer: C

33. 029EK1.01 1

Initial conditions:

- An ATWT has occurred on Unit 2 at EOL conditions.
- 19211-C, "FR-S.1, Response to Nuclear Power Generation/ATWT" is in progress.
- Attempts to establish Emergency Boration have been unsuccessful.

Current conditions:

- Step 23 to "Check Reactor power" is being performed.
- Reactor power indicates 6%.
- Intermediate Range Startup rate is positive.
- RCS temperature is slowly rising.
- RCS pressure is 2285 psig.

Which one of the following correctly completes the following statement?

Per 19211-C, the operators will ___(1)___ the RCS heatup

and

with Reactor power at the current level the crew will ___(2)___ .

- A. (1) allow
 - (2) perform other actions that do NOT cooldown the RCS or add positive reactivity
- B. (1) allow
 - (2) open PORVs to reduce RCS pressure to 2185 psig to raise charging flow
- C. (1) stop
 - (2) open PORVs to reduce RCS pressure to 2185 psig to raise charging flow
- D. (1) stop
 - (2) perform other actions that do NOT cooldown the RCS or add positive reactivity

029EK1.01 ATWT

Knowledge of the operational implications of the following concepts as they apply to the ATWT (CFR 41.8 / 41.10 / 45.3):

Reactor nucleonics and thermo-hydraulics behavior

K/A MATCH ANALYSIS

The question presents an ATWT scenario where the success path is to allow RCS heatup to reduce RX power (negative MTC) and not perform any actions to cooldown.

ANSWER / DISTRACTOR ANALYSIS

- A. Correct. First part is correct, per step 23 RNO allow RCS to heatup to add negative reactivity (plant is at EOL so MTC is negative). Second part is correct, the RNO allows other FRP actions to be performed that do not cooldown the RCS or add positive reactivity.
- B. Incorrect. First part is correct, per step 23 RNO allow RCS to heatup to add negative reactivity (plant is at EOL so MTC is negative). Second part is incorrect, step 4f RNO step requires reducing pressure to < 2135 psig, not 2185 psig.
- C. Incorrect. First part is incorrect, per step 23 RNO allow RCS to heatup to add negative reactivity (plant is at EOL so MTC is negative). Second part is incorrect, step 4f RNO step requires reducing pressure to < 2135 psig, not 2185 psig.

D. Incorrect. First part is incorrect, per step 23 RNO allow RCS to heatup to add negative reactivity (plant is at EOL so MTC is negative). Second part is correct, the RNO allows other FRP actions to be performed that do not cooldown the RCS or add positive reactivity.

REFERENCES

EOP 19211-C," FR-S.1, Response to Nuclear Power Generation/ATWT" Ver 20.5

Farley 2007 RO NRC Exam Question 32

VEGP learning objectives:

LO-LP-37041-08 State the major action categories of EOP 19211-C.

Answer: A
34. 036AK3.03 1

Initial conditions:

- Fuel shuffle in progress in the Spent Fuel Pools.

Current conditions:

- An irradiated assembly is dropped in the Unit 1 Spent Fuel Pool.
- The SRDC indicates HIGH radiation on multiple FHB Effluent Radiation Monitors.
- The FHB HVAC system responds as designed.

The crew enters 18006-C, "Fuel Handling Event" and is at the step to "verify proper FHB Post Accident Exhaust Filtration Unit alignment".

Which one of the following is correct regarding the operator actions to take, per 18006-C, and the reason for the actions?

- A. Stop one unit, this limits the offsite dose release.
- B. Start an additional unit, this limits the offsite dose release.
- C. Stop one unit, this ensures proper negative pressure in the FHB.

D. Start an additional unit, this ensures proper negative pressure in the FHB.

036AK3.03 Fuel Handling Incidents

Knowledge of the reasons for the following responses as they apply to the Fuel Handling Incidents (CFR 41.5 / 41.10 / 45.6 / 45.13):

Guidance contained in EOP for fuel handling incident

K/A MATCH ANALYSIS

The question presents a plausible scenario where an irradiated assembly is dropped in the SFP area resulting in HIGH radiation on the SRDC FHB Rad Monitors. The candidate must determine the proper action to take per 18006-C and the reason.

ANSWER / DISTRACTOR ANALYSIS

- A. Correct. Two FHB filter units will start on HIGH radiation, per AOP-18006-C, one unit must be stopped and the reason is to limit the offsite dose release.
- B. Incorrect. Two FHB filter units will start on HIGH radiation, per AOP-18006-C, one unit must be stopped and the reason is to limit the offsite dose release. It is plausible the candidate may think only one unit starts and a second unit is required to be started to limit the offsite dose release.
- C. Incorrect. Two FHB filter units will start on HIGH radiation, per AOP-18006-C, one unit must be stopped and the reason is to limit the offsite dose release. It is plausible the candidate may think the reason for stopping a unit is for proper FHB pressure boundary as this is one of the functions of the system but is not the reason for the step in the AOP.
- D. Incorrect. Two FHB filter units will start on HIGH radiation, per AOP-18006-C, one unit must be stopped and the reason is to limit the offsite dose release. It is plausible the candidate may think only one unit starts and a second unit is required to be started to proper FHB pressure boundary as this is one of the functions of the system but is not the reason for the step in the AOP.

REFERENCES

18006-C, "Fuel Handling Event", version 8.2, step 7.

LO-LP-60306-05, Fuel Handling Event, page 6.

VEGP learning objectives:

LO-LP-60306-01 Given the entire AOP, describe:

- a. Purpose of selected steps.
- b. How and why the step is performed.
- c. Expected response of the plant/parameter(s) for the step.

LO-PP-23101-07 Describe the Fuel Handling Building HVAC System flow path for both Normal and Post Accident Conditions.

LO-PP-23101-09 Explain how the Fuel Handling Building HVAC System responds to a Fuel Handling Building Isolation signal.

LO-PP-32101-08 List all safety-related radiation monitors by tag number and name. Describe those automatic actions that occur for each of the following safety-related monitors when its high alarm setpoint is exceeded.

- b. fuel handling building effluent (ARE-2532A, B, and ARE-2533A,B)

Answer: A

35. 037AA2.10 1

Unit 1 is experiencing a Steam Generator Tube Leak on SG 4. The crew is performing 18009-C, "Steam Generator Tube Leak".

Current conditions:

- Reactor power is 100% and stable.
- 1RE-0724 N-16 Rad Monitor indicates 155 gpd.
- 1RE-0810 SJAE Exhaust Rad Monitor indicates 160 gpd.

Based on these conditions, which one of the following correctly completes the following statement?

Per Tech Spec 3.4.13, "RCS Operational Leakage", the primary to secondary leakage is ___(1)___ the limit

and

per the Tech Spec Bases, the limit ensures that under the stress of a LOCA or MSLB a single crack leaking this amount will not ___(2)___ .

A. (1) within

(2) exceed the limits for secondary coolant activity

B. (1) within

(2) propagate to a SGTR

C. (1) exceeding

(2) exceed the limits for secondary coolant activity

D. (1) exceeding

(2) propagate to a SGTR

037AA2.10 Ability to determine and interpret the following as they apply to the SGTL:

Tech Spec limits for RCS leakage (CFR 43.5 / 45.13)

K/A MATCH ANALYSIS

The question presents a plausible steam generator tube leak scenario. The candidate must determine if Tech Spec limits are exceeded and know the bases for the limit.

SRO 10CFR55.43 (b)(2)

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. First part incorrect. The Tech spec limit is 150 gpd through any one SG. The leakage is identified in SG 4 per the question stem and leakage rad monitors exceed this limit.

Second part incorrect. The bases provided is that for 3.7.16 Secondary Specific Activity. It is plausible as this bases involves SGTL dose consequences.

B. Incorrect. First part incorrect. The Tech spec limit is 150 gpd through any one SG. The leakage is identified in SG 4 per the question stem and leakage rad monitors exceed this limit.

Second part correct. Bases for 3.4.13 limits on primary to secondary leakage are stated in bases 3.4.17 SG tube integrity bases. The limit prevents a single tube leak from becoming a rupture during a LOCA or MSLB.

- C. Incorrect. First part correct. Limit of 150 gpd is exceeded.
Second part incorrect. The bases provided is that for 3.7.16 Secondary Specific Activity. It is plausible as this bases involves SGTL dose
- D. Correct. First part correct. Limit of 150 gpd is exceeded.
Second part correct. Bases for 3.4.13 limits on primary to secondary leakage are stated in bases 3.4.17 SG tube integrity bases. The limit prevents a single tube leak from becoming a rupture during a LOCA or MSLB.

REFERENCES

Tech Spec 3.4.13, RCS Operational Leakage

Tech Spec Bases 3.4.17 Steam Generator Tube Integrity

Tech Spec Bases 3.7.16 Secondary specific activity

VEGP learning objectives:

- V-LO-LP-39208-05 Given a set of Tech Specs and the bases, determine for a specific set of plant conditions, equipment availability, and
- a. Whether any Tech Spec LCOs of section 3.4 are exceeded.
 - b. The required actions for all section 3.4 LCOs.

V-LO-LP-39208-04 Describe the bases for any given Tech Spec in section 3.4.

Figure 1: Screening for SRO-only linked to 10 CFR 55.43(b)(2) (Tech Specs)

Can question be answered *solely* by knowing \leq 1 hour TS/TRM Action?

Yes RO question

No

Can question be answered *solely* by knowing the LCO/TRM information listed "above-the-line?"

Yes RO question

No

Can question be answered *solely* by knowing the TS Safety Limits?

Yes RO question

No

Does the question involve one or more of the following for TS, TRM, or ODCM?

Application of Required Actions (Section 3) and Surveillance Requirements (Section 4) in accordance with rules of application requirements (Section 1)

Application of generic LCO requirements (LCO 3.0.1 thru 3.0.7 and SR 4.0.1 thru 4.0.4)

Knowledge of TS bases that is required to analyze TS required actions and terminology

Yes SRO only

Answer: D

36. 037AK1.02 1

Unit 2 is shutting down from 100% Rated Thermal Power in response to a steam generator tube leak per 18009-C, "Steam Generator Tube Leak".

Which one of the following correctly states the trend of the estimated leak rate during the SHUTDOWN and the reason for the trend? (Assume that the geometric size of the flaw remains constant)

Estimated leak rate will _____ .

A. lower

because the primary to secondary pressure difference is reduced as power is lowered.

B. lower

because the air ejector flow rate would lower as power is lowered.

C. remain the same

because the monitored isotopes are independent of power level.

D. rise

because of the iodine spiking associated with the shutdown.

037AK1.02 SGTL

Knowledge of the operational implications of the following concepts as they apply to SGTL (CFR 41.8 / 41.10 / 45.3):

Leak rate vs. pressure drop

K/A MATCH ANALYSIS

The question tests knowledge of operational implications of how the leak rate changes as the dP across the SG tubes lowers with a power reduction.

ANSWER / DISTRACTOR ANALYSIS

- A. Correct. As Turbine Control Valves are closed, the pressure in the SGs will rise, thus reducing the dP across the tubes, there by reducing the leak rate.
- B. Incorrect. If offgas flow rate goes down, then the leakage based on the SGTL rad monitors would go up due to the more concentrated radiogas seen by the detectors.
- C. Incorrect. Leakage lowers. Plausible there is not a noticeable change in isotopes and this distractor could be considered realistic if an applicant did not consider the dP changes.
- D. Incorrect. Plausible because iodine spiking does occur on a rapid shutdown such as a reactor trip only if leaking fuel is present . None is stated in stem.

REFERENCES

Vogtle 2005 RO exam Q # 31

VEGP learning objectives:

LO-LP-60309-02 Describe the actions necessary after shutdown to reach minimum break flow to the affected SG.

LO-LP-60309-05 Given the entire AOP, describe:

- step
- a. Purpose of selected steps
 - b. How and why the step is being performed
 - c. Expected response of the plant/parameter(s) for the

Answer: A
37. 039G2.1.25 1

Unit 1 is at 100% power.

Maintenance testing of the Main Steam Safety valves is in progress.

The following test results are obtained for the valve lift settings:

1PSV-3002	1205 psig
1PSV-3011	1210 psig
1PSV-3022	1160 psig

NO valve lift setting adjustments have been made.

Based on this data, which one correctly completes the following statement?

A total of ___(1)___ Main Steam Safety Valves exceed their allowable lift settings
and

the MAXIMUM Allowable Power Range Neutron Flux High Trip Setpoint per Tech
Specs is ___(2)___ .

REFERENCE PROVIDED

___(1)___ ___(2)___

- | | |
|--------|-----|
| A. One | 71% |
| B. One | 51% |
| C. Two | 71% |

D. Two

51%

039G2.1.25 Main and Reheat Steam

Ability to interpret reference materials, such as graphs, curves, tables, etc.(CFR 41.10 / 43.5 / 45.12)

K/A MATCH ANALYSIS

The question presents a plausible scenario where the candidate must use the tables of Tech Spec 3.7.1 to evaluate the operability of MSSVs tested and determine the Maximum PR High Flux Trip setpoint.

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. First part incorrect. PSV 3011 is out of tolerance high at 1210 psig (setpoint 1185 psig with a band of 1149.5 psig to 1208.7 psig) and PSV 3022 is out of tolerance low at 1160 psig (1200 psig with a band of 1164 psig to 1224 psig) Candidate may not apply the proper setpoint or not apply the low tolerance thinking early is conservative. A valve out of tolerance low is showing degradation (drift) and may open late the next demand.

Second part is correct for stem conditions.

B. Incorrect. First part incorrect. PSV 3011 is out of tolerance high at 1210 psig (setpoint 1185 psig with a band of 1149.5 psig to 1208.7 psig) and PSV 3022 is out of tolerance low at 1160 psig (1200 psig with a band of 1164 psig to 1224 psig) Candidate may not apply the proper setpoint or not apply the low tolerance thinking early is conservative. A valve out of tolerance low is showing degradation (drift) and may open late the next demand.

Second part incorrect but plausible as this is the setpoint if two safeties per per SG is inoperable and the candidate applies the total inoperable safeties to table 3.7.1-1.

C. Correct. First part correct for stem conditions.

Second part correct for stem conditions.

D. Incorrect. First part correct for stem conditions.

Second part incorrect but plausible as this is the setpoint if two safeties

per per SG is inoperable and the candidate applies the total inoperable safeties to table 3.7.1-1.

REFERENCES

Technical Specification 3.7.1 (pages 3.7.1-1,3, and 4) will be provided to the applicants as the reference

VEGP learning objectives:

LO-PP-21101-11 Discuss the following concerning the "Main Steam Safety Valves":

- a. Why we have them
- b. Technical Specification requirements for operability (to include lift setpoint)
- c. Impact on plant if they fail open (include how the operators can determine which valve has failed and operator response to failure)

Answer: C

38. 039G2.1.28 1

Per Tech Spec 3.7.4 "Atmospheric Relief Valves (ARVs)," which one of the following identifies;

(1) the primary purpose of the ARVs,

and

(2) the basis for requiring three operable ARVs in modes 1, 2, and 3?

A. (1) The ARVs provide for cooling the unit to RHR entry conditions should the Steam Dumps not be available.

(2) Ensure ARV capacity for cooldown following a SGTR assuming a failure of one ARV.

B. (1) The ARVs provide for cooling the unit to RHR entry conditions should the Steam Dumps not be available.

(2) Ensure ARV capacity for a 50°F/hr cooldown assuming a failure of one ARV.

C. (1) The ARVs limit operation of Main Steam Safety Valves during transients.

(2) Ensure ARV capacity for cooldown following a SGTR assuming a failure of one ARV.

D. (1) The ARVs limit operation of Main Steam Safety Valves during transients.

(2) Ensure ARV capacity for a 50°F/hr cooldown assuming a failure of one ARV.

039G2.1.28 Main and Reheat Steam System

Knowledge of the purpose and function of major system components and controls (CFR 41.7)

K/A MATCH ANALYSIS

The question asks for the purpose of ARVs per Tech Specs and the basis for requiring three operable.

SRO 10CFR55.43 (b2)

ANSWER / DISTRACTOR ANALYSIS

A. Correct. First Part correct. This is the purpose from the safety analysis section of Tech Spec 3.7.4 bases.

Second Part correct. This is in the safety analysis section of Tech spec 3.7.4 discussion of limiting single failure.

B. Incorrect. First Part correct. This is the purpose from the safety analysis section of Tech Spec 3.7.4 bases.

Second Part incorrect. The ARVs are sized to allow cooldown to cold shutdown with one ARV. No rate is specified. The 50 degree/hour cooldown is in the bases for CST water volume which adds plausibility to the answer.

C. Incorrect. First Part incorrect. The answer given is a system design criterion that is a plausible Tech Spec purpose for the ARVs.

Second Part correct. This is in the safety analysis section of Tech spec 3.7.4 discussion of limiting single failure as the basis for three operable.

D. Incorrect. First Part incorrect. The answer given is a system design criterion that is a

plausible Tech Spec purpose for the ARVs.

Second Part incorrect. The ARVs are sized to allow cooldown to cold shutdown with one ARV. No rate is specified. The 50 degree/hour cooldown is in the bases for CST water volume which adds plausibility to the answer.

REFERENCES

Tech Spec Bases 3.7.4

VEGP learning objectives:

LO-PP-21101-10 Discuss the following concerning the "Atmospheric Relief valves" (ARV):

- a. Why we have them
- b. Basic description of how they operate (automatic and manual)
- c. Where each can be operated from
- d. Technical Specification requirements for operability
- e. Impact on plant if they fail open (include how the operators can determine which valve has failed and operator response to failure)
- f. Power supplies required to operate from the control room

Figure 1: Screening for SRO-only linked to 10 CFR 55.43(b)(2) (Tech Specs)

Can question be answered *solely* by knowing ≤ 1 hour TS/TRM Action?

Yes RO question

No

Can question be answered *solely* by knowing the LCO/TRM information listed "above-the-line?"

Yes RO question

No

Can question be answered *solely* by knowing the TS Safety Limits?

Yes RO question

No

Does the question involve one or more of the following for TS, TRM, or ODCM?

Application of Required Actions (Section 3) and Surveillance Requirements (Section 4) in accordance with rules of application requirements (Section 1)

Application of generic LCO requirements (LCO 3.0.1 thru 3.0.7 and SR 4.0.1 thru 4.0.4)

Knowledge of TS bases that is required to analyze TS required actions and terminology

Yes SRO only

Answer: A
39. 039K5.08 1

Given the following plant conditions:

- Unit 1 is at EOL conditions.
- A Reactor Startup is in progress following a 5 day outage.
- The Estimated Critical Condition (ECC) calculation predicts criticality at 100 steps on Control Bank D.

Which one of the following conditions will result in critical rod height being HIGHER than the value predicted by the ECC?

- A. A dilution of 500 gallons is performed.
- B. Aux Feedwater flow is RAISED to all SGs.
- C. A Post Maintenance Test results in the closure of all MSIVs.
- D. Steam Dump controller fails, resulting in a steam pressure DROP of 50 psig.

039K5.08 Main and Reheat Steam

Knowledge of the operational implications of the following concepts as they apply to the MSRS (CFR 41.5 / 45.7) :

Effect of steam removal on reactivity

K/A MATCH ANALYSIS

The question presents a plausible scenarios where the candidate must determine reactivity effect on the ECC, three of which are secondary system perturbations and two of these are main steam including the correct answer.

ANSWER / DISTRACTOR ANALYSIS

- A. Incorrect. A dilution results in positive reactivity addition. ECC rod height will be lower.
- B. Incorrect. More AFW flow will lower RCS temp adding positive reactivity (Negative MTC at EOL). ECC rod height will be lower.
- C. Correct. MSIV closure will increase RCS temp to ARV lift sepoint (approx 5 degrees) adding negative reactivity (Negative MTC at EOL). ECC rod height will be higher.
- D. Incorrect. Lowering main steam pressure lowers RCS temp adding positive reactivity (Negative MTC at EOL). ECC rod height will be lower.

REFERENCES

Watts Bar 2008 RO NRC exam question # 41

VEGP learning objectives:

V-LO-LP-61201-02 During subcritical conditions, state the possible effect on subcriticality of the following:

- a. Rod withdrawal/insertion
- b. Boron concentration changes
- c. Xenon concentration changes
- d. Heat removal/addition

Answer: C
40. 040AA1.20 1

Initial conditions:

- Unit 1 is operating at 100% power.

Current conditions:

- Reactor power is 100.4% and slowly rising.

- RCS pressure is 2212 psig and slowly lowering.
- Turbine load is 1200 MWe and lowering.
- Containment pressure is 1.4 psig and rising.
- Containment temperature is 117.5°F and rising.

Which one of the following correctly completes the following statement?

A ___(1)___ break is the event in progress

and

per 18008-C, "Secondary Coolant Leakage", the crew will ___(2)___ to lower Reactor power.

___(1)___

___(2)___

- | | |
|--------------|----------------------|
| A. steamline | reduce turbine load |
| B. steamline | manually insert rods |
| C. feedline | reduce turbine load |
| D. feedline | manually insert rods |

040AA1.20 Steam Line Rupture

Ability to operate and/or monitor the following as they apply to the Steam Line Rupture (CFR 41.7 / 45.5 / 45.6):

Containment pressure and temperature trends

K/A MATCH ANALYSIS

The question presents a plausible scenario where a secondary break has occurred in containment. The candidate must be able to differentiate between steam line or feed line break and the first actions he is required to take.

ANSWER / DISTRACTOR ANALYSIS

A. Correct. First part is correct, power rising, turbine MWe lowering, and RCS pressure lowering coincident with containment temperature and pressure rising are classic indications of a steamline break.

Second part is correct, first action per AOP-18008-C, "Secondary Coolant

Leakage" is to reduce Turbine load.

- B. Incorrect. First part is correct, power rising, turbine MWe lowering, and RCS pressure lowering coincident with containment temperature and pressure rising are classic indications of a steamline break.

Second part is incorrect, first action per AOP-18008-C, "Secondary Coolant Leakage" is to reduce Turbine load. It is a common misconception among many candidates to use rods to initially lower reactor power.

- C. Incorrect. First part is incorrect, power rising, turbine MWe lowering, and RCS pressure lowering coincident with containment temperature and pressure rising are classic indications of a steamline break. On a feedline break, power would be stable, turbine MWe would be stable, and RCS pressure would be stable.

Second part is correct, first action per AOP-18008-C, "Secondary Coolant Leakage" is to reduce Turbine load.

- D. Incorrect. First part is incorrect, power rising, turbine MWe lowering, and RCS pressure lowering coincident with containment temperature and pressure rising are classic indications of a steamline break. On a feedline break, power would be stable, turbine MWe would be stable, and RCS pressure would be stable.

Second part is incorrect, first action per AOP-18008-C, "Secondary Coolant Leakage" is to reduce Turbine load. It is a common misconception among many candidates to use rods to initially lower reactor power.

REFERENCES

AOP-18008-C, "Secondary Coolant Leakage", version 9.1.

VEGP learning objectives:

LO-PP-37121-05 Describe the plant response to the following conditions:

- a. steam line break vs feed line break

LO-LP-60308-03 Given the entire AOP, describe:

- a. Purpose of selected steps.
- b. How and why the step is being performed.
- c. Expected response of the plant/parameter(s) for the step.

Answer: A
41. 041K3.02 1

Unit 1 is at full power.

The Main Turbine trips due to high vibration.

Reactor Trip Breaker B remains shut.

Which one of the following correctly completes the following statement?

RCS temperature will be controlled at ___(1)___ due to Steam Dumps controlling on the ___(2)___ controller.

___(1)___ ___(2)___

- A. 559°F plant trip
- B. 559°F load reject
- C. 557°F plant trip
- D. 557°F load reject

041K3.02 Steam Dumps

Knowledge of the effect that a loss or malfunction of the SDS will have on following (CFR 41.7 / 45.6):

RCS

K/A MATCH ANALYSIS

The question presents a plausible scenario where a plant trip has occurred with trip breaker "B" failing to open. The candidate must determine the temperature where steam dumps will control RCS Tave and which mode of operation the steam dumps are operating.

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. First part is correct. 559°F is the correct RCS temperature.

Second part is incorrect. It is plausible that the plant trip controller is controlling if candidate does not know P-4 train B shift to the plant trip controller from load rejection controller.

B. Correct. Load reject controller will control RCS Tave at 559°F.

C. Incorrect. First part is incorrect. This is correct response without P-4 Train B failure which is plausible if candidate does factor the failure into the response.

Second part is incorrect. This is correct response without P-4 Train B failure which is plausible if candidate does factor the failure into the response.

D. Incorrect. First part is incorrect. This temperature is no load temperature. it is plausible if the candidate does not apply the load reject controller setpoint.

Second part is correct.

REFERENCES

V-LO-TX-21201, Steam Dump System, pages 19 - 23.

1X6AA02-00234 Functional Diagram for Steam Dump Control

VEGP learning objectives:

LO-PP-21201-07 Discuss how the Steam Dump System will respond to a Reactor Trip from Reactor Power level.

LO-PP-21201-17 Discuss how the Steam Dump System will respond to a large temperature error signal in the Tavg Mode of operation.

Answer: B

42. 051AA2.02 1

Initial conditions:

- Unit 2 is at 55% power ramping up at 3% per hour.
- Condenser vacuum is degrading.
- ALB19-B04, TURB COND VAC LO alarms.
- 18040-C, "Partial Loss of Condenser Vacuum", actions are in progress.

Current conditions:

- Power has been reduced to 45%.
- Condenser vacuum is 22.35 in Hg and lowering.

Based on the current conditions, a Reactor trip ___(1)___ required
and

the Steam Dumps ___(2)___ operate.

___(1)___ ___(2)___

- A. is will
- B. is will NOT
- C. is NOT will
- D. is NOT will NOT

051AA2.02 Loss of Condenser Vacuum

**Ability to determine and interpret the following as they apply to the
Loss of Condenser Vacuum (CFR 43.5 / 45.13):**

Conditions requiring reactor and/or turbine trip

K/A MATCH ANALYSIS

The question presents a plausible scenario where a loss of condenser vacuum is occurring during a power ascent. Candidate must chose correct action per 18040-C and / or given vacuum conditions.

ANSWER / DISTRACTOR ANALYSIS

- A.Incorrect. A reactor trip is required per 18040-C and a Reactor trip should occur at 22.42 inches Hg (Due to Turbine Trip > P-9). Steam dumps will NOT operate with vacuum < 24.92 inches.
- B. Correct. A reactor trip is required per 18040-C and a Reactor trip should occur at 22.42 inches Hg (Due to Turbine Trip > P-9). Steam dumps will NOT operate with vacuum < 24.92 inches.

C. Incorrect. A reactor trip is required per 18040-C and a Reactor trip should occur at 22.42 inches Hg (Due to Turbine Trip > P-9). Steam dumps will NOT operate with vacuum < 24.92 inches.

D. Incorrect. A reactor trip is required per 18040-C and a Reactor trip should occur at 22.42 inches Hg (Due to Turbine Trip > P-9). Steam dumps will NOT operate with vacuum < 24.92 inches.

REFERENCES

AOP 18040-C," Partial Loss of Condenser Vacuum" Ver. 2.0

ARP- 17019-1 Ver 24.0 windows A04 and B04

1X6AA00-00240 Functional Diagram for Turbine Trips, Runbacks, & Other Signals

VEGP learning objectives:

LO-PP-60333-02 Given the entire AOP, describe:

- a. Purpose of selected steps
- b. How and why the step is being performed
- c. Expected response of the plant/parameter(s) for the step

Answer: B
43. 054AA2.02 1

Initial conditions:

- Unit 1 is at full power.

Current conditions:

- Spurious Train "A" Safety Injection signal occurs.

Which one of the following is correct regarding the status of the Main Feedwater Pumps?

	<u>MFW Pump "A"</u>	<u>MFW Pump "B"</u>
A.	Tripped on SI	Tripped on SI
B.	Tripped on SI	Running - will trip on manual operator action
C.	Tripped on SI	Running - will trip on P-4, Low Tavg FWI
D.	Running - will trip on P-4 , Low Tavg FWI	Running - will trip on P-4, Low Tavg FWI

054AA2.02 Loss of MFW

Ability to determine and interpret the following as they apply to the Loss of Main Feedwater (CFR 43.5 / 45.13):

Differentiation between loss of all MFW and trip of one MFW pump

K/A MATCH ANALYSIS

The question presents a plausible scenario where a spurious SI occurs while the plant is at power. The candidate must determine the effect of the spurious SI on the MFP's for both trains.

ANSWER / DISTRACTOR ANALYSIS

A. Correct. MFP "A" will trip on the SI is correct.

MFP "B" will trip on the SI is correct, either train SI trips both pumps.

B. Incorrect. MFP "A" will trip on the SI is correct.

MFP "B" will trip on the SI, manually tripping the MFP is plausible if the candidate does not realize a single train SI trips both MFPs because on a normal reactor trip the operators are required to manual trip the MFP.

C. Incorrect. MFP "A" will trip on the SI is correct.

MFP "B" will trip on the SI, MFP "B" tripping on P-4, Low Tave FWI is plausible if the candidate does not realize a single train SI trips both MFPs. Low Tave FWI shuts the FWI valves but does not trip the MFP.

D. Incorrect. Both MFPs will trip on the single train SI. P-4, Low Tave FWI is plausible if the candidate does not realize a single train SI trips both MFPs. Low Tave FWI shuts the FWI valves but does not trip the MFPs.

REFERENCES

Callaway 2005 RO NRC exam question # 49

V-LO-TX-28101, Reactor Protection System pages 18, 28, and 29

1X6AA02-00237 Functional Diagram Feedwater Control and Isolation

VEGP learning objectives:

LO-LP-28103-05 List all ESF actuation signals with applicable set points, coincidences, permissives, blocks, and discuss the systems response to each ESF actuation signal.

LO-PP-18101-26 Discuss the conditions that will lead to Feedwater Isolation Signal to include:

- a. Actuating signal
- b. Logic for the actuating signal
- c. Bases for each signal

Answer: A

44. 054AG2.1.7 1

Unit 1 is at 78% power and stable when the following occurs:

- ALB13-A01 (B01, C01, D01) STM GEN 1 (2,3,4) FLOW MISMATCH alarms.
- ALB13-A06 (B06, C06, D06) STM GEN 1 (2,3,4) HI/LO LVL DEVIATION alarms.
- ALB15-B05 MFPT DISCH HDR LO PRESS alarms.
- Feed flow indications less than Steam flow indications on all SGs.

- SS enters 18016-C, "Condensate and Feedwater Malfunction".

To PREVENT having to trip the Reactor, which one of the following procedure sections must be performed?

- A. SECTION A. LOSS OF MAIN FEED PUMP
- B. SECTION B. CONDENSATE OR HEATER DRAIN PUMP TRIP
- C. SECTION D. MAIN FEEDWATER VALVE MALFUNCTION
- D. SECTION E. FAILURE OF MFP SPEED CONTROL

054AG2.1.7 Loss of Main Feedwater

Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation. (CFR 41.5. / 43.5 / 45.12 / 45.13)

K/A MATCH ANALYSIS

The question presents a plausible scenario where candidate must determine, from the given plant conditions that are common to all sections, the proper procedure section to enter to prevent a reactor trip. SRO is responsible for selecting procedure sections when all normal symptoms for a given condition are not present.

SRO 10CFR55.43 (b)(5)

ANSWER / DISTRACTOR ANALYSIS

- A. Incorrect. The stem provides indications of feed < steam mismatches on all SGs and low MFPT HDR pressure. No MFP trip indications are provided. It is plausible that a candidate could select this section, but with power >70% IOAs would be to perform a RX Trip. No guidance is provided in this section to attempt to control MFP speed.

- B. Incorrect. The stem provides indications of feed < steam mismatches on all SGs and low MFPT HDR pressure. No MFP low suction pressure indications

are provided which would indicate a condensate or heater pump trip. It is plausible that a candidate could select this section, but this section, focuses on increasing suction pressure while monitoring SG levels for Rx Trip criteria. Guidance is provided in this section to to lower MFP speed only to maintain suction pressure > 275 psig.

C. Incorrect. The stem provides indications of feed < steam mismatches on all SGs and low MFPT HDR pressure. These symptoms will rule out a single FRV failure since all 4 SGs are affected.

D. Correct. The stem provides indications of feed < steam mismatches on all SGs and low MFPT HDR pressure. These are the symptoms of a MFP controller malfunction. This section allows manual control of MFP speed.

REFERENCES

AOP 18016-C, "Condensate and Feedwater Malfunction" Ver. 23.2

VEGP learning objectives:

V-LO-LP-60314-04 Given conditions and/or indications, determine the required AOP to enter (including subsections, as applicable).

V-LO-LP-60314-05 Given the entire AOP, describe:

- a. Purpose of selected steps
- b. How and why the step is being performed
- c. Expected response of the plant/parameter(s) for the

step

Figure 2: Screening for SRO-only linked to 10 CFR 55.43(b)(5) (Assessment and selection of procedures)

Can the question be answered *solely* by knowing "systems knowledge", i.e., how the system works, flowpath, logic, component location?

Yes RO question

No

Can the question be answered *solely* by knowing immediate operator actions?

Yes RO question

No

Can the question be answered *solely* by knowing entry conditions for AOPs or plant parameters that require direct entry to major EOPs?

Yes RO question

No

Can the question be answered *solely* by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure?

Yes RO question

No

Does the question require one or more of the following?

Assessing plant conditions (normal, abnormal, or emergency) and then selecting a procedure or section of a procedure to mitigate, recover, or with which to proceed

Knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps

Knowledge of diagnostic steps and decision points in the EOPs that involve transitions to event specific subprocedures or emergency contingency procedures

Knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures

Yes SRO-only

Answer: D

45. 055EA2.01 1

Procedure titles are as follows:

- 19101-C, "ECA-0.1, Loss of All AC Power Recovery Without SI Required"
- 19102-C, "ECA-0.2, Loss of All AC Power Recovery With SI Required"

Initial conditions:

- 19100-C, "ECA-0.0, Loss of All AC Power" is in progress on Unit 1.

Current conditions:

- 1AA02 is energized from the SAT.

- RCS subcooling is 36°F.
- PRZR level is 35%.
- Both BIT valves are closed.
- CNMT pressure is 0.4 psig.

Which one of the following correctly completes the following statements?

When instrument air pressure is lost, FV-0121, Charging Flow Control valve will fail to the ___(1)___ position

and

based on the current conditions, the SS will direct transition to ___(2)___ .

___(1)___ ___(2)___

- A. open 19101-C
- B. open 19102-C
- C. closed 19101-C
- D. closed 19102-C

055EA2.01 Loss of Offsite and Onsite Power (Station Blackout)

Ability to determine and interpret the following as they apply to the Station Blackout:

**Existing valve positioning on a loss of instrument air system
(CFR 43.5 / 45.13)**

K/A MATCH ANALYSIS

The question presents a plausible scenario where all offsite power is lost to the class 1E 4160 buses and the Non-1E 4160 buses. The candidate must determine the failure mode of FV-0121 on loss of instrument air. The candidate must also determine from given conditions once power is restored to one 1E bus, the proper transition from 19100-C to a recovery procedure.

SRO 10CFR55.43 (b)(5) assessment and selection of procedures

ANSWER / DISTRACTOR ANALYSIS

A. Correct. The first half is correct, FV-0121 will fail to the open position.

The second half is correct, 19101-C is the correct transition due to SI is NOT required per step 49 of 19100-C, "ECA-0.0, Loss of All AC Power".

B. Incorrect. The first half is correct, FV-0121 will fail to the open position.

The second half is incorrect, 19101-C is the correct transition due to SI is NOT required per step 49 of 19100-C, "ECA-0.0, Loss of All AC Power".

C. Incorrect. The first half is incorrect, FV-0121 will fail to the open position.

The second half is correct, 19101-C is the correct transition due to SI is NOT required per step 49 of 19100-C, "ECA-0.0, Loss of All AC Power".

D. Incorrect. The first half is incorrect, FV-0121 will fail to the open position.

The second half is incorrect, 19101-C is the correct transition due to SI is NOT required per step 49 of 19100-C, "ECA-0.0, Loss of All AC Power".

REFERENCES

19100-C, ECA 0.0, Loss of All AC Power, version # 37

18028-C, Loss of Instrument Air, version # 26.2

V-LO-PP-09200-02.1, CVCS Charging, slide # 71

VEGP learning objectives:

LO-LP-37031-08, Using EOP 19100 as a guide, briefly describe how each step is accomplished.

LO-LP-37032-01, State the entry conditions for 19101-C.

LO-LP-37033-01, State the entry conditions for 19102-C.

LO-PP-09200-06, Given that a partial or complete loss of instrument air has occurred, determine how the CVCS charging system will respond and describe the steps that are required to control RCS inventory and seal injection.

Figure 2: Screening for SRO-only linked to 10 CFR 55.43(b)(2) (Assessment and selection of procedures)

Can question be answered *solely* by knowing "systems knowledge", i.e., how the

system works, flowpath, logic, component location?

Yes RO question

No

Can question be answered *solely* by knowing immediate operator actions?"

Yes RO question

No

Can question be answered *solely* by knowing entry conditions for AOPs or plant parameters that required direct entry into major EOPs?

Yes RO question

No

Can the question be answered *solely* by knowing the purpose, overall sequence of events or overall mitigative strategy of a procedure?

Yes RO question

No

Does the question require one or more of the following?

Assessing plant conditions (normal, abnormal, or emergency) and then selecting a procedure or section of a procedure to mitigate, recover, or with which to proceed.

Knowledge of when to implement attachments and appendices, including how to coordinate, these items with procedure steps.

Knowledge of diagnostic steps and decision points in the EOPs that involve transitions to event specific sub-procedures or emergency contingency procedures.

Knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures.

Yes SRO only

Answer: A

46. 055EA2.02 1

Initial conditions:

- A Loss of All AC power (station blackout) occurs on Unit 1.
- Power has been restored to both emergency buses.
- 19101-C, "ECA-0.1 Loss of All AC Power Recovery Without SI Required" is in effect.

Current conditions:

- ALL SG pressures are 965 psig and stable.
- CETCs are 567°F and stable.
- Subcooling is 69°F and stable.
- RCS Hot leg temperatures are 563°F and stable.
- RCS Cold leg temperatures are 542°F and stable.

Which one of the following correctly completes the following statement?

Per 19101-C, natural circulation __ (1) __ occurring

and

to establish / maintain natural circulation, steam release will be through the __ (2) __.

__ (1) __ __ (2) __

- A. is steam dumps
- B. is ARVs
- C. is NOT steam dumps
- D. is NOT ARVs

055EA2.02 Loss of All AC power (Station Blackout)

Ability to determine and interpret the following as they apply to a Loss of All AC power (Station Blackout) (CFR 43.5 / 45.13):

RCS cooling through natural circulation cooling to SG cooling

K/A MATCH ANALYSIS

The question presents a plausible scenario where the candidate must verify natural circulation conditions exist during recovery from a loss of all AC power and know that ARVs are the only method of steam release available.

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. First part correct. All parameters are met.

Second part incorrect. Steam dumps are not available due to no circulating water pumps running, but plausible as steam dumps are the preferred method.

B. Correct. First part correct. All parameters are met.

Second part correct. ARVs are the only method available.

C. Incorrect. First part incorrect. Since all parameters are stable it is plausible the candidate may believe natural circulation is not occurring.

no Second part incorrect. Steam dumps are not available due to circulating water pumps running, but plausible as steam dumps are the preferred method.

D. Incorrect. First part incorrect. Since all parameters are stable it is plausible the candidate may believe natural circulation is not occurring.

Second part correct. ARVs are the only method available.

REFERENCES

19100-C, "ECA-0.0, Loss of All AC Power Recovery" version # 37.0.

19101-C, "ECA-0.1 Loss of All AC Power Recovery Without SI Required" Version 24.0.

1X6AA00-00234, Functional Diagram for Steam Dump Control (already included on question # 34).

VEGP learning objectives:

V-LO-LP-37032-02 Describe the major actions of 19101-C.

V-LO-LP-37031-08 Using EOP 19100-C as a guide, briefly describe how each step is accomplished.

Answer: B

47. 056AK1.03 1

Given the following:

- Following an LOSP, the crew is performing 19001-C, "ES-0.1 Reactor Trip Response."
- RCS pressure is 2045 psig.
- RCS Hot leg Temperatures are 574°F.
- RCS Cold leg Temperatures are 553°F.
- CETCs are 580°F.

Which one of the following is the correct value of subcooling?

- A. 60°F
- B. 63°F
- C. 66°F
- D. 76°F

056AK1.03 Loss of offsite power

Knowledge of the operational implications of the following concepts as they apply to the Loss of Offsite Power (CFR 41.8 / 41.10 / 45.3):

Definition of subcooling: use of steam tables to determine it

K/A MATCH ANALYSIS

The question presents a plausible scenario where offsite power is lost and the candidate must calculate subcooling using pressure and temperature indications and steam tables.

ANSWER / DISTRACTOR ANALYSIS

- A. Correct. This calculation uses T_{sat} for 2060 psia (640°F - 580°F).
- B. Incorrect. A plausible error would be to average the hottest temps. This calculation is correct if T-hot and Core exit temp is averaged and used instead of Core exit temps.
- C. Incorrect. A plausible error would be to use T-hot. This calculation is correct if T-hot is used instead of Core exit temp.

D. Incorrect. A plausible error would be to use T-avg. This calculation is correct if T-avg calculated from T-hot and T-cold temps is used instead of Core exit temps.

REFERENCES

V-LO-TX-34700 Thermal Hydraulics Ver 3.0 page 8

Steam tables (based on 2000 ASME steam tables) printed by Derosa Printing Company

VEGP learning objectives:

V-LO-LP-33700-29 Define and describe subcooling margin.

Answer: A

48. 058AG2.4.9 1

Initial conditions:

- Unit 1 is in Mode 3, 2235 psig and 557°F, all systems in normal alignment.

Current conditions:

- 1CD1 de-energizes due to a bus fault.
- 1HV-8160, RCS LETDOWN LINE ISO VLV IRC indicates closed on the QMCB.
- Indicating lights are dark for 1HV-5106 TDAFW Pump Steam Admission Valve.
- The crew enters 18034-1, "Loss of Class 1E 125V DC Power", Section C for "Loss of 125V DC Bus 1CD1".

Per 18034-1, which one of the following correctly completes the following statement?

The Letdown Orifice valves (1HV-8149A, B, C) and the Letdown Isolations (1LV-459 and 1LV-460) are ___(1)___ to be closed,

and

the Shift Supervisor will enter LCO 3.7.5, "Auxiliary Feedwater" ___(2)___ .

__(1)__

__(2)__

- | | |
|-----------------|------------------------------------|
| A. required | Condition A for TDAFW Steam Supply |
| B. required | Condition B for TDAFW Train |
| C. NOT required | Condition A for TDAFW Steam Supply |
| D. NOT required | Condition B for TDAFW Train |

058AG2.4.9 Loss of DC Power

Knowledge of low power/shutdown implications in accident (e.g., loss of coolant or loss of residual heat removal) mitigation strategies (CFR 41.10 / 43.5 / 45.13)

K/A MATCH ANALYSIS

The question presents a plausible scenario where a loss of 125V 1E DC bus CD1 has occurred. This results in HV-5106, the TDAFW pump common steam admission valve failing as is (normally shut) and will prevent operation of the TDAFW pump from the QMCB.

The TDAFW pump would be rendered inoperable per Tech Specs. In addition, the TDAFW pump Trip and Throttle valve would fail as is and the speed governor would fail to the fully open position. These are additional items rendering the TDAFW pump inoperable for use. HV-5106 having no indication (loss of power) is given in the stem.

In addition, HV-8160 will lose power and fail shut due to a loss of power to 120V 1E Vital Bus, CY1A. This results in the 600 psig Letdown Relief valve lifting and relieving to the PRT (in essence a LOCA to the PRT). Step C2 of 18034-1/2 directs isolation of letdown for the purpose of terminating the LOCA to the PRT. Step E2 of 18032-1/2 also directs isolation of letdown for this purpose.

SRO 10CFR55.43 (b)(2)(Tech Specs)

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. First half is incorrect, while HV-8160 is closed, letdown is in effect lifting the 600 psig relief to the PRT. The Letdown Isolation valves and Orifices must be shut in order to isolate a LOCA to the PRT. It is plausible the candidate may think letdown is isolated with HV-8160 given indication, however, the Letdown Isolations and the Orifices must be closed per

procedure 18034 and 18032.

Second half is incorrect, it is plausible the candidate may think Tech Spec Condition A for TDAFW Steam Supply is the correct condition to apply. However, valve HV-5106 is a common steam supply and renders the TDAFW pump inoperable. The Speed governor and Trip and Throttle Valve in addition also render the TDAFW pump to be inoperable. Condition B is the correct condition to apply.

- B. Incorrect. First half is incorrect, while HV-8160 is closed, letdown is in effect lifting the 600 psig relief to the PRT. The Letdown Isolation valves and Orifices must be shut in order to isolate a LOCA to the PRT.

Second half is correct, Tech Spec Condition A for TDAFW Steam Supply is the correct condition to apply. Valve HV-5106 is a common steam supply and renders the TDAFW pump inoperable. The Speed governor and Trip and Throttle Valve in addition also render the TDAFW pump to be inoperable. Condition B is the correct condition to apply.

- C. Incorrect. First half is correct, while HV-8160 is closed, letdown is in effect lifting the 600 psig relief to the PRT. The Letdown Isolation valves and Orifices must be shut in order to isolate a LOCA to the PRT.

Second half is incorrect, it is plausible the candidate may think Tech Spec Condition A for TDAFW Steam Supply is the correct condition to apply. However, valve HV-5106 is a common steam supply and renders the TDAFW pump inoperable. The Speed governor and Trip and Throttle Valve in addition also render the TDAFW pump to be inoperable. Condition B is the correct condition to apply.

- D. Correct. First half is correct, while HV-8160 is closed, letdown is in effect lifting the 600 psig relief to the PRT. The Letdown Isolation valves and Orifices must be shut in order to isolate a LOCA to the PRT.

Second half is correct, Tech Spec Condition A for TDAFW Steam Supply is the correct condition to apply. Valve HV-5106 is a common steam supply and renders the TDAFW pump inoperable. The Speed governor and Trip and Throttle Valve in addition also render the TDAFW pump to be inoperable. Condition B is the correct condition to apply.

REFERENCES

Technical Specification 3.7.5, Auxiliary Feedwater System

Tech Spec Bases for 3.7.5, Auxiliary Feedwater System.

AOP-18034-1/2, "Loss of Class 1E 125V DC Power", section C for "Loss of 125V DC Bus CD1". (version 12)

AOP-18032-1/2, "Loss of 120AC Instrument Power", section E for "Loss of Vital Instrument Panel CY1A". (version 28.2)

061A2.03, Vogtle 2009 June SRO Exam, Question # 87

VEGP learning objectives:

LO-LP-60324-01 Given the appropriate plant drawings, logics, and/or procedures, describe how the plant will respond to a loss of the following 120VAC instrument panels.

e. 1CY1A

LO-LP-60324-02 Given that a loss of 120VAC instrument power has occurred to any of the following panels, and given the appropriate plant procedures, describe the operator actions required and why these actions are taken.

LO-LP-60324-03 Describe the required action(s) if stable plant conditions cannot be maintained, during the performance of AOP-18032-C, "Loss of 120 VAC Instrument Power" (Loss of Vital Instrument Bus Panel 1AY1A, or 1BY1B).

LO-LP-60329-01 Given that a loss of power has occurred to any of the following 125VDC vital buses and given the appropriate plant procedures, describe the operator actions required and why these actions are taken:

c. 1CD1

LO-LP-60329-02 Given the appropriate drawings, logics, and/or procedures, describe how the plant will respond to a loss of the following 125V DC buses:

c. 1CD1

Figure 1: Screening for SRO-only linked to 10 CFR 55.43(b)(2) (Tech Specs)

Can question be answered *solely* by knowing \leq 1 hour TS/TRM Action?

Yes RO question

No

Can question be answered *solely* by knowing the LCO/TRM information listed “above-the-line?”

Yes RO question

No

Can question be answered *solely* by knowing the TS Safety Limits?

Yes RO question

No

Does the question involve one or more of the following for TS, TRM, or ODCM?

Application of Required Actions (Section 3) and Surveillance Requirements (Section 4) in accordance with rules of application requirements (Section 1)

Application of generic LCO requirements (LCO 3.0.1 thru 3.0.7 and SR 4.0.1 thru 4.0.4)

Knowledge of TS bases that is required to analyze TS required actions and terminology

Yes SRO only

Answer: B

49. 058AK3.01 1

Given the following:

- DG1B is running for the monthly surveillance.
- A loss of 125V DC 1E bus 1BD1 occurs.

Depressing the DG1B Pull-to-Run / Push-to-Stop pushbutton will shut off ___(1)___.

The DG1B output breaker is required to be opened locally at the switchgear using ___(2)___.

___(1)___

___(2)___

- A. combustion air only the breaker TRIP pushbutton
- B. combustion air only the local breaker handswitch

- C. combustion air and fuel the breaker TRIP pushbutton
- D. combustion air and fuel the local breaker handswitch

058AK3.01 Loss of DC Power:

Knowledge of the reasons for the following responses as they apply to the Loss of DC Power.

Use of dc control power by D/Gs.

K/A MATCH ANALYSIS

Question gives a plausible scenario where a DG is running for a monthly surveillance when a loss of DC control power occurs. Candidate must choose the correct method to shutdown the DG.

ANSWER / DISTRACTOR ANALYSIS

- A. Incorrect. Normal starting and stopping circuitry is disabled with a loss of DC control power to 1BD11 / 1BD12. Pull-toRun button shuts off both combustion air and fuel, the breaker must be tripped locally using the TRIP pushbutton due to a loss of DC control power.
- B. Incorrect. Normal starting and stopping circuitry is disabled with a loss of DC control power to 1BD11 / 1BD12. Pull-toRun button shuts off both combustion air and fuel, the breaker must be tripped locally using the TRIP pushbutton due to a loss of DC control power.
- C. Correct. Normal starting and stopping circuitry is disabled with a loss of DC control power to 1BD11 / 1BD12. Pull-toRun button shuts off both combustion air and fuel, the breaker must be tripped locally using the TRIP pushbutton due to a loss of DC control power.
- D. Incorrect. Normal starting and stopping circuitry is disabled with a loss of DC control power to 1BD11 / 1BD12. Pull-toRun button shuts off both combustion air and fuel, the breaker must be tripped locally using the TRIP pushbutton due to a loss of DC control power.

REFERENCES

Vogtle 2007 RO NRC Exam question # 42

AOP-18034-C, "Loss of Class 1E 125V DC Power" version 12, step # B6.b

17035-1 B08 & B09, ARP for DG1A Engine Control Power "A" and "B" Failure

V-LO-PP-11101-40-001 from Vogtle LO Active Exam bank was used as the base for this question (slightly modified from bank).

VEGP learning objectives:

LO-PP-11101-40 Predict the effect on the following malfunctions on the operation of the diesel engine:

b. Loss of engine (A, B, or C) control power.

Answer: C

50. 059K4.08 1

Initial conditions:

- Unit 1 is operating at a steady state power level of 90%.
- All feedwater control systems in automatic.

Current conditions:

- STM GEN 2 FLOW MISMATCH annunciator illuminates.
- MFRV for Loop 2 is modulating in the OPEN direction.

Which one of the following channel failures caused the MFRV response?

- A. S/G pressure transmitter failed low.
- B. S/G feed flow transmitter failed high.
- C. S/G steam flow transmitter failed high.
- D. S/G narrow range level transmitter failed high.

059K4.08 Main Feedwater

Knowledge of MFW design feature(s) and/or interlock(s) which provide for the following (CFR 41.7):

Feedwater regulatory valve operation (on basis of steam flow, feed flow mismatch)

K/A MATCH ANALYSIS

The question presents a plausible scenario where a SG Flow Mismatch alarm is received and the associated MFRV is modulating open. The candidate has to determine from a list of SG instrumentation failures the cause of the plant response.

ANSWER / DISTRACTOR ANALYSIS

- A. Incorrect. SG pressure instrumentation failing low would result in the steam flow instrument failing flow due to density compensation from the pressure instrument. The MFRV would throttle closed anticipating lower feed flow requirements due to lower steam demand.
- B. Incorrect. SG feed flow instrumentation failing high would result in the MFRV throttling closed as feed flow would be too high relative to steam demand.
- C. Correct. SG steam flow instrumentation failing high would result in the MFRV throttling open in anticipation of higher steam flow requirements due to higher steam demand.
- D. Incorrect. SG level instrumentation failing high would result in the MFRV throttling closed due to SG level indicating higher than program level. The MFRV will throttle shut to attempt to reduce level.

REFERENCES

V-LO-TX-18101, Condensate and Feedwater

LO-PP-18101-23-001 from LOIT bank used as base for the question.

VEGP learning objectives:

LO-PP-18101-17 Discuss the operation of the following Steam Generator Level instrumentation.

- a. Narrow Range Instruments
- b. Wide Range instruments
- c. The affects of post accident conditions in Containment on

indicated level.

LO-PP-18101-23 Discuss how the Steam Generator Water Level Control System will respond to the following channel failures.

- a. level channel fails high

- b. level channel fails low
- c. steam flow channel fails high
- d. steam flow channel fails low
- e. feedwater flow channel fails high
- f. feedwater flow channel fails low

Answer: C
 51. 061A3.04 1

Initial conditions:

- MDAFW pump A is in automatic.
- MDAFW pump A mini-flow valve red light is LIT on the ZLB on the QMCB.
- MDAFW pump B is in automatic.
- MDAFW pump B mini-flow valve is in LOCAL control on Shutdown Panel B with the red light LIT on the handswitch.

Current conditions:

- An AFW actuation starts both MDAFW pumps.

If an operator were monitoring at each location, which one of the following will describe the mini-flow valves status for each of the MDAFW pumps?

MDAFW "A" mini-flow ZLB

MDAFW "B" mini-flow handswitch

- | | |
|-----------------------------------|--------------------------------|
| A. red light remains lit | red light remains lit |
| B. red light remains lit | green light lit, red light out |
| C. green light lit, red light out | red light remains lit |
| D. green light lit, red light out | green light lit, red light out |

061A3.04 Auxiliary Feedwater

Ability to monitor automatic operation of the AFW including (CFR 41.7 / 45.5):

Automatic AFW isolation

K/A MATCH ANALYSIS

The question presents a plausible scenario where both MDAFW pumps are in standby with the mini-flow valve for one pump in LOCAL control at a shutdown panel. The candidate must determine the mini-flow valve response to an AFW auto actuation.

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. The first part is incorrect, the MDAFW pump A miniflow will close once AFW flow initiates. The green light would illuminate on the ZLB.

The second part is correct, the MDAFW pump B miniflow in LOCAL control will not respond in auto and is under direct control of the operator, the red light would remain illuminated.

B. Incorrect. The first part is incorrect, the MDAFW pump A miniflow will close once AFW flow initiates. The green light would illuminate on the ZLB.

The second part is incorrect, the MDAFW pump B miniflow in LOCAL control will not respond in auto and is under direct control of the operator, the red light would remain illuminated.

C. Correct. The first part is correct, the MDAFW pump A miniflow will close once AFW flow initiates. The green light would illuminate on the ZLB, the red light would extinguish on the ZLB.

The second part is correct, the MDAFW pump B miniflow in LOCAL control will not respond in auto and is under direct control of the operator, the red light would remain illuminated.

D. Incorrect. The first part is correct, the MDAFW pump A miniflow will close once AFW flow initiates. The green light would illuminate on the ZLB, the red light would extinguish on the ZLB.

The second part is incorrect, the MDAFW pump B miniflow in LOCAL control will not respond in auto and is under direct control of the operator, the red light would remain illuminated.

REFERENCES

V-LO-TX-20101 Auxiliary Feedwater System, page 26

18038-1, Operation From Remote Shutdown Panels, version 32.1, Caution and step 32

VEGP learning objectives:

LO-LP-20101-04 List the AFW system automatic start signals and component

actuations.

- LO-LP-20101-18 Describe the differences between control room and remote shutdown panel operation of the AFW system.
- LO-PP-60326-06 Describe how the following equipment interlocks are affected after transfer to local control.

NSCW pumps and associated valves
PORVs / COPs
MDAFW Mini-Flow Valves
Pressurizer Heater Lo-Lo Level Protection
VCT low level protection
RHR pump miniflow protection

Answer: C
52. 061K6.02 1

Initial conditions:

- The Unit 1 TDAFW pump has a "mechanical overspeed trip" during pump startup.
- 1PV-15129 TDAFW Pump Trip Throttle Valve handswitch (1HS-15111) indicates green and amber.

Current conditions:

- 1HS-15111 green light only is lit.

Based on the current conditions, the amber light EXTINGUISHED when the ...

- A. mechanical trip linkage was manually reset.
- B. motor operator reached the full closed position.
- C. motor operator reached the 80% closed position.
- D. pump speed lowered below the mechanical overspeed trip setpoint.

061K6.02 Auxiliary Feedwater

Knowledge of the effect of a loss or malfunction of the following will have on the AFW components (CFR 41.7 / 45.7):

Pumps

K/A MATCH ANALYSIS

This question tests the candidates knowledge of the TDAFW pump trip and throttle valve handswitch status lights on the QMCB. The candidate must determine from a list of items the one which causes the amber light to extinguish after a reset.

ANSWER / DISTRACTOR ANALYSIS

- A. Correct. Mechanical trip linkage reset causes amber light to extinguish. The other 3 choices are plausible as they are items mentioned in the T & T valve reset section of the procedure.
- B. Incorrect. Mechanical trip linkage reset causes amber light to extinguish. The other 3 choices are plausible as they are items mentioned in the T & T valve reset section of the procedure.
- C. Incorrect. Mechanical trip linkage reset causes amber light to extinguish. The other 3 choices are plausible as they are items mentioned in the T & T valve reset section of the procedure.
- D. Incorrect. Mechanical trip linkage reset causes amber light to extinguish. The other 3 choices are plausible as they are items mentioned in the T & T valve reset section of the procedure.

REFERENCES

13610-1, Auxiliary Feed Water System Checklist 2, Auxiliary Feedwater System Alignment For Standby Readiness.

Vogtle Text Chapter 20, Auxiliary Feedwater System, page 12

VEGP learning objectives:

LO-PP-20101-07 Describe the control room indications of a TDAFW pump over speed trip.

Answer: A
53. 062A2.11 1

Initial conditions:

- Unit 1 is at 100% power.
- All Train A required equipment is in service.

Current conditions:

- A Loss of RAT A occurs.
- DG1A starts and re-energizes 1AA02.
- The crew enters 18031-C, "Loss of Class 1E Electrical Systems".

Per 18031-C, which one of the following components will require a manual start to align to the emergency bus?

- A. Reactor Cavity Cooling Fans
- B. Containment Cooling Fans
- C. ACCW Pump
- D. SFP Pump

062A2.11 AC Electrical Distribution

Ability to (a) predict the impacts of the following malfunctions or operations on the AC Electrical Distribution System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations. (CFR 41.5 / 43.5 / 45.3 / 45.13):

Aligning standby equipment with correct emergency power source (D/G)

K/A MATCH ANALYSIS

The question presents a plausible scenario where RAT "A" trips and the DG re-energizes the bus. The candidate must determine which component would require a manual start to align with the emergency power source per the procedure.

ANSWER / DISTRACTOR ANALYSIS

- A. Incorrect. Train A Reactor Cavity Coolers will re-start on the Train A load sequence.
- B. Incorrect. Train A Containment Coolers will re-start on the Train A load sequence.
- C. Incorrect. Train A ACCW pump will re-start on the Train A load sequence.

D. Correct. Train A SFP pump will load shed and not re-start on the Train A load sequence. SFP pump A will have to be locally started to close its breaker 480V Swgr powered from 1AA02 (emergency power source from DG).

REFERENCES

18031-C, "Loss Of Class 1E Electrical Systems", section B, Loss of Power with DG Tying to Bus.

V-LO-TX-29101, "Containment HVAC Systems".

V-LO-TX-04101, "Auxiliary Component Cooling Water System".

V-LO-TX-28201, "Safety Features Sequencer Sytem"

1X3D-BD-H01B Ver. 4.0 Elementary diagram for SFP pump A.

VEGP learning objectives:

LO-PP-28201-03 Describe sequencer operation, including load shedding, load sequencing, and diesel generator operation under the following conditions:

a. Undervoltage (UV)

LO-PP-29101-14 State all auto start signals for the Containment Cooling including set points and coincidence where applicable.

LO-PP-04101-04 From memory describe the expected system response and operator corrective actions for each of the following (ACCW):

b. LOSP

LO-LP-60323-05 Given the entire AOP(18031-C), describe:

- a. Purpose of selected steps
- b. How and why the step is being performed
- c. Expected response of the plant/parameter(s) for the step

Answer: D
54. 062AA2.03 1

Initial conditions:

- Unit 1 is in Mode 3 due to a loss of both trains of NSCW.
- A leaking Train A NSCW load has been isolated.
- Crew determines Train A NSCW can be restarted in single pump operation.

Current conditions:

- 13150A-1, "Train A Nuclear Service Cooling Water System", section 4.4.9, "Train A NSCW Single Pump Operation (Abnormal)" is being performed.

- ACCW HX valves have been throttled to their prestart positions.

Which one of the following is/are the NSCW Train A load(s) that must be ISOLATED prior to the restart of one NSCW pump?

- A. Component Cooling Water heat exchanger
- B. Diesel Generator Jacket Water heat exchanger
- C. Control Building Engineered Safety Features Chiller
- D. Containment Auxiliary Cooler and Reactor Cavity Cooler

062AA2.03 Loss of NSCW

Ability to determine and interpret the following as they apply to the Loss of NSCW (CFR 43.5 / 45.13):

The valve lineups necessary to restart SWS while bypassing the portion of the system causing abnormal condition.

K/A MATCH ANALYSIS

The question presents a plausible scenario where NSCW is being returned to single pump operations following isolation of a leak. The candidate must pick from a list the load which is isolated prior to restart of the NSCW pump in single pump operation.

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. The CCW Hx is plausible because this the load that is throttled while performing the pump IST surveillances.

B. Incorrect. The DG JW Hx is a plausible choice as it is a load and the single pump

operations (Outage) section 4.4.8 allows throttling if flow is too high.

C. Incorrect. The ESF chiller is a plausible choice but incorrect as there is a NOTE and steps in the procedure to monitor and adjust ESF chiller pump flow. This load is not isolated.

D. Correct. The Containment Auxiliary Cooler and Reactor Cavity Cooler are isolated as they do not support safety related loads. The procedure isolates this load and one pair of containment coolers.

REFERENCES

13150A-1, "Train A Nuclear Service Cooling Water System", section 4.4.9 for "Train A NSCW Single Pump Operation (Abnormal)".

VEGP learning objectives:

LO-LP-06101-14 Describe the operation of the NSCW system for single pump operations during refueling outages and in response to a loss of NSCW per the AOP.

Answer: D
55. 063A2.01 1

Initial conditions:

- Unit 1 is in Mode 3, with all systems in normal alignment.
- ALB34-B01, 125V DC SWGR 1BD1 TROUBLE illuminates.
- A ground was found on 125V DC bus 1BD1.
- Battery Charger 1BD1CA has been removed from service.

Current conditions:

- The ground on 1BD1 has cleared.
- Battery Charger 1BD1CA remains out of service.

Which one of the following correctly completes the statements below?

Based on the current conditions, in accordance with Tech Spec 3.8.4, "DC Sources - Operating," the Train B DC Source is ___(1)___,

and

when Battery Charger 1BD1CA is returned to service, procedure 13405-1, "125V DC 1E Electrical Distribution System" requires the Battery Charger to be in the ___(2)___

mode.

____(1)____

____(2)____

- | | |
|---------------|----------|
| A. INOPERABLE | float |
| B. INOPERABLE | equalize |
| C. OPERABLE | float |
| D. OPERABLE | equalize |

063A2.01 DC Electrical Distribution

Ability to (a) predict the impacts of the following malfunctions or operations on the DC electrical system and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations (CFR 41.5 / 43.5 / 45.3 / 45.13):

Grounds

K/A MATCH ANALYSIS

The question presents a plausible scenario where a ground occurs on a battery charger, then the ground clears when the charger is removed from service. The candidate has to determine the operability of the 125V DC bus with one charger removed from service. One charger is required for operability of the bus and the candidate must also determine which is the normal mode of operation for the battery chargers (normally operated in the float-charge mode of operation). All of the information for determining operability are in the bases of Tech Spec 3.8.4, "DC Sources-Operating"

SRO 10CFR55.43 (b)(2)(Technical Specifications)

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. The first half is incorrect. Per Tech Spec 3.8.4 bases, only one charger is required to be operable to support the associated DC power system.

The second half is correct, battery chargers are normally operated in the float-charge mode of operation versus the equalize mode.

B. Incorrect. The first half is incorrect. Per Tech Spec 3.8.4 bases, only one charger is

required to be operable to support the associated DC power system.

The second half is incorrect, battery chargers are normally operated in the float-charge mode of operation versus the equalize mode.

C. Correct. The first half is correct. Per Tech Spec 3.8.4 bases, only one charger is required to be operable to support the associated DC power system.

The second half is correct, battery chargers are normally operated in the float-charge mode of operation versus the equalize mode.

D. Incorrect. The first half is correct. Per Tech Spec 3.8.4 bases, only one charger is required to be operable to support the associated DC power system.

The second half is incorrect, battery chargers are normally operated in the float-charge mode of operation versus the equalize mode.

REFERENCES

Tech Spec Bases 3.8.4, "DC Sources-Operating"

063G2.2.25, Vogtle 2006 SRO Exam Question # 87

VEGP learning objectives:

LO-LP-39212-02 Given a set of Tech Specs and the bases, determine for a specific set of plant conditions, equipment availability, and operational mode:

a. Whether any Tech Spec LCOs of section 3.8 are exceeded.

Early Submittal
Suggest revise Q

Figure 1: Screening for SRO-only linked to 10 CFR 55.43(b)(2)
(Tech Specs)

Can question be answered *solely* by knowing \leq 1 hour TS/TRM Action?

Yes RO question

No

Can question be answered *solely* by knowing the LCO/TRM information listed "above-the-line?"

Yes RO question

No

Can question be answered *solely* by knowing the TS Safety Limits?

Yes RO question

No

Does the question involve one or more of the following for TS, TRM, or ODCM?

Application of Required Actions (Section 3) and Surveillance Requirements (Section 4) in accordance with rules of application requirements (Section 1)

Application of generic LCO requirements (LCO 3.0.1 thru 3.0.7 and SR 4.0.1 thru 4.0.4)

Knowledge of TS bases that is required to analyze TS required actions and terminology

Yes SRO only

Answer: C
56. 063K3.01 1

Unit 1 is operating at 100% power.

- A loss of 125V DC distribution panel 1AD11 occurs.

Which one is the following correctly completes the following statement?

DG1A __(1)__ be started,

and

if DG1A was running prior to the loss of 1AD11, the stop pushbuttons on the QEAB
__(2)__ stop the DG.

__(1)__

__(2)__

A. can will NOT

B. can will

- C. can NOT will NOT
- D. can NOT will

063K3.01 DC Electrical Distribution

Knowledge of the effect that a loss or malfunction of the DC Electrical system will have on following: (CFR 41.7 / 45.6):

ED/G

K/A MATCH ANALYSIS

The question asks the effect of a loss of 1AD11 on DG1A. The candidate must know the effect on starting capability and stopping capability from the control room.

ANSWER / DISTRACTOR ANALYSIS

- A. Incorrect. First part correct. The DG will still start on "B" circuit power powered from 1AD12 which is still available.
- Second part incorrect. Stopping circuitry is powered from 1AD12 which is still available but plausible if candidate believes stopping circuitry powered from 1AD11.
- B. Correct. First part correct. The DG will still start on "B" circuit power powered from 1AD12 which is still available.
- Second part correct. Stopping circuitry is powered from 1AD12 which is still available.
- C. Incorrect. First part incorrect. The DG will still start on "B" circuit power which is powered from 1AD12 but plausible if candidate believes both power sources are necessary for start.
- Second part incorrect. Stopping circuitry is powered from 1AD12 which is still available but plausible if candidate believes stopping circuitry powered from 1AD11.
- D. Incorrect. First part incorrect. The DG will still start on "B" circuit power which is powered from 1AD12 but plausible if candidate believes both power sources are necessary for start. .
- Second part correct. Stopping circuitry is powered from 1AD12 which is

still available.

REFERENCES

Vogtle Training Text Chapter 11-Emergency Diesel Generators

18034-1, Loss of Class 1E 125V DC Power, Attachment A, Loss of 125v DC bus 1AD1

VEGP learning objectives:

V-LO-PP-11101-40 Predict the effect on the following malfunctions on the operation of the diesel engine:

- a) Loss of low pressure control air
- b) Loss of engine (A,B, or C) control power
- c) Loss of generator control power

Answer: B

57. 063K4.04 1

Initial conditions:

- Unit 2 is in Mode 3, normal operating temperature and pressure.
- CCP "B" is in service.

Current conditions:

- 125V DC bus 2BD1 is inadvertently de-energized.

Which one of the following is correct regarding:

- (1) QMCB handswitch light(s) indication for CCP "B", and
- (2) CCP "B" breaker status if a fault occurs on the pump motor.

- | | __(1)__ | __(2)__ |
|----|---------------|----------------|
| A. | light(s) lit | trips open |
| B. | light(s) lit | remains closed |
| C. | no lights lit | trips open |
| D. | no lights lit | remains closed |

063K4.04 DC Electrical Distribution

Knowledge of DC Electrical System design feature(s) and/or interlock(s) which provide for the following: (CFR 41.7)

Trips

K/A MATCH ANALYSIS

The question presents a plausible scenario where a loss of a 125V DC switchgear BD1 has occurred. The student must determine if the design feature for QMCB indication for a major load (CCP "B") is available and if the breaker protective trips for CCP "B" still function.

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. The first part is incorrect, QMCB indications for CCP "B" are lost, it is plausible for the student to think the pump indications are still available as smaller loads from 480V MCCs indications such as valves are still available.

The second part is also incorrect, protective trip features for the breakers are also lost. It is plausible to think protective features would still trip the breakers.

B. Incorrect. The first part is incorrect, QMCB indications for CCP "B" are lost, it is plausible for the student to think the pump indications are still available as smaller loads from 480V MCCs indications such as valves are still available.

The second part is correct, protective trip features for the breakers are lost and the breaker will not open.

C. Incorrect. The first part is correct, the handswitch indication for CCP "B" is lost.

The second part is also incorrect, protective trip features for the breakers are also lost. It is plausible to think protective features would still trip the breakers.

D. Correct. CCP "B" indications are lost and the protective trip will not function and the breaker would remain closed.

REFERENCES

063K4.02 from Vogtle 2010 NRC Exam question # 48 used as a base model, the question is significantly different enough to be called new.

18034-1, Loss of Class 1E 125 V DC Power, Attachment B, Loss of 125V DC Bus 1BD1

VEGP learning objectives:

LO-PP-01101-05 Describe how a failure of DC control power affects the electrical distribution system and its components.

Answer: D
58. 064K6.07 1

The following conditions have occurred on Unit 1:

- Alignment problems have caused both DGs Air Start Receivers pressures to lower.

Current air start receiver pressure readings:

- DG1A air receiver pressures read 145 and 148 psig respectively.
- DG1B air receiver pressures read 148 and 155 psig respectively.

Which one of the following is correct regarding the DGs capability to perform a normal and emergency start?

	<u>Normal Start</u>	<u>Emergency Start</u>
A.	DG1A	BOTH
B.	BOTH	DG1A
C.	DG1B	BOTH
D.	BOTH	DG1B

064K6.07 Emergency Diesel Generator

**Knowledge of the effect of a loss or malfunction of the following will
(CFR: 41.7 / 45.7)**

Air receivers

K/A MATCH ANALYSIS

The question gives a plausible scenario where the DG air receiver pressures are low. The candidate has to determine from the given information whether each of the DGs will accept a normal or emergency start signal.

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. First column is correct, either DG can normal start.

Second column is incorrect, only DG1B would accept an emergency start signal, DG1A would not accept an emergency start signal as both air receivers are < 150 psig.

B. Incorrect. First column is correct, both DGs would accept a normal start signal.

Second column is incorrect, DG1A would not accept an emergency start signal as both air receivers are < 150 psig.

C. Incorrect. First column is correct, both DGs would accept a normal start signal.

Second column is incorrect, DG1A would not accept an emergency start signal as both air receivers are < 150 psig.

D. Correct. First column is correct, both DGs would accept a normal start signal.

Second column is correct, only DG1B would accept an emergency start signal, DG1A would not accept an emergency start signal as both air receivers are < 150 psig.

REFERENCES

SOP-13145A-1, "Diesel Generator Train A" Ver. 3.2 limitation 2.2.1

V-LO-TX-11101, Emergency Diesel Generator.

064K6.07 HL-16 RO Audit exam question # 49

LOIT Bank 064K6.07-01 (Vogle 2006 RO NRC Exam question # 51)

VEGP learning objectives:

LO-PP-11101-10 Describe the operation of each of the system components listed below as related to: 1) Engine Normal Start Signal ; 2) Engine Emergency Start Signal; 3) Low Air Start System pressure.

- a. air compressors
- b. air receivers
- c. solenoid operated air start admission valves

Answer: D

59. 065AK3.04 1

Initial conditions:

- Both units are at full power.

Current sequence of conditions:

- Unit 1 is losing instrument air pressure.
- The instrument air headers have been cross-tied.

Which one of the following correctly completes the following statements?

Per 18028-C, "Loss of Instrument Air", the Unit's instrument air headers are cross-tied in order to PREVENT ____ (1) ____

and

the isolation of the Unit's instrument air headers is required at ____ (2) ____.

- A. (1) the Unit 1 crew from having to perform a manual reactor trip
(2) 80 psig
- B. (1) the Unit 1 crew from having to perform a manual reactor trip
(2) 70 psig
- C. (1) losing the Spent Fuel Pool gate seals
(2) 80 psig
- D. (1) losing the Spent Fuel Pool gate seals
(2) 70 psig

065AK3.04 Loss of Instrument Air

Knowledge of the reasons for the following responses as they apply to the Loss of Instrument Air (CFR 41.5 / 41.10/ 45.6 / 45.13):

Cross-over to backup air supplies

K/A MATCH ANALYSIS

The question asks knowledge of the reasons the unit air headers are crosstied when one unit is losing instrument air pressure and the pressure at which the units must be re-isolated on lowering air pressure.

ANSWER / DISTRACTOR ANALYSIS

- A. Correct. Preventing a plant trip is the correct reason and the units must be reisolated at 80 psig and lowering.
- B. Incorrect. Preventing a plant trip is the correct reason and the units must be reisolated at 80 psig and lowering.
- C. Incorrect. Preventing a plant trip is the correct reason and the units must be reisolated at 80 psig and lowering. SFP gate seals will be lost if IA is lost but there is a back up N2 supply.
- D. Incorrect. Preventing a plant trip is the correct reason and the units must be reisolated at 80 psig and lowering. SFP gate seals will be lost if IA is lost but there is a back up N2 supply.

REFERENCES

18028-C, "Loss of Instrument Air" version 26.2

ALB01-C06, Annunciator Response Procedure for Service Air Header Lo Pressure

VEGP learning objectives:

- LO-LP-02101-02 State the number and type of compressors available for Unit 1 and Unit 2.
- LO-PP-02101-11 Using AOP-18028-C, describe the plant response to a loss of instrument air.
 - a. with the unit at full power.
 - b. Unit in mode 3
 - c. Unit in Mode 4, 5, or 6.
- LO-LP-60321-11 Given the entire AOP, describe:

- a. Purpose of selected steps.
- b. How and why the step is being performed.
- c. Expected response of the plant/parameter(s) for the step.

Answer: A
60. 068AA2.10 1

Initial conditions:

- A fire results in an evacuation of the Unit 1 Control Room.
- The crew is performing 18038-1, "Operation From Remote Shutdown Panels".

Current conditions:

- Counts on 1NI-13135D Neutron Flux Low Range (Extended Range) are reading erratic.

Which one of the following correctly completes the following statement?

The Neutron Flux Low Range (Extended Range) monitor is located on Remote Shutdown Panel __ (1) __

and

the Test / Status Control Switch in the Control Building is required to be placed to the __ (2) __ position

__ (1) __ __ (2) __

- A. Train A Local
- B. Train A App R
- C. Train B Local
- D. Train B App R

068AA2.10 Control Room Evacuation

Ability to determine and interpret the following as they apply to the Control Room Evacuation (CFR 43.5 / 45.13):

Source range count rate

K/A MATCH ANALYSIS

The question asks the candidate which shutdown panel has the Neutron Flux Low Range (SR counts) instrumentation available for remote shutdown operations. Knowing the location of the panel is tantamount to being able to determine the count rate. The candidate must know the proper switch position for the NFMS Amplifier Optical Isolation switch to prevent erroneous indication.

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. First part is incorrect, the Neutron Flux Low Range counts meter is located on Train B Shutdown Panel.

Second part is incorrect, Appendix R is the proper position. Local is plausible as most other remote shutdown panel handswitches are placed in local.

B. Incorrect. First part is incorrect, the Neutron Flux Low Range counts meter is located on Train B Shutdown Panel.

Second part is correct, Appendix R is the proper position.

C. Incorrect. First part is correct, the Neutron Flux Low Range counts meter is located on Train B Shutdown Panel.

Second part is incorrect, Appendix R is the proper position. Local is plausible as most other remote shutdown panel handswitches are placed in local.

D. Correct. First part is correct, the Neutron Flux Low Range counts meter is located on Train B Shutdown Panel.

Second part is correct, Appendix R is the proper position.

REFERENCES

V-LO-TX-17201, Nuclear Instrumentation Gamma-Metrics Source Range and Intermediate Range, Version. 2.0.

V-LO-TX -60327, Remote Shutdown Equipment, Version 1.0.

18038-1, Operation From Remote Shutdown Panels, version 32.1

VEGP learning objectives:

V-LO-PP-17201-03 Discuss the operation of the Extended Range to include:

- a. The channel signal flow path
- b. How it meets the Appendix R requirements

Answer: D

61. 071A1.06 1

Given the following conditions:

- Transfer of Gas Decay Tank # 2 contents to Gas Decay Tank # 4 is in progress.
- Auxiliary Bldg HVAC is in service.
- High radiation alarms are received on the following Rad monitors:

1RE-0039A Waste Gas Decay Tank - Radiogas

1RE-0039B Waste Gas Compressor & Catalytic Recombiner - Radiogas

1RE-12442C Plant Vent Radiogas Particulate (Low Range)

Which one of the following correctly completes the following statement regarding the Auxiliary Bldg HVAC and operator actions required (if any)?

The Auxiliary Bldg HVAC will ____ (1) ____ and the operator will ____ (2) ____ .

A. (1) trip

(2) manually start the Piping Penetration Units

B. (1) trip

(2) take no action with regards to Auxiliary Building HVAC

C. (1) remain running

(2) manually secure all Auxiliary Bldg HVAC

D. (1) remain running

(2) take no action with regards to Auxiliary Building HVAC

071A1.06 Waste Gas disposal

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with Waste Gas disposal System operating the controls including (CFR 41.5 / 45.5):

Ventilation System

K/A MATCH ANALYSIS

The question presents a plausible scenario where Aux Bldg and Plant Vent radiogas alarms are received during a transfer of Gas Decay Tank contents. The candidate must know the effect on the Aux Bldg HVAC and that no action is required on Aux Bldg HVAC to remain within design limits. The Gas Decay Tank Rupture analysis assumes entire contents released to environment in two hours.

ANSWER / DISTRACTOR ANALYSIS

- A. Incorrect. First part incorrect. There are no auto trips in Aux Bldg Normal HVAC except for CNMT High Rad CVI. It is plausible that one could confuse the rad monitors and high rad alarms usually automatically isolate the source.
- Second part correct. No action is taken per procedure, but it is plausible one could start ESF filtration to minimize release.
- B. Incorrect. First part incorrect. There are no auto trips in Aux Bldg Normal HVAC except for CNMT High Rad CVI. It is plausible that one could confuse the rad monitors and high rad alarms usually automatically isolate the source.
- Second part correct. No action is taken per procedure.
- C. Incorrect. First part correct. There are no auto trips in Aux Bldg Normal HVAC except for CNMT High Rad CVI. It is plausible that one could confuse the rad monitors and high rad alarms usually automatically isolate the source.
- Second part incorrect. No action is taken per procedure but is plausible, since the units trip on a CVI, one would manually secure them.
- D. Correct. First part correct. There are no auto trips in Aux Bldg Normal HVAC except for CNMT High Rad CVI.
- Second part correct. No action is taken per procedure.

REFERENCES

17100-1 pages 38, 39, 40, 41, 64, 65, 66 for RE-0039A, 0039B, RE-12442C, RE-12444-C.

071A1.06 from Vogtle 2010 RO Audit question # 49

VEGP learning objectives:

Not applicable

Answer: D

62. 071G2.1.23 1

Shutdown Gas Decay tank A-1902-V6-010 must be released.

A-RE-0014, Waste Gas Processing System Effluent Monitor is INOPERABLE.

Which one of the following correctly completes the following statement?

Per Procedure 13202-1, "Gaseous Releases" to release tank 10, the ____ (1) ____
Gaseous Waste Processing System(s) must be shutdown,

and

per the ODCM, effluent releases via this pathway may proceed provided ____ (2) ____ .

A. (1) Unit 1 and Unit 2

(2) at least two independent samples of the tank contents are analyzed, and at least two technically qualified members of the Facility Staff independently verify

the discharge line valving, and verify the release rate calculations

B. (1) Unit 1 and Unit 2

(2) grab samples are taken at least once per 12 hours and these samples are analyzed for radioactivity within 24 hours

C. (1) Unit 1 only

(2) at least two independent samples of the tank contents are analyzed, and at least two technically qualified members of the Facility Staff independently verify

the discharge line valving, and verify the release rate calculations

D. (1) Unit 1 only

(2) grab samples are taken at least once per 12 hours and these samples are analyzed for radioactivity within 24 hours

071G2.1.23 Waste Gas Disposal System

Ability to perform specific system and integrated plant procedures during all modes of operation (CFR 41.10 / 43.5 / 45.2 / 45.6)

K/A MATCH ANALYSIS

The candidate must know which systems must be shutdown to release shutdown tank 10 and the ODCM gaseous release required actions.

SRO 10CFR55.43 (b)(2)(Technical Specifications)

ANSWER / DISTRACTOR ANALYSIS

A. Correct. First part correct - found in step 3.3 of 13202-1, Gaseous Releases.

Second part correct, it is Action 45 of table 3-1 of ODCM for ARE-0014 inoperable.

B. Incorrect. First part correct - found in step 3.3 of 13202-1, Gaseous Releases.

Second part incorrect but plausible as it is Action 47 from ODCM table 3-1 for inop noble gas monitor

C. Incorrect. First part incorrect but plausible if the candidate does not know the all reliefs go to SDT 10.

Second part correct, it is Action 45 of table 3-1 of ODCM for ARE-0014 inoperable.

D. Incorrect. First part incorrect but plausible if the candidate does not know the all reliefs go to SDT 10.

Second part incorrect but plausible as it is Action 47 from ODCM table

3-1 for inop noble gas monitor.

REFERENCES

VEGP ODCM, Table 3-1, "Radioactive Gaseous Effluent Monitoring Instrumentation"

SOP 13202-1 Gaseous Releases Ver 19, Prerequisite & Initial Condition 3.3, NOTE at start of section 4.1

SOP 13202-2 Gaseous Releases Ver 14, NOTE at start of section 4.1

VEGP learning objectives:

LO-PP-46101-07 Predict the consequences of RE-014 failing high or low on the Gaseous Radwaste System during a gas release.

LO-PP-46101-10 Describe the major steps involved in releasing a gas decay tanks contents to the environment.

Figure 1: Screening for SRO-only linked to 10 CFR 55.43(b)(2) (Tech Specs)

Can question be answered *solely* by knowing \leq 1 hour TS/TRM Action?

Yes RO question

No

Can question be answered *solely* by knowing the LCO/TRM information listed "above-the-line?"

Yes RO question

No

Can question be answered *solely* by knowing the TS Safety Limits?

Yes RO question

No

Does the question involve one or more of the following for TS, TRM, or ODCM?

Application of Required Actions (Section 3) and Surveillance Requirements (Section 4) in accordance with rules of application requirements (Section 1)

Application of generic LCO requirements (LCO 3.0.1 thru 3.0.7 and SR 4.0.1 thru 4.0.4)

Knowledge of TS bases that is required to analyze TS required actions and terminology

Yes SRO only

Answer: A

63. 072K5.02 1

Given the following:

- Unit 1 is in Mode 5 during a refueling outage.
- A high rad trash container will be moved through the Containment personnel air lock.
- The container is staged at the entrance to the open airlock 15 feet away from 1RE-0004 Containment Hatch area rad monitor.
- 1RE-0004 is reading 5 mr/hr.
- During transport, the minimum distance from the container to 1RE-0004 is 2 feet.

The distances listed above include any difference in height from the container to the radiation monitor detector. Consider the container a radiation **point source**.

Based on these conditions, which one of the following correctly identifies the **MAXIMUM** reading 1RE-0004 will indicate during movement of the container through the air lock?

- A. 281 mr/hr
- B. 211 mr/hr
- C. 38 mr/hr
- D. 14 mr/hr

072K5.02 Area radiation monitoring

Knowledge of the operational implications of the following concepts as they apply to the ARM system (CFR 41.5 / 45.7):

Radiation intensity changes with source distance

K/A MATCH ANALYSIS

Questions presents a plausible scenario where a point source calculation should be made. The candidate is presented initial dose at a given distance. The candidate has to make a dose calculation for a new given distance.

ANSWER / DISTRACTOR ANALYSIS

- A. Correct- $I_1 \times (D1)^2 = I_2 \times (D2)^2$. Therefore, $5 \text{ mR/hr} \times (15 \text{ ft})^2 / (2 \text{ ft})^2 = I_2$
Therefore, $I_2 = 281 \text{ mr/hr}$.
- B. Incorrect-Plausible if an error subtracting the minimum distance from maximum then using that number in the equation.
- C. Incorrect-Plausible if candidate does not square the distances in the equation.
- D. Incorrect-Plausible if candidate uses the square root of the distances, instead of properly squaring the distances.

REFERENCES

V-LO-LP-38000-C Health Physics Fundamentals (point source formula)

VEGP learning objectives:

LO-LP-38000-14 Calculate the dose rate at a distance from a gamma point source or

Answer: A
64. 073K5.03 1

Given the following:

- An SO is preparing to flush RE-0018 following a pulse test in a field of 15 mr/hour prior to releasing a Waste Monitor Tank.
- The operator's exposure limit is 7.5 mrem.
- If the operator preplans his work, he can finish in 20 minutes.

How many mrem **below** his exposure limit will he be if he preplans his job?

- A. 1.25 mrem
- B. 2.5 mrem
- C. 5.0 mrem
- D. 7.5 mrem

073K5.03 Process radiation monitoring system

Knowledge of the operational implications as they apply to concepts as they apply to the PRM system. (CFR 41.5 / 45.7):

Relationship between radiation intensity and exposure limits

K/A MATCH ANALYSIS

The question presents a plausible scenario where an operator performing an alignment on a process radiation monitor reaches his dose limit in a given time. The candidate can calculate accumulated dose from the information given. The candidate can then calculate how much dose below his exposure limit will have been saved with preplanning of the evolution.

ANSWER / DISTRACTOR ANALYSIS

- A. Incorrect. Incorrect, the dose rate is 0.25 mr per minute. At 30 minutes his mr limit will have been 7.5 mr. At 20 minutes he will have received 5.0 mr. This means he will have been 2.5 mr under the limit. This is plausible as it is 1/2 of the correct figure and possible with a math error.
- B. Correct. Correct, the dose rate is 0.25 mr per minute. At 30 minutes his mr limit will have been 7.5 mr. At 20 minutes he will have received 5.0 mr. This means he will have been 0.5 mr under the limit.
- C. Incorrect. the dose rate is 0.25 mr per minute. At 30 minutes his mr limit will have been 7.5 mr. At 20 minutes he will have received 5.0 mr. This means he will have been 2.5 mr under the limit. This is plausible as 5.0 mr will be the dose received in 20 minutes if the candidate dose not subtract it from the original dose limit of 7.5 mr.

D. Incorrect. the dose rate is 0.25 mr per minute. At 30 minutes his mr limit will have been 7.5 mr. At 20 minutes he will have received 5.0 mr. This means he will have been 2.5 mr under the limit. This is the 30 minute dose limit and a plausible choice.

REFERENCES

Callaway 2009 June NRC exam question # 63.

V-LO-LP-38000 Health Physics Fundamentals

VEGP learning objectives:

Not applicable.

Answer: B

65. 074EA1.25 1

Initial conditions:

- The crew is performing 19221-C, "FR-C.1 Response To Inadequate Core Cooling".
- Safety Injection flow to the RCS can NOT be established.

Current conditions:

- The crew is depressurizing the SGs to depressurize the RCS.
- Atmospheric Relief Valves (ARVs) are being used for the depressurization.

Which one of the following correctly completes the following statements?

While depressurizing the SGs to 200 psig, ARV QMCB controller demand indication will be at ___(1)___

and

later, while depressurizing the SGs to atmospheric pressure, ARV controller demand indication will be at ___(2)___ .

___(1)___ ___(2)___

- A. ~25% ~25%
- B. ~25% 100%
- C. 100% ~25%

D. 100% 100%

074EA1.25 Inadequate Core Cooling-Red Path

Ability to operate and/or monitor the following as they apply to a Inadequate Core Cooling (CFR 41.7 / 45.5 / 45.6) :

Atmospheric dump valve controllers and indicators

K/A MATCH ANALYSIS

The question presents a plausible scenario where the crew is performing Inadequate Core Cooling and initiation of the SG depressurization to 200 psig and atmospheric is in progress. The candidate must determine the demand indication for the ARVs.

NOTE: A major action of the procedure is to "rapidly depressurize SGs to depressurize RCS", the ROs are responsible for knowing the major actions of the EOPs.

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. First part is incorrect, demand should be at 100% for a maximum rate cooldown, not 25%. It is plausible the candidate may think a maximum cooldown is not required or either 25% demand would be maximum rate such as with the 3 steam dump cooldown valves.

Second part is incorrect, demand should be at 100% for a maximum rate cooldown, not 25%. It is plausible the candidate may think a maximum cooldown is not required or either 25% demand would be maximum rate such as with the 3 steam dump cooldown valves.

B. Incorrect. First part is incorrect, demand should be at 100% for a maximum rate cooldown, not 25%. It is plausible the candidate may think a maximum cooldown is not required or either 25% demand would be maximum rate such as with the 3 steam dump cooldown valves.

Second part is correct, demand should be at 100% for a maximum rate cooldown.

C. Incorrect. First part is correct, demand should be at 100% for a maximum rate cooldown.

Second part is incorrect, demand should be at 100% for a maximum rate

cooldown, not 25%. It is plausible the candidate may think a maximum cooldown is not required or either 25% demand would be maximum rate such as with the 3 steam dump cooldown valves.

D. Correct. First part is correct, demand should be at 100% for a maximum rate cooldown.

Second part is correct, demand should be at 100% for a maximum rate cooldown.

REFERENCES

19221-C, "FR-C.1, Response To Inadequate Core Cooling", version 23.

VEGP learning objectives:

LO-LP-37061-01 Using EOP-19221-C as a guide, briefly describe how each step is accomplished.

Answer: D

66. 075K4.01 1

Initial conditions:

- Unit 2 is maintaining 55% power.
- Circ Water pump # 2 is tagged out.

Current conditions:

- An SO reports the oil has leaked out of the lower bearing on Circ Water pump # 1.
- The OATC trips the plant.
- The UO places Circ Water Pump # 1 handswitch to STOP.

Which one of the following correctly completes the following statement?

Circ Water pump # 1 stops ___(1)___

and

after the Circ water pump stops, the steam dumps will ___(2)___.

- A. (1) immediately
(2) NOT open
- B. (1) immediately
(2) open as required
- C. (1) after the discharge valve closes ~70%
(2) NOT open
- D. (1) after the discharge valve closes ~ 70%
(2) open as required

075K4.01 Circulating Water

Knowledge of Circulating Water system design feature(s) and/or interlock(s) which provide for the following (CFR 41.7):

Heat sink

K/A MATCH ANALYSIS

The question presents a plausible scenario where a circulating water pump is tagged out and the other circulating water pump is manually tripped. The candidate has to determine the proper response of the circulating water pump and the steam dumps which provide heat sink to the main condenser.

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. The first part is incorrect, the pump will not trip immediately but will trip when the discharge valve is ~ 70% closed. This is plausible as a response since this would be the response if the operator had emergency tripped the pump.

The second part is correct, at least one circulating water pump has to have power and be running for C-9 to be present to allow steam dump operations. Neither pump would be running in this situation so steam dumps will NOT operate.

B. Incorrect. The first part is incorrect, the pump will not trip immediately but will trip

when the discharge valve is ~ 70% closed. This is plausible as a response since this would be the response if the operator had emergency tripped the pump.

The second part is incorrect, at least one circulating water pump has to have power and be running for C-9 to be present to allow steam dump operations. Neither pump would be running in this situation so steam dumps will NOT operate.

C. Correct. The first part is correct, the pump will not trip immediately but will trip when the discharge valve is ~ 70% closed.

The second part is correct, at least one circulating water pump has to have power and be running for C-9 to be present to allow steam dump operations. Neither pump would be running in this situation so steam dumps will NOT operate.

D. Incorrect. The first part is correct, the pump will not trip immediately but will trip when the discharge valve is ~ 70% closed.

The second part is incorrect, at least one circulating water pump has to have power and be running for C-9 to be present to allow steam dump operations. Neither pump would be running in this situation so steam dumps will NOT operate.

REFERENCES

13724-1, Circulating Water System, version 35.2

V-LO-TX-07101, Circulating Water System

V-LO-TX-21201, Steam Dump Control System

V-LO-TX-28101, Reactor Protection System

1X6AA02-00234 Functional Diagram for Steam Dump Control (previously included on Question # 34)

VEGP learning objectives:

LO-PP-07101-13 State the circulating water pump starting and stopping interlocks.

LO-PP-21201-11 Identify all the conditions that will arm the Steam Dump System and when they're normally activated.

LO-PP-21201-12 Discuss how the Steam Dump System knows if the Main Condenser

is available to receive steam flow.

LO-PP-28103-01 List all control interlocks with applicable set points, coincidences, and functions.

Answer: C

67. 076A2.02 1

Initial conditions:

- Unit 1 is at 100% power.
- Train B NSCW pumps are in PTL due to system leakage.
- 18021-C, "Loss of Nuclear Service Cooling Water" is in progress.

- NSCW TRAIN A LO HDR PRESS illuminates.

Current conditions:

- All NSCW Train A pump hand switch red lights are lit on the QMCB.
- NSCW Train A supply and return flow BOTH indicate ~ 17,000 gpm.
- NSCW TRAIN A LO HDR PRESS has extinguished.

Which one of the following correctly completes the following statement?

In accordance with 18021-C, the crew will ____ (1) ____

and

the Shift Supervisor will ____ (2) ____ .

- A. 1) stop one Train A NSCW pump
2) perform the actions of LCO 3.0.3
- B. 1) stop one Train A NSCW pump
2) enter INFO LCO 3.7.8 for NSCW Train A
- C. 1) place all Train A NSCW pumps in PTL
2) perform the actions of LCO 3.0.3
- D. 1) place all Train A NSCW pumps in PTL
2) enter LCO 3.7.8 for NSCW Train A

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 (CFR 41.5 / 43.5 / 45.3 / 45.13):

Service Water header pressure

K/A MATCH ANALYSIS

The question presents a plausible scenario where the crew is alerted to an NSCW problem by the NSCW TRAIN A LO HDR PRESS alarm in initial conditions. The candidate is then given current conditions with additional indications. The candidate must determine the correct action to take and the proper procedure to implement.

The candidate must also determine the appropriate Tech Spec actions to apply.

SRO 10CFR55.43 (b)(2)Tech Specs & (b)(5) Assessment and selection of procedures.

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. The first half is correct. This is an apparent sheared shaft by given indications, the candidate should stop one NSCW pump and continue with procedure 18021-C, Loss of NSCW.

The second half is incorrect. Tech Spec LCO 3.0.3 is plausible if the candidate were to think that both trains of NSCW were inoperable. The candidate must have knowledge of the Tech Spec Bases which states 2 NSCW pumps are required for the train to be operable.

B. Correct. First half is correct. This is an apparent sheared shaft by given indications, the candidate should stop one NSCW pump and continue with procedure 18021-C, Loss of NSCW.

The second half is correct. NSCW Train A is still operable due to 2 NSCW pumps are still operable. INFO LCO 3.7.8 is the proper Tech Spec determination to make.

C. Incorrect. The first half is incorrect. Placing all the NSCW pumps in PTL would be the correct action if a catastrophic leak has occurred. This is not the plant

condition present (sheared shaft is the correct event). Tripping the reactor and entering E-0 would be the correct action to take for both NSCW trains inoperable.

The second half is incorrect. Tech Spec LCO 3.0.3 is plausible if the candidate were to think that both trains of NSCW were inoperable. The candidate must have knowledge of the Tech Spec Bases which states 2 NSCW pumps are required for the train to be operable.

D.Incorrect. The first half is incorrect. Placing all the NSCW pumps in PTL would be the correct action if a catastrophic leak has occurred. This is not the plant condition present (sheared shaft is the correct event). Tripping the reactor and entering E-0 would be the correct action to take for both NSCW trains inoperable.

The second half is incorrect. This is plausible if the candidate thinks NSCW train A is inoperable and a separate LCO entry is required for Train A or misses that NSCW Train B is inoperable from the stated conditions in the stem.

REFERENCES

Technical Specification 3.7.8, "Nuclear Service Cooling Water"

AOP-18021-C, "Loss of Nuclear Service Cooling Water", version 18

VEGP learning objectives:

LO-LP-39211-02 Given a set of Tech Specs and the bases, determine for a specific set of plant conditions, equipment availability, and operational mode:

a. Whether any Tech Spec LCOs of section 3.7 are exceeded.

LO-LP-39211-04 Describe the bases for any given Tech Spec in section 3.7.

LO-LP-60317-04 Given the entire AOP, describe:

a. Purpose of selected steps

b. How and why the step is being performed

c. Expected response of the plant/parameter(s) for the step

**Figure 1: Screening for SRO-only linked to 10 CFR 55.43(b)(2)
(Tech Specs)**

Can question be answered *solely* by knowing \leq 1 hour TS/TRM Action?

Yes RO question

No

Can question be answered *solely* by knowing the LCO/TRM information listed "above-the-line?"

Yes RO question

No

Can question be answered *solely* by knowing the TS Safety Limits?

Yes RO question

No

Does the question involve one or more of the following for TS, TRM, or ODCM?

Application of Required Actions (Section 3) and Surveillance Requirements (Section 4) in accordance with rules of application requirements (Section 1)

Application of generic LCO requirements (LCO 3.0.1 thru 3.0.7 and SR 4.0.1 thru 4.0.4)

Knowledge of TS bases that is required to analyze TS required actions and terminology

Yes SRO only

No Question might not be linked to 10 CFR 55.43(b)(2) for SRO-only

Figure 2: Screening for SRO-only linked to 10 CFR 55.43(b)(5) (Assessment and selection of procedures)

Can question be answered *solely* by knowing "systems knowledge", i.e., how the system works, flowpath, logic, component location?

Yes RO question

No

Can question be answered *solely* by knowing immediate operator actions?"

Yes RO question

No

Can question be answered *solely* by knowing entry conditions for AOPs or plant parameters that required direct entry into major EOPs?

Yes RO question

No

Can the question be answered *solely* by knowing the purpose, overall sequence of events or overall mitigative strategy of a procedure?

Yes RO question

No

Does the question require one or more of the following?

Assessing plant conditions (normal, abnormal, or emergency) and then selecting a procedure or section of a procedure to mitigate, recover, or with which to proceed.

Knowledge of when to implement attachments and appendices, including how to coordinate, these items with procedure steps.

Knowledge of diagnostic steps and decision points in the EOPs that involve transitions to event specific sub-procedures or emergency contingency procedures.

Knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures.

Yes SRO only

Answer: B

68. 076K1.09 1

Initial conditions at full power:

- CCP "B" is in service.

Current conditions:

- A valve misalignment has resulted in a loss of NSCW cooling to both ACCW heat exchangers.
- The crew has entered 18022-C, "Loss of Auxiliary Component Cooling Water".
- Letdown has been isolated.

Which one of the following RCP components will reach its temperature limit the soonest for this event, AND includes the correct setpoint that requires a RCP trip per 18022-C?

- A. RCP motor bearing; 195°F
- B. RCP motor bearing; 230°F
- C. RCP seal water inlet; 195°F
- D. RCP seal water inlet; 230°F

076K1.09 NSCW

Knowledge of the physical connections and/or cause-effect relationships between NSCW and the following systems (CFR 41.2 to 41.9 / 45.7 to 45.8):

Reactor building closed cooling water

K/A MATCH ANALYSIS

The question presents a plausible scenario where a loss of NSCW has resulted in a loss of cooling to the ACCW system. This would affect the ACCW ability to cool the RCPs in Containment. The candidate has to pick the first criteria which would require the crew to trip the RCPs.

ANSWER / DISTRACTOR ANALYSIS

- A. Correct RCP motor bearing temperature of 195°F would be the first setpoint to be reached that is a correct RCP trip criteria per 18022-C.
- B. Incorrect. The RCP motor bearing would be the first setpoint to be reached but the correct setpoint is 195°F, not 230°F. 230°F is used as a plausible distractor since the pump seal water Hx trip setpoint is 230°F.

- C. Incorrect. Seal water inlet temperature of 195°F is incorrect, but the temperature is used as a plausible distractor. The seal water inlet temperature should not rise as long as seal injection remains in service with CCP "B" running.
- D. Incorrect. Seal water inlet temperature of 230°F is the correct setpoint to trip the RCPs. However, this temperature should not be reached with seal injection in service provided by CCP "B".

REFERENCES

North Anna 2010 RO NRC exam question # 22.

AOP-18022-C, "Loss of Auxiliary Component Cooling Water".

VEGP learning objectives:

- LO-PP-04101-01 From memory state the following for the ACCW system.
- Heat loads
 - Heat loads cooled by either unit's ACCW cooling system.
 - Where heat is rejected to
 - The impact on ACCW due to a loss of one train of NSCW
- LO-PP-16401-05 Given a loss of RCP seal injection, describe the indications that would be monitored and impact to continued operation of the RCP.
- LO-PP-16401-06 Given a loss of ACCW to the RCP thermal barrier, describe the indications that would be monitored and the expected response.
- LO-PP-16401-07 List the RCP components that are cooled by the ACCW system.

Answer: A
69. 077AA2.08 1

Procedure titles as follows:

- 18017-C, Section A, "Degraded Grid Conditions"
- 18017-C, Section B, "Loss of Grid"
- 19000-C, "E-0 Reactor Trip or Safety Injection"

Initial Conditions:

The crew is ensuring vital equipment is available due to degraded system voltage per 18017-C, "Abnormal Grid Disturbances / Loss of Grid", Section A.

Current Conditions:

- 1AA02 and 1BA03 Normal Incoming Breakers have tripped.
- DG1A and DG1B start and re-energize 1AA02 and 1BA03.

Which one of the following correctly completes the following statement?

With bus voltages at 3595V, the Normal Incoming Breakers tripped after ___(1)___ seconds

and

the Shift Supervisor will ___(2)___ .

A. (1) 20

(2) continue power operations and perform Section B of 18017-C only

B. (1) 0.8

(2) trip the Reactor, initiate 19000-C and go to Section B of 18017-C

C. (1) 20

(2) trip the Reactor, initiate 19000-C and go to Section B of 18017-C

D. (1) 0.8

(2) continue power operations and perform Section B of 18017-C only

077AA2.08 Generator Voltage and Electric Grid Disturbances

**Ability to determine and interpret the following as they apply to the Gen Voltage & Electric Grid Disturbances.
(CFR 41.5 / 43.5 / 45.3 / 45.13)**

Criteria to trip turbine or reactor.

K/A MATCH ANALYSIS

The question presents a plausible scenario where a loss of grid event occurs. The candidate must determine the voltage conditions which would have resulted in a load shed and auto start of the DGs. The candidate must also have the knowledge of an imbedded procedure transition step which requires concurrent performance of E-0 and 18017-C section B.

SRO 10CFR55.43 (b)(5)(Assessment and selection of procedures)

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. The first half is correct, 3595 V for 20 seconds would cause a load shed.

The second half is correct, if neither bus is energized by offsite power, the RNO for step A13 has the operator trip the reactor, initiate E-0 and go to section B, Loss of Grid.

B. Incorrect. The first half is incorrect, 3595 V for 0.8 seconds will not cause a load shed, for 0.8 seconds to cause a load shed, the bus voltage would have to drop to be between 2975 V and 2912 V for 0.8 seconds.

The second half is incorrect but plausible. This would be correct if one of the 1E buses was energized by offsite power.

C. Correct. The first half is correct, 3595 V for 20 seconds would cause a load shed.

The second half is correct, if neither bus is energized by offsite power, the RNO for step A13 has the operator trip the reactor, initiate E-0 and go to section B, Loss of Grid.

D. Incorrect. The first half is incorrect, 3595 V for 0.8 seconds will not cause a load shed, for 0.8 seconds to cause a load shed, the bus voltage would have to drop to be between 2975 V and 2912 V for 0.8 seconds.

The second half is incorrect but plausible. This would be correct if one of the 1E buses was energized by offsite power.

REFERENCES

AOP-18017-C, Abnormal Grid Disturbances / Loss of Grid, version 9, step A13 & RNO

Tech Spec 3.3.5, "4.16 kV ESF Bus Loss of Power (LOP) Instrumentation, SR 3.3.5.2

077G2.4.02, Vogtle 2010 SRO Audit Exam Question # 55

VEGP learning objectives:

LO-PP-11101-53 Describe the Operation of the sequencer relative to the EDG.

LO-PP-28201-02 List the signals that will start the sequencer, with applicable setpoints and coincidences.

- LO-PP-28201-03 Describe sequencer operation, including load shedding, load sequencing, and diesel generator operation under the following conditions:
- LO-LP-60330-02 Given conditions and/or indications, determine the required AOP to enter (including subsections, as applicable).
- LO-LP-60330-03 Given the entire AOP, describe:
- Purpose of selected steps
 - How and why the step is being performed
 - Expected response of the plant/parameter(s) for the step

Figure 2: Screening for SRO-only linked to 10 CFR 55.43(b)(5) (Assessment and selection of procedures)

Can question be answered *solely* by knowing "systems knowledge", i.e., how the system works, flowpath, logic, component location?

Yes RO question

No

Can question be answered *solely* by knowing immediate operator actions?"

Yes RO question

No

Can question be answered *solely* by knowing entry conditions for AOPs or plant parameters that required direct entry into major EOPs?

Yes RO question

No

Can the question be answered *solely* by knowing the purpose, overall sequence of events or overall mitigative strategy of a procedure?

Yes RO question

No

Does the question require one or more of the following?

Assessing plant conditions (normal, abnormal, or emergency) and then selecting a procedure or section of a procedure to mitigate, recover, or with which to proceed.

Knowledge of when to implement attachments and appendices, including how to coordinate, these items with procedure steps.

Knowledge of diagnostic steps and decision points in the EOPs that involve transitions to event specific sub-procedures or emergency contingency procedures.

Knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures.

Yes SRO only

Answer: C
70. 077AK1.02 1

Initial conditions:

- Unit 1 is at 100% power.
- The crew is performing 18017-C, "Abnormal Grid Disturbances / Loss of Grid" Section A "Degraded Grid Conditions".
- The Main Generator is operating at 1215 MW and 40 MVARs lagging.
- Main Generator hydrogen pressure is 60 psig.

Current conditions:

- A grid disturbance causes the Main Generator to go to 1200 MW and 400 MVARs lagging.

Per 18017-C, which one of the following is the action (if any) the UO will perform?

REFERENCE PROVIDED

- A. No action required.
- B. Raise turbine load.

- C. Raise generator voltage.
- D. Lower generator voltage.

077AK1.02 Gen Voltage & Electric Grid Disturbances

**Knowledge of the operational implications of the following concepts as they apply to Gen Voltage & Electric Grid Disturbances:
(CFR 41.4 / 41.5 / 41.7 / 41.10 / 45.8)**

Over-excitation

K/A MATCH ANALYSIS

The question presents a plausible scenario where the main generator is overexcited and exceeding the capability curve for plant conditions and asks what do you do, an operational implication.

ANSWER / DISTRACTOR ANALYSIS

- A. Incorrect. Main generator is overexcited and exceeds capability Main generator voltage must be reduced to within curve.
- B. Incorrect. Main generator is overexcited and exceeds capability Main generator voltage must be reduced to within curve. Raising generator voltage higher would drive the excitation further out of limits. This is plausible as MWatts had lowered from 1215 MWatts to 1200MWatts and the candidate may think this is a corrective action.
- C. Incorrect. Main generator is overexcited and exceeds capability Main generator voltage must be reduced to within curve. This is plausible if the candidate thinks lagging is in the negative MVARs direction and does not notice the leading - lagging labels on the curve. This answer would be correct if MVARs were leading.
- D. Correct. Main generator is overexcited and exceeds capability Main generator voltage must be reduced to within curve.

REFERENCES

Figure 1 of 18017-C to be given as reference to the candidate.

AOP 18017-C, "Abnormal Grid Disturbances / Loss of Grid" Ver. 9

VEGP learning objectives:

V-LO-LP-60330-04 Given main generator operational parameters, determine the operating point on the generator capability curve and identify if the point is within or outside the capabilities of the main generator.

Answer: D
71. 078K3.01 1

A Safety Injection has occurred on Unit 1.

At 10:00:

- 1HV-9378, INSTR AIR CNMT ISO VLV has closed.

At 10:40:

- CIA has been reset.
- The UO attempts to open 1HV-9378.
- 1HV-9378 will NOT open.

Based on the present plant configuration,

which one of the following valves inside the Containment will fail OPEN?

- A. 1PV-455B, RCS PRZR SPRAY VALVE LOOP 4
- B. 1HV-8160, RCS LETDOWN LINE ISO VLV IRC
- C. 1HV-8141A, RCP SEAL LEAKOFF ISOLATION
- D. 1HV-8145, PZR AUX SPRAY VALVE

078K3.01 Instrument Air

Knowledge of the effect that a loss or malfunction of the IAS will have on following (CFR 41.7 / 45.6):

Containment air system

K/A MATCH ANALYSIS

The question presents a plausible scenario where instrument air has been lost to containment and cannot be established. After time the air header will be depressurized, the candidate must determine which valve from a list of valves inside containment will fail to the open position.

ANSWER / DISTRACTOR ANALYSIS

- A. Incorrect. 1PV-455B is an air operated valve and will fail shut.
- B. Incorrect. 1HV-8160 is an air operated valve and will fail shut.
- C. Correct. 1HV-8141A is an air operated valve and will fail open.
- D. Incorrect. 1HV-8145 is an air operated valve and will fail shut.

REFERENCES

1X4DB112 P & ID for RCS.

1X4DB114 P & ID for CVCS.

VEGP learning objectives:

LO-LP-60321-02 State the fail position of the following valves on loss of instrument air.

- a. extraction steam non-return valves
- b. feedwater heater high level dump valves
- c. HV-182 (charging flow control valve)
- d. containment instrument air header isolation valves
- e. MSIVs
- f. SGFP mini-flow valves
- g. FRV
- h. FRV bypass
- i. RHR heat exchanger outlet valve
- j. RHR heat exchanger bypass valve
- k. CVCS letdown isolation valve
- l. Containment isolation valves
- m. CVI valves
- n. HV-128 (RHR to Letdown valve)
- o. FV-121 (Charging Flow Control valve)

Answer: C
72. 086A4.06 1

A Halon Suppression System Fire Alarm has occurred for Control Building Level A.

Which one of the following correctly completes the following statement?

The primary computer location for receipt of the alarm is ___(1)___

and

a MINIMUM of ___(2)___ detector(s) is/are required for the system to actuate.

___(1)___

___(2)___

- | | |
|------------------------|-----|
| A. Main Control Room | one |
| B. Main Control Room | two |
| C. Clearance & Tagging | one |
| D. Clearance & Tagging | two |

086A4.06 Fire Protection

**Ability to manually operate and/or monitor in the control room
(CFR 41.7 / 45.5 to 45.8):**

Halon system

K/A MATCH ANALYSIS

The question presents the candidate a fire alarm for a Halon system and he/she must know the primary alarm location and how many detectors must actuate to cause a system actuation.

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. First part correct. The control room is primary fire alarm computer location.

Second part incorrect. It is plausible that one could be chosen as it takes only one detector to actuate a water suppression system.

B. Correct. The control room is the primary location. Two or more detectors must actuate to cause the system to actuate.

C. Incorrect. First part incorrect. It is plausible as the C&T location is the backup alarm response location.

Second part incorrect. It is plausible that one could be chosen as it takes only one detector to actuate a water suppression system.

D. Incorrect. First part incorrect. It is plausible as the C&T location is the backup alarm response location.

Second part correct. Two or more detectors must actuate to cause the system to actuate.

REFERENCES

ARP 17103A-C Annunciator Response Procedures For Fire Alarm Computer Ver. 36.0

ARP 17103B-C Annunciator Response Procedures For Fire Alarm Computer Ver.15.0

V-LO-TX-43101 Fire Protection

VEGP learning objectives:

LO-PP-43101-03 List the areas protected by Halon 1301 system, requirements for actuation and the purpose for the actuation time delay.

Answer: B

73. 103A2.02 1

Initial conditions:

- Mode 3, 557°F and 2235 psig.

Current conditions:

- A Containment entry is to be made to check an RCP oil level.
- The incore detectors are fully inserted in their storage locations.

Which one of the following correctly completes the following statement?

Per 00303-C, "Containment Entry" the SS shall ensure that the Moveable Incore

Detector System (MIDS) panel power supply breakers are off and ___(1)___
and

per 00303-C, the HP Manager is ___(2)___ to authorize this entry.

___(1)___

___(2)___

- | | |
|-------------------------|--------------|
| A. Danger Tagged | not required |
| B. Danger Tagged | required |
| C. locked with HP locks | not required |
| D. locked with HP locks | required |

103A2.02 Containment System

Ability to (a) predict the impacts of the following malfunctions or operations on the Containment System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations (CFR 41.5 / 43.5 / 45.3 / 45.13):

Necessary plant conditions for work in containment

K/A MATCH ANALYSIS

The question presents a plausible scenario where a Containment entry is required to be made. The candidate must determine the administrative requirements per 00303-C, "Containment Entry" for control of the Incore Detectors and whose authorization is required for Containment entries.

SRO 10CFR55.43 (b)(5)(Assessment and selection of procedures)

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. The first half is incorrect, HP locks are required for MIDS, Danger Tags are the old method, however, this is a plausible method for configuration control of the MIDS.

The second half is correct. The Shift Manager authorizes Containment Entries per 00303-C, Containment Entry while the plant is in Modes 1 - 4.

B. Incorrect. The first half is incorrect, HP locks are required for MIDS, Danger Tags are the old method, however, this is a plausible method for configuration control of the MIDS.

The second half is incorrect. The HP Manager is a plausible but incorrect choice for approval of Containment entries in Modes 1 - 4.

C. Correct. The first half is correct, HP locks are required for MIDS.

The second half is correct. The Shift Manager authorizes Containment Entries per 00303-C, Containment Entry while the plant is in Modes 1 - 4.

D. Incorrect. The first half is correct, HP locks are required for MIDS.

The second half is incorrect. The HP Manager is a plausible but incorrect choice for approval of Containment entries in Modes 1 - 4.

REFERENCES

00303-C, "Containment Entry", version 28

VEGP learning objectives:

LO-LP-63303-01 Briefly describe the steps to allow containment entry during planned and rapid entries. (SRO ONLY)

LO-LP-63303-02 With regards to containment entry, describe the responsibility of the Shift Manager and Shift Supervisor. (SRO ONLY)

Figure 2: Screening for SRO-only linked to 10 CFR 55.43(b)(5) (Assessment and selection of procedures)

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Yes RO question

No

Can question be answered *solely* by knowing immediate operator actions?"

Yes RO question

No

Can question be answered *solely* by knowing entry conditions for AOPs or plant parameters that required direct entry into major EOPs?

Yes RO question

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Knowledge of when to implement attachments and appendices, including how to coordinate, these items with procedure steps.

Knowledge of diagnostic steps and decision points in the EOPs that involve transitions to event specific sub-procedures or emergency contingency procedures.

Knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures.

Yes SRO only

NOTE: Vogtle has 2 SRO ONLY objectives for containment entry, see distractor analysis page and references for specifics. This is an additional reason the question can be SRO ONLY per Region II NRC guidance.

Answer: C

74. 103K1.08 1

Which one of the following correctly completes the following statement?

A Containment Isolation Phase A (CIA) is actuated by ___(1)___

and

the signal may be reset ____ (2) ____ .

- A. (1) Containment Hi-1 only
(2) independently of any other safeguards actuation signal
- B. (1) Containment Hi-1 only
(2) only after SI has been reset
- C. (1) any SI signal
(2) independently of any other safeguards actuation signal
- D. (1) any SI signal
(2) only after SI has been reset

103K1.08 Containment

**Knowledge of the physical connections and/or cause-effect relationships between the containment system and the following systems
(CFR 41.2 to 41.9 / 45.7 to 45.8):**

SIS, including action of safety injection reset.

K/A MATCH ANALYSIS

The question presents a plausible scenario where determination of the capability of resetting CIA is required with or without other actuation signals present.

ANSWER / DISTRACTOR ANALYSIS

A. Incorrect. Plausible because Containment Hi-1 will cause an SI which will initiate CIA, but is not the only SI signal that will actuate CIA. Second part is correct because CIA can be reset with other actuations signals present.

B. Incorrect. Plausible because Containment Hi-1 will cause an SI which will initiate CIA, but is not the only SI signal that will actuate CIA. Second also plausible because SI will cause the CIA.

C. Correct. Any SI signal will actuate CIA. Second part is correct because CIA can be

reset with other actuations signals present.

D. Incorrect. Plausible because the first part is correct because any SI signal will cause the CIA.

REFERENCES

Wolf Creek NRC August 2009
Logic Drawing 1X6AA02-00232-17

VEGP learning objectives:

V-LO-PP-28103-06 Determine when ESF actuation signals can be reset and describe actions required to reset the signal.

Rejected KA 103K1.07

Answer: C
75. G2.1.29 1

You are performing a lineup verification for valves in various positions.

In accordance with NMP-OS-002, "Verification Policy", for each case below, which one of the following is the correct method of verification?

A. Case - A valve is required to be closed.

Method - Turn valve in the open direction, using reasonable force, reclose the valve.

B. Case - A valve is required to be throttled 2 turns open.

Method - Turn valve in the closed direction, count turns to ensure correct, re-open the valve 2 turns.

C. Case - A valve is found not in the required lineup position.

Method - Align valve in the required position, notify the SS once the valve is properly aligned.

D. Case - A valve position cannot be determined by local observation.

Method - Leave valve as is, use remote handswitch light indications to verify the valve position.

G2.1.29 Knowledge of how to conduct system lineups, such as valves, breakers, switches, etc (CFR 41.10 / 45.1 / 45.12).

K/A MATCH ANALYSIS

The questions gives plausible scenarios where a lineup verification is being performed. The candidate must choose which of the scenarios is proper verification performance.

ANSWER / DISTRACTOR ANALYSIS

- A. Incorrect. Plausible but closed valves should be taken closed direction, not open.
- B. Incorrect. Plausible but throttle valves should not be manipulated, verify visually.
- C. Incorrect. The SS should be contacted prior to manipulation of the valve.
- D. Correct. This would be an indirect IV of the valve position which is allowed.

REFERENCES

NMP-OS-002, "Verification Policy" section 6.1.9 for Independent Verification Methods and section 6.3 for Mispositioned Components Discovered During Verification version # 6.0

Vogtle 2009 RO NRC exam question # 61

VEGP learning objectives:

LO-LP-63308 Briefly describe the Independent Verification Policy. Include a discussion of the different types of verification that are available, including Concurrent Verification.

Answer: D
76. G2.1.38 1

Initial conditions:

- Core reload is in progress during a refueling outage.

Current conditions:

- While in transit to the core, the Refueling Machine PLC (Programmable Logic Controller) fails with an irradiated fuel assembly in the mast.